■ 片式陶瓷電容器及相關產品

產品	產品分類	實物圖形	型號規格	電容量範圍	特性介紹	頁碼
TC 系列片容	通用型 COG片容		0402CG	0.1PF～1000PF	在-55℃～125℃工作温度範圍内,温度特性爲: 0±30ppm/℃(COG)、 0±60ppm/℃(COH)。 應用于各種高頻電路,如:振蕩、計時電路等。	15～18
			0603CG	0.1PF～3,300PF		
			0805CG	0.3PF～22,000PF		
			1206CG	0.3PF～100,000PF		
	通用型 X7R片容		0402B	100PF～0.1μF	在-55℃～125℃工作温度範圍内，温度特性爲±15%。 應用于隔直、耦合、旁路、鑒頻等電路中。	19~24
			0603B	150PF～0.47μF		
			0805B	150PF～1μF		
			1206B	200PF～2.2μF		
			1210B	220PF～4.7μF		
			1808B	220PF～4.7μF		
			1812B	470PF～4.7μF		
	通用型 X5R片容		0402X	0.1μF～4.7μF	在-55℃～85℃工作温度範圍内，温度特性爲±15%。 應用于隔直、耦合、旁路、鑒頻等電路中。	25~28
			0603X	0.47μF～10μF		
			0805X	1μF～22μF		
			1206X	2.2μF～100μF		
	通用型 Y5V片容		0402F	1nF～1μF	在-25℃～85℃工作温度範圍内,温度特性爲+30%，-80%。 應用于隔直、旁路等電路中。	29~32
			0603F	1nF～10μF		
			0805F	1nF～22μF		
			1206F	1nF～47μF		
	通用型 Z5U片容		0402E	1nF～1μF	在10℃～85℃工作温度範圍内,温度特性爲+22%，-56%。 應用于隔直、旁路等電路中。	33~36
			0603E	1nF～10μF		
			0805E	1nF～22μF		
	通用型 PH片容		0402PH	0.5PF～47PF	在-25℃～85℃工作温度範圍内,温度特性爲 -150±60PPM/℃。 應用于温度補償電路中。	37~44
			0603PH	0.5PF～82PF		
			0805PH	0.5PF～120PF		
	通用型 RH片容		0402RH	0.5PF～47PF	在-25℃～85℃工作温範圍内, 温度特性爲-220±60PPM/℃。 應用于温度補償電路中。	37~44
			0603RH	0.5PF～82PF		
			0805RH	0.5PF～120PF		

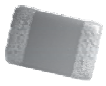
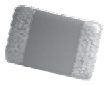
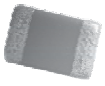
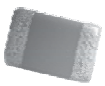
■Multilayer Chip Ceramic Capacitor and Correlational Products

Product	Product Classify	Product Picture	Part Number	Capacitance	Character	Page
TC series MLCC	COG MLCC for generaluse		0402CG	0.1PF ~ 1000PF	Operating temperature range is -55℃～125℃,temperature characterics is 0±30PPM/℃ (COG）,0±60PPM/℃(COH）. Can be applied to all kids of high frequency circuits such as oscillator and timing circuits,etc.	15 ~ 18
			0603CG	0.1PF ~ 3,300PF		
			0805CG	0.3PF ~ 22,000PF		
			1206CG	0.3PF ~ 100,000PF		
	X7R MLCC for generaluse		0402B	100PF ~ 0.1 μF	Operating temperature range is -55℃～125℃,temperature characterics is ±15%.Can be applied to DC-blocking, coupling,bypassing frequency discriminating circuits,etc.	19~24
			0603B	150PF ~ 0.47 μF		
			0805B	150PF ~ 1 μF		
			1206B	200PF ~ 2.2 μF		
			1210B	220PF ~ 4.7 μF		
			1808B	220PF ~ 4.7 μF		
			1812B	470PF ~ 4.7 μF		
	X5R MLCC for generaluse		0402X	0.1 μF ~ 4.7 μF	Operating temperature range is -55℃～85℃,temperature characterics is ±15%.Can be applied to DC-blocking, coupling,bypassing frequency discriminating circuits,etc.	25~28
			0603X	0.47 μF ~ 10 μF		
			0805X	1 μF ~ 22 μF		
			1206X	2.2 μF ~ 100 μF		
	Y5V MLCC for generaluse		0402F	1nF ~ 1 μF	Operating temperature range is -25℃～85℃,temperature characterics is +30%,-80%. Can be applied to DC-blocking,bypassing circuits,etc.	29~32
			0603F	1nF ~ 10 μF		
			0805F	1nF ~ 22 μF		
			1206F	1nF ~ 47 μF		
	Z5U MLCC for generaluse		0402E	1nF ~ 1 μF	Operating temperature range is 10℃～85℃,temperature characterics is +22%,-56%. Can be applied to DC-blocking,bypassing circuits,etc.	23~36
			0603E	1nF ~ 10 μF		
			0805E	1nF ~ 22 μF		
	PH MLCC for generaluse		0402PH	0.5PF ~ 47PF	Operating temperature range is -25℃～85℃,temperature characterics is -150±60PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603PH	0.5PF ~ 82PF		
			0805PH	0.5PF ~ 120PF		
	RH MLCC for generaluse		0402RH	0.5PF ~ 47PF	Operating temperature range is 25℃～85℃,temperature characterics is -220± 60PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603RH	0.5PF ~ 82PF		
			0805RH	0.5PF ~ 120PF		

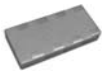
產品	產品分類	實物圖形	型號規格	電容量範圍	特性介紹	頁碼
TC系列片容	通用型 SH片容		0402SH 0603SH 0805SH	0.5PF ~ 47PF 0.5PF ~ 82PF 0.5PF ~ 120PF	在-25℃ ~ 85℃工作温度範圍 内,温度特性爲: -330 ± 60PPM/℃。 應用于温度補償電路中。	37~44
	通用型 TH片容		0402TH 0603TH 0805TH	0.5PF ~ 68PF 0.5PF ~ 100PF 0.5PF ~ 150PF	在-25℃ ~ 85℃工作温度範圍 内,温度特性爲: -470 ± 60PPM/℃。 應用于温度補償電路中。	37~44
	通用型 UJ片容		0402UJ 0603UJ 0805UJ	0.5PF ~ 82PF 0.5PF ~ 100PF 0.5PF ~ 180PF	在-25℃ ~ 85℃工作温度範圍 内,温度特性爲: -750 ± 120PPM/℃。 應用于温度補償電路中。	37~44
	通用型 SL片容		0402SL 0603SL 0805SL	0.5PF ~ 470PF 0.5PF ~ 1000PF 0.5PF ~ 2200PF	在-25℃ ~ 85℃工作温度範圍 内,温度特性爲: -1000 ~ 140PPM/℃。 應用于温度補償電路中。	37~44
高Q型片容	高Q型片容		0402CQ 0603CQ 0805CQ	0.5PF ~ 180PF 0.5PF ~ 680PF 0.5PF ~ 1500PF	自諧振頻率高。 應用于各種高頻電路。	59~62
	微波片容		0402RF 0603RF 0805RF 0505RF 1111RF	0.1PF ~ 22PF 0.3PF ~ 47PF 0.3PF ~ 100PF 0.5PF~100PF 0.5PF~1000PF	自諧振頻率高，功率大。 應用于無綫通訊站，無綫發射臺電子綫路等。	63~66

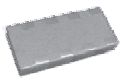
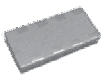
Product	Product Classify	Product Picture	Part Number	Capacitance	Character	Page
TC series MLCC	SH MLCC for General-use		0402SH	0.5PF～47PF	Operating temperature range is -25℃～85℃,temperature characterics is -330±60 PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603SH	0.5PF～82PF		
			0805SH	0.5PF～120PF		
	TH MLCC for General-use		0402TH	0.5PF～68PF	Operating temperature range is -25℃～85℃,temperature characterics is -470±60PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603TH	0.5PF～100PF		
			0805TH	0.5PF～150PF		
	UJ MLCC for General-use		0402UJ	0.5PF～82PF	Operating temperature range is -25℃～85℃,temperature characterics is -750±120 PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603UJ	0.5PF～100PF		
			0805UJ	0.5PF～180PF		
	SL MLCC for General-use		0402SL	0.5PF～470PF	Operating temperature range is -25℃～85℃,temperature characterics is -1000±140 PPM/℃.Can be applied to temperature compensating circuits.	37~44
			0603SL	0.5PF～1000PF		
			0805SL	0.5PF～2200PF		
High Q MLCC	High-Q MLCC		0402CQ	0.5PF~180PF	Self-resonance frequency is high.Can be applied to all kinds of high frequency circuits.	59~62
			0603CQ	0.5PF~680PF		
			0805CQ	0.5PF~1500PF		
	Microwave Caps		0402RF	0.1PF~22PF	Self-resonance frequency is high.Can be applied to all kinds of high frequency circuits, power is big.Can be applied to wireless, comunication base,wireless launch pad circuits,etc.	63~66
			0603RF	0.3PF~47PF		
			0805RF	0.3PF~100PF		
			0505RF	0.5PF~100PF		
			1111RF	0.5PF~100PF		

產品	產品分類	實物圖形	型號規格	電容量範圍	特性介紹	頁碼
直流中高壓片容	低損耗中高壓片容 (COG類)		100V	0.5PF ~ 27nF	工作電壓高，損耗低。應用于各種高壓電子綫路。	67~98
			200V	0.5PF ~ 22nF		
			250V	0.5PF ~ 22nF		
			500V	0.5PF ~ 22nF		
			1000V	0.5PF ~ 4.7nF		
			2000V	0.5PF ~ 1nF		
			3000V	0.5PF ~ 1nF		
			4000V	0.5PF ~ 1nF		
	大容量中高壓片容 (X7R類)		100V	150PF ~ 3.3μF	工作電壓高，較引綫圓片高壓電容，生產的容值範圍寬。可用于各種高壓電子綫路。	
			200V	150PF ~ 2.2μF		
			250V	150PF ~ 2.2μF		
			500V	150PF ~ 1μF		
			1000V	150PF ~ 56nF		
			2000V	150PF ~ 47nF		
			3000V	150PF ~ 10nF		
			4000V	150PF ~ 8.2nF		
	大容量中高壓片容 (Y5V類)		100V	1nF ~ 2.2μF		
			200V	10nF ~ 2.2μF		
			250V	10nF ~ 2.2μF		
	封裝型中高壓片容(N,B)		4000V	0.5PF ~ 1000PF	采用了封裝形式,工作電壓得到提高。	99~100
			5000V	0.5PF ~ 1000PF		
大容量片容	大容量X5R片容		0402X	0.1μF ~ 10μF	電容量較大。應用于濾波、旁路電路。	101~104
			0603X	0.47μF ~ 10μF		
			0805X	1μF ~ 22μF		
			1206X	1μF ~ 100μF		
			1210X	1μF ~ 100μF		
			1812X	1μF ~ 100μF		
	大容量Y5V片容		0402F	1μF		
			0603F	1μF ~ 10μF		
			0805F	1μF ~ 22μF		
			1206F	1μF ~ 47μF		
			1210F	1μF ~ 100μF		
			1812F	2.2μF ~ 100μF		

Product	Product Classify	Product Picture	Part Number	Capacitance	Character	Page
DC Medium-voltage MLCC	Low Dissipation Factor Medium-voltage MLCC (COG)		100V	0.5PF ~ 27nF	Operating voltage is high,dissipaion factor is low.Can be applied to all kinds of high-voltage circuits.	67~98
			200V	0.5PF ~ 22nF		
			250V	0.5PF ~ 22nF		
			500V	0.5PF ~ 22nF		
			1000V	0.5PF ~ 4.7nF		
			2000V	0.5PF ~ 1nF		
			3000V	0.5PF ~ 1nF		
			4000V	0.5PF ~ 1nF		
	High-capacitance Medium-volage MLCC(X7R)		100V	1nF ~ 3.3 μF	Operating voltage is high,the capacitance of it is high than that of lead high-voltage disc capacitor.Can be applied to all kinds of high-voltage circuits.	
			200V	1nF ~ 2.2 μF		
			250V	1nF ~ 2.2 μF		
			500V	1nF ~ 1 μF		
			1000V	1nF ~ 56nF		
			2000V	1nF ~ 47nF		
			3000V	680PF ~ 10nF		
			4000V	680PF ~ 8.2nF		
	High-capacitance Medium-volage MLCC(Y5V)		100V	1nF ~ 2.2 μF		
			200V	10nF ~ 2.2nF		
			250V	10nF ~ 2.2nF		
	High volage MLCC(N,B)		4000V	0.5PF ~ 1000PF	Has more than high work voltage.	99~100
			5000V	0.5PF ~ 1000PF		
High-capacitance MLCC	X5R High-cap. MLCC		0402X	0.1 μF ~ 10 μF	The capacitance is a little bit high. Can be applied to filter,bypassing circuits,etc.	101~104
			0603X	0.47 μF ~ 10 μF		
			0805X	1 μF ~ 22 μF		
			1206X	1 μF ~ 100 μF		
			1210X	1 μF ~ 100 μF		
			1812X	1 μF ~ 100 μF		
	Y5V High-cap. MLCC		0402F	1 μF		
			0603F	1 μF ~ 10 μF		
			0805F	1 μF ~ 22 μF		
			1206F	1 μF ~ 47 μF		
			1210F	1 μF ~ 100 μF		
			1812F	2.2 μF ~ 100 μF		

多層片式陶瓷電容器
MULTILAYER CHIP CERAMIC CAPACITOR

產品	產品分類	實物圖形	型號規格	電容量範圍	特性介紹	頁碼
超小尺寸片容	0201超小容量片容		0201CG	0.5PF ~ 100PF	尺寸小，應用于助聽器，以及IC和LTCC電路等。	105~112
			0201B	100PF ~ 10nF		
			0201F	10nF ~ 100nF		
	超薄尺寸片容		0805CG	0.5PF ~ 330PF	厚度超薄。 主要用于IC底片或IC卡電路。	113~116
			0805B	100PF ~ 22nF		
			1206CG	0.5PF ~ 470PF		
			1206B	100PF ~ 47nF		
排容	0612型 四聯體排容		6124N	0.5PF ~ 1000PF	4(或2)只電容片容集于一體。 用于更高密度的表面安裝。用于手機主板，筆記本電腦電路等。	117~122
			6124B	100PF ~ 100nF		
			6124F	470PF ~ 100nF		
	0508型 四聯體排容		5084N	0.5PF ~ 100PF		
			5084B	100PF ~ 4.7nF		
			5084F	1nF ~ 22nF		
	0508型 二聯體排容		5082N	0.5PF ~ 220PF		
			5082B	100PF ~ 22nF		
			5082F	1nF ~ 47nF		
低ESL片容	0508型 低ESL片容		0508N	0.5PF ~ 3300PF	具有低等效串聯電感特性，寄生電感量小。 主要用于高頻電路。	123~126
			0508B	100PF ~ 100nF		
			0508F	1nF ~ 470nF		
	0612型 低ESL片容		0612N	0.5PF ~ 3300PF		
			0612B	1nF ~ 220nF		
			0612F	10nF ~ 2.2μF		
三端EMI濾波器	0805型 三端濾波器		5081N	10PF ~ 1200PF	具有優良的通流特性，適合表面安裝。具有良好的濾波特性，良好的吸收噪音，抑制浪涌脉衝的作用。 主要應用于移動電路及基站通訊設備等。	127~132
			5081B	1000PF ~ 330nF		
	1205型 三端濾波器		5121N	10PF ~ 1500PF		
			5121B	1000PF ~ 330nF		
	1806型 三端濾波器		6181N	10PF ~ 1500PF		
			6181B	1000PF ~ 330nF		
安規片容	COG安規片容		1808CG	2PF ~ 100PF	符合安規認證。 主要用于信息設備的濾波器。	133~136
			1812CG	2PF ~ 150PF		
	X7R安規片容		2220CG	2PF ~ 330PF		
			2225CG	2PF ~ 330PF		
			1808B	100PF ~ 3.3nF		
			1812B	100PF ~ 4.7nF		
			2220B	100PF ~ 4.7nF		
			2225B	100PF ~ 4.7nF		

Product	Product Classify	Product Picture	Part Number	Capacitance	Character	Page
Ultra-small MLCC	0201 MLCC		0201CG	0.5PF ~ 100PF	The size is small.Can be applied to heating aids,IC and LTCC circuits.	105~112
			0201B	100PF ~ 10nF		
			0201F	10nF ~ 100nF		
	Ultra-thin MLCC		0805CG	0.5PF ~ 330PF	Ultra-thin.Mainly be applied to iC base or IC card circuits.	113~116
			0805B	100PF ~ 22nF		
			1206CG	0.5PF ~ 470PF		
			1206B	100PF ~ 47nF		
C-Array	0612 four-elements C-Arrays		6124N	0.5PF ~ 1000PF	Four(or two)pieces MLCC fixed together. Can be applied to higher density surface ammounting such as the mainbord of the mobile phone,notebook computer circuits,etc.	117~122
			6124B	100PF ~ 100nF		
			6124F	470PF ~ 100nF		
	0508 four-elements C-Arrays		5084N	0.5PF ~ 100PF		
			5084B	100PF ~ 4.7nF		
			5084F	1nF ~ 22nF		
	0508 two-elements C-Arrays		5082N	0.5PF ~ 220PF		
			5082B	100PF ~ 22nF		
			5082F	1nF ~ 47nF		
Low ESL MLCC	0508 type low Esl MLCC		0508N	0.5PF ~ 3300PF	Have the properties of low ESL,autoecious inductance is small. Mainly be applied to high frequency circuits.	123~126
			0508B	100PF ~ 100nF		
			0508F	1nF ~ 470nF		
	0612 type low Esl MLCC		0612N	0.5PF ~ 3300PF		
			0612B	1nF ~ 220nF		
			0612F	10nF ~ 2.2 μF		
Three Terminal EMI filter	0805 type		5081N	10PF ~ 1200PF	Has beautiful current circulating character, good filteing character and impulse restraining,mainly be use to base comunication equipment.	127~132
			5081B	1000PF ~ 330nF		
	1205 type		5121N	10PF ~ 1500PF		
			5121B	1000PF ~ 330nF		
	1806 type		6181N	10PF ~ 1500PF		
			6181B	1000PF ~ 330nF		
Type MLCC	COG type MLCC		1808CG	2PF ~ 100PF	Conform to safety certificate	133~136
			1812CG	2PF ~ 150PF		
			2220CG	2PF ~ 330PF		
			2225CG	2PF ~ 330PF		
	X7R type MLCC		1808B	100PF ~ 3.3nF	Mainly be use to filters for information equipment.	
			1812B	100PF ~ 4.7nF		
			2220B	100PF ~ 4.7nF		
			2225B	100pF ~ 4.7nF		

■ 片式陶瓷電容器及相關產品

產品	產品分類	實物圖形	型號規格	可靠性	包裝
TC系列片容	通用型COG片容		0402CG 0603CG 0805CG 1206CG	第45~50頁	第139~161頁
	通用型X7R片容		0402B 0603B 0805B 1206B	第51~58頁	
	通用型Y5V片容		0402F 0603F 0805F 1206F	第51~58頁	
	通用型Z5U片容		0402E 0603E 0805E	第51~58頁	
	通用型PH片容		0402PH 0603PH 0805PH	第45~50頁	
	通用型RH片容		0402RH 0603RH 0805RH	第45~50頁	
	通用型SH片容		0402SH 0603SH 0805SH	第45~50頁	
	通用型TH片容		0402TH 0603TH 0805TH	第45~50頁	

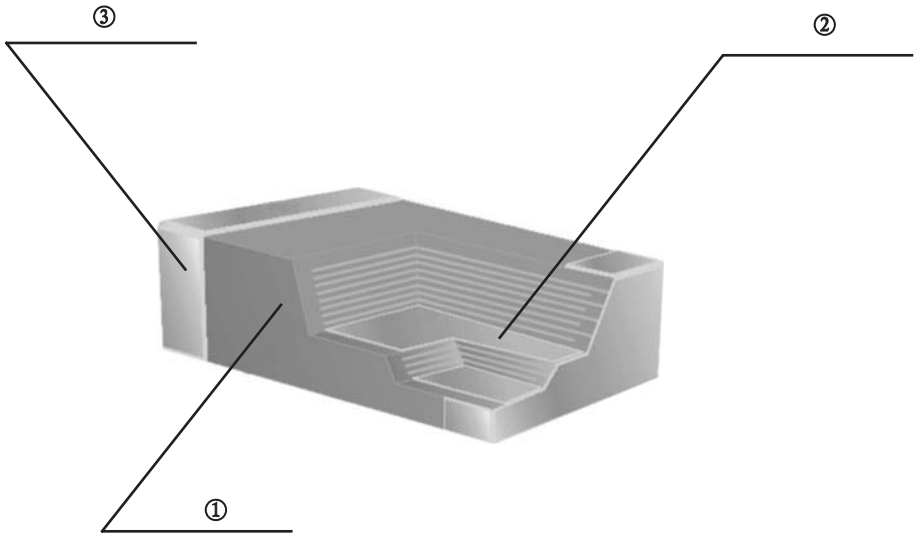
■ Multilayer Chip Ceramic Capacitor and Correlational Products

Product	Product Classsifv	Product Picture	Part Number	Reliability	Packaging
TC series MLCC	COG MLCC for general -use		0402CG	Page 45~50	Page 139~161
			0603CG		
			0805CG		
			1206CG		
	X7R MLCC for general -use		0402B	Page 51~58	
			0603B		
			0805B		
			1206B		
	Y5V MLCC for general -use		0402F	Page 51~58	
			0603F		
			0805F		
			1206F		
	Z5U MLCC for general -use		0402E	Page 51~58	
			0603E		
			0805E		
	PH MLCC for general -use		0402PH	Page 45~50	
			0603PH		
			0805PH		
	RH MLCC for general -use		0402RH	Page 45~50	
			0603RH		
			0805RH		
	SH MLCC for general -use		0402SH	Page 45~50	
			0603SH		
			0805SH		
	TH MLCC for general -use		0402TH	Page 45~50	
			0603TH		
			0805TH		

產品	產品分類	實物圖形	型號規格	可靠性	包裝
TC系列片容	通用型UJ片容		0402UJ	第45~50頁	第139~161頁
			0603UJ		
			0805UJ		
	通用型SL片容		0402SL	第45~50頁	
			0603SL		
			0805SL		
直流中高壓片容	低損耗中高壓片容 (COG類)		100V	第81~86頁	
			200V		
			250V		
			500V		
			1000V		
			2000V		
			3000V		
			4000V		
	大容量中高壓片容 (X7R類)		100V	第87~92頁	
			200V		
			250V		
			500V		
			1000V		
			2000V		
			3000V		
			4000V		
	大容量中高壓片容 (Y5V類)		100V	第93~98頁	
			200V		
			250V		
	封裝型中高壓片容 (N,B)		4000V	第99~100頁	
			5000V		

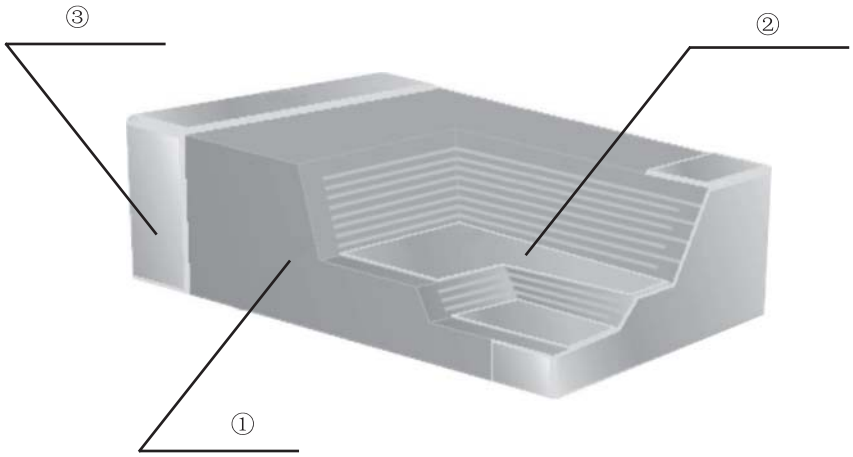
Product	Product Classsify	Product Picture	Part Number	Reliability	Packaging
TC series MLCC	UJ MLCC for general -use		0402UJ	Pages 45~50	Pages 139~161
			0603UJ		
			0805UJ		
	SL MLCC for general -use		0402SL	Pages 45~50	
			0603SL		
			0805SL		
DC Medium-voltage MLCC	Low Dissipation Factor Medium-voltage MLCC(COG)		100V	Pages 81~86	
			200V		
			250V		
			500V		
			1000V		
			2000V		
			3000V		
			4000V		
	High-capacitance Medium-voltage MLCC(X7R)		100V	Pages 87~92	
			200V		
			250V		
			500V		
			1000V		
			2000V		
			3000V		
			4000V		
	High-capacitance Medium-voltage MLCC(Y5V)		100V	Pages 93~98	
			200V		
			250V		
	High voltage(N,B)		4000V	Pages 99~100	
			5000V		

■ 片式電容器結構圖



序號	①	②	③	用途
名稱	陶瓷體	內電極	外電極	
成份	匹配貴金屬共燒的陶瓷介質	銀鈀合金	銀-鎳-錫	表面貼裝
		銀鈀合金	銀	加工引綫
	匹配賤金屬共燒的陶瓷介質	鎳	銅-鎳-錫	表面貼裝
		鎳	銅	加工引綫

■ MLCC Structuce



NO.	①	②	③	Use
Name	Ceramic body	Inner electrode	Outer electrode	
Content	ceramic dielectric based on expensive metal	Pd/Ag	Ag-Ni-Sn	SMD
		Pd/Ag	Ag	Used for Leads MLCC
	ceramic dielectric based on cheap metal	Ni	Cu-Ni-Sn	SMD
		Ni	Cu	Used for Leads MLCC

■ 通用型COG/COH片容

通用型COG片容屬于Ⅰ類高頻電容器，其電容量非常穩定，幾乎不隨温度、電壓和時間的變化而變化。尤其適用于高頻電子綫路。

- 特性

＊ 具有高的電容量穩定性,在-55℃～125℃工作範圍内,其温度系數爲0±30ppm/℃、0±60ppm/℃。
＊ 叠層獨石結構,具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于各種高頻電子綫路。

- 産品規格型號表示方法

0805 CG 101 J 500 N T
① ② ③ ④ ⑤ ⑥ ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②介質種類	
代碼	介質材料
CG	COG或NPO
CH	COH

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

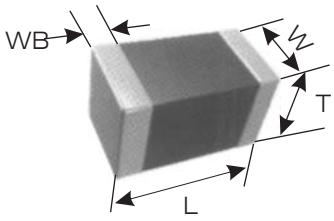
④誤差級別	
代碼	誤差
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20 1.60±0.20	0.60±0.30

■ COG/COH MLCC for general-use

COG MLCC for General-use is class I high frequency capacitor, its capacitance is very stable, almost will not change along with the temperature, voltage and time. Specially be suitable for high frequency circuits.

- Features

* The capacitance is very stable, its operating temperature is -55℃～125℃,within the range, the temperature coefficient is 0±30ppm/℃,0±60ppm/℃.
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow/reflow soldering.

- Application

* It is suitable for all kinds of high frequency circuits.

- Product Part Number Expression

0805 ① CG ② 101 ③ J ④ 500 ⑤ N ⑥ T ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
CH	COH

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^0
101	10×10^1
102	10×10^2

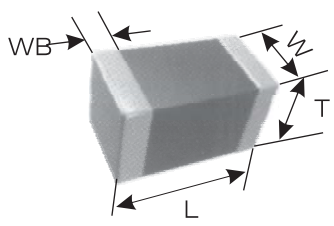
④Capacitance Tolerance	
Code	Tolerance
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤Rated Voltage	
Expression Method	Actual Value
500	50V
250	25V
101	100V
201	200V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension (mm)			
British Expression	Metric Expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20 1.60±0.20	0.60±0.30

- 電容量範圍

項目	通用型COG/COH片容																			
尺寸	0402					0603					0805					1206				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量																				
0.1PF																				
0.3PF																				
0.5PF																				
1PF																				
2PF																				
5PF																				
6PF																				
7PF																				
10PF																				
22PF																				
33PF																				
47PF																				
68PF																				
100PF																				
120PF																				
150PF																				
180PF																				
220PF																				
330PF																				
470PF																				
560PF																				
680PF																				
1000PF																				
2200PF																				
2700PF																				
3300PF																				
4700PF																				
5600PF																				
6800PF																				
10nF																				
12nF																				
15nF																				
22nF																				
47nF																				
68nF																				
100nF																				

■ Capacitance Range

Item	COG/COH MLCC for general-use																			
Dimension	0402					0603					0805					1206				
Rated Voltage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance																				
0.5PF																				
1PF																				
2PF																				
3PF																				
4PF																				
5PF																				
6PF																				
7PF																				
10PF																				
22PF																				
33PF																				
47PF																				
68PF																				
100PF																				
120PF																				
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220PF																				
330PF																				
470PF																				
560PF																				
680PF																				
1000PF																				
2200PF																				
2700PF																				
3300PF																				
4700PF																				
5600PF																				
6800PF																				
10nF																				
12nF																				
15nF																				
22nF																				
47nF																				
68nF																				
100nF																				

■ 通用型X7R片容

通用型X7R片容屬于Ⅱ類低頻電容器，其電容量相對穩定。

- 特性

＊ 具有較高的電容量且較穩定，在-55℃～125℃工作範圍內，其温度特性爲±15%。
＊ 疊層獨石結構，具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于各種濾波，耦合電路。

- 産品規格型號表示方法

0805 ① B ② 103 ③ K ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60
1210	0.12×0.10	3.20×2.50
1812	0.18×0.12	4.50×3.20
2220	0.22×0.20	5.70×5.00

②介質種類	
代碼	介質材料
B	X7R

③標稱電容量(PF)	
表示方式	實際值
101	10×10^{1}
102	10×10^{2}
103	10×10^{3}

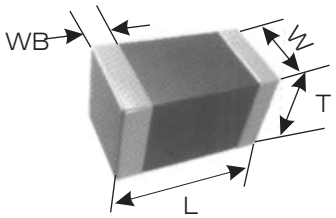
④誤差級別	
代碼	誤差
J	±5%
K	±10%
M	±20%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30
1210	3225	3.20±0.30	2.50±0.30	≤2.80	0.60±0.30
1812	4532	4.50±0.40	3.20±0.30	≤3.50	0.60±0.30
2220	5750	5.70±0.40	5.00±0.40	≤3.50	0.60±0.30

■ X7R MLCC for General-use

X7R MLCC for General-use is class II low frequency capacitor, its capacitance is stable.

- Properties

* The capacitance is stable, its operating temperature is -55℃～125℃,within the range, the temperature coefficient is ±15%。
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow soldering/reflow soldering.

- Applications

It is suitable for all kinds of filter and coupling circuits.

- Product part number expression method

0805	B	103	K	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60
1210	0.12×0.10	3.20×2.50
1812	0.18×0.12	4.50×3.20
2220	0.22×0.20	5.70×5.00

③Normal Capacitance(PF)	
Expression Method	Actual Value
101	10×10^{1}
102	10×10^{2}
103	10×10^{3}

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

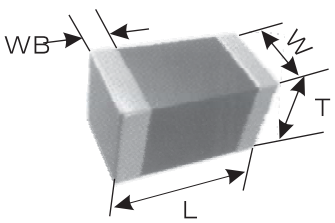
⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
100	10V
250	25V
500	50V

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%
M	±20%

②Dielectric Type	
Code	Dielectric Material
B	X7R

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30
1210	3225	3.20±0.30	2.50±0.30	≤2.80	0.60±0.30
1812	4532	4.50±0.40	3.20±0.30	≤3.50	0.60±0.30
2220	5750	5.70±0.40	5.00±0.40	≤3.50	0.60±0.30

- 電容量範圍

項目	通用型X7R片容																		
尺寸	0402					0603					0805					1206			
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	4V	16V	25V	50V
電容量																			
100PF																			
150PF																			
200PF																			
470PF																			
1000PF																			
1.5nF																			
2.2nF																			
3.3nF																			
4.7nF																			
6.8nF																			
10nF																			
12nF																			
15nF																			
22nF																			
27nF																			
33nF																			
39nF																			
47nF																			
56nF																			
68nF																			
100nF																			
150nF																			
220nF																			
270nF																			
330nF																			
470nF																			
820nF																			
1 μF																			
2.2 μF																			
4.7 μF																			
10 μF																			
22 μF																			
27 μF																			
33 μF																			
47 μF																			

- Capacitance Range

Item	X7R MLCC for general-use																	
Dimension	0402					0603					0805					1206		
Rated Voltage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	4V	16V	25V	50V
Capacitance																			
100PF																			
150PF																			
200PF																			
470PF																			
1000PF																			
1.5nF																			
2.2nF																			
3.3nF																			
4.7nF																			
6.8nF																			
10nF																			
12nF																			
15nF																			
22nF																			
27nF																			
33nF																			
39nF																			
47nF																			
56nF																			
68nF																			
100nF																			
150nF																			
220nF																			
270nF																			
330nF																			
470nF																			
820nF																			
1 μF																			
2.2 μF																			
4.7 μF																			
10 μF																			
22 μF																			
27 μF																			
33 μF																			
47 μF																			

- 電容量範圍

項目	通用型X7R片容														
尺寸	1210					1808					1812				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
220PF															
330PF															
470PF															
680PF															
1000PF															
1.5nF															
2.2nF															
3.3nF															
4.7nF															
6.8nF															
10nF															
12nF															
15nF															
22nF															
27nF															
33nF															
39nF															
47nF															
56nF															
68nF															
100nF															
150nF															
220nF															
270nF															
330nF															
470nF															
820nF															
1μF															
2.2μF															
4.7μF															
6.8μF															
10μF															
22μF															
33μF															
47μF															

- Capacitance Range

Item	X7R MLCC for general-use														
Dimension	1210					1808					1812				
Rated Voltage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
220PF															
330PF															
470PF															
680PF															
1000PF															
1.5nF															
2.2nF															
3.3nF															
4.7nF															
6.8nF															
10nF															
12nF															
15nF															
22nF															
27nF															
33nF															
39nF															
47nF															
56nF															
68nF															
100nF															
150nF															
220nF															
270nF															
330nF															
470nF															
820nF															
1 μF															
2.2 μF															
4.7 μF															
6.8 μF															
10 μF															
22 μF															
33 μF															
47 μF															

■ 通用型X5R片容

通用型X5R片容屬于Ⅱ類低頻電容器，其電容量相對穩定。

- 特性

＊ 電容容量較大，比容大。
＊ 具有較高的電容量且較穩定，在-55℃～+85℃工作範圍內，其温度特性爲≤±15%。
＊ 叠層獨石結構，具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于各種濾波，耦合電路。

- 産品規格型號表示方法

0805 ① X ② 105 ③ K ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②介質種類	
代碼	介質材料
X	X5R

③標稱電容量(PF)	
表示方式	實際值
104	10×10^4
105	10×10^5
106	10×10^6

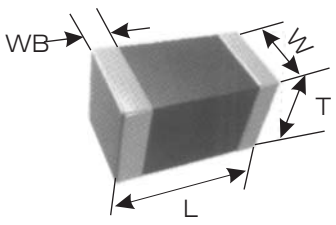
④誤差級別	
代碼	誤差
J	±5%
K	±10%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30

■ X5R Multilayer Chip Ceramic Capacitor

X5R MLCC for General-use is class Ⅱ low frequency capacitor,its capacitance is stable.

• Features

* Capacitance is big,unit capacitance is big.
* The Capacitance is stable,its operating temperature is -55℃ and +85℃,within the range,the temperature coefficient is ±15%.
* It has multi-layer monolithic structure,has high reliability.
* It has good solderability and soldering resistance,suitable for flow soldering/reflow soldering.

• Application

* It is suitable for all kinds of filter and coupling circuits.

• Product Part Number Expression

0805	X	105	K	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②Dielectric Type	
Code	Dielectric Material
X	X5R

③Normal Capacitance(PF)	
Expression Method	Actual Value
104	10×10^4
105	10×10^5
106	10×10^6

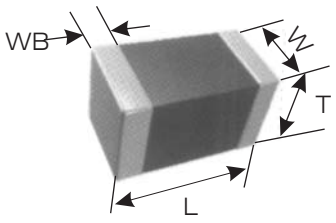
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
100	10V
250	25V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



Type		Dimension (mm)			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30

- 電容量範圍

項目	通用型X5R片容															
尺寸	0402				0603				0805				1206			
工作電壓	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
電容量																
100nF																
220nF																
330nF																
470nF																
680nF																
1 μF																
2.2 μF																
3.3 μF																
4.7 μF																
6.8 μF																
10 μF																
22 μF																
33 μF																
47 μF																
100uF																

- Capacitance Range

Item	X5R MLCC for general-use															
Dimension	0402				0603				0805				1206			
Rated Voltage	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
Capacitance																
100nF																
220nF																
330nF																
470nF																
680nF																
1μF																
2.2μF																
3.3μF																
4.7μF																
6.8μF																
10μF																
22μF																
33μF																
47μF																
100uF																

■通用型Y5V片容

通用型Y5V片容屬于Ⅱ類低頻電容器，其電容量受温度、電壓、時間變化大。

- 特性

＊ 在-25℃～85℃工作範圍内,其温度特性爲+30%，-80%。
＊ 疊層獨石結構,具有高可靠性。
＊ 優良的可焊性和耐焊性，適用于回流焊和波峰焊。

- 應用

適用于各種濾波綫路。

- 産品規格型號表示方法

0805 ① F ② 104 ③ M ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②介質種類	
代碼	介質材料
F	Y5V

③標稱電容量(PF)	
表示方式	實際值
102	10×10^2
103	10×10^3
104	10×10^4

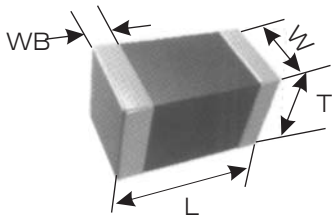
④誤差級別	
代碼	誤差
M	±20%
Z	+80% -20%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30

■ Y5V MLCC for General-use

Y5V MLCC for General-use is class II low frequency capacitor, its capacitance will change a lot along with the temperature,voltage,time.

- Features

* Its operating temperature is -25℃～85℃,within the range, the temperature coefficient is +30%，-80%.
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow soldering/reflow soldering.

- Applications

It is suitable for all kinds of filter circuits.

- Product Part Number Expression

0805 ① F ② 104 ③ M ④ 500 ⑤ N ⑥ T ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②Dielectric Type	
Code	Dielectric
F	Y5V

③Normal Capacitance(PF)	
Expression Method	Actual Value
102	10×10^2
103	10×10^3
104	10×10^4

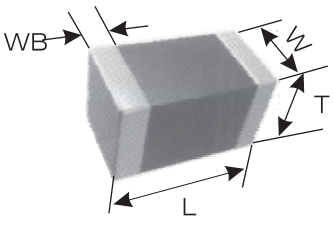
④Capacitance Tolerance	
Code	Tolerance
M	±20%
Z	+80% -20%

⑤Rated Voltage	
Expression Method	Actual Value
250	25V
500	50V
101	100V
201	200V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30

- 電容量範圍

項目	通用型Y5V片容																			
尺寸	0402					0603					0805					1206				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量																				
1000PF																				
1.5nF																				
2.2nF																				
3.3nF																				
4.7nF																				
6.8nF																				
10nF																				
12nF																				
15nF																				
22nF																				
27nF																				
33nF																				
39nF																				
47nF																				
56nF																				
68nF																				
100nF																				
150nF																				
220nF																				
270nF																				
330nF																				
470nF																				
680nF																				
1μF																				
2.2μF																				
4.7μF																				
10μF																				
22μF																				
33μF																				
47μF																				
100μF																				

• Capacitance Range

Item	Y5V MLCC for General-use																			
Dimension	0402					0603					0805					1206				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance																				
1000PF																				
1.5nF																				
2.2nF																				
3.3nF																				
4.7nF																				
6.8nF																				
10nF																				
12nF																				
15nF																				
22nF																				
27nF																				
33nF																				
39nF																				
47nF																				
56nF																				
68nF																				
100nF																				
150nF																				
220nF																				
270nF																				
330nF																				
470nF																				
680nF																				
1μF																				
2.2μF																				
4.7μF																				
10μF																				
22μF																				
33μF																				
47μF																				
100μF																				

■ 通用型Z5U片容

通用型Z5U片容屬于Ⅱ類低頻電容器，其電容量的穩定性介于X7R和Y5V之間。

- 特性

＊ 在10℃～85℃工作範圍内,其温度特性爲+22%，-56%。
＊ 叠層獨石結構,具有高可靠性。
＊ 優良的可悍性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于各種濾波，耦合綫路。

- 産品規格型號表示方法

0805 ① E ② 104 ③ M ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②介質種類	
代碼	介質材料
E	Z5U

③標稱電容量(PF)	
表示方式	實際值
102	10×10^2
103	10×10^3
104	10×10^4

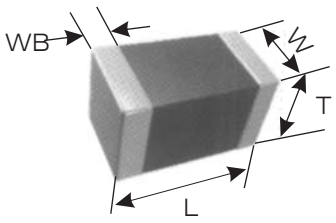
④誤差級别	
代碼	誤差
M	±20%
Z	+80% -20%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類别	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

■ Z5U MLCC for General-use

Z5U MLCC for General-use is class II low frequency capacitor, its capacitance stability is between that of X7R and Y5V.

- Features

* Its operating temperature is 10℃～85℃,within the range, the temperature coefficient is +22%，-56%.
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow soldering/reflow soldering.

- Applications

It is suitable for all kinds of filter and coupling circuits.

- Product Part Number Expression

0805 ① E ② 104 ③ M ④ 500 ⑤ N ⑥ T ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.0×0.5
0603	0.06×0.03	1.6×0.8
0805	0.08×0.05	2.0×1.25

②Dielectric Type	
Code	Dielectric
E	Z5U

③Normal Capacitance(PF)	
Expression Method	Actual Value
102	10×10^2
103	10×10^3
104	10×10^4

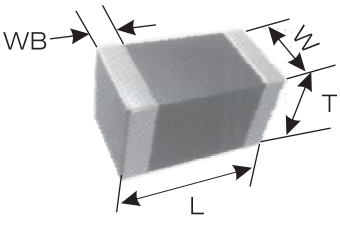
④Capacitance Tolerance	
Code	Tolerance
M	±20%
Z	+80% -20%

⑤Rated Voltage	
Expression Method	Actual Value
250	25V
500	50V
101	100V
201	200V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

- 電容量範圍

項目	通用型Z5U片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
1000PF															
1.5nF															
2.2nF															
3.3nF															
4.7nF															
6.8nF															
10nF															
12nF															
15nF															
22nF															
27nF															
33nF															
39nF															
47nF															
56nF															
68nF															
100nF															
150nF															
220nF															
270nF															
330nF															
470nF															
680nF															
1μF															
2.2μF															
4.7μF															
10μF															
22μF															
33μF															
47μF															
100μF															

- Capacitance Range

Item	Z5U MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
1000PF															
1.5nF															
2.2nF															
3.3nF															
4.7nF															
6.8nF															
10nF															
12nF															
15nF															
22nF															
27nF															
33nF															
39nF															
47nF															
56nF															
68nF															
100nF															
150nF															
220nF															
270nF															
330nF															
470nF															
680nF															
1μF															
2.2μF															
4.7μF															
10μF															
22μF															
33μF															
47μF															
100μF															

■ 通用型PH、RH、SH、TH、UJ、SL片容

通用型PH、RH、SH、TH、UJ、SL片容屬于Ⅰ類電容器。

- 特性

＊ 在-55℃～85℃工作範圍内,其温度系數爲負值。
＊ 叠層獨石結構,具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于温度補償型電路。

- 産品規格型號表示方法

0805 ① PH ② 101 ③ J ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②介質種類	
代碼	介質材料
PH	PH
RH	RH
SH	SH
TH	TH
UJ	UJ
SL	SL

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

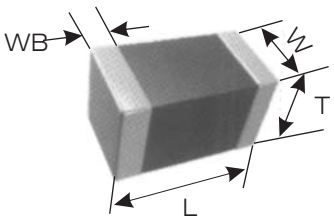
④誤差級別	
代碼	誤差
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

■ PH、RH、SH、TH、UJ、SL MLCC for General-use

PH、RH、SH、TH、UJ、SL MLCC for General-use is class I capacitor.

• Features

* Its operating temperature is -55℃～85℃,within the range, the temperature coefficient is -150±60PPM/℃～1400PPM/℃。
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow soldering/reflow soldering.

• Applications

It is suitable for temperature compensating circuits.

• Product Part Number Expression

0805	PH	101	J	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.0×0.5
0603	0.06×0.03	1.6×0.8
0805	0.08×0.05	2.0×1.25

②Dielectric Type	
Code	Dielectric
PH	PH
RH	RH
SH	SH
TH	TH
UJ	UJ
SL	SL

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

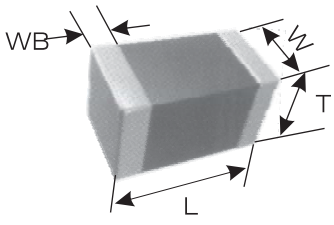
④Capacitance Tolerance	
Code	Tolerance
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
100	10V
250	25V
500	50V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

- 電容量範圍

項目	通用型PH片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															

項目	通用型RH片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															

- Capacitance Range

Item	PH MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF 1PF 2PF 3PF 4PF 5PF 6PF 7PF 8PF 10PF 15PF 18PF 22PF 33PF 47PF 68PF 82PF 100PF 120PF 150PF 180PF															

Item	RH MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF 1PF 2PF 3PF 4PF 5PF 6PF 7PF 8PF 10PF 15PF 18PF 22PF 33PF 47PF 68PF 82PF 100PF 120PF 150PF 180PF															

項目	通用型SH片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															

項目	通用型TH片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															
220PF															

Item	SH MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF 1PF 2PF 3PF 4PF 5PF 6PF 7PF 8PF 10PF 15PF 18PF 22PF 33PF 47PF 68PF 82PF 100PF 120PF 150PF 180PF															

Item	TH MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF 1PF 2PF 3PF 4PF 5PF 6PF 7PF 8PF 10PF 15PF 18PF 22PF 33PF 47PF 68PF 82PF 100PF 120PF 150PF 180PF 220PF															

項目	通用型UJ片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															

項目	通用型SL片容														
尺寸	0402					0603					0805				
工作電壓	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
電容量															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															
220PF															
330PF															
470PF															
560PF															
680PF															
1000PF															
1500PF															
2200PF															
3300PF															

Item	UJ MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															

Item	SL MLCC for General-use														
Dimension	0402					0603					0805				
Rated Volatage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance															
0.5PF															
1PF															
2PF															
3PF															
4PF															
5PF															
6PF															
7PF															
8PF															
10PF															
15PF															
18PF															
22PF															
33PF															
47PF															
68PF															
82PF															
100PF															
120PF															
150PF															
180PF															
220PF															
330PF															
470PF															
560PF															
680PF															
1000PF															
1500PF															
2200PF															
3300PF															

■ 通用型COG、COH、PH~SL可靠性測試方法

<table>
<tr><th rowspan="2">編號</th><th rowspan="2">項目</th><th colspan="2">標准</th><th rowspan="2">測試方法</th></tr>
<tr><th>通用型COG、COH片容</th><th>通用型PH、RH、SH、TH、UJ、SL片容</th></tr>
<tr><td>1</td><td>工作温度範圍</td><td>-55℃ ~ 125℃</td><td>-55℃ ~ 85℃</td><td></td></tr>
<tr><td>2</td><td>外觀</td><td colspan="2">1.瓷體顏色一致性好。
2.芯片無可見損傷,光滑平整。
3.瓷體無外露電極,裂痕,孔洞。
4.端電極無裂痕,孔洞,磨損及表面氧化等。
5.端電極應無延伸現象或延伸部分不超過端頭寬度的一半。</td><td>※在≥10×倍以上的顯微鏡下觀察。</td></tr>
<tr><td>3</td><td>尺寸</td><td colspan="2">在規定尺寸範圍內</td><td>※使用千分尺或游標卡尺。</td></tr>
<tr><td>4</td><td>電容量</td><td colspan="2">在規定偏差範圍內</td><td rowspan="2">※測試儀器:HP4278A電橋、HP4284電橋。
※測試條件：1.測試温度：25℃ ±5℃，濕度:30% ~ 75%。
2.測試電壓:1.0 ± 0.2V。
3.測試頻率:C<1000PF,1.0 ± 0.1MHz;
C≥1000PF,1.0 ± 0.1KHZ</td></tr>
<tr><td>5</td><td>損耗因數(D.F.)</td><td colspan="2">Cr<5PF ≤0.56%
5PF≤Cr<50PF 1.5 [(150/Cr)+7]×10^{-4}
Cr≥50PF ≤0.15%</td></tr>
<tr><td>6</td><td>絶緣電阻
(I.R.)</td><td colspan="2">C≤10nF Ri≥5×10^{10} Ω
C>10nF Ri · Cr≥500s</td><td>※測試儀器:絶緣電阻測試儀(如:SF2511絶緣測試機)。
※測試方法:施加額定工作電壓,在60 ± 5 秒內測量絶緣電阻。</td></tr>
<tr><td>7</td><td>耐電壓强度</td><td colspan="2">>3x額定工作電壓</td><td>※施加3倍額定工作電壓，持續 1~5 秒，未出現擊穿現象并且充電／放電電流低于50mA。</td></tr>
<tr><td>8</td><td>電容量温度特性</td><td colspan="2">在工作温度範圍內符合電容器特性温度系數要求</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60 ± 5 分鐘，然后在室温條件下放置 24 ± 2 小時。
※在 -55 ~ 125℃或者-55 ~ 85℃範圍內測試電容量，其電容值相對于20℃時數值的變化率應在規定範圍內。</td></tr>
<tr><td>9</td><td>可焊性</td><td colspan="2">75% 端電極覆蓋錫</td><td>※將電容器浸在乙醇和松香溶液中。然后浸入 有鉛235 ± 5℃(無鉛245 ± 5℃) 的混合焊錫 溶液 2 ± 0.5 秒。浸入速度：25 ± 2.5mm/秒。</td></tr>
<tr><td>10</td><td>耐焊接熱</td><td>外觀
電容量變化率
D.F.
I.R.</td><td>無明顯缺陷
≤ ± 5% 或 ± 0.5PF取兩者中最大的
同初始標准
同初始標准</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60 ± 5 分鐘，然后在室温條件下放置 24 ± 2 小時。
※然后按下表預熱電容器。將電容器浸入 265 ± 5℃ 的混合焊錫溶液10 ± 1 秒。再在室温條件下放置24 ± 2 小時，然后進行測量。浸入速度：25 ± 2.5mm/秒。
※預熱條件如下:
<table>
<tr><th>階段</th><th>温度</th><th>時間</th></tr>
<tr><td>1</td><td>100℃—120℃</td><td>1分鐘</td></tr>
<tr><td>2</td><td>170℃—200℃</td><td>1分鐘</td></tr>
</table></td></tr>
</table>

- General COG、COH、PH～SL MLCC reliability test method

Number	Item	Standard		Test Method
		COG、COH MLCC for General-use	PH, RH, SH, TH, UJ, SL MLCC for General-use	
1	Operating Temperature Range	-55℃～125℃	-55℃～85℃	
2	Appearance	1.Good ceramic body color continuity. 2.The chips have no visual damages and must be very smooth. 3.No exposed inner- electrode, no cracks or holes. 4.The outer electrode should have no cracks, holes, damages or surface oxidation. 5.Outer electrode no prolongation or the prolongation is less than half of that of the termination width.		※Check by using microscope ≥10×.
3	Dimensions	Within the specified dimensions		※Using micrometer or vernier calipers
4	Capacitance	Within the specified tolerance		※Measuring Equipments:HP4278 capacitance meter,HP4284 capacitance, ※Measuring Conditions: 1.Measuring Temperature:25℃±5℃.Humidity: 30%~75%. 2.Measuring Voltage:1.0±0.2V. 3.Measuring Frequency:C<1000PF，1.0±0.1MHz C≥1000PF，1.0±0.1KHz
5	Dissipation Factor (DF)	Cr<5PF ≤0.56% 5PF≤Cr<50PF 1.5 [(150/Cr)+7]×10^{-4} Cr≥50PF ≤0.15%		
6	Insulation Resistance	C≤10nF Ri≥5×10^{10} Ω C>10nF Ri·Cr≥500s		※Measuring Equipment:Insulation resistance meter (such as Sf2511 insulation resistance). ※Measuring Method:Must measure at rated voltage, and measure the IR within 60±5 seconds.
7	Withstanding Voltage	>3x rated continuous working voltage		※Must measure at 3 times rated voltage, dwell time: 1～5 seconds, no short and the changing/discharging current less than 50mA.
8	Capacitance Temperature Characteristic	Must meet the capacitor character temperature coefficient requirements within the operating temperature range.		※First, pre-heat: heat treat 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature. ※Measure the capacitance at -55～125℃ or -55～85℃, the capacitance change ratio comparing to that of 25℃ must be within the specified range.
9	Solderability	Tin coverage should be 75% of the outer electrode		※Dip the capacitor into ethanol or colophony solution, and then dip it into 235±5℃(or 245±5℃ leadless eutedtic solder solution) eutectic solder solution hanving lead for 2±0.5 seconds. Dipping speed: 25±2.5mm/second.
10	Resistance to Soldering	Appearance	No defects visible	※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature. ※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 265±5℃ eutectic solder solution for 10±1 seconds. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second. ※Preheat conditions:
		Cap. Change ratio	≤±5%or±0.5PF (whichever is larger)	
		DF	Same as original spec	
		IR	Same as original spec	

Stage	Temperature	Time
1	100℃—120℃	1minute
2	170℃—200℃	1minute

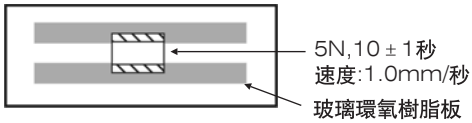
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td>11</td><td>端電極結合强度</td><td colspan="2">不應出現端頭脱落或其它缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 1 中所示的測試夾具(玻璃環氧樹脂板）上。然后沿箭頭方向施加 10N 的力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

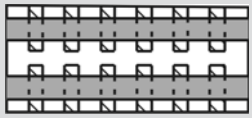
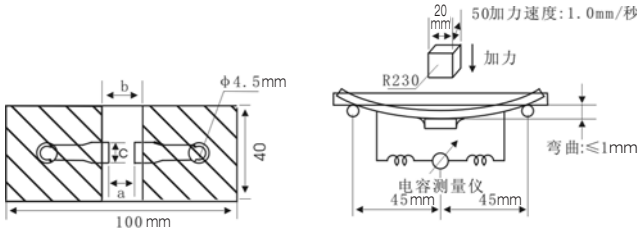
圖1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">耐振動性</td><td>外觀</td><td>無明顯缺陷</td><td rowspan="3">※將電容器焊接在測試夾具(玻璃環氧樹脂板）上。電容器應進行簡諧運動，其總幅值爲 1.5mm，頻率在近似 10—55Hz 之間均匀變化。頻率範圍(從 10 至 55Hz 再返回 10Hz）應在約 1 分鐘内完成。振動應在三個相互垂直方向各進行 2 小時(總計 6 小時）。
 
圖2</td></tr>
<tr><td>電容量</td><td>在規定偏差範圍内</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>13</td><td>抗彎曲性</td><td colspan="2">不應出現裂縫或其他缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 3 中所示的測試夾具(玻璃環氧樹脂板）上，然后在圖 4 所示的方向加力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

图3　　图4
<table><tr><th rowspan="2">L×W (mm)</th><th colspan="4">尺寸 (mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr><tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr><tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr></table></td></tr>
<tr><td>14</td><td>温度循環</td><td>外觀</td><td>無缺陷或异常</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。
※按照下表中列出的四種熱處理方法執行五次循環。
在室温條件下放置 24±2 小時，然后進行測量。</td></tr>
</table>

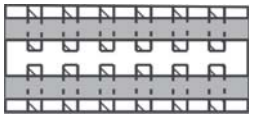
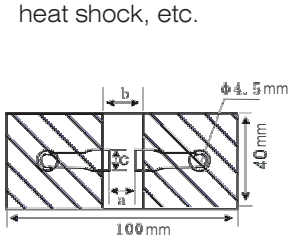
<table>
<tr><th>Number</th><th>Items</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>11</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defect shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder.Then apply a 10N force inthe direction shown as the arrowhead.The aoldering shall be done either with an iron or using the reflow method and shall be conducted with care so that an iron or using the refow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock,etc.
 
5N,10±1s
Speed:1.0mm/s
Glss epoxy resinboard
Fig.1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Vibration Resistance</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="3">※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute.This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total is 6 hours).
 
Fif.2</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance range</td></tr>
<tr><td>DF</td><td>Same as original spec</td></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">No cracks or other defects shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a 10N force in the direction shown as Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.
 

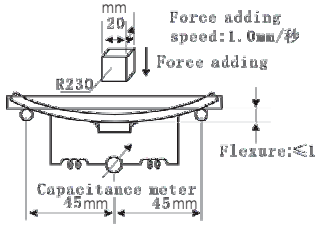
Fig.3
 

Fig.4
<table><tr><th rowspan="2">L×W (mm)</th><th colspan="4">Dimension</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr><tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr><tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr></table></td></tr>
<tr><td>14</td><td>Temperature Cycle</td><td>Appearance</td><td>No defects or abnormities</td><td>※Pre-treatment: Heat-treat the capacitor for 60± 5minutes at 150+0/-10℃, then set it for 24 2 hours at room temperature.
※Perform five cycles according to the four heat treatments listed in the following table. Set it for 24±2 hours at room temperature, then measure.</td></tr>
</table>

<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td>14</td><td>温度循環</td><td colspan="2">△C/C ⩽ ±1%或1PF,
取兩者中最大值</td><td>熱處理方法如下表:
<table><tr><th>階段</th><th>温度(℃)</th><th>時間(分鐘)</th></tr><tr><td>1</td><td>最低工作温度 ±3</td><td>30 ±3</td></tr><tr><td>2</td><td>常温</td><td>2—3</td></tr><tr><td>3</td><td>最高工作温度 ±2</td><td>30 ±3</td></tr><tr><td>4</td><td>常温</td><td>2—3</td></tr></table></td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">濕度(穩態)</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40 ±2℃和 90—95% 相對濕度條件下放置500+24/-0小時。
然后將其移動到室温條件下恢復放置 24 ±2 小時，進行測量。</td></tr>
<tr><td>電容量</td><td>⩽ ±2%或
±1PF,取兩
者中最大的。</td></tr>
<tr><td>D.F.</td><td>⩽2倍初始標准</td></tr>
<tr><td>I.R.</td><td>大于2500MΩ</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">濕度負荷</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40 ±2℃和 90—95% 相對濕度條件下施加額定電壓
500+24/-0小時。然后將其移動到室温條件下放置 24 ±2 小時，
進行測量。</td></tr>
<tr><td>電容量</td><td>⩽ ±2%或
±1PF,取兩
者中最大的。</td></tr>
<tr><td>D.F.</td><td>⩽2倍初始標准</td></tr>
<tr><td>I.R.</td><td>大于2500MΩ</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">壽命</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在上限温度下施加1.5倍的額定工作電壓1000 ±12小時，充放電電
流不超過50mA。將其移動到室温條件下恢復放置 24 ±2 小時，
進行測量。</td></tr>
<tr><td>電容量</td><td>⩽ ±2%或
±1PF,取兩
者中最大的。</td></tr>
<tr><td>D.F.</td><td>⩽2倍初始標准</td></tr>
<tr><td>I.R.</td><td>大于4000MΩ
或Ri · CR ⩾ 40S</td></tr>
</table>

<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>14</td><td>Temperature Cycle</td><td>Cap. Change ratio</td><td>⩽±2% or ±1 PF (whichever is larger)</td><td>※Heat-treatment:
<table><tr><th>stage</th><th>temperature（℃）</th><th>time（min.）</th></tr><tr><td>1</td><td>lowest opeating temperature±3</td><td>30±3</td></tr><tr><td>2</td><td>normal temperature</td><td>2—3</td></tr><tr><td>3</td><td>high operating temperature±2</td><td>30±3</td></tr><tr><td>4</td><td>normal temperature</td><td>2—3</td></tr></table></td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Humidity Steady State</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Set the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Then remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>⩽±2% or ±1 PF (whichever is larger)</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>More than 2500MΩ</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Humidity Load</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Apply rated voltage to the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>⩽±2% or ±1 PF (whichever is larger)</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>More than 2500MΩ</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Apply 1.5 times rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>⩽±2% or ±1 PF (whichever is larger)</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>More than 4000MΩ or Ri・CR⩾40S</td></tr>
</table>

■ 通用型X7R、X5R、Z5U、Y5V可靠性測試方法

編號	項目	標准		測試方法
1	工作温度範圍	X5R: -55℃ ~85℃ X7R: -55℃ ~125℃	Z5U: 10℃ ~85℃ Y5V: -25℃~85℃	
2	外觀	1.瓷體顏色一致性好。 2.芯片無可見損傷,光滑平整。 3.瓷體無外露電極,裂痕,孔洞。 4.端電極無裂痕,孔洞,磨損及表面氧化等。 5.端電極應無延伸現象或延伸部分不超過端頭寬度的一半。		※在≥ ×10倍以上的顯微鏡下觀察。
3	尺寸	在規定尺寸範圍内		※使用千分尺或游標卡尺。
4	電容量	在規定偏差範圍内		※測試儀器: HP4278A電橋、HP4284電橋。 ※測試條件: 1.測試温度:25℃±5℃, 濕度:30%~75%。 2.測試電壓:1.0±0.2V, (Y5V)0.5±0.2V(Z5U)。 3.測試頻率:1.0±0.1KHz。
5	損耗因數(D.F.)	X5R,X7R Ur≥50V, Df≤250×10^{-4} Ur=25V,16V,10V: C<0.47uF, DF≤350×10^{-4} C≥0.47uF, DF≤1000×10^{-4} Ur=6.3V: C<0.15uF, Df≤500×10^{-4} C≥0.15uF, DF≤1000×10^{-4}	Z5U,Y5V Ur≥25V: C<1.0μF,DF≤700×10^{-4} C≥1.0μF,DF≤900×10^{-4} Ur=16V、10V、6.3V: DF≤1500×10^{-4}	
6	絶緣電阻(I.R.)	C≤25nF,IR≥10000MΩ C>25nF,R×C≥100S	C≤25nF,IR≥4000MΩ C>25nF,R×C≥100S	※測試儀器:絶緣電阻測試儀(如:SF2511絶緣測試機)。 ※測試方法:施加額定工作電壓,在60±5 秒内測量絶緣電阻。
7	耐電壓强度	>2.5x額定工作電壓		※施加2.5倍額定工作電壓，持續1~5秒，未出現擊穿現象并且充電／放電電流低于50mA。
8	電容量温度特性	在工作温度範圍内符合電容器特性温度系數要求		※首先進行預處理：進行 150+0/-10℃ 熱處理 60±5 分鐘，然后在 室温條件下放置 24±2 小時。 ※在 -55~125℃或者-55~85℃(X7R. X5R);-25℃~85℃+10℃~85℃(Y5V~Z5U)範圍内測試電容量,其電容值相對于20℃時數值的變化率應在規定範圍内。
9	可焊性	75% 端電極覆蓋錫		※將電容器浸在乙醇和松香溶液中。然后浸入 有鉛235±5℃(無鉛245±5℃) 的混合焊錫 溶液 2±0.5 秒。浸入速度： 25±2.5mm/秒。

● X7R、X5R、Z5U、Y5V MLCC for general use reliability test method

Number	Item	Standard		Test Method
1	Operating Temperature Range	X5R: -55℃ ~ 85℃ X7R: -55℃ ~ 125℃	Z5U: 10℃ ~ 85℃ Y5V: -25℃ ~ 85℃	
2	Appearance	1.Good ceramic body color continuity. 2.The chips have no visualdamages and must be very smooth. 3.No exposed inner- electrode, no cracks or holes. 4.The outer electrode should have no cracks, holes, damages or surface oxidation. 5.Outer electrode no prolongation or the prolongation is less than half of that of the termination width.		※Check by using microscope ⩾10× .
3	Dimensions	Within the specified dimensions		※Using micrometer or vernier calipers
4	Capacitance)	Within the specified tolerance		※Measuring Equipments: HP4278 capacitance meter, HP4284 capacitance, ※Measuring Conditions: 1.Measuring Temperature: 25℃ ± 5℃. Humidity: 30% ~ 75%. 2.Measuring Voltage: 1.0 ± 0.2V. 3.Measuring Frequency: 1.0 ± 0.1MHz
5	Dissipation Factor (DF)	X5R,X7R Ur⩾50V, Df⩽250×10^{-4} Ur=25V,16V,10V: C<0.47uF, DF⩽350×10^{-4} C⩾0.47uF, DF⩽1000×10^{-4} Ur=6.3V: C<0.15uF, Df⩽500×10^{-4} C⩾0.15uF, DF⩽1000×10^{-4}	Z5U,Y5V Ur⩾25V: C<1.0μF,DF⩽700×10^{-4} C⩾1.0μF,DF⩽900×10^{-4} Ur=16V、10V、6.3V: Df⩽1500×10^{-4}	
6	Insulation Resistance	C⩽25nF,IR⩾10000MΩ C>25nF,R×C⩾100S	C⩽25nF,IR⩾40000MΩ 1C>25nF,R×C⩾100S	※Measuring Equipment: Insulation resistance meter (such as Sf2511 insulation resistance). ※Measuring Method: Must measure at rated voltage, and measure the IR within 60 ± 5 seconds.
7	Withstanding Voltage	>2.5Ur		※Must measure at 2.5 times rated voltage, dwell time: 1~5 seconds, no short and the changing/discharging current less than 50mA.
8	Capacitance Temperature Characteristic	Must meet the capacitor character temperature coefficient requirements within the operating temperature range.		※First, pre-heat: heat treat 60 ± 5 minutes at 150+0/-10℃, then set it for 24 ± 2 hours at room temperature. ※Measure the capacitance at -55 ~ 125℃ or -55 ~ 85℃, the capacitance change ratio comparing to that of 20℃ must be within the specified range.
9	Solderability	Tin coverage should be 75% of the outer electrode		※Dip the capacitor into ethanol or colophony solution,and then dip it into 245 ± 5℃ eutectic solder solution for 2 ± 0.5 seconds. Dipping speed: 25 ± 2.5mm/second.

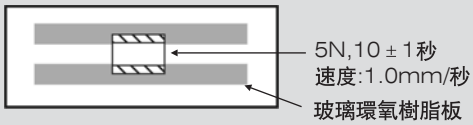
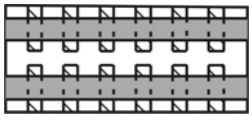
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">耐焊接熱</td><td>外觀</td><td>無明顯缺陷</td><td rowspan="4">※首先進行預處理：進行 150+0/-10℃ 熱處理 60±5分鐘，然后在室温條件下放置24±2小時。
※然后按下表預熱電容器。將電容器浸入 265±5℃ 的混合焊錫溶液 10±1 秒。再在室温條件下放置24±2 小時，然后進行測量。
浸入速度：25±2.5mm/秒。
※預熱條件如下:
<table><tr><th>階段</th><th>温度</th><th>時間</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1分鐘</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1分鐘</td></tr></table></td></tr>
<tr><td>電容量變化率</td><td>X7R, X5R:-5～+10%
Z5U, Y5V:-10～+20%</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>同初始標准</td></tr>
<tr><td>11</td><td>端電極結合强度</td><td colspan="2">不應出現端電極脱落或其它缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 1 中所示的測試夾具(玻璃環氧樹脂板）上。然后沿箭頭方向施加 10N 的力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

圖1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">耐振動性</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="3">※將電容器焊接在測試夾具(玻璃環氧樹脂板）上。電容器應進行簡諧運動，其總幅值爲 1.5mm，頻率在近似10—55Hz 之間均匀變化。頻率範圍(從10至55Hz再返回 10Hz）應在約1分鐘内完成。振動應在三個相互垂直方向各進行2小時(總計 6 小時）。
 
圖2</td></tr>
<tr><td>電容量</td><td>在規定偏差範圍内</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">不應出現裂痕或其他缺陷</td><td>※使用混合焊錫將電容器焊接在圖 3 中所示的測試夾具(玻璃環氧樹脂板）上，然后在圖 4 所示的方向加力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。</td></tr>
</table>

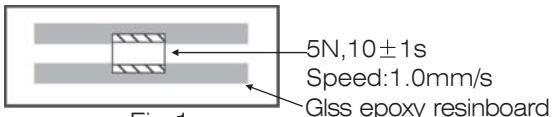
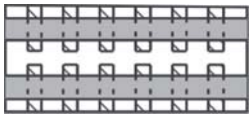
<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">Resistance to Soldering</td><td>Appearance</td><td>No defects visible</td><td rowspan="4">※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 265±5℃ eutectic solder solution for 10±1s. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second.
※Preheat conditions:
<table><tr><th>Stage</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1minute</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1minute</td></tr></table></td></tr>
<tr><td>Cap. Change ratio</td><td>X7R, X5R: within -5~+10%
Z5U, Y5V: within -10~+20%</td></tr>
<tr><td>DF</td><td>Same as original spec.</td></tr>
<tr><td>IR</td><td>Same as original spec.</td></tr>
<tr><td>11</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defect shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder. Then apply a 10N force in the direction shown as the arrowhead. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.
 

Fig.1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Resistance to Vibration</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="3">※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute. This motion shall be applied for a period of 2 hours in
each 3 mutually perpendicular directions (total is 6 hours).
 
Fif.2</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance range</td></tr>
<tr><td>D.F.</td><td>Same as original spec.</td></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">No cracks or other defects shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a 10N force in the direction shown as Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.</td></tr>
</table>

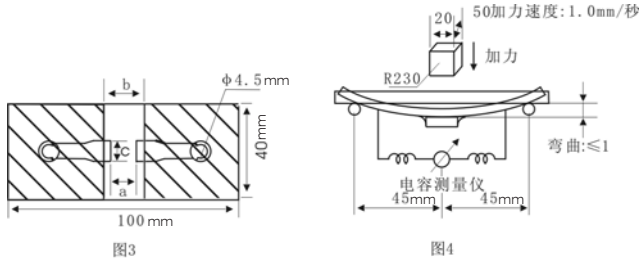
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">電容量變化率:
在±10%範圍內</td><td>


图3 图4
<table>
<tr><th rowspan="2">L×W
(mm)</th><th colspan="4">尺寸(mm)</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr>
<tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr>
<tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr>
</table>
</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">温度循環</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">
<table>
<tr><th>階段</th><th>温度(℃)</th><th>時間(分鐘)</th></tr>
<tr><td>1</td><td>最低工作温度±3</td><td>30±3</td></tr>
<tr><td>2</td><td>常温</td><td>2—3</td></tr>
<tr><td>3</td><td>最高工作温度±2</td><td>30±3</td></tr>
<tr><td>4</td><td>常温</td><td>2—3</td></tr>
</table>
</td></tr>
<tr><td>電容量
變化率</td><td>X7R, X5R:
在±10%範圍內
Z5U, Y5V:
在±20%範圍內</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>同初始標准</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">濕度(穩態)</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40±2℃和 90—95% 相對濕度條件下放置 500+24/-0小時。
然后將其移動到室温條件下恢復放置 48±2 小時，進行測量。</td></tr>
<tr><td>電容量
變化率</td><td>X7R, X5R:
在±10%範圍內
Z5U, Y5V:
在±30%範圍內</td></tr>
<tr><td>D.F.</td><td>≤2倍初始標准</td></tr>
<tr><td>I.R.</td><td>Ri≥1000MΩ 或
Ri*C_R≥25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">濕度負荷</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40±2℃和 90—95% 相對濕度條件下施加額定電壓
500+24/-0小時。然后將其移動到室温條件下放置
48±2 小時，進行測量。</td></tr>
<tr><td>電容量
變化率</td><td>X7R, X5R:
在±10%範圍內
Z5U, Y5V:
在±30%範圍內</td></tr>
<tr><td>D.F.</td><td>≤2倍初始標准</td></tr>
<tr><td>I.R</td><td>Ri≥2500MΩ 或
Ri*C_R≥25S</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">壽命</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在上限温度下施加1.5倍的額定工作電壓1000±12小時，充
放電電流不超過50mA。將其移動到室温條件下恢復放置
48±2 小時，進行測量。</td></tr>
<tr><td>電容量
變化率</td><td>X7R, X5R:
在±20%範圍內
Z5U, Y5V:
在±30%範圍內</td></tr>
<tr><td>D.F.</td><td>≤2倍初始標准</td></tr>
<tr><td>I.R</td><td>Ri≥4000MΩ 或
Ri*C_R≥40S</td></tr>
</table>

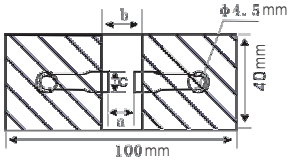
<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">Cap. Change ratio :
within ±10%</td><td>


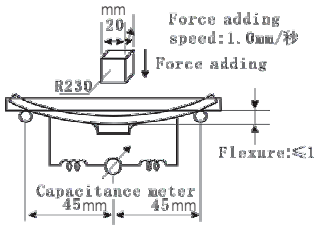
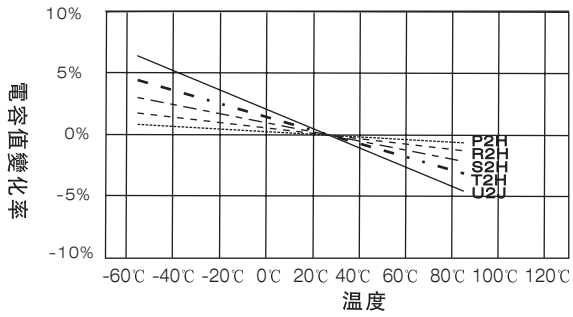
Fig. 3


Fig. 4
<table>
<tr><th rowspan="2">L×W (mm)</th><th colspan="4">Dimension</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr>
<tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr>
<tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr>
</table>
</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">Temperature Cycle</td><td>Appearance</td><td>No defects</td><td rowspan="4">
<table>
<tr><th>Stage</th><th>Temperature (℃)</th><th>Time (min.)</th></tr>
<tr><td>1</td><td>Min. Operating Temperature±3</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>2—3</td></tr>
<tr><td>3</td><td>Max. Operating Temperature 2</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>2—3</td></tr>
</table>
</td></tr>
<tr><td>Cap. Change ratio</td><td>X7R, X5R:
within ±10%
Z5U, Y5V:
within ±20%</td></tr>
<tr><td>D.F.</td><td>Same as orginal standard</td></tr>
<tr><td>I.R.</td><td>same as orginal standard</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Humidity Steady State</td><td>Appearance</td><td>No defects</td><td rowspan="4">※Set the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Then remove and set it for 48±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>X7R, X5R:
within ±10%
Z5U, Y5V:
within ±30%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥1000MΩ or
Ri • C_R≥25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Humidity Load</td><td>Appearance</td><td>No defects</td><td rowspan="4">※Apply rated voltage to the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Remove and set it for 48±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>X7R, X5R:
within ±10%
Z5U, Y5V:
within ±30%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥2500MΩ or
Ri • C_R≥25S</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects</td><td rowspan="4">※Apply 1.5 times rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24 2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>X7R, X5R:
within ±20%
Z5U, Y5V:
within ±30%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥4000MΩ or
Ri • C_R≥40S</td></tr>
</table>

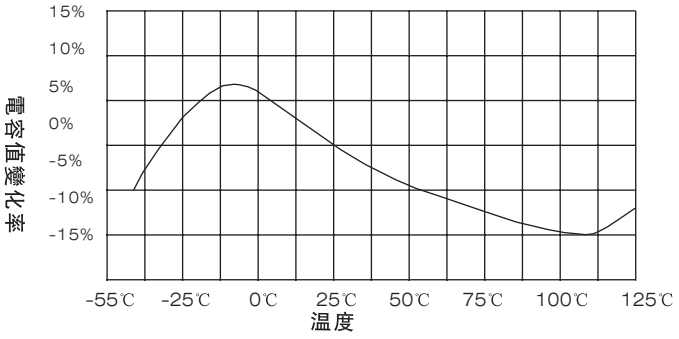
■通用型片容特性曲綫

• COG和PH、RH、SH、TH、UH系列

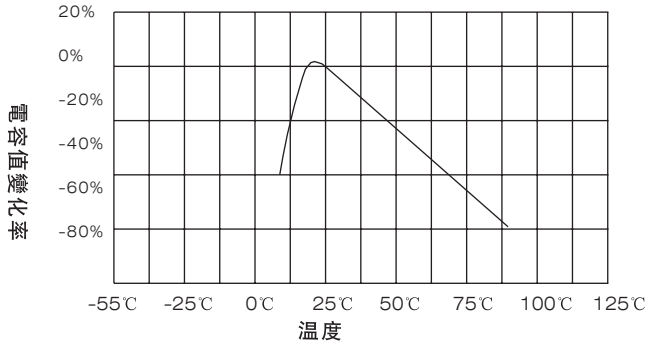
溫度系數圖



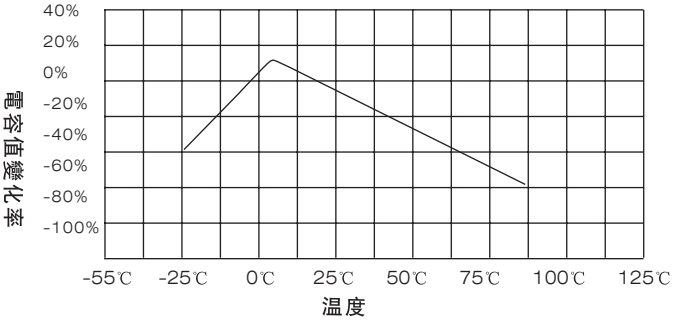
X7R溫度特性



Z5U溫度特性

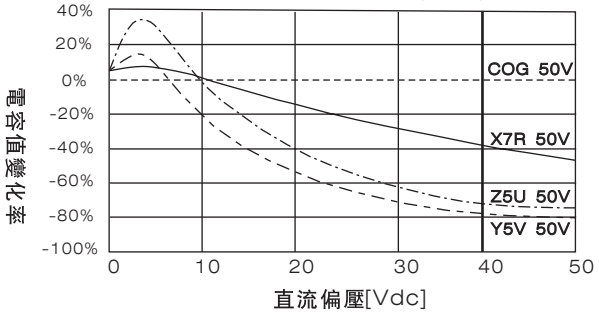


Y5V溫度特性



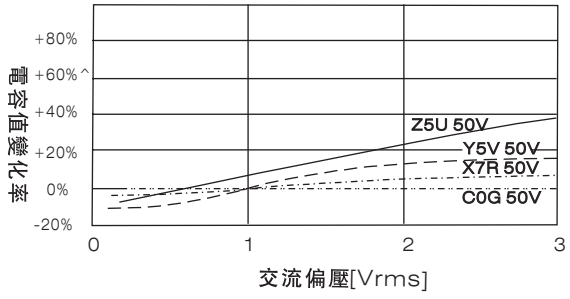
• 電容器偏壓特性圖

測量條件：COG :1MHZ
X7R,Z5U,Y5V:1KHZ

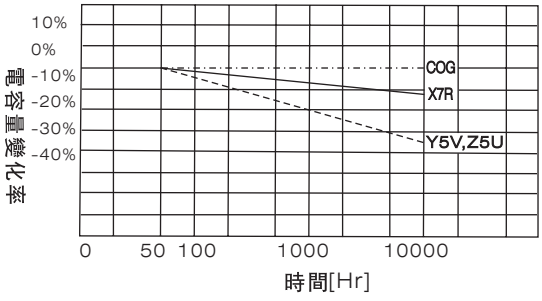


• 電容器交流電壓特性圖

測量條件：COG :1MHZ
X7R,Z5U,Y5V:1KHZ



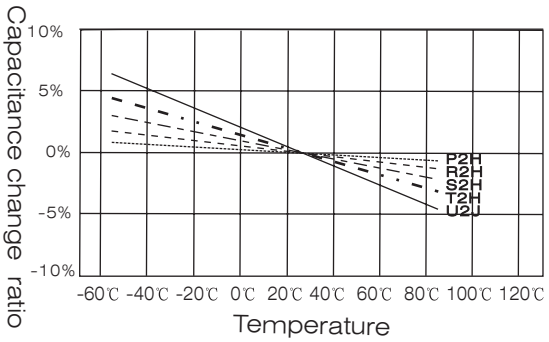
• 電容器老化特性圖



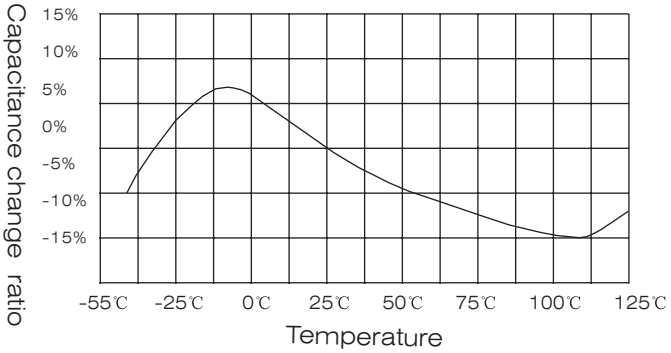
GENEREL-USE MLCC CHARCCTER PROFILES

- COG and PH、RH、SH、TH、UH siries

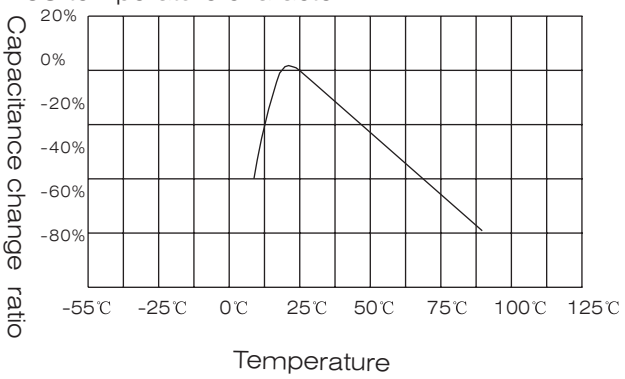
temperature coefficent



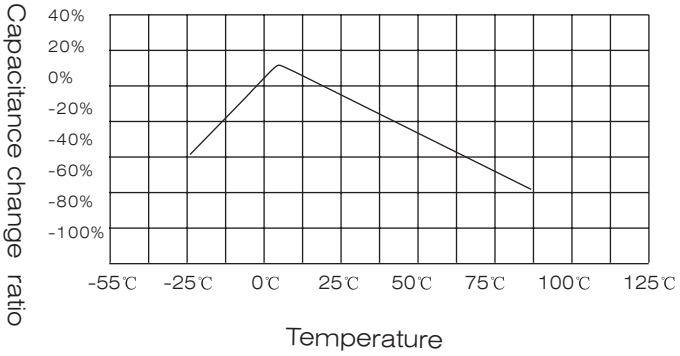
X7R tempreture characteristics



Z5U temperature character

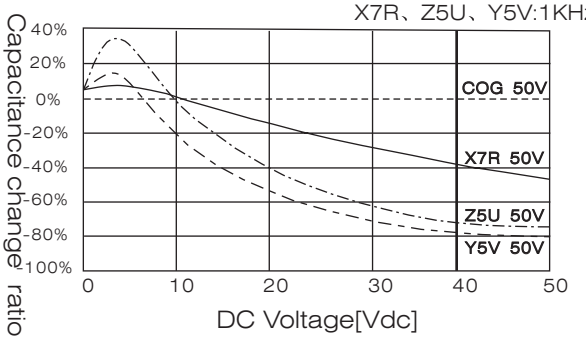


Y5V temperature characteristics



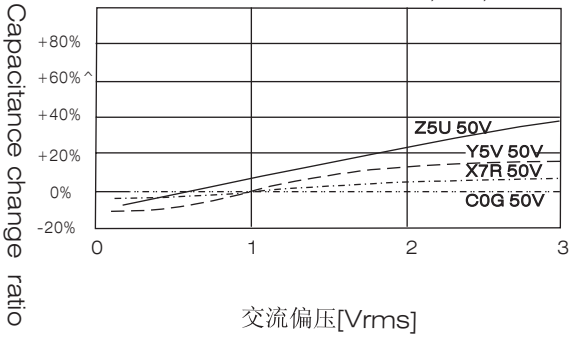
- DC Voltage Characteristics

Measuring condition COG :1MHz
X7R、Z5U、Y5V:1KHz

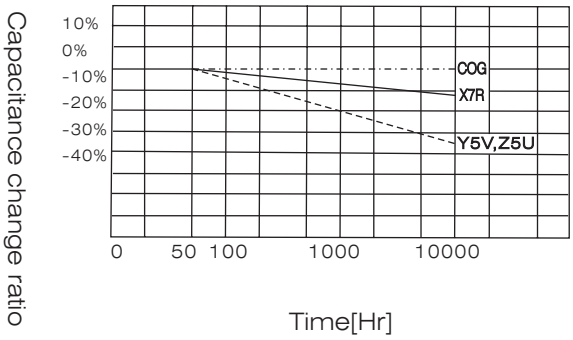


- Capacitance-AC Voltage Characterics

Measuring condition：COG :1MHz
X7R,Z5U,Y5V:1KHz



- Capacitance change_aging



■通用高Q型片容

通用高Q型片容屬于Ⅰ類高頻電容器。

- 特性

＊ 高頻率，高Q值，使用頻率在1MHZ～3GHZ之間。
＊ 叠層獨石結構,具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊和波峰焊。

- 應用

＊ 適用于射頻RF電路及要求Hi-Q，低ESR，高頻率響應的微波電路中。

- 產品規格型號表示方法

0805 ① CQ ② 100 ③ J ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②介質種類
代碼
CQ

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

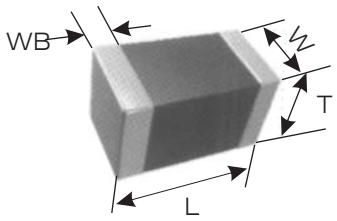
④誤差級別	
代碼	誤差
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤工作電壓	
表示方法	額定電壓
250	25V
500	50V
101	100V
201	200V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

■ High-Q MLCC for General-use

High-Q MLCC for General-use is class Ⅰ high frequency capacitor.

- Features:

* It has High frequency and high Q value, its using frequency is 1MHz～3GHz。
* It has multi-layer monolithic structure, has high reliability.
* It has good solderability and soldering resistance, suitable for flow soldering/ reflow soldering.

- Applications:

* It is suitable for ultra-high frequency RF circuits and Hi-Q, low ESR, high frequency response microwave circuits.

- Product Part Number Expression:

0805	CQ	100	J	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②Dielectric Type
Code
CQ

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

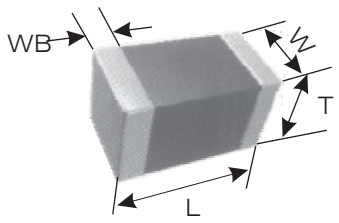
④Capacitance Tolerance	
Code	Tolerance
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

⑤Rated Voltage	
Expression Method	Actual Value
250	25V
500	50V
101	100V
201	200V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20

- 電容量範圍

項目	通用高Q型片容									
介質種類	CQ									
尺寸	0402		0603				0805			
工作電壓	25V	50V	25V	50V	100V	200V 250V	25V	50V	100V	200V 250V
電容量										
0.5PF										
1PF										
2PF										
3PF										
4PF										
50PF										
6PF										
7PF										
8PF										
10PF										
15PF										
18PF										
22PF										
33PF										
39PF										
47PF										
56PF										
68PF										
82PF										
100PF										
120PF										
150PF										
180PF										
220PF										
330PF										
390PF										
470PF										
560PF										
680PF										
820PF										
1000PF										
1200PF										
1500PF										

- Capacitance Range

Item	High-Q MLCC for General-use									
Dielectric Type	CQ									
Dimension	0402		0603				0805			
Rated Volatage	25V	50V	25V	50V	100V	200V 250V	25V	50V	100V	200V 250V
Capacitance										
0.5PF										
1PF										
2PF										
3PF										
4PF										
50PF										
6PF										
7PF										
8PF										
10PF										
15PF										
18PF										
22PF										
33PF										
39PF										
47PF										
56PF										
68PF										
82PF										
100PF										
120PF										
150PF										
180PF										
220PF										
330PF										
390PF										
470PF										
560PF										
680PF										
820PF										
1000PF										
1200PF										
1500PF										

■ 微波片容

- **特點:**

  高Q值、低等效串聯電阻、高自諧振頻率

- **應用:**

＊移動通信基站
＊無綫通信產品
＊射頻功率放大器
＊產品規格型號表示方法

0603 ① RF ② 101 ③ J ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②介質種類
代碼
RF

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

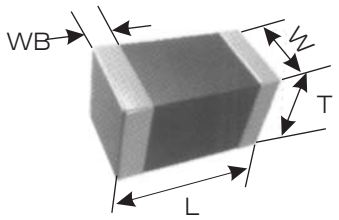
④誤差級別	
代碼	誤差
J	±5%
K	±10%

⑤工作電壓	
表示方法	額定電壓
6R3	6.3V
500	50V
101	100V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- **外形尺寸**



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
0505	1414	1.40±0.38	1.40±0.38	≤1.45	0.30±0.10
1111	2828	2.79±0.50	2.79±0.50	≤2.59	0.80±0.30

■ Microwave Caps (RF SERIES)

●Features

*High Q
*Low equivalent series resistance
*High self-resonance

●Applications

*Celluar base station
*Wireless communication devices
*RF power amplifier

●HOW TO ORDER

0603 RF 101 J 500 N T
① ② ③ ④ ⑤ ⑥ ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25

②Dielectric Type
Code
RF

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^0
101	10×10^1
102	10×10^2

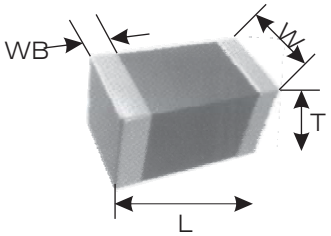
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
500	50V
101	100V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
0505	1414	1.40±0.38	1.40±0.38	≤1.45	0.30±0.10
1111	2828	2.79±0.50	2.79±0.50	≤2.59	0.80±0.30

- 電容量範圍

項目	微波片容															
介質種類	RF															
尺寸	0402			0603			0805			0505			1111			
工作電壓	25V	50V	100V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	500V
電容量																
0.1PF																
0.3PF																
0.5PF																
1PF																
3PF																
5PF																
6PF																
7PF																
8PF																
10PF																
15PF																
18PF																
22PF																
33PF																
39PF																
47PF																
56PF																
68PF																
82PF																
100PF																
120PF																
150PF																
180PF																
220PF																
330PF																
390PF																
470PF																
560PF																
680PF																
820PF																
1000PF																
1200PF																
1500PF																

- Capacitance Range

Item	Microwave Caps															
Dielectric Type	RF															
Dimension	0402			0603			0805			0505			1111			
Rated Volatage	25V	50V	100V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	25V 50V	100V	200V 250V	500V
Capacitance																
0.1PF																
0.3PF																
0.5PF																
1PF																
3PF																
5PF																
6PF																
7PF																
8PF																
10PF																
15PF																
18PF																
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56PF																
68PF																
82PF																
100PF																
120PF																
150PF																
180PF																
220PF																
330PF																
390PF																
470PF																
560PF																
680PF																
820PF																
1000PF																
1200PF																
1500PF																

■ 直流中高壓片容

中高壓多層片狀陶瓷電容器是在多層片狀陶瓷電容器的工藝技術、設備基礎上，通過采用特殊設計制作出來的一種具有良好耐壓，高可靠性的產品。該產品適合于表面貼裝，適合于多種直流高壓綫路，可以有效地改善電子綫路的性能。

• 特性

＊ 叠層獨石結構。
＊ 體積小，電容量高，能在高電壓下工作。
＊ 具有良好的可焊性和耐焊性。
＊ 技術指標(下表:)

額定電壓	測試電壓	最大充電電流	測試時間
⩽1000V	1.5倍額定電壓	50mA	5S
1000V～2000V	1.2倍額定電壓	50mA	5S
⩾2000V	1.2倍額定電壓	10mA	5S

• 應用

＊ 用作DC-DC轉換器的熱－冷耦合。
＊ 用于電話、傳真機及制解調器的綫路濾波器及振鈴檢測器。
＊ 用于切換式電源的二極管緩衝電路上。

• 產品規格型號表示方法

1206 CG 100 J 202 N T
① ② ③ ④ ⑤ ⑥ ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0603	0.60×0.30	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60
1210	0.12×0.10	3.20×2.50
1808	0.18×0.08	4.50×2.00
1812	0.18×0.12	4.50×3.20
2225	0.22×0.25	5.70×6.30

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R
F	Y5V

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

④誤差級別	
代碼	誤差
J	±5%
K	±10%

⑤工作電壓	
表示方法	額定電壓
6R3	6.3V
500	50V
101	100V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

■ DC Medium-voltage MLCC

DC medium-voltage MLCC has good high-voltage reliability, it is made in special design that based on the MLCC technology and equipments. It is suitable for surface-mounting , can improve the properties of circuits.

- Features

* New monolithic structure
* The size of the capacitor is small, yet has high electrostatic capacitance, can operate at high-voltage levels.
* Has good solderability.
* Technology Parameter (refer to the picture below):

Rated Voltage	Measuring Condition	Max. charging current	Measuring Time
≤1000V	1．5×Ur.	50mA	5S
1000V～2000V	1．2×Ur.	50mA	5S
≥2000V	1．2×Ur.	10mA	5S

- Applications：

* DC-DC converter.。
* The circuit filter and vibration bell of telephone, electrograph and modem.
* Snubber circuit for switching power supply.

- Product Part Number Expression：

1206 ① CG ② 100 ③ J ④ 202 ⑤ N ⑥ T ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0603	0.60×0.30	1.6×0.8
0805	0.08×0.05	2.0×1.25
1206	0.12×0.06	3.2×1.6
1210	0.12×0.10	3.2×2.5
1808	0.18×0.08	4.5×2.0
1812	0.18×0.12	4.5×3.2
2225	0.22×0.25	5.7×6.3

②Dielectric Type	
Code	Dielectric Material
CG	COG or NPO
B	X7R
F	Y5V

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

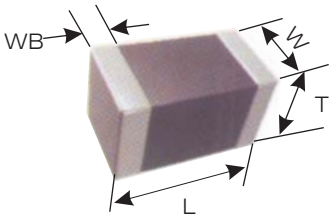
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
500	50V
101	100V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
NOMARKS	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

• 外形尺寸

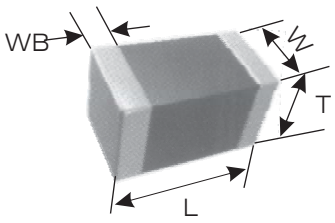


規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.10
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.50 ± 0.20
1206	3216	3.20 ± 0.30	1.60 ± 0.30	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.60 ± 0.30
1210	3225	3.20 ± 0.30	2.50 ± 0.30	⩽2.8	0.60 ± 0.30
1808	4520	4.50 ± 0.40	2.00 ± 0.20	⩽2.2	0.60 ± 0.30
1812	4532	4.50 ± 0.40	3.20 ± 0.30	⩽3.5	0.60 ± 0.30
2225	5763	5.70 ± 0.50	6.30 ± 0.50	⩽6.2	0.60 ± 0.30

• 電容量範圍

尺寸規格	工作電壓(V)	電容量範圍(PF)			尺寸規格	工作電壓(V)	電容量範圍(PF)		
		NPO	X7R	Y5V			NPO	X7R	Y5V
0603	100	0.5 ~ 1000	150 ~ 100,000	2,200 ~ 100,000	1808	2000	10 ~ 470	150 ~ 10,000	------
	200	0.5 ~ 1000	150 ~ 10,000	--------		3000	10 ~ 330	150 ~ 4,700	------
0805	100	0.5 ~ 4,700	150 ~ 100,000	10,000 ~ 100,000		4000	10 ~ 33	150 ~ 2,200	------
	200	0.5 ~ 4,700	150 ~ 22,000	10,000 ~ 47,000		5000	10 ~ 33		
	250	0.5 ~ 1,500	150 ~ 22,000	10,000 ~ 47,000	1812	100	10 ~ 10,000	150 ~ 1,000,000	150,000 ~ 2,200,000
	500	0.5 ~ 560	150 ~ 10,000	------		200	10 ~ 6,800	150 ~ 560,000	100,000 ~ 470,000
1206	100	0.5 ~ 3,300	150 ~ 470,000	10,000 ~ 470,000		250	10 ~ 6,800	150 ~ 560,000	100,000 ~ 470,000
	200	0.5 ~ 2,700	150 ~ 220,000	10，000 ~ 220,000		500	10 ~ 4,700	150 ~ 150,000	------
	250	0.5 ~ 2,700	150 ~ 220,000	10，000 ~ 220,000		1000	10 ~ 1,200	150 ~ 56,000	------
	500	0.5 ~ 1,500	150 ~ 33，000	------		2000	10 ~ 1,000	150 ~ 12,000	------
	1000	0.5 ~ 1,000	150 ~ 10,000	------		3000	10 ~ 560	150 ~ 4,700	------
	2000	0.5 ~ 270	150 ~ 2,700	------		4000	10 ~ 220	150 ~ 3,300	------
1210	100	10 ~ 6,800	150 ~ 1,000,000	15,000 ~ 1,000,000		5000	10 ~ 68		
	200	10 ~ 3,300	150 ~ 220,000	15,000 ~ 470,000	2225	100	10 ~ 27,000	150 ~ 2,200,000	250,000 ~ 3,300,000
	250	10 ~ 3,300	150 ~ 220,000	15,000 ~ 470,000		200	10 ~ 12,000	150 ~ 1,200,000	220,000 ~ 2,200,000
	500	10 ~ 2,200	150 ~ 68,000	------		250	10 ~ 12,000	150 ~ 1,200,000	220,000 ~ 2,200,000
	1000	10 ~ 1,000	150 ~ 22,000	------		500	10 ~ 6,800	150 ~ 470,000	------
	2000	10 ~ 470	150 ~ 10,000	------		1000	10 ~ 3,900	150 ~ 100,000	------
1808	100	10 ~ 4,700	150 ~ 2,200,000	150,000 ~ 1,000,000		2000	10 ~ 1,000	150 ~ 47,000	------
	200	10 ~ 3,900	150 ~ 220,000	10,000 ~ 390,000		3000	10 ~ 680	150 ~ 15,000	------
	250	10 ~ 3,900	150 ~ 220,000	10,000 ~ 390,000		4000	10 ~ 560	150 ~ 6,800	------
	500	10 ~ 2,700	150 ~ 68,000	------		5000	10 ~ 120	150 ~ 3,300	------
	1000	10 ~ 1,000	150 ~ 22,000	------					

• Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.00±0.20 1.25±0.20	0.50±0.20
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.00±0.20 1.25±0.20	0.60±0.30
1210	3225	3.20±0.30	2.50±0.30	≤2.8	0.60±0.30
1808	4520	4.50±0.40	2.00±0.20	≤2.2	0.60±0.30
1812	4532	4.50±0.40	3.20±0.30	≤3.5	0.60±0.30
2225	5763	5.70±0.50	6.30±0.50	≤6.2	0.60±0.30

• Capacitance Range

Size	Rated Voltage	Capacitance Range(pf)			Size	Rated Voltage	Capacitance Range(pf)		
		NPO	X7R	Y5V			NPO	X7R	Y5V
0603	100	0.5～1000	150～100,000	2，200～100,000	1808	2000	10～470	150～10,000	------
	200	0.5～1000	150～10,000	--------		3000	10～330	150～4,700	------
0805	100	0.5～4,700	150～100,000	10,000～100,000		4000	10～33	150～2,200	------
	200	0.5～4,700	150～22,000	10,000～47,000		5000	10～33		
	250	0.5～1,500	150～22,000	10,000～47,000	1812	100	10～10,000	150～1,000,000	150,000～2,200,000
	500	0.5～560	150～10,000	------		200	10～6,800	150～560,000	100,000～470,000
1206	100	0.5～3,300	150～470,000	10,000～470,000		250	10～6,800	150～560,000	100,000～470,000
	200	0.5～2,700	150～220,000	10，000～220,000		500	10～4,700	150～150,000	------
	250	0.5～2,700	150～220,000	10，000～220,000		1000	10～1,200	150～56,000	------
	500	0.5～1,500	150～33，000	------		2000	10～1,000	150～12,000	------
	1000	0.5～1,000	150～10,000	------		3000	10～560	150～4,700	------
	2000	0.5～270	150～2,700	------		4000	10～220	150～3,300	------
1210	100	10～6,800	150～1,000,000	15,000～1,000,000		5000	10～68		
	200	10～3,300	150～220,000	15,000～470,000	2225	100	10～27,000	150～2,200,000	250,000～3,300,000
	250	10～3,300	150～220,000	15,000～470,000		200	10～12,000	150～1,200,000	220,000～2,200,000
	500	10～2,200	150～68,000	------		250	10～12,000	150～1,200,000	220,000～2,200,000
	1000	10～1,000	150～22,000	------		500	10～6,800	150～470,000	------
	2000	10～470	150～10,000	------		1000	10～3,900	150～100,000	------
1808	100	10～4,700	150～2,200,000	150,000～1,000,000		2000	10～1,000	150～47,000	------
	200	10～3,900	150～220,000	10,000～390,000		3000	10～680	150～15,000	------
	250	10～3,900	150～220,000	10,000～390,000		4000	10～560	150～6,800	------
	500	10～2,700	150～68,000	------		5000	10～120	150～3,300	------
	1000	10～1,000	150～22,000	------					

項目	COG中高壓片容																	
尺寸	0603		0805				1206						1210					
工作電壓(V)	100	200	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000
電容量																		
0.5PF																		
1PF																		
4PF																		
5PF																		
8PF																		
10PF																		
15PF																		
18PF																		
22PF																		
33PF																		
47PF																		
68PF																		
100PF																		
120PF																		
150PF																		
180PF																		
220PF																		
270PF																		
330PF																		
470PF																		
560PF																		
680PF																		
820PF																		
1000PF																		
1500PF																		
1800pf																		
2200PF																		
2700PF																		
3300PF																		
4700PF																		
5600PF																		
6800PF																		

Item	COG Medium-voltage MLCC																	
Dimension	0603		0805				1206						1210					
Rated Volatage(V)	100	200	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000
Capacitance																		
0.5PF																		
1PF																		
4PF																		
5PF																		
8PF																		
10PF																		
15PF																		
18PF																		
22PF																		
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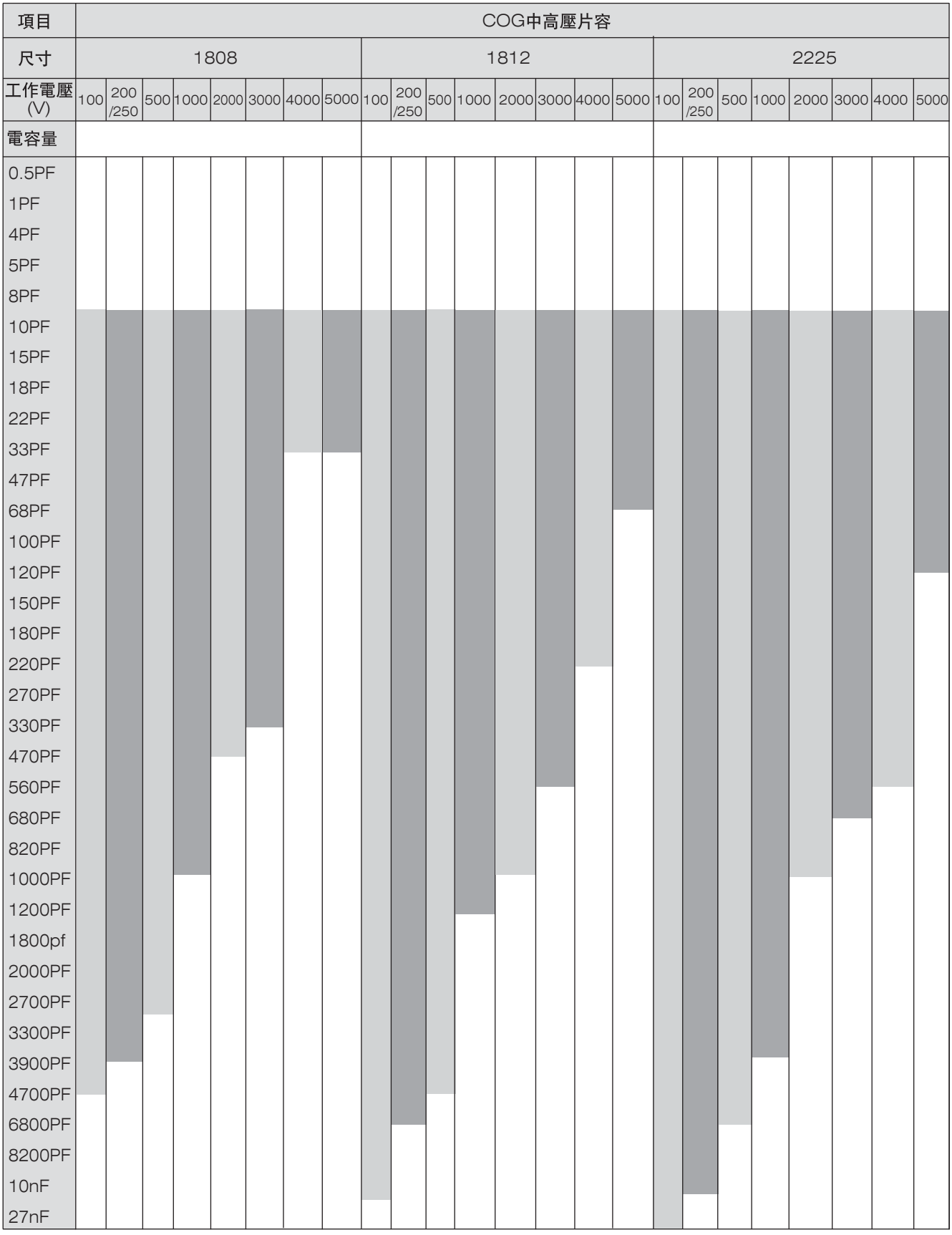
2200PF																		
2700PF																		
3300PF																		
4700PF																		
5600PF																		
6800PF																		


項目
COG中高壓片容
尺寸
1808
1812
2225
工作電壓 (V)
100
200 /250
500
1000
2000
3000
4000
5000
電容量
0.5PF
1PF
4PF
5PF
8PF
10PF
15PF
18PF
22PF
33PF
47PF
68PF
100PF
120PF
150PF
180PF
220PF
270PF
330PF
470PF
560PF
680PF
820PF
1000PF
1200PF
1800pf
2000PF
2700PF
3300PF
3900PF
4700PF
6800PF
8200PF
10nF
27nF

Item	COG Medium-voltage MLCC																							
Dimension	1808								1812								2225							
Rated Volatage(V)	100	200 /250	500	1000	2000	3000	4000	5000	100	200 /250	500	1000	2000	3000	4000	5000	100	200 /250	500	1000	2000	3000	4000	5000
Capacitance																								
0.5PF																								
1PF																								
4PF																								
5PF																								
8PF																								
10PF																								
15PF																								
18PF																								
22PF																								
33PF																								
47PF																								
68PF																								
100PF																								
120PF																								
150PF																								
180PF																								
220PF																								
270PF																								
330PF																								
470PF																								
560PF																								
680PF																								
820PF																								
1000PF																								
1200PF																								
1800pf																								
2000PF																								
2700PF																								
3300PF																								
3900PF																								
4700PF																								
6800PF																								
8200PF																								
10nF																								
27nF																								

項目	X7R中高壓片容																	
尺寸	0603		0805				1206						1210					
工作電壓 (V)	100	200	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000
電容量																		
100PF																		
150PF																		
330PF																		
470PF																		
680PF																		
1000PF																		
1.5nF																		
2.2nF																		
3.3nF																		
4.7nF																		
6.8nF																		
10nF																		
12nF																		
15nF																		
22nF																		
27nF																		
33nF																		
39nF																		
47nF																		
56nF																		
68nF																		
100nF																		
120nF																		
150nF																		
220nF																		
270nF																		
330nF																		
470nF																		
680nF																		
1μF																		
2.2μF																		
4.7μF																		
10μF																		
22μF																		

Item	X7R Medium-voltage MLCC																	
Dimension	0603		0805				1206						1210					
Rated Volatage(V)	100	200	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000
Capacitance																		
100PF																		
150PF																		
330PF																		
470PF																		
680PF																		
1000PF																		
1.5nF																		
2.2nF																		
3.3nF																		
4.7nF																		
6.8nF																		
10nF																		
12nF																		
15nF																		
22nF																		
27nF																		
33nF																		
39nF																		
47nF																		
56nF																		
68nF																		
100nF																		
120nF																		
150nF																		
220nF																		
270nF																		
330nF																		
470nF																		
680nF																		
1 μF																		
2.2 μF																		
4.7 μF																		
10 μF																		
22 μF																		

項目	X7R中高壓片容																			
尺寸	1808							1812							2225							
工作電壓(V)	100	200/250	500	1000	2000	3000	4000	100	200/250	500	1000	2000	3000	4000	100	200/250	500	1000	2000	3000	4000	5000
電容量																						
100PF																						
150PF																						
330PF																						
470PF																						
680PF																						
1000PF																						
1nF																						
2.2nF																						
3.3nF																						
4.7nF																						
6.8nF																						
10nF																						
12nF																						
15nF																						
22nF																						
27nF																						
33nF																						
39nF																						
47nF																						
56nF																						
68nF																						
100nF																						
120nF																						
150nF																						
220nF																						
270nF																						
330nF																						
470nF																						
680nF																						
1μF																						
2.2μF																						
3.3μF																						
10μF																						
22μF																						

Item	X7R Medium-voltage MLCC																			
Dimension	1808							1812							2225							
Rated Volatage(V)	100	200 /250	500	1000	2000	3000	4000	100	200 /250	500	1000	2000	3000	4000	100	200 /250	500	1000	2000	3000	4000	5000
Capacitance																						
100PF																						
150PF																						
330PF																						
470PF																						
680PF																						
1000PF																						
1nF																						
2.2nF																						
3.3nF																						
4.7nF																						
6.8nF																						
10nF																						
12nF																						
15nF																						
22nF																						
27nF																						
33nF																						
39nF																						
47nF																						
56nF																						
68nF																						
100nF																						
120nF																						
150nF																						
220nF																						
270nF																						
330nF																						
470nF																						
680nF																						
1μF																						
2.2μF																						
3.3.μF																						
10μF																						
22μF																						

項目	Y5V中高壓片容															
尺寸	0603	0805			1206			1210			1812			2225		
工作電壓 (V)	100	100	200	250	100	200	250	100	200	250	100	200	250	100	200	250
電容量																
1000PF																
1.5nF																
2.2nF																
3.3nF																
4.7nF																
6.8nF																
10nF																
12nF																
15nF																
22nF																
27nF																
33nF																
39nF																
47nF																
56nF																
68nF																
100nF																
150nF																
220nF																
270nF																
330nF																
390nF																
470nF																
680nF																
820nF																
1μF																
2.2μF																
3.3μF																
10μF																

Item	Y5V Medium-voltage MLCC															
Dimension	0603	0805			1206			1210			1812			2225		
Rated Volatage(V)	100	100	200	250	100	200	250	100	200	250	100	200	250	100	200	250
Capacitance																
1000PF																
1.5nF																
2.2nF																
3.3nF																
4.7nF																
6.8nF																
10nF																
12nF																
15nF																
22nF																
27nF																
33nF																
39nF																
47nF																
56nF																
68nF																
100nF																
150nF																
220nF																
270nF																
330nF																
390nF																
470nF																
680nF																
820nF																
1 μF																
2.2 μF																
3.3 μF																
10 μF																

■ 直流中高壓COG片容可靠性測試方法

<table>
<tr><th>編號</th><th>項目</th><th>標準</th><th>測試方法</th></tr>
<tr><td>1</td><td>工作温度範圍</td><td>-55℃～125℃</td><td></td></tr>
<tr><td>2</td><td>外觀</td><td>1.瓷體顏色一致性好。
2.芯片無可見損傷,光滑平整。
3.瓷體無外露電極,裂痕,孔洞。
4.端電極無裂痕,孔洞,磨損及表面氧化等。
5.端電極應無延伸現象或延伸部分不超過端頭寬度的一半。</td><td>※在≥10×倍以上的顯微鏡下觀察。</td></tr>
<tr><td>3</td><td>尺寸</td><td>在規定尺寸範圍內</td><td>※使用千分尺或游標卡尺。</td></tr>
<tr><td>4

5</td><td>電容量

損耗因數(D.F.)</td><td>在規定偏差範圍內

Cr<5PF　≤0.56%
5PF≤Cr<50PF　$1.5[(150/Cr)+7]\times10^{-4}$
Cr≥50PF　≤0.15%</td><td>※測試儀器:HP4278A電橋、HP4284電橋。
※測試條件：1.測試温度：25℃±5℃，濕度:30%～75%。
2.測試電壓：1.0±0.2V。
3.測試頻率：C<1000PF,1.0±0.1MHz;
C≥1000PF,1.0±0.1KHZ</td></tr>
<tr><td>6</td><td>絶緣電阻
(I.R.)</td><td>C<10nF，IR≥$5\times10^{10}\Omega$
C>10nF，IR×CR≥500S</td><td>※測試儀器:絶緣電阻測試儀(如:SF2511絶緣測試機)。
※測試方法:施加額定工作電壓，若額定工作電壓>500V，按500V測試,在60±5 秒内測量絶緣電阻。</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">耐電壓强度</td><td colspan="2">要求</td><td>額定電壓</td><td>最大充電電流</td><td>測試時間</td></tr>
<tr><td colspan="2">耐電壓值>2倍額定電壓</td><td>100V≤Ur<500V</td><td>50mA</td><td>5S</td></tr>
<tr><td colspan="2">耐電壓值>1．5倍額定電壓</td><td>500V≤Ur≤1000V</td><td>50mA</td><td>5S</td></tr>
<tr><td colspan="2">耐電壓值>1．2倍額定電壓</td><td>1000V<Ur≤2000V</td><td>50mA</td><td>5S</td></tr>
<tr><td colspan="2">耐電壓值>1．2倍額定電壓</td><td>>2000V</td><td>10mA</td><td>5S</td></tr>
<tr><td>8</td><td>電容量温度特性</td><td>在工作温度範圍内符合電容器特性温度系數要求</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。
※在 -55～125℃範圍内測試電容量，其電容值相對于20℃時數值的變化率應在規定範圍内。</td></tr>
<tr><td>9</td><td>可焊性</td><td>75% 端電極覆蓋錫</td><td>※將電容器浸在乙醇和松香溶液中。然后浸入 有鉛235±5℃(無鉛245±5℃) 的混合焊錫溶液 2±0.5 秒。浸入速度：25±2.5mm/秒。</td></tr>
<tr><td>10</td><td>耐焊接熱</td><td>外觀 / 無明顯缺陷
電容量變化率 / ≤±5%或±0.5PF,取兩者中最大的。
D.F. / 同初始標准
I.R. / 同初始標准</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。
※然后按下表預熱電容器。將電容器浸入 265±5℃ 的混合焊錫溶液10±1 秒。再在室温條件下放置24±2 小時，然后進行測量。浸入速度：25±2.5mm/秒。
※預熱條件如下:
<table>
<tr><th>階段</th><th>温度</th><th>時間</th></tr>
<tr><td>1</td><td>100℃—120℃</td><td>1分鐘</td></tr>
<tr><td>2</td><td>170℃—200℃</td><td>1分鐘</td></tr>
</table></td></tr>
</table>

■ Middle and high Voltage COG MLCC reliability test method

<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>1</td><td>Operating Temperature Range</td><td colspan="2">-55℃～125℃</td><td></td></tr>
<tr><td>2</td><td>Appearance</td><td colspan="2">1.Good ceramic body color continuity.
2.The chips have no visual damages and must be very smooth.
3.No exposed inner-electrode, no cracks or holes.
4.The outer electrode should have no cracks, holes, damages or surface oxidation.
5.Outer electrode no prolongation or the prolongation is less than half of that of the termination width.</td><td>※Check by using microscope ≥10×.</td></tr>
<tr><td>3</td><td>Dimensions</td><td colspan="2">Within the specified dimensions</td><td>※Using micrometer or vernier calipers</td></tr>
<tr><td>4</td><td>Capacitance</td><td colspan="2">Within the specified tolerance</td><td rowspan="2">※Measuring Equipment:HP4278 capacitance meter,HP4284 capacitance,
※Measuring Conditions:
1.Measuring Temperature:25℃±5℃.Humidity: 30%~75%.
2.Measuring Voltage:1.0±0.2V.
3.Measuring Frequency:C<1000PF，1.0±0.1MHz
C≥1000PF，1.0±0.1KHz</td></tr>
<tr><td>5</td><td>Dissipation Factor (DF)</td><td colspan="2">Cr<5PF ≤0.56%
5PF≤Cr<50PF 1.5[(150/Cr)+7]×10^{-4}
Cr≥50PF ≤0.15%</td></tr>
<tr><td>6</td><td>Insulation Resistance</td><td colspan="2">C<10nF,IR≥5×10^{10}Ω
C>10nF,IR×CR≥500S</td><td>※Measuring Equipment:Insulation resistance meter (such as Sf2511 insulation resistance).
※Measuring Method:Must measure at rated voltage, and if Ur>500V,then just use 500V,measure the IR within 60±1 seconds.</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Withstanding Voltage</td><td>Requirement</td><td>Ur</td><td>Max. Current</td><td>Measuring Time</td></tr>
<tr><td>>2Ur</td><td>100V≤Ur<500V</td><td>50mA</td><td>5S</td></tr>
<tr><td>>1.5Ur</td><td>500V≤Ur≤1000V</td><td>50mA</td><td>5S</td></tr>
<tr><td>>1.2Ur</td><td>1000V<Ur≤2000V</td><td>50mA</td><td>5S</td></tr>
<tr><td>>1.2Ur</td><td>>2000V</td><td>10mA</td><td>5S</td></tr>
<tr><td>8</td><td>Capacitance Temperature Characteristics</td><td colspan="2">Must meet the capacitor temperature coefficient requirements within the operating temperature range.</td><td>※First, pre-heat: heat treat 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Measure the capacitance at 55~125℃ or 55~85℃, the capacitance change ratio comparing to that of 20℃ must be within the specified range.</td></tr>
<tr><td>9</td><td>Solderability</td><td colspan="2">Tin coverage 75% should be of the outer electrode covered by Tin</td><td>※Dip the capacitor into ethanol or colophony solution, and then dip it into 235±5℃ eutectic solder solution for 2±0.5 seconds. Dipping speed: 25±2.5mm/second.</td></tr>
<tr><td rowspan="4">10</td><td rowspan="4">Resistance to Soldering</td><td>Appearance</td><td>No defects visible</td><td rowspan="4">※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 265±5℃ eutectic solder solution for 10±1 seconds. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second.
※Preheat conditions:
<table><tr><th>Stage</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1minutes</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1minutes</td></tr></table></td></tr>
<tr><td>Cap. Change ratio</td><td>≤±5% or ±0.5PF whichever is bigger</td></tr>
<tr><td>DF</td><td>Same as original standard</td></tr>
<tr><td>IR</td><td>Same as original standard</td></tr>
</table>

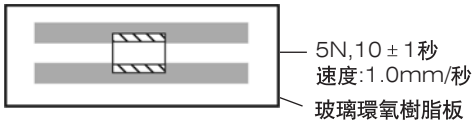
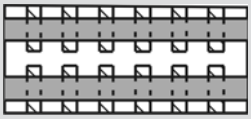
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td>11</td><td>端電極結合强度</td><td colspan="2">不應出現端頭脱落或其它缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 1 中所示的測試夾具(玻璃環氧樹脂板）上。然后沿箭頭方向施加 10N 的力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

圖1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">耐震動性</td><td>外觀</td><td>無明顯缺陷</td><td rowspan="3">※將電容器焊接在測試夾具(玻璃環氧樹脂板）上。電容器應進行簡諧運動，其總幅值爲 1.5mm，頻率在近似 10—55Hz 之間均匀變化。頻率範圍(從 10 至 55Hz 再返回 10Hz）應在約 1 分鐘内完成。振動應在三個相互垂直方向各進行 2 小時(總計 6 小時）。
 
圖2</td></tr>
<tr><td>電容量</td><td>在規定偏差範圍内</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>3</td><td>抗彎曲性能</td><td colspan="2">不應出現裂縫或其他缺陷。

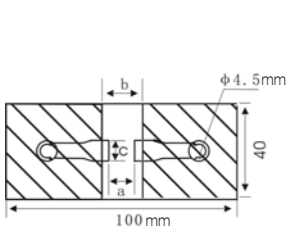
電容量變化率:
在±10%範圍内</td><td>※使用混合焊錫將電容器焊接在圖 3 中所示的測試夾具(玻璃環氧樹脂板）上，然后在圖 4 所示的方向加力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

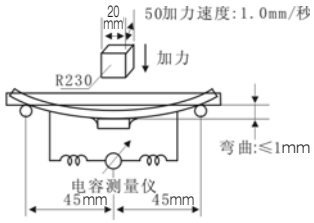
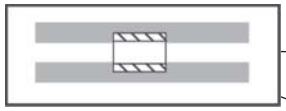
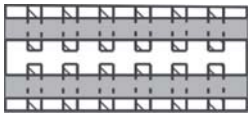
图3
 

图4
<table><tr><th rowspan="2">L×W
(mm)</th><th colspan="4">尺寸(mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr><tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr><tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr></table></td></tr>
<tr><td>14</td><td>温度循環</td><td>外觀</td><td>無缺陷或异常</td><td>※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。
※按照下表中列出的四種熱處理方法執行五次循環。
在室温條件下放置 24±2 小時，然后進行測量。</td></tr>
</table>

<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>11</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the termination or other defect shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder.Then apply a 10N force inthe direction shown as the arrowhead.The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock,etc.
 
5N,10±1s
Speed:1.0mm/s
Glss epoxy resin board
Fig.1</td></tr>
<tr><td>12</td><td>Vibration Resistance</td><td>Appearance
Capacitance
DF</td><td>No defects or abnormities
Within the specified tolerance range
Same as original standard</td><td>※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute.This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total is 6 hours).
 
Fig.2</td></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">No cracks or other defects shall occur

Cap. Change ratio :

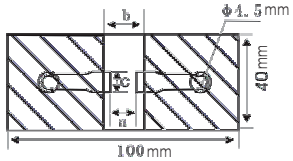
within ±10%</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a force in the direction shown in Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.
 

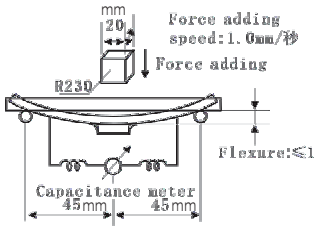
Fig.3
 

Fig.4
<table><tr><th rowspan="2">L×W (mm)</th><th colspan="4">Dimension</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr><tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr><tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr></table></td></tr>
<tr><td>14</td><td>Temperature Cycle</td><td>Appearance</td><td>No defects or abnormities</td><td>※Pre-treatment: Heat-treat the capacitor for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Perform five cycles according to the four heat treatments listed in the following table. Set it for 24±2 hours at room temperature, the measure.</td></tr>
</table>

<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td rowspan="3">14</td><td rowspan="3">温度循環</td><td>電容量</td><td>⩽ ± 1%或
± 1PF,取兩
者中最大的。</td><td rowspan="3">熱處理方法如下表:
<table><tr><th>階段</th><th>温度(℃)</th><th>時間(min.)</th></tr><tr><td>1</td><td>最低工作温度 ± 3</td><td>30 ± 3</td></tr><tr><td>2</td><td>常温</td><td>2—3</td></tr><tr><td>3</td><td>最高工作温度 ± 2</td><td>30 ± 3</td></tr><tr><td>4</td><td>常温</td><td>2—3</td></tr></table></td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>大于10000MΩ</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">濕度(穩態)</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40 ± 2℃和 90—95% 相對濕度條件下放置500+24/-0小時。然后將其移動到室温條件下恢復放置 24 ± 2 小時，進行測量。</td></tr>
<tr><td>電容量</td><td>⩽ ± 2%或
± 1PF,取兩
者中最大的。</td></tr>
<tr><td>D.F.</td><td>⩽2倍初始標准</td></tr>
<tr><td>I.R.</td><td>Ri⩾2500MΩ 或
Ri*C_R⩾25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">壽命</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在上限温度下施加1.5倍的額定工作電壓1000 ± 12小時，充放電電流不超過50mA。將其移動到室温條件下恢復放置 24 ± 2 小時，進行測量。(若額定工作電壓>2000V，就施加1.2倍的額定工作電壓試驗.)</td></tr>
<tr><td>電容量</td><td>⩽ ± 2%或
± 1PF,取兩
者中最大的。</td></tr>
<tr><td>D.F.</td><td>⩽2倍初始標准</td></tr>
<tr><td>I.R.</td><td>Ri⩾4000MΩ 或
Ri*C_R⩾40S</td></tr>
</table>

<table>
<tr><th>Number</th><th>Items</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td rowspan="3">14</td><td rowspan="3">Temperature Cycle</td><td>Cap. Change ratio</td><td>⩽±2% or ±1PF whichever is larger</td><td rowspan="3">※Heat-treatment:
<table><tr><th>Stage</th><th>Temperature（℃）</th><th>Time（min.）</th></tr><tr><td>1</td><td>lowest operating temperature±3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temperature</td><td>2—3</td></tr><tr><td>3</td><td>Highes operating temperature±2</td><td>30±3</td></tr><tr><td>4</td><td>Room Temperature</td><td>2—3</td></tr></table></td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>More than 10000MΩ</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Humidity Steady State</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Set the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Then remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>⩽±2% or ±1PF whichever is larger</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri⩾2500MΩ or Ri • C_R⩾25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Apply 1.5 times rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24±2 hours at room temperature, then measure.(If Ur>2000V,apply 1.2times Ur to test)</td></tr>
<tr><td>Cap. Change ratio</td><td>⩽±2% or ±1PF (whichever is larger)</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri⩾4000MΩ or Ri • C_R⩾40S</td></tr>
</table>

■ 直流中高壓X7R片容可靠性測試方法

編號	項目	標准	測試方法
1	工作温度範圍	-55℃～125℃	
2	外觀	1.瓷體顏色一致性好。 2.芯片無可見損傷,光滑平整。 3.瓷體無外露電極,裂痕,孔洞。 4.端電極無裂痕,孔洞,磨損及表面氧化等。 5.端電極應無延伸現象或延伸部分不超過端頭寬度的一半。	※在≥×10倍以上的顯微鏡下觀察。
3	尺寸	在規定尺寸範圍内	※使用千分尺或游標卡尺。
4	電容量	在規定偏差範圍内	※測試儀器: HP4278A電橋、HP4284電橋。 ※測試條件: 1.測試温度：25℃±5℃， 濕度:30%～75%。 2.測試電壓:1.0±0.2V。 3.測試頻率:1.0±0.1KHz。
5	損耗因數(D.F.)	$\leqslant 250\times10^{-4}$	
6	絶緣電阻(I.R.)	C≤25nF,IR≥10000MΩ C>25nF,R×C≥100S	※測試儀器:絶緣電阻測試儀(如:SF2511絶緣測試)。 ※測試方法:施加額定工作電壓，若額定工作電壓>500V，按500V測試,在60±5 秒内測量絶緣電阻。

7 耐電壓强度	要求	額定電壓	最大充電電流	測試時間
	耐電壓值>2倍額定電壓	100V≤Ur<500V	50mA	5S
	耐電壓值>1．5倍額定電壓	500V≤Ur≤1000V	50mA	5S
	耐電壓值>1．2倍額定電壓	1000V<Ur≤2000V	50mA	5S
	耐電壓值>1．2倍額定電壓	>2000V	10mA	5S

8	電容量温度特性	在工作温度範圍内符合電容器特性温度系數要求	※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。 ※在 -55～125℃範圍内測試電容量，其電容值相對于 20℃ 時數值的變化率應在規定範圍内。
9	可焊性	75% 端電極覆蓋錫	※將電容器浸在乙醇和松香溶液中。然后浸入 有鉛235±5℃（ 無鉛245±5℃） 的混合焊錫溶液 2±0.5 秒。 浸入速度：25±2.5mm/秒。

■ General X7R MLCC reliability test method

Number	Item	Standard	Test Method
1	Operating Temperature Range	-55℃～125℃	
2	Appearance	1.Good ceramic body color continuity. 2.The chips have no visualdamages and must be very smooth. 3.No exposed inner- electrode, no cracks or holes. 4.The outer electrode should have no cracks, holes, damages or surface oxidation. 5.Outer electrode no prolongation or the prolongation is less than half of the termination width.	※Check by using microscope ≥×10 .
3	Dimensions	Within the specified dimensions	※Using micrometer or vernier calipers
4	Capacitance	Within the specified tolerance	※Measuring Equipments: HP4278 capacitance meter, HP4284 capacitance, ※Measuring Conditions: 1.Measuring Temperature: 25℃±5℃. Humidity: 30%～75%. 2.Measuring Voltage: 1.0±0.2V. 3.Measuring Frequency:1.0±0.1KHz
5	Dissipation Factor (DF)	250×10^{-4}	
6	Insulation Resistance	C≤25nF,IR≥10000MΩ C>25nF,R×C≥100S	※Measuring Equipment: Insulation resistance meter (such as Sf2511 insulation resistance). ※Measuring Method: Must measure at rated voltage, and measure the IR within 60±1 seconds.
7	Withstanding Voltage	Requirement	Ur / Max. Current / Measuring Time
		>2Ur	100≤Ur<5000V / 50mA / 5S
		>1.5Ur	500V≤Ur≤1000V / 50mA / 5S
		>1.2Ur	1000V<Ur≤2000V / 50mA / 5S
		>1.2Ur	>2000V / 10mA / 5S
8	Capacitance Temperature Characteristics	Must meet the capacitor character temperature coefficient requirements within the operating temperature range.	※First, pre-heat: heat treat 60±5 minutes at 150+0/-10℃,then set it for 24±2 hours at room temperature. ※Measure the capacitance at -55～125℃ ,the capacitance change ratio comparing to that of 20℃ must be within the specified range.
9	Solderability	75% of the outer electrode should be covered by Tin	※Dip the capacitor into ethanol or colophony solution,and then dip it into 245±5℃ eutectic solder solution for 2±0.5 seconds. Dipping speed:25±2.5mm/second.

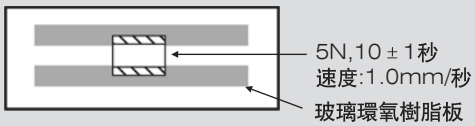
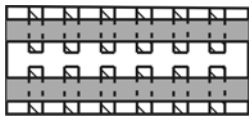
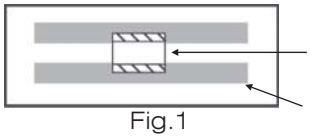
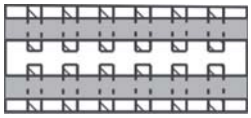
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">耐焊接熱</td><td>外觀</td><td>無明顯缺陷</td><td rowspan="4">※首先進行預處理：進行 150+0/-10℃熱處理 60±5 分鐘，然后在室温條件下放置 24±2 小時。
※然后按下表預熱電容器。將電容器浸入 265±5℃ 的混合焊錫溶液 10±1秒。再在室温條件下放置24±2 小時，然后進行測量。
浸入速度：25±2.5mm/秒。
※預熱條件如下:
<table><tr><th>階段</th><th>温度</th><th>時間</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1分鐘</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1分鐘</td></tr></table></td></tr>
<tr><td>電容量變化率</td><td>在±10%範圍內</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>同初始標准</td></tr>
<tr><td>11</td><td>端電極結合强度</td><td colspan="2">不應出現端電極脱落或其它缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 1 中所示的測試夾具（ 玻璃環氧樹脂板）上。然后沿箭頭方向施加 10N 的力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

圖1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">耐振動性</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="3">※將電容器焊接在測試夾具（ 玻璃環氧樹脂板）上。電容器應進行簡諧運動，其總幅值爲 1.5mm，頻率在近似10—55Hz 之間均匀變化。頻率範圍（ 從10至55Hz再返回 10Hz）應在約1分鐘内完成。振動應在三個相互垂直方向各進行2小時（ 總計 6 小時）。
 
圖2</td></tr>
<tr><td>電容量</td><td>在規定偏差範圍內</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">不應出現裂痕或其他缺陷</td><td>※使用混合焊錫將電容器焊接在圖 3 中所示的測試夾具(玻璃環氧樹脂板)上，然后在圖 4 所示的方向加力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。</td></tr>
</table>

<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">Resistance to Soldering</td><td>Appearance</td><td>No defects visible</td><td rowspan="4">※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 265±5℃ eutectic solder solution for 10±1s. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second.
※Preheat conditions:
<table><tr><th>Stage</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1minute</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1minute</td></tr></table></td></tr>
<tr><td>Cap. Change ratio</td><td>Within ±10%</td></tr>
<tr><td>DF</td><td>Same as original spec.</td></tr>
<tr><td>IR</td><td>Same as original spec.</td></tr>
<tr><td>11</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defect shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder. Then apply a 10N force in the direction shown as the arrowhead. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.
 
5N,10±1s
Speed:1.0mm/s
Glss epoxy resinboard
Fig.1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Resistance to Soldering</td><td>Appearance</td><td>No defects visible or abnormities</td><td rowspan="3">※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute. This motion shall be applied for a period of 2 hours in
each 3 mutually perpendicular directions (total is 6 hours).
 
Fig.2</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance range</td></tr>
<tr><td>D.F.</td><td>Same as original spec.</td></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">No cracks or other defects shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a force in the direction shown as Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.</td></tr>
</table>

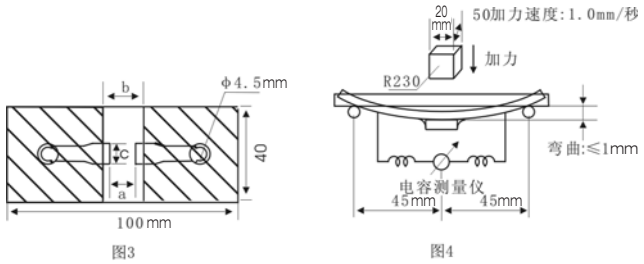
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標準</th><th>測試方法</th></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">電容量變化率:
在±10%範圍內</td><td>


图3 图4
<table>
<tr><th rowspan="2">L×W
(mm)</th><th colspan="4">尺寸(mm)</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr>
<tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr>
<tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr>
</table>
</td></tr>
<tr><td>14</td><td>温度循環</td><td>外觀
電容量
變化率
D.F.
I.R.</td><td>無缺陷或异常
在±10%範圍內
同初始標准
同初始標准</td><td>
<table>
<tr><th>階段</th><th>温度(℃)</th><th>時間(min.)</th></tr>
<tr><td>1</td><td>最低工作温度±3</td><td>30±3</td></tr>
<tr><td>2</td><td>常温</td><td>2—3</td></tr>
<tr><td>3</td><td>最高工作温度±2</td><td>30±3</td></tr>
<tr><td>4</td><td>常温</td><td>2—3</td></tr>
</table>
</td></tr>
<tr><td>15</td><td>濕度(穩態)</td><td>外觀
電容量
變化率
D.F.
I.R.</td><td>無缺陷或异常
在±10%範圍內
≤2倍初始標准
Ri≥1000MΩ或
Ri*C_R≥25S</td><td>※在 40±2℃和 90—95% 相對濕度條件下放置 500+24/-0小時。
然后將其移動到室温條件下恢復放置 48±2 小時，進行測量。</td></tr>
<tr><td>16</td><td>壽命</td><td>外觀
電容量
變化率
D.F.
I.R</td><td>無缺陷或异常
在±20%範圍內
≤2倍初始標准
Ri≥2000MΩ或
Ri*C_R≥50S</td><td>※在上限温度下施加1.5倍的額定工作電壓1000±12小時，充放電電流不超過50mA。將其移動到室温條件下恢復放置 24±2 小時，進行測量。(若額定工作電壓>2000V，就施加1.2倍的額定工作電壓試驗.)</td></tr>
</table>

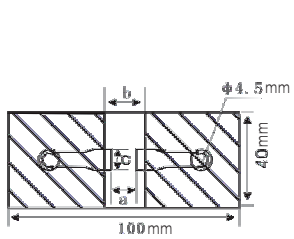
<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">Cap. Change ratio :
within ±10%</td><td> 

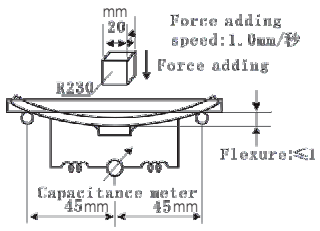
Fig. 3


Fig. 4
<table>
<tr><th rowspan="2">L×W (mm)</th><th colspan="4">Dimension</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr>
<tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr>
<tr><td>5.7×6.3</td><td>4.5</td><td>8.0</td><td>5.6</td></tr>
</table></td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">Temperature Cycle</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4"><table>
<tr><th>Stage</th><th>Temperature（℃）</th><th>Time（min.）</th></tr>
<tr><td>1</td><td>Min. Operating Temperature±3</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>2—3</td></tr>
<tr><td>3</td><td>Max. Operating Temperature 2</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>2—3</td></tr>
</table></td></tr>
<tr><td>Cap. Change ratio</td><td>Within ±10%</td></tr>
<tr><td>D.F.</td><td>Same as original Specification</td></tr>
<tr><td>I.R.</td><td>Same as original Specification</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Humidity Steady State</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">※Set the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Then remove and set it for 48±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>within ±10%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥1000MΩ or Ri • C_R≥25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects or abnonrmities</td><td rowspan="4">※Apply 1.5 times rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24±2 hours at room temperature, then measure.(If Ur>2000V,apply 1.2Ur to test.)</td></tr>
<tr><td>Cap. Change ratio</td><td>within ±20%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥2000MΩ or Ri • C_R≥50S</td></tr>
</table>

■ 直流中高壓Y5V片容可靠性測試方法

編號	項目	標准	測試方法
1	工作温度範圍	-25℃~85℃	
2	外觀	1.瓷體顏色一致性好。 2.芯片無可見損傷,光滑平整。 3.瓷體無外露電極,裂痕,孔洞。 4.端電極無裂痕,孔洞,磨損及表面氧化等。 5.端電極應無延伸現象或延伸部分不超過端頭寬度的一半。	※在≥×10倍以上的顯微鏡下觀察。
3	尺寸	在規定尺寸範圍内	※使用千分尺或游標卡尺。
4	電容量	在規定偏差範圍内	※測試儀器: HP4278A電橋、HP4284電橋。 ※測試條件: 1.測試温度:25℃±5℃, 濕度:30%~75%。 2.測試電壓:1.0±0.2V。 3.測試頻率:1.0±0.1kHz。
5	損耗因數(D.F.)	≤700×10⁻⁴（C<1.0μF） ≤900×10⁻⁴（C>1.0μF）	
6	絶緣電阻(I.R.)	C≤25nF,IR≥4000MΩ C>25nF,R×C≥100S	※測試儀器: 絶緣電阻測試儀(如: SF2511絶緣測試)。 ※測試方法: 施加額定工作電壓,在60±5 秒内測量絶緣電阻。
7	耐電壓强度	要求	額定電壓 / 最大充電電流 / 測試時間
		耐電壓值>2倍額定電壓	100V≤Ur<500V / 50mA / 5S
		耐電壓值>1.5倍額定電壓	500V≤Ur≤1000V / 50mA / 5S
		耐電壓值>1.2倍額定電壓	1000V<Ur≤2000V / 50mA / 5S
		耐電壓值>1.2倍額定電壓	>2000V / 10mA / 5S
8	電容量温度特性	在工作温度範圍内符合電容器特性温度系數要求	※首先進行預處理：進行 150+0/-10℃熱處理 60±5分鐘，然后在室温條件下放置 24±2 小時。 ※在-25~85℃範圍内測試電容量，其電容值相對于20℃時數值的變化率應在規定範圍内。
9	可焊性	75% 端電極覆蓋錫	※將電容器浸在乙醇和松香溶液中。 然后浸入有鉛235±5℃(無鉛245 ±5℃）的混合焊錫溶液 2±0.5 秒。浸入速度：25±2.5mm/秒。

■General Y5V MLCC reliability test method

Number	Item	Standard	Test Method
1	Operating Temperature Range	-25℃～85℃	
2	Appearance	1.Good ceramic body color continuity. 2.The chips have no visualdamages and must be very smooth. 3.No exposed inner- electrode, no cracks or holes. 4.The outer electrode should have no cracks, holes, damages or surface oxidation. 5.Outer electrode no prolongation or the prolongation is less than half of that of the termination width.	※Check by using microscope≥×10.
3	Dimensions	Within the specified dimensions	※Using micrometer or vernier calipers
4	Capacitance)	Within the specified tolerance	※Measuring Equipments: HP4278 capacitance meter, HP4284 capacitance, ※Measuring Conditions: 1.Measuring Temperature: 25℃±5℃. Humidity: 30%～75%. 2.Measuring Voltage: 1.0±0.2V. 3.Measuring Frequency: 1.0±0.1KHz
5	Dissipation Factor (DF)	≤700×10^{-4}（C<1.0μF） ≤900×10^{-4}（C>1.0μF）	
6	Insulation Resistance	C≤25nF,IR≥4000MΩ C>25nF,R×C≥100S	※Measuring Equipment: Insulation resistance meter (such as Sf2511 insulation resistance). ※Measuring Method: Must measure at rated voltage, and measure the IR within 60±5seconds.
7	Withstanding Voltage	Requirement	Ur / Max. Current / Measuring Time
		>2Ur	100V≤Ur<500V / 50mA / 5S
		>1.5Ur	500V≤Ur≤1000V / 50mA / 5S
		>1.2Ur	1000V<Ur≤2000V / 50mA / 5S
		>1.2Ur	>2000V / 10mA / 5S
8	Capacitance Temperature Characteristics	Must meet the capacitor temperature coefficient requirements within the operating temperature range.	※First, pre-heat: heat treat 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature. ※Measure the capacitance at 55～125℃ or 55～85℃,the capacitance change ratio comparing to that of 20℃ must be within the specified range.
9	Solderability	75% of the outer electrode should be covered by Tin	※Dip the capacitor into ethanol or colophony solution,and then dip it into 235±5℃(or 245±5℃ leadless eutectic solder solution) eutectic solder solution hanging lead for 2±0.5seconds. Dipping speed: 25±2.5mm/second.

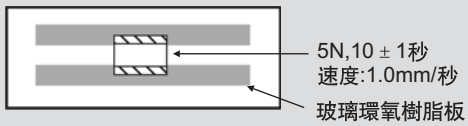
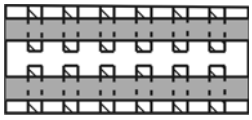
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標准</th><th>測試方法</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">耐焊接熱</td><td>外觀</td><td>無明顯缺陷</td><td rowspan="4">※首先進行預處理：進行 150+0/-10℃熱處理 60 ± 5 分鐘，然后在室温條件下放置 24 ± 2 小時。
※然后按下表預熱電容器。將電容器浸入 265 ± 5℃ 的混合焊錫溶液 10 ± 1 秒。再在室温條件下放置24 ± 2 小時，然后進行測量。浸入速度：25 ± 2.5mm/秒。
※預熱條件如下:
<table><tr><th>階段</th><th>温度</th><th>時間</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1分鐘</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1分鐘</td></tr></table></td></tr>
<tr><td>電容量變化率</td><td>在-10%~+20%範圍內</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>同初始標准</td></tr>
<tr><td>11</td><td>端電極結合强度</td><td colspan="2">不應出現端電極脱落或其它缺陷。</td><td>※使用混合焊錫將電容器焊接在圖 1 中所示的測試夾具(玻璃環氧樹脂板）上。然后沿箭頭方向施加 10N 的力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。
 

圖1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">耐振動性</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="3">※將電容器焊接在測試夾具(玻璃環氧樹脂板）上。電容器應進行簡諧運動，其總幅值爲 1.5mm，頻率在近似10—55Hz 之間均匀變化。頻率範圍(從10至55Hz再返回 10Hz）應在約1分鐘内完成。振動應在三個相互垂直方向各進行2小時(總計 6 小時）。
 
圖2</td></tr>
<tr><td>電容量</td><td>在規定偏差範圍内</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">不應出現裂痕或其他缺陷</td><td>※使用混合焊錫將電容器焊接在圖 3 中所示的測試夾具 (玻璃環氧樹脂板) 上，然后在圖 4 所示的方向加力。焊接應利用烙鐵或使用回流焊方法進行，而且應謹慎作業，以使焊接均匀且不會出現熱衝擊等不良現象。</td></tr>
</table>

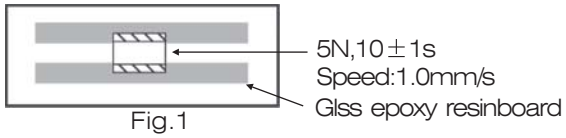
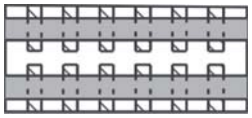
<table>
<tr><th>Number</th><th>Item</th><th colspan="2">Standard</th><th>Test Method</th></tr>
<tr><td rowspan="4">10</td><td rowspan="4">Resistance to Soldering</td><td>Appearance</td><td>No defects visible</td><td rowspan="4">※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.
※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 265±5℃ eutectic solder solution for 10±1s. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second.
※Preheat conditions:
<table><tr><th>Stage</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100℃—120℃</td><td>1minute</td></tr><tr><td>2</td><td>170℃—200℃</td><td>1minute</td></tr></table></td></tr>
<tr><td>Cap. Change ratio</td><td>Z5U, Y5V: within -10%~+20%</td></tr>
<tr><td>DF</td><td>Same as original spec.</td></tr>
<tr><td>IR</td><td>Same as original spec.</td></tr>
<tr><td>11</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defects shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder. Then apply a 10N force in the direction shown as the arrowhead. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.
 

Fig.1</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Resistance to Soldering</td><td>Appearance</td><td>No defects visible or abnormities</td><td rowspan="3">※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute. This motion shall be applied for a period of 2 hours in
each 3 mutually perpendicular directions (total is 6 hours).
 
Fig.2</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance range</td></tr>
<tr><td>D.F.</td><td>Same as original spec.</td></tr>
<tr><td>13</td><td>Bending Resistance</td><td colspan="2">No cracks or other defects shall occur</td><td>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a force in the direction shown as Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.</td></tr>
</table>

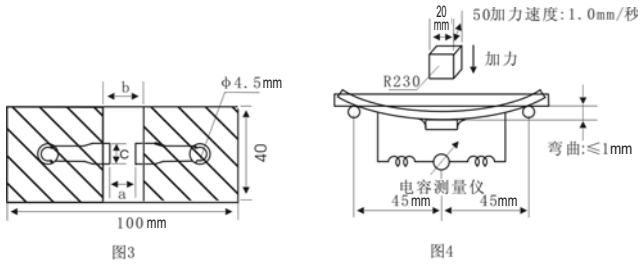
<table>
<tr><th>編號</th><th>項目</th><th colspan="2">標準</th><th>測試方法</th></tr>
<tr><td>13</td><td>抗彎曲性能</td><td colspan="2">電容量變化率:
在±10%範圍內</td><td>


图3 图4
<table>
<tr><th rowspan="2">L×W
(mm)</th><th colspan="4">尺寸(mm)</th></tr>
<tr><th>a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">1.0</td></tr>
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</table>
</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">温度循環</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">
<table>
<tr><th>階段</th><th>温度(℃)</th><th>時間(min.)</th></tr>
<tr><td>1</td><td>最低工作温度±3</td><td>30±3</td></tr>
<tr><td>2</td><td>常温</td><td>2—3</td></tr>
<tr><td>3</td><td>最高工作温度±2</td><td>30±3</td></tr>
<tr><td>4</td><td>常温</td><td>2—3</td></tr>
</table>
</td></tr>
<tr><td>電容量
變化率</td><td>在±20%範圍内</td></tr>
<tr><td>D.F.</td><td>同初始標准</td></tr>
<tr><td>I.R.</td><td>同初始標准</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">濕度(穩態)</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在 40±2℃和 90—95% 相對濕度條件下放置 500+24/-0小時。
然后將其移動到室温條件下恢復放置 48±2 小時，進行測量。</td></tr>
<tr><td>電容量
變化率</td><td>在±30%範圍内</td></tr>
<tr><td>D.F.</td><td>≤2倍初始標准</td></tr>
<tr><td>I.R.</td><td>Ri≥1000MΩ或
Ri*C_R≥25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">壽命</td><td>外觀</td><td>無缺陷或异常</td><td rowspan="4">※在上限温度下施加1.5倍的額定工作電壓1000±12小時，充
放電電流不超過50mA。將其移動到室温條件下恢復放置
48±2 小時，進行測量。</td></tr>
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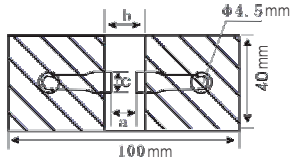
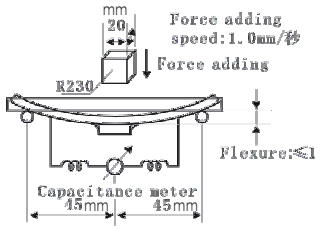


Fig. 3


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<table>
<tr><th>Stage</th><th>Temperature (℃)</th><th>Time (min.)</th></tr>
<tr><td>1</td><td>Min. Operating Temperature±3</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>2—3</td></tr>
<tr><td>3</td><td>Max. Operating Temperature 2</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>2—3</td></tr>
</table>
</td></tr>
<tr><td>Cap. Change ratio</td><td>Within±20%</td></tr>
<tr><td>D.F.</td><td>Same as original spec.</td></tr>
<tr><td>I.R.</td><td>Same as original spec.</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Humidity Steady State</td><td>Appearance</td><td>No defects or abnonrmities</td><td rowspan="4">※Set the capacitor for 500+24/-0 hours at the condition of 40±2℃ and 90-95% humidity. Then remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>within ±30%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥1000MΩ or Ri • C_R≥25S</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects or abnonrmities</td><td rowspan="4">※Apply 1.5 times rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Cap. Change ratio</td><td>within ±30%</td></tr>
<tr><td>D.F.</td><td>Not more than twice of initial value</td></tr>
<tr><td>I.R.</td><td>Ri≥2000MΩ or Ri • C_R≥50S</td></tr>
</table>

■封裝型中高壓片容

封裝型中高壓片容是在常規中高壓片容的基礎,封裝樹脂型包封層。該包封層有效地避免了高壓表面飛弧的產生，防潮性好。

- 特性

＊ 具有高的工作電壓。
＊ 優良的焊接性和耐焊性，適用于回流焊。

- 應用

＊ 應用于環境較苛刻，工作電壓高的電子綫路。

- 產品規格型號表示方法

2412 ① CG ② 101 ③ J ④ 502 ⑤ N ⑥ M ⑦

①尺寸		
型號	英制	公制
2412	0.24×0.12	6.00×3.20

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R

③標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}

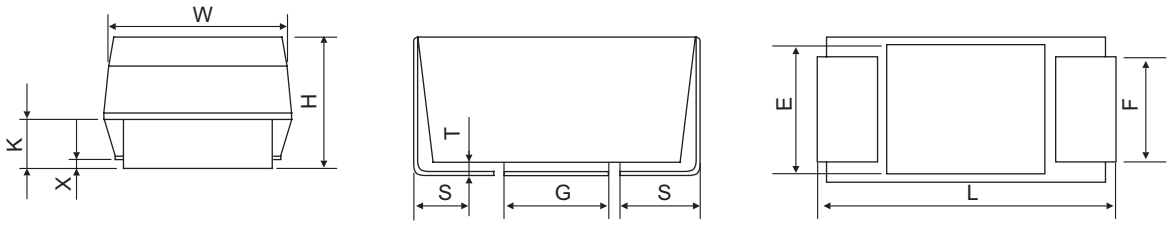
④誤差級別	
代碼	誤差
J	±5%
K	±10%

⑤工作電壓	
表示方法	額定電壓
402	4000V
502	5000V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
M	樹脂包封/ 可焊貼裝

- 外形尺寸



單位：mm

L	W	H	K	F	S	X	T	G	E
6.0±0.2	3.2±0.2	2.5±0.2	1.4	2.2	1.3	0.10±0.10	0.13	3.0	3.0

- 容量範圍

額定工作電壓	電容量範圍(PF)	
	NPO	X7R
4000V	0.5~470	150~1000
5000V	0.5~330	150~1000

■ Envelopment type middle/high voltage MLCC

Envelopment tupe middle/high voltage MLCC is made by enveloping a resin envelopment based on normal middle/high boltage MLCC.The envelopment layer can prevent the high voltage flash over problems and have good moistureproof property.

- Features

* High operating voltage.
* Good solder ability and soldering resistance properties,suitable for re-flow soldering.

* Application

Suitable for the circuits where have rigorous working environment and high operating voltage.

* Part number expressions

2412	CG	101	J	502	N	M
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Tupe	british (Inch)	metric (mm)
2412	0.24×0.12	6.00×3.20

②Dielectric Type	
Code	Dielectric Material
CG	COG or NPO
B	X7R

③Normal Capacitance	
Expression Method	Actual Value
100	10×10^{0}
101	10×10^{1}

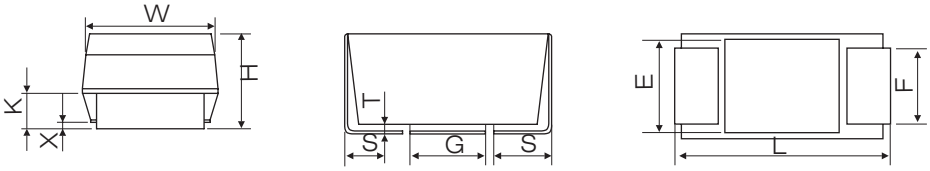
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
402	4000V
502	5000V

⑥Termination Type	
Expression Method	Termination
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
M	Bulk Plastic Box Packaging

* Outside dimensions



Unit:mm

L	W	H	K	F	S	X	T	G	E
6.0±0.2	3.2±0.2	2.5±0.2	1.4	2.2	1.3	0.10±0.10	0.13	3.0	3.0

* capacitance range

Work Voltage dielectric	Capacitor range(PF)	
	NPO	X7R
4000V	0.5～470	150～1000
5000V	0.5～330	150～1000

■ 大容量片容

大容量片容分爲X5R和Y5V片容。

- 特性

＊ 電容量較大,比容大。
＊ 疊層獨石結構,具有高可靠性。
＊ 優良的焊接性和耐焊性，適用于回流焊。

- 應用

＊ 應用于濾波、旁路電路。

- 產品規格型號表示方法

1206 ① B ② 105 ③ K ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0402	0.04 × 0.02	1.00 × 0.50
0603	0.06 × 0.03	1.60 × 0.80
0805	0.08 × 0.05	2.00 × 1.25
1206	0.12 × 0.06	3.20 × 1.60
1210	0.12 × 0.10	3.20 × 2.50
1812	0.18 × 0.12	4.50 × 3.20

②介質種類	
代碼	介質材料
X	X5R
F	Y5V

③標稱電容量(PF)	
表示方式	實際值
100	10×10^0
101	10×10^1
102	10×10^2

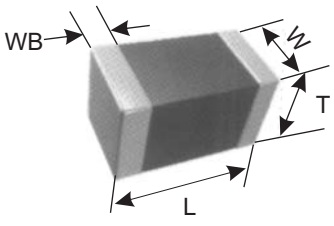
④誤差級別	
代碼	誤差
J	± 5%
K	± 10%

⑤工作電壓	
表示方法	額定電壓
6R3	6.3V
500	50V
101	100V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0402	1005	1.00 ± 0.05	0.50 ± 0.50	0.50 ± 0.50	0.25 ± 0.10
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.10
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.50 ± 0.20
1206	3216	3.20 ± 0.30	1.60 ± 0.20	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.60 ± 0.30
1210	3225	3.20 ± 0.30	2.50 ± 0.20	⩽2.00	0.50 ± 0.25
1812	4532	4.50 ± 0.40	3.20 ± 0.30	⩽2.50	0.50 ± 0.25

■ High layer MLCC

Big Capacitance MLCC including X7R and Y5V MLCC。

- Features

* Capacitance is big,unit capacitance is big.
* It has multi-layer monolithic structure, has high reliability.
* Good solderability and solder resistance,suitable for reflow soldering.

- Application

It is suitable for filter and bypassing circuits.

- Product Part Number Expression

1206	B	105	K	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04 × 0.02	1.00 × 0.50
0603	0.06 × 0.03	1.60 × 0.80
0805	0.08 × 0.05	2.00 × 1.25
1206	0.12 × 0.06	3.20 × 1.60
1210	0.12 × 0.10	3.20 × 2.50
1812	0.18 × 0.12	4.50 × 3.20

②Dielectric Type	
Code	Dielectric Material
X	X7R
F	Y5V

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

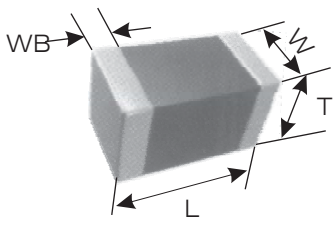
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
500	50V
101	100V

⑥Termination Type	
Expression Method	Termination
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension（mm）			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00 ± 0.05	0.50 ± 0.50	0.50 ± 0.50	0.25 ± 0.10
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.10
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.50 ± 0.20
1206	3216	3.20 ± 0.30	1.60 ± 0.20	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.60 ± 0.30
1210	3225	3.20 ± 0.30	2.50 ± 0.20	⩽2.00	0.50 ± 0.25
1812	4532	4.50 ± 0.40	3.20 ± 0.30	⩽2.50	0.50 ± 0.25

- 電容量範圍

項目	大容量X5R片容																			
尺寸	0603				0805				1206				1210				1812			
工作電壓	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
電容量																				
100nF																				
220nF																				
330nF																				
470nF																				
560nF																				
680nF																				
1 μF																				
2.2 μF																				
3.3 μF																				
4.7 μF																				
10 μF																				
22 μF																				
33 μF																				
47 μF																				
100 μF																				

項目	大容量Y5V片容																			
尺寸	0603				0805				1206				1210				1812			
工作電壓	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
電容量																				
1 μF																				
2.2 μF																				
3.3 μF																				
4.7 μF																				
10 μF																				
22 μF																				
33 μF																				
47 μF																				
56 μF																				
68 μF																				
82 μF																				
100 μF																				

- Capacitance Range

Item	X5R Big Capacitance MLCC																			
Dimension	0603				0805				1206				1210				1812			
Rated Volatage	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
Capacitance																				
100nF																				
220nF																				
330nF																				
470nF																				
560nF																				
680nF																				
1 μF																				
2.2 μF																				
3.3 μF																				
4.7 μF																				
10 μF																				
22 μF																				
33 μF																				
47 μF																				
100 μF																				

Item	Y5V Big Capacitance MLCC																			
Size	0603				0805				1206				1210				1812			
Rated Volatage	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
Capacitance																				
1 μF																				
2.2 μF																				
3.3 μF																				
4.7 μF																				
10 μF																				
22 μF																				
33 μF																				
47 μF																				
56 μF																				
68 μF																				
82 μF																				
100 μF																				

■ 0201片容

- 特性

＊ 小型芯片尺寸(長 × 寬 × 厚：0.6 × 0.3 × 0.3mm) ;
＊ 電容寄生電感小;
＊ 適合回流焊接;
＊ 適合微型微波組件、便携式機器及高頻電路。

- 應用

＊ 微型微波組件用;
＊ 便携式機器用;
＊ 高頻電路用。

- 產品規格型號表示方法

0201 ① CG ② 100 ③ J ④ 100 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0201	0.02 × 0.01	0.50 × 0.25

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R
F	Y5V

③標稱電容量(PF)	
表示方式	實際值
100	10×10^0
101	10×10^1
102	10×10^2

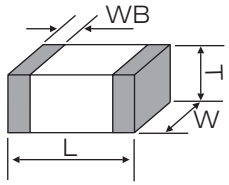
④誤差級別	
代碼	誤差
J	±5%
K	±10%
M	±20%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0201	0603	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	⩾0.10、⩽0.20

■ 0201 MLCC

• Features

* Small chip size .
* Terminations are made of metal highly resistant to migration.
* This type is suited to only reflow soldering.
* Suited to miniature micro wave module, portable equipment and high-frequency circuits.

• Applications

* Miniature micro wave module.
* Portable equipment;
* High-frequency circuits.

• Product Part Number Expression

0201	CG	100	J	100	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0201	0.02 × 0.01	0.5 × 0.25

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
B	X7R
F	Y5V

③Normal Capacitance	
Expression Method	Actual Value
100	10

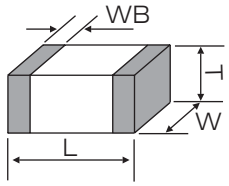
④Capacitance Tolerance	
Code	Tolerance
J	± 5%
K	± 10%
M	± 20%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3
100	10V
250	25V

⑥Termination Type	
Expression Method	Termination
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



Type		Dimension(mm)			
British expression	Metric expression	L	W	T	WB
0201	0603	0.60 ± 0.03	0.30 ± 0.03	0.3 ± 0.03	0.1 ~ 0.2

- 電容量範圍

項目	0201電容					
尺寸	COG	X7R	X5R		Y5V	
工作電壓	50V	10V/16V/25V	6.3V	10V	6.3V/10V	
電容量						電容量
0.5PF						0.5PF
1PF						1PF
2PF						2PF
4PF						4PF
5PF						5PF
10PF						10PF
20PF						20PF
33PF						33PF
47PF						47PF
100PF						100PF
220PF						220PF
330PF						330PF
470PF						470PF
680PF						680PF
1000PF						1000PF
1.5nF						1.5nF
2.2nF						2.2nF
3.3nF						3.3nF
4.7nF						4.7nF
6.8nF						6.8nF
10nF						10nF
15nF						15nF
33nF						33nF
47nF						47nF
100nF						100nF
470nF						470nF
1000nF						1000nF

- Capacitance Range

Item	0201 MLCC					
Dielectric Type	COG	X7R	X5R		Y5V	
Rated Volatage	50V	6.3V10V/16V	6.3V	10V	10V	
Capacitance						Capacitance
0.5PF						0.5PF
1PF						1PF
2PF						2PF
4PF						4PF
5PF						5PF
10PF						10PF
20PF						20PF
33PF						33PF
47PF						47PF
100PF						100PF
220PF						220PF
330PF						330PF
470PF						470PF
680PF						680PF
1000PF						1000PF
1.5nF						1.5nF
2.2nF						2.2nF
3.3nF						3.3nF
4.7nF						4.7nF
6.8nF						6.8nF
10nF						10nF
15nF						15nF
33nF						33nF
47nF						47nF
100nF						100nF
470nF						470nF
1000nF						1000nF

■ 超小型片容

- 特性

＊ 電容寄生電感小;
＊ 適合回流焊接;
＊ 小型化(尺寸0.4 × 0.2 × 0.2mm)
＊ 適合微型微波組件、便携式機器及高頻電路。

- 應用

＊ 功率放大器(PA) ;
＊ 壓控振蕩器(VCO) ;
＊ 高頻模塊。

- 產品規格型號表示方法

01005	CG	100	J	100	N	T
①	②	③	④	⑤	⑥	⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
01005	0.01×0.005	0.40×0.20

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R

③標稱電容量(PF)	
表示方式	實際值
100	10×10^0
103	10×10^3

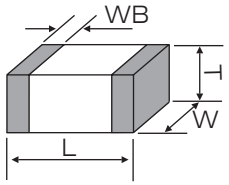
④誤差級別	
代碼	誤差
J	±5%
K	±10%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
160	16V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
01005	0402	0.40±0.02	0.20±0.02	0.20±0.02	0.07～0.14

■ Ultra-small size,the word's smallest

• Features

* Terminations are made of metal highly resistant to migration;
* Suited to only reflow soldering;
* For equipment miniaturization（dimension 0.4×0.2×0.2mm）;
* Suited to miniature micro wave module,portable equipment and high-frequency circuits.

• Application

* For PAs,VCOx and high frequency modules.

• Product Part Number Expression

01005 ① CG ② 100 ③ J ④ 100 ⑤ N ⑥ T ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
01005	0.01×0.005	0.40×0.20

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
B	X7R

③Normal Capacitance	
Expression Method	Actual Value
100	10×10^{0}
103	10×10^{3}

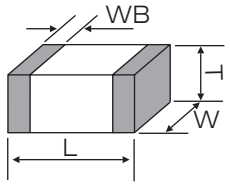
④Capacitance Tolerance	
Code	Tolerance
J	±5%
K	±10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3
100	10V
160	16V

⑥Termination Type	
Expression Method	Termination
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



Type		Dimension(mm)			
British expression	Metric expression	L	W	T	WB
01005	0402	0.40±0.02	0.20±0.02	0.20±0.02	0.07～0.14

項目	超小尺寸多層片式陶瓷電容器									
尺寸	01005		0201							
介質種類	COG	X7R	COG	X7R				Y5V		
工作電壓	10V	16V	25V	6.3V	10V	16V	25V	6.3V	16V	
電容量										電容量
0.5PF										0.5PF
10PF										10PF
20PF										20PF
47PF										47PF
100PF										100PF
1nF										1nF
1.5nF										1.5nF
2.2nF										2.2nF
3.3nF										3.3nF
4.7nF										4.7nF
6.8nF										6.8nF
10nF										10nF
15nF										15nF
22nF										22nF
33nF										33nF
47nF										47nF
68nF										68nF
100nF										100nF

Item	Ultra-small size Multilayer Chip Ceramic Capacitor									
Dimension	01005		0201							
Dielectric Type	COG	X7R	COG	X7R				Y5V		
Rated Volatage	10V	16V	25V	6.3V	10V	16V	25V	6.3V	16V	
Capacitance										Capacitance
0.5PF										0.5PF
10PF										10PF
20PF										20PF
47PF										47PF
100PF										100PF
1nF										1nF
1.5nF										1.5nF
2.2nF										2.2nF
3.3nF										3.3nF
4.7nF										4.7nF
6.8nF										6.8nF
10nF										10nF
15nF										15nF
22nF										22nF
33nF										33nF
47nF										47nF
68nF										68nF
100nF										100nF

■ 薄型電容器

- 特征

＊ 超薄尺寸,厚度爲0.3mm,0.4mm,0.5mm;
＊ 適合波峰焊及回流焊接;
＊ 非常適合小型電子產品生產及安裝在IC下。

- 應用

＊ IC卡或IC底座。
＊ 產品規格型號表示方法

0805 ① CG ② 100 ③ J ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0805	0.08 × 0.05	2.00 × 1.25
1206	0.12 × 0.06	3.20 × 1.60

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R

③標稱電容量(PF)	
表示方式	實際值
100	10×10^0
101	10×10^1
102	10×10^2

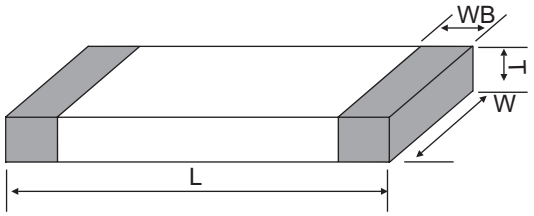
④誤差級別	
代碼	誤差
J	± 5%
K	± 10%

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
100	10V
250	25V
500	50V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.30 ± 0.10 0.40 ± 0.10 0.50 ± 0.10	0.50 ± 0.25
1206	3216	3.20 ± 0.30	1.60 ± 0.20	0.30 ± 0.10 0.40 ± 0.10 0.50 ± 0.10	0.50 ± 0.25

■Thin Type MLCC

- Features:

* Ultra-thin size,thickness is 0.3mm、0.4mm、0.5mm.
* This type is suited to flow and reflow soldering.
* Its thin package makes this series ideally suited for the production of small electronic products and for mounting underneath ICs.

- Applications:

* IC cards or IC base

- Product Part Number Expression

0805	CG	100	J	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0805	0.08 × 0.05	2.0 × 1.25
1206	0.12 × 0.06	3.2 × 1.60

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
B	X7R

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^0
101	10×10^1
102	10×10^2

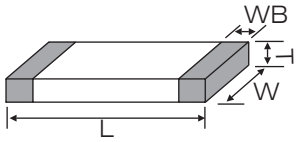
④Capacitance Tolerance	
Code	Tolerance
J	± 5%
K	± 10%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
100	10V
250	25V
500	50V

⑥Termination Type	
Expression Method	Termination
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
T	Taping Packaging

- Outside Dimension



Type		Dimension(mm)			
British expression	Metric expression	L	W	T	WB
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.30 ± 0.10 0.40 ± 0.10 0.50 ± 0.10	0.50 ± 0.25
1206	3216	3.20 ± 0.30	1.60 ± 0.20	0.30 ± 0.10 0.40 ± 0.10 0.50 ± 0.10	0.50 ± 0.25

■電容量範圍

項目	0805型薄形電容器						1206型薄形電容器				
介質種類	COG			X7R			COG		X7R		
厚度	0.3mm	0.4mm	0.5mm	0.3mm	0.4mm	0.5mm	0.4mm	0.5mm	0.4mm	0.5mm	
電容量											電容量
0.5PF											0.5PF
1PF											1PF
5PF											5PF
10PF											10PF
15PF											15PF
22PF											22PF
33PF											33PF
47PF											47PF
68PF											68PF
100PF											100PF
150PF											150PF
220PF											220PF
330PF											330PF
470PF											470PF
1000PF											1000PF
2.2nF											2.2nF
3.3nF											3.3nF
4.7nF											4.7nF
6.8nF											6.8nF
10nF											10nF
22nF											22nF
33nF											33nF
47nF											47nF
100nF											100nF

- Capacitance Range

Item	0805 Thin MLCC						1206 Thin MLCC				
Dielectric Type	COG			X7R			COG		X7R		
Thickness	0.3mm	0.4mm	0.5mm	0.3mm	0.4mm	0.5mm	0.4mm	0.5mm	0.4mm	0.5mm	
Capacitance											Capacitance
0.5PF											0.5PF
1PF											1PF
5PF											5PF
10PF											10PF
15PF											15PF
22PF											22PF
33PF											33PF
47PF											47PF
68PF											68PF
100PF											100PF
150PF											150PF
220PF											220PF
330PF											330PF
470PF											470PF
1000PF											1000PF
2.2nF											2.2nF
3.3nF											3.3nF
4.7nF											4.7nF
6.8nF											6.8nF
10nF											10nF
22nF											22nF
33nF											33nF
47nF											47nF
100nF											100nF

■片式排容

片式排容是由若干個電容并排列而成的電容陣列，應用于對元器件空間要求嚴格的PCB，如手提電腦、PDA、手提電話等，特别適用于輸入、輸出接口電路。

- 特性

＊ 高密度安裝，節省安裝空間。
＊ 節省安裝成本。
＊ 適合回流焊接。

- 應用

＊ 適用于對元器件空間要求嚴格的PCB，如手提電腦、PDA、無繩電話。
＊ 特别適用于輸入、輸出接口電路。

- 產品規格型號表示方法

612 ① 4 ② B ③ 102 ④ K ⑤ 500 ⑥ N ⑦ T ⑧

①尺寸規格	
612	0612
508	0508
504	0504

②内置單元數目	
4	4個内置單元
2	2個内置單元

③介質種類	
代碼	介質材料
CG	NPO/COG
B	X7R
F	Y5V

④標稱電容量(PF)	
表示方式	實際值
100	10×10^{0}
101	10×10^{1}
102	10×10^{2}

⑤誤差級别	
代碼	誤差
C	±0.25PF
D	±0.50PF
G	±2%
J	±5%
K	±10%
M	±20%

⑦端頭類别	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑥工作電壓	
表示方法	實際電壓
6R3	6.3V
500	50V
101	100V

⑧包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

■ Capacitor Arrays

Capacitor Arrays is formed with several chips paratactic inside, applied to the PCB that has strict space requirement about the parts, such as portable computer, PDA, portable telephone, etc., Special suitable for input/output circuits.

- Features

* Has high density mounting so that save the mounting space
* Can save mounting cost .
* Suitable for reflow soldering.

- Applications

* Suitable for the PCB that has strict parts space requirement such as portable computer, PDA and wireless telephone.
* Special suitable for input/output circuits.

- Product Part Number Expression:

612	4	B	102	K	500	N	T
①	②	③	④	⑤	⑥	⑦	⑧

①Dimensions	
612	0612
508	0508
504	0504

②Elements Inside	
4	Four elements inside
2	Two elements inside

③Dielectric Type	
Code	Dielectric Material
CG	COG or NPO
B	X7R
F	Y5V

④Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^0
101	10×10^1
102	10×10^2

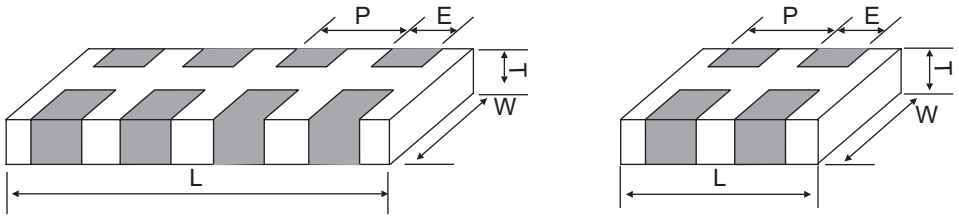
⑤Capacitance Tolerance	
CODE	TOLERANCE
J	±5%
G	±2%
C	±0.25PF
K	±10%
D	±0.50PF
M	±20%

⑥Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
500	50V
101	100V

⑦Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑧Package Method	
Expression Method	Packaging
T	Taping Packaging
B	Bulk Plastic Box Packaging

- 外形尺寸

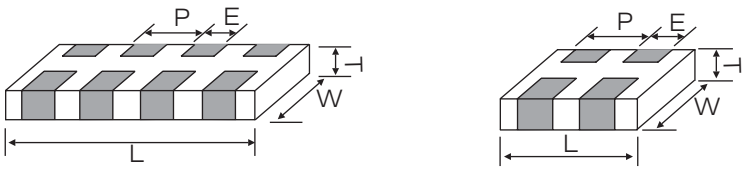


規格型號	尺寸(mm)				
	L	W	T	P	E
0805二聯體	2.00 ± 0.20	1.25 ± 0.20 1.00 ± 0.10	0.80 ± 0.10	1.00 ± 0.10	0.50 ± 0.05
0805四聯體	2.00 ± 0.20	1.25 ± 0.20 1.00 ± 0.10	0.80 ± 0.10	0.50 ± 0.05	0.25 ± 0.05
1206四聯體	3.20 ± 0.30	1.60 ± 0.20 1.00 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.40 ± 0.10

- 電容量範圍

項目	0603 × 4									
尺寸	COG			X7R			Y5V			
工作電壓	16V	25V	50V	16V	25V	50V	16V	25V	50V	
電容量										電容量
0.5PF 5PF 10PF 15PF 20PF 22PF 33PF 47PF 100PF 150PF 220PF 330PF 470PF 1000PF 2.2nF 3.3nF 4.7nF 6.8nF 10nF 22nF 33nF 47nF 68nF 100nF 220nF										0.5PF 5PF 10PF 15PF 20PF 22PF 33PF 47PF 100PF 150PF 220PF 330PF 470PF 1000PF 2.2nF 3.3nF 4.7nF 6.8nF 10nF 22nF 33nF 47nF 68nF 100nF 220nF

- Outside Dimension



Type		Dimension(mm)			
British expression	Metric expression	L	W	T	WB
0805 two elements	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.10 1.00 ± 0.10	1.00 ± 0.10	0.5
0805 two elements	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.10 1.00 ± 0.10	0.50 ± 0.05	0.25 ± 0.05
1206 four elements	3.20 ± 0.30	1.60 ± 0.20	0.80 ± 0.10 1.00 ± 0.10	0.80 ± 0.10	0.40 ± 0.10

- Capacitance Range

Item	0603 × 4									
Size	COG			X7R			Y5V			
Rated Volatage	16V	25V	50V	16V	25V	50V	16V	25V	50V	
Capacitance										Capacitance
0.5PF 5PF 10PF 15PF 20PF 22PF 33PF 47PF 100PF 150PF 220PF 330PF 470PF 1000PF 2.2nF 3.3nF 4.7nF 6.8nF 10nF 22nF 33nF 47nF 68nF 100nF 220nF										0.5PF 5PF 10PF 15PF 20PF 22PF 33PF 47PF 100PF 150PF 220PF 330PF 470PF 1000PF 2.2nF 3.3nF 4.7nF 6.8nF 10nF 22nF 33nF 47nF 68nF 100nF 220nF

項目	0502 × 4										0504 × 2								
介質種類	COG			X7R			Y5V				COG			X7R			Y5V		
工作電壓	16V	25V	50V	16V	25V	50V	16V	25V	50V		16V	25V	50V	16V	25V	50V	16V	25V	50V
電容量																			
0.5PF																			
5PF																			
10PF																			
15PF																			
20PF																			
22PF																			
33PF																			
47PF																			
100PF																			
150PF																			
220PF																			
330PF																			
470PF																			
1000PF																			
2.2nF																			
3.3nF																			
4.7nF																			
6.8nF																			
10nF																			
22nF																			
33nF																			
47nF																			
68nF																			
100nF																			
220nF																			

Item	0502 × 4										0504 × 2								
Dielectric Type	COG			X7R			Y5V				COG			X7R			Y5V		
Rated Volatage	16V	25V	50V	16V	25V	50V	16V	25V	50V		16V	25V	50V	16V	25V	50V	16V	25V	50V
Capacitance																			
0.5PF																			
5PF																			
10PF																			
15PF																			
20PF																			
22PF																			
33PF																			
47PF																			
100PF																			
150PF																			
220PF																			
330PF																			
470PF																			
1000PF																			
2.2nF																			
3.3nF																			
4.7nF																			
6.8nF																			
10nF																			
22nF																			
33nF																			
47nF																			
68nF																			
100nF																			
220nF																			

■ 低感抗片式電容器

低感抗片式多層陶瓷電容器通過改變與端頭結合部分的長寬比,做成短而寬的產品,提高電極的導電率和導電面積,降低ESR和ESL,減少電流變化的電壓下降引起的噪聲干擾。從而使系統達到低損耗、高效率、高速運行的目的。

- 特性

* 適合回流焊接。

- 應用

* 高速微處理器;
* 多芯片模塊(MCM) 中心流噪聲的抑制;
* 高速數字設備。

- 產品型號規格表示方法

0508 ① B ② 102 ③ K ④ 500 ⑤ N ⑥ T ⑦

①尺寸		
型號	英制(英寸)	公制(毫米)
0508	0.05×0.08	1.25×2.00
0612	0.06×0.12	1.60×3.20

②介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R
F	Y5V

③標稱電容量(PF)	
表示方式	實際值
0R5	0.5
1R0	1.0
102	10×10^2

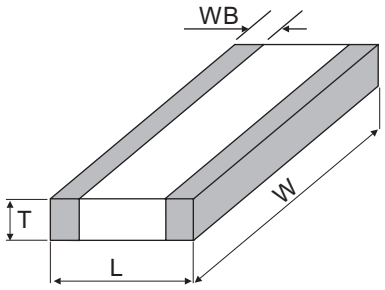
④誤差級別	
代碼	誤差
J	±5%
K	±10%
M	±20%

⑦包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

⑤工作電壓	
表示方法	實際電壓
6R3	6.3V
500	50V
101	100V

⑥端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

- 外形尺寸



規格型號		尺寸(mm)			
英制表示	公制表示	L	W	T	WB
0508	1220	1.20±0.10	2.00±0.20	0.8±0.10	0.25±0.10
0612	1632	1.60±0.10	3.20±0.20	0.8±0.15	0.25±0.10

■ Low Inductance MLCC

Low inductance MLCC is short and wide products by change the length over width ratio of the section that connected with the termination. This can increase the conductivity and current conducting area, reduce ESR and ESL, reduce the noise disturbance due to voltage decreasing caused by current change, then make the whole system has low dissipation factor, high efficiency and high speed.

- Features

* Suitable for reflow soldering.

- Applications

* High-speed micro processor.
* Reduce multi chip module center current noise
* High speed digital equipment.

- Product Part Number Expression

0508	B	102	K	500	N	T
①	②	③	④	⑤	⑥	⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0805	0.08 × 0.05	2.0 × 1.25
0612	0.06 × 0.12	1.6 × 3.2

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
B	X7R
F	Y5V

③Normal Capacitance(PF)	
Expression Method	Actual Value
OR5	0.5
1R0	1.0
102	10×10^2

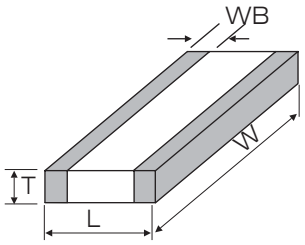
④Capacitance Tolerance	
Code	Tolerance
J	± 5%
K	± 10%
M	± 20%

⑤Rated Voltage	
Expression Method	Actual Value
6R3	6.3V
250	25V
101	100V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
NOMARKS	Bulk Bag Packaging
T	Taping Packaging
B	Bulk Plastic Box Packaging

- Outside Dimension



Type		Dimension(mm)			
British expression	Metric expression	L	W	T	WB
0508	1220	1.20 ± 0.10	2.00 ± 0.20	0.80 ± 0.10	0.25 ± 0.10
0612	1632	1.60 ± 0.10	3.20 ± 0.20	0.80 ± 0.15	0.25 ± 0.10

- 電容量範圍

項目	0508低感抗片容										0612低感抗片容								
介質種類	COG			X7R			Y5V				COG			X7R			Y5V		
工作電壓	16V	25V	50V	16V	25V	50V	16V	25V	50V		16V	25V	50V	16V	25V	50V	16V	25V	50V
電容量																			
0.5PF																			
5PF																			
10PF																			
15PF																			
20PF																			
22PF																			
33PF																			
47PF																			
100PF																			
150PF																			
220PF																			
330PF																			
470PF																			
1000PF																			
2.2nF																			
3.3nF																			
4.7nF																			
6.8nF																			
10nF																			
22nF																			
33nF																			
47nF																			
68nF																			
100nF																			
220nF																			
330nF																			
470nF																			
1μF																			
2.2μF																			

- Capacitance Range

Item	0508 Low Inductance MLCC									0612 Low Inductance MLCC								
Dielectric Type	COG			X7R			Y5V			COG			X7R			Y5V		
Rated Volatage	16V	25V	50V	16V	25V	50V	16V	25V	50V	16V	25V	50V	16V	25V	50V	16V	25V	50V
Capacitance																		
0.5PF																		
5PF																		
10PF																		
15PF																		
20PF																		
22PF																		
33PF																		
47PF																		
100PF																		
150PF																		
220PF																		
330PF																		
470PF																		
1000PF																		
2.2nF																		
3.3nF																		
4.7nF																		
6.8nF																		
10nF																		
22nF																		
33nF																		
47nF																		
68nF																		
100nF																		
220nF																		
330nF																		
470nF																		
1 μF																		
2.2 μF																		

■ 片式三端陶瓷濾波電容器(EMI)

- 特性

＊ 具有優良的通流特性
＊ 無極性,適合高密度的表面安裝
＊ 具有優良的濾波特性
＊ 具有良好的吸收噪音、抑制浪涌脉衝的作用
＊ 具有良好的可焊與耐焊性能

- 應用範圍

＊ 移動電話及基站
＊ 通信設備
＊ 自動化儀表和程序控制器

- 汽車電子

＊ 計算機及外圍設備

- 產品規格型號表示方法

508	1	CG	101	J	500	B	T
①	②	③	④	⑤	⑥	⑦	⑧

①尺寸		
型號	英制(英寸)	公制(毫米)
508	0.05×0.08	1.25×2.00
512	0.05×0.12	1.25×3.20
618	0.06×0.18	1.60×4.50

②代號	
1	抗電磁干擾電容器

③介質種類	
代碼	介質材料
CG	NPO
B	X7R
F	Y5V

④標稱電容量(PF)	
表示方式	實際值
102	10×10^{2}
222	22×10^{2}

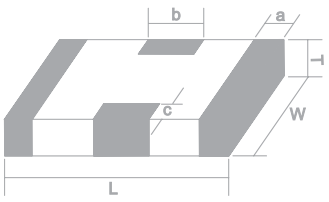
⑤誤差級別	
代碼	誤差
M	±20%
S	+50%－20%

⑥額定電壓	
表示方法	實際電流
6R3	6.3
160	16
250	25
101	100

⑦額定電流	
表示方法	實際電流
B	0.3A
C	0.4A
D	1A
E	2A

⑧包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

- 外形尺寸



單位: mm

項目 / 規格	長	寬	厚	端頭厚度	第三端寬度	第三端頭厚度
508	2.00±0.20	1.25±0.20	0.80±0.20	0.25±0.10	0.60±0.20	0.25±0.15
512	3.20±0.20	1.25±0.20	0.70±0.20	0.30±0.20	1.10±0.30	0.25±0.20
618	4.50±0.30	1.60±0.20	1.00±0.20	0.40±0.30	1.50±0.30	0.30±0.20

■ Chip Three-terminals Ceramic Filter (EMI)

• Features

* Has good current properties.
* No reverse, suitable for high-density surface-mounting.
* Good filter property.
* Good noise suppression and surge suppression.
* Good solderability and soldering resistance.

• Applications:

* Mobile telephone and mobile base.
* Communication equipment.
* Automatization instruments and process controller.
* Bus circuits.
* Computers and outside equipment.

• Product Part Number Expression

508	1	CG	101	J	500	B	T
①	②	③	④	⑤	⑥	⑦	⑧

①Dimensions		
Type	British (Inch)	Metric (mm)
508	0.05 × 0.08	1.25 × 2.0
512	0.05 × 0.12	1.25 × 3.20
618	0.06 × 0.18	1.60 × 4.57

②Code	
1	Electromagnetism Disturbance Suppression

③Dielectric Type	
Code	Dielectric Material
CG	NPO
B	X7R
F	Y5V

④Normal Capacitance(PF)	
Expression Method	Actual Value
102	10×10^2
222	22×10^2

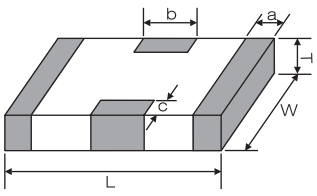
⑤Capacitance Tolerance	
CODE	TOLERANCE
M	± 20%
S	+50% ~ 20%

⑥Rated Voltage	
Expression Method	Actual Value
6R3	6.3
160	16
250	25
101	100

⑦Rated Current	
Expression Method	Actual Value
B	0.3A
C	0.4A
D	1A
E	2A

⑧Package Method	
Expression Method	Packaging
NOMARKS	Bulk Bag Packaging
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



Item / Size	L	W	H	Termination thickness	Third Temination Width	Third Temination Thickness
508	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.20	0.25 ± 0.10	0.60 ± 0.20	0.25 ± 0.15
512	3.20 ± 0.20	1.25 ± 0.20	0.70 ± 0.20	0.30 ± 0.20	1.10 ± 0.30	0.25 ± 0.20
618	4.50 ± 0.30	1.60 ± 0.20	1.00 ± 0.20	0.40 ± 0.30	1.50 ± 0.30	0.30 ± 0.20

- 電容量範圍

項目	5081型EMI								5081型EMI						
介質種類	COG								X7R						
工作電壓	4V	6.3V	10V	16V	25V	50V	100V		4V	6.3V	10V	16V	25V	50V	100V
電容量															
10PF															
15PF															
20PF															
22PF															
33PF															
47PF															
100PF															
150PF															
220PF															
330PF															
470PF															
1000PF															
1.2nF															
3.3nF															
4.7nF															
5.6nF															
10nF															
22nF															
33nF															
47nF															
56nF															
100nF															
120nF															
220nF															
330nF															
470nF															
1μF															
2.2μF															

- Capacitance Range

Item	5081型EMI								5081型EMI						
Dielectric Type	COG								X7R						
Rated Volatage	4V	6.3V	10V	16V	25V	50V	100V		4V	6.3V	10V	16V	25V	50V	100V
Capacitance															
10PF															
15PF															
20PF															
22PF															
33PF															
47PF															
100PF															
150PF															
220PF															
330PF															
470PF															
1000PF															
1.2nF															
3.3nF															
4.7nF															
5.6nF															
10nF															
22nF															
33nF															
47nF															
56nF															
100nF															
120nF															
220nF															
330nF															
470nF															
1μF															
2.2μF															

- 電容量範圍

項目	5121型EMI										5121型EMI								
介質種類	COG										X7R								
工作電壓	4V	6.3V	10V	16V	25V	50V	100V	200V	250V		4V	6.3V	10V	16V	25V	50V	100V	200V	250V
電容量																			
10PF																			
15PF																			
20PF																			
22PF																			
33PF																			
47PF																			
100PF																			
150PF																			
220PF																			
330PF																			
470PF																			
820PF																			
1000PF																			
1.5nF																			
3.3nF																			
4.7nF																			
5.6nF																			
10nF																			
22nF																			
33nF																			
47nF																			
68nF																			
100nF																			
120nF																			
220nF																			
330nF																			
470nF																			
1μF																			

- Capacitance Range

Item	5121 EMI										5121 EMI								
Dielectric Type	COG										X7R								
Rated Volatage	4V	6.3V	10V	16V	25V	50V	100V	200V	250V		4V	6.3V	10V	16V	25V	50V	100V	200V	250V
Capacitance																			
10PF																			
15PF																			
20PF																			
22PF																			
33PF																			
47PF																			
100PF																			
150PF																			
220PF																			
330PF																			
470PF																			
820PF																			
1000PF																			
1.5nF																			
3.3nF																			
4.7nF																			
5.6nF																			
10nF																			
22nF																			
33nF																			
47nF																			
68nF																			
100nF																			
120nF																			
220nF																			
330nF																			
470nF																			
1μF																			

■安全規格認證GF型多層陶瓷電容器

• 特性

＊ 新型獨石結構，體積小，電容量高，能在高壓下工作。
＊ 符合UL60950-1標准。
＊ 僅用于回流焊接。
＊ 它們實用于薄型設備。

• 應用範圍

＊ 適合于無變壓器的DAA調制調解器綫路濾波器及耦合用。
＊ 適合信息設備綫路濾波器用。

• 產品規格型號表示方法

Y2 ① 08 ② B/ ③ 222 ④ K ⑤ 302 ⑥ N ⑦ T ⑧

①代號
安規電容器

②尺寸		
型號	英制(英寸)	公制(毫米)
08	0.18 × 0.08	4.50 × 2.00
12	0.18 × 0.12	4.50 × 3.20
20	0.22 × 0.20	5.70 × 5.00
25	0.22 × 0.25	5.70 × 6.30

③介質種類	
代碼	介質材料
CG	COG或NPO
B	X7R

④標稱電容量(PF)	
表示方式	實際值
102	10×10^2
222	22×10^2

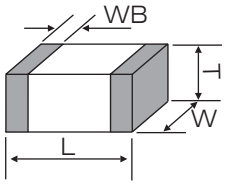
⑤誤差級別	
代碼	誤差
J	± 5%
K	± 10%
M	± 20%

⑥特定交流工作電壓	
302	交流250V

⑦端頭類別	
表示方法	端頭材料
S	純銀端頭
C	純銅端頭
N	三層電鍍端頭 (銀或銅層/鎳層/錫層)

⑧包裝方式	
表示方法	包裝
無標記	袋裝散包裝
T	編帶包裝
B	塑料盒散包裝

• 外形尺寸



代號	規格型號	尺寸(mm)			
		L	W	T	WB
08	1808	4.50 ± 0.40	2.00 ± 0.20	≤2.5	0.75 ± 0.25
12	1812	4.50 ± 0.40	3.20 ± 0.30	≤3.5	0.80 ± 0.30
20	2220	5.70 ± 0.40	5.00 ± 0.40	≤3.5	1.00 ± 0.40
25	2225	5.70 ± 0.50	6.30 ± 0.50	≤3.5	1.00 ± 0.40

■ Type MLCC

● Features

* A New monolithic structure capacitor for small,high-capacitance capability of operating at high-voltage levels.
* Available for equipment base on UL60950-1.
* Only for reflow soldering
* Fit for use on thin type equipment.

● Application

* Ideal for use on line filters and couplings for DAA modems without transformers.
* Ideal for use on line filters for information equipment.

● Product Part Number Expression

Y2	08	B	222	K	302	N	T
①	②	③	④	⑤	⑥	⑦	⑧

①Code
Y2 Capacitor

②Dimensions		
Type	British (Inch)	Metric (mm)
08	0.18×0.08	4.50×2.00
12	0.18×0.12	4.50×3.20
20	0.22×0.20	5.70×5.00
25	0.22×0.25	5.70×5.00

③Dielectric Type	
Code	Dielectric Material
CG	COG or NPO
B	X7R

④Normal Capacitance	
Expression Method	Actual Value
102	10×10^2
222	22×10^2

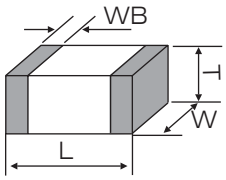
⑤Capacitance Tolerance(PF)	
Code	Tolerance
J	±5%
K	±10%
M	±20%

⑥Rated Voltage	
Expression Method	Actual Value
302	AC 250 voltages

⑦Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑧Package Method	
Expression Method	Packaging
NOMARKS	Bulk Bag Packaging
T	Taping Packaging
B	Bulk Plastic Box Packaging

• Outside Dimension



代號	規格型號	尺寸(mm)			
		L	W	T	WB
08	1808	4.50±0.40	2.00±0.20	≤2.5	0.75±0.25
12	1812	4.50±0.40	3.20±0.30	≤3.5	0.80±0.30
20	2220	5.70±0.40	5.00±0.40	≤3.5	1.00±0.40
25	2225	5.70±0.50	6.30±0.50	≤3.5	1.00±0.40

- 電容量範圍

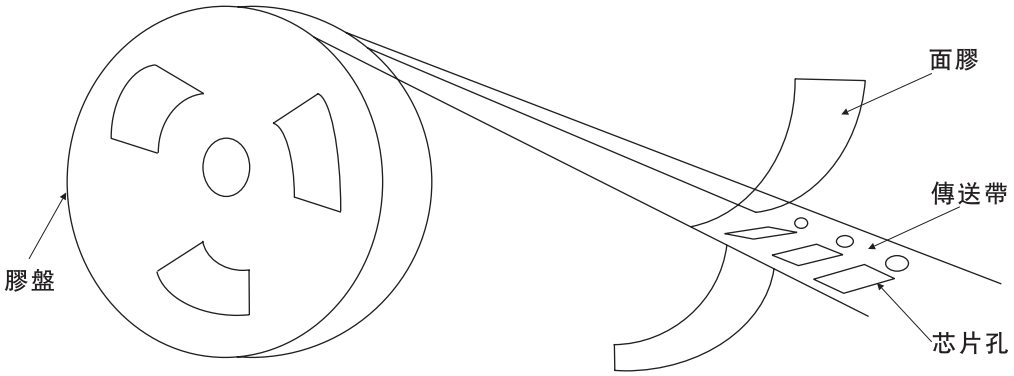
項目	安規電容器								
介質種類	COG				X7R				
尺寸	1808	1812	2220	2225	1808	1812	2220	2225	
電容量									電容量
2PF									2PF
10PF									10PF
22PF									22PF
33PF									33PF
47PF									47PF
56PF									56PF
68PF									68PF
82PF									82PF
100pF									100pF
150pF									150pF
220pF									220pF
330pF									330pF
470pF									470pF
680pF									680pF
1.0nF									1.0nF
2.2nF									2.2nF
3.3nF									3.3nF
4.7nF									4.7nF
6.8nF									6.8nF
10nF									10nF
22nF									22nF

- Capacitance Range

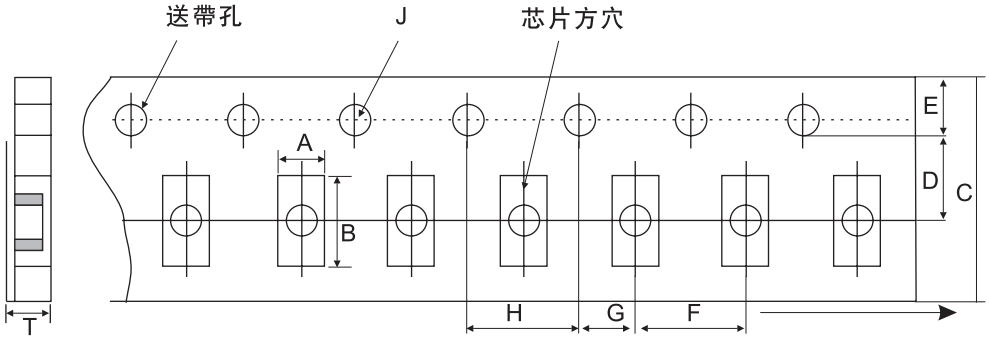
Item	Safety Standard Recognized Type GF MLCC								
Dielectric Type	COG				X7R				
Dimension	1808	1812	2220	2225	1808	1812	2220	2225	
Capacitance									Capacitance
2PF									2PF
10PF									10PF
22PF									22PF
33PF									33PF
47PF									47PF
56PF									56PF
68PF									68PF
82PF									82PF
100pF									100pF
150pF									150pF
220pF									220pF
330pF									330pF
470pF									470pF
680pF									680pF
1.0nF									1.0nF
2.2nF									2.2nF
3.3nF									3.3nF
4.7nF									4.7nF
6.8nF									6.8nF
10nF									10nF
22nF									22nF

■包裝

- 紙帶卷盤結構



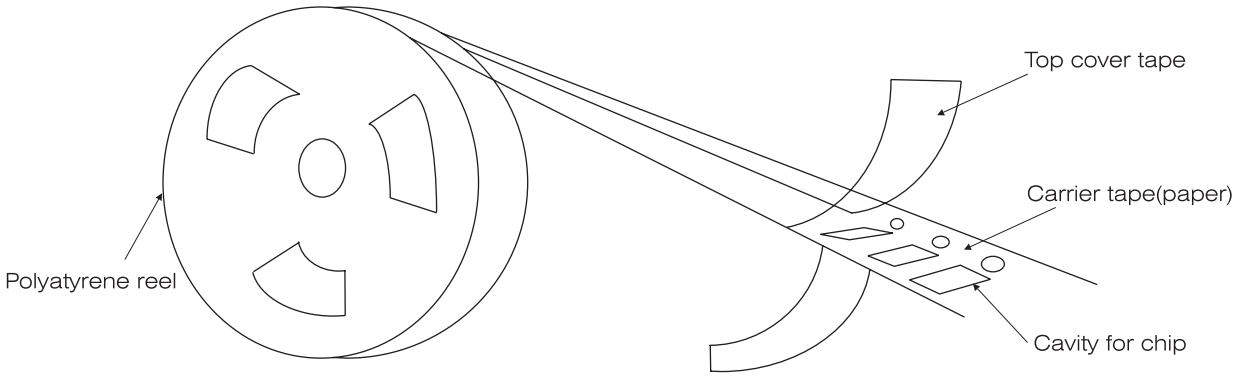
＊ 適合 0402,0603，0805，1206 常規尺寸產品的紙帶尺寸



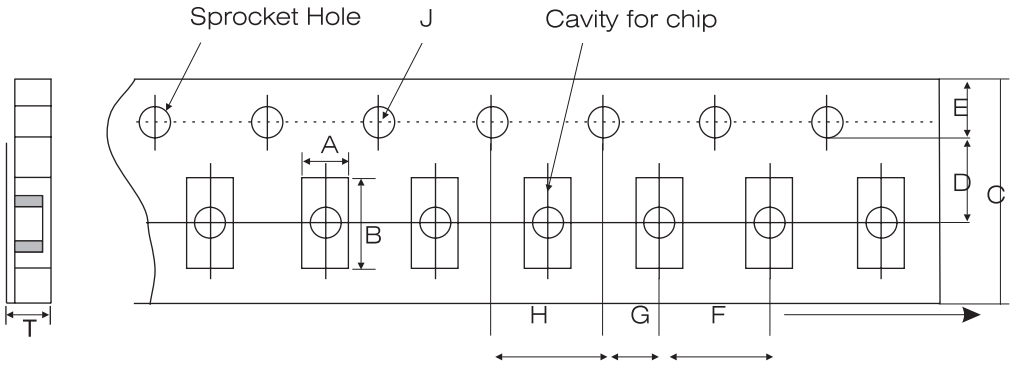
代號 / 紙帶規格	A	B	C	D	E	F	G	H	J	T *
0201	0.37 ±0.10	0.67 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 0.80
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	低于 0.80
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.10
0805	1.45 ±0.20	2.30 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.10
1206	1.80 ±0.20	3.40 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.10

■ Package

• Paper Tape Taping



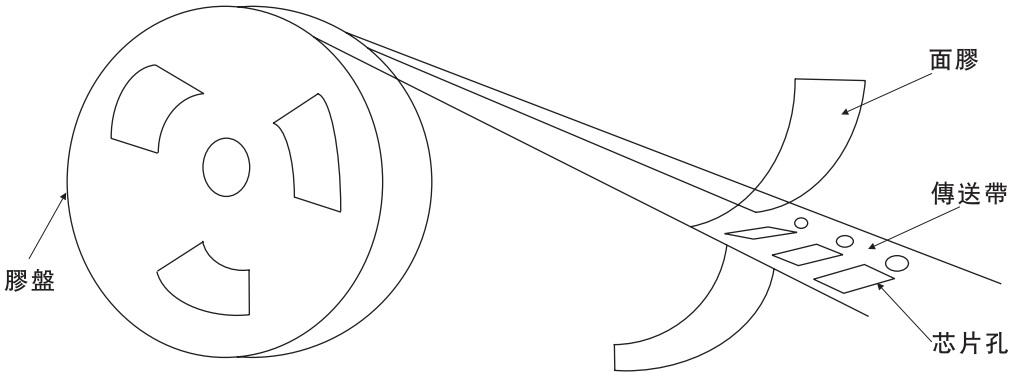
※Dimensions of paper take taping for0402,0603，0805，1206



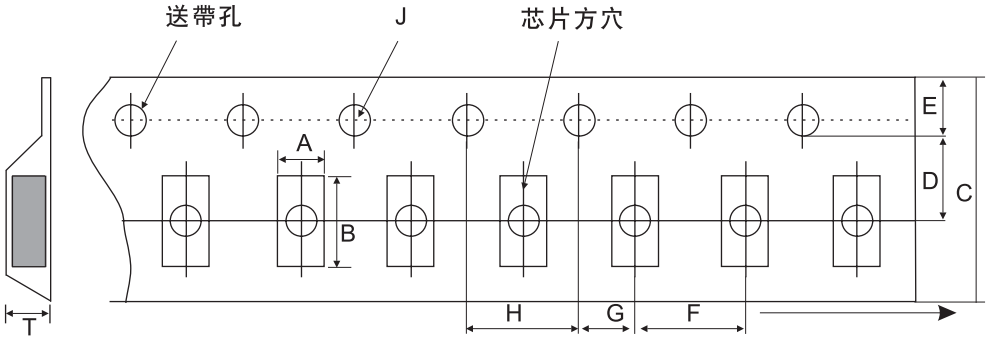
Code / Paper size	A	B	C	D	E	F	G	H	J	T*
0201	0.37 ±0.10	0.67 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 0.80
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 0.80
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.10
0805	1.45 ±0.20	2.30 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.10
1206	1.80 ±0.20	3.40 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.10

■包裝

- 紙帶卷盤結構



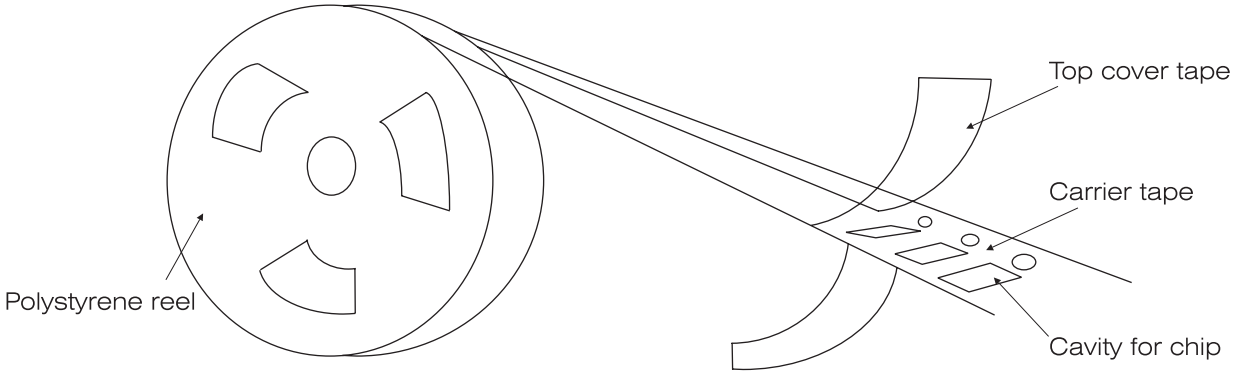
＊適合0805，1206，1210，1808，1812常規尺寸產品的塑膠帶尺寸



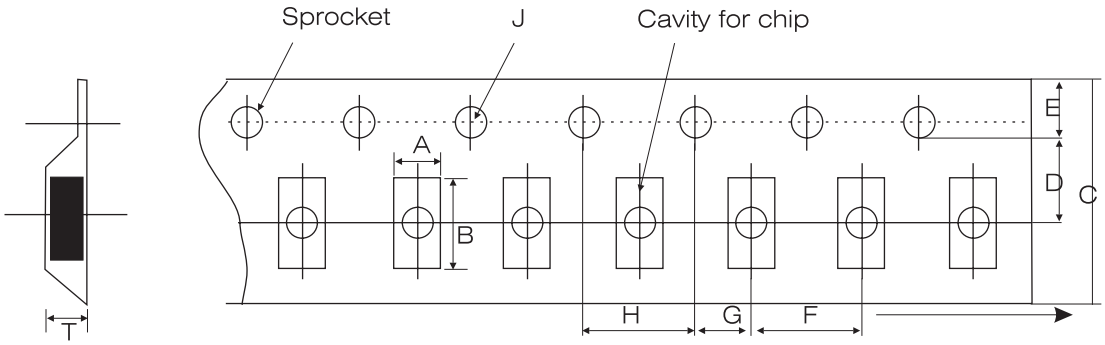
代號 紙帶規格	A	B	C	D	E	F*	G	H	J	T
0805	1.55 ±0.20	2.35 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.50
1206	1.95 ±0.20	3.60 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.85
1210	2.70 ±0.10	3.42 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	低于 3.2
1808	2.20 ±0.10	4.95 ±0.10	12.00 ±0.10	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	低于 3.0
1812	3.66 ±0.10	4.95 ±0.10	12.00 ±0.10	5.50 ±0.05	1.75 ±0.10	8.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	低于 4.0

注意:*表示此處對尺寸的要求非常精確

- Embossed Taping



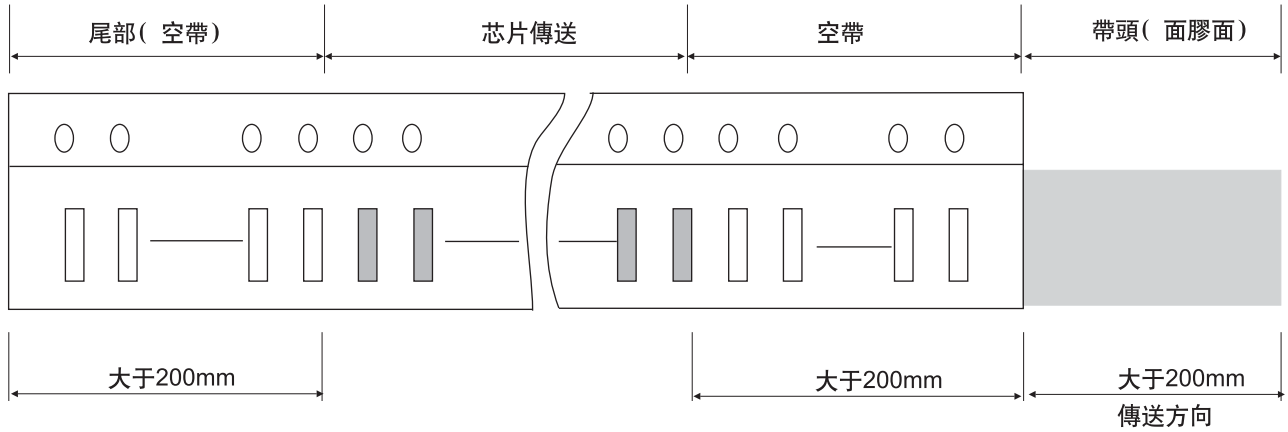
※Dimensions of embossed taping for 0805, 1206, 1210, 1808, 1812 type



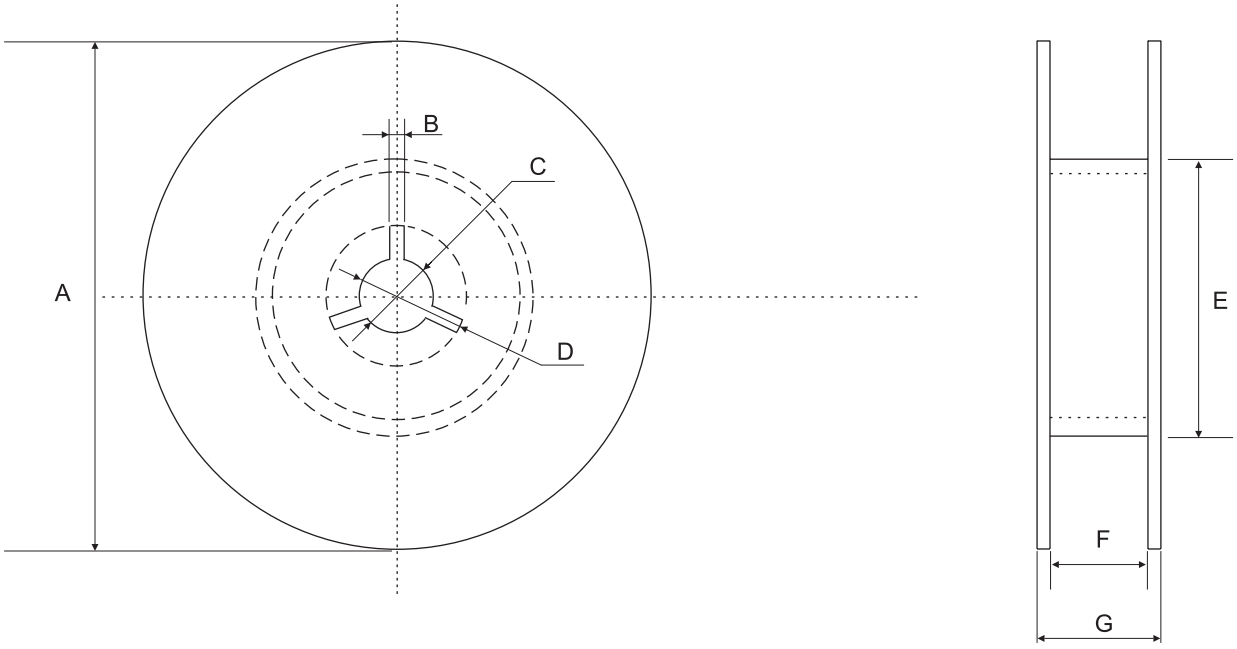
Code / Tape size	A	B	C	D	E	F*	G	H	J	T
0805	1.55 ±0.20	2.35 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.50
1206	1.95 ±0.20	3.60 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.85
1210	2.70 ±0.10	3.42 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 3.2
1808	2.20 ±0.10	4.95 ±0.10	12.00 ±0.10	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 3.0
1812	3.66 ±0.10	4.95 ±0.10	12.00 ±0.10	5.50 ±0.05	1.75 ±0.10	8.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 4.0

Note:The place with "*" means where needs exactly dimensions.

- 傳送帶的前后結構



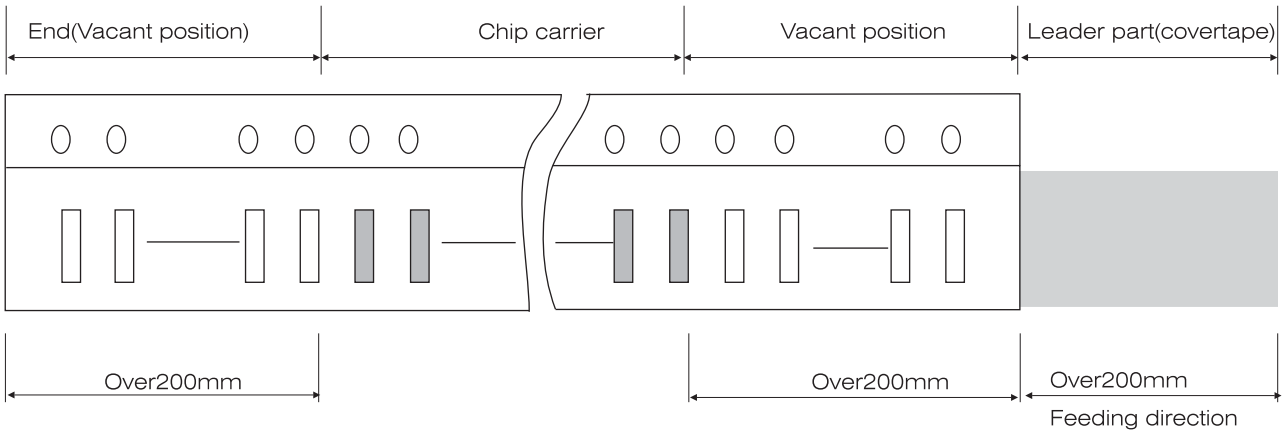
- 卷盤尺寸(單位:mm)



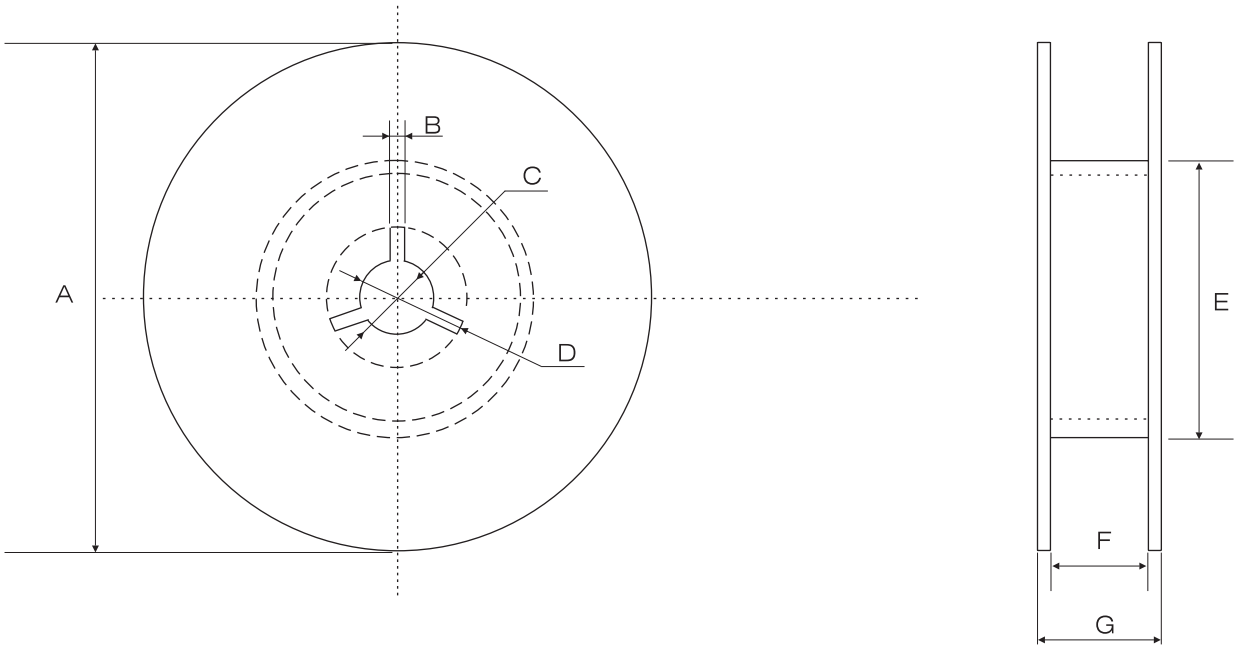
- 尺寸代碼

A	B	C	D	E	F	G
Φ178.00 ± 2.00	3.00	Φ13.00 ± 0.50	Φ21.00 ± 0.80	Φ50.00或更大	10.00 ± 1.50	12MAX
Φ330.00 ± 2.00	3.00	Φ13.00 ± 0.50	Φ21.00 ± 0.80	Φ50.00或更大	10.00 ± 1.50	12MAX

- Structure of leader part and end part of the carrier paper



- Reel Dimensions (unit:mm)



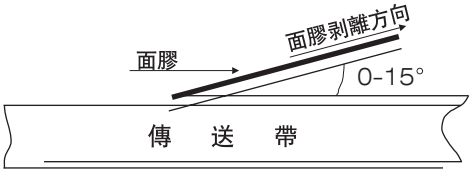
- Code

A	B	C	D	E	F	G
Φ178.00 ± 2.00	3.00	Φ13.00 ± 0.50	Φ21.00 ± 0.80	Φ50.00 or max	10.00 ± 1.50	12MAX
Φ330.00 ± 2.00	3.00	Φ13.00 ± 0.50	Φ21.00 ± 0.80	Φ50.00 or max	10.00 ± 1.50	12MAX

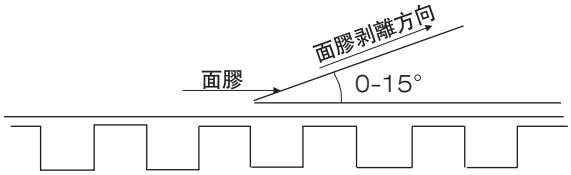
■ 關于卷帶的説明

- 面膠剥離强度

(A)紙帶



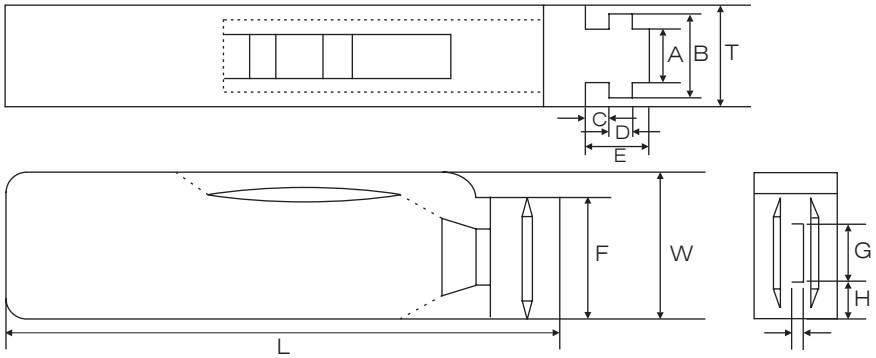
(B)塑料膠盤



標准：0.1N<剥離强度<0.7N；在剥離時，紙帶不能有紙碎，也不能粘在底、面膠上。

- 塑料盒散包裝

標示	A	B	T	C	D	E
尺寸	6.80±0.10	8.80±1.00	12.00±0.10	15.00+0.10/-0	2.00±0/-0.10	4.70±0.10
標示	F	W	G	H	L	I
尺寸	31.50+0.20/-0	36.00+0/-0.2	19.00±0.35	7.00±0.35	110.00±0.70	5.00±0.35



- 包裝數量

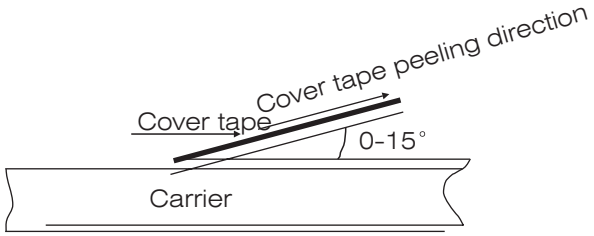
尺寸	包裝形式和數量			
	紙帶卷盤	膠帶卷盤	塑料盒散裝	一般散裝
0402	10000		20000	5000
0603	4000		15000	5000
0805	4000	3000	10000	5000
1206	4000	T≤1.35mm 3000 T>1.35mm 2000	5000	5000
1210		T≤1.80mm 2000 T>1.80mm 1000		2000
1808		2000		2000
1812		T≤1.85mm 1000 T>1.85mm 500		2000
2225		500		500
3035		500		

注意：包裝的形式和數量可根據客户的要求來定。

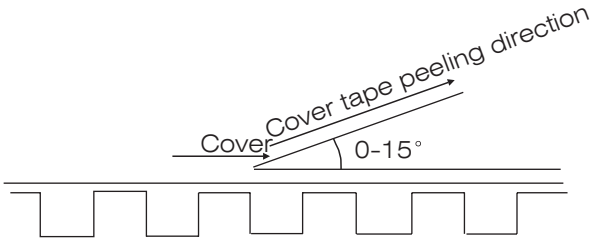
■ TAPING SPECIFICATION

- Top cover tape peeling strength

(A)Paper Taping



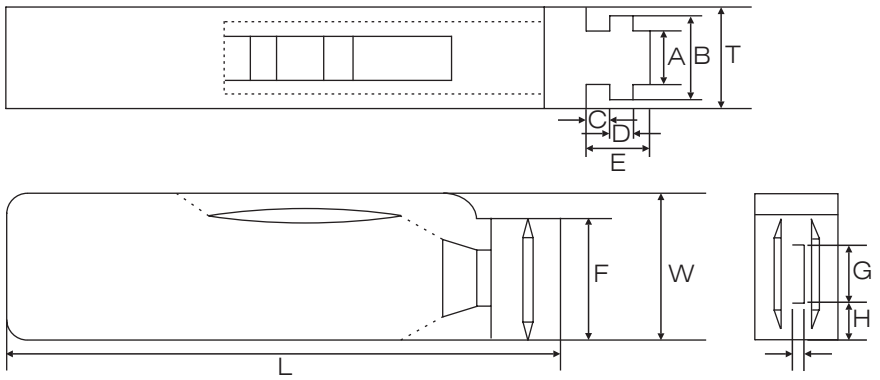
(b)Cover tape peeling direction



Standard：0.1N<peeling forc<0.7N；
No paper dirty remains on the scotch when peeling，and no sticks to top and bottom cover tape.

- Bulk Case Package

Symbol	A	B	T	C	D	E
Dimension	6.80±0.10	8.80±1.00	12.00±0.10	15.00+0. 10/-1	2.00±0/-0.10	4.70±0.10
Symol	F	W	G	H	L	I
Dimension	31.50+0.20/-0	36.00+0/-0.2	19.00±0.35	7.00±0.35	110.00±0.70	5.00±0.35

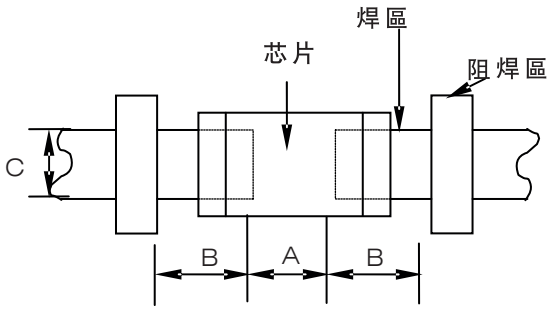


- Pack Quantity

Size	Pakaging method and quantity			
	Paper tape taping	Plastistic embossed taping	Bulk plastic box packaging	Normal bulk packaging
0402	10000		20000	5000
0603	4000		15000	5000
0805	4000	3000	10000	5000
1206	4000	T≤1.35mm 3000 T>1.35mm 2000	5000	5000
1210		T≤1.80mm 2000 T>1.80mm 1000		2000
1808		2000		2000
1812		T≤1.85mm 1000 T>1.85mm 500		2000
2225		500		500
3035		500		

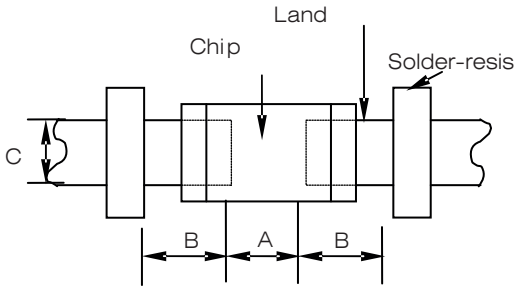
Note：We can choose packing style and quantity can be according to the customer's requirement.

■ 通用型片式電容使用注意事項

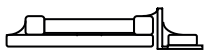
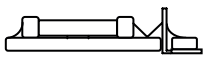
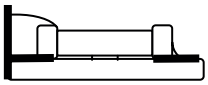
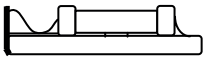
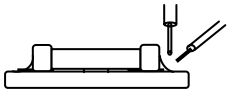
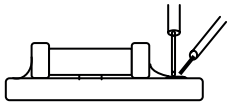
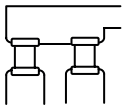
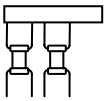
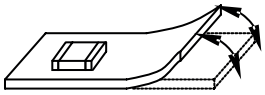
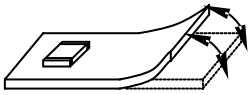
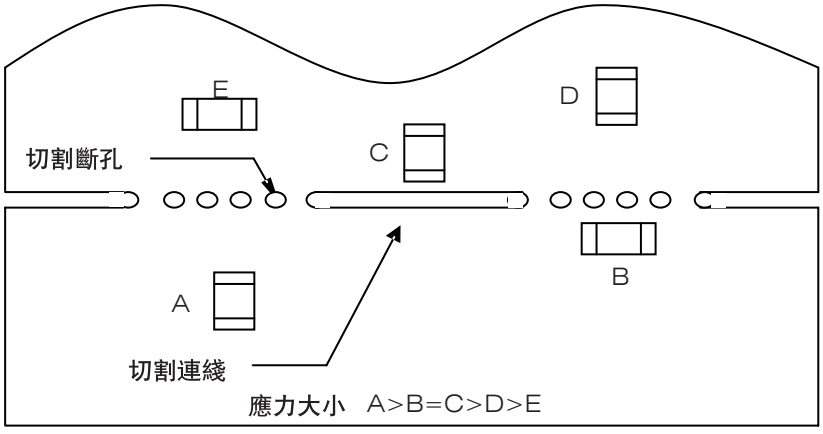
<table>
<tr><th>階段</th><th>預防</th><th>注意事項</th></tr>
<tr><td>1.綫路設計</td><td>使用環境的確認:
醫療器械、航空用器、原子彈反應器如果出現故障，會對人的生命和整個社會造成巨大的損壞。因此用于這些設備的電容器必須具有很高的可靠性和安全性，并且比用于普通應用的電容器元件的要求更高，其區別也很明顯。</td><td>電子額定系數和性能的
工作電壓 （額定電壓的確認）
1. 電容器的工作電壓應比其額定電壓低。如果在一DC電壓上加載一個AC電壓，那么兩個峰值電壓之和應小于所選擇的電容器的額定值。對于同時使用 AC電壓和脉衝電壓的電路，它們的峰值電壓之和也應低于電容器的額定電壓。
2. 甚至在供給的電壓低于額定電壓值時，如果電路中使用的高頻 AC電壓或脉衝電壓升高的時間過快，那么電容器的性能會因此被減弱。</td></tr>
<tr><td>2. PCB板的設計</td><td>基板配置 （墊板的設計）
當電容器被安裝在PCB板上后，所使用的焊料的量（焊盤的大小）會直接影響電容器的性能。因此在設計焊盤時必須考慮到以下幾點:
1. 所用焊料的量的大小會影響芯片抗機械應力的能力，從而可能導致電容器破碎或開裂。因此在設計基板時，必須慎重考慮焊盤的大小和配置，這些對組成基板的焊料的量有着决定的作用。
2. 如果不止一個元件被連續焊接在同一基板或焊盤上時，焊盤的設計應可以使每個元件的焊接點被阻焊區隔離開。</td><td>以下圖表爲所推薦使用的墊板以防止過量的焊料量(基板較大時會超出元件的端頭)同時也給出了不合理的基板設計圖。
以下爲推薦使用的 PCB上焊盤的尺寸
 

推薦用于波峰焊接的焊盤尺寸（單位: mm）
<table>
<tr><th colspan="2">類型</th><th>0603</th><th>0805</th><th>1206</th><th>1210</th></tr>
<tr><td rowspan="2">尺寸</td><td>L</td><td>1.60</td><td>2.00</td><td>3.20</td><td>3.20</td></tr>
<tr><td>W</td><td>0.80</td><td>1.25</td><td>1.60</td><td>2.5</td></tr>
<tr><td colspan="2">A</td><td>0.8~1.0</td><td>1.0~1.4</td><td>1.8~2.5</td><td>1.8~2.5</td></tr>
<tr><td colspan="2">B</td><td>0.5~0.8</td><td>0.8~1.5</td><td>0.8~1.7</td><td>0.8~1.7</td></tr>
<tr><td colspan="2">C</td><td>0.6~0.8</td><td>0.9~1.2</td><td>1.2~1.6</td><td>1.8~2.5</td></tr>
</table>
推薦用于回流焊接的焊盤尺寸（單位: mm）
<table>
<tr><th colspan="2">類型</th><th>0402</th><th>0603</th><th>0805</th><th>1206</th><th>1210</th><th>1812</th><th>2225</th></tr>
<tr><td rowspan="2">尺寸</td><td>L</td><td>1.10</td><td>1.60</td><td>2.00</td><td>3.20</td><td>3.20</td><td>4.50</td><td>5.70</td></tr>
<tr><td>W</td><td>0.50</td><td>0.80</td><td>1.25</td><td>1.60</td><td>2.50</td><td>3.20</td><td>6.30</td></tr>
<tr><td>A</td><td colspan="2">0.45~0.55</td><td>0.6~0.8</td><td>0.8~1.2</td><td>1.8~ 2.5</td><td>1.8~ 2.5</td><td>2.5~3.5</td><td>3.7~ 4.7</td></tr>
<tr><td>B</td><td colspan="2">0.40~0.50</td><td>0.6~0.8</td><td>0.6~1.2</td><td>0.6~ 1.5</td><td>0.6~ 1.5</td><td>1.0~1.8</td><td>1.0~ 2.3</td></tr>
<tr><td>C</td><td colspan="2">0.45~0.55</td><td>0.6~0.8</td><td>0.9~1.6</td><td>1.2~ 2.0</td><td>1.8~ 3.2</td><td>2.3~3.5</td><td>3.5~ 5.5</td></tr>
</table>
過量的焊料會影響芯片耐機械應力的能力。因此在設計基板時，需注意這些。</td></tr>
</table>

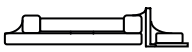
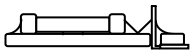
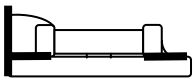
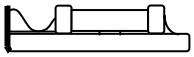
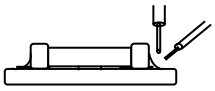
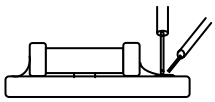
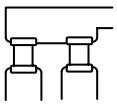
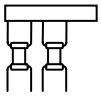
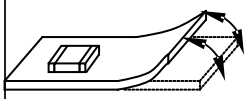
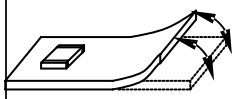
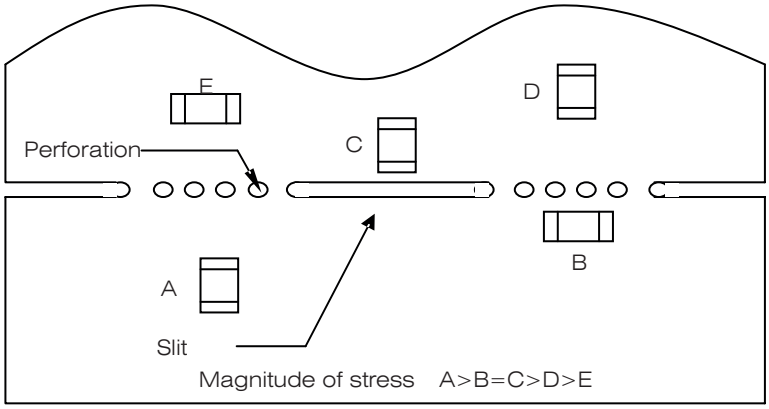
■ Precautions for the use of general MLCC

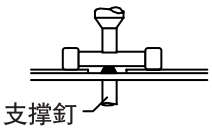
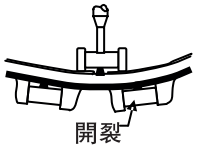
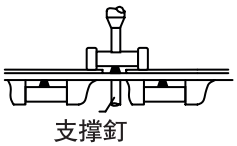
<table>
<tr><th>Stages</th><th>Precaution</th><th>Technical considerations</th></tr>
<tr><td>1.Circuit Design</td><td>Verification of operating environment:
If there were any malfunction in medical equipment, spacecraft or nuclear reactors, etc. it will causes serious damage to human life or social ramifications. For this reason , any capacitors to be used in such equipments must have very high safety and reliability considerations and must have high requirements than capacitor normal for applications.</td><td>Electrical rating and performance:
Operating Voltage (Verification of Rated voltage)
1. The operating voltage for capacitors must always be lower than their rated values.
If an AC voltage is loaded on a DC voltage, the sum of the two peak voltages should be lower than the rated value of the capacitor chosen. For a circuit where both an AC and a pulse voltage may be present, the sum of their peak voltages should also be lower than the capacitor's rated voltage.
2. Even if the applied voltage is lower than the rated value, the reliability of capacitors might be reduced if either a high frequency AC voltage or a pulse voltage having rapid rise time is present in the circuit.</td></tr>
<tr><td>2.PCB Design</td><td>Pattern configurations
(Design of Land-patterns)
When capacitors are mounted on a PCB, the amount of solder used (size of fillet) can directly affect capacitor performance. Therefore, the following items must be carefully considered in the design of solder land patterns:
(1)The amount of solder applied can affect the 8ability of chips to withstand mechanical stresses, which may lead to breaking or cracking. Therefore, when designing land-patterns it is necessary to consider the appropriate size and configuration of the solder pads, which determines the amount of solder necessary to form the fillets.
(2) When more than one part is jointly soldered onto the same land or pad, the pad must be designed so that each component's soldering point is separated by soldering-resist.</td><td>1. The following diagrams and tables show some examples of recommended patterns to prevent excessive solder amounts (larger fillets will extend above the component's end terminations).
Examples of improper pattern designs are also shown.
Recommended land dimensions for PCB
 

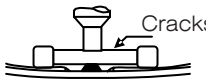
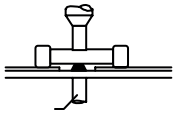
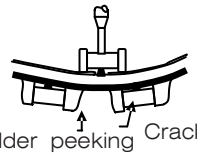
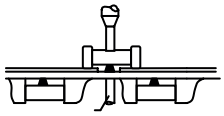
Recommend land dimensions for wave-soldering (unit: mm)
<table>
<tr><td colspan="2">Type</td><td>0603</td><td>0805</td><td>1206</td><td>1210</td></tr>
<tr><td rowspan="2">Size</td><td>L</td><td>1.60</td><td>2.00</td><td>3.20</td><td>3.20</td></tr>
<tr><td>W</td><td>0.80</td><td>1.25</td><td>1.60</td><td>2.50</td></tr>
<tr><td colspan="2">A</td><td>0.80~1.00</td><td>1.00~1.40</td><td>1.80~2.50</td><td>1.80~2.50</td></tr>
<tr><td colspan="2">B</td><td>0.50~0.80</td><td>0.80~1.50</td><td>0.80~1.70</td><td>0.80~1.70</td></tr>
<tr><td colspan="2">C</td><td>0.60~0.80</td><td>0.90~1.20</td><td>1.20~1.60</td><td>1.80~2.50</td></tr>
</table>
Recommend land dimensions for reflow-soldering (unit: mm)
<table>
<tr><td colspan="2">Type</td><td>0402</td><td>0603</td><td>0805</td><td>1206</td><td>1210</td><td>1812</td><td>2225</td></tr>
<tr><td rowspan="2">Size</td><td>L</td><td>1.00</td><td>1.60</td><td>2.00</td><td>3.20</td><td>3.20</td><td>4.50</td><td>5.70</td></tr>
<tr><td>W</td><td>0.50</td><td>0.80</td><td>1.25</td><td>1.60</td><td>2.50</td><td>3.20</td><td>6.30</td></tr>
<tr><td colspan="2">A</td><td>0.45~0.55</td><td>0.6~0.8</td><td>0.8~1.2</td><td>1.8~2.5</td><td>1.8~2.5</td><td>2.5~3.5</td><td>3.7~4.7</td></tr>
<tr><td colspan="2">B</td><td>0.40~0.50</td><td>0.6~0.8</td><td>0.6~1.2</td><td>0.6~1.5</td><td>0.6~1.5</td><td>1.0~1.8</td><td>1.0~2.3</td></tr>
<tr><td colspan="2">C</td><td>0.45~0.55</td><td>0.6~0.8</td><td>0.9~1.6</td><td>1.2~2.0</td><td>1.8~3.2</td><td>2.3~3.5</td><td>3.5~5.5</td></tr>
</table>
Excess solder can affect the ability of chips to withstand mechanical stresses. Therefore, please take proper precautions when designing land-patterns.</td></tr>
</table>

<table>
<tr><th>階段</th><th>預防</th><th>注意事項</th></tr>
<tr>
<td></td>
<td>基板配置
（電容器在儀器 （分割）PCB板上的安裝設計）
將電容器安裝在板上之后，芯片將承受在下一加工過程中產生的機械應力（PCB的切割，板的檢驗、其它部件的安裝，裝配到底盤、波峰焊接回流焊板 ，等）。出于這個原因，在設計焊盤和 SMD電容器的位置時，應注意考慮將應力減到最低點。</td>
<td>焊料用量好與差的例子如下：
<table>
<tr><th>項目</th><th>不推薦</th><th>推薦</th></tr>
<tr><td>混合安裝 SMD和引綫元件</td><td>  </td><td>  </td></tr>
<tr><td>靠近底盤的元件的安裝</td><td>  </td><td>  </td></tr>
<tr><td>在已安裝元件的附近手工焊接引綫元件</td><td>  </td><td>  </td></tr>
<tr><td>水平安裝元件</td><td>  </td><td>  </td></tr>
</table>
1.下圖示爲電容器在PCB板上布局好壞的例子： PCB板彎曲變形時產生應力，應將電容器安裝在 PCB板上的受影響最小的位置。
<table>
<tr><th></th><th>不推薦</th><th>推薦</th></tr>
<tr><td>板的變形</td><td>  </td><td>  </td></tr>
</table>
2.電容器安裝在切割PCB板上時，電容器所受機械應力的大小由電容器的布局而定。以下爲推薦使用的布局方式：


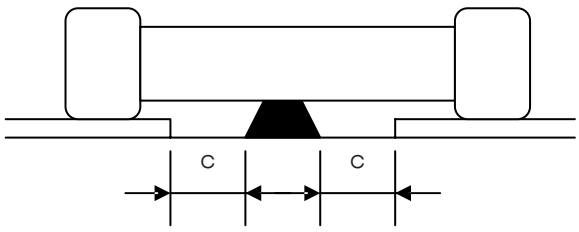
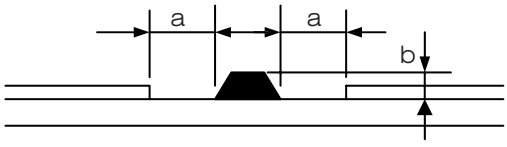
</td>
</tr>
</table>

<table>
<tr><th>Stages</th><th>Precautions</th><th>Technical considerations</th></tr>
<tr><td></td><td>Pattern configurations (Capacitor layout on panelized [breakaway] PC boards)
After capacitors have been mounted on the boards, chips can be subjected to mechanical stresses in subsequent manufacturing processes (PCB cutting, board inspection, mounting of additional parts, assembly into the chassis, wave soldering the reflow-soldering boards etc.). For this reason, planning pattern configurations and the position of SMD capacitors should be carefully performed to minimize stress.</td><td>Examples of good and bad solder application.
<table>
<tr><th>Items</th><th>Not recommended</th><th>Recommended</th></tr>
<tr><td>Mixed mounting of SMD and leaded components</td><td>  </td><td>  </td></tr>
<tr><td>Component placement close to the chassis</td><td>  </td><td>  </td></tr>
<tr><td>Hand -soldering of leaded components near mounted components</td><td>  </td><td>  </td></tr>
<tr><td>Horizontal component placement</td><td>  </td><td>  </td></tr>
</table>
1.The following are examples of good and bad capacitor layout: SMD capacitors should be located to minimize any possible mechanical stresses from board warp or deflection.
<table>
<tr><th></th><th>Not recommended</th><th>Recommended</th></tr>
<tr><td>Deflection of the board</td><td>  </td><td>  </td></tr>
</table>
2.To layout the capacitors for the breakaway PC board, it should be noted that the amount of mechanics stresses given will vary depending on capacitor layout, The example below shows recommendations for better design.

</td></tr>
</table>

<table>
<tr><th>階段</th><th>預防</th><th>注意事項</th></tr>
<tr><td></td><td></td><td>3.PCB 板沿着接縫孔切割開時，電容器所受機械應力的大小因使用的方法不同而不同。以下方法按應力從小到大進行排列：推板、割裂、V 形凹槽、接縫孔。因此，任何理想的 SMD電容器的布局必須考慮到 PCB板的分割方法。</td></tr>
<tr><td>3. 自動安裝應考慮到的問題</td><td>調節安裝機器：
在將電容器安裝在PCB板上時，不能讓電容器承受過量的衝擊力。應定期對安裝機器進行維修和檢查。</td><td>1.如果吸拾管降低的位置超過最低限位，就會對電容器產生過大的壓力，從而導致電容器破裂。爲了避免上述現象的發生，在降低吸拾管時，要注意以下各點：
（1） 在校正 PCB板的偏差后，應將吸拾管的低限位調節到 PCB板的表面水平位置。
（2） 吸拾壓力應調節至1到 3N之間。
（3） 爲了減少吸拾管衝擊力導致 PCB板的變形程度，支撐釘應放在PCB板的下方。下圖有吸拾管安裝較好的例子。
<table>
<tr><th></th><th>不推薦使用</th><th>推薦使用</th></tr>
<tr><td>單面安裝</td><td> 
</td><td> 
</td></tr>
<tr><td>雙面安裝</td><td> 
</td><td> 
</td></tr>
</table>
2. 如果對位釘磨損，吸管的調整會致使電容器受到機械應力的衝擊而缺口或開裂。爲了避免這種現象的發生，在對處于停止狀態下對位釘間寬度和支撐釘進行定期的檢查、維修、檢驗和更換。</td></tr>
</table>

<table>
<tr><th>Stages</th><th>Precautions</th><th>Technical considerations</th></tr>
<tr><td></td><td></td><td>3. When breaking PC boards along their perforations, the amount of mechanical stress on the capacitors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, slit, V-grooving, and perforation. Thus, any ideal SMD capacitor layout must also consider the PCB splitting method.</td></tr>
<tr><td>3.Considerations for automatic placement</td><td>Adjustment of mounting machine
Excessive impact load should not be imposed on the capacitors when mounting onto the PC boards.The maintenance and inspection of the mounting devices must minimize the stresses..</td><td>1. If the pick-up nozzle is lower than the low limit, too much force may be imposed on the capacitors, causing damage. To avoid this, the following points should be considered before lowering the pick-up nozzle:
(1) The lower limit of the pick-up nozzle should be adjusted to the surface level of the PC board after correcting for deflection of the board.
(2) The pick-up pressure should be adjusted between 1 and 3 N static loads.
(3) To reduce the amount of deflection of the board caused by impact of the pick-up nozzle, supporting pins of back-up should be used the under PC board. The following diagrams show some typical examples of good pick-up nozzle placement:
<table><tr><th></th><th>Not recommended</th><th>Recommended</th></tr><tr><td>Single-sided mounting</td><td>  </td><td>  </td></tr><tr><td>Double-sided mounting</td><td>  </td><td>  </td></tr></table>
2. As the alignment pin wears out, adjustment of the nozzle height can cause chipping or cracking of the capacitors because of mechanical impact on the capacitors. To avoid this, should have periodically inspection, maintenance, repair and change about the alignment pin width and supporting pins, and all this actions should be done under stopped position.</td></tr>
</table>

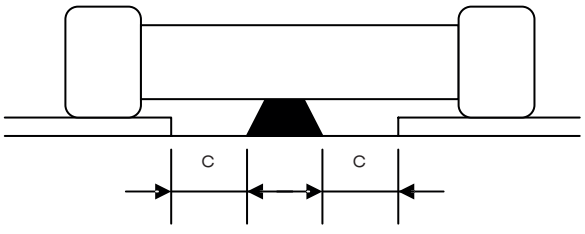
<table>
<tr><th>階段</th><th>預防</th><th>注意事項</th></tr>
<tr><td>3.自動安裝應考慮到的問題</td><td>粘着劑的選用：
在焊接安裝電容器之前，用粘着劑將電容器固定在基板上，這將導致電容器的特性降級，除非對以下因素進行合理的檢查：基板的大小、粘着劑的類型和用量、硬化的温度和時間。因此，用户在使用粘着劑時，要注意其用法和用量。</td><td>1. 一些粘着劑會減少電容器的絶緣。粘着劑和電容器收縮率的不同會在電容器上産生應力并導致開裂。甚至板上過多或過少的粘着劑會影響元件的安裝。因此在使用粘着劑時應注意以下事項：
（1） 要求粘着劑具有的特性：
a. 在安裝和焊接過程中，粘着劑應有足够大的力來支撐板上的元件。
b. 粘着劑在高温下要有充足的强度。
c. 粘着劑要有很好的粘稠度
d. 粘着劑應在其使用期限前使用
e. 粘着劑應可快速硬化。
f. 粘着劑不能被雜質污染
g. 粘着劑要有很好的絶緣特性
h. 粘着劑不能有毒或不能發出有毒的氣體。

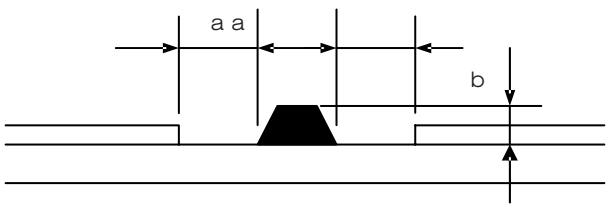
<table><tr><th>序號</th><th>以 0805/1206 尺寸爲例</th></tr><tr><td>a</td><td>最小 0.3 mm</td></tr><tr><td>b</td><td>100~120μm</td></tr><tr><td>c</td><td>粘着劑不能接觸到焊區</td></tr></table>
電容固化后
 
  </td></tr>
</table>

<table>
<tr><th>Stages</th><th>Precautions</th><th>Technical considerations</th></tr>
<tr><td>3.Considerations for automatic placement</td><td>Selection of Adhesives
1.Mounting capacitors with adhesives in land patterns, before the soldering stage, may lead to degraded capacitor characteristics unless the following factors are appropriately checked: the size of land patterns, type of adhesive, amount applied, hardening temperature and hardening period. Therefore , users must pay attention to the using method and using amount of adhesives during using the adhesives.</td><td>1. .Some adhesives may cause reduced insulation resistance, The difference between the shrinkage percentage of the adhesive and that of the capacitors may result in stresses on the capacitors and lead to cracking. Moreover, too little or too much adhesive applied to the board may adversely affect component placement, so the following precautions should be noted in the application of adhesives.
(1) Required adhesive characteristics
a. The adhesive should be strong enough to hold parts on the board during the mounting & solder process.
b. The adhesive should have sufficient strength at high temperatures.
c. The adhesive should have good coating and thickness consistency.
d. The adhesive should be used during its prescribed shelf life.
e. The adhesive should harden rapidly.
f. The adhesive must not be contaminated.
g. The adhesive should have excellent insulation characteristics.
h. The adhesive should not be toxic and have no emission of toxic gasses.

2.The recommended amount of adhesives is as follows.

<table>
<tr><th>Figure</th><th>0805/1206 case sizes as examples</th></tr>
<tr><td>a</td><td>0.3 mm min</td></tr>
<tr><td>b</td><td>100~120 μm</td></tr>
<tr><td>c</td><td>Adhesives should not contact the pad</td></tr>
</table>

After capacitors are bonded
 

Amount of adhesive
 

</td></tr>
</table>

<table>
<tr><th>階段</th><th>預防</th><th>注意事項</th></tr>
<tr><td>4.焊接</td><td></td><td>
1.活化助焊劑中的鹵化物過多或使用了高酸性的助焊劑,那么焊接后過多的殘留物會腐蝕電容器端頭電極或降解電容器表面的絶緣。
2.流焊接過程中使用助焊劑是爲了增强電容器的可焊性，但如使用過多的助焊劑，助焊劑大量的霧氣會射到電容器上，從而使電容器可焊性受到破壞性的影響。應盡可能减少助焊劑的用量，推薦使用助焊劑氣泡體系。
3.由于溶水性助焊劑的殘留物易溶于空氣中的水,因此高濕條件下電容器表面上的殘留物會導致電容器絶緣下降并影響電容器的可靠性。當選用了溶水性助焊劑時，要特别留意清洗方法和所使用的機器的能力。

焊接時的預熱處理：
加熱：在焊接前應對片式陶瓷元件在100到130℃下預熱。
冷却：元件和清洗過程中的温度差异不能大于100℃。當陶瓷片式電容器曝放在快速或集中致熱或快速致冷的條件下，會受到熱衝擊的影響。因此在焊接過程中要特别注意防止電容器受到過量熱衝擊的影響。

推薦使用的焊接方式

<table>
<tr><th>規格尺寸</th><th>温度特性</th><th>額定電壓</th><th>容量範圍</th><th>焊接方法</th></tr>
<tr><td rowspan="3">0201</td><td>NPO</td><td>/</td><td></td><td>R</td></tr>
<tr><td>X7R</td><td>/</td><td></td><td>R</td></tr>
<tr><td>Y5V</td><td>/</td><td></td><td>R</td></tr>
<tr><td rowspan="3">0402</td><td>NPO</td><td>/</td><td></td><td>R</td></tr>
<tr><td>X7R</td><td>/</td><td></td><td>R</td></tr>
<tr><td>Y5V</td><td>/</td><td></td><td>R</td></tr>
<tr><td rowspan="5">0603</td><td>NPO</td><td>/</td><td></td><td>R/W</td></tr>
<tr><td rowspan="2">X7R</td><td rowspan="2">/</td><td>C≥1μF</td><td>R</td></tr>
<tr><td>C<1μF</td><td>R/W</td></tr>
<tr><td rowspan="2">Y5V</td><td rowspan="2">/</td><td>C≥1μF</td><td>R</td></tr>
<tr><td>C<1μF</td><td>R/W</td></tr>
<tr><td rowspan="5">0805</td><td>NPO</td><td>/</td><td>/</td><td>R/W</td></tr>
<tr><td rowspan="2">X7R</td><td rowspan="2">/</td><td>C≥4.7μF</td><td>R</td></tr>
<tr><td>C<4.7μF</td><td>R/W</td></tr>
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<tr><td>C<1μF</td><td>R/W</td></tr>
<tr><td rowspan="5">1206</td><td>NPO</td><td>/</td><td>/</td><td>R/W</td></tr>
<tr><td rowspan="2">X7R</td><td rowspan="2">/</td><td>C≥10μF</td><td>R</td></tr>
<tr><td>C<10μF</td><td>R/W</td></tr>
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<tr><td>C<10μF</td><td>R/W</td></tr>
<tr><td rowspan="3">≥1210</td><td>NPO</td><td>/</td><td>/</td><td>R</td></tr>
<tr><td>X7R</td><td>/</td><td>/</td><td>R</td></tr>
<tr><td>Y5V</td><td>/</td><td>/</td><td>R</td></tr>
</table>
焊接方式：R—回流焊
W—波峰焊
</td></tr>
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<table>
<tr><th>Stages</th><th>Precautions</th><th>Technical considerations</th></tr>
<tr><td>4.Soldering</td><td></td><td>
1. When too much halogenated substance(Chlorine, etc) content is used to activate the flux, or highly acidic flux is used, an excessive amount of residue after soldering may lead to corrosion of the terminal electrodes or degradation of insulation resistance on the surface of the capacitors.
2. Flux is used to increase solderability in flow soldering, but if too much flux is applied, a large amount of flux gas may be emitted and may detrimentally affect solderability. To minimize the amount of flux applied, it is recommended to use a flux-bubbling system.
3. Since the residue of water-soluble flux is easily dissolved by water content in the air, the residue on the surface of capacitors in high humidity conditions may cause a degradation of insulation resistance and therefore affect the reliability of the components. The cleaning methods and the capability of the machines used should also be considered carefully when selecting water-soluble flux.
Preheating when soldering
Heating: Preheat the chips at 100℃ to 130 100℃before soldering.
Cooling: The temperature difference between the components and cleaning process should not be greater than 100℃.
Ceramic chip capacitors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling, Therefore, the soldering process must be conducted with great care so as to prevent malfunction of the components due to excessive thermal shock.
Reconmmended Soldering Method
<table>
<tr><th>Size</th><th>Temperature Characteristics</th><th>RatedVoltage</th><th>Capacitance</th><th>Soldering Method</th></tr>
<tr><td rowspan="3">0201</td><td>NPO</td><td>/</td><td></td><td>R</td></tr>
<tr><td>X7R</td><td>/</td><td></td><td>R</td></tr>
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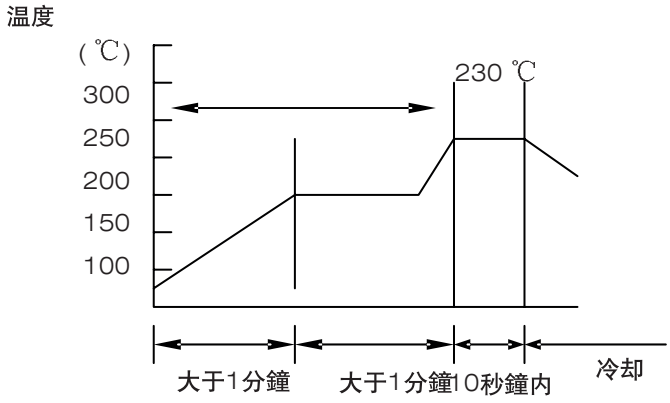
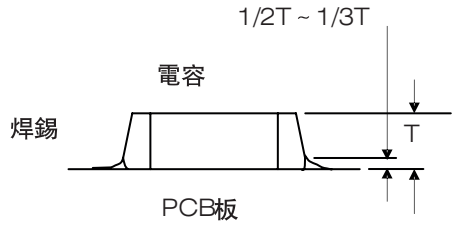
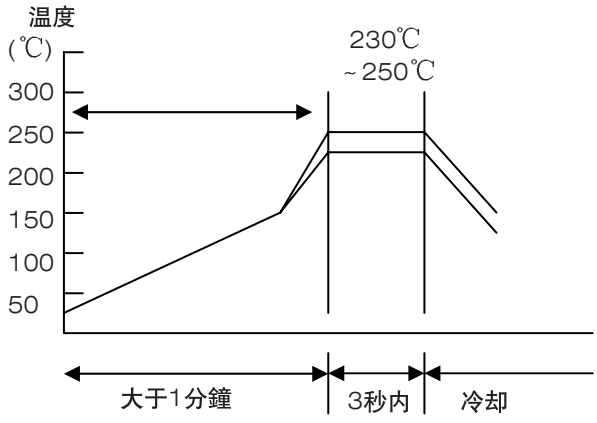
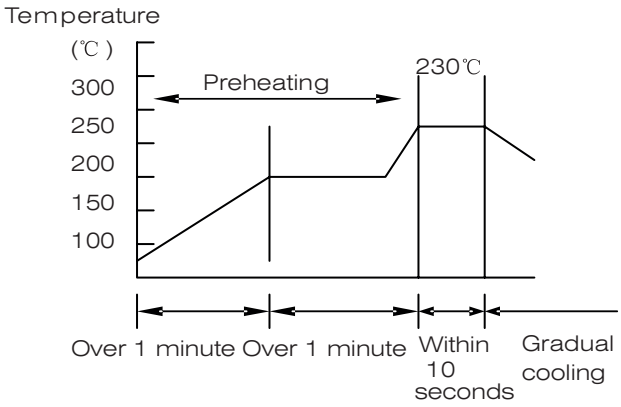
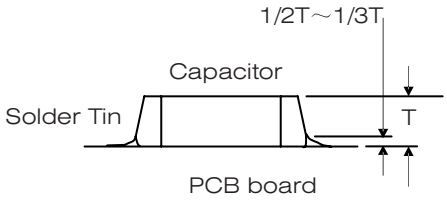
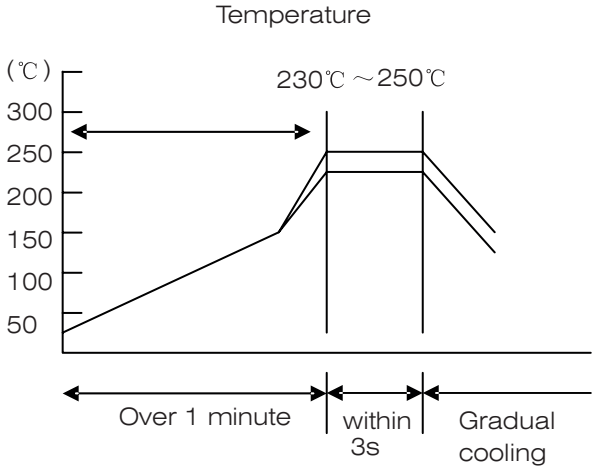
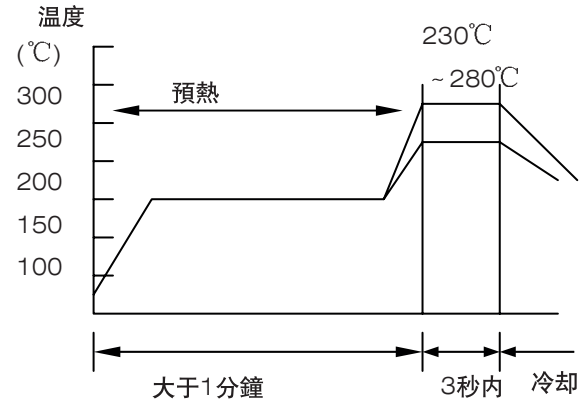
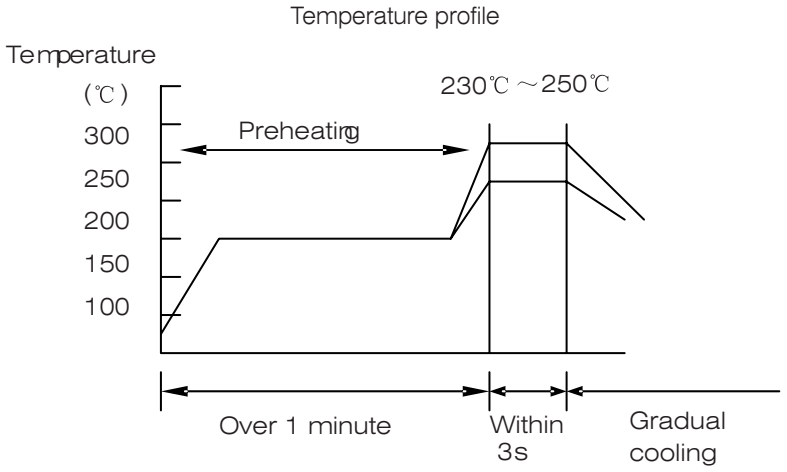
</table>
Soldering method：R—Reflow Solering
W—Wave Soldering
</td></tr>
</table>

階段	預防	
4.焊接		推薦使用的焊接條件： [回流焊接] (温度曲綫)  警告： 1. 理想的焊料量應爲電容器厚度的1/2或1/3。，如下圖所示：  注意事項 太長的浸焊料時間會損壞電容器的可焊性，因此焊接時間應盡可能接近所推薦的時間。 [波峰焊接] 温度曲綫  警告： 1. 確保電容器已經預熱充分。 2. 電容器和熔化的焊料之間的温度之差不能大于100到130℃ 3. 焊接后的冷却方法應盡可能是自然冷却 4. 指定僅可用回流焊接的電容器不能用波峰焊接。

Stages	Precautions	Technical considerations
4. Soldering		Recommended conditions for soldering [Re-flow soldering] Temperature profile  Cautions 1.The ideal condition is to have solder mass (fillet)controlled to 1/2 to 1/3 of the thickness of the capacitor, as shown below  Because excessive dwell times can detrimentally affect solderability, soldering duration should be kept as close to recommended times as possible. [Wave soldering] Temperature profile  Caution 1. Make sure the capacitors are preheated sufficiently. 2. The temperature difference between the capacitor and melted solder should not be greater than 100 to 130℃. 3. Cooling after soldering should be as gradual as possible. 4. Wave soldering must not be applied to the capacitors designated as for reflow soldering only.

階段	預防	注意事項
		[手工焊接] 温度曲綫  警告： 1. 使用的烙鐵的尖頂的直徑最大爲 1.0mm。 2. 烙鐵不能直接碰到電容器上。
5. 清洗	清洗條件： 1. 在安裝完所有的電容器，在清洗PCB板時，應根據所使用的助焊劑和清洗的目的（ 如爲了除掉焊接時殘留的助焊劑還是生產過程中的其他材料）來選擇適當的清洗溶劑。 2. 應對清洗條件進行核對并取人清洗過程不電容器的特性影響	1. 如果使用不恰當的溶劑，會使其它物質如助焊劑殘留物粘到電容器或破壞電容器的外部塗層，從而導致電容器的電性能下降（特別是絶緣）。 2. 不恰當的清洗條件 （清洗不够，或過渡清洗）會破壞電容器的電性能。 （1）過渡清洗； 在用超聲波清洗的情况下，輸出的能源太大則會使PCB板承受過量的振動，這會導致電容或焊接點開裂，或降低端電極强度。因此要特別注意以下檢查條件： 超聲波輸出：低于 20W/L 超聲波頻率： 低于 40KHz 超聲波清洗時間：5分鐘或更少

Stages	Precautions	Technical considerations
		[Hand soldering]  Caution 1. Use soldering iron with a maximum tip diameter of 1.0 mm. The soldering iron should not directly touch the capacitor. [Wave soldering]
5. Cleaning	Cleaning conditions 1.When cleaning the PC board after the Capacitors are all mounted, select the appropriate cleaning solution according to the type of flux used and purpose of the cleaning (e. g. to remove soldering flux or other materials from the production process.) 2.Cleaning conditions should be determined after verifying. Make sure that the cleaning process does not affect the capacitors characteristics.	1.The use of inappropriate solutions can cause foreign substances such as flux residue to adhere to the capacitor or deteriorate the capacitor’s outer coating ,resulting in a degradation of the capacitor’s electrical (especially insulation resistance). 2.Inappropriate cleaning conditions (insufficient or excessive cleaning) may detrimentally affect the performance of the capacitors. (1)Excessive cleaning In the case of ultrasonic cleaning, too much power output can cause excessive vibration of the PC board which may lead to the cracking of the capacitor or the soldered portion, or decrease the terminal electrodes, strength, thus the following conditions should be carefully checked; Ultrasonic output Below20W/L Ultrasonic frequency Below 40KHZ Ultrasonic washing period 5min or less

階段	預防	注意事項
6.清洗后處理工作	一些樹脂含有腐蝕性氣體或化學反應氣體會保留在樹脂中，在硬化期或在正常儲存温度下，均會影響破壞電容器的性能。 當樹脂硬化的温度高于電容器的運行温度時，大量的熱會産生應力從而導致電容器受到損壞或破壞。因此不能推薦使用此類樹脂、熔化材料等。	
7. 處理	切割PCB板（沿着接縫孔分割開） 1. 在安裝完電容器和其它元件后，分割 PCB板時，注意不能在板上施加任何力。 2. 板的分割不能用手工分割，應使用合適的設備	機械方面應注意的事項: 注意不能主電容器承受過量的機械衝擊 （1）如果電容器掉在地上或掉在硬物上，則不能再使用這些電容器。 （2）在處理安裝板時，注意安裝元件不能碰到或撞到其它板或元件上。
8.儲存條件	儲存 1. 爲了保持端電極的可焊性和保證包裝材料處于良好的條件狀態，要注意監控好電容器儲存區域的温度和濕度控制。 推薦的條件: 温度: 0~40℃ 濕度 ：低于 70% 室温必須低于40℃。但即使在理想儲存條件下存放，電容器端頭可焊性也會隨着時間的推移而下降，因此電容器應在發貨之日算起6個月内使用 。 包裝材料應存放在不含氯或硫的空氣中。 2. 高介電常數的電容器的容量值將隨着時間的推移而下降，因此在設計電路時要考慮到這一點。如果電容器的容量值減少了，在150℃的條件下對電容器進行預熱，那么電容器的容量值會恢復到初始值。	如果將電容器存放在高温和高濕的環境下，電容器的端電極就會被氧化，從而導致其可焊性下降；另外，在這種儲存條件下，電容器的編帶/包裝材料會受到破壞。出于這個原因，電容器應在自發貨之日算起6個月内使用 。如果超出了這個期限，在使用電容器之前要對其可焊性進行檢驗。

Stages	Precautions	Technical considerations
6.Post cleaning Processes	With some type of resins a decomposition gas or chemical reaction vapor may remain inside the resin during the hardening period or even while left under normal storage conditions will result in the deterioration of the capacitor ' s performance. 1. When a resin' s hardening temperature is higher than the capacitor ' s operating temperature. The stresses generated by the excess heat may lead to capacitor damage or destruction. The use of such resins molding materials is not recommended.	
7. Handling	Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting capacitors and other components, care is required so as not to give any stresses of twisting to board. 2. Board separation should not be done manually, but by using the appropriate devices.	Mechanical considerations 1. Be careful not to subject the capacitors to excessive mechanical shocks. (1) If ceramic capacitors are dropped onto the floor or a hard surface, they should not be used. (2) When handling the mounted boards, be careful that the mounted components do not come in contact with or bump against other boards or components.
8.Storage Conditions	Storage 1. To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible. ※Recommended conditions Temperature 0～40℃ Humidity Below 70% RH	1. If the parts are stored in a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place. For this reason, components should be used within 6 months from the rime of delivery. If exceeding the above period, please check solderability before using the capacitors.
	※The room temperature must below 40℃.Even under ideal storage conditions capacitor electrode solderability decreased as time passes, so ceramic chip capacitors should be used within 6 months from the time of delivery. ※The packaging material should be kept where nochlorine or sulfur exist in the air. 2.The capacitance value of high dielectric constant capacitors (type 2&3) will gradually decrease with the Passage of time, so this should be taken into consideration in the circuit design. If such a capacitance reduction occurs, a heat treatment of 150℃ for 1 hour will return the capacitance to its initial level.	