承　　認　　書
SPECIFICATION FOR　APPROVAL

客户名称:
Customer: 深圳市立创电子商务有限公司

产 品 型 号:
Product Type: M/C　475K/300VAC　P27.5mm

产 品 编 码:
Product Code: C2913435

客 户 料 号:
Customer Code: HAPK3A0W47K4R050

日期: 2021年11月25日

Approval signature:		
AUTHORIZED BY	CHECK BY	VALIDATED BY

承认后请寄回一份（Please return one copy after approved）

东莞市弘源电子有限公司
Dongguan City Hongyuan Electronic Co.,Ltd

地址：东莞市塘厦镇林村新鸿路9号
No.9, Xinhong Road, tangxialin village, Dongguan City, Guangdong Province

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确 认	研发部 2021.11.25 魏三春	制 作	刘静

Table of Contents 目录

Datasheet Version update list
规格书版本更新履历

Version 版本号	Update content 变更内容	Update Date 变更日期	Remark 备注
V1.0	脚长 20mm 修改为 L0	20180926	

HAPK 系列承认书

NO	客户料号	规格	料号
1		HAPK475K300V S=27.5mm L=5mm W*H*T=32*37*22mm	HAPK3A0W47K4R050
2		以下空白	
3			
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PRODUST SPECIFICATIONS
产品规格

ISSUED DATE: 2021-11-24
签发日期：2021-11-24

DESCRIPTIONS :Metallized POLYPROPYLENE Film CAPACITOR
描述：金属化聚丙烯薄膜电容器

TYPE: HMPB SERIES
系列：HAPK系列

Operating temperature :-40℃~105℃(Derate DC voltage 1.5%/. above 85°C to 105°C)
操作温度范围：-40℃~105℃（+85℃～+105℃，直流电压降额系数1.5%/℃）

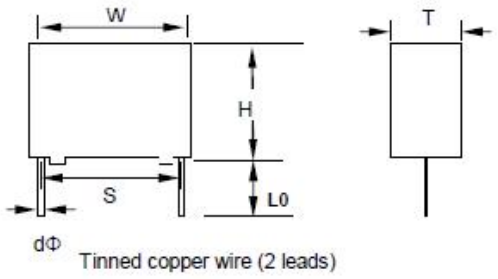


Fig. 1

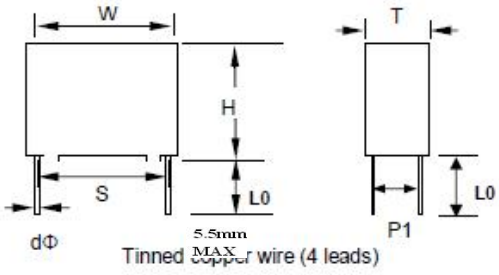


Fig. 2

PRODUCT DIMENSIONS :
产品尺寸(mm)

CUSTOMER'S PART NO. 客户料号	CAP 容量 (uF)	Tol. 误差 ± %	R.V. 电压 VAC	T.V. 耐压 VDC	W 长度 ± 0.5	H 高度 ± 0.5	T 厚度 ± 0.5	S 脚距 +1/-0.5	P1 脚距 ± 0.5	d 线径 ± 0.05	L0 ± 1	Fig.	HONGFARAD Cap PART NO. 我司料号	dv/dt (v/us)
	4.7	10	300	645	32.0	37.0	22.0	27.5		0.8	5	1	HAPK3A0W47K4R050	100

Rated RMS Voltage(U_{rms})	Rated AC Voltage(U_n)	Maximum continuous DC voltage	Ls(nH)	ESR@10 KHz(mΩ)	I(A)	Is(A)	Imax @70℃,10KHZ(A)
300VAC	425VAC	560VDC	22	4.0	470	1410	13

APPROVED BY
批准：
研发部 2021.11.24 魏三春

CHECKED BY:
审核：
研发部 2021.11.24 魏三春

PREPARED BY:
制作：刘静

产品编码说明 Part number system

16 位产品代码如下:

The 16 digits part number is formed as follow:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
H	M	K	P	3	A	1	W	4	7	K	0	Q	2	0	0	

H:商标代码

1. 1~3 TYPE OF CAPACITOR:
电容器系列

TYPE	MKP	MKB	MPP	MPB	PPS	MPS	PPN	MPA	MPB	M61	MKD	APA	APT
CODE	MKP	MKB	MPP	MPB	PPS	MPS	PPN	MPA	MPB	M61	MKD	APA	APT
TYPE	MEK	PEI	MEA	MET	MEF	MEB	AHI						
CODE	MEK	PEI	MEA	MET	MEF	MEB	AHI						

2. 4~6 RATED VOLTAGE:
额定电压

063: 63VDC/JIS 1J. **400: 400VDC/JIS 2G.** **1K6: 1,600VDC/JIS 3C.**
100: 100VDC/JIS 2A. **630: 630VDC/JIS 2J.** **1N0: 10,000VDC/JIS 4A.**
250: 250VDC/JIS2E. **1K0: 1,000VDC/JIS 3A.** **2A7: 275VAC 3A1:310VAC.**

3. 7~9 Symbols of capacitance in uF:
电容器容量代码

A: Indicates tens. EX: 12uF=A12, 10uF=A10.

W(Word): Indicates unit. EX: 1.5uF=W15

P(Point): Digits following the decimal point. EX: 0.22uF=P22

S(Single Zero): Digits following the decimal point followed by one zero. EX: 0.015uF=S15

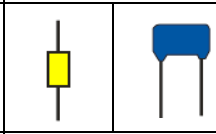
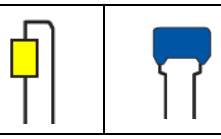
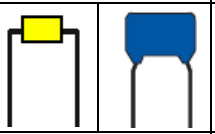
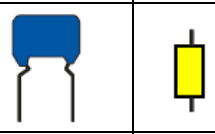
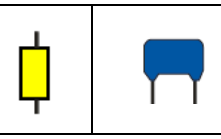
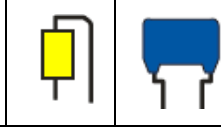
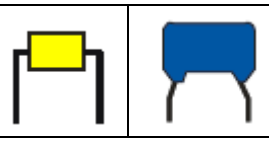
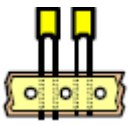
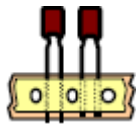
D(Double Zeroes): Digits following the decimal point followed by two zeroes. EX: 0.0047uF=D47

T(Triple Zeroes): Digits following the decimal point followed by three zeroes. EX: 0.00068uF=T68

4. 10 Symbols of capacitance Tolerance:
容量公差代码

TOLERANCE	±1%	±2%	±3%	±5%	±10%	±20%	+80%-20%	+100%-0%
CODE	F	G	H	J	K	M	Z	P

5. 11 Lead Style Code:
引脚方式

CODE	0(不加工)	1（内弯）	2（外弯）	3(内外弯)	4(切脚)
LEAD TYPE					
CODE	5(内弯切脚)	6（内弯切脚）	7（内外弯切脚）	A(直角编带)	B(弯脚编带)
LEAD TYPE					

6. 12 Lead Space (mm)
引线脚距

SPACE	3.5	4.0	5.0	6.0	7.5	10.0	12.5	15.0	20.0	22.5	27.5	30.0	31.5	32.0	37.5	42.5	
CODE	A	B	C	E	D	F	V	I	M	N	R	U	S	T	Q	W	O
SPACE	47.5	52.5															
CODE	P	Y															

7. 13~14 引线脚长 Lead Length 3A=3.5 4A=4.5 05=5mm 5A=5.5 20=20mm

8. 15 特征码 Feature Codes ROHS: 0 Halogen Free: A capacitive divider: B

9. 16 内部码 Internal Codes

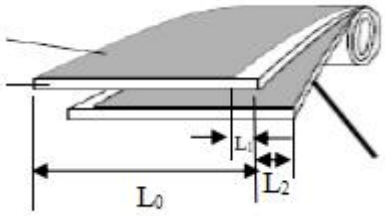
HAPK SERIES CAPACITORS
金属化聚丙烯薄膜电容器HAPK系列

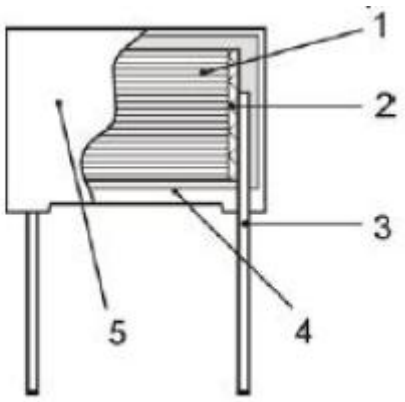
1.结构及材料(Construction and Component)

a产品结构图&印字(Construction&Mark)

金属化蒸镀层/Metallized layer

聚丙烯薄膜层/POLYPROPYLENE film





项次 Item	构成部位 Component
L_0	膜宽 Width
L_1	留边 Margin
L_2	错边 Stagger joint
d	膜厚 Film thickness

B材料构成清单:(Component List)

项次 Item	构成部位 Component	材料名称/材质 Material	环保要求 RoHS Requirements
1	Element 素子	金属化聚丙烯薄膜 Metallized OPP film	符合RoHS要求 Compliant with RoHS
2	喷金层 Metal spray layer	锌线锡锌合金线 Zn and Zn-Tin alloy wire	符合RoHS要求 Compliant with RoHS
3	引线 Leads	镀锡铜包钢线 Tinned copper-base alloy wire	符合RoHS要求 Compliant with RoHS
4	灌封胶 Potting Compound	UL94V-0 级阻燃環氧樹脂 Flameretardant epoxy resin(UL94V0)	符合RoHS要求 Compliant with RoHS
5	塑胶外壳 Enclosure	UL94V-0级阻燃PBT材质 Flameretardant PBT Plastic(UL 94V0)	符合RoHS要求 Compliant with RoHS
6	本体印字 Marking	激光刻印Laset	符合RoHS要求 Compliant with RoHS

2.技术规范/Technical specification

项次 NO.	检测项目 Test item	性能 Performance	检测方法(参照IEC61071;GB/T17702) Test method (refer to IEC61071;GB/T17702)
1	耐压测试 Withstand Voltage		参照4.2.1节 Ref 4.2.1 clause
	引线与引线间(T-T)	应无永久性击穿及飞弧 No permanent breakdown or flashover	Apply 2.15% of rated voltage / 60sec
	引线与外壳间 Terminal-Case		3000Vac(60s). C≤1uf 漏电流≤5.0mA C>1 uf 漏电流≤10.0mA 电压爬升时间：AC:150V/S DC:250V/S
2	绝缘电阻 Insulation Resistance	(20℃，100V,1min) C_R≤0.33uF; IR>100000MΩ C_R>0.33uF;IR*C>30 000S	充电时间60秒charge time 60sec 充电电压100Vdc, charge voltage100V 参照4.2.4 节Ref 4.2.4 clause
3	容量 Capacitance	J ± 5% ;K ± 10% ;M ± 20%	参照4.2.2节 :Ref 4.2.2 clause 测试条件:1V, 1KHZ （25℃ ± 5℃）
4	Dissipation factor 损耗角正切	≦0.0015 (0.15%) at 1 KHz.	测试条件:1V,1KHZ （25℃ ± 5℃） 参照4.2.3节 :Ref 4.2.3 clause
5	可焊性 Solderability	被测引线90%以上上锡率 At least 90% immersed lead wire should be covered new solder.	参照4.5节: Ref 4.5 clause Ta:锡槽法(方法1) Ta:Tin bath method (1) 温度:260 ± 5℃； 时间:2 ± 0.5秒 Solder temperature :260 ± 5℃ Immersion time: 2 ± 0.5 sec
6	引线强度测试 Terminal strength	引线脚无可见的破损 There shall be no visible damage	参照4.3节 :Ref 4.3 clause 拉力Ua: 0.5<d≤0.8 ,10N ± 10% 0.8<d≤1.25, 20N ± 10% 弯力Ub: 0.5<d≤0.8 , 5N ± 10% 0.8<d≤1.25, 10N ± 10% 引线在每个方向进行两次弯曲 引线为刚性,Ub试验方式不适用 Lead to rigid, Ub test method is not applicable Tense(Ua): 0.5<d≤0.8 , 10N ± 10% 0.8<d≤1.25, 20N ± 10% Bend(Ub): 0.5<d≤0.8 , 5N ± 10% 0.8<d≤1.25, 10N ± 10% Bent 2 times each Lead to rigid, Ub test method is not applicable

項次 NO.	檢測項目 Test item	性能 Performance	檢測方法检测方法(参照IEC61071;GB/T17702) Test method (refer to IEC61071;GB/T17702)
7	耐焊接热 Resistance to Solder heat	There should be no visible damage, ΔC/C< ± 3% 外观无可见的损伤,标志清 晰,容量变化率 ΔC/C< ± 3%	参照4.4节: Ref 4.4 clause Tb:锡槽法(方法1A) Tb:Tin bath method (1 A) 温度:260 ± 5℃； 时间:5-10秒 Solder temperature :260 ± 5℃ Immersion time: 5-10 sec
8	初始测量 Initial measurement	容量,损耗角正切 Capacitance, Tan δ	
	温度快速变化 Rapid change of temperature	外观无可见的损伤 There should be no visible damage.	参照4.4节: Ref 4.4 clause θA= -40℃,θB=+85℃ 循环周期:5次, 5 cycles 周期时间:30分钟 Duration=30min
	振动 Vibration	外观无可见的损伤 There should be no visible damage.	参照4.7节: Ref 4.7 clause 位移0.75mm或加速度0.98m/s² Amplitude 0.75mm or acceleration 0.98m/s² (两者取较小者) (whichever is the smaller values) 振动频率:10~500HZ, 三个方向,每2小时/方向,共6小时 2h each direction, total 6h
	Bump 碰撞	外观无可见的损伤,标志清 晰,容量变化率 ΔC/C< ± 5% There should be no visible damage, ΔC/C< ± 5%	参照4.8节: Ref 4.8 clause 4000次,加速度390m/s² 4000 times ,acceleration 390m/s² 脉冲持续时间:6ms. Pulse duration 6ms.
	最终测量 Final measurement	外观无可见的损伤,标志清 晰,容量变化率 ΔC/C< ± 5% There should be no visible damage, ΔC/C< ± 5% 损耗角正切增加:Increase of Tan δ CR ⩽ 1uf: ⩽ 0.003 绝缘电阻(IR):>50%的额定值 IR>50% *Rate value	

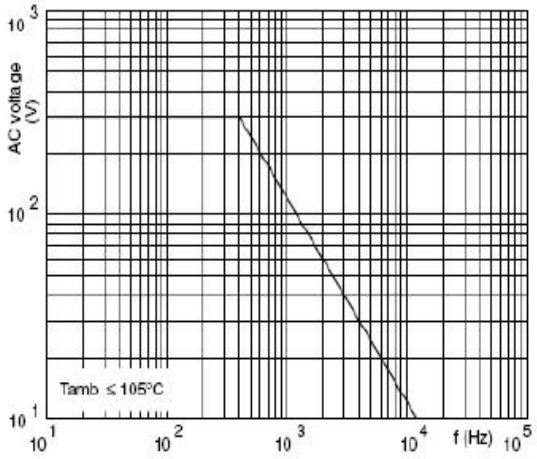
项次 NO.	检测项目 Test item		性能 Performance	检测方法(参照IEC61071;GB/T17702) Test method (refer to IEC61071;GB/T17702)
9	气候顺序	Initial measurement 初始测量		参照4.10节: Ref 4.10 clause
		干热Dry heat		+105℃,16h
		寒冷Cold		-40℃,2h
		循环湿热 Damp heat, cyclic		试验Db,其余循环 Test Db, remaining cycles
	最终测量及要求 Final measurement		应无可见损坏,标志清晰 There should be no visible damage, legible marking. 容量变化率ΔC/C<±5% Capacitance change ΔC/C<±5% 损耗角正切增加: Increase of Tan δCR≤1uf≤0.003 绝缘电阻(IR):>50%的额定值 IR>50% *Rate value	
10	稳态湿热 Damp heat steady state		应无可见损坏,标志清晰 There should be no visible damage, legible marking. Capacitance change ΔC/C<±5% 容量变化率ΔC/C<±5% 损耗角正切增加: Increase of Tan δC ≤1uf≤0.005	参照4.11节: Ref 4.11 clause Temperature: 40±2% 温度:40±2% 湿度:93(+2/-3)%RH Humidity: 93(+2/-3)%RH 持续时间:21天 Duration:21 days
11	耐久性 Endurance		应无可见损坏,标志清晰 There should be no visible damage, legible marking. 容量变化率ΔC/C<±5% Capacitance change ΔC/C<±5% 损耗角正切增加: Increase of Tan δ CR≤1uf≤0.003 绝缘电阻(IR):>50%的额定值 IR>50% *Rate value	参照4.12节: Ref 4.12 clause 在最高允许温度下85℃，施加试验电压1.25*U ,试验周期 1000小时 (1.25*U)at 85℃,1000h

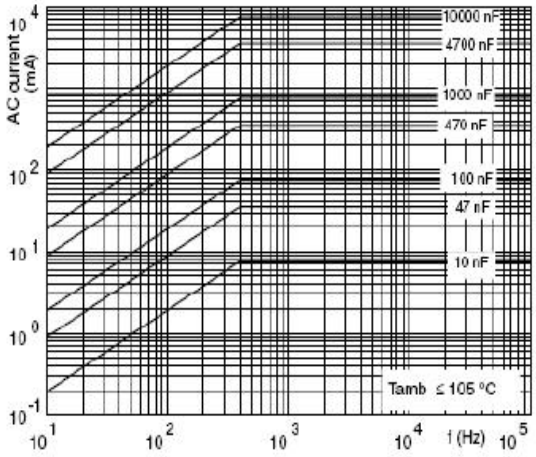
项次 NO.	检测项目 Test item	性能 Performance	检测方法(参照IEC61071;GB/T17702) Test method (refer to IEC61071;GB/T17702)
12	充放电 Charge and Discharge	应无可见损坏,标志清晰 There should be no visible damage, legible marking. 容量变化率ΔC/C<±5% Capacitance change ΔC/C<±5% 损耗角正切增加: Increase of Tanδ C_R ≤ 1uf ≤ 0.003 绝缘电阻(IR):>50%的额定值 R>50% *Rate value	参照4.13节: Ref 4.13 clause 试验电容≤1uf 试验次数:10000次 试验时间:0.5秒 放电电阻: $R1=\frac{U_R}{C_R\frac{du}{dt}}$ C > 1 uF 频率: 1KHz C≦1 uF 频率: 10KHz C ≤1uf Test of time:0.5s,10000 times Discharge resistance: $R1=\frac{U_R}{C_R\frac{du}{dt}}$
13	内部温度上升 Internal temperature rise	Temperature rise(ΔT)≤10℃ 温度上升≤10℃	试验温度:正常室温. 试验应由焊接电容器印刷的另一侧电路板等的影响周围的热组件 Test temperature: normal room temperature.

金属化聚丙烯薄膜电容器HAPK系列

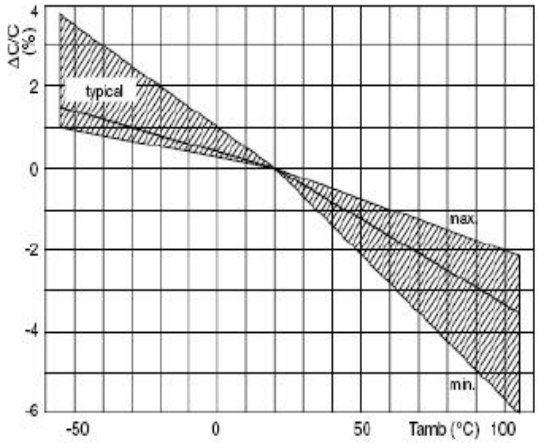
3.特性曲线图　CHARACTERISTIC CURVE

最大有效值，额定交流电压及电流对比工作频率曲线图
MAXIMUM RMS VOLTAGE AND AC CURRENT (SINEWAVE)AS A FUNCTION OF FREQUENCY

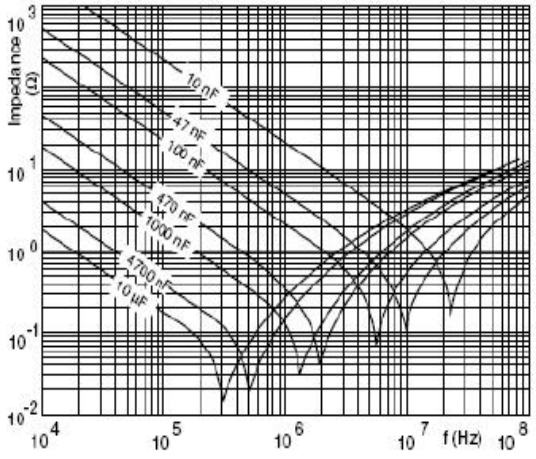




容量变化率对比工作温度曲线图
CAPACITANCE



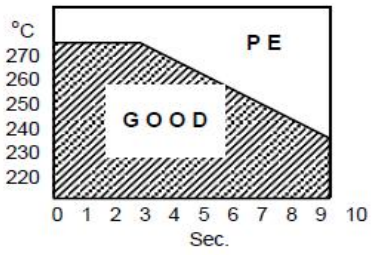
电容阻抗对比工作频率曲线图
IMPEDANCE

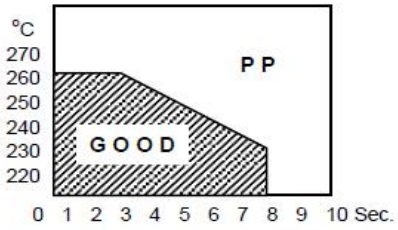


金属化聚丙烯薄膜电容器HAPK系列

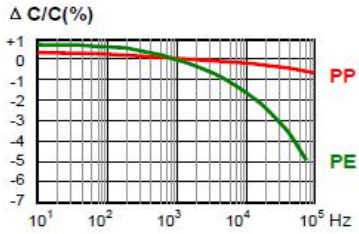
CHARACTERISTICS REFERENCE

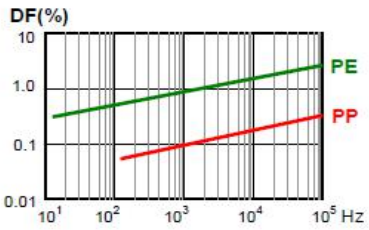
Solderring Temperature VS Time 焊接温度 VS 时间





Frequency Characteristics 频率特性





Temperature Characteristics 温度特性