

Manufacturer : Anshan Keifat Electronic Ceramic Technical Co.,Ltd.

No:

Approval Sheet for Product Specification

Customer:

Product: Lead Type Varistor

PART No.:

Mfr. P/N:

Date: 年 月 日

Manufacturer		Customer Confirm	
Prepared by		合 格 OK <input type="checkbox"/>	
		不 合 格 NG <input type="checkbox"/>	
Checked by		Checked by	
Approved by		Approved by	

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■ Application

Ideal for semiconductor, signal relay, telecommunication, communication intermedium station, distribution board, surge absorption and lightning-protection of all sorts of electric equipment.

■ Products series

Part No.	Maximum Operating Voltage (V)		Varistor Voltage (V)		Maximum Clamping Voltage (V)(8/20μs)		普通型			高能型(J)		
	AC	DC	下限 min.	上限 max.	Ip (A)	Vc (V)	Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)	Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)
							(2ms)	(10/1000μs)		(2ms)	(10/1000μs)	
05D241K	150	200	216	264	5	415	6.5	8.0	400	8.5	10.5	800
05D271K	175	225	243	297	5	475	7.5	8.5	400	9.5	11	800
05D301K	190	250	270	330	5	520	8	9.0	400	10.0	12	800
05D331K	210	275	297	363	5	570	8.5	9.5	400	10.5	13	800
05D361K	230	300	324	396	5	620	9	10.0	400	11	16	800
05D391K	250	320	351	429	5	675	10	12.0	400	12	17	800
05D431K	275	350	387	473	5	745	11	13.0	400	13	20	800
05D471K	300	385	423	517	5	810	13	15.0	400	15	21	800
05D511K	320	415	459	561	5	845	15	16.0	400	17	22.5	800
05D561K	350	460	504	616	5	920	17	16.8	400	19	24	800
05D621K	385	505	558	682	5	1025	19	17.7	400	21	26.6	800
05D681K	420	560	612	748	5	1120	21	19.4	400	24	29.1	800
07D241K	150	200	216	264	10	395	11.5	15.0	1200	15	21	1750
07D271K	175	225	243	297	10	455	12	18.0	1200	17	24	1750
07D301K	190	250	270	330	10	500	13	20.0	1200	18.5	26	1750
07D331K	210	275	297	363	10	550	14	23.0	1200	20	28	1750
07D361K	230	300	324	396	10	595	15	24.0	1200	23	32	1750
07D391K	250	320	351	429	10	650	17	26.0	1200	25	35	1750
07D431K	275	350	387	473	10	710	20	28.0	1200	27.5	40	1750
07D471K	300	385	423	517	10	775	21	29.0	1200	30	42	1750
07D511K	320	415	459	561	10	845	23	31.0	1200	32	45	1750
07D561K	350	460	504	616	10	925	27	35.0	1200	35	49	1750
07D621K	385	505	558	682	10	1025	29	38.0	1200	38	55	1750
07D681K	420	560	612	748	10	1120	32	42.0	1200	42	60	1750
07D751K	460	615	675	825	10	1240	35	45.0	1200	46	64	1750
07D781K	485	640	702	858	10	1290	37	48.0	1200	48	69	1750
07D821K	510	670	738	902	10	1355	40	52.0	1200	52	73	1750
07D911K	550	745	819	1001	10	1500	44	57.0	1200	56	78	1750



Part No.	Maximum Operating Voltage (V)		Varistor Voltage (V)		Maximum Clamping Voltage (V)(8/20μs)		普通型			高能型(J)		
							Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)	Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)
	AC	DC	下限 min.	上限 max.	Ip (A)	Vc (V)	(2ms)	(10/1000μs)		(2ms)	(10/1000μs)	
10D221K	140	180	198	242	25	360	23	32.0	2500	27.5	39	3500
10D241K	150	200	216	264	25	395	25	35.0	2500	30	42	3500
10D271K	175	225	243	297	25	455	30	37.0	2500	35	49	3500
10D301K	190	250	270	330	25	500	32	40.0	2500	38	54	3500
10D331K	210	275	297	363	25	550	33.5	43.0	2500	42	58	3500
10D361K	230	300	324	396	25	595	35	47.0	2500	45	65	3500
10D391K	250	320	351	429	25	650	40	60.0	2500	50	70	3500
10D431K	275	350	387	473	25	710	45	65.0	2500	55	80	3500
10D471K	300	385	423	517	25	775	46	67.0	2500	60	85	3500
10D511K	320	415	459	561	25	845	47	69.0	2500	62	90	3500
10D561K	350	460	504	616	25	925	48	70.0	2500	65	92	3500
10D621K	385	505	558	682	25	1025	49	72.0	2500	67	95	3500
10D681K	420	560	612	748	25	1120	50	75.0	2500	68	98	3500
10D751K	460	615	675	825	25	1240	51	77.0	2500	70	100	3500
10D781K	485	640	702	858	25	1290	52	80.0	2500	75	105	3500
10D821K	510	670	738	902	25	1355	55	85.0	2500	80	110	3500
10D911K	550	745	819	1001	25	1500	60	93.0	2500	90	130	3500
10D102K	625	825	900	1100	25	1650	65	102.0	2500	100	140	3500
10D112K	680	895	990	1210	25	1815	70	115.0	2500	110	155	3500
10D122K	750	990	1080	1320	25	1980	76	127.0	2500	120	165	3500
10D152K	930	1200	1350	1650	25	2475	82	135.0	2500	130	180	3500



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Part No.	Maximum Operating Voltage (V)		Varistor Voltage (V)		Maximum Clamping Voltage (V)(8/20μs)		普通型			高能型(J)		
							Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)	Maximum Energy (J)		Maximum Withstanding surge Current(A) (8/20μs)
	AC	DC	下限 min.	上限 max.	Ip (A)	Vc (V)	(2ms)	(10/1000μs)		(2ms)	(10/1000μs)	
14D201K	130	170	185	225	50	340	38	57	4500	50	70	6000
14D221K	140	180	198	242	50	360	40	60	4500	55	78	6000
14D241K	150	200	216	264	50	395	45	63	4500	60	84	6000
14D271K	175	225	243	297	50	455	52	70	4500	70	99	6000
14D301K	190	250	270	330	50	500	56	77	4500	75	108	6000
14D331K	210	275	297	363	50	550	63	85	4500	80	115	6000
14D361K	230	300	324	396	50	595	70	93	4500	90	130	6000
14D391K	250	320	351	429	50	650	72	100	4500	100	140	6000
14D431K	275	350	387	473	50	710	75	115	4500	110	155	6000
14D471K	300	385	423	517	50	775	80	118	4500	125	175	6000
14D511K	320	415	459	561	50	845	82	121	4500	136	180	6000
14D561K	350	460	504	616	50	925	85	125	4500	138	185	6000
14D621K	385	505	558	682	50	1025	88	128	4500	140	190	6000
14D681K	420	560	612	748	50	1120	90	130	4500	145	200	6000
14D751K	460	615	675	825	50	1240	100	143	4500	150	210	6000
14D781K	485	640	702	858	50	1290	105	148	4500	165	220	6000
14D821K	510	670	738	902	50	1355	110	157	4500	170	235	6000
14D911K	550	745	819	1001	50	1500	120	175	4500	180	255	6000
14D102K	625	825	900	1100	50	1650	130	190	4500	200	280	6000
14D112K	680	895	990	1210	50	1815	140	213	4500	220	310	6000
14D122K	750	990	1080	1320	50	1980	150	232	4500	245	324	6000
14D142K	880	1140	1260	1540	50	2310	165	238	4500	280	327	6000
14D162K	1000	1280	1440	1760	50	2640	170	243	4500	320	331	6000
14D182K	1100	1465	1620	1980	50	2970	185	250	4500	360	335	6000

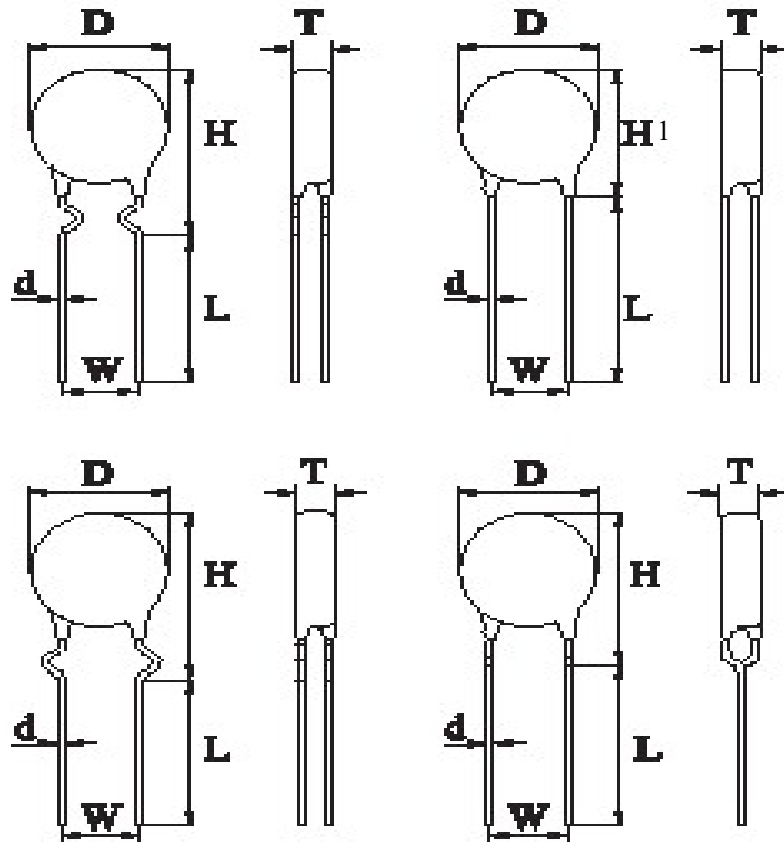
■ Marking

		Manufacturer's Marking
	14	diameter
	D	Type Designation
	471	Varistor Voltage (Marked with 3 figures)
	K	Tolerance

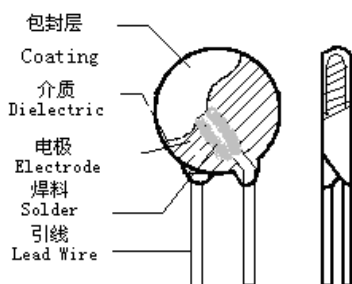


■ (mm)

ITEM	5D	7D	10D	14D
D:max	7.0	9.0	14.0	17.5
H1:max	10.0	12.0	17.0	20.5
H:max	12.5	14.5	20.0	22.5
T:max	4.9	4.9	8.5	8.5
F	5.0	5.0	7.5	10.0
d	0.6	0.6	0.6	0.8



■ Structure



- ①包封层 Coating : 环氧树脂 Epoxy Resin
- ②介质 Dielectric : 陶瓷 Ceramic
- ③电极 Electrode : 铜、银 Copper or silver
- ④焊料 Solder : 无铅焊料 Alloy Tin
- ⑤引线 Lead wire : CP 线 CP Lead



■ Room Condition

Temp.: 15°C~35°C R.H.: 45%~75%RH
 Atm Pressure : 86~106kPa (860~1060mbar)

■ Part Code Designation

KFR - 14 D - 471 - K J -b 10
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Type

Code	Type Designation
KFR	Manufacturer' s Marking

② Diameter

Code	diameter
05	5mm
10	10mm
14	14mm

③ Type Designation

Code	Chip Type
D	Disk type

④ Varistor Voltage

Code	Varistor Voltage
471	470 V DC

⑤ Tolerance

Code	Tolerance
K	± 10%

⑥ special marking

Code	Type Designation
“无”	普通型
J	高能型

⑦ Lead Shape

Code	Shape
a	Single Crimp
b	Straight
k	Out Kink
Y	Vertical Crimp

⑧ Lead spacing

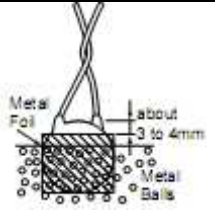
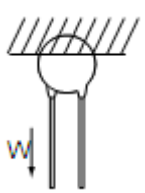
Code	Shape
5	5.0±0.5mm
7.5	7.5±0.5mm
10	10.0±0.5mm

■ Specification and Test Method

Item	Specifications	Test Method
1. Storage Temp. Range	-40°C~+85°C	
2. Operating Temp. Range	-40°C~+85°C	
3. Appearance and dimensions	No marked defect on Appearance form and dimensions are within Specified tolerance	Appearance be watched on sight Dimension be measured by caliper
4. Marking	To be easily legible	Be watched on sight

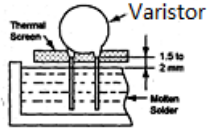


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Item	Specifications	Test Method								
5. Varistor Voltage	In specified tolerance	Element diameter $\leq 5\text{mm}$ test current 0.1mA (DC), others DC1mA								
6. Max. Clamping Voltage (V)	In specified tolerance	Current waveshapes $8 \times 20 \mu\text{s}$								
7. Maximum Energy (J)	In specified tolerance	测试电流为 2ms 方波或 $10/100 \mu\text{s}$ Current input of rectangular wave								
8. Max. Withstanding surge Current(A)	In specified tolerance	Current waveshapes $8 \times 20 \mu\text{s}$								
9. Dielectric Strength	Body Insulation	No failure and No marked defect on Appearance								
		<p>First, the terminals of the varistor should be connected together. Then, as shown in figure at right, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 3 to 4mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, apply a voltage of Table 2 for 60 sec. Between the capacitor lead wires and metal balls.</p> <div style="text-align: right;">  </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 50%; text-align: center;"><Table 2></td> <td style="width: 50%; text-align: center;">Test Voltage</td> </tr> <tr> <td></td> <td style="text-align: center;">AC2500V(r.m.s)</td> </tr> </table>	<Table 2>	Test Voltage		AC2500V(r.m.s)				
<Table 2>	Test Voltage									
	AC2500V(r.m.s)									
10. Temp. Char. Of Varistor Voltage	$-0.05 \leq T_c \leq 0$ (%/°C)	<p>Varistor should be measured at each step as following. Pre-treatment: The Varistor should be placed at $85 \pm 2^\circ\text{C}$ for 1 hour, then placed Post-treatment: Varistor should be stored for 24 ± 2 hours at room condition.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">阶段 Step</th> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">温度 Temp.(°C)</td> <td style="text-align: center;">22 ± 2</td> <td style="text-align: center;">85 ± 2</td> <td style="text-align: center;">25 ± 2</td> </tr> </tbody> </table>	阶段 Step	1	2	3	温度 Temp.(°C)	22 ± 2	85 ± 2	25 ± 2
阶段 Step	1	2	3							
温度 Temp.(°C)	22 ± 2	85 ± 2	25 ± 2							
11. Vibration Resistance	Appearance	No marked defect								
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$								
12. Strength of Lead wires	Tensile	Lead wire should not be cut off and Varistor should not be broken.								
	Bending	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$								
13. Solderability of leads	Lead wire should be soldered With uniform coating on the axial direction over 90% of the circumferential direction.	<p>Fix the body of the Varistor and apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N, and keep for 10 ± 1 sec.</p> <div style="text-align: right;">  </div> <p>Each lead wire should be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction return to original position, and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3s for 2 times.</p> <p>The lead wires of the Varistor should be dipped into alcohol Solution of 25% wt rosin and then into molten solder of 235°C within 2.0sec. In both case the depth of dipping is up to about 2.0 to 2.5mm from the root of the lead wires.</p>								

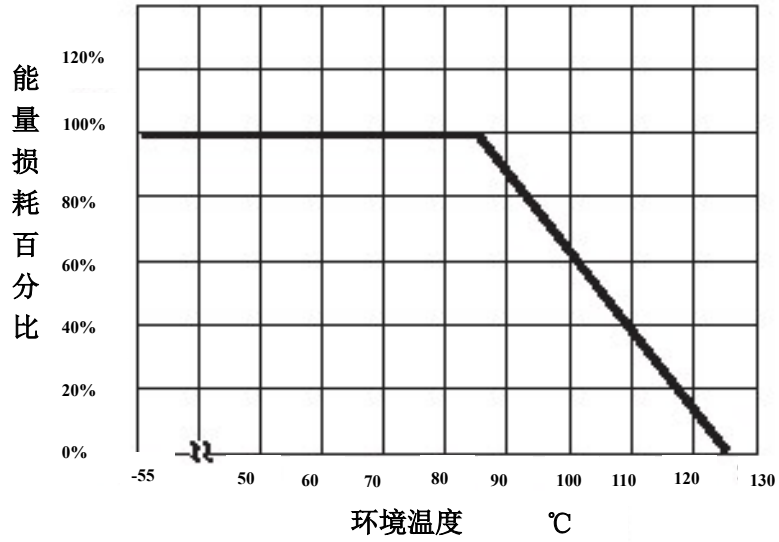


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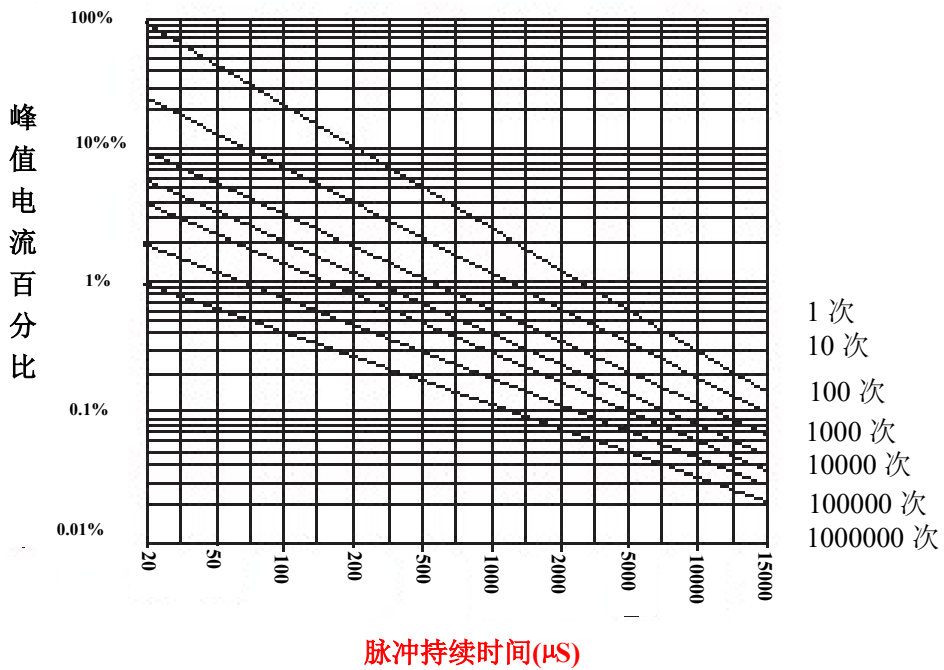
Item		Specifications	Test Method															
14. Soldering Effect	Appearance	No marked defect	The lead wires should be immersed in solder of $260 \pm 5^\circ\text{C}$ up to 1.5 to 2.0mm from the roof of terminal for 10 ± 1 sec. 															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																
15. Humidity	Appearance	No marked defect	Set the Varistor for 1344 hrs. at $40 \pm 2^\circ\text{C}$ in 90 to 95% relative humidity ..															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																
	I.R.	100M Ω min																
16. Humidity Cycling	Appearance	No marked defect	Apply the 10% rated voltage for 1344 hrs. at $40 \pm 2^\circ\text{C}$ in 90 to 95% relative humidity . (Charge/discharge current $\leq 50\text{mA}$) Post-treatment: Varistor should be stored for 24 ± 2 hours at room condition.															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																
	I.R.	100M Ω min																
17. Life Test	Appearance	No marked defect	Apply a voltage of Vdc/Vrms for 1000hrs. at 85°C (Charge/discharge current $\leq 50\text{mA}$) and relative humidity of 50% max.															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 10\%$																
18. Hot resistance	Appearance	No marked defect	Set Varistor for 1000hrs. at 125°C and relative humidity of 50% max.															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																
19. Cold resistance	Appearance	No marked defect	Set Varistor for 1000hrs. at -40°C															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																
20. Temperature Cycle	Appearance	No marked defect	The Varistor should be subjected to 5 temperature cycles. <div style="text-align: center;"> <p>< Temperature Cycle ></p> <table border="1" style="margin: auto;"> <thead> <tr> <th>Step</th> <th>Temperature($^\circ\text{C}$)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25+0/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>3</td> </tr> <tr> <td>3</td> <td>125+3/-0</td> <td>30</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>3</td> </tr> </tbody> </table> <p>Cycle time:5 cycle 周期数 5 个</p> </div>	Step	Temperature($^\circ\text{C}$)	Time(min)	1	-25+0/-3	30	2	Room temp.	3	3	125+3/-0	30	4	Room temp.	3
	Step	Temperature($^\circ\text{C}$)		Time(min)														
1	-25+0/-3	30																
2	Room temp.	3																
3	125+3/-0	30																
4	Room temp.	3																
Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 5\%$																	
21. Life Test of 8/20 μs current	Appearance	No marked defect	The Varistor should be put 10000 Maximum Withstanding surge Current and Current waveshapes $8 \times 20 \mu\text{s}$, the interval time is 10sec															
	Varistor Voltage	$\Delta V/V_{1\text{mA}} \leq \pm 10\%$																



能量损耗与温度关系图

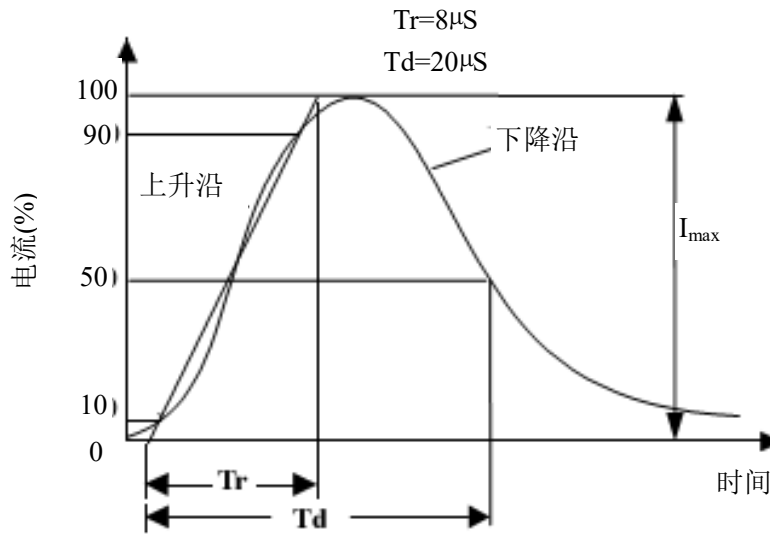


脉冲次数与脉冲峰值电流关系图





8/20 μ s 标准波形图



推荐焊接条件

