

Carli[®]

Customer: 立创

No: MEHF190121A

STN013 Edt:F



Capacitors



品名:

金属化聚脂膜电容器

(Description)

Metallized Polyester Film Capacitor

型式:

(Type)

MEH (Code AH) (Halogen-free)

零件料号:

(Part No.)

AH474K2G159L270D9H

客户料号:

(Customer Part No)

日期:

(Date)

2019.01.21

承认章 (Approved By)



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承认书修订履历表
UPDATE HISTORY

客户 (Customer)	立 创		承认书编号 (SPEC NO)	MEHF190121A
NO	Date	Edition	Histroy	
1	2019.01.21	A	新制订承认书编号: MEHF190121A	
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2019-1-21

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General Information

0: Product Code System 产品代码系统

For example: The part number, comprising 18 digits, is formed as follows.

举例: 产品料号由18位数组成, 如下:

A	H	4	7	4	K	2	G	1	5	9	L	2	7	0	D	9	H
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

- | | |
|-------------------------------------|-------------------------------------------|
| Digit 1~2: Type Code | Digit 11 and 17: Type Series Code |
| 数位1~2: 型号代码 | 数位11和17: 型号系列码 |
| Digit 3~5: Capacitance Value Code | Digit 12: Lead Form Code |
| 数位 3~5: 容量代码 | 数位 12: 引线加工型式代码 |
| Digit 6: Capacitance Tolerance Code | Digit 13~15: Lead Length Code |
| 数位 6: 容量偏差代码 | 数位 13~15: 引线长度码 |
| Digit 7~8: Rated Voltage Code | Digit 16: Lead Length Tolerance Code |
| 数位 7~8: 额定电压代码 | 数位 16: 引线长误差代码 |
| Digit 9~10: Case or Pitch Code | Digit 18: RoHs or HF Compliance Type Code |
| 数位 9~10: 壳体或脚距代码 | 数位 18: RoHs或HF符合性代码 |

0.1 Digit 1 to 2 - 数位1~2: TYPE code. 型号代码

TYPE型号	MPX	MPF	MPH	MPB	MPV	MPC	PPS	PPN	DPS	DPC	DMB
CODE代码	PX	PF	PH	PB	PV	PC	DF	NF	DS	DC	DB

TYPE型号	MEF	MTF	MEH	MEC	MSC	MSF	MTB	MEV
CODE代码	AF	TF	AH	AC	SC	SF	TB	AV

0.2 Digit 3 to 5 - 数位3~5: Capacitance Expressed in 3-digit code 3位数代码表示容值

The first 2 digits indicate significant figures, and the third digit specifies the number of zero to follow.
前两位表示基数, 第三个数位表示其后零的个数

This gives the capacitance in picofarads. 容量值单位为皮法。

For examples 举例:

$102 = 10 \times 10^2 \text{ pF} = 1,000 \text{ pF} = 1.0 \text{ nF} = 0.001 \mu\text{F}$ $105 = 10 \times 10^5 \text{ pF} = 1,000,000 \text{ pF} = 1000 \text{ nF} = 1 \mu\text{F}$

0.3 Digit 6 - 数位6 Capacitance tolerance 容量偏差

Tolerance	±1%	±2%	±3%	±5%	±10%	±20%
CODE	F	G	H	J	K	M

0.4 Digit 7 to 8 - 数位7~8: Rated Voltage 额定电压:

VR(DC)	50	63	100	160	250	400	450	500	630	800	1000	1250	1600	2000	2500
CODE	1H	1J	2A	2C	2E	2G	2Y	2H	2J	2K	3A	3V	3C	3D	3E
VR(AC)	125	140	150	160	220	250	275	310	350	400	440	450	500	600	630
CODE	2L	4B	2S	2U	2P	2I	3I	2W	2F	2R	4A	2T	2M	2Z	3J

0.5 Digit 9 to 10 - 数位9~10: Pitch expressed by Case No or two digits 表示壳体或两个数位的脚距代码

Box type 盒装型

Pitch脚距	7.5	10	12.5	15	20	22.5	27.5	37.5	42.5	55
Case No 壳体代码	B*	C*	G*	D*	S*	E*	F*	J*	K*	P*



Powder Coating type 粉涂型

Pitch脚距	7.5	10	15	20	22.5	27.5
Code代码	07	10	15	20	22	27






0.6 Digit 11 and 17 - 数位11和17 series code 系列代码:

0.7 Digit 12 - 数位12 Lead Form 引线加工型式代码

Box type 盒装型

Code 代码	L	H
Lead Type 形式		

Powder Coating type 粉涂型

Code 代码	L	H	K	N	M
Lead Type 形式					

0.8 Digit 13 to 15 - 数位13~15: Lead Length (Straight): Expressed in 3-letter code 引线长度以3个数位代码表示

example 举例: code 代码270 = 270/10=27 (mm),

0.9 Digit 16 - 数位16: Tolerance of Lead Length (Straight) 引线长度 (直型) 偏差: Expressed in 1-letter 1个字母表示

Tolerance	±0.3 mm	±0.5 mm	+0.5/-0mm	±1mm	±2mm	±0.4mm
Code	A	B	C	D	E	F

0.10 Digit 18 - 数位18 "H" Halogen-Free compliant, 无卤型 "R" ROHS compliant. ROHS符合型

Specification for metallized polyester film capacitor

金属化膜电容器说明

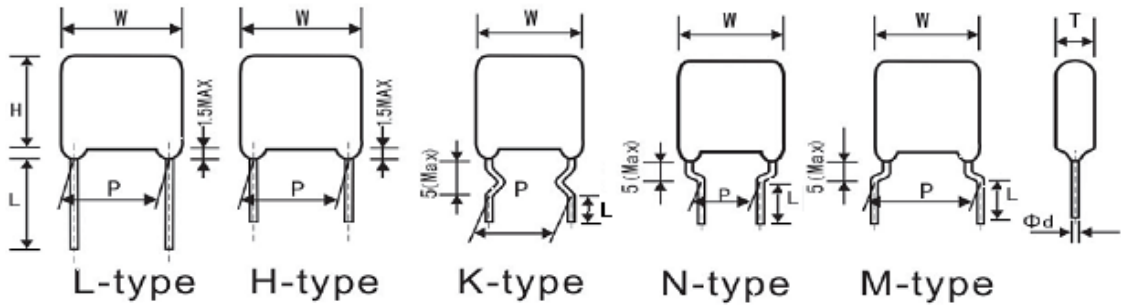
TYPE MEH

1.Scope 范围 .

This specification applies to metallized Polyester film capacitors ,type name MEH (code AH) , used in electronic equipments .

本规范适用于应用在电子设备中的金属化聚脂膜电容器,型号MEH（代码AH）.

2. Dimension sheet 规格尺寸



NO	CARLI P/N	CAP (μF)	TOL ±%	R.V VDC	DF (1KHz) ≤%	DIMENSIONS 尺寸 (mm)						FIG	CUSTOMER P/N (客户料号)
						W (Max)	H (Max)	T (Max)	P±1	L±1	φd±0.05		
1	AH474K2G159L270D9H	.47	10	400	1.0	17.5	12.5	5.5	15	27	0.6	L	
2													
3													
4													
5													
6													
7													
8													
9													
10													

NOTE

Designed by 制作	刘金香	Checked by 审查	谭娟	Approved by 核准	林乔伟
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Specification for metallized polyester film capacitor , MEH type

金属化PE膜电容器规格，MEH 系列

3. Type introduction and application 型号介绍及用途

3.1 MEH are winded with metallized polyester film dielectric , non-inductive construction ,copper wire lead and flame retardant epoxy resin Powder coating .

MEH 是由金属化聚脂膜无感结构卷绕而成，采用镀锡铜导线，阻燃型粉末环氧树脂封装。

3.2 Typical Application .

blocking ,coupling, decoupling, filtering ,by-pass,

It is popular for use as filter in PFC

circuit of SMPS, Ballaster,Adapter.

用途：隔直流,耦合,去耦,滤波,旁路等,

广泛应用于SMPS,镇流器,适配器中的PFC回路滤波用.

4. Features 产品特点:

- Small size and excellent self-healing property .小型化,自愈性能好;
- Non- inductive construction . 无感结构;
- Good solder - ability.良好可焊性;
- Flame retardent epoxy powder coating .阻燃环氧树脂粉末涂装.

5. Electrical specifications -电气特性

Unless otherwise specified, electrical characteristics refers to IEC 60384-2.

如无其他说明,电气特性请参考IEC60384-2.

Item 项目	Specification 详述
Operating Temperature 工作温度	Max. operating temperature:105°C
Capacitance Range 容量范围	0.01μF~2.2μF
Capacitance Tolerance 容量偏差	±5%(J), ±10%(K)
Rated Voltage 额定电压	250VDC, 400VDC/450VDC, 500VDC/550VDC,630VDC
Dissipation Factor 散逸因素	≦ 1.0% (1KHz at 25±5°C)
Insulation Resistance 绝缘电阻	≧ 9000MΩ for C≦0.33μF ≧ 3000MΩ·μF for C>0.33μF (Measured at 100 ±10VDC/60s/25±5°C)
Withstand Voltage between terminals 端子间耐压	Add DC test voltage of 140% R.V for 1-5s , no breakdown or flashover (Voltage raising time 5~10sec,cut off current 10mA, ARC=OFF) - 施加 140% R.Vdc 1~5秒,无永久性击穿和飞弧为合格 (升压时间5~10秒,漏电流10mA,ARC关闭).

备注

Operating temperature range	Max. operating temperature $T_{OP,max}$	+105℃
	Upper category temperature T_{max}	+105℃
	Lower category temperature T_{min}	-40℃
	Rated temperature T_R	+85℃
Category voltage V_C (continuous operation with V_{DC} at $f \leq 1kHz$)	$T_{op}(^{\circ}C)$	DC voltage derating
	$T_{op} \leq 85$ $85 < T_{op} \leq 105$	$V_C = V_R$ $V_C = V_R \times (165 - T_{op}) / 80$
Operating voltage for short operating periods (V_{DC} at $f \leq 1kHz$)	$T_{op}(^{\circ}C)$	DC voltage(max.hours)
	$T_{op} \leq 85$ $85 < T_{op} \leq 105$	$V_{OP} = 1.1 \times V_C (1000h)$ $V_{OP} = 1.0 \times V_C (1000h)$

6. Marking印章说明:

CARLI MEH
474K 400V
K 2 18 A 01

Normal type

CARLI MEH
474K 400VHF
K 2 18 A 01

Halogen Free-type

CARLI: Manufacture's trademark 制造者商标 → CARLI

MEH: Product type 产品型号 MEH

474K: Capacitance And Tolerance 容量与偏差 → $474 = 47 \times 10^4 pF = 47 \times 10 nF = 0.47 \mu F$, $K = \pm 10\%$

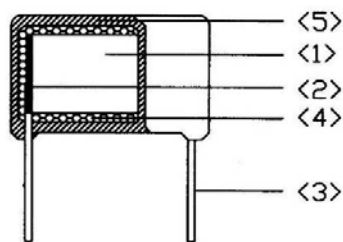
400V: Rated voltage 额定电压 400VDC(2G)

K 2 18 A 01: Lot No (D/C), for very small size products, it will be deleted -批号,小尺寸产品不含此项

HF: Halogen Free 无卤

7. Construction and main materials of products -产品结构和主材

MEH TYPE:



Main Materials

NO.	material name 主要材料	describe 描述	Note备注
1	Metallized polyester film 金属化聚脂膜	MPE	-/-
2	Solder 焊料	Sn-based alloy 锡基合金	-/-
3	Terminal 引线	Copper wire 镀锡铜线	-/-
4	inside coating material 内涂材料	Epoxy resin 环氧树脂	-/-
5	Over coating material 外涂材料	Epoxy powder 环氧粉末	Flame retardant type 阻燃型

8. Packing 包装说明:

Package bag and Carton 包装袋与纸箱



CARLI 交货明细表				
规格	型式	包数	数量	

(Normal Product)
常规品

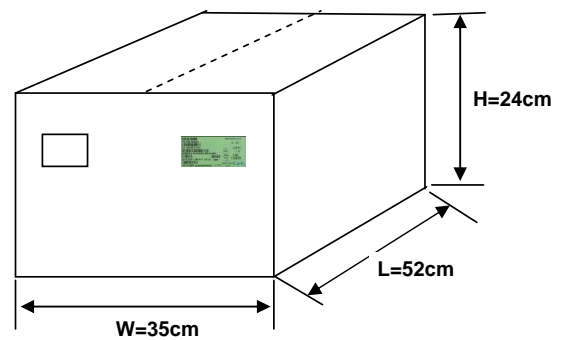


CARLI 环保无卤HF 交货明细表				
规格	型式	包数	数量	

(Halogen Free Product)
无卤品



CARLI 凯励电子股份有限公司 CARLI ELECTRONICS CO.,LTD		
ORDER NO.		
Cap	TOLERANCE	W.V
	±%	
P/N	QUANTITY	DATE
	PCS	



8.1 Carton size 纸箱尺寸: L*W*H(长*宽*高)=52*35*24 cm

8.2 The detail of the carton 纸箱包装说明:

8.2.1 Packing list card, including 装箱明细, 包括:

Part number of manufacturer, 制造商料号,

Total quantity of bags and unit包数及每包数量, Lot No批号.

8.2.2 Marking or table for RoHS : RoHS 标识

8.2.3 Other marking customer required 其他客户要求标识.

9. Storage conditions 存储条件:

9.1 It should be noted that the solderability of the terminals may be deteriorated when

Stored barely in an atmosphere for a long periods .

请注意,长时间暴露在空气中会导致引线焊接性能衰减.

9.2 It shouldn't be located in particularly high temperature and high humidity ,it must

Submit to the following conditions(keeping in the original package):

不能放置在高温和高湿环境中,请遵循以下存储条件(原包装下保存)

Temperature 温度: 35°C MAX.

Relative humidity 相对湿度: 85% MAX.

9.3 Storage period: Loose :12 months max.

存储时间 : 最长12个月.

10. Origin , including产地:

10.1 CHINA P.R.C 中国;

10.2 TAIWAN R.O.C 中国台湾;

11. The compliance with enviroment requirement 环保要求符合性

11.1 Compliance with the requirement of RoHS. 符合RoHS要求;

11.2 Compliance with the requirement of REACH 符合REACH 要求;

11.3 Without Halogen (as required) 符合无卤(如要求);

12. Characteristics and test conditions 电气特性和测试条件

Test condition: Unless otherwise specified, the standard range of atmospheric

Conditions for marking measurements and test is as follows Ambient

测试条件: 除非另外说明,则在大气标准范围内测试,试验条件如下:

Temperature 环境温度: 15~35 °C,

Relative humidity 相对湿度: 25~75%.

If there may be any doubt on the results, measurements shall be made within the

Following limits.

如对测试结果有任何疑问,则按以下限制测试:

Ambient temperature 环境温度: 20±2°C , Relative humidity 相对湿度: 60~70%.

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12.1 Characteristics特性:

NO.	Item 项目	Characteristics 特性	Test method 试验方法	
1	Capacitance Range 容量范围	0.01~2.2uF	At 1KHz Test temp测试温度:25±5℃	
2	Capacitance Tolerance 容量偏差	Within specified tolerance 规定偏差范围内 J:±5%; K:±10%	At 1KHz Test temp测试温度: 25±5℃	
3	Dissipation Factor 散逸因素	DF ≤ 1.0%	Measure at 1KHz (25±5℃)	
4	Rated Voltage 额定电压	250VDC, 400VDC/450VDC 500VDC/550VDC, 630VDC	/	
5	Withstand Voltage 耐压	Between Terminals 端子间	No abnormality 无异常	Add DC test voltage of 140% R.V for 1-5s between Terminals (Voltage raising time 5~10sec, cut off current 10mA, ARC=OFF) 端子间施加DC电压140%R.V 1-5s (电压爬升时间: 5~10sec, 漏电流 10mA, ARC=OFF)
6	Insulation Resistance 绝缘电阻	≥ 9000MΩ for C ≤ 0.33μF ≥ 3000MΩ·μF for C > 0.33μF	Charge time 充电时间: 60 ±5sec Charge voltage 充电电压: 100VDC Test temp 温度: 25±5℃	
7	Terminal Strength 端子强度	Pull Strength 拉伸强度	There shall be no such mechanical Damage as terminal damage etc 无可见机械损伤	Wire diameter 线径:0.6 & 0.8mm Load 负重: 10N, time时间:10sec
		Bending Strength 弯曲强度		Wire diameter 线径:0.6 & 0.8mm Load 力度: 5N, 900 ×4times
8	Solderability焊锡附着性	At least 95% of the Circumference of the lead wire. Around load surface dipped Into with new solder 焊锡覆盖面积必须达浸沾表面积 95%以上	Solder temp 焊剂温度: 245 ±5℃ Immersion time 浸入时间: 2.5 ±0.5sec	

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NO.	Item 项目		Characteristics 特性	Test method 试验方法
9	Resistance to Soldering heat 焊接耐热性	Appearance 外观	No visible damage 无可见损伤	Solder temp 焊锡温度:260±5℃ Immersion time 浸入时间:10±1sec Then recovery at ordinary Condition 1~ 2 hours 恢复时间1~ 2 小时
Withstand Voltage 耐电压		140% R.V for 1~5s No abnormality 无异常		
Capacitance Variation 容量变化		$\Delta C/C \leq \pm 5\%$		
10	Damp heat, Steady state 稳态湿热	Appearance 外观	No visible damage 无可见损伤	Humidity 相对湿度 : 90-95% RH Temp 温度:40 ±2℃ Duration 持续时间: 500 +24/-0Hrs Then recovery at ordinary condition 1~2 hours 恢复时间1~ 2 小时
Capacitance Variation 容量变化		$\Delta C/C \leq \pm 10\%$		
Dissipation Factor 散逸因素		$\leq 1.5\%$		
Withstand Voltage 耐压		140% R.V for 1~5s No abnormality无异常		
Insulation Resistance 绝缘电阻		$\Delta IR/IR \leq 50\%$		
11	High temp Loading test 高温负荷试验	Appearance 外观	No visible damage 无可见受损	DC voltage of 111% of rated Voltage shall be applied to the Capacitor for 1000+48/0 h Through serial resistor of 20 to 1000Ω per 1V at the test Temperature of 85 ± 2°C. (for example, RV450vdc,500vdc shall be applied.) 施加111%额定直流电压 1000+48/0 h, 连接串联电阻20~1000 Ω /伏特,试验温度 85 ± 2°C. (举例, 额定电压450vdc, 则应施加 500vdc) Then recovery at ordinary Condition at least 16 hours 恢复时间至少16 小时
Capacitance Variation 容量变化		$\Delta C/C \leq \pm 10\%$		
Dissipation Factor 散逸因素		$\leq 1.5\%$		
Withstand Voltage 耐压		140% R.V for 1~5s No abnormality无异常		
Insulation Resistance 绝缘阻抗		$\Delta IR/IR \leq 50\%$		

13. Regulation in useage - 使用规则

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13.1 Soldering suggestions - 焊接的建议

When soldering a capacitor, heat in soldering is conducted to the element of the capacitor from wire lead and an enclosure, and hence it should be noted that soldering under high temperature and a long period may cause deterioration of breakdown of capacitors. Be sure to solder within the following temperature condition range.

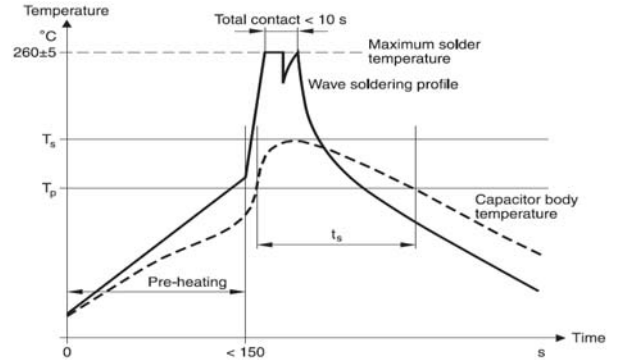
当焊接电容器时,焊锡热会通过引线端子高温和封装层传递到电容器素子,因此必须注意高温和长时间焊接引起的电容器特性衰减或损坏,请确认焊锡在以下温度范围内。

T_s : Capacitor body maximum temperature at wave soldering

电容器本体最高波峰焊温度

T_p : Capacitor body maximum temperature at pre-heating

电容器本体最高预热温度



Body temperature should follow the description below:

电容器本体温度应该符合以下描述

MPP电容器

During pre-heating: $T_p \leq 110^\circ\text{C}$

During soldering: $T_s \leq 120^\circ\text{C}$, $t_s \leq 45\text{s}$

加热温度: $T_p \leq 110^\circ\text{C}$

焊接温度: $T_s \leq 120^\circ\text{C}$, $t_s \leq 45\text{s}$

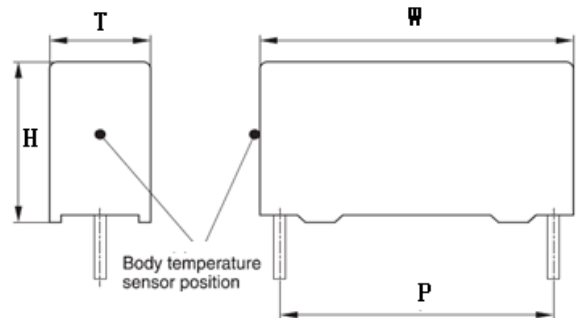
MPE电容器

During pre-heating: $T_p \leq 125^\circ\text{C}$

During soldering: $T_s \leq 160^\circ\text{C}$, $t_s \leq 45\text{s}$

加热温度: $T_p \leq 125^\circ\text{C}$

焊接温度: $T_s \leq 160^\circ\text{C}$, $t_s \leq 45\text{s}$



■ When SMD components are used together with leaded ones, the film capacitors should not pass into the SMD adhesive curing oven. The leaded components should be assembled after the SMD curing step.

当SMD元件与引脚式元件一起使用时,薄膜电容器不应进入SMD粘合剂固化炉。引脚式部件应在SMD固化步骤之后组装。

■ Leaded film capacitors are not suitable for reflow soldering.

引脚式薄膜电容器不适合回流焊

■ In order to ensure proper conditions for manual or selective soldering, the body temperature of the capacitor (T_s) must be $\leq 120^\circ\text{C}$.

为了确保手动或选择性焊接的适当条件,电容器(T_s)的本体温度必须是 $\leq 120^\circ\text{C}$ 。

■ One recommended condition for manual soldering is that the tip of the soldering iron should be $< 360^\circ\text{C}$ and the soldering contact time should be no longer than 3 seconds.

手工焊接的一个推荐条件是烙铁的顶端应该是 $< 360^\circ\text{C}$, 焊接接触时间不应超过3秒。

■ For uncoated MPE capacitors with lead spacings $\leq 10\text{mm}$ the following measures are recommended:

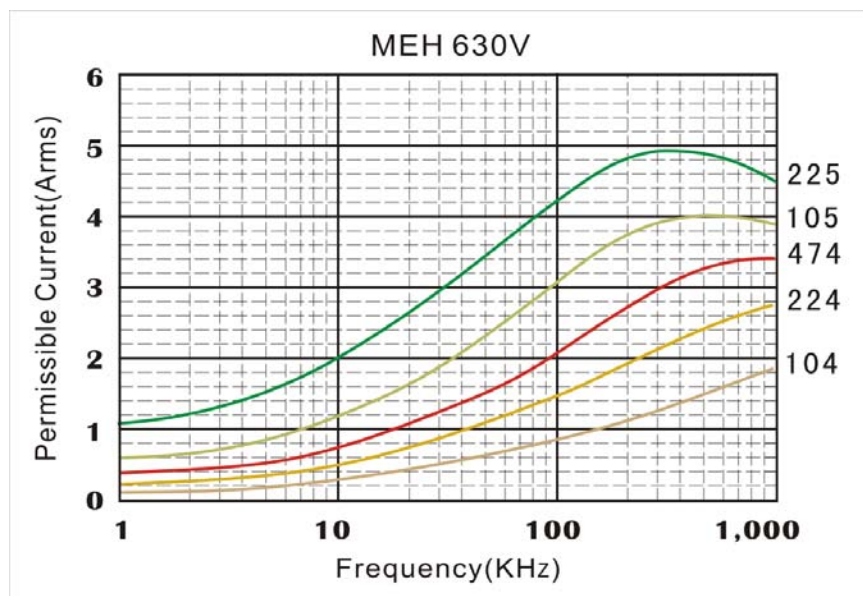
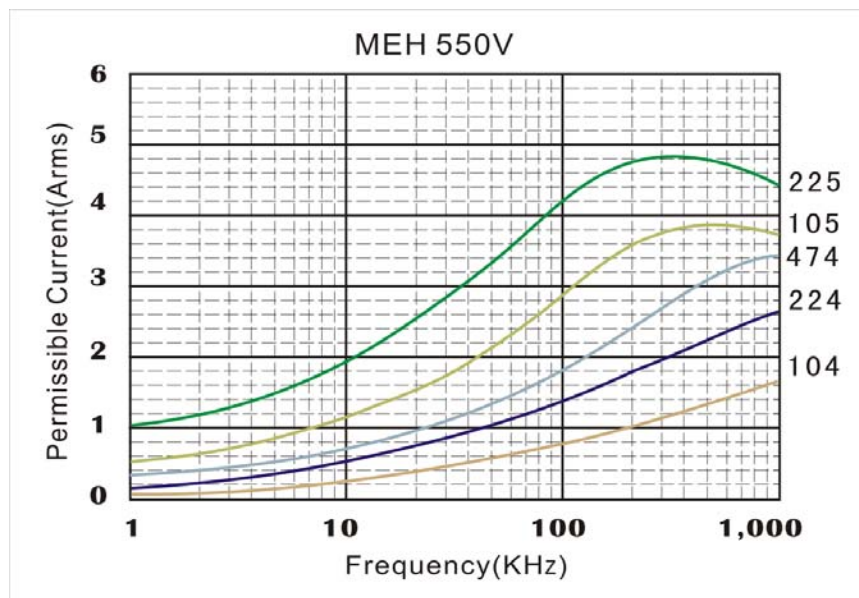
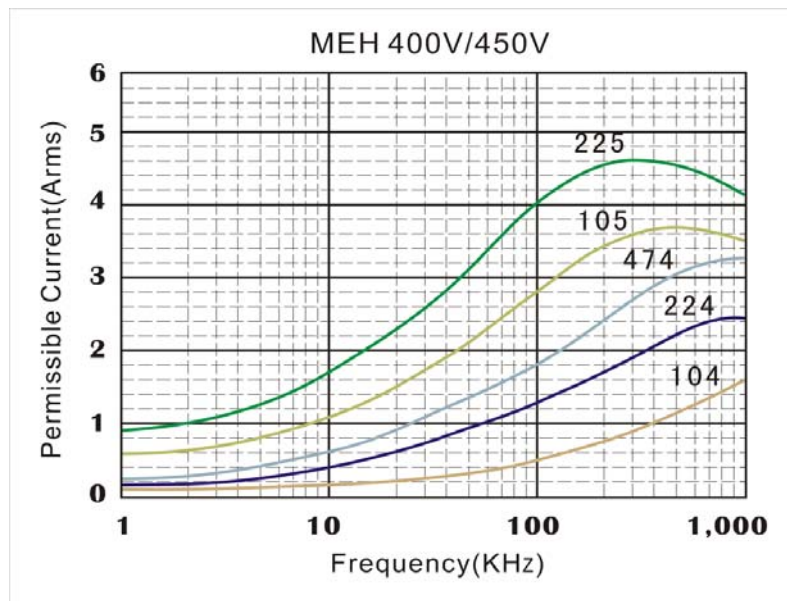
未涂覆的MPE电容器引线间隔为 ≤ 10 毫米, 建议采取以下措施

1. pre-heating to not more than 110°C in the preheater phase 预热阶段预热温度不超过 110°C

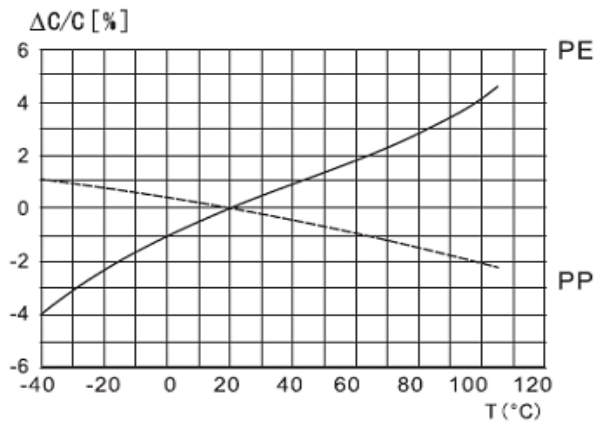
2. rapid cooling after soldering 焊后快速冷却

Characteristics of permissible current (Arms)Vs Frequency

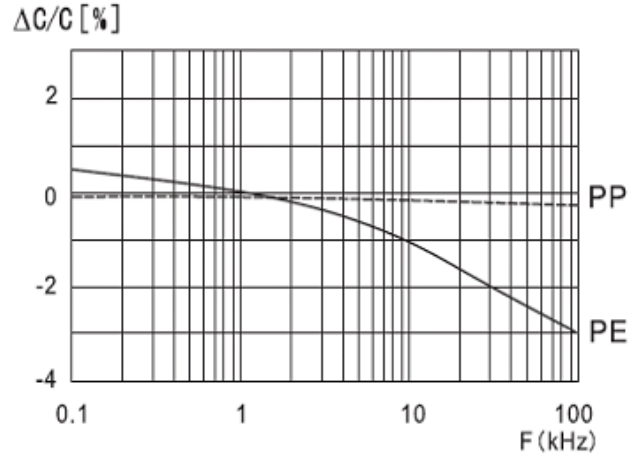
电流Vs频率特性图



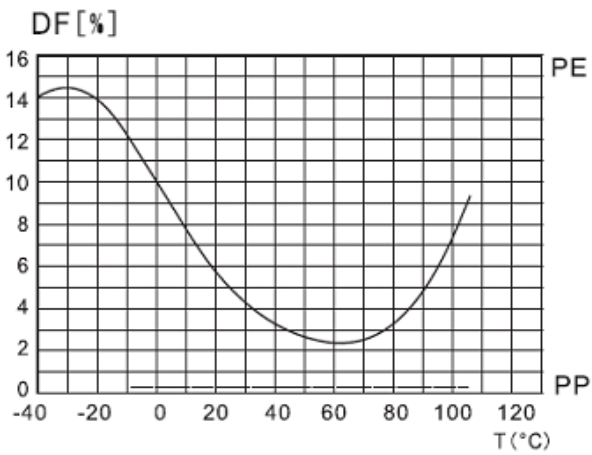
14. Product electrical characteristic graph 产品电气特性图



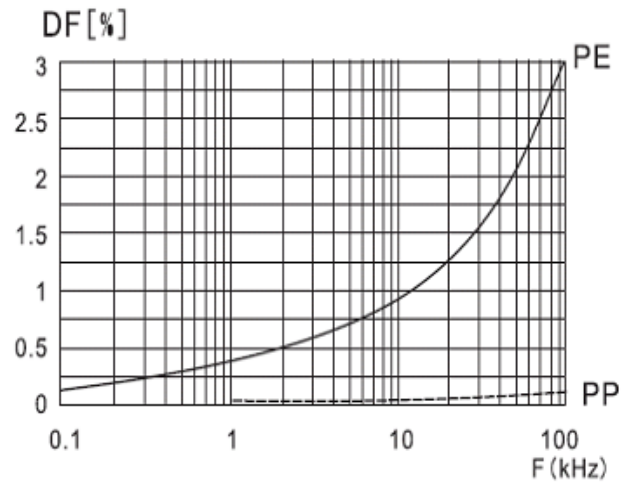
Capacitance vs. temperature at 1kHz



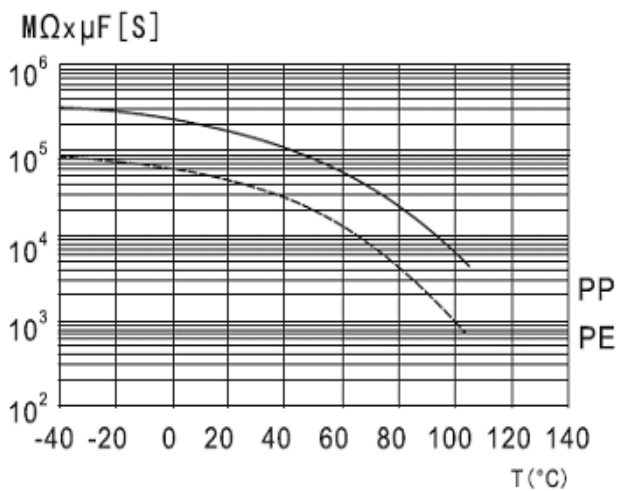
Capacitance vs. frequency (Room temperature)



Dissipation factor vs. temperature at 1KHz



Dissipation factor vs. frequency (Room temperature)



I.R. vs. temperature

----- 聚丙烯膜 (Polypropylene Film)
 ————— 聚脂薄膜 (Polyester Film)

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