Dersonic®
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安规陶瓷电容器承认书

APPROVAL SPECIFICATIONS FOR SAFETY CERAMIC CAPACITOR

(AEC-Q200 REV.)

客户 CUSTOMER	立创商城		
客户料号 CUSTOMER P/N	C3293130		
规格描述 DESCRIPTION	CY2471KD1IEB45VZAE		
产品品号 PART NUMBER	Y2/471/K/F7.5/L24/Y5P/300VAC/AEC-Q200		
日期 DATE	2022-07-08	文件编号 DOC. NO.	DEC-SA-WI010

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样品承认章

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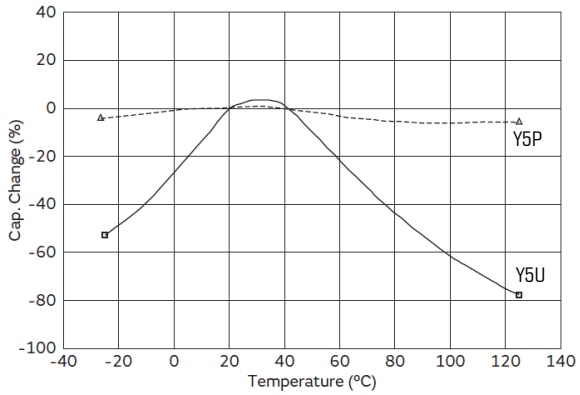
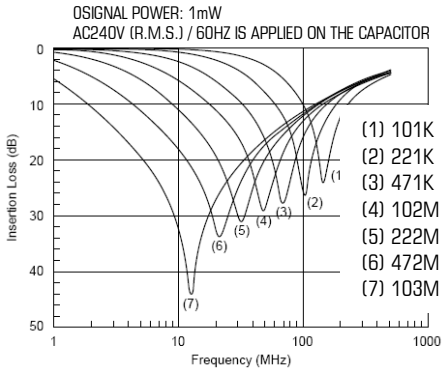
1. FEATURES

- CAPACITORS DESIGNED FOR AC LINE FILTERS FOR PHEV/EV
- MEET AEC-Q200
- HEAT CYCLE: 1000 CYCLE (-55/+125 DEG.)
- CLASS Y2 CAPACITORS CERTIFIED BY CQC, UL, VDE/ENEC
- RATED VOLTAGE: 250/300/400/500VAC
- COATED WITH FLAME-RETARDANT EPOXY RESIN (CONFORMING TO UL94V-0 STANDARD).
- TYPICAL TEMPERATURE CHARACTERISTIC CURVES (FOR REFERENCE)

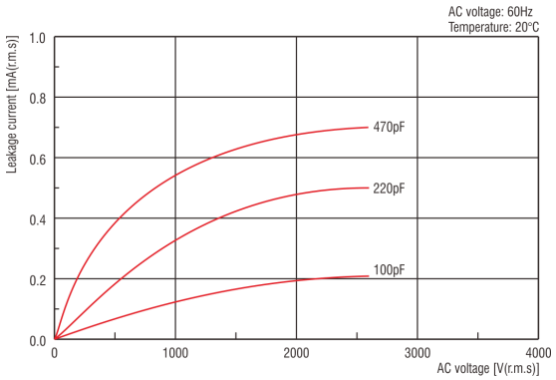


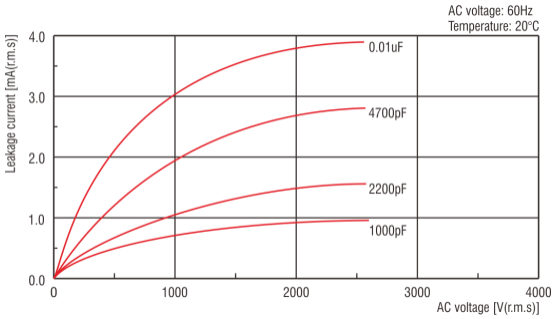
FIG, TEMP-CHARACTERISTIC



FIG, INSERTION LOSS-FREQUENCY

- INSERTION LOSS-FREQUENCY CHARACTERISTICS (SEE ABOVE RIGHT)
- LEAKAGE CURRENT CHARACTERISTICS





- TAPING AVAILABLE FOR AUTOMATIC INSERTION.
- AVAILABLE PRODUCT FOR ROHS RESTRICTION (EU DIRECTIVE 2002/95/EC).

2. APPLICATIONS

- IDEAL FOR USE AS Y CAPACITORS FOR AC LINE FILTERS AND PRIMARY-SECONDARY COUPLING ON BATTERY CHARGERS FOR PHEV/EV.
- IDEAL FOR USE AS A FILTER CAPACITOR FOR DC-DC CONVERTERS FOR PHEV/EV AND HEV.

3. STANDARD CERTIFICATION

APPROVAL MARK	APPROVAL STANDARDS	RATED VOLTAGE	CERTIFICATE NUMBER
c UL us	UL 60384-14	AC500V AC400V AC300V AC250V	E472525
EN 10 VDE	DIN EN 60384-14(VDE 0565-1-1):2014-04 EN 60384-14:2013-08 IEC 60384-14(ed. 4)		40045478
CQC	IEC 60384-14:2013		CQC17001162592

4. HOW TO ORDER

CY2	471	K	D	1	I	E	B4	5V	ZAE
TYPE	NOMINAL CAPACITANCE	TOLERANCE	LEAD SPACING	LEAD STYLE	LEAD LENGTH OR TAPING SPECIFICATION	COATING STYLE	TEMPERATURE CHARACTERISTICS	INTER CONTROL CODE	SERIES

■ TYPE

CY2: CLASS 2 TYPE SAFETY CERAMIC CAPACITORS

■ NOMINAL CAPACITANCE

THREE-DIGIT REPRESENTATION, IN PICO-FARADS. EX.
471: 470PF;
222: 2200PF

■ TOLERANCE

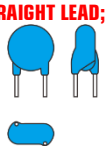
K: ±10%;
M: ±20%

■ LEAD SPACING

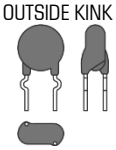
D: 7.5MM±1.0MM;
E: 10.0MM±1.0

■ LEAD STYLE

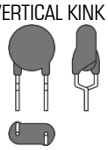
1: STRAIGHT LEAD;



2: OUTSIDE KINK LEAD



5: VERTICAL KINK LEAD



■ LEAD LENGTH OR TAPING SPECIFICATION

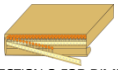
● **BULK (LEAD LENGTH)**

2: 3.0MM±0.5MM;
4: 3.5MM±0.5MM;
6: 4.0MM±1.0MM;
8: 5.0MM±1.0MM;
9: 6.0MM±1.0MM;
A: 8.0MM±2.0MM;
B: 10.0MM±2.0MM;
I: 24.0MM±4.0MM;
J: 26.0MM±4.0MM
M: 32.0MM±4.0MM

● TAPING

T: REEL PACKING;

P: AMMO PACKING



NOTE: SEE SECTION 9 FOR DIMENSIONS.

■ COATING MATERIAL

E: EPOXY COATING (BLUE)

■ TEMPERATURE CHARACTERISTICS

B4: Y5P;
E4: Y5U

■ INTER CONTROL CODE

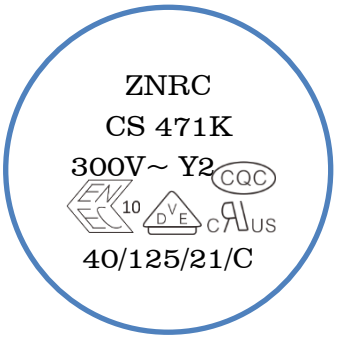
NOT BE DESCRIBED IN THIS AN APPROVAL SPECIFICATIONS.

■ SERIES

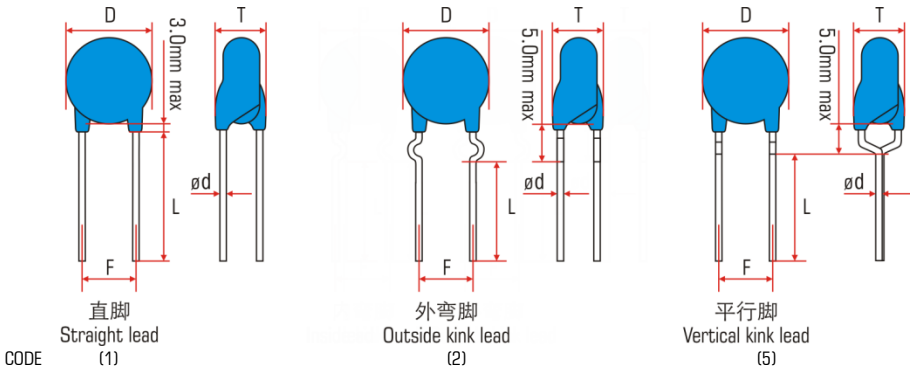
ZAE: COMPLIES AEC-Q200 REQUIREMENTS, RATED VOLTAGE 300VAC

5. MARKING

THE MARKING IS COMPOSED OF COMPANY TRADEMARKS, SPECIFICATIONS, SAFETY MARKS AND CLIMATIC CATEGORY, ETC., AS DESCRIBED BELOW.

MARKING (EXAMPLE)	EXPLANATION
	COMPANY TRADEMARK (ZNRC)
	SPECIFICATIONS, INCLUDING FOR SAFETY SUBCLASS, NOMINAL CAPACITANCE AND ITS TOLERANCE. CS: Y2; 471: NOMINAL CAPACITANCE, 470PF; K: CAPACITANCE TOLERANCE, ±10%
	RATED VOLTAGE AND SAFETY SUBCLASS 300V~: RATED VOLTAGE Y2: SAFETY SUBCLASS
	SAFETY CERTIFICATION MARK VDE MARK: ENEC MARK: CQC MARK: UL/cUL MARK:
	CLIMATIC CATEGORY (40/125/21) AND PASSIVE FLAMMABILITY CATEGORY (C)

6. SPECIFICATIONS LIST



TEMP. CHAR.	CAP. (PF)	TOL.	BODY DIAMETER (D max)	BODY THICKNESS (T max)	LEAD SPACING (F±1.0mm)	LEAD WIRE DIAMETER (Φd±0.1mm)	PART NUMBER
Y5P	100	±10%	7.0mm	5.0mm	7.5mm	0.55mm	CY2101KD□□EB44GZAE
	150	±10%	7.0mm	5.0mm	7.5mm	0.55mm	CY2151KD□□EB44GZAE
	220	±10%	7.0mm	5.0mm	7.5mm	0.55mm	CY2221KD□□EB44GZAE
	330	±10%	7.0mm	5.0mm	7.5mm	0.55mm	CY2331KD□□EB44GZAE
	470	±10%	7.5mm	5.0mm	7.5mm	0.55mm	CY2471KD□□EB45VZAE
	680	±10%	8.5mm	5.0mm	7.5mm	0.55mm	CY2681KD□□EB46ZZAE
	1000	±10%	11.0mm	5.0mm	7.5mm	0.55mm	CY2102KD□□EB48UZAE
Y5U	1000	±20%	7.5mm	5.0mm	7.5mm	0.55mm	CY2102MD□□EE45VZAE
	1500	±20%	8.5mm	5.0mm	7.5mm	0.55mm	CY2152MD□□EE46ZZAE
	2200	±20%	10.0mm	5.0mm	7.5mm	0.55mm	CY2222MD□□EE48FZAE
	3300	±20%	12.0mm	5.0mm	7.5mm	0.55mm	CY2332MD□□EE49VZAE
	4700	±20%	14.0mm	5.5mm	7.5mm	0.55mm	CY2472MD□□EE4BHZAE
					10.0mm	0.55mm	CY2472ME□□EE4BHZAE
	10000	±20%	18.0mm	5.5mm	7.5mm	0.55mm	CY2103MD□□EE4GBZAE
					10.0mm	0.55mm	CY2103ME□□EE4GBZAE

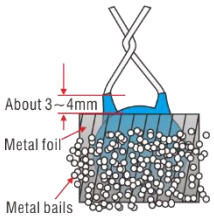
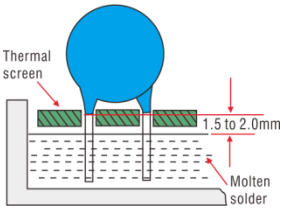
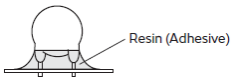
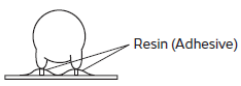
*: "□□" IS THE CODE OF LEAD STYLE AND LEAD LENGTH (BULK) OR TAPING SPECIFICATIONS, WHICH CAN BE CUSTOMIZED.

7. SPECIFICATION AND TEST METHODS

- TEST AND MEASUREMENT SHALL BE MADE AT THE STANDARD CONDITION (TEMPERATURE 15~35°C, RELATIVE HUMIDITY 45~75%).
  UNLESS OTHERWISE SPECIFIED HEREIN. IF DOUBT OCCURRED ON THE VALUE OF MEASUREMENT, AND MEASUREMENT WAS REQUESTED BY CUSTOMER CAPACITORS SHALL BE MEASURED AT THE REFERENCE CONDITION (TEMPERATURE 25±2°C, RELATIVE HUMIDITY 60~70%.)
- OPERATING TEMPERATURE RANGE: -40 TO +125°C

NO.	ITEM	SPECIFICATIONS	TESTING METHOD
1	APPEARANCE AND DIMENSION	NO MARKED DEFECT ON APPEARANCE FORM AND DIMENSIONS ARE WITHIN SPECIFIED RANGE.	THE CAPACITOR SHOULD BE VISUALLY INSPECTED FOR EVIDENCE OF DEFECT. DIMENSIONS SHOULD BE MEASURED WITH SLIDE CALIPERS.
2	MARKING	TO BE EASILY LEGIBLE	THE CAPACITOR SHOULD BE VISUALLY INSPECTED.
3	CAPACITANCE (C_R)	WITHIN SPECIFIED TOLERANCE	THE CAPACITANCE, TANδ SHOULD BE MEASURED AT 25°C ± 1°C WITH 1KHZ AND AC1.0V (R.M.S.). READ 8.1 BEFORE MEASUREMENT
4	TANGENT OF LOSS ANGLE (TANδ)	<0.025	
5	INSULATION RESISTANCE (IR)	>10000MΩ	THE INSULATION RESISTANCE SHOULD BE MEASURED WITH A DC 500V AT NORMAL TEMPERATURE AND HUMIDITY AND LESS THAN 1 MIN. OF CHARGING (THE TEST MAY BE TERMINATED IN A SHORTER TIME, IF THE REQUIRED VALUE OF INSULATION RESISTANCE IS REACHED).

CONTINUED FROM THE PRECEDING PAGE ⇲

<table>
<tr><th>NO.</th><th colspan="2">ITEM</th><th>SPECIFICATIONS</th><th>TESTING METHOD</th></tr>
<tr><td rowspan="2">6</td><td rowspan="2">TEST VOLTAGE (TV)</td><td>LEAD WIRES</td><td>NO FAILURE</td><td>THE CAPACITOR SHOULD NOT BE DAMAGED WHEN TEST VOLTAGES OF FOLLOWING TABLE ARE APPLIED BETWEEN THE LEAD WIRES FOR 60 SEC. (CHARGE/DISCHARGE CURRENT ≤50MA)
TYPE | Y2
TEST VOLTAGE | AC2500V</td></tr>
<tr><td>BODY INSULATION</td><td>NO FAILURE</td><td>FIRST, THE TERMINALS OF THE CAPACITOR SHOULD BE CONNECTED TOGETHER. THEN, AS SHOWN IN FIGURE AT RIGHT, A METAL FOIL SHOULD BE CLOSELY WRAPPED AROUND THE BODY OF THE CAPACITOR TO THE DISTANCE OF ABOUT 3 TO 4MM FROM EACH TERMINAL.
THEN, THE CAPACITOR SHOULD BE INSERTED INTO A CONTAINER FILLED WITH METAL BALLS OF ABOUT 1MM DIAMETER. FINALLY, AC VOLTAGE OF FOLLOWING TABLE IS APPLIED FOR 60 SEC. BETWEEN THE CAPACITOR LEAD WIRES AND METAL BALLS.
 
TYPE | Y2
TEST VOLTAGE | AC2500V</td></tr>
<tr><td>7</td><td colspan="2">TEMPERATURE CHARACTERISTICS</td><td>Y5P: WITHIN ±10%
Y5U: WITHIN +20/-55%
(TEMP. RANGE: -25 TO +85°C)</td><td>THE CAPACITANCE MEASUREMENT SHOULD BE MADE AT EACH STEP SPECIFIED IN FOLLOWING TABLE.
STEP | TEMPERATURE (°C)
1 | +20±2
2 | -25±2
3 | +20±2
4 | +85±2
5 | -20±2
PRE-TREATMENT:
CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H BEFORE INITIAL MEASUREMENTS.</td></tr>
<tr><td>8</td><td colspan="2">SOLDERABILITY</td><td>LEAD WIRE SHOULD BE SOLDERED WITH UNIFORM COATING ON THE AXIAL DIRECTION OVER 3/4 OF THE CIRCUMFERENTIAL DIRECTION.</td><td>SHOULD BE PLACED INTO STEAM AGING FOR 8H±15MIN. AFTER THE STEAM AGING, THE LEAD WIRE OF A CAPACITOR SHOULD BE DIPPED INTO AN ETHANOL SOLUTION OF 25% ROSIN AND THEN INTO MOLTEN SOLDER FOR 5+0/-0.5S.
THE DEPTH OF IMMERSION IS UP TO ABOUT 1.5 TO 2.0MM FROM THE ROOT OF LEAD WIRES.
TEMP. OF SOLDER: LEAD FREE SOLDER (SN-3AG-0.5CU) 245±5°C
H63 EUTECTIC SOLDER (PB37/SN63) 235±5°C</td></tr>
<tr><td rowspan="4">9</td><td rowspan="4">RESISTANCE TO SOLDERING HEAT</td><td>APPEARANCE</td><td>NO MARKED DEFECT</td><td rowspan="4">AS SHOWN IN THE FIGURE, THE LEAD WIRES SHOULD BE IMMERSED IN SOLDER OF 260±5°C UP TO 1.5 TO 2.0MM FROM THE ROOT OF TERMINAL FOR 10±1S.
PRE-TREATMENT:
CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H BEFORE INITIAL MEASUREMENTS.
 
POST-TREATMENT:
CAPACITOR SHOULD BE STORED FOR 1 TO 2H AT ROOM CONDITION.</td></tr>
<tr><td>ΔC/C</td><td>±10%</td></tr>
<tr><td>IR</td><td>>2000MΩ</td></tr>
<tr><td>TV</td><td>PER ITEM 6</td></tr>
<tr><td rowspan="3">10</td><td rowspan="3">VIBRATION RESISTANCE</td><td>APPEARANCE</td><td>NO MARKED DEFECT</td><td rowspan="3">SOLDER THE CAPACITOR AND GUM UP THE BODY TO THE TEST JIG RESIN (ADHESIVE)(GLASS EPOXY BOARD) BY RESIN (ADHESIVE).
 
THE CAPACITOR SHOULD BE FIRMLY SOLDERED TO THE SUPPORTING LEAD WIRE, 1.5MM IN TOTAL AMPLITUDE, WITH ABOUT A 20 MINUTES RATE OF VIBRATION CHANGE FROM 10HZ TO 2000HZ AND BACK TO 10HZ.
THIS MOTION SHOULD BE APPLIED 12 TIMES IN EACH OF 3 MUTUALLY PERPENDICULAR DIRECTIONS (TOTAL OF 36 TIMES).
THE ACCELERATION IS 5G MAX.</td></tr>
<tr><td>C_R</td><td>WITHIN THE SPECIFIED TOLERANCE</td></tr>
<tr><td>TANδ</td><td>PER ITEM 4</td></tr>
<tr><td rowspan="4">11</td><td rowspan="4">MECHANICAL SHOCK</td><td>APPEARANCE</td><td>NO MARKED DEFECT</td><td rowspan="4">SOLDER THE CAPACITOR AND GUM UP THE BODY TO THE TEST JIG (GLASS EPOXY BOARD) BY RESIN (ADHESIVE).
 
THREE SHOCKS IN EACH DIRECTION SHOULD BE APPLIED ALONG 3 MUTUALLY PERPENDICULAR AXES TO AND FROM OF THE TEST SPECIMEN (18 SHOCKS).
THE SPECIFIED TEST PULSE SHOULD BE HALF-SINE AND SHOULD HAVE A DURATION: 0.5MS, PEAK VALUE: 100G AND VELOCITY CHANGE: 4.7M/S</td></tr>
<tr><td>C_R</td><td>WITHIN THE SPECIFIED TOLERANCE</td></tr>
<tr><td>TANδ</td><td><0.050</td></tr>
<tr><td>TV</td><td>>10000MΩ</td></tr>
</table>

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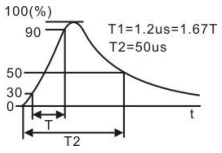
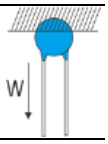
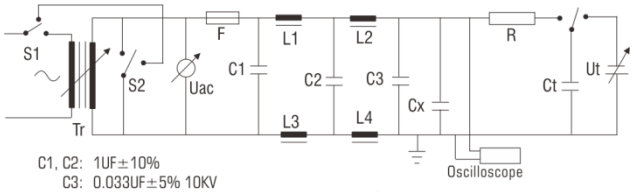
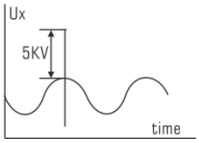
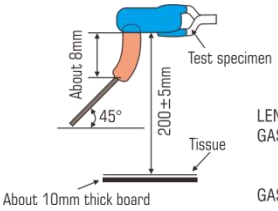
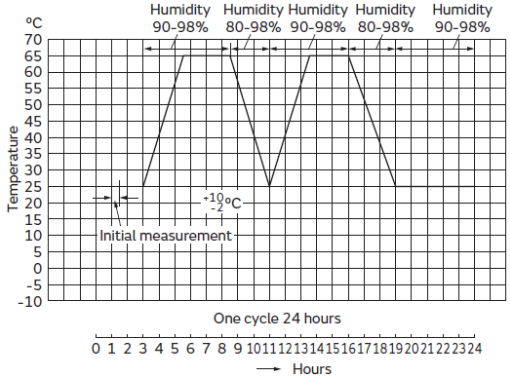
NO.	ITEM		SPECIFICATIONS	TESTING METHOD
12	HUMIDITY (UNDER STEADY STATE)	APPEARANCE	NO MARKED DEFECT	SET THE CAPACITOR FOR 1000±12H AT 85±3°C IN 80 TO 85% RELATIVE HUMIDITY. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H BEFORE INITIAL MEASUREMENTS. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 1 TO 2H AT ROOM CONDITION*.
		ΔC/C	Y5P: ±10% Y5U: ±15%	
		TANδ	<0.050	
		IR	>2000MΩ	
		TV	PER ITEM 6	
13	HUMIDITY LOADING	APPEARANCE	NO MARKED DEFECT	APPLY THE RATED VOLTAGE FOR 1000±12H AT 85±3°C IN 80 TO 85% RELATIVE HUMIDITY. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H BEFORE INITIAL MEASUREMENTS. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 1 TO 2H AT ROOM CONDITION*.
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANδ	<0.050	
		IR	>2000MΩ	
		TV	PER ITEM 6	
14	LIFE	APPEARANCE	NO MARKED DEFECT	IMPULSE VOLTAGE EACH INDIVIDUAL CAPACITOR SHOULD BE SUBJECTED TO A 5KV IMPULSE FOR THREE TIMES. THEN THE CAPACITORS ARE APPLIED TO LIFE TEST.  APPLY A VOLTAGE FROM FOLLOWING TABLE FOR 1000H AT 125+2/-0°C, AND RELATIVE HUMIDITY OF 50% MAX. APPLIED VOLTAGE AC510V(R.M.S.) <50/60HZ>, EXCEPT THAT ONCE EACH HOUR THE VOLTAGE IS INCREASED TO AC1000V(R.M.S.) FOR 0.1S. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H BEFORE INITIAL MEASUREMENTS. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 1 TO 2 HRS. AT ROOM CONDITION.
		ΔC/C	±20%	
		IR	>3000MΩ	
		TV	PER ITEM 6	
15	ROBUSTNESS OF TERMINATIONS	TENSILE	LEAD WIRE SHOULD NOT BE CUT OFF. CAPACITOR SHOULD NOT BE BROKEN.	AS SHOWN IN THE fiGURE AT RIGHT, fiX THE BODY OF THE CAPACITOR AND APPLY A TENSILE WEIGHT GRADUALLY TO EACH LEAD WIRE IN THE RADIAL DIRECTION OF THE CAPACITOR UP TO 10N AND KEEP IT FOR 10±1S. 
		BENDING		EACH LEAD WIRE SHOULD BE SUBJECTED TO 5N OF WEIGHT AND BENT 90° AT THE POINT OF EGRESS, IN ONE DIRECTION, THEN RETUREND TO ITS ORIGINAL POSITION AND BENT 90° IN THE OPPOSITE DIRECTION AT THE RATE OF ONE BEND IN 2 TO 3S.
16	ACTIVE FLAMMABILITY		THE CHEESE-CLOTH SHOULD NOT BE ON FIRE.	THE CAPACITOR SHOULD BE INDIVIDUALLY WRAPPED IN AT LEAST ONE BUT NOT MORE THAN TWO COMPLETE LAYERS OF CHEESE-CLOTH. THE CAPACITOR SHOULD BE SUBJECTED TO 20 DISCHARGES. THE INTERVAL BETWEEN SUCCESSIVE DISCHARGES SHOULD BE 5 SEC. THE UAC SHOULD BE MAINTAINED FOR 2 MIN. AFTER THE LAST DISCHARGE.  C1, C2: 1UF±10% C3: 0.033UF±5% 10KV Ct: 3UF±5% 10KV Cx: CAPACITOR UNDER TEST F: FUSE, RATED 10A R: 100Ω±5% U_n: RATED VOLTAGE Ut: VOLTAGE APPLIED TO Ct. L1 TO L4: 1.5mH±20% 16A ROD CORE CHOKE 
17	PASSIVE FLAMMABILITY		THE BURNING TIME SHOULD NOT EXCEED 30 SEC. THE TISSUE PAPER SHOULD NOT IGNITE.	THE CAPACITOR UNDER TEST SHOULD BE HELD IN THE FLAME IN THE POSITION WHICH BEST PROMOTES BURNING. EACH SPECIMEN SHOULD ONLY BE EXPOSED ONCE TO THE FLAME. TIME OF EXPOSURE TO FLAME: 30 SEC.  LENGTH OF FLAME: 12±1MM GAS BURNER: LENGTH 35MM MIN. INSIDE DIA. 0.5±0.1MM OUTSIDE DIA. 0.9MM MAX. GAS: BUTANE GAS PURITY 95% MIN.

CONTINUED FROM THE PRECEDING PAGE ⇲

NO.	ITEM		SPECIFICATIONS	TESTING METHOD
18	TEMPERATURE AND IMMERSION CYCLE	APPEARANCE	NO MARKED DEFECT	THE CAPACITOR SHOULD BE SUBJECTED TO 1000 TEMPERATURE CYCLES. STEP 1: TEMPERATURE (°C) -55 +0/-3, TIME (MIN) 30 STEP 2: ROOM TEMP., 3 STEP 3: 125 +3/-0, 30 STEP 4: ROOM TEMP., 3 PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 85±2°C FOR 1H., AND THEN PLACED AT ROOM CONDITION FOR 24±2 H. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 24±2 H. AT ROOM CONDITION.
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANδ	<0.050	
		IR	>3000MΩ	
		TV	PER ITEM 6	
19	HIGH TEMPERATURE EXPOSURE (STORAGE)	ΔC/C	±20%	SET THE CAPACITOR FOR 1000±12H AT 150±3°C. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 24±2H AT ROOM CONDITION.
		TANδ	<0.050	
		IR	>1000MΩ	
20	THERMAL SHOCK	APPEARANCE	NO MARKED DEFECT EXCEPT COLOR CHANGE OF OUTER COATING.	THE CAPACITOR SHOULD BE SUBJECTED TO 300 CYCLES. STEP 1: TEMPERATURE (°C) -55+0/-3, TIME (MIN) 15.0±3.0 STEP 2: 125+3/-0, 15.0±3.0 PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 85±2°C FOR 1H., AND THEN PLACED AT ROOM CONDITION FOR 24±2 H. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 24±2 H. AT ROOM CONDITION.
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANΔ	<0.050	
		IR	>3000MΩ	
21	RESISTANCE TO SOLVENTS	APPEARANCE	NO MARKED DEFECT	PER MIL-STD-202 METHOD 215 SOLVENT 1: 1 PART (BY VOLUME) OF ISOPROPYL ALCOHOL 3 PARTS (BY VOLUME) OF MINERAL SPIRITS SOLVENT 2: TERPENE DEFLUXER SOLVENT 3: 42 PARTS (BY VOLUME) OF WATER 1 PART (BY VOLUME) OF PROPYLENE GLYCOL MONOMETHYL ETHER 1 PART (BY VOLUME) OF MONOETHANOLOMINE
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANΔ	<0.050	
		IR	>3000MΩ	
22	BIASED HUMIDITY	APPEARANCE	NO MARKED DEFECT	APPLY THE RATED VOLTAGE AND DC1.3+0.2/-0V (ADD 6.8KΩ RESISTOR) AT 85±3°C AND 80 TO 85% HUMIDITY FOR 1000±12H. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 24±2H AT ROOM CONDITION.
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANΔ	<0.050	
		IR	>3000MΩ	
23	MOISTURE RESISTANCE	APPEARANCE	NO MARKED DEFECT	APPLY 24H OF HEAT (25 TO 65°C) AND HUMIDITY (80 TO 98%) TREATMENT SHOWN BELOW, 10 CONSECUTIVE TIMES. PRE-TREATMENT: CAPACITOR SHOULD BE STORED AT 125±3°C FOR 1H, THEN PLACED AT ROOM CONDITION FOR 24±2H. POST-TREATMENT: CAPACITOR SHOULD BE STORED FOR 24±2H AT ROOM CONDITION. 
		ΔC/C	Y5P: ±10% Y5U: ±20%	
		TANΔ	<0.050	
		IR	>3000MΩ	

8. MEASURING AND APPLICATION NOTICE

8.1. MEASUREMENT NOTICE

PLEASE MEASURE UNDER THE FOLLOWING CONDITIONS.

8.1.1. STANDARD ATMOSPHERIC CONDITIONS

UNLESS OTHERWISE SPECIFIED, ALL TESTS AND MEASUREMENTS SHALL BE MADE UNDER STANDARD ATMOSPHERIC CONDITIONS FOR TESTING AS GIVEN IN 5.3 OF IEC 60068-1.

TEMPERATURE, °C	RELATIVE HUMIDITY, %	AIR PRESSURE, KPA
15～35	25～75	86～106

BEFORE THE MEASUREMENTS ARE MADE, THE CAPACITOR SHALL BE STORED AT THE MEASURING TEMPERATURE FOR A TIME SUFFICIENT TO ALLOW THE ENTIRE CAPACITOR TO REACH THIS TEMPERATURE. THE PERIOD AS PRESCRIBED FOR RECOVERY AT THE END OF A TEST IS NORMALLY SUFFICIENT FOR THIS PURPOSE.
TEST AND MEASUREMENT SHALL BE MADE UNDER STANDARD ATMOSPHERIC CONDITIONS FOR TESTING, IN THE EVENT OF A DISPUTE, THE MEASUREMENTS SHALL BE REPEATED USING ONE OF THE REFEREE TEMPERATURES (AS GIVEN IN 8.1.3).
WHEN TESTS ARE CONDUCTED IN A SEQUENCE, THE FINAL MEASUREMENTS OF ONE TEST MAY BE TAKEN AS THE INITIAL MEASUREMENTS FOR THE SUCCEEDING TEST.
DURING MEASUREMENTS THE CAPACITOR SHALL NOT BE EXPOSED TO DRAUGHTS, DIRECT SUNLIGHT OR OTHER INFLUENCES LIKELY TO CAUSE ERROR.

8.1.2. RECOVERY CONDITIONS

UNLESS OTHERWISE SPECIFIED RECOVERY SHALL TAKE PLACE UNDER THE STANDARD ATMOSPHERIC CONDITIONS FOR TESTING (8.1.1).
IF RECOVERY UNDER CLOSELY CONTROLLED CONDITIONS IS NECESSARY, THE CONTROLLED RECOVERY CONDITIONS OF 5.4.1 OF IEC 60068-1 SHALL BE USED.
UNLESS OTHERWISE SPECIFIED IN THE RELEVANT SPECIFICATION, A DURATION OF 1 H TO 2 H SHALL BE USED.

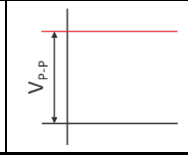
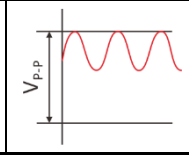
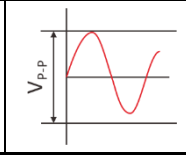
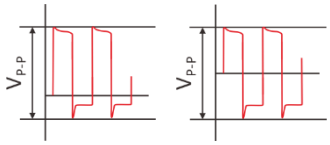
8.1.3. REFEREE CONDITIONS

TEMPERATURE, °C	RELATIVE HUMIDITY, %	AIR PRESSURE, KPA
25±1	48～52	86～106

FOR REFEREE PURPOSES, ONE OF THE STANDARD ATMOSPHERIC CONDITIONS FOR REFEREE TESTS TAKEN FROM 5.2 OF IEC 60068-1, AS GIVEN IN TABLE 1 BELOW, SHALL BE SELECTED:

8.2. OPERATING VOLTAGE

WHEN DC-RATED CAPACITORS ARE TO BE USED IN AC OR RIPPLE CURRENT CIRCUITS, BE SURE TO MAINTAIN THE VP-P VALUE OF THE APPLIED VOLTAGE OR THE VO-P WHICH CONTAINS DC BIAS WITHIN THE RATED VOLTAGE RANGE. WHEN THE VOLTAGE IS APPLIED TO THE CIRCUIT, STARTING OR STOPPING MAY GENERATE IRREGULAR VOLTAGE FOR A TRANSIT PERIOD BECAUSE OF RESONANCE OR SWITCHING. BE SURE TO USE A CAPACITOR WITH A RATED VOLTAGE RANGE THAT INCLUDES THESE IRREGULAR VOLTAGES.

VOLTAGE	DC VOLTAGE	DC+AC VOLTAGE	AC VOLTAGE	PULSE VOLTAGE
POSITIONAL MEASUREMENT				

8.3. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

KEEP THE SURFACE TEMPERATURE OF A CAPACITOR BELOW THE UPPER LIMIT OF ITS RATED OPERATING TEMPERATURE RANGE. BE SURE TO TAKE INTO ACCOUNT THE HEAT GENERATED BY THE CAPACITOR ITSELF. WHEN THE CAPACITOR IS USED IN A HIGH FREQUENCY CURRENT, PULSE CURRENT OR SIMILAR CURRENT, IT MAY HAVE SELF-GENERATED HEAT DUE TO DIELECTRIC LOSS. APPLIED VOLTAGE LOAD SHOULD BE SUCH THAT SELF-GENERATED HEAT IS WITHIN 20℃ UNDER THE CONDITION WHERE THE CAPACITOR IS SUBJECTED AT AN ATMOSPHERE TEMPERATURE OF 25℃. WHEN MEASURING, USE A THERMOCOUPLE OF SMALL THERMAL CAPACITY-K OF Ø0.1MM UNDER CONDITIONS WHERE THE CAPACITOR IS NOT AFFECTED BY RADIANT HEAT FROM OTHER COMPONENTS OR WIND FROM SURROUNDINGS. EXCESSIVE HEAT MAY LEAD TO DETERIORATION OF THE CAPACITOR'S CHARACTERISTICS AND RELIABILITY. (NEVER ATTEMPT TO PERFORM MEASUREMENT WITH THE COOLING FAN RUNNING. OTHERWISE, ACCURATE MEASUREMENT CANNOT BE ENSURED.)

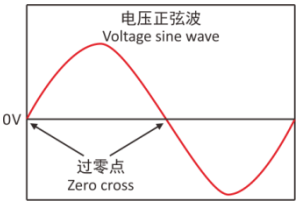
8.4. TEST CONDITION FOR WITHSTANDING VOLTAGE

8.4.1. TEST EQUIPMENT

TEST EQUIPMENT FOR AC WITHSTANDING VOLTAGE SHOULD BE USED WITH THE PERFORMANCE OF THE WAVE SIMILAR TO 50/60HZ SINE WAVE. IF THE DISTORTED SINE WAVE OR OVERLOAD EXCEEDING THE SPECIFIED VOLTAGE VALUE IS APPLIED, A DEFECT MAY BE CAUSED.

8.4.2. VOLTAGE APPLIED METHOD

WHEN THE WITHSTANDING VOLTAGE IS APPLIED, CAPACITOR'S LEAD OR TERMINAL SHOULD BE FIRMLY CONNECTED TO THE OUTPUT OF THE WITHSTANDING VOLTAGE TEST EQUIPMENT, AND THEN THE VOLTAGE SHOULD BE RAISED FROM NEAR ZERO TO THE TEST VOLTAGE (RISING SPEED 150V/S).
IF THE TEST VOLTAGE WITHOUT THE RAISE FROM NEAR ZERO VOLTAGE WOULD BE APPLIED DIRECTLY TO CAPACITOR, TEST VOLTAGE SHOULD BE APPLIED WITH THE ZERO CROSS. AT THE END OF THE TEST TIME, THE TEST VOLTAGE SHOULD BE REDUCED TO NEAR ZERO, AND THEN CAPACITOR'S LEAD OR TERMINAL SHOULD BE TAKEN OFF THE OUTPUT OF THE WITHSTANDING VOLTAGE TEST EQUIPMENT.
IF THE TEST VOLTAGE WITHOUT THE RAISE FROM NEAR ZERO VOLTAGE WOULD BE APPLIED DIRECTLY TO CAPACITOR, THE SURGE VOLTAGE MAY ARISE, AND THEREFORE, A DEFECT MAY BE CAUSED.
ZERO CROSS IS THE POINT WHERE VOLTAGE SINE WAVE PASSES 0V. SEE FIGURE AT RIGHT.



8.5. FAIL-SAFE

WHEN CAPACITOR WOULD BE BROKEN, FAILURE MAY RESULT IN A SHORT CIRCUIT. BE SURE TO PROVIDE AN APPROPRIATE FAIL-SAFE FUNCTION LIKE A FUSE ON YOUR PRODUCT IF FAILURE WOULD RESULT IN AN ELECTRIC SHOCK, FIRE OR FUMING.

8.6. CAPACITANCE CHANGE OF CAPACITORS

CAPACITORS HAVE AN AGING CHARACTERISTIC, WHEREBY THE CAPACITOR CONTINUALLY DECREASES ITS CAPACITANCE SLIGHTLY IF THE CAPACITOR IS LEFT ON FOR A LONG TIME. MOREOVER, CAPACITANCE MIGHT CHANGE GREATLY DEPENDING ON THE SURROUNDING TEMPERATURE OR AN APPLIED VOLTAGE. SO, IT IS NOT LIKELY TO BE SUITABLE FOR USE IN A CONSTANT TIME CIRCUIT.
PLEASE CONTACT US IF YOU NEED DETAILED INFORMATION.

8.7. PERFORMANCE CHECK BY EQUIPMENT

BEFORE USING A CAPACITOR, CHECK THAT THERE IS NO PROBLEM IN THE EQUIPMENT'S PERFORMANCE AND THE SPECIFICATIONS.

GENERALLY SPEAKING, CLASS 2 (B/E/F CHAR.) CERAMIC CAPACITORS HAVE VOLTAGE DEPENDENCE CHARACTERISTICS AND TEMPERATURE DEPENDENCE CHARACTERISTICS IN CAPACITANCE. SO, THE CAPACITANCE VALUE MAY CHANGE DEPENDING ON THE OPERATING CONDITION IN THE EQUIPMENT. THEREFORE, BE SURE TO CONFIRM THE APPARATUS PERFORMANCE OF RECEIVING INFLUENCE IN THE CAPACITANCE VALUE CHANGE OF A CAPACITOR, SUCH AS LEAKAGE CURRENT AND NOISE SUPPRESSION CHARACTERISTIC.

MOREOVER, CHECK THE SURGE-PROOF ABILITY OF A CAPACITOR IN THE EQUIPMENT, IF NEEDED, BECAUSE THE SURGE VOLTAGE MAY EXCEED SPECIFIC VALUE BY THE INDUCTANCE OF THE CIRCUIT.

8.8. OPERATING AND STORAGE ENVIRONMENT

THE INSULATING COATING OF CAPACITORS DOES NOT FORM A PERFECT SEAL; THEREFORE, DO NOT USE OR STORE CAPACITORS IN A CORROSIVE ATMOSPHERE, ESPECIALLY WHERE CHLORIDE GAS, SULFIDE GAS, ACID, ALKALI, SALT OR THE LIKE ARE PRESENT. AND AVOID EXPOSURE TO MOISTURE.

BEFORE CLEANING, BONDING, OR MOLDING THIS PRODUCT, VERIFY THAT THESE PROCESSES DO NOT AFFECT PRODUCT QUALITY BY TESTING THE PERFORMANCE OF A CLEANED, BONDED OR MOLDED PRODUCT IN THE INTENDED EQUIPMENT.

STORE THE CAPACITORS WHERE THE TEMPERATURE AND RELATIVE HUMIDITY DO NOT EXCEED 5 TO 40 DEGREES CENTIGRADE AND 20 TO 70%. USE CAPACITORS WITHIN 6 MONTHS AFTER DELIVERED.

8.9. SOLDERING AND MOUNTING

8.9.1. VIBRATION AND IMPACT

DO NOT EXPOSE A CAPACITOR OR ITS LEADS TO EXCESSIVE SHOCK OR VIBRATION DURING USE.

8.9.2. SOLDERING

WHEN SOLDERING THIS PRODUCT TO A PCB/PWB, DO NOT EXCEED THE SOLDER HEAT RESISTANCE SPECIFICATIONS (260°C, 5S) OF THE CAPACITOR. SUBJECTING THIS PRODUCT TO EXCESSIVE HEATING COULD MELT THE INTERNAL JUNCTION SOLDER AND MAY RESULT IN THERMAL SHOCKS THAT CAN CRACK THE CERAMIC ELEMENT.

WHEN SOLDERING CAPACITOR WITH A SOLDERING IRON, IT SHOULD BE PERFORMED IN THE FOLLOWING CONDITIONS.

TEMPERATURE OF IRON-TIP: 320 DEGREES C. MAX.

SOLDERING IRON WATTAGE: 40W MAX.

SOLDERING TIME: 3.0 SEC. MAX.

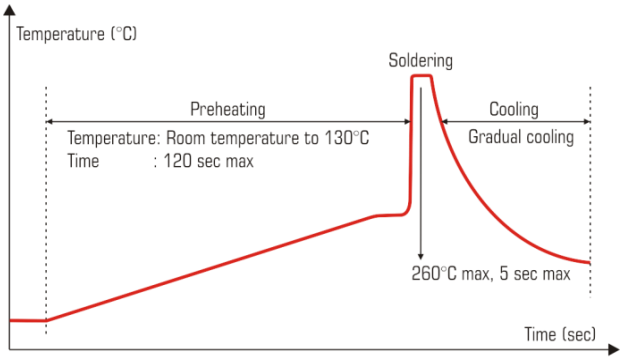


Fig.: Wave-soldering temperature-time profile to recommend

8.9.3. BONDING, RESIN MOLDING AND COATING

BEFORE BONDING, MOLDING OR COATING THIS PRODUCT, VERIFY THAT THESE PROCESSES DO NOT AFFECT THE QUALITY OF CAPACITOR BY TESTING THE PERFORMANCE OF THE BONDED, MOLDED OR COATED PRODUCT IN THE INTENDED EQUIPMENT.

IN CASE THE AMOUNT OF APPLICATIONS, DRYNESS/HARDENING CONDITIONS OF ADHESIVES AND MOLDING RESINS CONTAINING ORGANIC SOLVENTS (ETHYL ACETATE, METHYL ETHYL KETONE, TOLUENE, ETC.) ARE UNSUITABLE, THE OUTER COATING RESIN OF A CAPACITOR IS DAMAGED BY THE ORGANIC SOLVENTS AND IT MAY RESULT, WORST CASE, IN A SHORT CIRCUIT.

THE VARIATION IN THICKNESS OF ADHESIVE, MOLDING RESIN OR COATING MAY CAUSE OUTER COATING RESIN CRACKING AND/OR CERAMIC ELEMENT CRACKING OF A CAPACITOR IN A TEMPERATURE CYCLING.

8.9.4. CLEANING (ULTRASONIC CLEANING)

TO PERFORM ULTRASONIC CLEANING, OBSERVE THE FOLLOWING CONDITIONS.

RINSE BATH CAPACITY: OUTPUT OF 20 WATTS PER LITER OR LESS.

RINSING TIME: 5 MIN. MAXIMUM.

DO NOT VIBRATE THE PCB/PWB DIRECTLY.

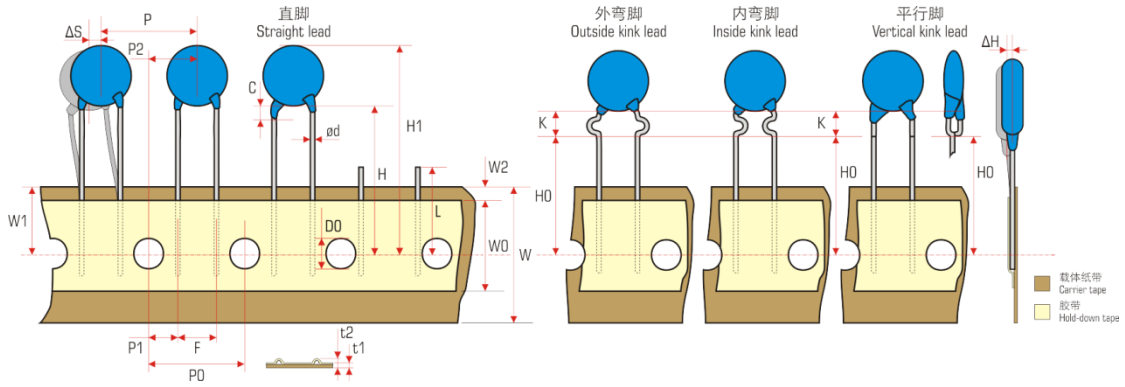
EXCESSIVE ULTRASONIC CLEANING MAY LEAD TO FATIGUE DESTRUCTION OF THE LEAD WIRES.

9. TAPING SPECIFICATIONS

■ MODE 1

AS SHOWN IN THE FOLLOWING FIGURE:

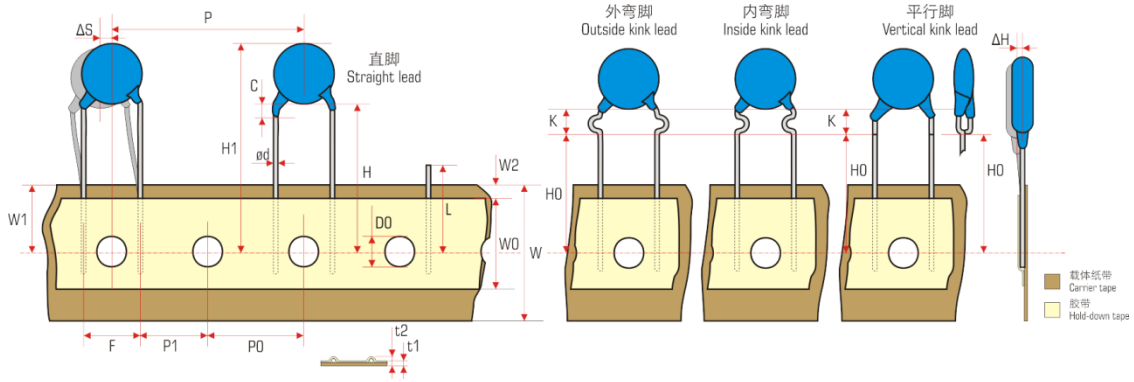
12.7MM BY FEED HOLE PITCH (P0) AND COMPONENTS PITCH (P)
OR, 15.0MM BY FEED HOLE PITCH (P0) AND COMPONENTS PITCH (P)



■ MODE 2

AS SHOWN IN THE FOLLOWING FIGURE:

FEED HOLE PITCH (P0) WITH 12.7MM AND COMPONENTS PITCH (P) WITH 25.4MM



■ DIMENSIONS (MM)

ITEM		LEAD TO LEAD DISTANCE	COMPONENT PITCH	FEED HOLE PITCH	FEED CENTER TO LEAD	HOLE CENTER TO COMPONENT CENTER
SYMBOL		F	P	P0	P1	P2
SPECIFICATIONS	MODE 1	5.0	12.7	12.7	3.85	6.35
		7.5	15.0	15.0	3.75	7.5
	MODE 2	7.5	25.4	12.7	3.85	---
		10.0	25.4	12.7	7.7	---
TOLERANCE		±0.8	±1.0	±0.3	±0.7	±1.3

ITEM	LEAD WIRE DIAMETER	DEVIATION ALONG TAPE, LEFT OR RIGHT	DEVIATION ALONG TAPE, FRONT OR BACK	TAPE WIDTH	HOLD-DOWN TAPE WIDTH	HOLE POSITION	HOLD-DOWN TAPE POSITION	HEIGHT OF COMPONENT FROM TAPE CENTER		COMPONENT HEIGHT	FEED HOLE DIAMETER	TOTAL TAPE THICKNESS	TOTAL TAPE, TAPE AND LEAD WIRE	SNIPPED LENGTH	COATING RUNDOWN ON LEADS	HEIGHT OF KINK
								STRAIGHT LEAD TYPE	KINK LEAD TYPE							
SYMBOL	ΦD	ΔS	ΔH	W	W0	W1	W2	H	H0	H1	D0	T1	T2	L	C	K
SPECIFICATIONS	0.55	1.3	2.0	18.0	7.0	9.0	3.0	18.0	16.0	40.0*	4.0	0.9	1.5	11.0	3.0	5.0
TOLERANCE	±0.1	MAX	MAX	+1.0 -0.5	MIN	+0.75 -0.5	MAX	+2.0 -0	±0.5	MAX	±0.3	MAX	MAX	MAX	MAX	MAX