

# Carli®

Customer: Maritex

No: MPH1180203A

STN007,edt I



## Capacitors



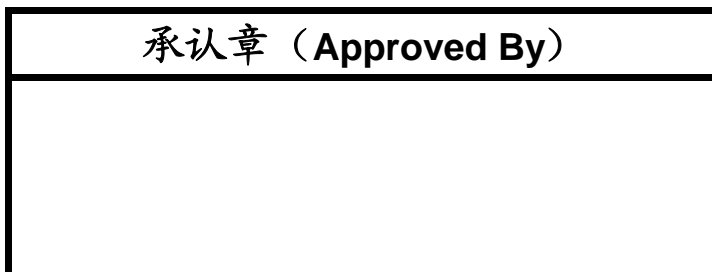
品名: 小型化金属化聚丙烯膜电容器  
(Description) **Mini-size Metallized Polypropylene Film Capacitor**

型式: **MPH (Code 代号 PH) (Halogen-free)**  
(Type)

零件料号: **PH104K2Y109L270D9H**  
(Part No.)

客户料号: \_\_\_\_\_  
(Customer Part No.)

日期: **2018.02.03**  
(Date)



**Carli** 凱勵集團  
CARLI GROUP LIMITED

東莞凱勵電子有限公司  
DongGuan Carli Electronics Co.,Ltd.

TAIWAN HEADQUARTER  
臺灣省臺中市后里區甲后路三段88号  
No.88, The three section, jiahou Road  
Houli Dist, Taichung City, TaiWan  
TEL:8864-25565190 FAX:8864-25561643  
E-mail:carli168@ms7.hinet.net  
Http://www.carli-cap.com.tw

DONGGUAN FACTORY  
廣東省東莞市東坑鎮坑美管理區  
KengMei District, DongKeng Town,  
DongGuan City, GuangDong  
TEL:0769-83389877 0769-83389798  
FAX:0769-83380208  
E-mail:carlicn@21cn.net  
Http://www.carli.com.cn

ZHEJIANG FACTORY  
浙江省嘉興市嘉善縣姚莊鎮錦綉大道218號  
No.218 Fairview Avenue, Yaozhuang Town,  
Jiashan County, Jiaxing City, Zhejiang, China  
TEL:0573-84778885-7 FAX:0573-84778881  
E-mail:carlizj@21cn.net



## 承认书修订履历表

### UPDATE HISTORY

客户 (Customer)	Maritex		承认书编号 (SPEC NO)	MPHI180203A
NO	Date	Edition	Histroy	
1	2018.02.03	A	新制订承认书编号: MPHI180203A	
2				
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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:

P	H	1	0	4	K	2	Y	1	0	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: 容值代码                         | 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:

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

### 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200 = 200/10=20 (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 polypropylene film capacitor 金属化膜电容器说明

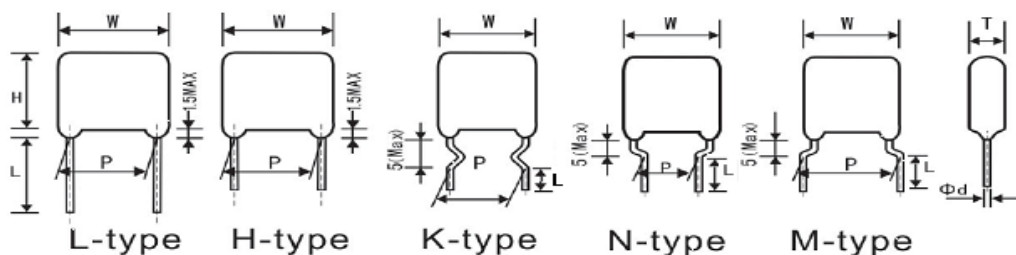
## TYPE MPH

### 1.Scope 范围 .

This specification applies to metallized polypropylene film capacitors ,  
type name MPH (code PH) ,used in electronic equipments .

此规范应用于电子设备中的金属化聚丙烯膜电容器,型号MPH（代码PH）.

### 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 客户 P/N 料号
						W (Max)	H (Max)	T (Max)	P±1	L±1	Φd±0.05		
1	PH104K2Y109L270D9H	.1	10	450	0.1	12.5	10	6	10	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								

## Specification for metallized polypropylene film capacitor ,MPH type

### 金属化聚丙烯膜电容器规格 ,MPH

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

3.1 MPH are winded with metallized polypropylene

film dielectric ,non-inductive construction ,

Cp or Cu lead wire and flame retardant epoxy

powder coating .

MPH 电容是由金属化聚丙烯膜无感结构卷绕而成,

采用镀锡铜包钢线或镀锡铜线及阻燃性粉体环氧树脂封装构成.

3.2 Type Application: -典型应用

blocking ,coupling, filtering etc.As intermidiate circuit capacitor for

SMPS, Electronic Ballast inverter(i.e. DC-link, DC filter and P.F.C)

用途: 隔直流、耦合、滤波等,用于电源供应器、镇流器、适配器的中

间电路直流滤波 (DC-link, PFC等)用.

#### 4. Features -特性:

- Mini-size metallized Polypropylene non-inductive structure 小型化MPP无感结构;
- High reliability due to self-healing effect. 自愈性好,寿命长;
- Low loss at high frequency 高频损耗小;
- 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, electric characteristics shall refer to IEC 60384-16

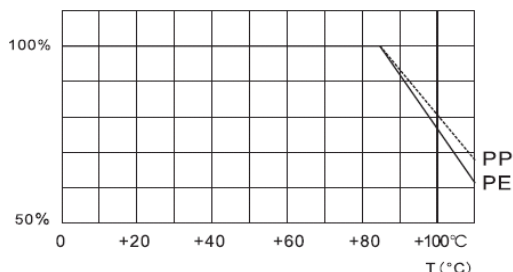
如无其他说明,电气特性请参考IEC60384-16.

Item	Specification
Operating Temperature 工作温度	-40℃ ~ +105℃ (+85℃~+105℃Drating factor 1.25%per℃ for R.V(DC))
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	400VDC(2G) 450VDC(2Y) 500VDC(2H) 550VDC(2X) 630VDC(2J)
Dissipation Factor 散逸因素	≦0.1% (1KHz at 25±5℃)
Insulation Resistance 绝缘电阻	≧30000MΩ for C≦0.33μF ≧10000MΩ·μF for C>0.33μF (Measured at 100 ±10VDC/60s/25±5℃)
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) 施加测试电压140% R.V for 1-5s , 无击穿或电弧(电压上升时间 5~10sec,漏电流10mA, ARC=OFF).

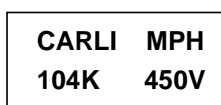
Note : Rated voltage is defined the voltage which shall be capable of applying to capacitors continuously in the operating temperature range. However, rated voltage shall be derated 1.25% per °C when capacitors operation temperature is between 85 °C to 105 °C

额定电压定义：在工作温度范围内,电容器连续工作的可承受电压。

但是,工作温度在85°C~105°C之间时,每上升1°C额定电压下降1.25%。



6. Marking:



Halogen Free-type  
(无卤型)

CARLI: Manufacture's trademark code 制造商标 CARLI

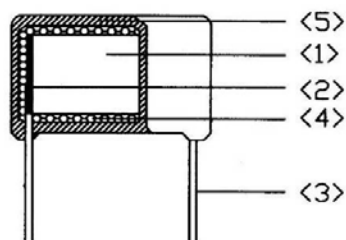
MPH: Product type 产品型号 MPH

104K: Capacitance and tolerance 容值与偏差 104=10×10<sup>4</sup>pF=10×10nF=0.1μF, K=±10%

450V: Rated voltage 额定电压 450VDC(2Y)

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

MPH TYPE:



Main Materials

NO.	Main Materials 主要材料	Specification	Note
1	Metallized Polypropylene Film 金属化聚丙烯膜	MPP	-/-
2	Solder 焊料	Sn-based alloy 锡基合金	-/-
3	Terminal 引线	Cp or Cu lead wire Cp或Cu导线	-/-
4	Under coating material 封装材料	Epoxy resin 环氧树脂	-/-
5	Over coating material 封装材料	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

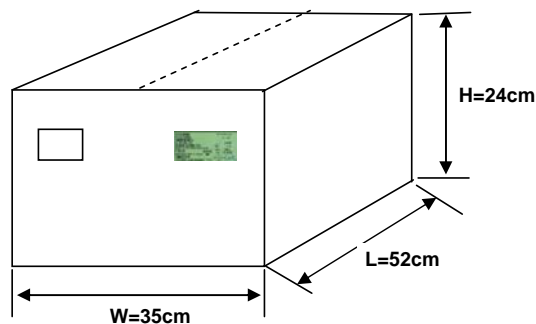


CARLI 环保无卤HF 交货明细表				
规格	型式	包数	数量	

(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℃ 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 environment 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,条件如下:

Temperature 环境温度: 15~35 ℃,

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℃ , Relative humidity 相对湿度60~70%.

2018-2-3

## 12.1 Characteristics:

NO.	Item 项目	Characteristics 特性	Test method 试验方法	
1	Operating Temperature 工作温度	-40°C~+105°C	+85°C~+105°C:derating factor 1.25% at each 1°C in the range of 85°C ~105°C. 85°C~105°C时, 温度每升高1°C额定 电压应降低1.25%。	
2	Capacitance Range 容量范围	0.01μF~2.2μF	/	
3	Capacitance Tolerance 容量偏差	Within specified tolerance 规定范围内偏差 J:±5%; K:±10%	At 1KHz Test Temp: 25±5°C	
4	Dissipation Factor 散逸因素	≅0.1%	Measure at 1KHz ( 25±5°C)	
5	Rated Voltage 额定电压	400VDC(2G) 450VDC(2Y) 500VDC(2H) 550VDC(2X) 630VDC(2J)	/	
6	Withstand Voltage 耐电压	Between Terminals 端子间	No abnormality无异常	Add DC test voltage of 140% R.V at 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)
7	Insulation Resistance 绝缘电阻	≅30000MΩ for C≅0.33μF ≅10000MΩ·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°C	
8	Terminal Strength 端子强度	Pull Strength 拉伸强度	There shall be no such mechanical 无可见机械损伤	Wire diameter线径:0.6 & 0.8mm Load 荷重: 10N, time时间:10sec
		Bending Strength 弯曲强度		Wire diameter 线径:0.6 & 0.8mm Load 荷重: 5N, 90° ×4times次
9	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 焊锡温度: 245 ±5°C Immersion time 浸入时间: 2.5 ±0.5sec	

2018-2-3

## 12.1 Characteristics:

NO.	Item 项目	Characteristics 特性	Test method 试验方法	
10	Resistance to Soldering heat 焊接耐热性	Appearance 外观  Withstand Voltage 耐电压  Capacitance Variation 容量变化	No visible damage 无可见损伤  140% R.V for 1~5s No abnormality 施加140%R.V,1~5秒,无损伤  $\Delta C/C \leq \pm 5\%$	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
11	Damp heat, Steady state 稳态湿热	Appearance 外观  Capacitance Variation 容量变化  Dissipation Factor 散逸因素  Withstand Voltage 耐电压  Insulation Resistance 绝缘电阻	No visible damage 无可见损伤  $\Delta C/C \leq \pm 5\%$  $\leq 0.2\% \quad 1\text{KHz}$  140% R.V for 1~5s No abnormality 施加140%R.V,1~5秒,无损伤  $\Delta IR/IR \leq 50\%$	Humidity 相对湿度:90-95% 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
12	High temp Loading test 高温负荷试验	Appearance 外观  Capacitance Variation 容量变化  Dissipation Factor 散逸因素  Withstand Voltage 耐电压  Insulation Resistance 绝缘阻抗	No visible damage  $\Delta C/C \leq \pm 10\%$  $\leq 0.2\% \quad 1\text{KHz}$  140% R.V for 1~5s No abnormality 施加140%R.V,1~5秒,无损伤  $\Delta IR/IR \leq 50\%$	DC voltage of 125% 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℃.  施加125%额定直流电压 1000+48/0 h, 连接串联电阻 20到1000Ω/伏特,试验温度85 ± 2℃.  Then recovery at ordinary Condition at least 16 hours 恢复时间至少16 小时

### 13. Regulation in useage - 使用规则

#### 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. characteristic or Be sure to solder within the following temperature condition range.

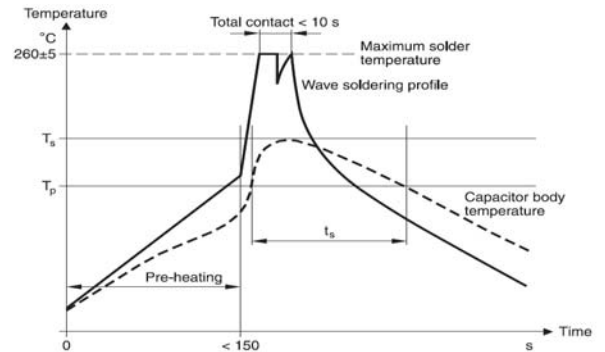
当焊接电容器时,焊锡热会通过引线端子高温和封装层传递到电容器素子,因此必须注意高温和长时间焊接引起的电容器特性衰减或损坏,请确认焊锡在以下温度范围内。

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

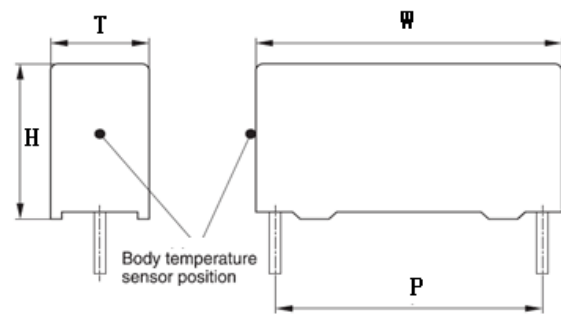
#### MPE电容器

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  $\leq 10$ 毫米, 建议采取以下措施

1. pre-heating to not more than  $110^\circ\text{C}$  in the preheater phase 预热阶段预热温度不超过  $110^\circ\text{C}$

2. rapid cooling after soldering 焊后快速冷却



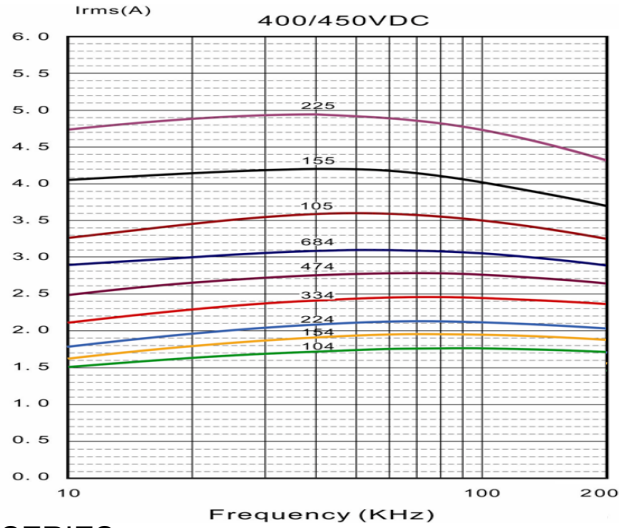
Characteristics of permissible current (Arms)Vs Frequency -

( sinusoidal wave ,  $\Delta T \leq 12^{\circ}\text{C}$ ,  $T_h \leq 40^{\circ}\text{C}$ )

允许电流 (Arms) 对频率特性曲线图 ( 正弦波 ,  $\Delta T \leq 12^{\circ}\text{C}$ )

( 正弦波 ,  $\Delta T \leq 12^{\circ}\text{C}$ ,  $T_h \leq 40^{\circ}\text{C}$ )

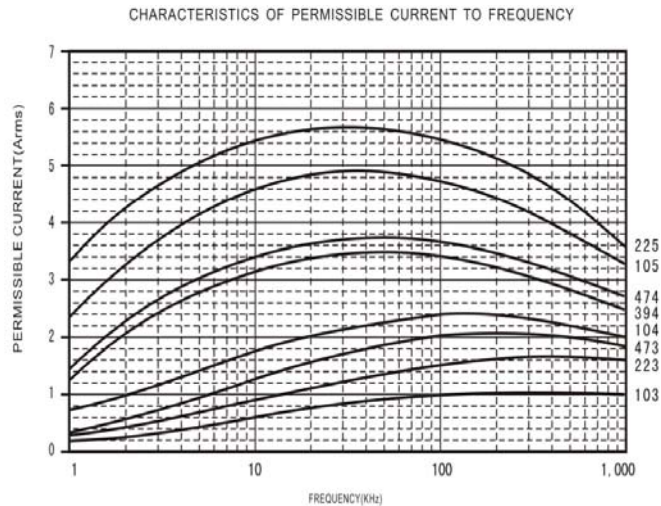
MPH 450V (2Y) SERIES



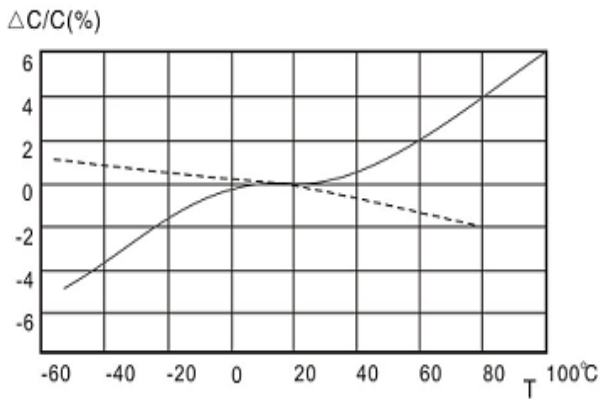
MPH 500V (2H) SERIES



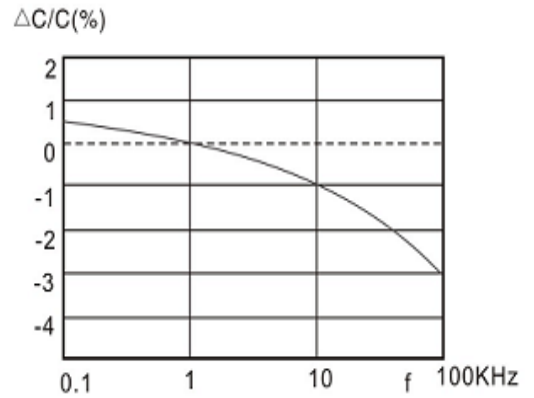
MPH 630V (2J) SERIES



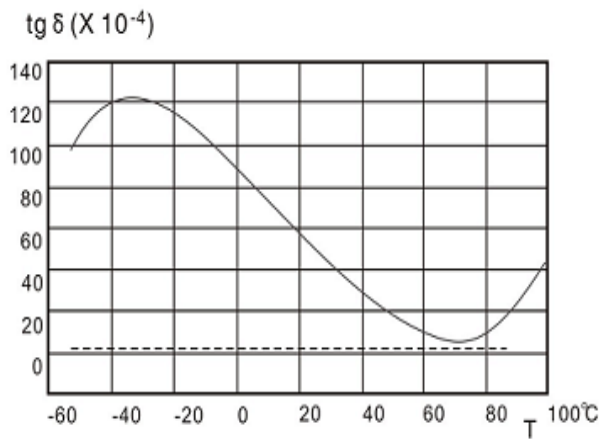
14. Product electrical characteristic graph 产品电气特性图



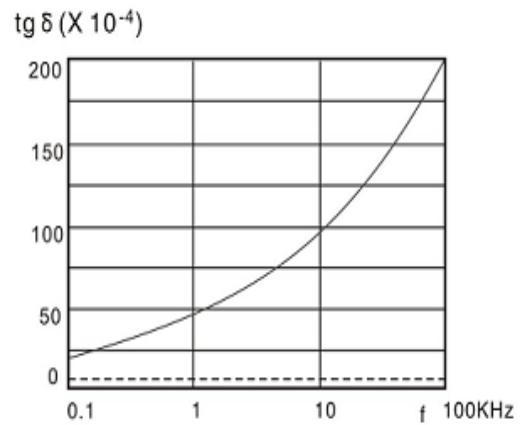
Capacitance vs. temperature at 1kHz



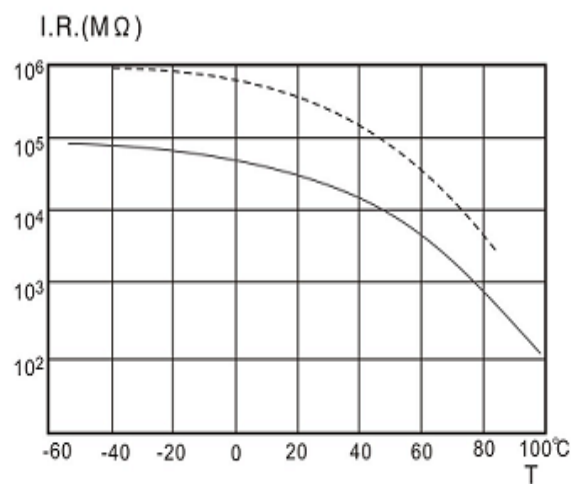
Capacitance vs. frequency (Room temperature)



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 )