

## ■ H 系列压敏电阻器

### H Series Varistor

氧化锌压敏电阻器是以氧化锌为主要材料制造的半导体无极性电子陶瓷元件。当施加在压敏电阻器两端的电压达到某一阈值时，压敏电阻器的电阻值迅猛变小，从而在电子（电力）线路上起降压作用，达到保护其它元器件的目的。



Zinc Oxide Varistor are non-linear resistors utilizing semiconductor ceramic element which mainly composed of zinc oxide. When the applied voltage on both termination reach the surge value, the voltage of electronic circuit would be reduced to protect the other components.

### ◆特性 FEATURES

- \*电压范围宽（18V~1.2KV） Widely voltage range 18 V~1.2 KV
- \*响应速度快 Fast response to the rapidly increase Voltage
- \*非线性指数大 Excellent non-linearity coefficient
- \*无极性 Symmetric V-I characteristics
- \*通流容量大 Great withstanding surge current
- \*寿命长 Long life
- \*符合 ROHS、REACH、无卤环保要求 Meet ROHS, REACH, HF requirements of environmental protection

### ◆应用 APPLICATIONS

家电、通讯、各类电源、新能源、电表、照明、工业设备

Household Appliance、Communication、All kinds of power supply、New energy、Electric meter、Lighting Power、Industrial equipment

### ◆安规认证 Safety certification

序号 NO	安规认证 Safety certification		安规标准 Standards	证书编号 Certification Number
1	中国 China	CQC	GB/T10193 GB/T10194 GB 4943.1 GB 8898	07H: CQC14001111447
				10H: CQC14001111568
				14H: CQC14001111589
				20H: CQC14001111567
2	美国 American、加拿大 Canada	UL、CUL	UL1449	E325462
3	德国 Germany	VDE	IEC61051	40008242

**◆型号表示法 Part Number**

FNR	14	H	621	K	B	2	S	20	P	N	1	Y	NN
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭

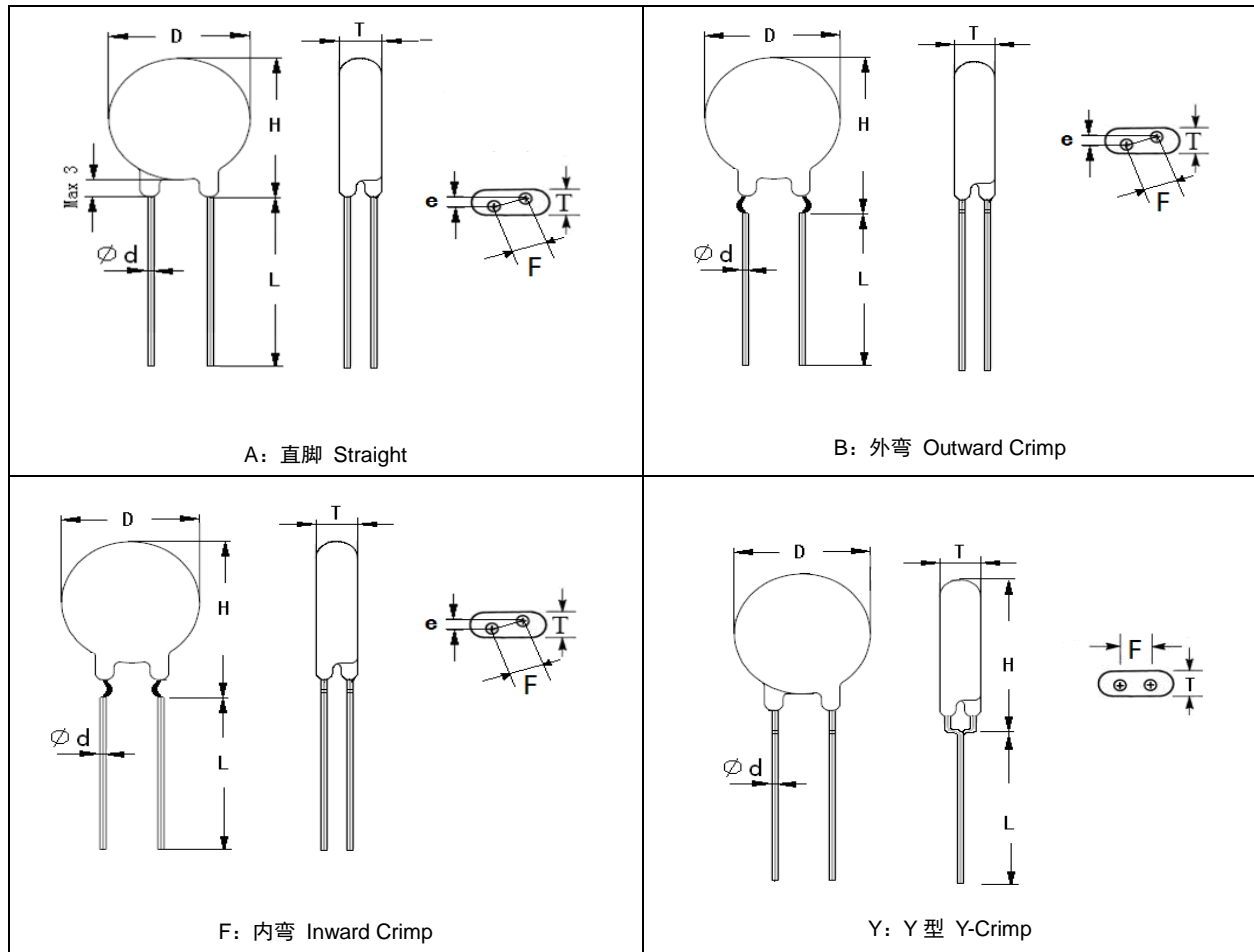
代码说明 Part Number Code Description

序号 NO	表示说明 Description		
①	风华压敏电阻 FenghuaNonlinearResistor		
②	芯片标称直径 Diameter of Element	07: 7mm	10: 10mm14: 14mm 20: 20mm
③	系列型号 Series Type	H 系列 H Series: 125℃环氧树脂 125℃Epoxy resinVaristor	
④	压敏电压 Varistor Voltage	180 : $18 \times 10^0 = 18V$	621 : $62 \times 10^1 = 620V$ 112 : $11 \times 10^2 = 1100V$
⑤	压敏电压公差 Tolerance	K: $\pm 10\%$	
⑥	引脚形状 Lead Style	A: 直脚 Straight B: 外弯 Outward-Crimp	F: 内弯 Inward--Crimp Y: Y 型 Y-Crimp
⑦	引脚间距和线径 Pin spacing and Wire diameter	1: 脚距&线径: Spacing and Wire diameter: 5.0mm & $\phi 0.6mm$ 2: 脚距&线径: Spacing and Wire diameter: 7.5mm & $\phi 0.8mm$ 3: 脚距&线径: Spacing and Wire diameter: 10.0mm & $\phi 1.0mm$ 4: 脚距&线径: Spacing and Wire diameter: 7.5mm & $\phi 0.7mm$ 5: 脚距&线径: Spacing and Wire diameter: 10.0mm & $\phi 0.8mm$ 6: 脚距&线径: Spacing and Wire diameter: 7.5mm & $\phi 1.0mm$ 7: 脚距&线径: Spacing and Wire diameter: 7.5mm & $\phi 0.6mm$ X: 特殊要求参照承认书 Special requirements Refer to Structure & Dimension	
⑧	包装方式-长/短脚/编带/步距 Packaging-Long lead/Short lead/Taping /pitch-row	S: 散装&长脚 Bulk& long lead C: 散装&短脚 Bulk&short lead T: 编带&孔距 12.7mmTaping &Pitch-row 12.7mm V: 编带&孔距 15.0mmTaping& Pitch-row 15.0mm	
⑨	编带 H <sub>0</sub> 值/引脚长度 Taping H <sub>0</sub> /Lead length	16: 编带 H <sub>0</sub> 值: 16.0mmTapingH <sub>0</sub> :16.0mm 19: 编带 H <sub>0</sub> 值: 19.0mmTapingH <sub>0</sub> :19.0mm 20: 长脚 ( $\geq 20mm$ .) Longlead (20mm Min.) 30: 短脚 3.0mm Short-Lead length 3.0mm 35: 短脚 3.5mm Short-Lead length 3.5mm	
⑩	引脚材料 Lead Material	U: 铜线 Tin-Plate Copper wire	P: 镀锡铜包钢线 Tin plating steel wire
⑪	产品等级 Product level	N: 常规 Standard	E: 高能 High Energy
⑫	产品配置 Product Configuration	1: 常规, 无护套无外壳 Conventional,no-jacket andno-explosion-proof 2: 透明套管 Lucency jacket 3: 黑色套管 Black jacket M: 立式防爆 Vertical explosion-proof W: 卧式防爆 Horizontal explosion-proof	
⑬	本体外观颜色/封装材 Body Color / Coating Material	Y: 黄色环氧树脂 Yellow Epoxy resin	
⑭	内部控制码 Internal code		

## ◆结构及尺寸 Structure And Dimensions

\*产品结构 and 主要材料 Construction and main materials of products

NO	主要结构 The main structure	物质成分 Material composition
1	瓷体 Ceramic disc	氧化锌 ZnO
2	电极 Electrodes	金属 Metal
3	焊点 Solder	锡、银、铜 Sn、Ag、Cu
4	包封层 Coating	环氧树脂 Epoxy resin
5	引线 Leads	镀锡铜包钢线或镀锡铜线 Tin-Plate steel wire or Tin-Plate Copper wire

**\*散装产品结构及尺寸 Bull Structure And Dimensions**


单位: mm										
规格 Part NO.	D <sub>max</sub>	Φd ±0.08	F ±1.0	H <sub>max</sub>		L ±1.0	L ±0.5	L <sub>min</sub>	H <sub>max</sub>	e ±1.0
				直脚 Straight	弯脚 Crimp	短直脚 Straight Short-Lead	短弯脚 CrimpShort-Lead	直脚 Long-Lead		
07H	9.0	0.6	5.0	12.0	14.0	3.5	3.5	20	请参考电性能 参数表 Please refer to the Electrical Characteristics Table	
10H	12.5	0.8	7.5	16.0	18.0	3.5	3.5	20		
14H	17.0	0.8	7.5	19.0	22.0	3.5	3.5	20		
20H	23.0	1.0	10.0	26.0	28.0	3.5	3.5	20		

### \*编带产品结构及尺寸 Taping Structure And Dimensions

图示

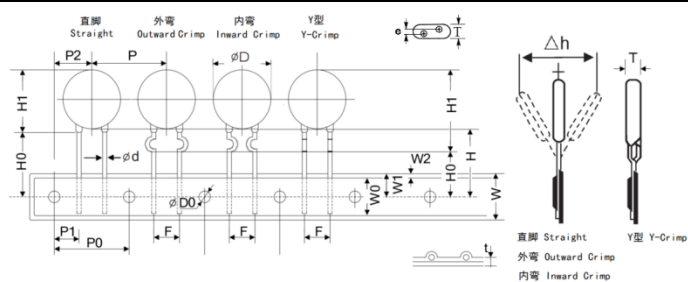


图 A Fig A

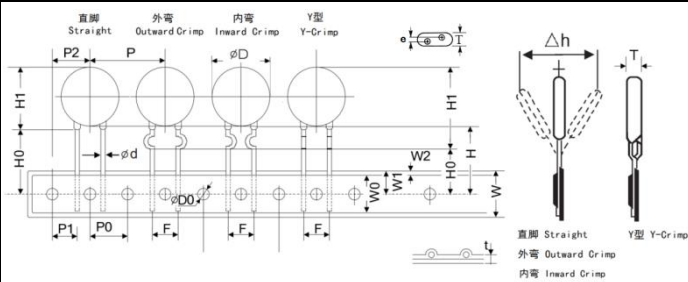


图 B Fig B

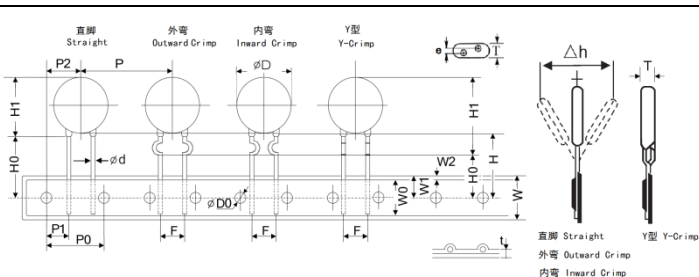


图 CFig C

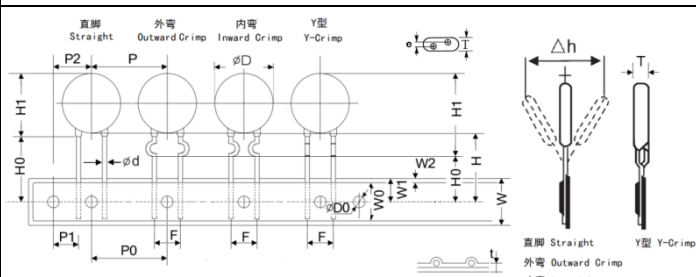


图 D Fig D

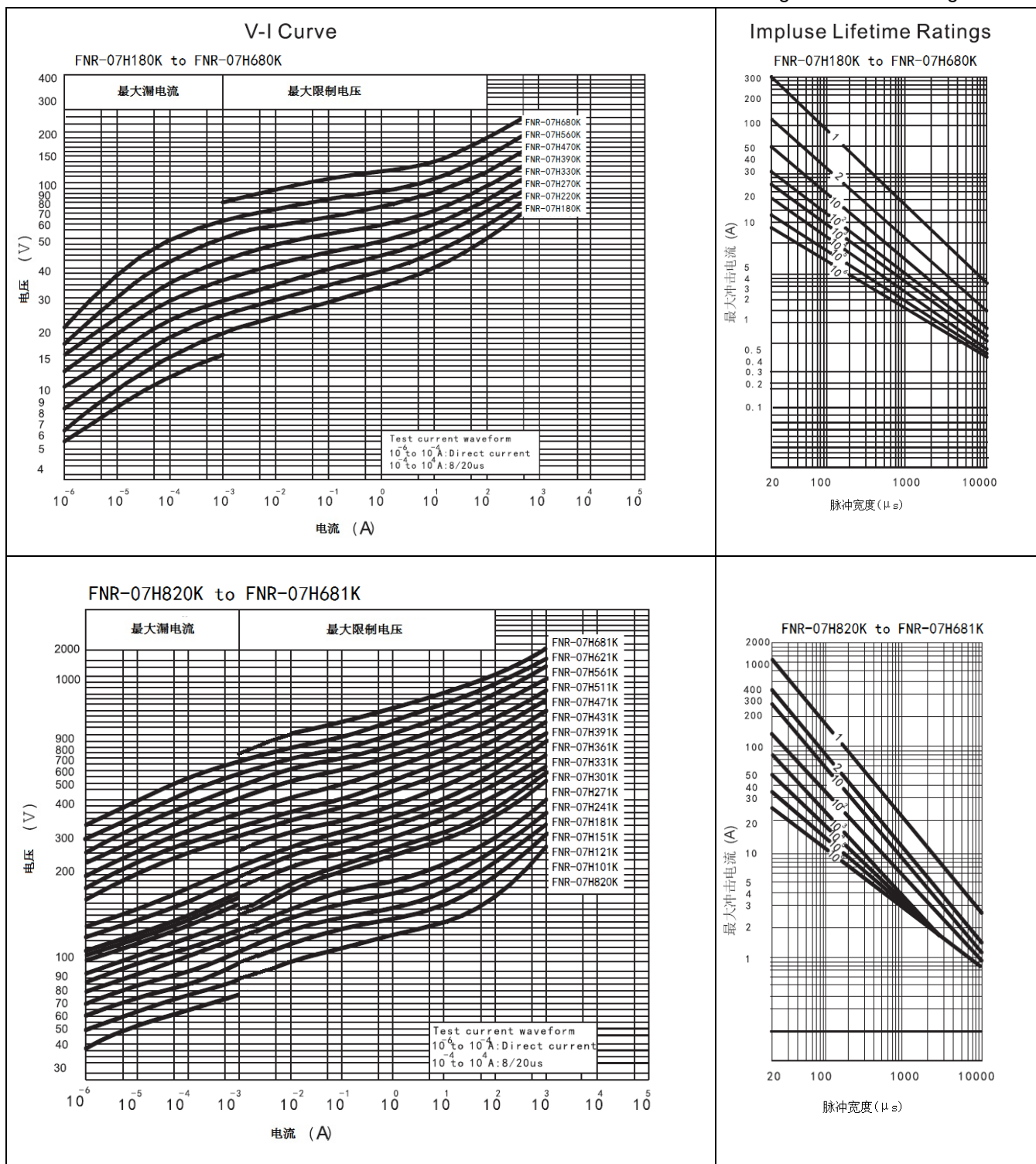
图号 Fig NO.	规格 Part NO.	代号&公差							Symbol & Tolerance									单位 (Unit) : mm		
		ΦD	Φd	P	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	H <sub>0</sub>	H <sub>1</sub>	△ h	t	F			
		max	±0.08	±1.0	±1.0	±0.7	±1.3	±0.2	±1.0	min	±1.0	max	±1.0	max	±2.0	±0.3	±1.0			
A	07H	9.0	0.6	12.7	12.7	3.85	6.35	4.0	18.0	9.8	9.0	3.0	16.0	14.0	0.0	0.6	5.0			
B	10H	12.5	0.8	25.4	12.7	8.95	12.7	4.0	18.0	9.8	9.0	3.0	16.0	18.0	0.0	0.6	7.5			
A	10H	12.5	0.8	15.0	15.0	3.75	7.5	4.0	18.0	9.8	9.0	3.0	16.0	18.0	0.0	0.6	7.5			
D	10H	12.5	0.8	12.7	12.7	8.95	12.7	4.0	18.0	9.8	9.0	3.0	16.0	18.0	0.0	0.6	7.5			
B	14H	17.0	0.8	25.4	12.7	8.95	12.7	4.0	18.0	9.8	9.0	3.0	16.0	22.0	0.0	0.6	7.5			
C	14H	17.0	0.8	30.0	15.0	3.75	7.5	4.0	18.0	9.8	9.0	3.0	16.0	22.0	0.0	0.6	7.5			
B	20H	23.0	1.0	25.4	12.7	7.7	12.7	4.0	18.0	9.8	9.0	3.0	16.0	28.0	0.0	0.6	10.0			

备注：产品厚度尺寸 T 请参考电性能参数表。Notes: Thickness T Please refer to the Electrical Characteristics Table.

**◆电气性能 Performance Specification**
**\*07H 系列电气性能 07H Series Performance Specification**

07H 系列 07H Series	压敏电压 Varistor Voltage (@1mA DC)	最大连续工作电压 Max. Allowable Voltage		最大限制电压 Max. Clamping Voltage (8/20μs)		最大冲击电流 Max. Impulse Current (8/20μs)	能量耐量 Max. Energy (2mS)	能量耐量 Max. Energy (10/1000 μs)	额定功率 Rated Wattage	静态电容量 (参考值) Typical Capacitance	产品尺寸 Dimensions	
规格型号 Part Number	V <sub>1mA</sub>	Ac (V)	Dc (V)	Vc (V)	I <sub>p</sub> (A)	1 Times	W <sub>max</sub> (J)	W <sub>max</sub> (J)	P (W)	Cp (PF)	T <sub>max</sub>	e ±1.0
FNR-07H180K	18 (16.2~19.8)	11	14	36	2.5	250	0.9	1.3	0.02	3500	3.6	1.1
FNR-07H220K	22 (19.8~24.2)	14	18	43	2.5	250	1.1	1.5	0.02	2800	3.8	1.2
FNR-07H270K	27 (24.3~29.7)	17	22	53	2.5	250	1.4	2.0	0.02	2000	4.0	1.1
FNR-07H330K	33 (29.7~36.3)	20	26	65	2.5	250	1.7	2.4	0.02	1500	3.7	1.2
FNR-07H390K	39 (35.1~42.9)	25	31	77	2.5	250	2.1	2.9	0.02	1350	3.9	1.4
FNR-07H470K	47 (42.3~51.7)	30	38	93	2.5	250	2.5	3.5	0.02	1150	4.1	1.6
FNR-07H560K	56 (50.4~61.6)	35	45	110	2.5	250	3.1	4.3	0.02	950	4.2	1.8
FNR-07H680K	68 (61.2~74.8)	40	56	135	2.5	250	3.6	5.0	0.02	700	4.3	2.1
FNR-07H820K	82 (73.8~90.2)	50	65	135	10	1200	4.2	5.5	0.25	550	3.5	1.2
FNR-07H101K	100 (90~110)	60	85	165	10	1200	4.8	6.5	0.25	500	3.8	1.3
FNR-07H121K	120 (108~132)	75	100	200	10	1200	5.9	7.8	0.25	450	4.0	1.5
FNR-07H151K	150 (135~165)	95	125	250	10	1200	8.0	9.7	0.25	350	4.3	1.8
FNR-07H181K	180 (162~198)	115	150	300	10	1200	10	11.7	0.25	300	3.6	1.2
FNR-07H201K	200 (180~220)	130	170	340	10	1200	13	14	0.25	250	3.7	1.2
FNR-07H221K	220 (198~242)	140	180	360	10	1200	13	14	0.25	250	3.8	1.3
FNR-07H241K	240 (216~264)	150	200	395	10	1200	13	14	0.25	200	4.0	1.4
FNR-07H271K	270 (243~297)	175	225	455	10	1200	15	18	0.25	170	4.1	1.5
FNR-07H301K	300 (270~330)	195	250	500	10	1200	17	21	0.25	150	4.3	1.6
FNR-07H331K	330 (297~363)	210	275	550	10	1200	22	25	0.25	150	4.5	1.8
FNR-07H361K	360 (324~396)	230	300	595	10	1200	20	25	0.25	130	4.6	1.9
FNR-07H391K	390 (351~429)	250	320	650	10	1200	22	25	0.25	130	4.9	2.0
FNR-07H431K	430 (387~473)	275	350	710	10	1200	26	28	0.25	110	5.1	2.2
FNR-07H471K	470 (423~517)	300	385	775	10	1200	26	30	0.25	100	5.4	2.3
FNR-07H511K	510 (459~561)	320	410	840	10	1200	26	33	0.25	100	5.6	2.5
FNR-07H561K	560 (504~616)	350	460	925	10	1200	26	33	0.25	90	5.9	2.7
FNR-07H621K	620 (558~682)	385	505	1025	10	1200	26	35	0.25	80	6.2	2.9
FNR-07H681K	680 (612~748)	420	560	1120	10	1200	26	35	0.25	75	6.7	3.2

**\*07H 系列 V-I 特性曲线和最大浪涌电流降额曲线 07H Series V-I Curve and Max. Surge Current Derating Curves**

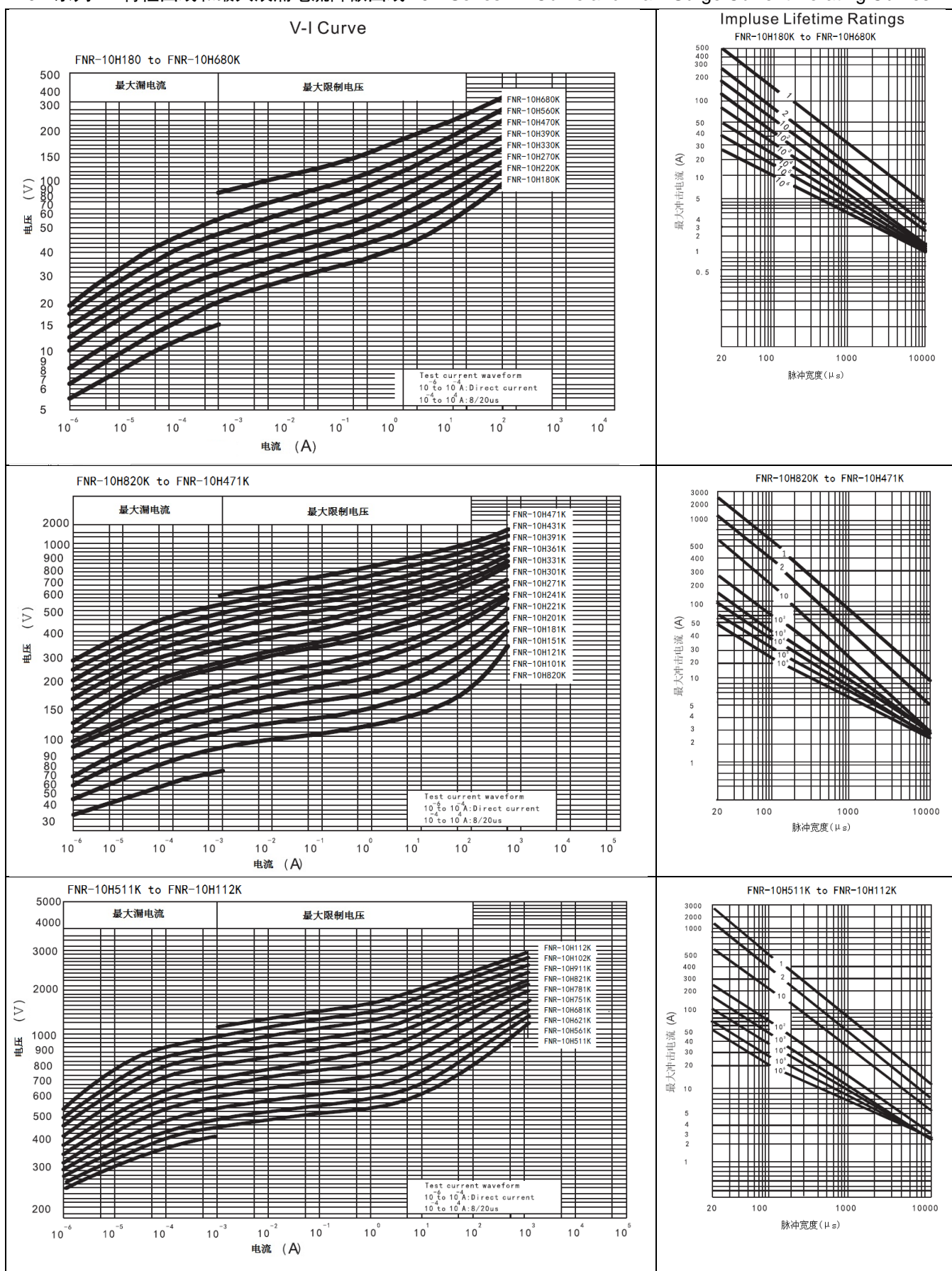


**\*10H 系列电气性能 10H Series Performance Specification**

10H 系列 10H Series	压敏电压 Varistor Voltage (@1mA DC)	最大连续工作电压 Max. Allowable Voltage		最大限制电压 Max. Clamping Voltage (8/20μs)		最大冲击电流 Max. Impulse Current (8/20μs)		能量耐量 Max. Energy (2mS)		能量耐量 Max. Energy (10/1000 μs)		额定功率 Rated Wattage	静态电容量 (参考值) Typical Capacitance	产品尺寸 Dimensions	
规格型号 Part Number	V <sub>1mA</sub>	Ac (V)	Dc (V)	Vc (V)	I <sub>p</sub> (A)	1 Times (A)		W <sub>max</sub> (J)		W <sub>max</sub> (J)		P (W)	V <sub>1mA</sub>	T <sub>max</sub>	e ±1.0
FNR-10H180K	18 (16.2~19.8)	11	14	36	5	500	/	2.1	/	2.9	/	0.05	7500	4	1.3
FNR-10H220K	22 (19.8~24.2)	14	18	43	5	500	/	2.5	/	3.5	/	0.05	6000	4.1	1.4
FNR-10H270K	27 (24.3~29.7)	17	22	53	5	500	/	3.0	/	4.2	/	0.05	4000	4.3	1.3
FNR-10H330K	33 (29.7~36.3)	20	26	65	5	500	/	4.0	/	5.6	/	0.05	3000	4.1	1.4
FNR-10H390K	39 (35.1~42.9)	25	31	77	5	500	/	4.6	/	6.4	/	0.05	2600	4.3	1.6
FNR-10H470K	47 (42.3~51.7)	30	38	93	5	500	/	5.5	/	7.7	/	0.05	2200	4.5	1.8
FNR-10H560K	56 (50.4~61.6)	35	45	110	5	500	/	7.0	/	9.8	/	0.05	1800	4.5	1.9
FNR-10H680K	68 (61.2~74.8)	40	56	135	5	500	/	8.2	/	11	/	0.05	1300	4.5	2.0
FNR-10H820K	82 (73.8~90.2)	50	65	135	25	2500	/	8.4	/	12	/	0.4	1800	3.8	1.4
FNR-10H101K	100 (90~110)	60	85	165	25	2500	/	10	/	15	/	0.4	1400	4.2	1.5
FNR-10H121K	120 (108~132)	75	100	200	25	2500	/	15	/	18	/	0.4	1100	4.4	1.7
FNR-10H151K	150 (135~165)	95	125	250	25	2500	/	20	/	22	/	0.4	900	4.7	2.0
FNR-10H181K	180 (162~198)	115	150	300	25	2500	3500	23	27	27	33	0.4	700	4.3	1.4
FNR-10H201K	200 (180~220)	130	170	340	25	2500	3500	26	30	30	35	0.4	500	4.4	1.4
FNR-10H221K	220 (198~242)	140	180	360	25	2500	3500	30	32	32	39	0.4	450	4.5	1.5
FNR-10H241K	240 (216~264)	150	200	395	25	2500	3500	32	35	35	42	0.4	400	4.7	1.6
FNR-10H271K	270 (243~297)	175	225	455	25	2500	3500	35	41	40	49	0.4	350	4.8	1.7
FNR-10H301K	300 (270~330)	195	250	500	25	2500	3500	35	45	40	53	0.4	325	5	1.8
FNR-10H331K	330 (297~363)	210	275	550	25	2500	3500	39	49	43	58	0.4	325	5.2	2.0
FNR-10H361K	360 (324~396)	230	300	595	25	2500	3500	45	53	47	65	0.4	300	5.3	2.1
FNR-10H391K	390 (351~429)	250	320	650	25	2500	3500	52	58	60	70	0.4	270	5.6	2.2
FNR-10H431K	430 (387~473)	275	350	710	25	2500	3500	58	63	65	80	0.4	250	5.7	2.4
FNR-10H471K	470 (423~517)	300	385	775	25	2500	3500	58	69	70	85	0.4	230	6.1	2.5
FNR-10H511K	510 (459~561)	320	410	840	25	2500	3500	58	69	70	92	0.4	200	6.3	2.7
FNR-10H561K	560 (504~616)	350	455	925	25	2500	3500	58	69	70	92	0.4	180	6.6	2.9
FNR-10H621K	620 (558~682)	385	505	1025	25	2500	3500	58	69	70	95	0.4	130	6.9	3.2
FNR-10H681K	680 (612~748)	420	560	1120	25	2500	3500	60	74	72	98	0.4	130	7.3	3.4
FNR-10H751K	750 (675~825)	460	615	1240	25	2500	3500	65	81	75	100	0.4	120	7.7	3.7
FNR-10H781K	780 (702~858)	485	640	1290	25	2500	3500	65	85	75	100	0.4	120	7.8	3.8
FNR-10H821K	820 (738~902)	510	670	1355	25	2500	3500	71	99	85	110	0.4	110	8.1	4.0
FNR-10H911K	910 (819~1001)	550	745	1500	25	2500	3500	78	109	93	130	0.4	100	8.7	4.3
FNR-10H102K	1000 (900~1100)	625	825	1650	25	2500	3500	84	117	102	140	0.4	90	8.1	4.7
FNR-10H112K	1100 (990~1210)	680	895	1815	25	2500	3500	91	127	115	155	0.4	80	8.6	5.0



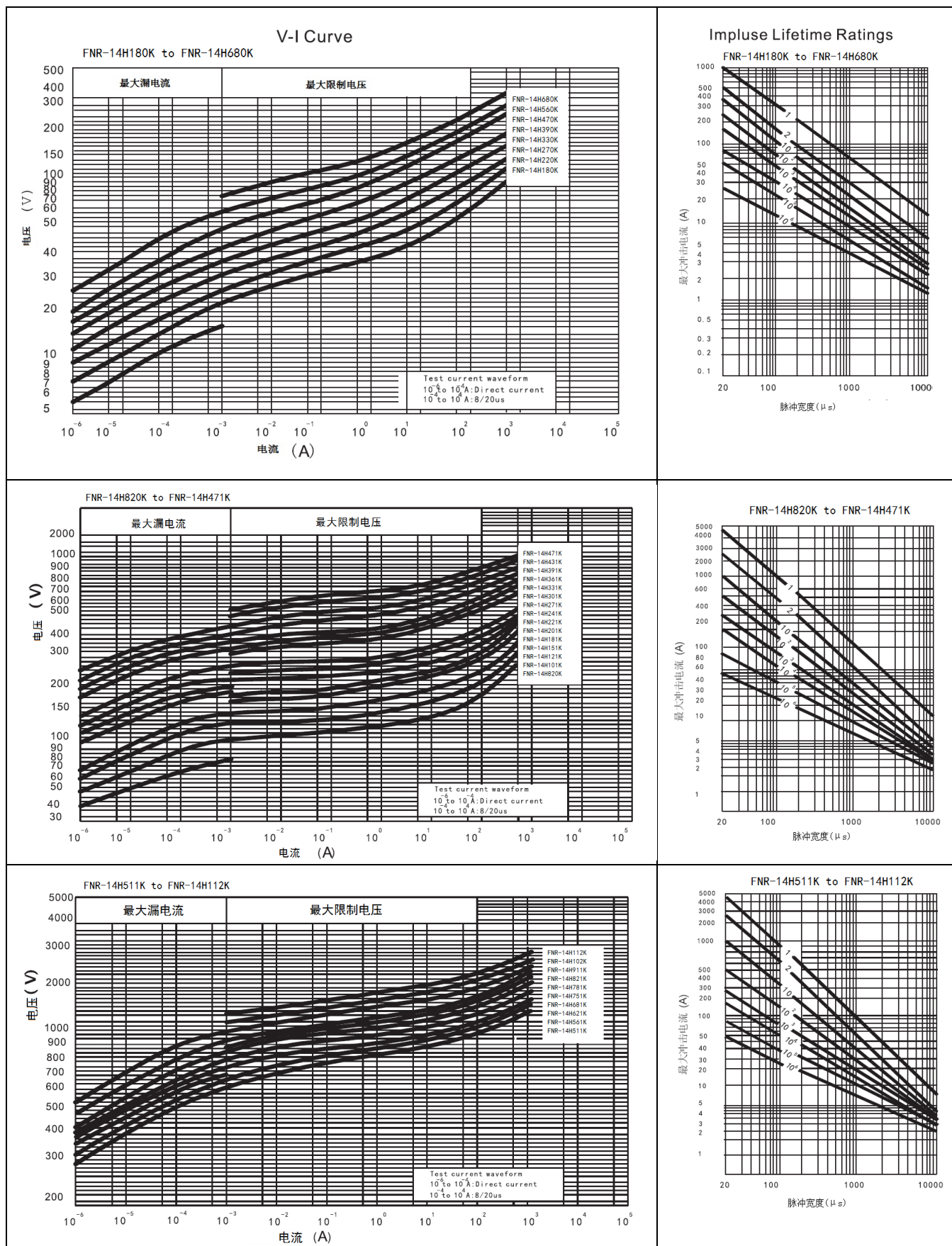
\*10H 系列 V-I 特性曲线和最大浪涌电流降额曲线 10H Series V-I Curve and Max. Surge Current Derating Curves



**\*14H 系列电气性能 14H Series Performance Specification**

14H 系列 14H Series	压敏电压 Varistor Voltage (@1mA DC)	最大连续工作电压 Max. Allowable Voltage		最大限制电压 Max. Clamping Voltage (8/20 $\mu$ s)		最大冲击电流 Max. Impulse Current (8/20 $\mu$ s)		能量耐量 Max. Energy (2mS)		能量耐量 Max. Energy (10/1000 $\mu$ s)		额定功率 Rated Wattage	静态电容量 (参考值) Typical Capacitance	产品尺寸 Dimensions	
规格型号 Part Number	V <sub>1mA</sub>	Ac (V)	Dc (V)	Vc (V)	I <sub>p</sub> (A)	1 Times (A)		W <sub>max</sub> (J)		W <sub>max</sub> (J)		P (W)	V <sub>1mA</sub>	T <sub>max</sub>	e <sub>±1.0</sub>
FNR-14H180K	18 (16.2~19.8)	11	14	36	10	1000	/	4.0	/	5.0	/	0.1	18000	4.1	1.3
FNR-14H220K	22 (19.8~24.2)	14	18	43	10	1000	/	5.0	/	6.0	/	0.1	15000	4.3	1.4
FNR-14H270K	27 (24.3~29.7)	17	22	53	10	1000	/	6.0	/	7.0	/	0.1	10000	4.5	1.3
FNR-14H330K	33 (29.7~36.3)	20	26	65	10	1000	/	7.5	/	8.5	/	0.1	7500	4.5	1.4
FNR-14H390K	39 (35.1~42.9)	25	31	77	10	1000	/	8.6	/	10	/	0.1	6500	4.4	1.6
FNR-14H470K	47 (42.3~51.7)	30	38	93	10	1000	/	10	/	12	/	0.1	5500	4.6	1.8
FNR-14H560K	56 (50.4~61.6)	35	45	110	10	1000	/	11	/	14	/	0.1	4500	4.7	1.9
FNR-14H680K	68 (61.2~74.8)	40	56	135	10	1000	/	14	/	18	/	0.1	3300	4.5	2.2
FNR-14H820K	82 (73.8~90.2)	50	65	135	50	4500	/	15	/	22	/	0.6	2900	4	1.4
FNR-14H101K	100 (90~110)	60	85	165	50	4500	/	18	/	28	/	0.6	2400	4.3	1.5
FNR-14H121K	120 (108~132)	75	100	200	50	4500	/	26	/	32	/	0.6	1900	4.5	1.7
FNR-14H151K	150 (135~165)	95	125	250	50	4500	/	32	/	40	/	0.6	1500	4.8	1.8
FNR-14H181K	180 (162~198)	115	150	300	50	4500	6000	39	54	52	60	0.6	1250	4.5	1.4
FNR-14H201K	200 (180~220)	130	170	340	50	4500	6000	45	61	57	84	0.6	1000	4.6	1.4
FNR-14H221K	220 (198~242)	140	180	360	50	4500	6000	52	65	63	91	0.6	1000	4.7	1.5
FNR-14H241K	240 (216~264)	150	200	395	50	4500	6000	52	71	63	98	0.6	900	4.9	1.6
FNR-14H271K	270 (243~297)	175	225	455	50	4500	6000	65	81	70	112	0.6	750	5	1.7
FNR-14H301K	300 (270~330)	195	250	500	50	4500	6000	71	90	78	123	0.6	650	5.2	1.9
FNR-14H331K	330 (297~363)	210	275	550	50	4500	6000	78	99	85	133	0.6	650	5.4	2.0
FNR-14H361K	360 (324~396)	230	300	595	50	4500	6000	84	107	93	147	0.6	550	5.5	2.2
FNR-14H391K	390 (351~429)	250	320	650	50	4500	6000	91	117	100	161	0.6	500	5.8	2.3
FNR-14H431K	430 (387~473)	275	350	710	50	4500	6000	97	127	115	182	0.6	450	5.9	2.4
FNR-14H471K	470 (423~517)	300	385	775	50	4500	6000	104	140	125	196	0.6	440	6.3	2.5
FNR-14H511K	510 (459~561)	320	410	840	50	4500	6000	104	150	125	210	0.6	380	6.5	2.7
FNR-14H561K	560 (504~616)	350	455	925	50	4500	6000	104	165	125	231	0.6	345	6.8	2.6
FNR-14H621K	620 (558~682)	385	505	1025	50	4500	6000	110	180	130	252	0.6	250	7.1	2.8
FNR-14H681K	680 (612~748)	420	560	1120	50	4500	6000	117	190	136	266	0.6	250	7.5	3.0
FNR-14H751K	750 (675~825)	460	615	1240	50	4500	6000	130	200	143	280	0.6	230	7.9	3.3
FNR-14H781K	780 (702~858)	485	640	1290	50	4500	6000	136	200	150	280	0.6	230	8	3.4
FNR-14H821K	820 (738~902)	510	670	1355	50	4500	6000	143	203	157	285	0.6	200	8.3	3.5
FNR-14H911K	910 (819~1001)	550	745	1500	50	4500	6000	156	220	175	308	0.6	180	8.9	3.9
FNR-14H102K	1000 (900~1100)	625	825	1650	50	4500	6000	169	240	190	336	0.6	150	8.3	4.1
FNR-14H112K	1100 (990~1210)	680	895	1815	50	4500	6000	182	260	213	364	0.6	150	8.8	4.5

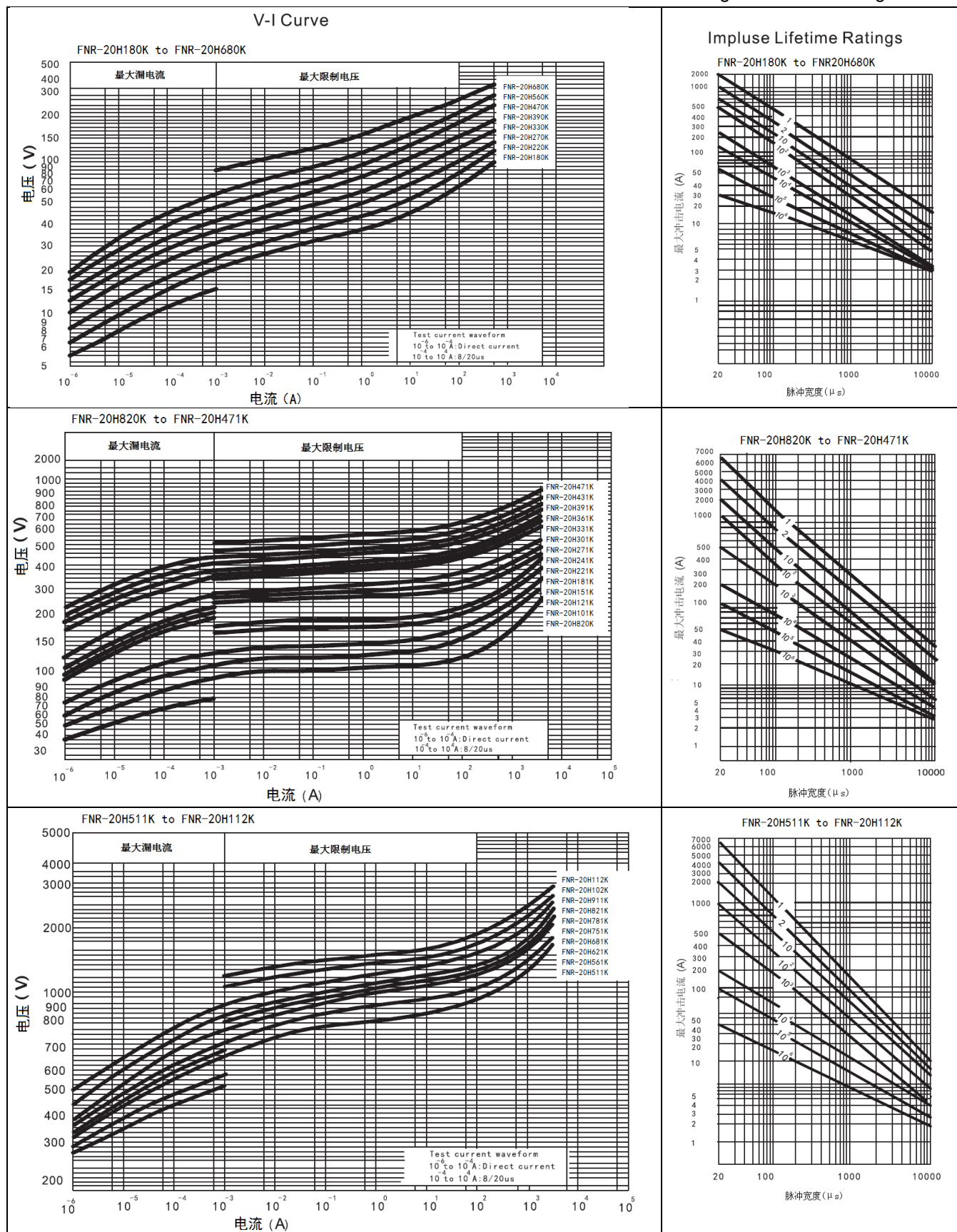
**\*14H 系列 V-I 特性曲线和最大浪涌电流降额曲线 14H Series V-I Curve and Max. Surge Current Derating Curves**



**\*20H 系列电气性能 20H Series Performance Specification**

20H 系列 20H Series	压敏电压 Varistor Voltage (@1mA DC)	最大连续工 作电压 Max. Allowable Voltage		最大限制电 压 Max. Clamping Voltage (8/20μs)		最大 冲击电流 Max.Impulse Current (8/20μs)		能量 耐量 Max.Energy (2mS)		能量 耐量 Max.Energy (10/1000 μs)		额定 功率 Rated Wattage	静态 电容量 (参考 值) Typical Capacit ance	产品尺寸 Dimensions	
规格型号 Part Number	V <sub>1mA</sub>	Ac (V)	Dc (V)	Vc (V)	I <sub>p</sub> (A)	1 Times (A)		W <sub>max</sub> (J)		W <sub>max</sub> (J)		P (W)	V <sub>1mA</sub>	T max	e ±1.0
FNR-20H180K	18(16.2~19.8)	11	14	36	20	2000	/	10	/	11	/	0.2	18000	4.5	1.4
FNR-20H220K	22(19.8~24.2)	14	18	43	20	2000	/	13	/	14	/	0.2	30000	4.6	1.6
FNR-20H270K	27(24.3~29.7)	17	22	53	20	2000	/	15	/	18	/	0.2	20000	4.8	1.5
FNR-20H330K	33(29.7~36.3)	20	26	65	20	2000	/	18	/	23	/	0.2	17000	5.0	1.6
FNR-20H390K	39(35.1~42.9)	25	31	77	20	2000	/	20	/	26	/	0.2	15000	4.7	1.7
FNR-20H470K	47(42.3~51.7)	30	38	93	20	2000	/	25	/	33	/	0.2	13000	4.9	1.9
FNR-20H560K	56(50.4~61.6)	35	45	110	20	2000	/	30	/	41	/	0.2	11000	5.0	2.1
FNR-20H680K	68(61.2~74.8)	40	56	135	20	2000	/	33	/	46	/	0.2	7000	5.0	2.3
FNR-20H820K	82(73.8~90.2)	50	65	135	100	6500	/	38	/	48	/	1.0	5500	4.3	1.6
FNR-20H101K	100(90~110)	60	85	165	100	6500	/	42	/	51	/	1.0	4800	4.6	1.7
FNR-20H121K	120(108~132)	75	100	200	100	6500	/	52	/	55	/	1.0	3800	4.6	1.9
FNR-20H151K	150(135~165)	95	125	250	100	6500	/	65	/	70	/	1.0	3000	5.1	2.0
FNR-20H181K	180(162~198)	115	150	300	100	6500	10000	78	90	84	126	1.0	2500	4.6	1.6
FNR-20H201K	200(180~220)	130	170	340	100	6500	10000	91	102	95	142	1.0	2000	4.8	1.6
FNR-20H221K	220(198~242)	140	180	360	100	6500	10000	97	108	100	151	1.0	2000	4.9	1.7
FNR-20H241K	240(216~264)	150	200	395	100	6500	10000	100	118	108	165	1.0	1800	5.0	1.8
FNR-20H271K	270(243~297)	175	225	455	100	6500	10000	117	136	127	191	1.0	1600	5.2	2.0
FNR-20H301K	300(270~330)	195	250	500	100	6500	10000	136	150	150	210	1.0	1400	5.4	2.1
FNR-20H331K	330(297~363)	210	275	550	100	6500	10000	136	165	150	231	1.0	1400	5.6	2.2
FNR-20H361K	360(324~396)	230	300	595	100	6500	10000	156	178	163	249	1.0	1200	5.9	2.4
FNR-20H391K	390(351~429)	250	320	650	100	6500	10000	169	195	180	273	1.0	1000	6.0	2.5
FNR-20H431K	430(387~473)	275	350	710	100	6500	10000	182	213	190	298	1.0	900	6.1	2.6
FNR-20H471K	470(423~517)	300	385	775	100	6500	10000	195	232	220	325	1.0	900	6.5	2.8
FNR-20H511K	510(459~561)	320	410	840	100	6500	10000	195	232	220	325	1.0	800	6.7	3.0
FNR-20H561K	560(504~616)	350	455	925	100	6500	10000	195	232	220	325	1.0	700	6.9	2.8
FNR-20H621K	620(558~682)	385	505	1025	100	6500	10000	195	246	220	344	1.0	500	7.3	3.0
FNR-20H681K	680(612~748)	420	560	1120	100	6500	10000	208	268	230	376	1.0	460	7.7	3.2
FNR-20H751K	750(675~825)	460	615	1240	100	6500	10000	227	297	255	416	1.0	420	8.0	3.5
FNR-20H781K	780(702~858)	485	640	1290	100	6500	10000	234	309	265	433	1.0	420	8.2	3.6
FNR-20H821K	820(738~902)	510	670	1355	100	6500	10000	247	325	282	455	1.0	400	8.5	3.8
FNR-20H911K	910(819~1001)	550	745	1500	100	6500	10000	280	360	310	504	1.0	350	9.1	4.0
FNR-20H102K	1000 (900~1100)	625	825	1650	100	6500	10000	299	396	340	554	1.0	320	8.5	4.4
FNR-20H112K	1100 (990~1210)	680	895	1815	100	6500	10000	325	435	383	609	1.0	300	9.0	4.8

\*20H 系列 V-I 特性曲线和最大浪涌电流降额曲线 20H Series V-I Curve and Max. Surge Current Derating Curves





**◆电气性能 Electrical Performance Test**

序号 NO	项目 Item	测试标准 Standard	测试方法 Test method	特性 Performance
1	压敏电压 Varistor Voltage	规格标准 Specification Standard	在规定电流条件下(DC <sub>1mA</sub> )的两端电压值。The voltage between two terminals with the specified measuring current ( DC <sub>1mA</sub> ).	参见电气性能 To meetPerformance Specification
2	漏电流 Leakage current	规格标准 Specification Standard	在标准测试条件下, 施加 83%压敏电压时流过压敏电阻器的电流值。The direct current flowing from the Varistor at0.83V <sub>V</sub> . V <sub>V</sub> :压敏电压 (DC <sub>1mA</sub> )	在 25℃ 时 Testtemperature:25℃ : ≥82V IR≤20μA <82V IR≤40μA (V <sub>V</sub> of 83%)
3	限制电压 Clamping Voltage	规格标准 Specification Standard	在 8/20us 波形下,施加规定电流后压敏电阻器两端的电压峰值。The maximum voltage between two terminals with the specified standard impulse current(8/20us) applied.	参见电气性能 To meetPerformance Specification
4	最大通流容量 Maximum Impulse Current (withstanding surge current)	规格标准 Specification Standard	在环境温度 25℃下, 施加 1 次 8/20us 的标准冲击电流后, 压敏电阻电压变化率在±10%内。The maximum current within the varistor voltage change of ±10% with the standard impulse applied by the specified condition.	参见电气性能 To meetPerformance Specification  Δ V/V ≤10%
5	能量耐量 Maximumenergy	规格标准 Specification Standard	在环境温度 25℃下, 施加 1 次 2ms 或 10/1000uS 的标准冲击电流后, 压敏电阻电压变化率在±10%内。 The maximum energy (2ms or 10/1000uS wave) within the Varistor Voltage change of ±10% when the specified impulse is applied.	参见电气性能 To meetPerformance Specification  Δ V/V ≤10%
6	电压温度系数 Temperature coefficient of varistor Voltage	规格标准 Specification Standard	在规定温度下显示压敏电压的变化值。Coefficient indicating dependency of Varistor Voltage on Specified temperature. $\frac{V1mA@125^{\circ}C - V1mA@25^{\circ}C}{V1mA@25^{\circ}C} \times \frac{1}{60} \times 100\% (\%/^{\circ}C)$ $\frac{V1mA@-40^{\circ}C - V1mA@25^{\circ}C}{V1mA@25^{\circ}C} \times \frac{1}{65} \times 100\% (\%/^{\circ}C)$	-0.05≤Tc≤0.05(%/℃)
7	静态电容量 Capacitance	规格标准 Specification Standard	在环境温度为 25±2℃, 测试频率为 1KHz±10%, 1Vrms (max) 下所测得的介电损失。Dielectric loss tangent shall be measured at 1KHz±10%, 1Vrms max bias and 25±2℃.	参见电气性能 To meetPerformance Specification

**◆可靠性试验项目 Reliability Testing Item**

序号 NO	项目 Item	测试标准 Standard	测试方法 Test method	特性 Performance								
1	端子抗拉强度 Tensile Strength of Terminals	IEC60068-2-21	<p>逐渐施加规定的力，并保持装置固定 10±1 秒。 Gradually applying the force specified and keepingthe unit fixed for 10±1 sec.</p> <table><tr><td>引线直径 Terminal diameter(mm)</td><td>拉力（N） Force(N)</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10</td></tr><tr><td>0.8&lt;d≤1.25</td><td>20</td></tr><tr><td>1.25&lt;d</td><td>40</td></tr></table>	引线直径 Terminal diameter(mm)	拉力（N） Force(N)	0.5<d≤0.8	10	0.8<d≤1.25	20	1.25<d	40	<p>无可见损伤。 压敏电压变化率在±5%内。Novisibledamage。   Δ V/V   ≤5%.</p>
引线直径 Terminal diameter(mm)	拉力（N） Force(N)											
0.5<d≤0.8	10											
0.8<d≤1.25	20											
1.25<d	40											
2	引线弯折试验 Bending Strength of Terminals	IEC 60068-2-21	<p>固定试样，并将以下规定的力施加到每个引脚上。将样品弯曲至 90°，然后回到原样位置。在相反的方向上重复此步骤。 Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction.</p> <table><tr><td>引线直径 Terminal diameter(mm)</td><td>拉力（N） Force(N)</td></tr><tr><td>0.5&lt;d≤0.8</td><td>5</td></tr><tr><td>0.8&lt;d≤1.25</td><td>10</td></tr><tr><td>1.25&lt;d</td><td>20</td></tr></table>	引线直径 Terminal diameter(mm)	拉力（N） Force(N)	0.5<d≤0.8	5	0.8<d≤1.25	10	1.25<d	20	<p>无可见损伤。 压敏电压变化率在±5%内。Novisibledamage。   Δ V/V   ≤5%.</p>
引线直径 Terminal diameter(mm)	拉力（N） Force(N)											
0.5<d≤0.8	5											
0.8<d≤1.25	10											
1.25<d	20											
3	振动试验 Resistance Vibration	IEC 60068-2-6	<p>振动频率：10 ~ 55 Hz 振幅：0.75mm 或 98 m/s<sup>2</sup> 3 方向，持续时间：6 小时(3 x 2 小时) Frequency range:10Hz-55Hz, Amplitude: 0.75mm or 98m/s<sup>2</sup>,three direction,Totalduration: 6h.</p>	<p>无可见损伤。 压敏电压变化率在±5%内。Novisibledamage。   Δ V/V   ≤5%.</p>								
4	碰撞 Bump	IEC 60068-2-29	<p>400m/S<sup>2</sup>，6ms，三个方向，共 4000 次。 Acceleration: 400m/S<sup>2</sup>，6ms，three direction，umber of bumps: 4000。</p>	<p>无可见损伤。 压敏电压变化率在±5%内。Novisibledamage。   Δ V/V   ≤5%.</p>								
5	耐溶剂性 Permanency of marking	IEC 60068-2-45	<p>溶剂：丙酮溶液 温度：23±5℃ 浸入时间：1 分钟。 Class of reagent :acetone solution Test temperature:23±5℃ Immersing time:1min</p>	<p>无损伤、标志清楚，容易辨认。 压敏电压变化率在±5%内。Novisibledamage. and legibly marking。   Δ V/V   ≤5%.</p>								
6	可焊性 Solderability	IEC 60068-2-20	<p>槽焊法 245±3℃，3±0.3 秒 Solder bath method245±5℃,3±0.3ses.</p>	<p>着锡面积≥95% At least 95% of terminal electrode is covered by new solder.</p>								

7	耐焊接热 Resistance to soldering heat	IEC 60068-2-20	槽焊法 260±5℃,10±1 秒,深度: 至引线根部 2.0~2.5mm 浸入速度: 25±2.5mm/sec Solder bath method 260±5℃, 10±1ses.Depth of immersion: up to 2.0~2.5mm from the root of the lead wire covered with thermal screen. Speed of immersion:25±2.5mm/sec.	无可见损伤。 压敏电压变化率在±5%内。Novisibledamage.   Δ V/V   ≤5%.															
8	稳态湿热 Resistance to damp heat (steady state)	IEC 60068-2-78	试验分 a、b 两组: a. 40±2℃, 90 ~ 95 % RH, 1344 小时 b. 40±2℃, 90 ~ 95 % RH, 10% VDC, 1344 小时 Group: a、b a. 40±2℃, 90 ~ 95 % RH, 1344 hrs b. 40±2℃, 90 ~ 95 % RH, 10% VDC, 1344 hrs	无可见损伤。 压敏电压变化率在±10%内。 绝缘电阻≥100MΩ。 No visible damage.  Δ V/V ≤10% Insulation resistance≥100MΩ															
9	上限类别温度耐久性 High temperature load	MIL-STD-202 Method 108	施加电压: 最大连续交流电压。 试验温度: 125±2℃ 试验时间: 1000h AtV <sub>AC</sub> (Max. Operating Voltage) 125 ± 2 °C, 1000 ± 24 hrs,	外观无可见损伤。 压敏电压变化率在±10%内。 No visible damage.  Δ V/V ≤10%															
10	高温贮存试验 Shelf life test	IEC 60068-2-2	在 125±2℃环境下无负荷贮 1000h。 The Zinc oxide varistor are then stored with no voltage applied at a temperature of 125±2℃ for 1000h.	外观无可见损伤。 压敏电压变化率在±5%内。 No visible damage.  Δ V/V ≤5%															
11	温度快速变化 Temperature cycling	IEC60068-2-14	温度循环应重复 5 次, 并在室温和湿度下保存 1 至 2 小时。 The conditions shown below shall be repeated 5 cycles. <table><tr><td>步骤 Step</td><td>温度 Temperature</td><td>时间 Period</td></tr><tr><td>1</td><td>-40±3℃</td><td>30min</td></tr><tr><td>2</td><td>室温</td><td>15min</td></tr><tr><td>3</td><td>+125±2℃</td><td>30min</td></tr><tr><td>4</td><td>室温</td><td>15min</td></tr></table>	步骤 Step	温度 Temperature	时间 Period	1	-40±3℃	30min	2	室温	15min	3	+125±2℃	30min	4	室温	15min	外观无可见损伤。 压敏电压变化率在±5%内。 No visible damage.  Δ V/V ≤5%
步骤 Step	温度 Temperature	时间 Period																	
1	-40±3℃	30min																	
2	室温	15min																	
3	+125±2℃	30min																	
4	室温	15min																	
12	脉冲寿命 Impulse life	IEC 61051-1	固定冲击电流用 8/20μS 标准波冲击 10000 次,时间间隔 10S,恢复时间室温 1~2 小时。 @8/20μS,10000 times,the interval 10 seconds. The specimen shall be stored at room temperature and humidity for 1 to 2 hours.	外观无可见损伤。 压敏电压变化率在±10%内。No visible damage.  Δ V/V ≤5%															
13	耐压试验 Voltage Proof	IEC 61051-1	金属球法, 2500 V <sub>AC</sub> 1 分钟 Metal balls method, 2500 V <sub>AC</sub> 1 min	外观无可见损伤。 No visible damage.															

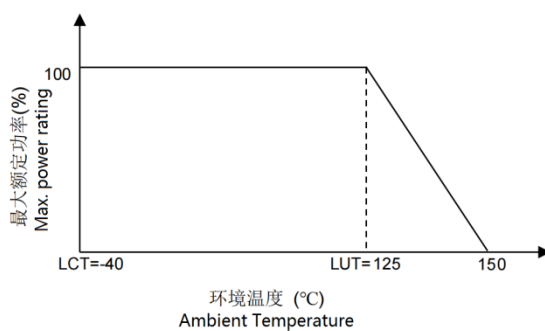


14	阻燃性试验 Fire hazard	IEC 60695-11-5	针焰测试 施加火焰时间: 10 秒 needle flame test Severity: vertical 10 s	不燃烧或残焰不超过 30s; 滴落物不引燃垫纸。 Flames or glowing of the specimen and the layer below extinguish in 30s, there has been no ignition of the specified layer.
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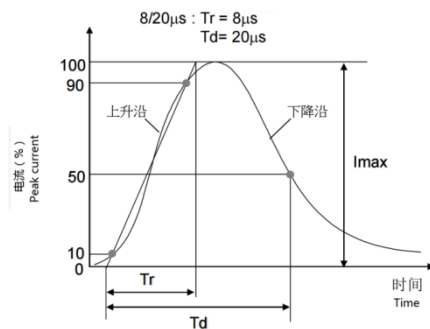
### ◆功率降额曲线 Power Derating Curve

在室温下操作超过 125℃功率会按下图降级。

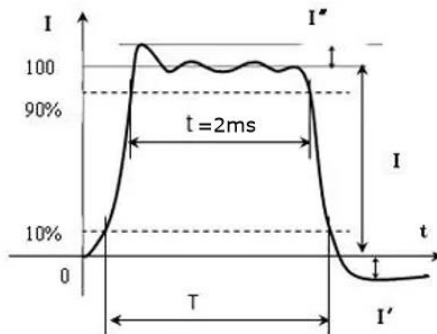
For operation at ambient temperature in excess of 125℃, the power should be derated in accordance with below figure.



### ◆8/20 μ S 标准脉冲波形 8/20 μ S Peak Pulse Current Test Waveform



### ◆2ms 标准脉冲波形 2ms and 10/1000 μ S Peak Pulse Current Test Waveform

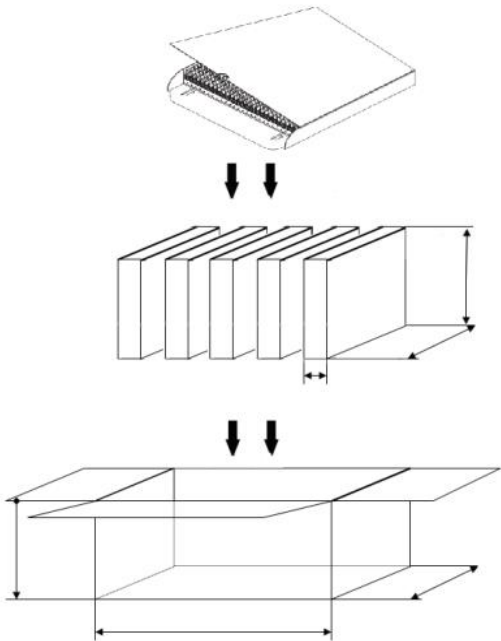
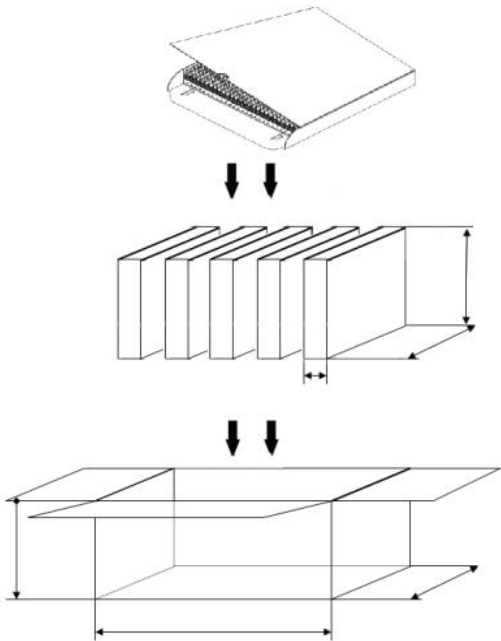


## ◆包装 Packaging

### \*1. 散装 Bulk

长脚 Long-Lead			短脚 Short-Lead			
规格 Series	适用 电压范围 Varistor Voltage Range	包装 数量 (支 / 袋) Quantity PCS/bag	规格 Series	适用 电压范围 Varistor Voltage Range	包装 数量 (支 / 袋) Quantity PCS/bag	
07H	180-681	1000	07H	180-681	1500	
10H	180-331	1000	10H	180-112	500	
	361-112	500				
14H	180-621	500	14H	180-112	500	
	681-112	250				
20H	180-361	250	20H	180-911	400	
	391-112	200		102-112	150	

### \*2. 编带 Tape & Box

规格 Series	适用电压范围 Varistor Voltage Range	包装数量 (支 / 盒) Quantity PCS/box	
07H	180-271	2000	
	331-681	1500	
10H	180-681	1000	
	751-911	800	
	102	400	
14H	112	200	
	180-431	1000	
	471-621	800	
20H	681-112	600	
	180-271	500	
	301-621	400	
	681-102	300	
	112	200	

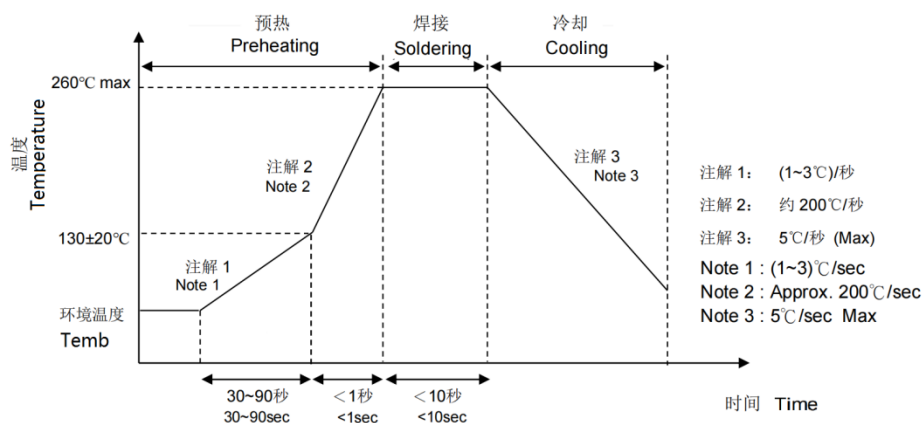
## ◆环保情况说明 Environmental Protection Statement

我司提供的所有压敏电阻物料均符合最新欧盟 ROHS 指令及 Reach 法规要求，请贵司放心使用。

We provide all varistor materials conform to the requirements of the latest EU ROHS directive and the Reach regulation, please rest assured to use.

## ◆推荐焊接条件 Soldering Recommendation

\*波峰焊曲线 Wave soldering profile



\*手工焊接 Iron soldering

项目 Item	条件 Conditions
烙铁头温度 Temperature of solderingIron-tip	360°C (max.)
焊接时间 Soldering Time	3s (max.)
焊接位置与涂装层距离 Distance from Varistor	2mm ( min.)

## ◆贮存方法 Storage Methods

元器件必须储存在清洁、通风、无腐蚀性气体的仓库内；除另有规定外，仓库的温度和相对湿度必须满足如下要求：a.温度：5~30℃；  
b 相对湿度： 20%~75%；存储期限：1 年。

Components must be stored in a clean, ventilated, non-corrosive gases warehouse; Unless otherwise specified, the warehouse temperature and relative humidity must meet the following requirements: a.Temperature: 5 ~ 30 °C;b. Relative humidity: 20% ~ 75%; Period of Storage: 1 year.

## ◆使用注意事项 Precautions For Use

- 1、工作环境温度应该在技术条件规定的范围以内。
- 2、不应该靠近发热或可燃元器件安装，最好有大于 3 毫米的间隔，以免损坏元器件。
- 3、接触引脚时请先佩戴手套。
- 1、 Working environment temperature should be within the prescribed scope of technical conditions.
- 2、 Near a fever or flammable components should not be installed, it is better to have more than 3 mm intervals, so as not to damage the components.
- 3、 Please wear gloves when the contact pin.

**◆修订履历 Update history**

版本 Version	日期 Date	修订内容 Revision Content	修订人 Reviser