

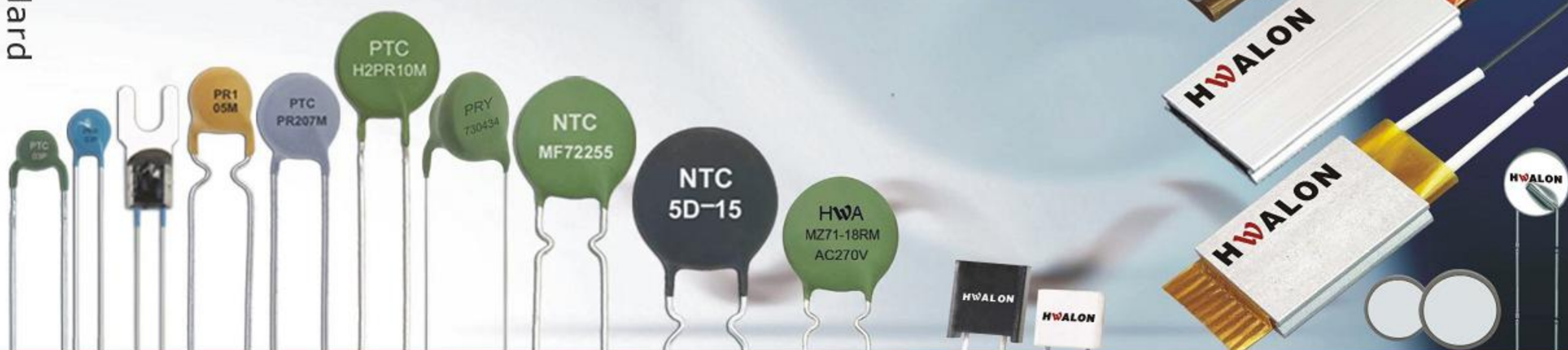
卓越品质 · 专业服务 · 专业制造  
Remarkable Quality Professional service Specially Made

**HwALON**<sup>®</sup>  
Electronics

**深圳歐藍達電子有限公司**

SHENZHEN OLANDA ELECTRONIC CO., LTD

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以网站资料为准 please see the website for standard



**WWW.HwALON.COM**

# 公 司 简 介

深圳欧蓝达电子有限公司是一家以PTCR热敏电阻器研究、开发、生产应用为主的高科技企业，是全球少数掌握PTC防护元件核心技术的制造商之一。创建于2002年，系中国PTCR行业的明星企业。公司建成了一个拥有成套的先进生产设备，完善的工艺检测手段及一批国内高水平专业技术人员的PTCR生产基地。先后与华中理工大学、天津大学、西安交通大学等高等院校的高技术人才进行了合作，开发并研制了PTCR系列的电子镇流器、节能灯延时启动用PTCR产品，彩色显像管用PTCR消磁回路元件，变压器、数字万用表、数字电度表RS485接口专用、通讯设备过流过载保护用PTCR元器件，电冰箱、电机启动器，变频空调机、暖风机、驱蚊器等加热用PTCR元件。在国内外PTCR行业享有很高的信誉。在2004年，通过了瑞士SGS国际环保认证检测，即ROHS认证检测，2005年相继又通过了ISO 9001国际质量管理体系认证。近期我们又引进了国外PTC热敏电阻行业先进的配方及生产工艺技术，进一步完善了本企业产品的核心技术，为新老客户提供了以质量为满意的服务平台。

目前，我们的产品不仅畅销国内而且远销东南亚、东欧、印度、西欧、北美等国际市场。

本公司坚持以“质量第一，客户至上”为宗旨，竭诚为广大客户提供优质的产品，完善的技术支持，满意的跟踪服务，合理的产品价格。我们的口号：架设合作的桥梁，共同发展，共同进步，携手共同创造奇迹！



**RoHS**



# ABOUT US.....

SHENZHEN OLANDA ELECTRONIC Co., Ltd, mainly studied with the research, development, production, and application of PTCR temperature sensing resistor, is a high-tech enterprise, which is one of the minorities of the global manufacturers that master the key technology of PTC protecting components. Established in 1993, it has been becoming a star enterprise of China PTCR industry. It has complete sets of advanced production equipments and has formed a PTCR production base of perfect craft detection means and a group of domestic high-level professional and technical personnels.

Cooperating with professional personnels from such institutions of higher learning as Institute of technology of Central China, Tianjin University, Xi'an Communications University, etc., we have developed the electronic ballast of PTCR series, and the PTCR products for the electricity-saving lamp softly - starting, degaussing return circuit components for the tricolor tube, the PTCR components and parts for the crossing, flowing, and protecting of the voltage transformer, digital universal meter, digital kilowatt-hour meter, communication apparatus , components for the heat of the refrigerator, electrical machinery starter, air conditioner, warm air blower, driving mosquito device ,etc. We enjoy high prestige in domestic PTCR trade. In 2004, we passed Swiss SGS international environmental protection authentication (ROHS authentication) testing and ISO 9001 international quality management system authentication again in succession in 2005. We have introduced advanced prescription and production technology again from the foreign PTC thermistor industry recently, which has perfected the key technology of this enterprise product further, and offered a service platform with quality for our old and new customers.

Our products not only have a great domestic market, but also find a good sale in such international markets as Southeast Asia, Eastern Europe, India, Western Europe, and North America, etc.

## 电阻值允许偏差 TOLERANCE OF RESISTANCE

5 代号 Code	电阻值允许偏差 tolerance of resistance
M	20%
H	25%
N	30%
Q	特定允许偏差 Given tolerance

## 芯片尺寸 SIZE OF CHIP

6 代码 Code	芯片直径 (mm) chip diameter
16	Φ16
08	Φ 8

## 温度特性 TEMPERATURE CHARACTERISTICS

7 代号 Code	温度特性 temp. Characteristics	代号 Code	温度特性 temp. Characteristics
HA	140℃	LA	90℃
HB	135℃	LB	80℃
HC	120℃	LC	75℃
HD	110℃	LD	70℃
HE	100℃	LE	60℃

## 电压特性 VOLTAGE CHARACTERISTICS

8 电压特性 Voltage characteristics	举例 example
节能灯用PTC的电压特性代表耐电压 The voltage characteristic of PTC for energy saving lamps stands for withstanding voltage	800 – 800VAC
	650 – 650VAC
线路过流过载保护用PTC的电压特性代表最大使用电压 The voltage characteristic of PTC for overcurrent and overload protection stands for the max. Operating voltage	265 – 265VAC
	140 – 140VAC



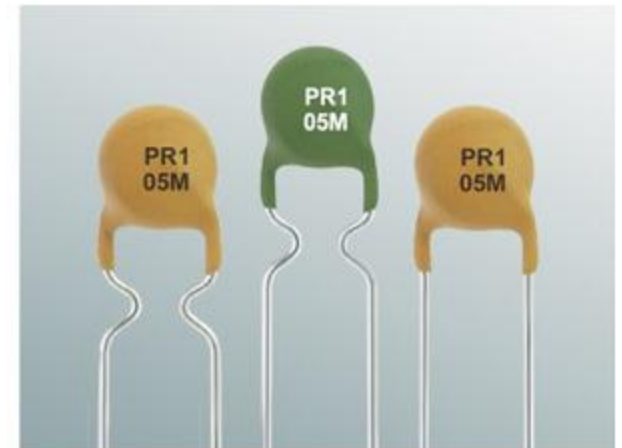
# PR 1 系列 PTC 热敏电阻器 PR1 SERIES PTC THERMISTOR

—用于节能灯和电子镇流器延时启动 For Time Delay of Lighting & Ballast



## 产品特性及应用 FEATURES & APPLICATION

1. 可靠性高，安全性和稳定性好，可频繁开关；  
High reliability, good performance of safety and stability, and Used in the frequent-switching.
  2. 耐电压可高达600-1000VAC以上；  
The withstanding voltage can reach to over 600-1000VAC.
  3. 开关通电100,000次以上，常温电阻不漂移；  
Switching current can pass over 100,000 times: the resistance will not float.
- 产品主要应用于：节能灯、荧光灯电子镇流器、数字万用表等。  
Applied in: energy-saving lamps, fluorescent electronic ballasts, and digital multi-meters.



**应用原理：**应用PTC热敏电阻实现预热启动如图1所示：刚接通开关时， $R_{PTC}$ 处于常温态，其阻值远远低于 $C_2$ 阻值，电流通过 $C_1$ ， $R_{PTC}$ 形成回路预热灯丝。约0.4-2秒后， $R_{PTC}$ 焦耳热温度超过开关温度 $T_c$ 跃入高阻态，其阻值远远高于 $C_2$ 阻抗，电流通过 $C_1$ 、 $C_2$ 形成回路导致L谐振，产生高压点亮灯管。对某一特定的电子镇流器、电子节能灯而言，所选用的PTC阻值越大、体积越小、开关温度越低，其功耗就越小、预热时间亦越短；反之功耗就越大，预热时间亦越长。

The application of the PTC thermistor to achieve preheated start is as follows(See Fig.1): Immediately after power is switched on,  $R_{PTC}$  is in normal temperature state and its resistance is far lower than the  $C_2$  resistance. The current through  $C_1$  and  $R_{PTC}$  forms a return circuit to preheat the filament. After about 0.4-2 seconds,  $R_{PTC}$  joule heat temperature exceeds Curie point  $T_c$  and skips into high resistance state of far higher than  $C_2$  resistance. The current passes through  $C_1$  and  $C_2$  to form a return circuit, which causes L resonance and produces high voltage to light the fluorescent tube. To a certain electronic ballast, energy saving light, higher PTC thermistor resistance, smaller PTC ceramic body dimension, lower switch temperature, will lead to its lower power consumption, and shorter preheating time; conversely, larger power consumption, and longer preheating time.

## 典型应用线路 TYPICAL APPLICATION CIRCUIT

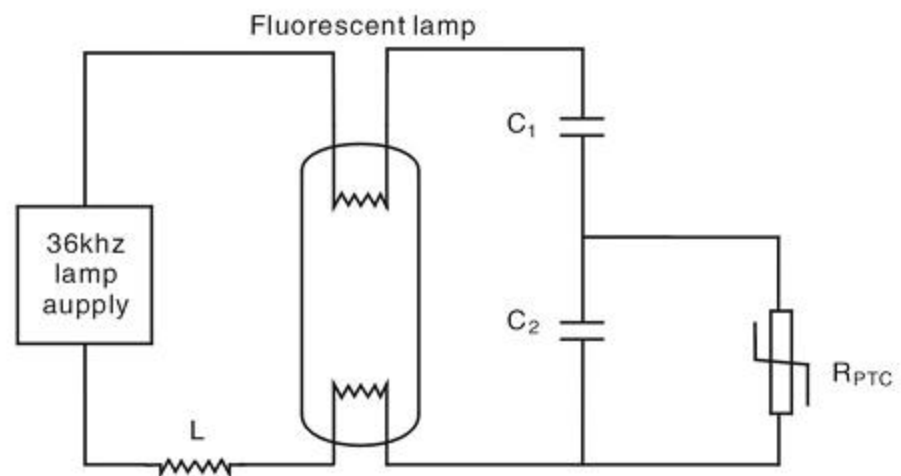
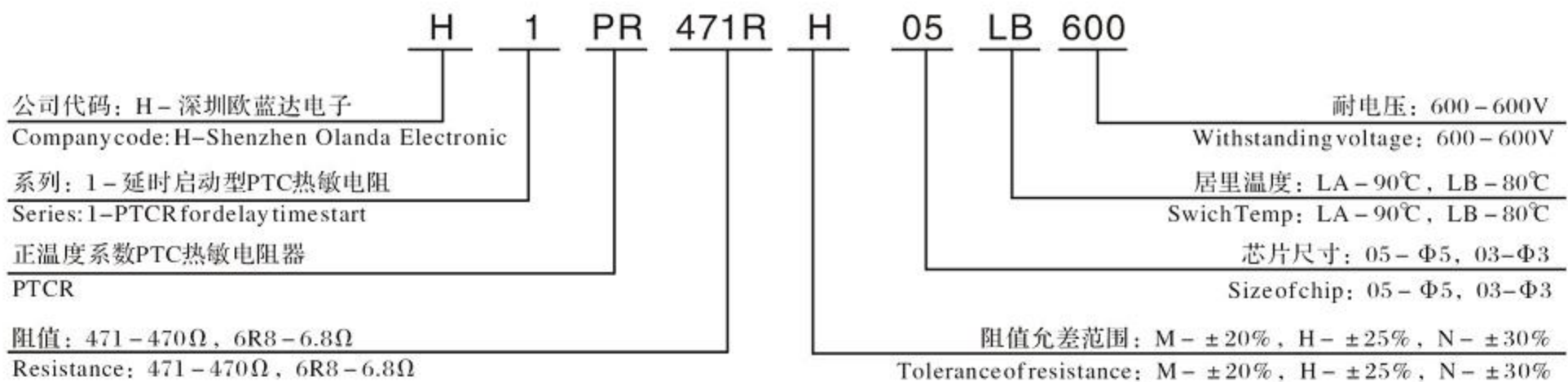
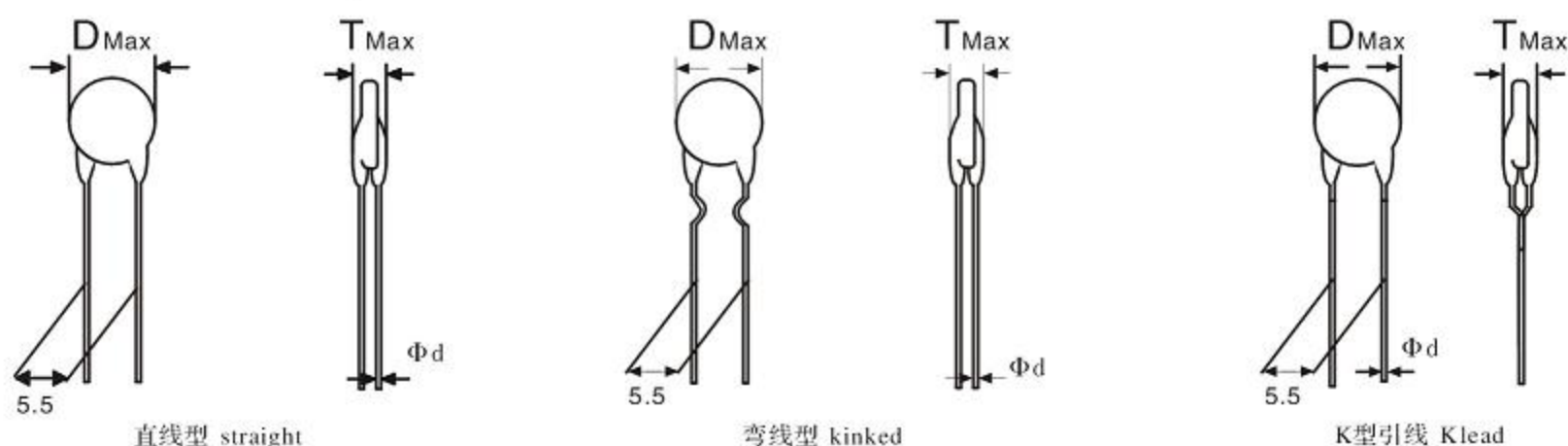


Fig.1

## 产品编号 PART NUMBERING



## 外形尺寸图 DIMENSIONS 单位: mm Unit: mm



## 一般技术参数 GENERAL TECHNICAL DATA

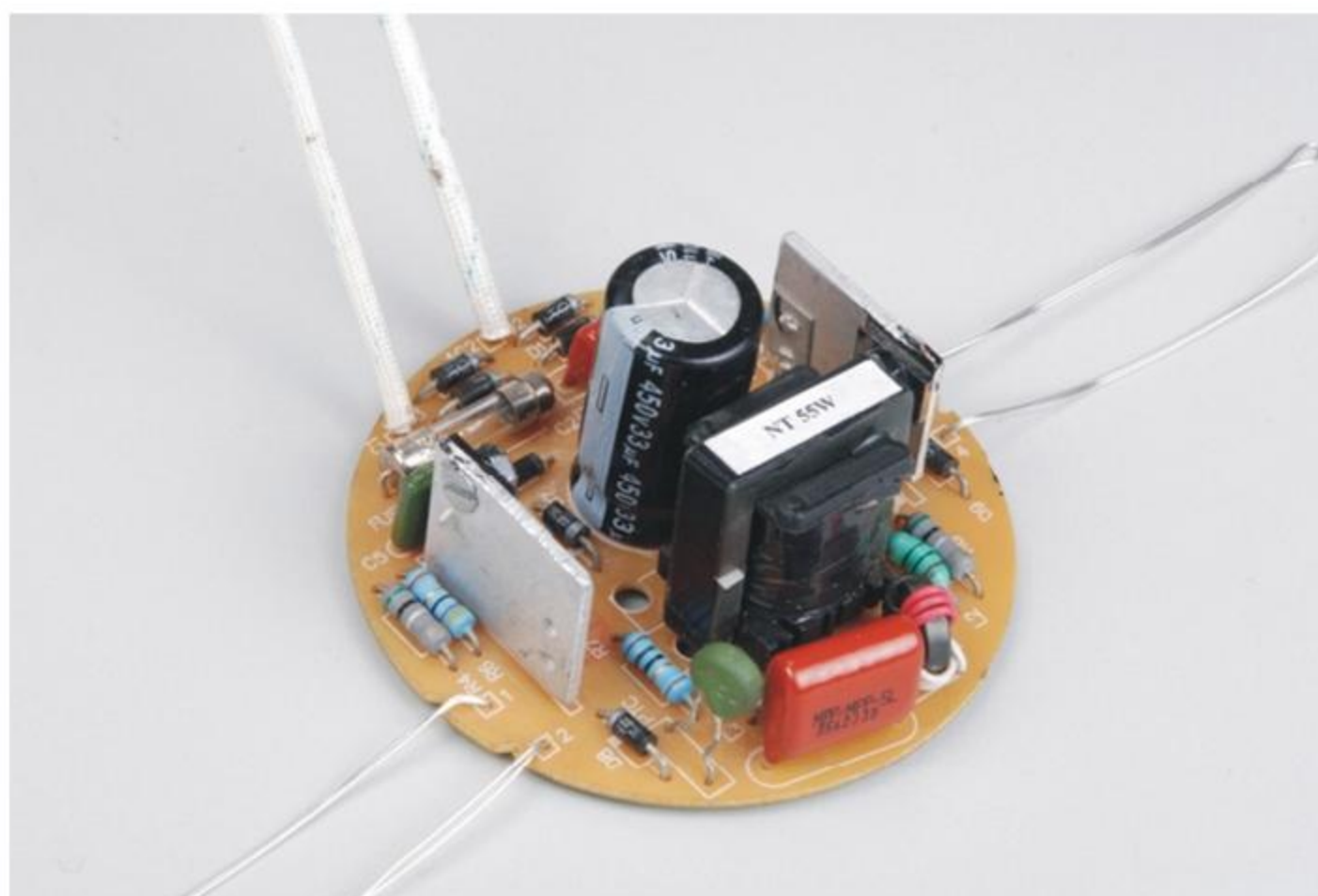
额定工作电压	RATED VOLTAGE	$V_N$	110V, 220 V rms
最大工作电压	MAX. OPERATING VOLTAGE	$V_{max}$	265 V rms
耐电压	SURGE VOLTAGE WITHSTANDING	$V_s$	400V~900V
一般开关次数	TYPICAL SWITCHING LIFE	N	$\geq 10,000$ 次
阻值允差(常规)	TOLERANCE OF RESISTANCE (TYP.)	$\Delta R_N$	$\pm 30\%$
开关温度允差	TOLERANCE OF SWITCHING TEMP.	$\Delta T_c$	$\pm 10^\circ\text{C}$
工作温度范围	OPERATING TEMPERATURE RANGE	$T_A$	-25 ~ +125 $^\circ\text{C}$ (V=0V时) 0 ~ +60 $^\circ\text{C}$ (V= $V_{max}$ 时)
储存条件	STORAGE CONDITIONS:		
温度	Temperature		-40 ~ +85 $^\circ\text{C}$
相对湿度	Relative humidity		$\leq 95\%$ RH ( $\pm 40^\circ\text{C}$ )
大气压	Atmosphere pressure		86 ~ 106 Kpa

## 电性能参数规格表 SPEC. OF PARAMETERS

编号 No	型号 Part No	居里温度 $T_c$ ( $^\circ\text{C}$ ) Swich Temp	额定电阻值 $R_{25}$ ( $\Omega$ ) Resistance @25 $^\circ\text{C}$	耐电压 $V_{AC}$ With standing Voltage	最大电流Max. Current $I_{Max}$ (mA)	成品外形尺寸Dimensions (mm)			
						Dmax	Tmax	$\Phi d$	
1	H1PR101RH03LC600	75 $^\circ\text{C} \pm 7^\circ\text{C}$ (LC)	100 $\pm 25\%$	600V	200mA	-	-	-	
2	H1PR151RH03LC600		150 $\pm 25\%$	600V	200mA	-	-	-	
3	H1PR221RH03LC600		220 $\pm 25\%$	600V	200mA	-	-	-	
4	H1PR271RH03LC600		270 $\pm 25\%$	600V	200mA	-	-	-	
5	H1PR331RH03LC600		330 $\pm 25\%$	600V	200mA	-	-	-	
6	H1PR391RH03LC600		390 $\pm 25\%$	600V	200mA	-	-	-	
7	H1PR471RH03LC650		470 $\pm 25\%$	650V	200mA	4.5	5.0	0.5	
8	H1PR681RH03LC650		680 $\pm 25\%$	650V	200mA	-	-	-	
9	H1PR102RH03LC800		1000 $\pm 25\%$	800V	100mA	-	-	-	
10	H1PR152RH03LC800		1500 $\pm 25\%$	800V	100mA	-	-	-	
11	H1PR222RH03LC800		2200 $\pm 25\%$	800V	100mA	-	-	-	
12	H1PR332RH03LC800		3300 $\pm 25\%$	800V	100mA	-	-	-	
13	H1PR472RH03LC800		4700 $\pm 25\%$	800V	100mA	-	-	-	
14	H1PR101RH04LC600	75 $^\circ\text{C} \pm 7^\circ\text{C}$ (LC)	100 $\pm 25\%$	600V	300mA	-	-	-	
15	H1PR151RH04LC600		150 $\pm 25\%$	600V	300mA	-	-	-	
16	H1PR221RH04LC650		220 $\pm 25\%$	650V	300mA	-	-	-	
17	H1PR331RH04LC650		330 $\pm 25\%$	650V	300mA	-	-	-	
18	H1PR391RH04LC800		390 $\pm 25\%$	800V	300mA	-	-	-	
19	H1PR471RH04LC800		470 $\pm 25\%$	800V	300mA	5.5	5.0	0.5	
20	H1PR681RH04LC800		680 $\pm 25\%$	800V	200mA	-	-	-	
21	H1PR102RH04LC800		1000 $\pm 25\%$	800V	200mA	-	-	-	
22	H1PR152RH04LC800		1500 $\pm 25\%$	800V	100mA	-	-	-	
23	H1PR222RH04LC800		2200 $\pm 25\%$	800V	100mA	-	-	-	
24	H1PR332RH04LC800		3300 $\pm 25\%$	800V	100mA	-	-	-	
25	H1PR101RH05LC600		75 $^\circ\text{C} \pm 7^\circ\text{C}$ (LC)	100 $\pm 25\%$	600V	400mA	-	-	-
26	H1PR151RH05LC650			150 $\pm 25\%$	650V	400mA	-	-	-
27	H1PR221RH05LC650	220 $\pm 25\%$		650V	400mA	-	-	-	
28	H1PR331RH05LC800	330 $\pm 25\%$		800V	400mA	-	-	-	
29	H1PR471RH05LC800	470 $\pm 25\%$		800V	400mA	-	-	-	
30	H1PR681RH05LC900	680 $\pm 25\%$		900V	300mA	6.5	5.0	0.5	
31	H1PR102RH05LC900	1000 $\pm 25\%$		900V	100mA	-	-	-	
32	H1PR152RH05LC900	1500 $\pm 25\%$		900V	100mA	-	-	-	
33	H1PR222RH05LC900	2200 $\pm 25\%$		900V	100mA	-	-	-	
34	H1PR332RH05LC900	3300 $\pm 25\%$		900V	100mA	-	-	-	
35	H1PR68RH07LC550	75 $^\circ\text{C} \pm 7^\circ\text{C}$ (LC)		68 $\pm 25\%$	550V	700mA	-	-	-
36	H1PR101RH07LC550			100 $\pm 25\%$	550V	700mA	-	-	-
37	H1PR151RH07LC800			150 $\pm 25\%$	800V	700mA	-	-	-
38	H1PR221RH07LC800		220 $\pm 25\%$	800V	700mA	-	-	-	
39	H1PR271RH07LC800		270 $\pm 25\%$	800V	600mA	-	-	-	
40	H1PR391RH07LC800		390 $\pm 25\%$	800V	400mA	8.0	5.0	0.6	
41	H1PR471RH07LC900		470 $\pm 25\%$	900V	400mA	-	-	-	
42	H1PR561RH07LC900		560 $\pm 25\%$	900V	300mA	-	-	-	
43	H1PR681RH07LC900		680 $\pm 25\%$	900V	200mA	-	-	-	
44	H1PR102RH07LC900		1000 $\pm 25\%$	900V	100mA	-	-	-	
45	H1PR152RH07LC900		1500 $\pm 25\%$	900V	100mA	-	-	-	
46	H1PR47RH08LC500		75 $^\circ\text{C} \pm 7^\circ\text{C}$ (LC)	47 $\pm 25\%$	500V	800mA	-	-	-
47	H1PR68RH08LC500			68 $\pm 25\%$	500V	800mA	-	-	-
48	H1PR151RH08LC800	150 $\pm 25\%$		800V	600mA	9.0	5.0	0.6	
49	H1PR331RH08LC900	330 $\pm 25\%$		900V	400mA	-	-	-	
50	H1PR102RH08LC900	1000 $\pm 25\%$		900V	100mA	-	-	-	
51	H1PR222RH08LC900	2200 $\pm 25\%$		900V	100mA	-	-	-	
52	H1PR101RH03HE600	100 $\pm 25\%$		600V	200mA	-	-	-	



编号 No	型号 Part No	居里温度T <sub>c</sub> (°C) Swich Temp	额定电阻值R <sub>25</sub> (Ω) Resistance @25°C	耐电压V <sub>AC</sub> With standing Voltage	最大电流Max. Current I <sub>Max</sub> (mA)	成品外形尺寸Dimensions (mm)		
						Dmax	Tmax	Φd
53	H1PR151RH03HE600	100°C ± 7°C(HE)	150±25%	600V	200mA	4.5	5.0	0.6
54	H1PR221RH03HE650		220±25%	650V	200mA			
55	H1PR331RH03HE650		330±25%	650V	200mA			
56	H1PR471RH03HE650		470±25%	650V	200mA			
57	H1PR681RH03HE650		680±25%	650V	100mA			
58	H1PR102RH03HE750		1000±25%	750V	100mA			
59	H1PR152RH03HE750		1500±25%	750V	100mA			
60	H1PR222RH03HE750		2200±25%	750V	100mA			
61	H1PR101RH05HE600		100±25%	600V	400mA			
62	H1PR151RH05HE650	150±25%	650V	400mA				
63	H1PR221RH05HE750	220±25%	750V	400mA				
64	H1PR331RH05HE800	330±25%	800V	400mA				
65	H1PR471RH05HE800	470±25%	800V	300mA				
66	H1PR681RH05HE900	680±25%	900V	200mA				
67	H1PR102RH05HE900	1000±25%	900V	100mA				
68	H1PR152RH05HE900	1500±25%	900V	100mA				
69	H1PR222RH05HE900	2200±25%	900V	100mA				
70	H1PR70RH07HE600	100°C ± 7°C(HE)	70±25%	600V	600mA	8.0	5.0	0.6
71	H1PR101RH07HE650		100±25%	650V	600mA			
72	H1PR151RH07HE800		150±25%	800V	600mA			
73	H1PR221RH07HE800		220±25%	800V	600mA			
74	H1PR271RH07HE800		270±25%	800V	600mA			
75	H1PR331RH07HE900		330±25%	900V	400mA			
76	H1PR391RH07HE900		390±25%	900V	400mA			
77	H1PR561RH07HE900		560±25%	900V	300mA			



# PRY系列PTC 热敏电阻器

## PTCR of PRY SERIES

——用于节能灯和电子镇流器延时启动 For Time Delay of Lighting & Ballast

HWA

随着全球对能源利用水平的不断提高,使得PTC行业技术也在不断的创新,经过我司研发团队长时间的潜心研究,开发出了一种新型节能型PTCR,即智能型PTCR,它作为电子镇流器、节能灯预热软启动元件能大大地提高灯的开关次数和使用寿命,同时克服了普通PTCR在电子镇流器、节能灯预热启动后,有温升、有功耗的缺点,提高了灯的光通量、流明数和发光效率,堪称绿色照明电器又一次突破性革命。

With the increasing energy utilizing level and consequent continual technology creation in PTC industry, our company have developed a new energy-saving PTCR( that is: intellectual PTCR) after the arduous study of our R&D group. As a preheating and delay time start component for electronic ballasts and energy-saving lamps, it can greatly prolong the on-off time of lamps. Meantime, it overcomes the shortcomings of temperature rising and power consumption which happen after the electronic ballasts and energy saving lamps preheat starting. It increases luminous flux and lighting efficiency. All of these prove that it can be called another breakthrough revolution in green lumination appliance field.

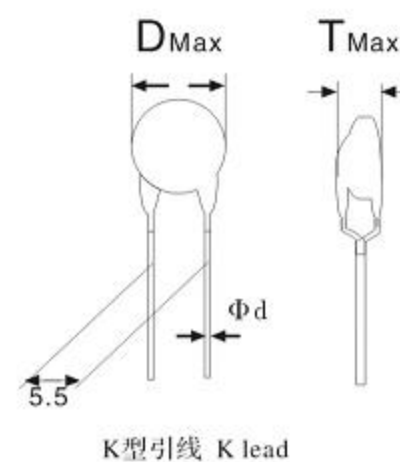
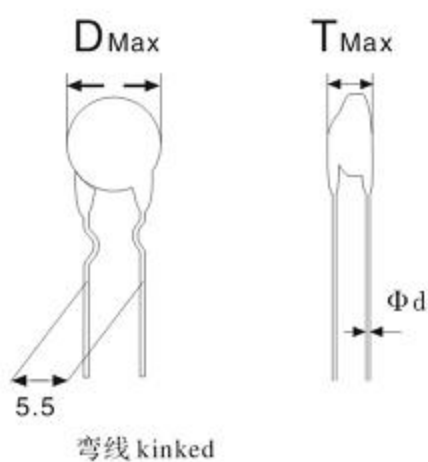
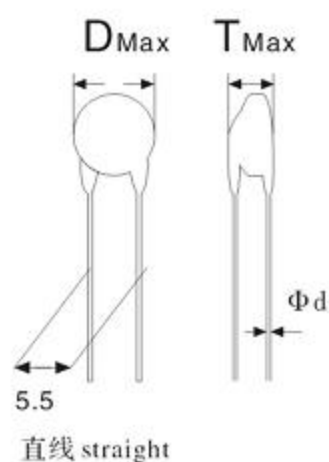
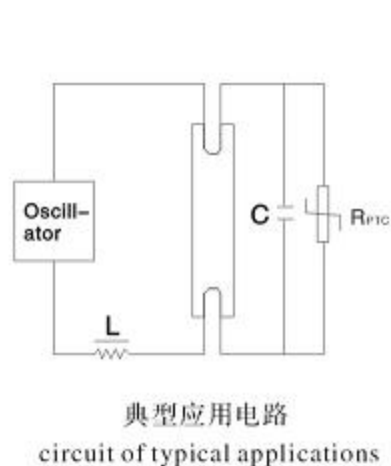
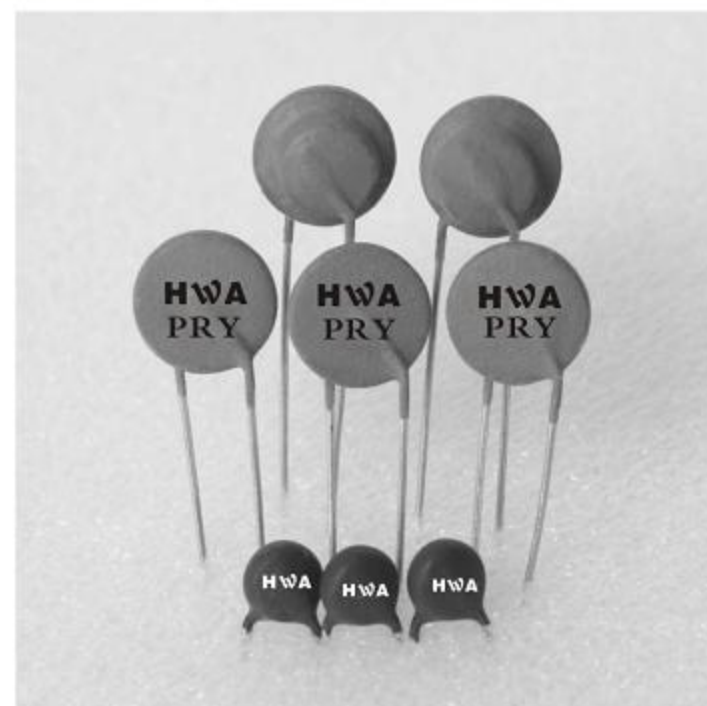
### 产品特点 FEATURES

热敏, 压敏复合型 Combination of PTC&Varistor

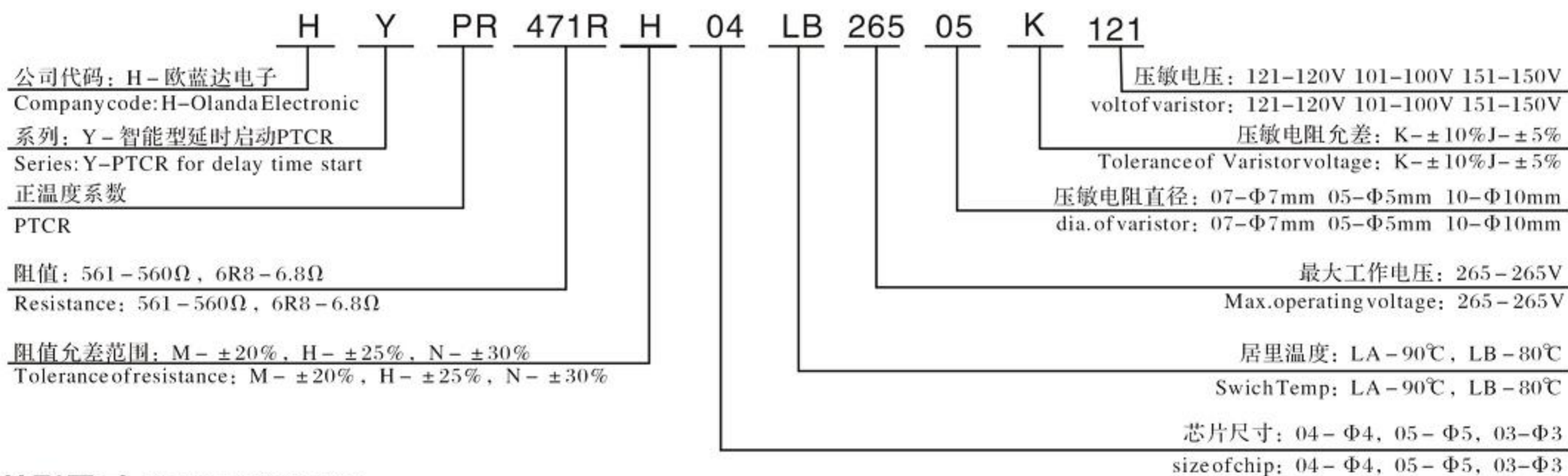
预热启动后无温升,无功耗 No temperature-increasing or power-consuming after preheating

### 典型应用 TYPICAL APPLICATIONS

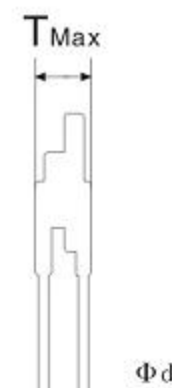
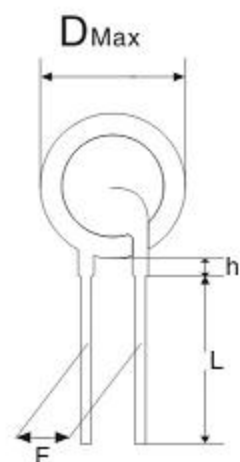
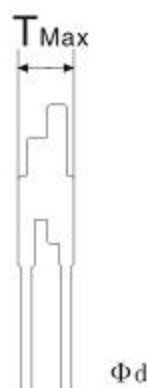
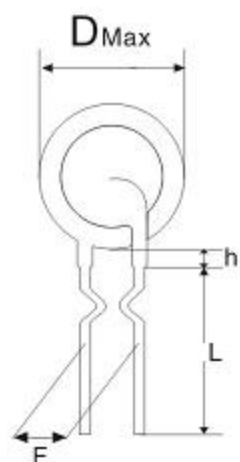
电子镇流器和节能灯预热启动 Preheating starting of electronic ballasts and energy-saving lamps



### 产品编号 PART NUMBERING



### 外形尺寸 DIMENSIONS







芯片直径代码 DISCDIA. CODE	尺寸DIMENSIONS ( mm )					
	D <sub>Max</sub> *	T <sub>Max</sub>	L <sub>Min</sub>	F ± 1	h <sub>Max</sub>	d ± 0.05
05	6.5	6.5	25	5	3	0.6
07	8.5	6.5	25	5	3	0.6
10	11.5	7.5	25	5	3	0.6
14	15.5	7.5	25	5	3	0.6

\* 产品的直径一般随压敏电阻的直径而变 \* The product diameter changes with that of varistor.

## 一般技术参数 GENERAL TECHNICAL DATA

额定工作电压	Rated voltage	V <sub>N</sub>	110V, 220 V rms
最大工作电压	Max. Operating voltage	V <sub>Max</sub>	265 V rms
耐电压	Surge voltage withstanding	V <sub>S</sub>	800V~1000V
一般开关次数	Typical switching life	N	≥10,000次
阻值允差(常规)	Tolerance of resistance (typ.)	ΔR <sub>N</sub>	±30%
压敏电压允差	Tolerance of varistor	ΔV <sub>V</sub>	±10%
开关温度允差	Tolerance of switching temp.	ΔT <sub>c</sub>	±10℃
工作温度范围	Operating temperature range	T <sub>A</sub>	-25 ~ +125 ℃ (V=0V时) 0 ~ +60 ℃ (V=V <sub>Max</sub> 时)
储存条件	Storage conditions:		
温度	Temperature		-40 ~ +85 ℃
相对湿度	Relative humidity		≤ 95% RH (±40℃)
大气压	Atmosphere pressure		86 ~ 106 Kpa

## 电性能参数规格表 SPEC. OF PARAMETERS

编号 No.	型号 Part No.	额定电阻值R <sub>25</sub> ( Ω ) Resistance @ 25℃	开关温度(℃) Switch Temp.	压敏电压 ( V ) Varistor Voltage	最大工作电流 ( mA ) Max. Current
1	HYPR221H03LB26505K121	220	80	120	200
2	HYPR331H03LB26505K121	330	80	120	200
3	HYPR681H03LB26505K121	680	80	120	200
4	HYPR102H03LB26505K121	1000	80	120	200
5	HYPR152H03LB26505K121	1500	80	120	200
6	HYPR221H03LB26507K151	220	80	150	200
7	HYPR331H03LB26507K151	330	80	150	200
8	HYPR681H03LB26507K151	680	80	150	200
9	HYPR102H03LB26507K151	1000	80	150	200
10	HYPR152H03LB26507K151	1500	80	150	200
11	HYPR331H04LB26505K121	330	80	120	300
12	HYPR471H04LB26505K121	470	80	120	300
13	HYPR681H04LB26505K121	680	80	120	300
14	HYPR102H04LB26505K121	1000	80	120	300
15	HYPR152H04LB26505K121	1500	80	120	300
16	HYPR331H04LB26507K151	330	80	150	300
17	HYPR471H04LB26507K151	470	80	150	300
18	HYPR681H04LB26507K151	680	80	150	300
19	HYPR102H04LB26507K151	1000	80	150	300
20	HYPR152H04LB26507K151	1500	80	150	300
21	HYPR151H03HE26505K121	150	100	120	200
22	HYPR221H03HE26505K121	220	100	120	200
23	HYPR331H03HE26505K121	330	100	120	200
24	HYPR471H03HE26505K121	470	100	120	200
25	HYPR681H03HE26505K121	680	100	120	200
26	HYPR102H03HE26505K121	1000	100	120	200
27	HYPR151H03HE26507K151	150	100	150	200
28	HUPR221H03HE26507K151	220	100	150	200
29	HYPR331H03HE26507K151	330	100	150	200
30	HYPR471H03HE26507K151	470	100	150	200

编号 No.	型号 Part No.	额定电阻值R25 (Ω) Resistance @25℃	开关温度(℃) Switch Temp.	压敏电压 (V) Varistor Voltage	最大工作电流 (mA) Max. Current
31	HYPR681H03HE26507K151	680	100	150	200
32	HYPR102H03HE26507K151	1000	100	150	200
33	HYPR151H03HE26507K151	150	100	150	400
34	HYPR221H05HE26507K151	220	100	150	400
35	HYPR331H05HE26507K151	330	100	150	400
36	HYPR471H05HE26507K151	470	100	150	400
37	HYPR681H05HE26507K151	680	100	150	400
38	HYPR102H05HE26507K151	1000	100	150	400
39	HYPR152H05HE26507K151	1500	100	150	400
40	HYPR101H05HE26510K201	100	100	200	800
41	HYPR151H05HE26510K201	150	100	200	800
42	HYPR221H05HE26510K201	220	100	200	800
43	HYPR331H05HE26510K201	330	100	200	800
44	HYPR471H05HE26510K201	470	100	200	800
45	HYPR101H05HE26510K151	100	80	150	800
46	HYPR151H07HE26510K151	150	80	150	800
47	HYPR221H07HE26510K151	220	80	150	800
48	HYPR331H07HE26510K151	330	80	150	800
49	HYPR471H07HE26510K151	470	80	150	800
50	HYPR101H07HE26514K201	100	80	200	800
51	HYPR151H07HE26514K201	150	80	200	800
52	HYPR221H07HE26514K201	220	80	200	800
53	HYPR331H07HE26514K201	330	80	200	800
54	HYPR471H07HE26514K201	470	80	200	800
55	HYPR331H07HE26510K331	330	120	330	800
56	HYPR681H07HE26510K331	680	120	330	800
57	HYPR152H07HE26510K331	1500	120	330	800
58	HYPR471H07HE26514K331	470	120	330	800
59	HYPR681H10HE26514K331	680	120	330	800
60	HYPR102H10HE26514K331	1000	120	330	800
61	HYPR152H10HE26514K331	1500	120	330	800

\* 可以视用户的需要而改变产品的各项参数和特性。 \* The product's parameter and characteristics can be changed by the requirement of customers.



# PR 2 系列 PTC 热敏电阻器 PR2 SERIES PTC THERMISTOR

—用于通用线路过流过载保护

For overcurrent and overload protection



## 产品特点 FEATURES

1. PR2系列PTC是一种自动保护，自动恢复，反复使用，无触点，无噪音，无火花的“万次保险器”  
PTC of MZ2 series is a million-time safety device of automatic protection, recoverability, using repeatedly, and no trigger, noise or sparks.
2. 当PTC处于常态时，阻值很小，不会影响到变压器初、次级线圈等被保护电路的正常工作。  
When PTC is in the normal state, the resistance is too low to affect the regular work of the protected circuit such as the voltage transformer's primary and secondary loops.
3. 当电路出现故障时，PTC陡然发热，阻值骤增至高阻态，使电路处于相对“断开”态，保护电路。  
When the circuit is in disorder, the PTC will generate heat suddenly, and the resistance value will go up to the high state, which can make the circuit in the state of relatively "reaking up" to protect the circuit.



## 主要应用 APPLICATIONS

用于通用线路过流、过载保护，例如：小型变压器初级线圈、开关电源、充电器、适配器、仪器、仪表、电子线圈、控制面板、家用电器、空调、微波炉等线路的过流、过载保护。

Overload and current protection of mini voltage transformer primary loops, chargers, safety guard unit and thunder surging protection circuit of telecom apparatus, and industry-controlling exchangers.

电能表，智能电表RS485接口专用过流保护，数字万用表的过流保护，微电机、晶体管的过流保护

Over-current protection of ammeter, digital multi-meter RS485 interface, micro-electricity machinery and transistor.

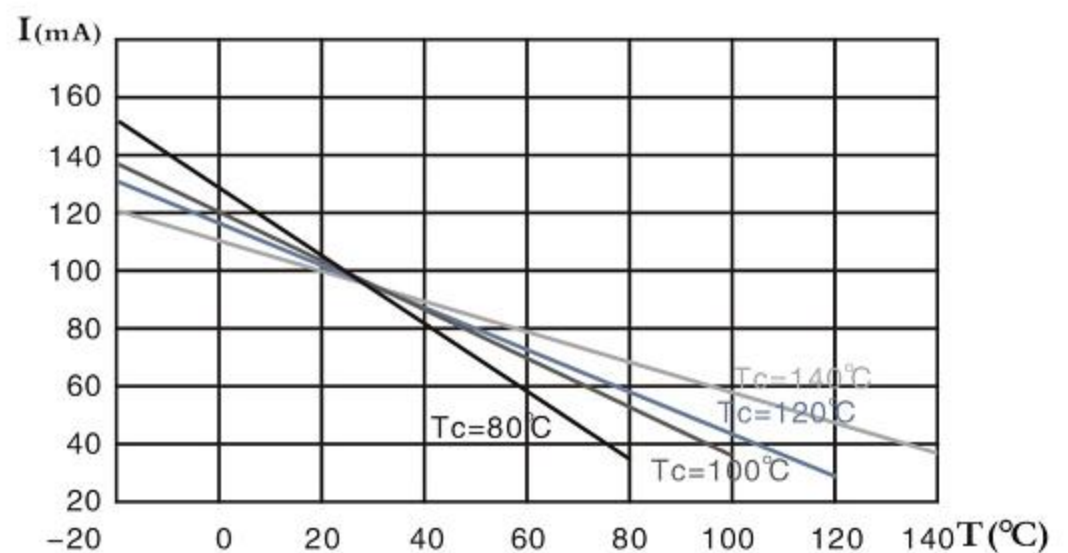
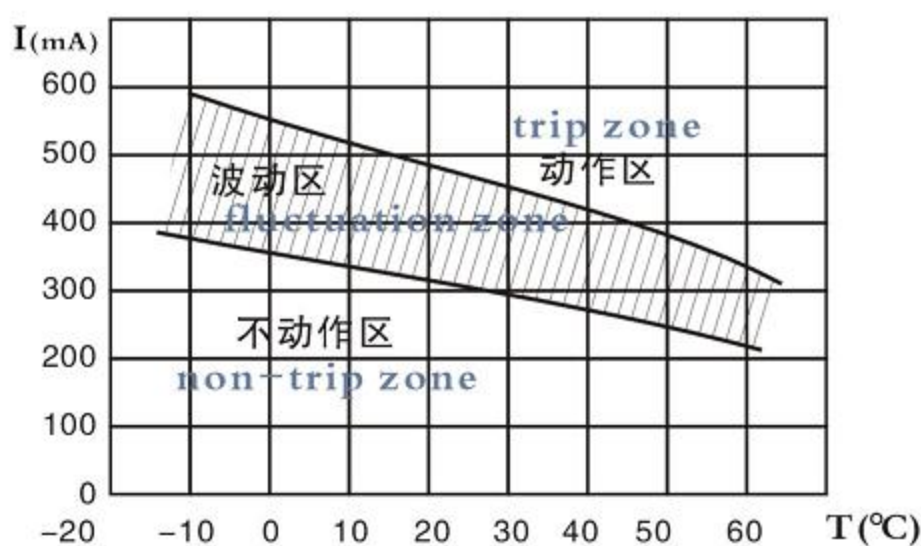
## 应用原理及典型线路 TYPICAL APPLICATIONS CIRCUITS

当电路处于正常状态时，通过PTC热敏电阻器的电流小于额定电流，PTC热敏电阻器处于常态，阻值很小，不会影响被保护电路的正常工作。当电路出现故障，电流大大超过额定电流时，PTC热敏电阻器陡然发热，呈高阻态，使电路处于相对“断开”状态，从而保护电路不受破坏。当故障排除后，PTC热敏电阻器亦自动回复至低阻态，电路恢复正常工作。

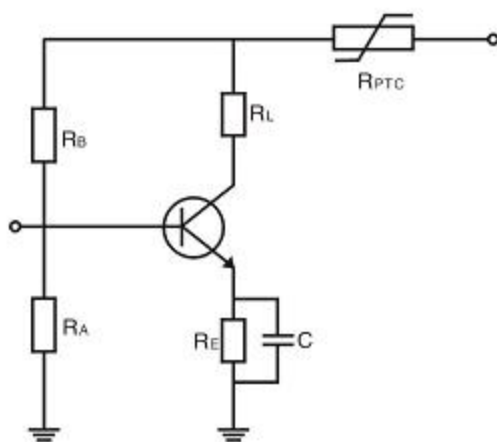
如图所示：使用环境温度，不动作电流及动作电流三者之间的关系。动作电流通常是不动作电流的2-3倍。随着工作环境温度的升高，不动作电流和动作电流会相应减小。

When a circuit is in the normal status, the current through PTC is lower than the rated current and PTC is in the normal state with small resistance value, which will not affect the normal operation of the protected circuit. In case of some trouble in the circuit and the current is greater than the rated current, the PTC will become hot quickly and present a high resistance state, which sets the circuit relatively "off" to protect the circuit from damage. After the trouble is removed, PTC will automatically restore its low resistance state and the circuit will resume normal operation. Normally, when PTC is used as an overload protection component, it is preferred to select maximum operating current, maximum operating voltage and proper specifications. The following shows the relations among the ambient temperature, nontrip current and trip current. trip current is always 2-3 times of nontrip current. The trip and nontrip current will decline with the ambient temperature of work rising.

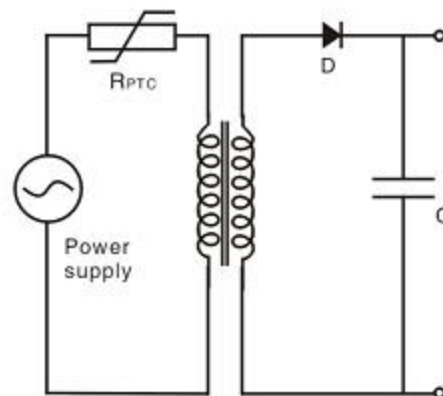
## 原理图 PRINCIPLE FIG.:



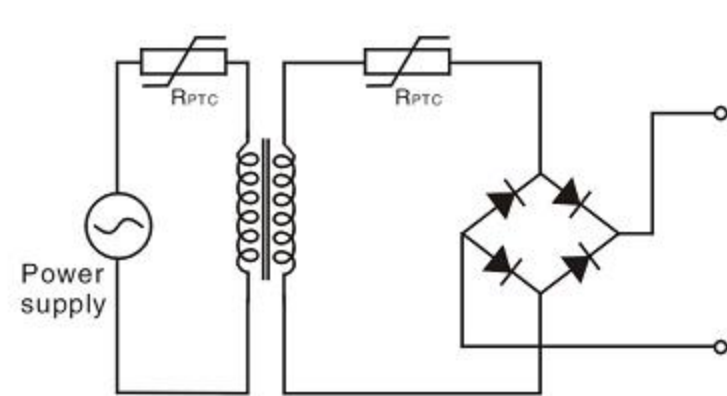
## 250VAC、265VAC应用举例 APPLICATION EXAMPLES:



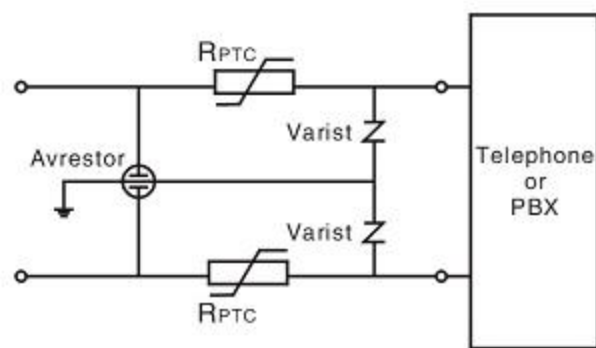
晶体管保护电路  
protection circuit of transistors



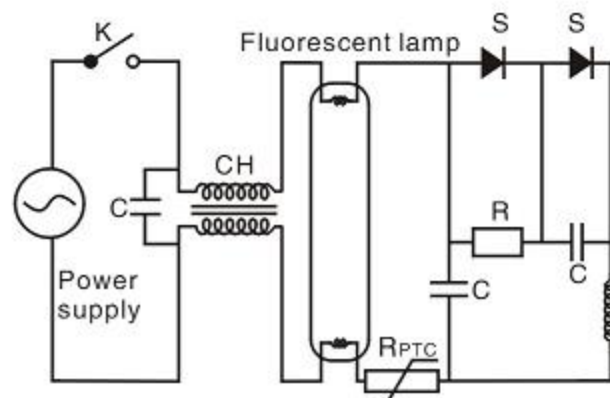
变压器保护电路 I  
Protection circuit of Transistor I



变压器保护电路 II  
protection circuit of Transformer II

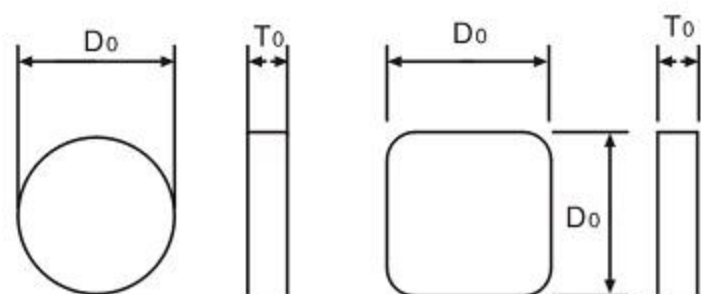


Ic短路测试 Ic short circuit test

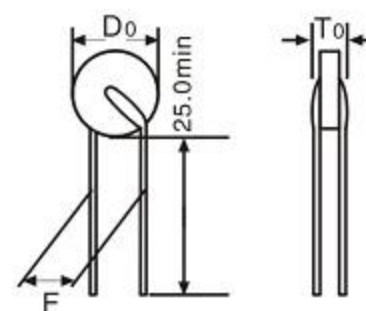


荧光灯保护电路  
Protection circuit of Fluorescent lamps

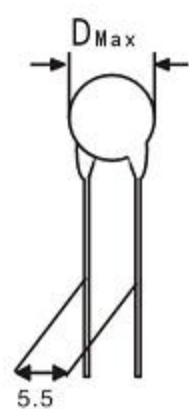
## 外形尺寸图 DIMENSIONS



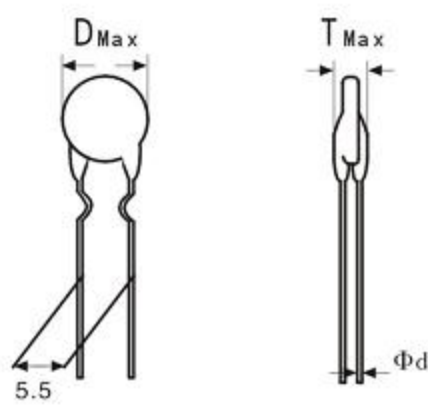
芯片型 Chip



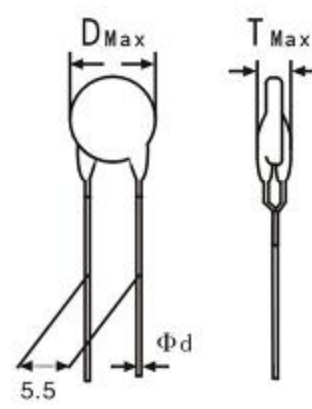
无封装型 Uncoated



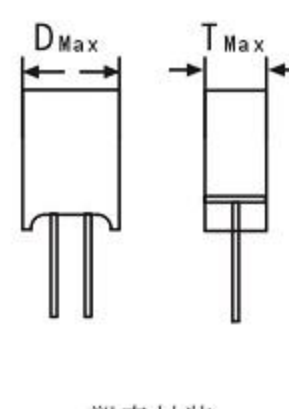
直线型 straight



弯线型 kinked



k型引线 K lead

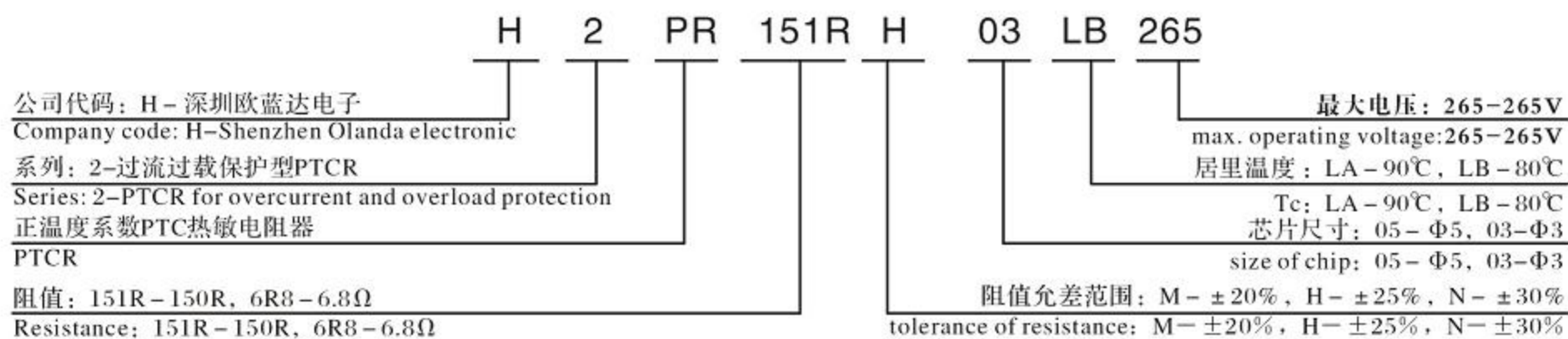


塑壳封装  
shell encapsulation

## 一般技术参数 GENERAL TECHNICAL DATA

额定工作电压	Rated voltage	Vn	12V ~ 220 Vrms
最大工作电压	Max. Operating voltage	Vmax	20V ~ 265 Vrms
耐电压	Surge voltage withstanding	Vs	Vmax × (1.2~1.5)
阻值允差(常规)	Tolerance of resistance (typ.)	ΔRN	±20% (M), ±25% (V)
不动作电流	Non-trip current	In	10mA~1800mA
动作电流	Trip current	It	20mA~3600mA
最大工作电流	Max. Operating current	Imax	0.2A~10.0Arms
恢复时间	Restore time	Tr	60 S (max)
一般开关次数	Typical switching times	N	100次
开关温度允差	Tolerance of switching temp.	ΔTc	±10℃
工作温度范围	Operating temperature range	TA	-25 ~ +125 ℃ (V=0 V) 0 ~ +60 ℃ (V=Vmax)
储存条件	Storage conditions:		
温度	Temperature		-40 ~ +85 ℃
相对湿度	Relative humidity		≤ 95% RH (±40℃)
大气压	Atmosphere pressure		86 ~ 106 Kpa

## 产品编号 PART NUMBERING





## 电性能参数规格表 SPEC. OF PARAMETERS

编号 No	型号 PartNo	最大工作电压 Max. operating voltage Vmax(V)	不动作电流 Non-trip current Int(mA)		动作电流 Trip current It (mA)	额定电阻值 Resistance @25°C(Ω) ±25%	最大电流 Imax (A) Max. Current	居里温度 Tc(°C) Swich Temp	成品外形尺寸 (mm) Dimensions		
			@25°C	@60°C					Dmax	Tmax	Φd
1	H2PR151RH03LB265	265	22	15	45	150±25%	0.2A	80°C ±7°C	4.5	5.0	0.5
2	H2PR101RH03LB250	250	25	18	55	100±25%	0.2A		4.5	5.0	0.5
3	H2PR70RH05LB250	250	50	30	100	70±25%	0.3A		6.5	5.0	0.5
4	H2PR121RH05LB265	265	30	20	60	120±25%	0.3A		6.5	5.0	0.5
5	H2PR101RH07LB265	265	50	30	100	100±25%	0.6A		8.0	5.0	0.6
6	H2PR12RH08LB250	250	120	70	220	12±25%	0.8A		9.0	5.0	0.6
7	H2PR25RH08LB265	265	85	50	170	25±25%	0.8A		9.0	5.0	0.6
8	H2PR35RH08LB265	265	80	50	150	35±25%	0.8A		9.0	5.0	0.6
9	H2PR50RH08LB265	265	60	40	120	50±25%	1.0A		9.0	5.0	0.6
10	H2PR70RH03HE250	250v	45	35	90	70±25%	0.1A		4.5	5.0	0.5
11	H2PR101RH03HE250	250v	40	30	80	100±25%	0.2A	4.5	5.0	0.5	
12	H2PR151RH03HE265	265v	33	25	65	150±25%	0.2A	4.5	5.0	0.5	
13	H2PR151RH04HE265	265v	36	28	80	150±25%	0.3A	5.5	5.0	0.5	
14	H2PR102RH05HE265	265v	15	12	30	1000±25%	0.2A	6.5	5.0	0.5	
15	H2PR601RH05HE265	265v	20	15	40	600±25%	0.2A	6.5	5.0	0.5	
16	H2PR301RH05HE265	265v	27	20	55	300±25%	0.3A	6.5	5.0	0.5	
17	H2PR151RH05HE265	265v	38	30	80	150±25%	0.3A	6.5	5.0	0.5	
18	H2PR22RH07HE250	250v	120	90	225	22±25%	0.5A	8.0	5.0	0.6	
19	H2PR22RH10HE265	265v	125	90	250	22±25%	1.2A	11.0	5.0	0.6	
20	H2PR18RH10HE265	265v	145	110	290	18±25%	1.2A	11.0	5.0	0.6	
21	H2PR12RH10HE250	250v	170	130	340	12±25%	1.2A	11.0	5.0	0.6	
22	H2PR151RH03HC250	250v	40	30	75	150±25%	0.2	4.5	5.0	0.5	
23	H2PR121RH04HC265	265v	40	30	80	120±25%	0.2	5.5	5.0	0.5	
24	H2PR70RH04HC250	250v	50	40	100	70±25%	0.2	5.5	5.0	0.5	
25	H2PR181RH05HC265	265v	40	30	80	180±25%	0.3	6.5	5.0	0.5	
26	H2PR121RH05HC265	265v	45	30	90	120±25%	0.3	6.5	5.0	0.5	
27	H2PR39RH05HC250	250v	80	65	160	39±25%	0.2	6.5	5.0	0.5	
28	H2PR85RH05HC265	265v	60	45	120	85±25%	0.3	6.5	5.0	0.5	
29	H2PR70RH05HC265	265v	65	50	130	70±25%	0.3	6.5	5.0	0.5	
30	H2PR33RH06HC250	250v	110	85	200	33±25%	0.4	7.0	5.0	0.6	
31	H2PR56RH07HC265	265v	90	60	175	56±25%	0.6	8.0	5.0	0.6	
32	H2PR82RH07HC265	265v	70	50	140	82±25%	.06	8.0	5.0	0.6	
33	H2PR55RH08HC265	265v	90	70	180	55±25%	0.8	9.0	5.0	0.6	
34	H2PR45RH08HC265	265v	105	80	200	45±25%	0.8	9.0	5.0	0.6	
35	H2PR35RH08HC265	265v	115	90	225	35±25%	0.8	9.0	5.0	0.6	
36	H2PR25RH08HC265	265v	130	100	250	25±25%	0.8	9.0	5.0	0.6	
37	H2PR15RH08HC250	250v	150	120	300	15±25%	0.8	9.0	5.0	0.6	
38	H2PR39RH10HC265	265v	130	100	250	39±25%	1.2	11.0	5.0	0.6	
39	H2PR15RH10HC265	265v	180	140	350	15±25%	1.2	11.0	5.0	0.6	
40	H2PR10RH12HC265	265v	250	200	500	10±25%	1.8	13.5	5.0	0.6	
41	H2PR12RH13HC265	265v	225	180	450	12±25%	1.8	14.0	5.0	0.6	
42	H2PR10RH13HC265	265v	260	200	520	10±25%	1.8	14.0	5.0	0.6	
43	H2PR7RH16HC265	265v	350	280	700	7±25%	3.1	17.5	5.0	0.6	
44	H2PR6RH16HC265	265v	390	300	780	6±25%	3.1	17.5	5.0	0.6	
45	H2PR3RH20HC265	265v	530	430	1050	3.7±25%	4.3	22.0	5.0	0.6	
Vmax=140V											
46	H2PR33RH05HC140	140v	90	70	175	33±25%	0.3	6.5	5.0	0.5	
47	H2PR25RH06HC140	140v	125	90	250	25±25%	0.5	7.0	5.0	0.6	
48	H2PR22RH08HC140	140v	135	110	270	22±25%	0.8	9.0	5.0	0.6	
49	H2PR6R8H10HC140	140v	275	200	550	6.8±25%	1.2	11.0	5.0	0.6	
50	H2PR10RH10HC140	140v	225	170	450	10±25%	1.2	11.0	5.0	0.6	
51	H2PR6R8H12HC140	140v	300	230	600	6.8±25%	1.8	13.5	5.0	0.6	
52	H2PR5R6H12HC140	140v	325	250	650	5.6±25%	1.8	13.5	5.0	0.6	
53	H2PR6R8H13HC140	140v	325	250	650	6.8±25%	1.8	14.0	5.0	0.6	
54	H2PR5R6H16HC140	140v	400	310	800	5.6±25%	3.1	17.5	5.0	0.6	
55	H2PR4R7H16HC140	140v	425	330	850	4.7±25%	3.1	17.5	5.0	0.6	
56	H2PR2R6H20HC140	140v	650	500	1300	2.6±25%	4.3	22.0	5.0	0.6	

编号 No	型号 PartNo	最大工作电压 Max. operating voltage Vmax(V)	不动作电流 Non-trip current Int(mA)		动作电流 Trip current It (mA)	额定电阻值 Resistance @25°C(Ω) ±25%	最大电流 Imax (A) Max. Current	居里温度 Tc(°C) Swich Temp	成品外形尺寸 (mm) Dimensions		
			@25°C	@60°C					Dmax	Tmax	Φd
Vmax=140V											
57	H2PR12RH08HA140	140v	200	160	400	12 ± 25%	0.6	140°C ± 7°C	9.0	5.0	0.6
58	H2PR10RH10HA140	140v	250	200	500	10 ± 25%	1.2		11.0	5.0	0.6
59	H2PR6R7H10HA140	140v	300	230	600	6.7 ± 25%	1.2		11.0	5.0	0.6
60	H2PR15RH10HA140	140v	250	170	420	15 ± 25%	1.2		11.0	5.0	0.6
61	H2PR3R8H13HA140	140v	500	400	1000	3.8 ± 25%	1.8		14.0	5.0	0.6
62	H2PR2R1H16HA140	140v	710	570	1420	2.1 ± 25%	3.1		17.5	5.0	0.6
Vmax=60v											
63	H3PR4R7H08LB60	60v	180	120	360	4.7 ± 25%	3.0	80°C ± 7°C	9.0	4.0	0.6
64	H3PR55RH03HC60	60v	60	50	120	55 ± 25%	0.7	120°C ± 7°C	4.5	4.0	0.5
65	H3PR25RH05HC60	60v	100	85	200	25 ± 25%	1.0		6.5	4.0	0.5
66	H3PR9R4H08HC60	60v	180	150	360	9.4 ± 25%	3.0		9.0	4.0	0.6
67	H3PR5R6H10HC60	60v	300	250	600	5.6 ± 25%	4.3		11.0	4.0	0.6
68	H3PR3R7H12HC60	60v	380	320	750	3.7 ± 25%	5.5		13.5	4.0	0.6
69	H3PR2R3H16HC60	60v	550	450	1100	2.3 ± 25%	8.0		17.5	4.0	0.6
Vmax=30v											
70	H2PR10RH05HC30	30v	170	140	340	10 ± 25%	1.0	140°C ± 7°C	6.5	4.0	0.5
71	H2PR4R2H08HC30	30v	280	230	560	4.2 ± 25%	3.0		9.0	4.0	0.6
72	H2PR1R8H08HC30	30v	550	450	1000	1.8 ± 25%	3.0		9.0	4.0	0.6
73	H2PR2R7H10HC30	30v	380	320	700	2.7 ± 25%	4.3		11.0	4.0	0.6
74	H2PR1R8H12HC30	30v	500	430	1000	1.8 ± 25%	5.5		13.5	4.0	0.6
75	H2PR1R2H12HC30	30v	750	600	1500	1.2 ± 25%	5.5		13.5	4.0	0.6
76	H2PR1R8H08HA30	30v	600	500	1100	1.8 ± 25%	3.0	9.0	4.0	0.6	
77	H2PR1R8H10HA30	30v	650	550	1300	1.8 ± 25%	4.3	11.0	4.0	0.6	
Vmax = 15/18v											
78	H2PR13RH03HC18	18v	145	120	280	13 ± 25%	0.7	120°C ± 7°C	4.5	4.0	0.5
79	H2PR4R6H05HC18	18v	300	250	580	4.6 ± 25%	1.0		6.5	4.0	0.5
80	H3PR1R8H08HC18	18v	550	450	1000	1.8 ± 25%	3.0		9.0	4.0	0.6
81	H3PR1R0H08HC18	18v	650	550	1200	1.0 ± 25%	3.0		9.0	4.0	0.6
82	H3PR1R2H10HC18	18v	700	600	1400	1.2 ± 25%	4.3		11.0	4.0	0.6
83	H3PR13RH03HA15	15v	180	150	350	13 ± 25%	0.7		4.5	4.0	0.5
84	H3PR4R6H05HA15	15v	350	300	680	4.6 ± 25%	1.0	6.5	4.0	0.5	
85	H3PR1R2H07HA15	15v	650	550	1200	1.2 ± 25%	2.5	8.0	4.0	0.6	
86	H3PR1R0H07HA15	15v	750	600	1350	1.0 ± 25%	2.5	8.0	4.0	0.6	
87	H3PR1R8H08HA15	15v	600	500	1100	1.8 ± 25%	3.0	9.0	4.0	0.6	
88	H3PR1R0H08HA15	15v	850	700	1500	1.0 ± 25%	3.0	9.0	4.0	0.6	
89	H3PR1R2H10HA15	15v	850	700	1550	1.2 ± 25%	4.3	11.0	4.0	0.6	

## 用于通讯设备过流过载保护用PTCR热敏电阻

### PTCR FOR TELECOM OF OVERCURRENT AND OVERLOAD PROTECTION

#### 概述

随着通讯设备技术的不断进步，对交换和用户设备的保护要求也大大提高。用PTC热敏电阻器保护电话线路。主要针对以下原因引起的过电流现象：

1. 直接雷击或者临近电话线路设备的雷击引线的浪涌电流
2. 临近的电力线路或者铁路系统故障时引起的交流感应电压
3. 电话线路与电力线路搭接

通常每一条电话线都串连一个PTC热敏电阻，即使有初级保护（全体放电管），PTC热敏电阻也必须满足严格的要求。由于会出现高达2000v的电压脉冲，为了耐受短期的感应电压，PTC热敏电阻必须有高耐压能力。如果线路中有初级保护，PTC热敏电阻耐压200-300就够了。如果线路中没有初级保护，ptc热敏电阻器耐压必须在600v以上。

#### 产品应用及经典线路：

程控交换机，总配线架，保安单元，电话机，及用户终端设备的过流保护

#### DESCRIPTION

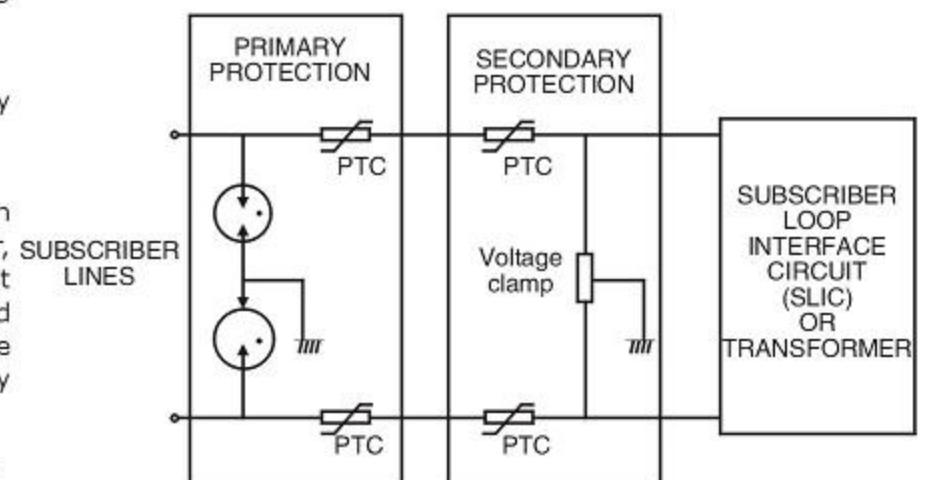
Advanced developments in telephony equipment in recent years have radically altered the protection requirements for both exchange and subscriber equipment. PTC thermistor protect telephone line against overcurrent, which mainly caused by the following examples:

1. Surges due to lighting strikes on or near to the line plant.
2. Short-term induction of alternating voltage from adjacent power lines or railway systems, usually when these lines or systems occur fault.
3. Direct contact between telephone lines and power lines.

TO provide good protection under such conditions, a PTC Thermistor is connected in series with each line, usually as secondary protection; see the following Fig. However, even with primary line protection (usually a gas discharge tube), the PTC Thermistor must fulfill severe requirements. Surge pulses of up to 2KV can occur and in order to withstand short-term power induction the PTC thermistor must withstand high voltages. If the line has primary protection, a 200V to 300V PTC thermistor is adequate, without primary protection, 600V PTC device is necessary.

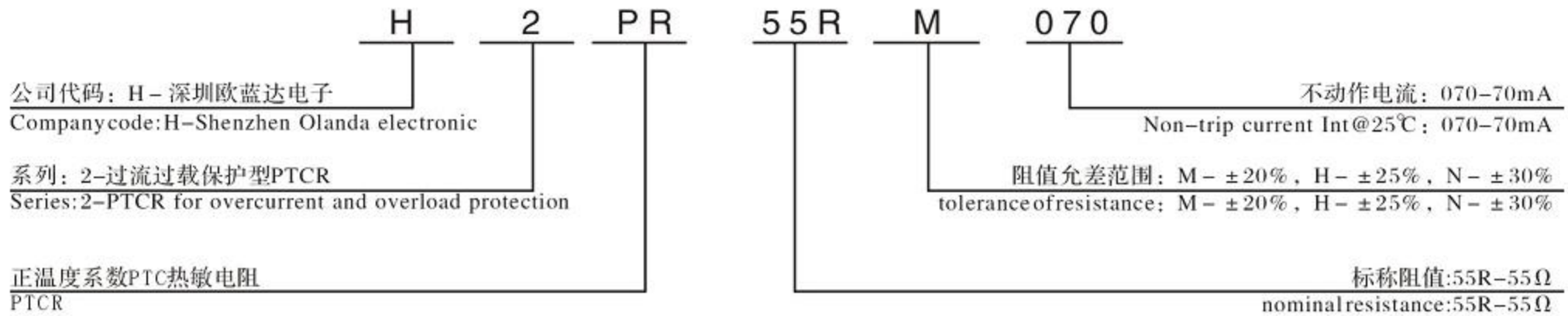
Application and typical circuit :

Program exchanger, security unit, telephone, and the overcurrent protection of terminals





## 产品编号 PART NUMBERING



## 一般技术参数

额定电阻值(Rn)	环境温度范围: 25±2°C, 在规定的允许偏差内
不动作特性	环境温度范围: 40±2°C, 在静止空气中放置30min, 电源电压60V <sub>DC</sub> , 通以最大不动作电流, 持续时间60min, 要求在测试过程中自身电阻变化率 (R-Rn)/Rn≤50%。
过流动作特性	PTC热敏电阻器的动作电流与动作时间之间的关系。
耐工频电压能力	电源电压230V <sub>rms</sub> /250 V <sub>rms</sub> , 通以最大电流, 通电时间30min, 恢复4小时后复测额定零功率电阻值, 要求ΔR/Rn≤20%
耐工频电流能力	电源电压220 V <sub>rms</sub> , 通以最大电流, 通电时间60S, 断电时间600S, 循环次数: 20次, 恢复4小时后复测额定零功率电阻值, 要求ΔR/Rn≤20%
耐冲击电流能力	短路电流波形: 10/1000μs, 最小开路电压: 1.0KV, 短路电流峰值: 25A, 间断时间3min, 循环次数30次, 恢复4小时后复测额定零功率电阻值, 要求ΔR/Rn≤20%
耐感应电压能力	(耐电压600V以上的需测试此项目) 电源电压650V <sub>rms</sub> , 起始电流1.1A, 通电时间2S, 断电时间600S, 循环次数10次, 恢复4小时后复测额定零功率电阻值, 要求ΔR/Rn≤20%
失效模式	I. 电源电压250 V <sub>rms</sub> , 起始电流10A, II. 电源电压600 V <sub>rms</sub> , 起始电流15A, III. 电源电压650 V <sub>rms</sub> , 起始电流10A。 通电时间30min, 允许开路或高阻态; 不允许出现低阻态或起明火。
恢复时间	恢复到两倍额定电阻值 (Rn) 的时间。要求小于60S。

## GENERAL TECHNICAL DATA

Resistance at 25°C (Rn)	Operating temperature range: 25±2°C. Within the allowable tolerance.
Non-operating characteristic	Operating temperature range: 40±2°C. In static air for 30minutes. Max. voltage:60 V <sub>DC</sub> , Non-trip current. Energized time:60min, (R-Rn)/Rn≤50%.
Over-current operating characteristic	Relation between trip current and trip time of PTC Thermistor
Over voltage withstanding	Voltage of power supply:230V <sub>rms</sub> /250 V <sub>rms</sub> , apply Maximum Current , Energized time:30min. Restore time in room temperature is 4 hours, then test the Rn. ΔR/Rn≤20%.
Over current withstanding	Max. voltage of supply:220V <sub>rms</sub> , apply maximum current. ON 60S, OFF 600S, Cycle:30 time, Restore time in room temperature is 4 hours, then re-test the Rn. ΔR/Rn≤20%.
Surge current withstanding	Current waves:10/1000μs, Min. Opening circuit Voltage 1.0KV, Peak current: 25A, Interval: 3min, Cycle:30 times, Restore time in room temperature is 4 hours, then re-test the Rn. ΔR/Rn≤20%.
Induction voltage withstanding(Only for maximum voltage more than 600V)	Max. voltage of supply:650V <sub>rms</sub> , Initial current :1.1A, ON2S, OFF 600S, Cycle: 10 times, Restore time in room temperature is 4 hours, then re-test the Rn. ΔR/Rn≤20%.
Fail Model	I. Voltage of power supply: 250V <sub>rms</sub> , Initial current: 10Arms. II. Voltage of power supply: 600V <sub>rms</sub> , Initial current: 15Arms. III. Voltage of power supply: 650V <sub>rms</sub> , Initial current: 10Arms. Energized time: 30min. High resistance or open circuit is allowance. Low resistance state or firing is not allowed.
Restore time	The necessary time for a PTC to return to twice of Rn≤60S.

## 通讯设备过流过载保护用热敏电阻器规格表

### PTC SPEC. OF OVERCURRENT AND OVERLOAD PROTECTION FOR TELECOM

型号 PartNo	最大工作电压 Max. operating voltage V <sub>max</sub> (V)	最大电流 Max. Current I <sub>max</sub> (A)	额定电阻值 Resistance @25°C(Ω) ±25%	不动作电流 Non-trip current Int(mA)		动作电流 Trip current @25°C It (mA)	最大电流下的动作时间 Tripping time at max current t (s)	失效模式 Fail model	成品外形尺寸 Dimensions (mm)		
				@ 25°C	@ 40°C				Dmax	Tmax	Φd
H2PR10RM13	250V	3.0	10±20%	130	100	260	<0.2	250V/10A	7.5	4.0	0.6
H2PR12RM130	250V	2.0	12±20%	130	100	260	<0.3	250V/10A	9.0	5.0	0.6
H2PR12RM190	250V	2.0	12±20%	90	60	160	<0.2	250V/10A	9.0	5.0	0.6
H2PR2RM100	250V	3.0	20±20%	100	80	200	<0.2	250V/10A	9.0	4.0	0.6
H2PR35RM090	250V	3.0	35±20%	90	75	180	<0.2	250V/10A	9.0	5.0	0.6
H2PR40RM080	250V	3.0	40±20%	80	70	160	<0.2	250V/10A	9.0	5.0	0.6
H2PR50RM070	250V	3.0	50±20%	70	60	150	<0.2	250V/10A	9.5	5.0	0.6
H2PR50RM075	650V	3.0	50±20%	75	60	150	<0.2	650V/10A	9.5	5.0	0.6
H2PR55RM070	650V	3.0	55±20%	70	60	150	<0.2	650V/10A	10.5	5.0	0.6

# PR 3 系列 PTC 热敏电阻器

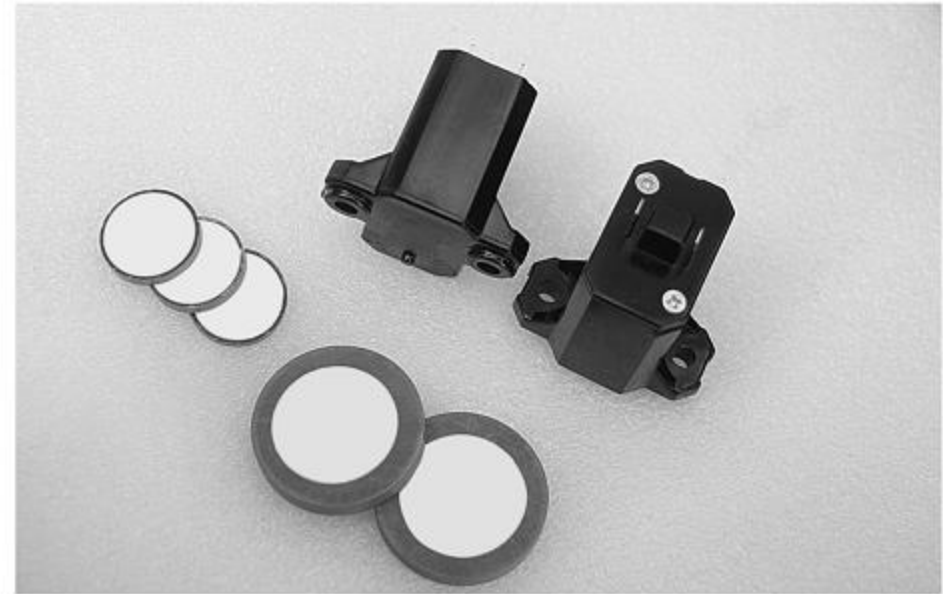
## PR3 SERIES PTC THERMISTOR

—用于冰箱、橱窗、净水器、自动贩卖机等压缩机启动电路 For the circuit of refrigerator and motor starting



### 产品特点 FEATURES

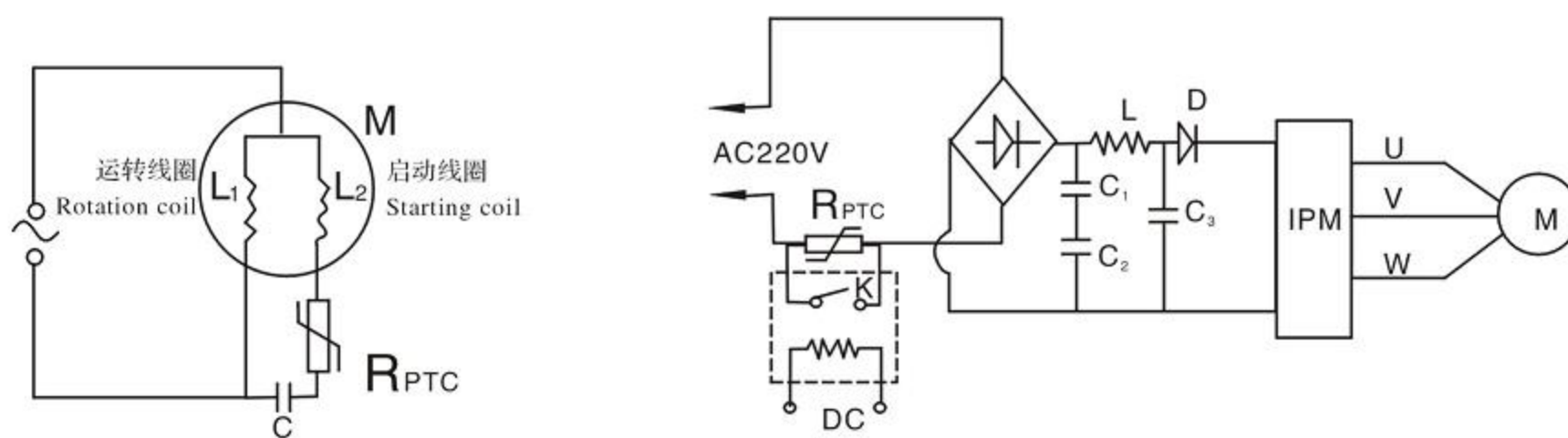
- 采用带有PTC热敏电阻器的启动电路,优于过去的重锤式启动电路  
Starting-circuit with PTC Thermistor has more advantages than the previous heavy-hammer starting-circuit
- ◇ 无触点、无噪音,自由开关,产品寿命长。
  - ◇ No trigger or noise, free Switching, and Long Operating Life
  - ◇ 产品自身的特性使其无需其它控制器也能控制电流。
  - ◇ It can control the current without other controllers.
  - ◇ 小型尺寸能直接连接压缩机使用。
  - ◇ The small size can be connected directly to compressors for use
  - ◇ 支持压缩机所要求的大部分回路。
  - ◇ Support most of the return circuits that compressors need
  - ◇ 消费电力少。
  - ◇ Low Power Consumption
  - ◇ 稳定性好,高耐久性,可靠性高
  - ◇ High Stability Durability and Reliability
  - ◇ 功能强大,价格合理
  - ◇ Cheap for it's many functions
  - ◇ 反应快,启动力矩大
  - ◇ Quick and Powerful Starting



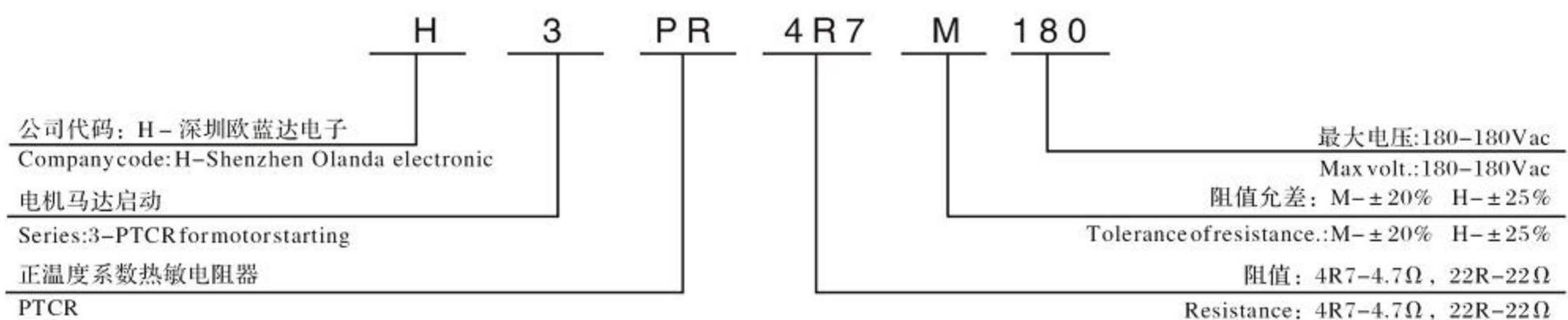
马达启动用正温度系数热敏电阻器,主要用于电冰箱,空调机马达启动,马达过热保护等电路。

PTC Thermistor for motor-starting is mainly used in the circuit of refrigerator, motor-starting, of air-conditioner, and frequency conversion air-conditioner, restricting over-heat of motor, etc.

### 典型应用 TYPICAL APPLICATIONS



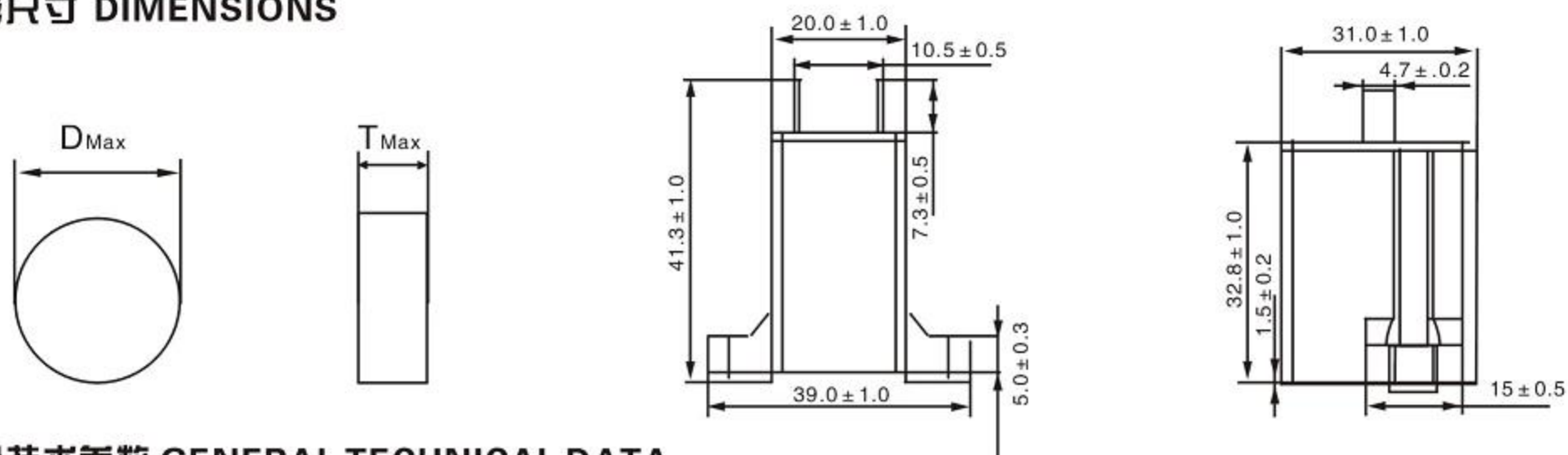
### 产品编号 PART NUMBERING







## 外形尺寸 DIMENSIONS



## 一般技术参数 GENERAL TECHNICAL DATA

耐电压	Surge voltage withstanding	V <sub>s</sub>	600-800v
阻值允差(常规)	Tolerance of resistance (typ.)	ΔR <sub>n</sub>	±30% ~ ±50%
开关温度允差	Tolerance of switching temp.	ΔT <sub>c</sub>	±10℃
工作温度范围	Operating temperature range	T <sub>A</sub>	-25 ~ +125℃(V=0V时) 0 ~ +60℃(V=V <sub>max</sub> 时)
储存条件	Storage conditions:		
温度	Temperature		-40~+85℃
相对湿度	Relative humidity		≦95%RH(±40℃)
大气压	Atmosphere pressure		86~106Kpa

## 电性能参数 ELECTRICAL SPECIFICATIONS

编号 No	型号 Part No	最大工作电压 Max. operating voltage V <sub>max</sub> (V)	最大电流 Max. Current I (max) A	额定电阻值 Resistance @25℃(Ω) ±25%	最大恢复时间 max recovery time	启动时间 Starting Time T (s)	居里温度 Swich Temp T <sub>c</sub> (℃)	外形尺寸 (mm) Dimensions	
								D <sub>MAX</sub>	T <sub>MAX</sub>
1	H3PR4R7M180	180V	12A	4.7Ω	90s	0.3-1.2 (150V, 10Ω)	120℃ ± 10℃	20.0 <sup>+0.5</sup> <sub>-1.0</sub>	2.5 ± 0.2
2	H3PR6R8M220	220V	10A	6.8Ω	90s	0.3-1.2 (150V, 15Ω)			
3	H3PR10RM240	240V	10A	10Ω	85s	0.2-0.8 (150V, 15Ω)			
4	H3PR15RM260	260V	10A	15Ω	85s	0.2-0.8 (150V, 25Ω)			
5	H3PR22RM300	300V	9A	22Ω	85s	0.2-0.8 (225V, 25Ω)			
6	H3PR33RM300	300V	9A	33Ω	85s	0.2-0.8 (225V, 25Ω)			
7	H3PR47RM300	300V	9A	47Ω	85s	0.2-0.8 (225V, 25Ω)			
8	H3PR68RM320	320V	9A	68Ω	85s	0.2-0.8 (245V, 25Ω)			
9	H3PR4R7M170	170V	12A	4.7Ω	80s	0.2-1.0 (150V, 10Ω)	120℃ ± 10℃	17.5 <sup>+0.5</sup> <sub>-1.0</sub>	2.5 ± 0.2
10	H3PR6R8M220	220V	10A	6.8Ω	80s	0.2-1.0 (150V, 15Ω)			
11	H3PR10RM240	240V	9A	10Ω	80s	0.2-1.0 (150V, 20Ω)			
12	H3PR15RM260	260V	8A	15Ω	80s	0.2-1.0 (150V, 20Ω)			
13	H3PR22RM280	280V	8A	22Ω	80s	0.2-0.8 (225V, 15Ω)			
14	H3PR33RM280	280V	7A	33Ω	80s	0.2-0.8 (225V, 20Ω)			
15	H3PR47RM300	300V	6A	47Ω	80s	0.2-0.8 (245V, 20Ω)			
16	H3PR68RM300	300V	5A	68Ω	80s	0.2-0.8 (245V, 20Ω)			
17	H3PR4R7M180	180V	12A	4.7Ω	70s	0.3-1.2 (150V, 10Ω)	135℃ ± 10℃	20.0 <sup>+0.5</sup> <sub>-1.0</sub>	2.5 ± 0.2
18	H3PR6R8M200	200V	10A	6.8Ω	70s	0.3-1.2 (150V, 15Ω)			
19	H3PR10RM230	230V	9A	10Ω	65s	0.2-1.0 (150V, 15Ω)			
20	H3PR15RM250	250V	8A	15Ω	65s	0.2-1.0 (150V, 15Ω)			
21	H3PR22RM300	300V	7A	22Ω	65s	0.2-1.0 (225V, 20Ω)			
22	H3PR33RM360	360V	6A	33Ω	65s	0.2-1.0 (280V, 25Ω)			
23	H3PR47RM400	400V	5A	47Ω	65s	0.2-1.0 (325V, 35Ω)			
24	H3PR68RM430	430V	4A	68Ω	65s	0.2-1.0 (355V, 55Ω)			
25	H3PR4R7M180	180V	10A	4.7Ω	65s	0.3-1.0 (150V, 15Ω)	135℃ ± 10℃	20.0 <sup>+0.5</sup> <sub>-1.0</sub>	2.5 ± 0.2
26	H3PR6R8M200	200V	9A	6.8Ω	65s	0.3-1.0 (150V, 15Ω)			
27	H3PR10RM220	220V	8A	10Ω	65s	0.3-1.0 (150V, 20Ω)			
28	H3PR15RM240	240V	7A	15Ω	65s	0.2-0.8 (150V, 20Ω)			
29	H3PR22RM280	280V	6A	22Ω	65s	0.2-0.8 (150V, 25Ω)			
30	H3PR33RM320	320V	4A	33Ω	65s	0.2-0.8 (280V, 45Ω)			
31	H3PR47RM350	350V	4A	47Ω	65s	0.2-0.8 (280V, 45Ω)			
32	H3PR68RM400	400V	4A	68Ω	65s	0.2-0.8 (280V, 45Ω)			

# PR 4 系列 PTC 热敏电阻器

## PR4 SERIES PTC THERMISTOR

——用于恒温加热 For Heating

HWA

### 产品特点 FEATURES

PTC发热体具有恒温的特点，不需要温度控制系统。

With the characteristic of constant temperature, the PTC heater does not need the temperature-controlling system.

若PTC发热体用来加热冷风，不送风时，PTC发热体不会损坏。

If the PTC heater is used to heat the cold wind, it will not be destroyed when the wind is stopped.

当PTC发热体用来加热液体（如水）时，液体烧干后，PTC发热体不会损坏，具有长期的电热稳定性，通电不会发红，着火，不耗氧，无火灾危险。

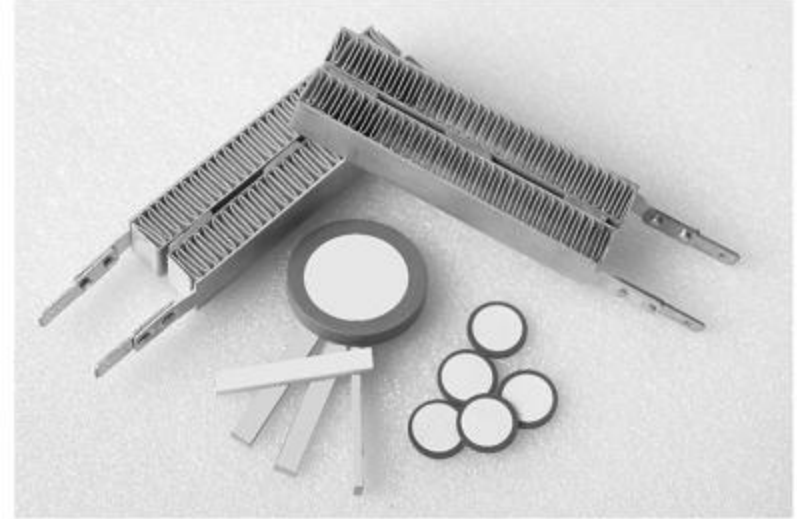
If the PTC heater is used to heat the liquid (eg: water), it will not be destroyed when the liquid is burnt to be dry.

对电压波动不敏感，使用电压范围宽

Not sensitive to voltage fluctuating, and wide range of operating voltage

失效后自动恢复

Restore automatically after invalidation



### 典型应用 TYPICAL APPLICATIONS

空气加热，暖风机，冷暖空调

air-heating, wind-warming equipment, cold and warm air-conditioner.

物理治疗，按摩器械，生物加热

physical treatment, massage apparatus, biology heating.

驱蚊器，开水器，加热板，干鞋器，卷发器

mosquito-driving apparatus, boiled-water equipment, heating board, shoe-drying apparatus, hair-curling equipment.

### PTC加热芯片 PTC HEATING CHIPS

产品设计范围 product design capability

额定电压：6-48V 100-120V 200-240V

Rated voltage: 6-48V 100-120V 200-240V

居里温度：50-280℃

Curie Temperature: 50-280℃

尺寸：5×4mm ~ 35×20

Dimension: 5×4mm ~ 35×20

外形：方形，圆形，环形

Types: square, round, ring

典型应用 typical application:

组装发热体应用陶瓷暖风机，干手机，吹风筒，干衣机等

Fan heating element for ceramic heater fan, hair

片式发热体应用于煮咖啡机，蒸汽式电熨斗，烧烤装置，蒸面器，加湿机等

Heating plates for coffee makers, steam irons, cooking devices, facial sauna, humidifier etc.

组装管式发热体应用于卷发器，融蜡器，热融胶枪，除湿机等

Tube heating elements for curling irons, wax warmer, glue gun, dehumidifier etc.

其他设计可用于灭蚊器，液体加热器，控制件等

Other shapes of heating element can be used for mosquito repellent, liquid warmer, control cevices etc.

### 暖风机用PTC组件 HEATING ELEMENT FOR FAN HEATER

PTC发热体是由PTC元件，电极板，散热条，端子等组装的高效能动力加热装置，PTC发热体通电后，通过装置在发热体后连续高速转动的马达风扇，连续吹出热风。弯曲的散热条散热面积非常大，电热转换效率很高。PTC自动控温特性使此种发热体不会超过设计温度，并能连续工作。敏正电子现有一系列完善的设计。

PTC fan heating element assembled with electrode plates and heat sink fins are dynamic heating element area of aluminum fins ensures a homogeneous heat transfer adjustable with air flowing volume. The design allows an automatic regulation of the heating power within certain ranges. MEC is providing a wide range of designs.

### PTC空调加热器 HEATING ELEMENT FOR AIR CONDITIONER

热泵型冷暖空调在制热中需一个电磁四通换向阀，完成制冷、制热循环的切换，但电磁通阀和辅助毛细管容易损坏，且易泄漏，在0℃以下使用时，容易结霜，蒸发器不能从外界空气中吸收足够热量来使制冷剂气化，使热泵制热效果下降。

The hot pump working in cold and warm air-conditioner needs a magnetic four-way change valve to finish the switching of the cooling and warming cycles. However, the magnetic four-way valve and its auxiliary capillary is delicate and easy to be leakage. When used below 0℃, it tends to be frosted, and the vaporizer can not absorb enough heat from the outside air to gasify the coolant, thus the working efficiency of hot pump is affected, heating generating is reduced.

PTC发热体使冷暖空调更加完美。因其在空调中使用结构简单、成本低，目前国内生产空调机的大型厂家已在窗机、分体机、柜机等中大量采用敏正公司生产的PTC发热体。

PTC heating element for air conditioner makes the product perfect with the advantages of rapid temperature rising, long working life, auto-temperature control, etc. MEC is now working closely with famous air conditioner manufacturers in domestic China and abroad, the heating element have been adopted to window type air conditioner, separate type, and also cabinet type of air conditioners.

主要特征：MAIN FEATURES

绝缘设计，无明火，无火灾危险 Insulated design, no fire hazard

除PTC自动控温外，外围设计附加保险丝和温控开关，保障产品性能

Designed with thermostat and fuses, protecting the air conditioner without getting any functional failure

高效，稳定，寿命长，节约能源 High efficiency, stable, long life and energy-consuming

启动温度低，卓越的除湿，反霜冻功能 Low starting point, outstand de-frosting performance



## PTC厚膜电热元件 PTC THICK-FILM ELECTROTHERMAL COMPONENTS

### 产品简介 BRIEF INTRODUCTION

厚膜电热元件是我公司开发研制的新产品。采用高品质的96 Al<sub>2</sub>O<sub>3</sub>陶瓷基板和特殊性能的电子浆料，利用厚膜电路技术研发而成，广泛应用于各种需要直接、快速、高温、高可靠性加热的领域中。

PTC thick-film electrothermal components adopt high-quality 96 Al<sub>2</sub>O<sub>3</sub> and special electron plasm, and have a wide application in various heating fields which need direct, fast, high-humidity, and high-reliability functions.

### 产品特点 CHARACTERISTICS:

- 符合欧盟ROHS指令：  
本产品不含Pb、Cr<sup>6+</sup>、Hg、Cd等违禁成分，更符合环保要求和ROHS标准。
- 热效率高：  
本产品是由印刷在96 Al<sub>2</sub>O<sub>3</sub>陶瓷基板表面的厚膜电阻膜带直接发热，再通过陶瓷基板传出热量，元件整体温度均匀一致。热传导效率更高。
- 电性能优良：
  - 1.1 本产品具有正温线性温度特性，在通电工作过程中，随着温度逐步升高元件阻值逐渐增大（温度系数  $\alpha \geq 1800 \text{ppm}/^\circ\text{C}$ ），电源负载电流将逐步减小，有利于电路保护；温度升高功率降低，当发热功率与散热功率达到动态平衡时，温度将不再升高，在特定的工作条件下，选定初始阻值后可以满足任意最高工作温度的要求。
  - 1.2 寿命长：产品在反复工作过程中，阻值非常稳定（阻值变化率  $\delta \leq 2\%$ ），功率衰减小，老化率低。
  - 1.3 耐高温：产品在通电工作过程，最高温度可长时间维持在600℃以上。
- 失效模式安全：  
由于本产品是面发热元件，即使在使用过程中出现不良品时，局部温度异常升高导致电阻膜带烧断，阻值无限大，该单元电路断路，保护电源和其它电路不受损坏。



1. With compliance with ROHS:  
No Pb, Cr+6, Hg, Cd, and comply with environment requirements and ROHS.
2. High heat efficiency:  
It generates heat directly by the resistance film belt, and then sends the heat out via the ceramic board. The temperature of the whole component is consistent.
3. Good electric performance:
  - 3.1 It possesses the positive temperature feature. The component resistance increases steadily with the temperature rising (temperature coefficient  $\alpha \geq 1800 \text{ppm}/^\circ\text{C}$ ) to protect the circuit.
  - 3.2 Long service time: Its resistance is very stable when working (resistance variation rate:  $\delta \leq 2\%$ ); low power attenuation and aging rate.
  - 3.3 Withstand high-temperature: the highest temperature can last above 600℃ for a long time.
4. Secure Invalidation mode:  
Even if an inferior component is used, the power supply and other circuits are not damaged.

### 产品参数 PRODUCT PARAMETER

#### 1. 外形图: dimension



#### 2. 基本参数: basic parameters

	A	B	L <sub>MAC</sub>	T <sub>MAC</sub>	F	额定电压 Rated voltage	阻值范围 Tolerance of resistance	备注 Remark
1	15 ± 0.5	70 ± 0.5	45	1.6	7 ± 1	6VDC; 12VDC	0.5~50Ω 50~1500Ω	可根据用户对功率或最高温度的要求进行电压和阻值设计 We can design in PTC application.
2	14.5 ± 0.2				7 ± 1	24VDC; 36VDC		
3	10 ± 0.2				5 ± 1	110VAC;		
4	6 ± 0.2				3 ± 1	220VAC;		

#### 3. 温度曲线: temperature curve

型号 model: 70145-110V68 ± 10%Ω; 70145-220V390 ± 10%Ω

#### 4. 产品用途: application

- 1) 高档理发工具; haircut apparatus
- 2) 高档控温电烙铁; temperature-controlling electric iron
- 3) 热继电器温度补偿; temperature compensation for relay
- 4) 其它各类需要快速、可靠、高温加热的领域。others

#### 说明:

我公司可为按用户图纸和技术质量指标加工生产任何要求的厚膜电热元件。

#### Note:

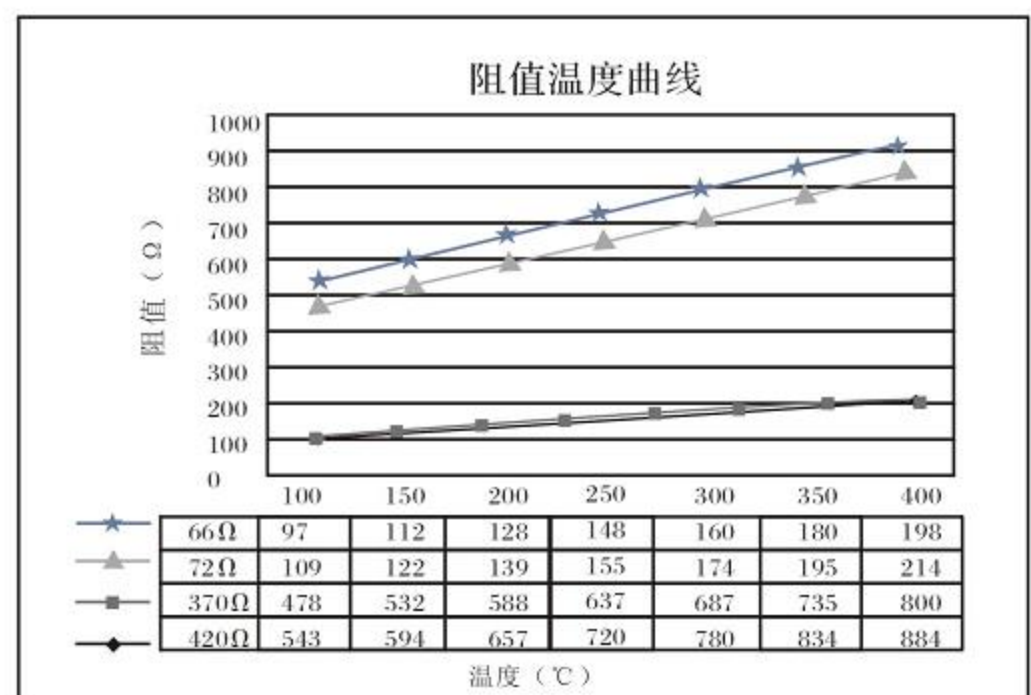
We can make the special component if our customers need.

#### 其他用途

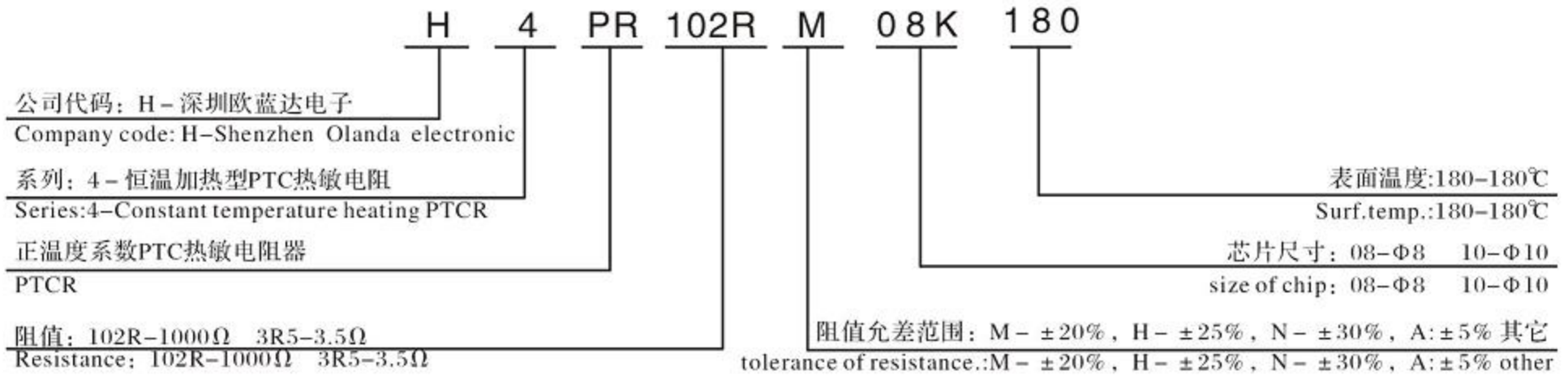
other applications

元丰电子在应用PTC方面还有其他系列设计

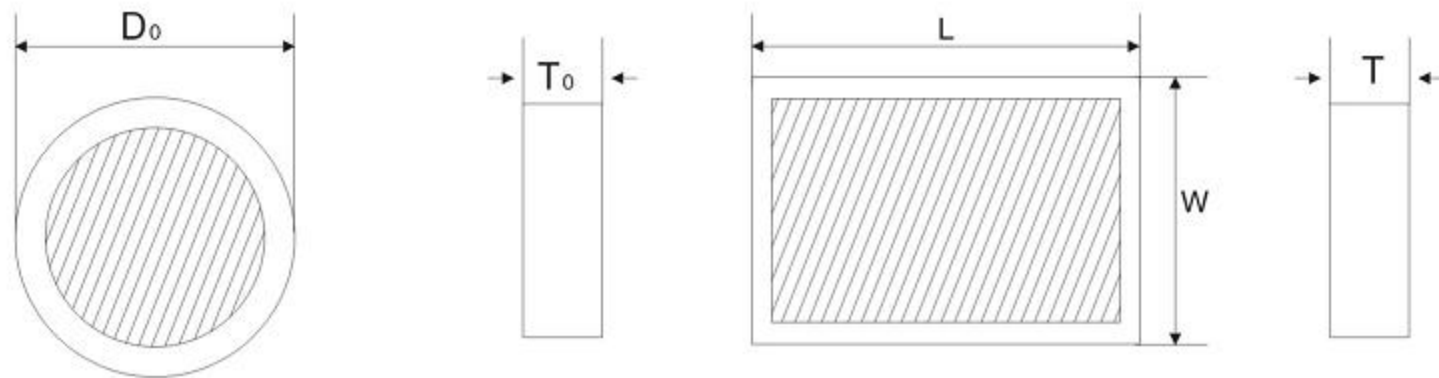
Other design in PTC application



## 产品编号 PART NUMBERING



## 外形尺寸 DIMENSIONS



	尺寸DIMENSIONS (mm)					额定工作电压 Rated Voltage	表面温度 Surface Temp.
	D <sub>0</sub>	T <sub>0</sub>	L	W	T		
圆片Cycle	5-25	1.0-1.5	/	/	/	3.6-50V	50-300℃
圆片Cycle	5-25	1.4-2.0	/	/	/	100-140V	50-300℃
圆片Cycle	5-25	1.8-2.5	/	/	/	220-240V	50-280℃
圆片Cycle	10-25	2.3-3.0	/	/	/	220-240V	250-320℃
方片Square	/	/	5-40	3-20	1.0-1.5	3.6-50V	50-300℃
方片Square	/	/	5-40	3-20	1.4-2.0	100-140V	50-300℃
方片Square	/	/	5-40	3-20	1.8-2.5	220-240V	50-280℃
方片Square	/	/	10-40	6-20	2.3-3.0	220-240V	250-320℃

\* 根据不同的应用, 厚度一般在所列范围调整, 同一规格型号的产品厚度允差为±0.1mm。

\* Generally speaking, the thickness is regulated in the listed range according to different applications; tolerance of the same specification is ±0.1mm.

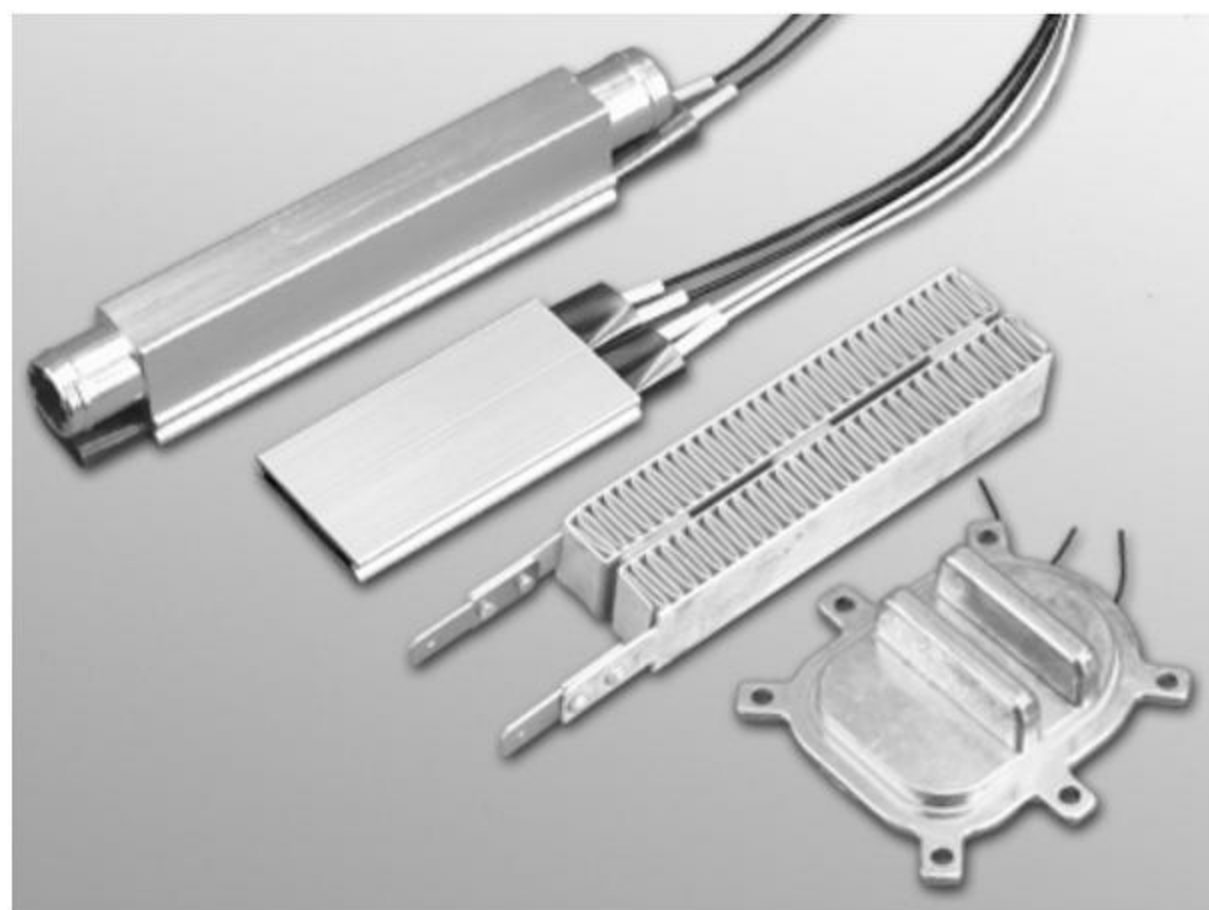
## 一般技术参数 GENERAL TECHNICAL DATA

额定工作电压	Rated voltage	V <sub>N</sub>	3.6V ~ 240 V rms
最大工作电压	Max. Operating voltage	V <sub>max</sub>	15V ~ 270 V rms
耐电压	Surge voltage withstanding	V <sub>s</sub>	400V~900V rms
阻值允差(常规)	Tolerance of resistance (typ.)	ΔR <sub>N</sub>	±30% ~ ±50%
表面温度允差	Tolerance of surface temp.	ΔT <sub>s</sub>	±3℃ ~ ±10℃
开关温度允差	Tolerance of switching temp.	ΔT <sub>c</sub>	±10℃
工作温度范围	Operating temperature range	T <sub>A</sub>	-25 ~ +125℃ (V=0V时) 0 ~ +60℃ (V=VMax时)
储存条件	Storage conditions:		
温度	Temperature		-40 ~ +85℃
相对湿度	Relative humidity		≤ 95% RH (±40℃)
大气压	Atmosphere pressure		86 ~ 106 Kpa



## 电性能参数 ELECTRICAL SPECIFICATIONS

编号 No	型号 PartNo	阻值(Ω) resistance	表面温度 Surf. Temp.	最大电压 max. voltage	直径(mm) Diameter (mm)	长度(mm) Length	宽度(mm) width	厚度(mm) thickness
1	H4PR3RA20K180	1-5	180	80	20.0	/	/	1.4
2	H4PR7R5A08K145	5-10	145	20	8.0	/	/	2.8
3	H4PR14RA13K075	8-20	75	80	13.0	/	/	2.5
4	H4PR14RA17K160	8-20	160	80	17.0	/	/	1.4
5	H4PR18RA10K110	10-25	110	80	10.0	/	/	2.5
6	H4PR35RA13K150	20-50	150	30	13.0	/	/	1.3
7	H4PR70RA13K155	50-90	155	80	13.0	/	/	1.3
8	H4PR321RA13K175	150-500	175	140	10.0	/	/	2.2
9	H4PR501RA10K150	200-800	150	140	10.0	/	/	2.2
10	H4PR501RA10K050	200-800	185	270	10.0	/	/	2.2
11	H4PR102RA08K050	500-1500	50	270	8.0	/	/	3.0
12	H4PR102RA13K075	500-1500	75	270	13.0	/	/	2.2
13	H4PR102RA08K130	500-1500	130	270	8.0	/	/	2.2
14	H4PR102RA20K130	500-1500	130	270	20.0	/	/	2.2
15	H4PR102RA10K155	500-1500	155	270	10.0	/	/	2.2
16	H4PR102RA20K160	500-1500	160	270	20.0	/	/	2.2
17	H4PR102RA10K180	500-1500	180	270	10.0	/	/	2.2
18	H4PR142RA13K230	800-2000	230	270	13.0	/	/	2.5
19	H4PR142RA13K250	800-2000	250	270	13.0	/	/	2.5
20	H4PR 352RA20K250	2000-5000	250	270	20.0	/	/	2.5
21	H4PR200RA16K055	12-32	55	20	10.0	/	/	1.5
22	H4PR140RA16K100	7-20	100	20	/	16.0	11.0	2.0
23	H4PR102RA19K100	600-1500	100	270	/	16.0	11.0	2.5
24	H4PR142RA19K230	800-2000	230	270	/	19.0	12.0	2.2
25	H4PR102RA20K110	500-1500	110	270	/	23.5	10.0	2.2
26	H4PR271RA16K090	150-400	90	140	/	16.0	11.0	2.5
27	H4PR551RA16K085	300-800	85	140	/	16.0	11.0	2.5
28	H4PR651RA23K250	300-1000	250	140	/	23.5	10.0	2.2
29	H4PR142RA24K255	800-2000	255	270	/	23.5	10.0	2.2
30	H4PR202RA24K255	500-3000	255	270	/	36.0	6.0	2.3
31	H4PR140RA24K280	8-20	280	50	/	24.0	15.0	1.4
32	H4PR551RA24K280	300-800	280	140	/	24.0	15.0	2.5
33	H4PR202RA24K280	800-3500	280	270	/	24.0	15.0	2.5
34	H4PR202RA24K290	500-3000	290	270	/	36.0	6.0	2.5



可来样来图，按需定制各种规格发热组建

you can send me the drawing and samples of the products, and we then send you the heating combined components according to your required specification

# PR 6 系列 PTC 热敏电阻器 PR6 SERIES PTC THERMISTOR

—用于过热保护 For thermal protection



## 产品特点&应用 FEATURES & APPLICATIONS

保护温度范围: 60 ~ 130°C

protection temperature range: 60 ~ 130°C

动作时间快

quick action time

稳定性好

good stability

尺寸小、安装方便

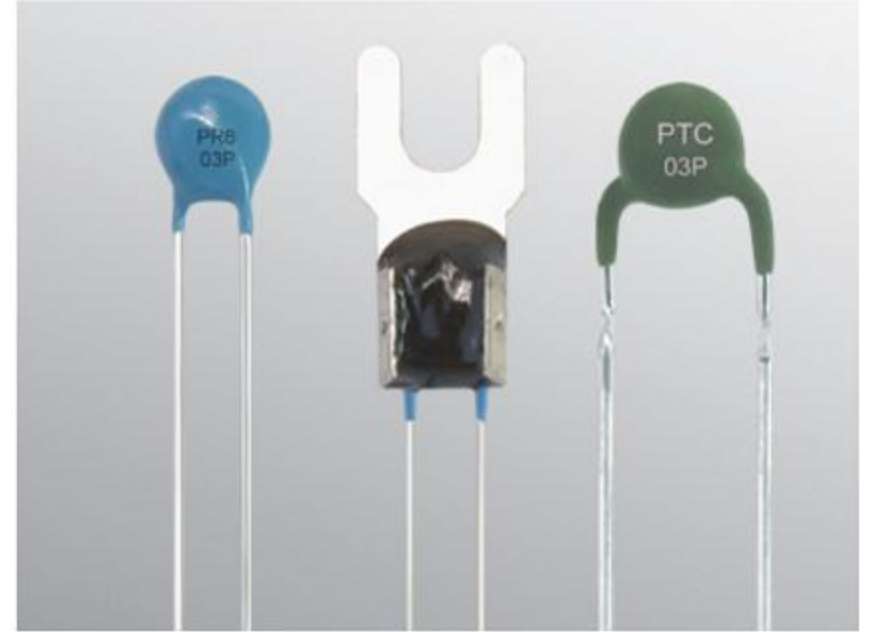
small size and convenient installment

过热保护后无需再设置

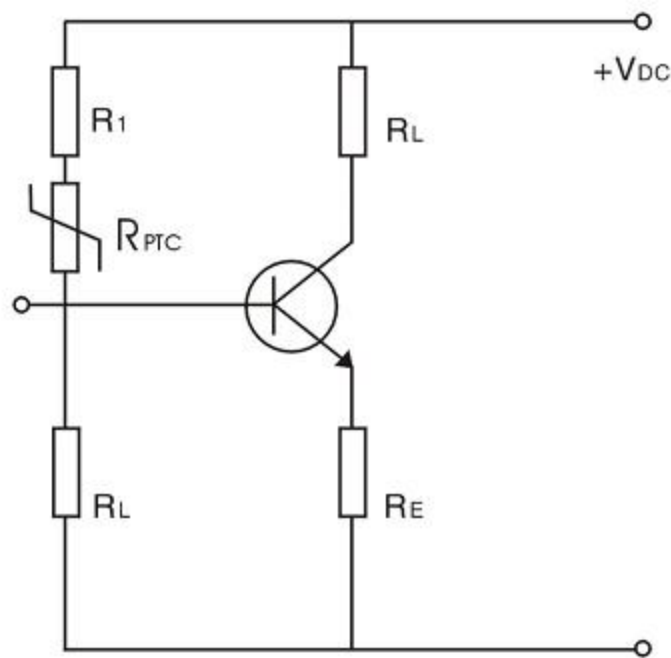
no setting again after over-heat protection

产品广泛应用在: 开关电源, 自动车床、电机、电热烘箱、球磨机连续运转的各类机电设备, 变压器及功率器件。

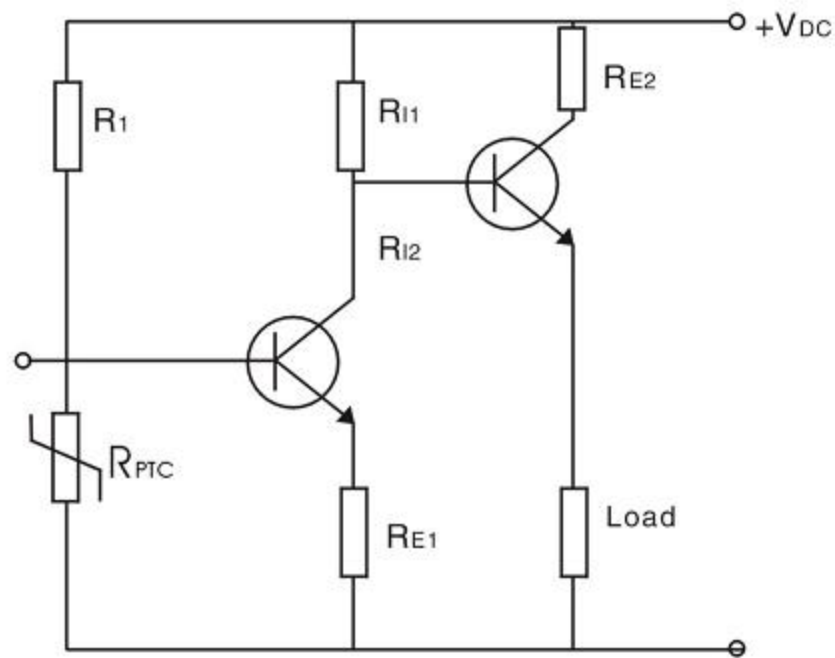
applied in: transformers, power parts, and all types of electricity machinery that work continuously, such as: switching power supply, automatic lathe, electro-thermal oven and so on.



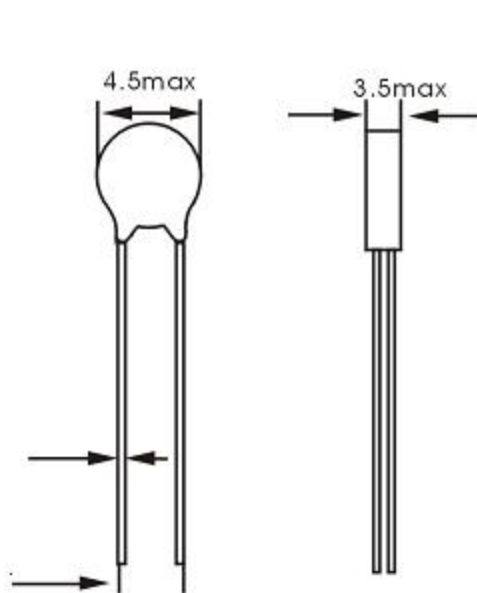
## 典型应用线路 TYPICAL APPLICATION CIRCUIT



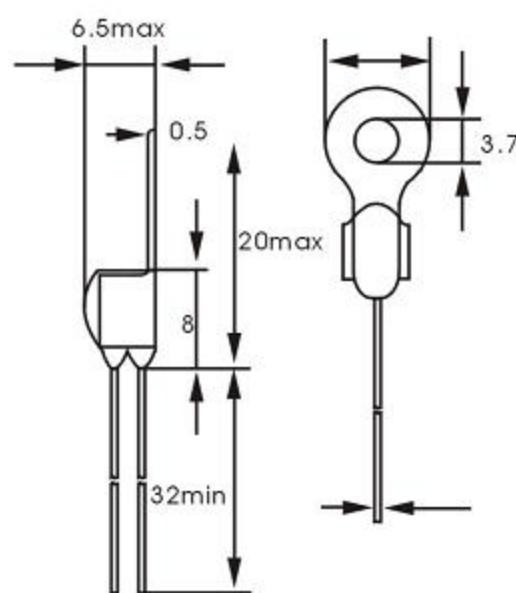
过热保护电路  
Overheat protection circuit



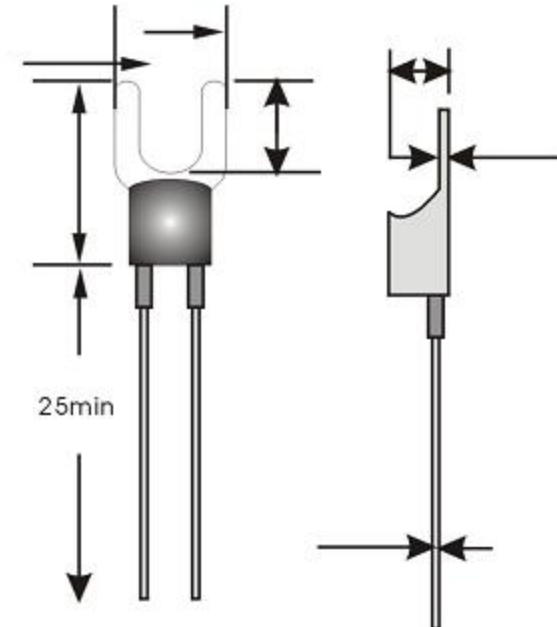
过热传感电路  
Overheat sensing heat



引线型 Lead



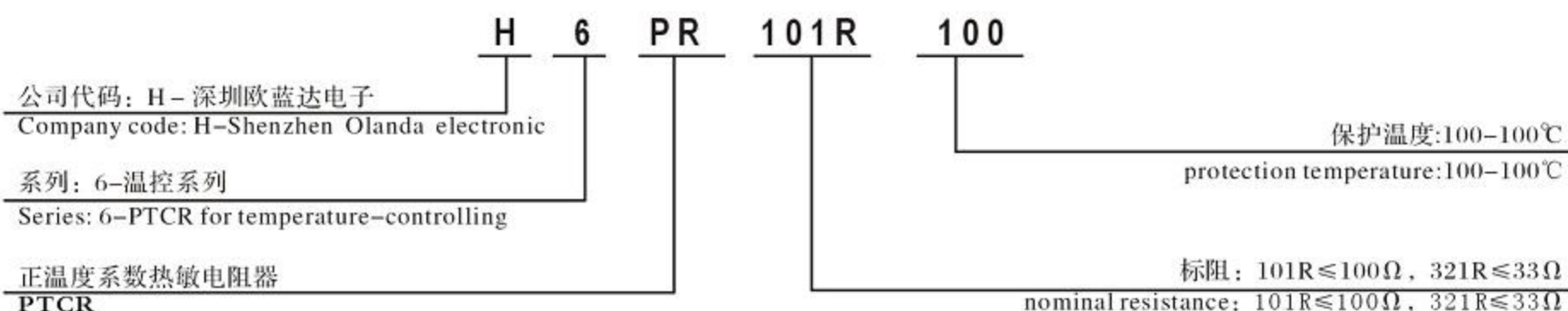
表面贴装型 Surface mount



表面贴装型 Surface mount



**产品编号 PART NUMBERING**



**电性能参数 ELECTRICAL SPECIFICATIONS**

型号 Part No	最大电压 Max.Voltage (Vmax)	居里温度 Tc (℃) Swich Temp	保护温度点 Protection Temperature Ts (℃)	额定电阻值 R <sub>25</sub> (Ω) Resistance @25℃ Max	保护温度-15℃ 电阻值 Resistance@ Ts-15℃ Rs-15(Ω)	保护温度电阻 Resistance@ Protection Temperature Rs(Ω)	最大电流 Max.current I <sub>max</sub> (mA)
H6PR101R60	30V	40℃	60℃	100	330	470	100
H6PR101R70	30V	50℃	70℃	100	330	470	100
H6PR101R80	30V	60℃	80℃	100	330	470	100
H6PR101R90	30V	70℃	90℃	100	330	470	100
H6PR101R100	30V	80℃	100℃	100	330	470	100
H6PR101R110	30V	90℃	110℃	100	330	470	100
H6PR101R120	30V	100℃	120℃	100	330	470	100
H6PR101R130	30V	110℃	130℃	100	330	470	100
H6PR331R60	30V	40℃	60℃	330	1500	2200	100
H6PR331R70	30V	50℃	70℃	330	1500	2200	100
H6PR331R80	30V	60℃	80℃	330	1500	2200	100
H6PR331R90	30V	70℃	90℃	330	1500	2200	100
H6PR331R100	30V	80℃	100℃	330	1500	2200	100
H6PR331R110	30V	90℃	110℃	330	1500	2200	100
H6PR331R120	30V	100℃	120℃	330	1500	2200	100

# NTC热敏电阻-突流限制元件

## NTC THERMISTOR INRUSH CURRENT LIMITING DEVICES

HWA

欧蓝达电子的NTC热敏电阻器系由特殊配置的金属氧化物陶瓷材料制成，它可用来抑制高的突波电流。相对于受保护电路，热敏电阻器具有较高的电阻。因此会抑制突波电流约1~2秒，在这一段时间内热敏电阻的电阻将因温度升高而下降，直至热敏电阻两端压降到可被忽略的电阻值为止。如图A以电源供应器为例，在电源开的瞬间，电容器一般阻抗极低，桥式整流器通常承受很大的电流，热敏电阻器特别使用于保护电源供应器。

Olanda electronic NTC Thermistor devices are made of a specially formulated metal oxide ceramic material which is capable of suppressing high inrush current surges. Thermistor devices, being of relatively high resistance, shall limit the inrush current for 1~2 seconds during which time the device decreased in resistance substantially to a point where its voltage drop is negligible. The devices are especially useful in power supplies (see Fig A) because of the extremely low impedance of the capacitor being charged, of which the bridge is usually subjected to an exceedingly high current surge at turnon point.

### 特质

- 有效抑止突波电流。
- 稳定状态下功率损耗极小(通常仅有1W或小于50W)。
- 热及电特性稳定性高。
- 宽广的电性规格可供选择。

### FEATURES

- High inrush current restriction effect
- Small power loss in stationary state (Normally less than 50W power)
- High thermal and electrical stability.
- Wide selection of electrical performances

### 应用概述

如图B所示，将一NTC热敏电阻与一白热灯丝串联时，可以消除突波电流。若一只NTC热敏电阻无法提供足够之突流限制功能时，二只或更多的热敏电阻可用于串联电路上或供应电路的各个分路上(如图A)。但要注意的是NTC热敏电阻，不可并联于电路上，因为其中一只NTC就可能传导几乎所有的电流。热敏电阻最好用于图A所示AC电路的A1或A2处，或是DC电路D1或D2处。

在设计上，当电路刚被打开的瞬间，NTC热敏电阻的阻值高于电路上所有白热灯丝的总电阻值。当电流开始通过时，热敏电阻随时产生「自然」现象，并在1到2秒内，阻值会降到几可忽略。以同样的构想来看电动马达的突波电流，亦可以被抑制到最低限度。图C表示应用热敏电阻保护直流马达前后突波电流波形的差异。

### APPLICATION

As shown in Fig.B, the current surge can be eliminated by placing a NTC thermistor in series with a filament string. Yet, if the resistance of one NTC thermistor does not provide sufficient inrush current limiting functions for your application, 2 or more may be used in series or in separate legs of the supply circuit (Fig.A). Be noticed, the thermistor can not be used in parallel since one unit will tend to conduct nearly all the current available. Thus, thermistor may be used in the AC (point A1 or A2) or the DC (point D1 or D2) locations in the circuit. (see Fig.A)

The resistance of NTC thermistor is designed higher than the total resistance of filaments when thermistor shall immediately self-heat. Then, in 1~2 seconds, its resistance will be reduced to a minimum and become insignificant to the total resistance of a circuit. With the same concept, current surges in electric motors can be held to minimum. Fig.C shows a typical DC motor's turn on surge before and after the application of a thermistor to the circuit

### 选用原则

- 1.热敏电阻器的最大工作电流 > 实际电源回路的工作电流
- 2.热敏电阻器的标称电阻值

$$R \geq \frac{E}{I_m}$$

式中E为线路电压 I<sub>m</sub>为浪涌电流

对于转换电源、逆变电源、开关电源、

UPS电源 I<sub>m</sub>=100倍工作电流

对于灯丝、加热器等回路 I<sub>m</sub>=30倍工作电流

### Selecton Principle

- 1.Maximum operating current > Actual operating current in the power loop
- 2.Retted zero power resistance at 25°C  $R \geq \frac{E}{I_m}$

of which, E: loop voltage, I<sub>m</sub>: Surge current.

For conversion power, reversion power, switch power,

UPS power, I<sub>m</sub>=100 times. operating current

For filament, heater, I<sub>m</sub>= 30 times operating current

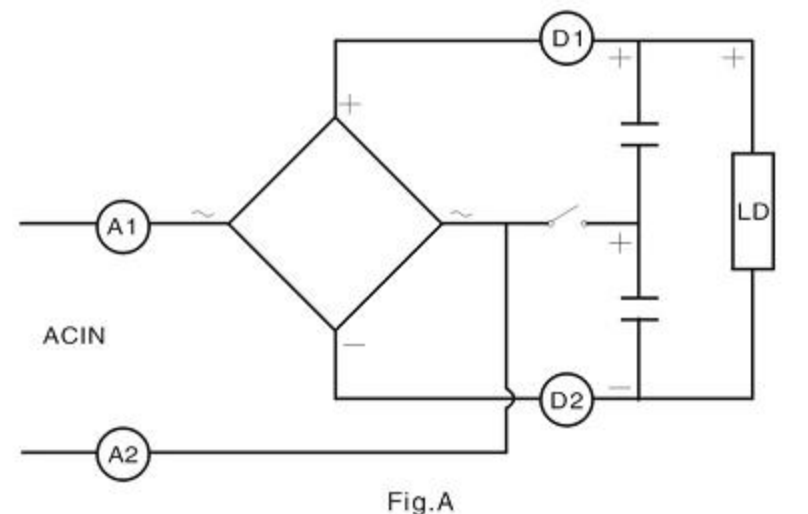


Fig.A

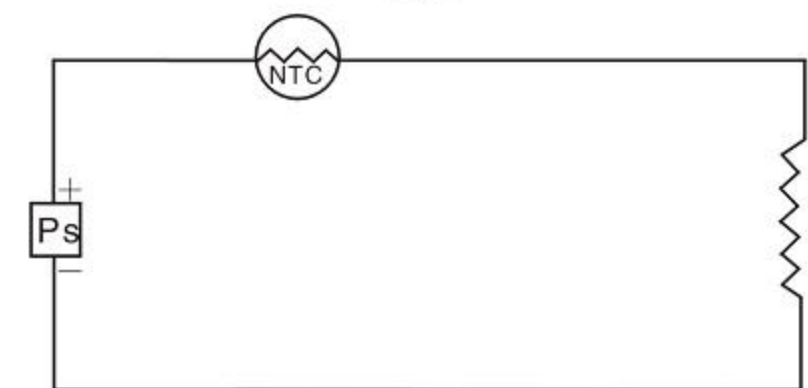


Fig.B

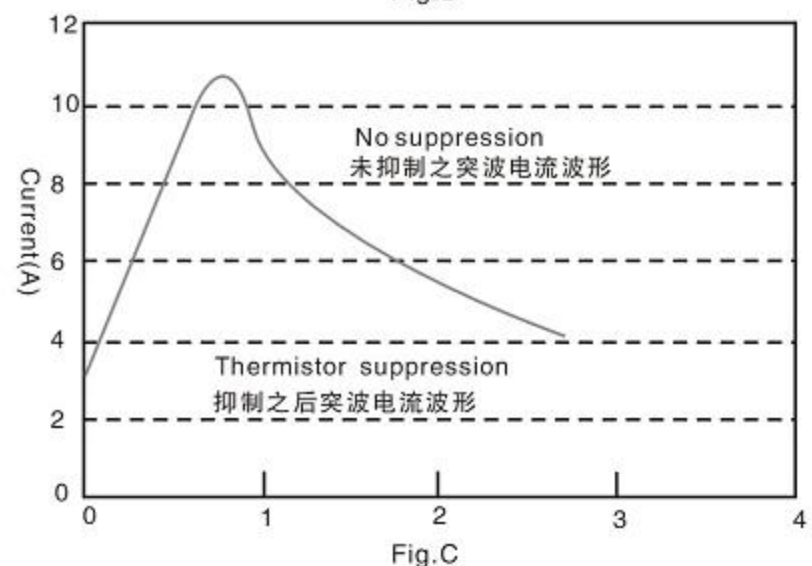


Fig.C





### 热敏电阻的递减曲线

#### DERATING CURVE OF SURGE CURRENT LIMITING THERMISTOR

热敏电阻之最大电功率将随其周边温度之变化而递减。(如图D)  
The maximum power of thermistor will decrease with the change of ambient temperature. (See Fig.D)

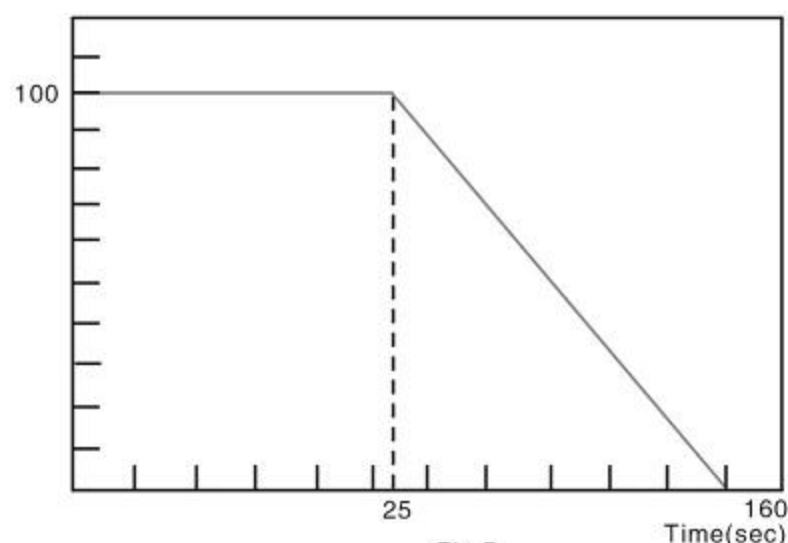


Fig.D

### NTC热敏电阻之特性

#### NTCTHERMISTOR CHARACTERISTICS

应用上NTC热敏电阻元件的参数，通常由下列三种基本特性决定：  
To choose for application or take as referable parameters,the NTC thermistors are usually decided by the following three fundamental characteristics:

### 温度-电阻特性

#### Temperature-Resistance characteristic:

当NTC热敏电阻之环境温度或它本身的温度上升时，NTC的电阻值随之减小(如图E)。  
The resistance value of NTC thermistor is decreased while the ambient temperature or itself temperature is increased. (See Fig.E)

- |                            |   |
|----------------------------|---|
| ● 25°C时之电阻值 (Ω) R25        | ● Nominal resistance at 25°C(Ω)R25                |
| ● 零功率电阻值 (Ω) RT            | ● Zero-power resistance RT                        |
| ● 电阻之容许差                   | ● Tolerance on the resistance nominal             |
| ● R25/ R25=15%(L) , 20%(M) | ● R25/ R25=15%(L) , 20%(M)                        |
| ● 材料常数 (敏感度指数) (0K) B      | ● Material constant(Sensibility index) (0K)B      |
| ● 电阻温度系数 (%/°C) αt         | ● Temperature coefficient of resistance (%/°C) αt |

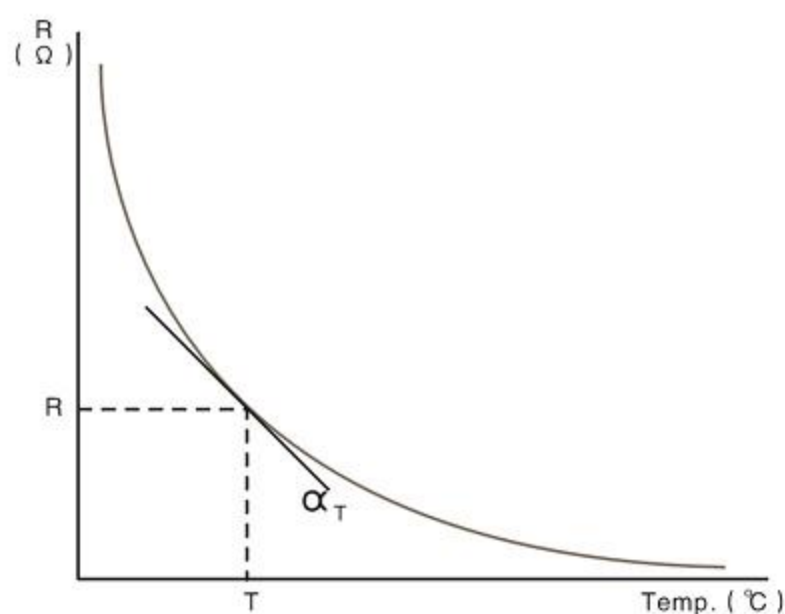


Fig.E

### 电压-电流特性

#### VoltageCurrent Characteristic:

当NTCR热敏电阻在小电流下工作时 (如图F)，由于功率太底，其电阻保持固定而表现线性关系 (符合欧姆定律V/R=1)。如果电流增加，NTC热敏电阻就会产生焦耳效应(P=V×I)而使自己发热，其电阻值随即减小表现「电流增加,电压下降」的状态。

- 耗散系数(mW/°C) δ
- 最大稳定电流(A)I max.
- 最大电流时之电阻 (Ω) Rimax.

When operating low current (see fig.F), due to very low power is unable to make the NTC thermistor self-heated, so its resistance value is thus maintained constant and displayed with a linear curve (in conformity with ohm-law V/R=1).If the current is increased, the NTC thermistor will follow Joule-efficiency(P= V×I) and make itself self-heated that results in a resistace value decreasing and thus displays with a status of voltage descending while current increased.

- Thermal dissipation coefficient(m W/°C)
- Maximum steady-state current (A) Imax.
- Resistance at maximum current (Ω)Rimax.

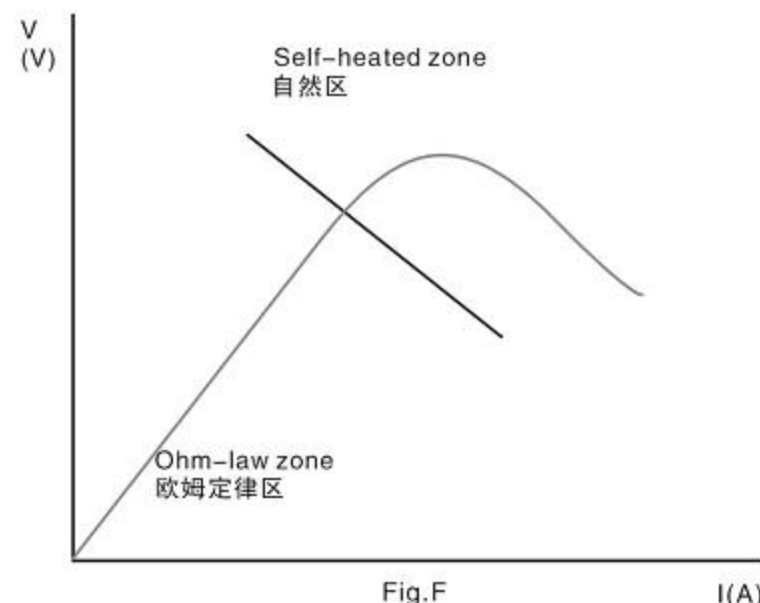


Fig.F

## 温度 - 时间特性

### Temperature-Time Characteristic:

(如图F), 说明NTC元件与环境达成热平衡所需的时间, 主要决定于材料热容量 (G) 及散热系数 ( $\delta$ )。当元件温度由T1降到T0, 则可得到下列平衡式:

$$-HdT = \delta(T - T_0)dt \quad \text{其中 } -HdT = \text{元件热损失}$$
$$\delta(T - T_0)dt: \text{元件散热量}$$

积分后可得温度与时间关系式  $T - T_1 = (T_0 - T_1) \times e^{-t/\tau}$

其中  $\tau = H/\delta$

As shown in fig.G which explains the time needed to reach thermal equilibrium of NTC components with the environment. This characteristic depends on two important parameters. If a step change in temperature is applied to a component e.g. from high (T1) to low (T0) temperature, the energy lost ( $\delta(T_0 - T_1)dt$ ) by the component ( $-HdT$ ) is equal to the energy dissipated by it.

$$-HdT = \delta(T - T_0)dt$$

This equation yields:  $T - T_1 = (T_0 - T_1) \times e^{-t/\tau}$

$$\tau = H/\delta$$

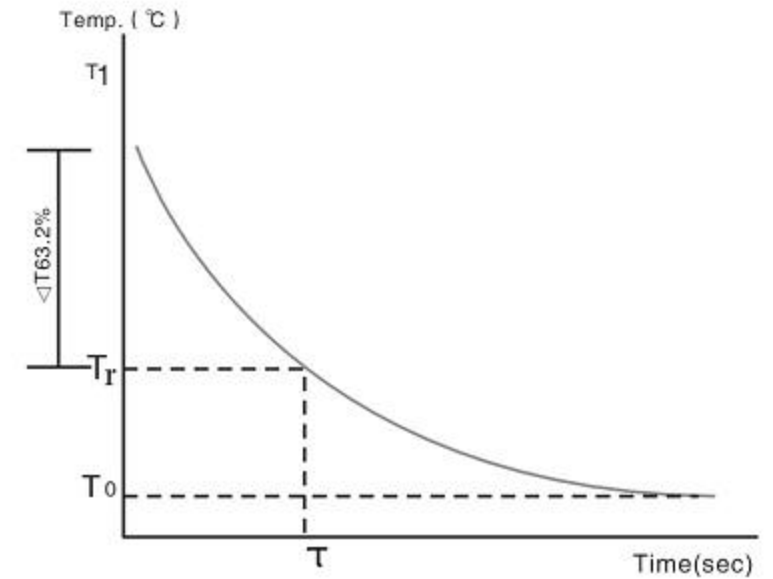


Fig.G

## 参数定义

### 热敏电阻

热敏电阻是一种对热敏感的电阻器, 其电阻值随元件本身温度变化而改变。

### 负温度系数 (NTC) 热敏电阻

NTC热敏电阻是零功率电阻随本身温度上升而下降的电阻。

### 突波电流 (冲击电流)

譬如已放电的电容器, 已冷却的灯丝, 或者一个静止的马达等等。有极低的起始阻抗。当负载的初期有较高的初始电流称为冲击电流。

### 突波电流抑制器

经过特殊设计和制造的NTC热敏电阻就是一种突波电流抑制器, 欧蓝达制造的突波电流抑制器有宽广的电流及零功率电阻范围可供搭配选择。

### 零功率电阻(RT)

在特定温度 (T) 下, 热敏电阻所消耗之功率极低时所量到的直流电阻值。该功率消耗低到如果电功率的再次下降, 电阻值变化率仍小于0.1%。

### 最大稳定电流

NTC热敏电阻能允许长时间通过的最大电流值, 通常以安培 (A) 表示。

### 最大电流电阻(Rimax)

NTC热敏电阻通过额定最大稳定电流时的残余电阻, 以欧姆 ( $\Omega$ ) 表示。

### 耗散系数( $\delta$ )

在一特定的环境温度下, 热敏电阻电功率消耗对本身温度变化量的比值, 通常以mW/°C表示。( $\delta = V \times I / \Delta T$ )

### 热时间常数 ( $\tau$ )

在零功率条件下, 热敏电阻之温度依照「步级函数」下降到其最初温度与最终温度差之63.2%时所需的时间, 通常以秒数 (Sec.) 表示。参考(图F)。

### 材料常数 (B)

材料常数又称贝他常数, 即NTC热敏电阻在某一温度之电阻与另一温度之电阻的比较值, 可由下面的公式计算得到, 并以卡氏温度 (OK) 表示之。

$$\text{欧蓝达的材料常数是 } T_1=298.15 \text{ OK}, \quad T_2=323.15 \text{ OK} \quad B = \ln(R_1/R_2) / (1/T_1 - 1/T_2)$$

### 电阻之温度系数 ( $\alpha_T$ )

热敏电阻在某一特定温度 (T), 零功率电阻对温度变化率及零功率电阻之比值, 通常以 (%/°C) 表示。  $\alpha = 1/R \cdot dR/dT$

### 突波能量

热敏电阻能承受最少6000次而电阻变化率在  $\pm 20\%$  以内之突波能量。此能量与所加之电压及电容值有关。可经由V-t图形积分而得。

### 注意事项:

- 热敏电阻在大功率工作时不可用手直接接触。
- 热敏电阻不可在超过目录最大电流情况下工作。
- 产品工作或储存环境注意事项:
  - a. 产品不可与水接触。
  - b. 产品不可与油、挥发性油性、有机溶剂接触或暴露在油、挥发性油类、有机溶剂之气氛中。
  - c. 产品不可在氯化物、硫酸、爆炸性气体...等还原或腐蚀性气氛下工作或储存。

## PARAMETERS DEFINITION

### Thermistor

A thermistor is a thermally sensitive resistor of which its primary function is to exhibit a change in resistance accompany with a change in itself temperature.

### Negative Temperature Coefficient (NTC) Thermistor

NTC Thermistor is a thermistor of which of which the zero-power resistance decreases which itself temperature is increased.

### Inrush current limiter

Specially designed and constructed NTC thermistor may be used as an inrush current limiter. OLANDA inrush current limiter is available in a wide range of current handling and zero-power resistance value combinations.

### Zero-power resistance (RT)

The zero-power resistance is the direct current resistance value of a thermistor measured at a specified temperature (T) with a power of dissipation by the thermistor low enough that any further decrease in power will result in less than 0.1 percent change in resistance.

### Maximum steady-state current (Imax.)

The maximum steady-state current is the rating of the maximum current, normally expressed in amperes (A), allowable to be conducted by an inrush limiting NTC thermistor for an extended period of time.

### Resistance at maximum current (RImax)

The resistance at maximum current is the approximate resistance of an inrush current limiting thermistor, expressed in ohms ( $\Omega$ ), when it is conducting its rated maximum steady-state current.

### Thermal dissipation coefficient ( $\delta$ )

The thermal dissipation coefficient is the ratio, normally expressed in milliwatts per degree C (mW/°C), at a specified ambient temperature, of a change in power dissipation in a thermistor to the resultant body temperature change.

$$(\delta = V \times I / \Delta T)$$

### Thermal time constant ( $\tau$ )

The thermal time constant is the time required for a thermistor to change 63.2 percent of total difference between its initial and final body temperature when subjected to a step function change in ambient temperature under zero-power condition and is normally expressed in second.

### Material constant (B)

The material constant of a NTC thermistor is a measure of its resistance at one temperature compared to its resistance at a different temperature. It value may be calculated by the formula shown below and is expressed in degrees kelvin. The reference temperature used in this formula for determining material constant rating of OLANDA thermistor is 298.15 OK and 323.15 OK

$$B = \ln(R_1/R_2) / (1/T_1 - 1/T_2)$$

### Temperature coefficient of resistance ( $\alpha_T$ )

The temperature coefficient of resistance is the ratio at a specified temperature T, of the rate of change of zero-power resistance with temperature to the zero-power resistance with temperature to the zero-power resistance of the thermistor. The temperature coefficient is commonly expressed in percent per degree C (%/°C).  $\alpha = 1/R \cdot dR/dT$

### Surge energy:

Surge energy is the maximum energy of pulses.

The thermistor is capable of tolerating surge energy more than 1000 times with the resistance changing rate within  $\pm 10\%$ . This energy varies with voltage and capacitance.

### WARNING

- Don't touch thermistor with hand when the thermistor is in high power operation.
- The thermistor shall not be operated beyond the specified Maximum Current.
- The thermistor shall not be operated and stored under following environmental condition.
  - a. To be exposed directly to water or drop of water.
  - b. To be exposed directly to oil, gasoline or organic solvent and/or that kind of atmospheres.
  - c. Under condition of deoxidized or corrosive atmospheres such as chlorine, hydrogen sulfide, sulphur oxide and craked gas from vinyl chloride...etc.



## 特点

1. MF72系列产品为径向引线树脂涂装型
2. 体积小, 功率大, 抑制浪涌电流能力强
3. 反应速度快
4. 材料常数 (B值) 大, 残余电阻小
5. 寿命长, 可靠性高
6. 产品规格齐全, 工作范围宽
7. 工作温度-55~+200℃

## Features

1. MF72 series in the form of radial resin coated form.
2. Small dimension, powerful, strong in inrush current limiting.
3. Fast response.
4. Large material constant, lower residue resistance.
5. Long life, high reliability.
6. Complete part, wide operation range.
7. Operating temperature -55~+200℃

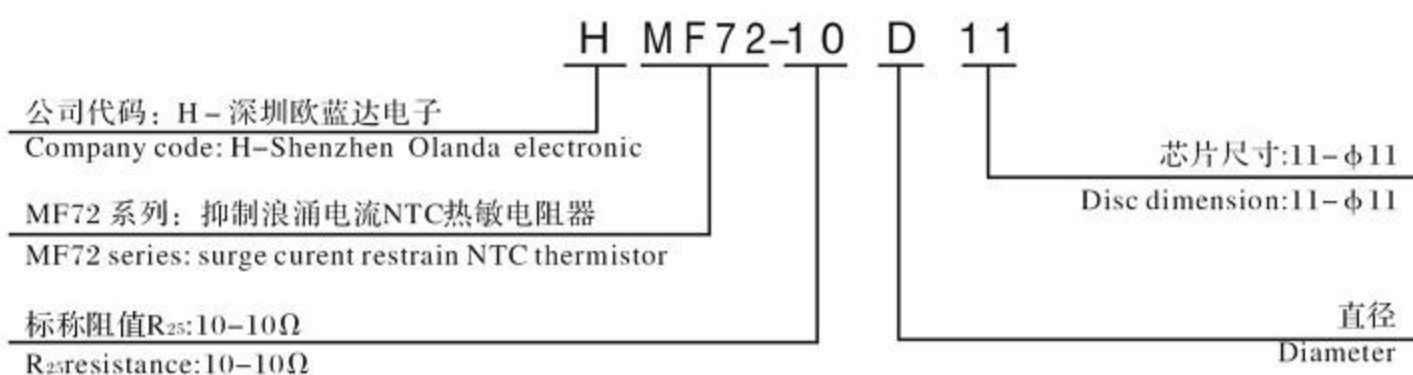
## 应用范围

1. 转换电源、开关电源、UPS电源
2. 电子节能灯、电子镇流器
3. 电子线路、电源线路等

## Application

1. Conversion power, switch mode power supply, UPS power.
2. Energy saving lights, ballast.
3. Electronic circuit, power supply circuit.

## 产品编号 PART NUMBERING



## 规格表 SPEC. TABLE

型号 Part Number	额定电阻值 $R_{25}$ (Ω) Resistance @25℃	最大稳态 电流 (A) Max. Stable Current	最大电流时 近似电阻值 (Ω) Approx. Resistance at Maximum Current	耗散系数 (Mw/℃) Dissipation Factor	热时间常数 (S) Thermal Time Constant	工作温度 (℃) Operating Temperature	外形尺寸 (mm) Dimensions			
							D±2	Tmax	F±1	φd
MF72-5D5	5	1	0.353	6	20	-55~+200	6.5	5	5/25	0.6/0.45
MF72-10D5	10	0.7	0.771	6	20		6.5	5	5/2.5	0.6/0.45
MF72-60D5	60	0.5	1.878	6	18		6.5	5	5/2.5	0.6/0.45
MF72-200D5	200	0.1	6.259	6	18		6.5	5	5/2.5	0.6/0.45
MF72-5D7	5	2	0.283	10	30		8.5	5	5	0.6
MF72-8D7	8	1	0.539	9	28		8.5	5	5	0.6
MF72-10D7	10	1	0.616	9	27		8.5	5	5	0.6
MF72-22D7	22	0.6	1.108	9	27		8.5	5	5	0.6
MF72-33D7	33	0.5	1.485	10	28		8.5	5	5	0.6
MF72-200D7	200	0.2	6.233	11	28		8.5	5	5	0.6
MF72-3D9	3	4	0.120	11	35		10.5	5.5	7.5/5	0.8/0.6
MF72-5D9	5	3	0.210	11	34		10.5	5.5	7.5/5	0.8/0.6
MF72-8D9	8	2	0.400	11	32		10.5	5.5	7.5/5	0.8/0.6
MF72-10D9	10	2	0.458	11	32		10.5	5.5	7.5/5	0.8/0.6
MF72-16D9	16	1	0.802	11	31		10.5	5.5	7.5/5	0.8/0.6
MF72-20D9	20	1	0.864	11	30		10.5	5.5	7.5/5	0.8/0.6
MF72-22D9	22	1	0.950	11	30	10.5	5.5	7.5/5	0.8/0.6	

型号 Part Number	额定电阻值 $R_{25}(\Omega)$ Resistance @25°C	最大稳态 电流 (A) Max. Stable Current	最大电流时 近似电阻值 ( $\Omega$ ) Approx. Resistance at Maximum Current	耗散系数 ( $Mw/^\circ C$ ) Dissipation Factor	热时间常数 (S) Thermal Time Constant	工作温度 ( $^\circ C$ ) Operating Temperature	外形尺寸 (mm) Dimensions			
							D $\pm$ 2	Tmax	F $\pm$ 1	$\phi$ d
MF72-33D9	33	1	1.124	11	30	-55~+200	10.5	5.5	7.5/5	0.8/0.6
MF72-60D9	60	0.8	1.502	11	30		10.5	5.5	7.5/5	0.8/0.6
MF72-200D9	200	0.5	5.007	11	32		10.5	5.5	7.5/5	0.8/0.6
MF72-2.5D11	2.5	5	0.095	13	43		12.5	5.5	7.5/5	0.8/0.6
MF72-5D11	5	4	0.156	13	45		12.5	5.5	7.5/5	0.8/0.6
MF72-8D11	8	3	0.255	14	47		12.5	5.5	7.5/5	0.8/0.6
MF72-10D11	10	3	0.275	14	47		12.5	5.5	7.5/5	0.8/0.6
MF72-16D11	16	2	0.470	14	50		12.5	5.5	7.5/5	0.8/0.6
MF72-22D11	22	2	0.563	15	52		12.5	5.5	7.5/5	0.8/0.6
MF72-33D11	33	1.5	0.734	15	52		12.5	5.5	7.5/5	0.8/0.6
MF72-60D11	60	1.5	1.215	15	52		12.5	5.5	7.5/5	0.8/0.6
MF72-1.3D13	1.3	7	0.062	13	60		14.5	6	7.5	0.8
MF72-1.5D13	1.5	7	0.073	13	60		14.5	6	7.5	0.8
MF72-2.5D13	2.5	6	0.088	13	60		14.5	6	7.5	0.8
MF72-3D13	3	6	0.092	14	60		14.5	6	7.5	0.8
MF72-5D13	5	5	0.125	15	68		14.5	6	7.5	0.8
MF72-8D13	8	4	0.194	15	60		14.5	6	7.5	0.8
MF72-10D13	10	4	0.206	15	65		14.5	6	7.5	0.8
MF72-15D13	15	3	0.335	16	60		14.5	6	7.5	0.8
MF72-16D13	16	3	0.338	16	60		14.5	6	7.5	0.8
MF72-47D13	47	2	0.810	17	65		14.5	6	7.5	0.8
MF72-1.3D15	1.3	8	0.048	18	68		16.5	6	10/7.5	0.8
MF72-1.5D15	1.5	8	0.052	19	69		16.5	6	10/7.5	0.8
MF72-3D15	3	7	0.075	18	76		16.5	6	10/7.5	0.8
MF72-5D15	5	6	0.112	20	76		16.5	6	10/7.5	0.8
MF72-8D15	8	5	0.178	20	80		16.5	6	10/7.5	0.8
MF72-10D15	10	5	0.180	20	75		16.5	6	10/7.5	0.8
MF72-15D15	15	4	0.268	21	85		16.5	6	10/7.5	0.8
MF72-16D15	16	4	0.276	21	70		16.5	6	10/7.5	0.8
MF72-47D15	47	3	0.680	21	86		16.5	6	10/7.5	0.8
MF72-0.7D20	0.7	12	0.018	25	89		21.5	7	10/7.5	1.0
MF72-1.3D20	1.3	9	0.037	24	88		21.5	7	10/7.5	1.0
MF72-3D20	3	8	0.055	24	88		21.5	7	10/7.5	1.0
MF72-5D20	5	7	0.087	23	87		21.5	7	10/7.5	1.0
MF72-8D20	8	6	0.142	25	105		21.5	7	10/7.5	1.0
MF72-0.7D25	0.7	13	0.014	30	120		26.5	8	10	1.0
MF72-1.5D25	1.5	10	0.027	30	121		26.5	8	10	1.0
MF72-3D25	3	9	0.044	32	124		26.5	8	10	1.0
MF72-5D25	5	8	0.070	32	125		26.5	8	10	1.0



贴片  
PTC and NTC: SMD PTC and NTC



高分子PTC: polymer PTC



NTC热敏电阻温度传感器  
NTC thermistor temperature sensor



电机马达启动PTC热敏电阻  
For the circuit of refrigerator and motor starting



珠状精密性NTC 热敏电阻  
high precision NTC thermistor



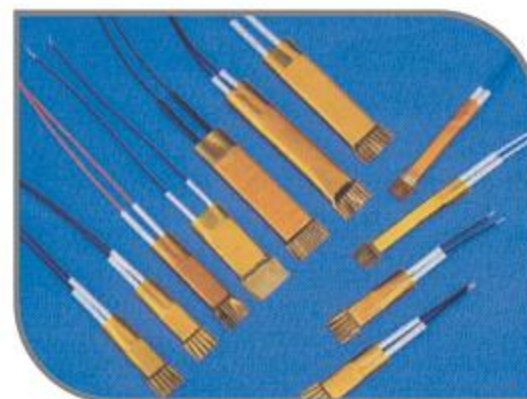
高分子PTC: polymer PTC



珠状精密性NTC 热敏电阻  
high precision NTC thermistor



彩电消磁元件  
degaussing component for color TV



PTC 恒温发热组件  
constant temperature heating  
PTC subassembly



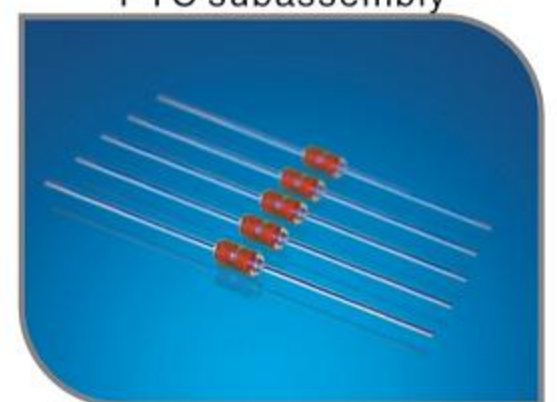
NTC热敏电阻温度传感器  
NTC thermistor temperature sensor



薄膜电路: film circuit



PTC 恒温发热组件  
constant temperature heating  
PTC subassembly



NTC热敏电阻  
NTC thermistor



NTC热敏电阻  
NTC thermistor



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