

贴片氧化锌压敏电阻规格书

SMD zinc oxide varistor specification



1、特点 Feature

1.1 先进的封装工艺，封装材料满足 UL94-V0

Advanced packaging technology, packaging materials meet UL94-V0

1.2 结构紧凑，体积小，节省空间

Compact structure, small size, space saving

1.3 优越的高温高湿性能

Superior high temperature and high humidity performance

1.4 强大的抑制高浪涌强电流能力

Strong ability to suppress high surge and high current

1.5 SMD 料盘包装，适用于无铅回流焊/波峰焊自动贴装

SMD tray packaging, suitable for lead-free reflow soldering/wave soldering automatic placement

1.6 符合 RoSH ， REACH ， H.F 无卤

Comply with RoSH, REACH, H.F

1.7 安规认证： Safety certification:

CUL (NO:E523420)



CQC (NO:CQC21001319729, NO:CQC21001320392)

TUV (NO:B 112025 0001 Rev.00 , B 112025 0002 Rev.00)

1.8 管理体系认证： ISO9001:2015 质量管理体系

ISO9001:2015 Quality Management System

ISO14001:2015 环境管理体系

ISO14001:2015 Environmental Management System

IAFT16949 汽车行业质量管理体系

IAFT16949 Automotive Quality Management System

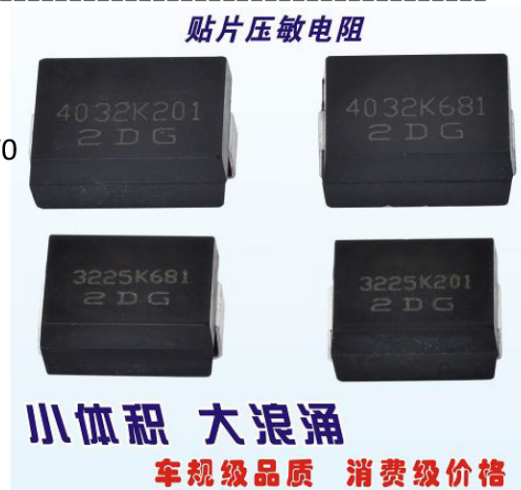
2、应用 Application

2.1 LED circuit protection LED 电路保护

2.2 Industrial equipment 工业设备

2.3 Communication equipment 通讯设备

2.4 Automotive Electronics 汽车电子



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3、适用标准 Applicable standards

- 3.1 UL1449
- 3.2 IEC61051-1, -2, -2-2, IEC60950-1 Annex Q
- 3.3 GB/T10193, GB/T10194, GB4943.1, GB8898
- 3.4 IEC61000-4-5

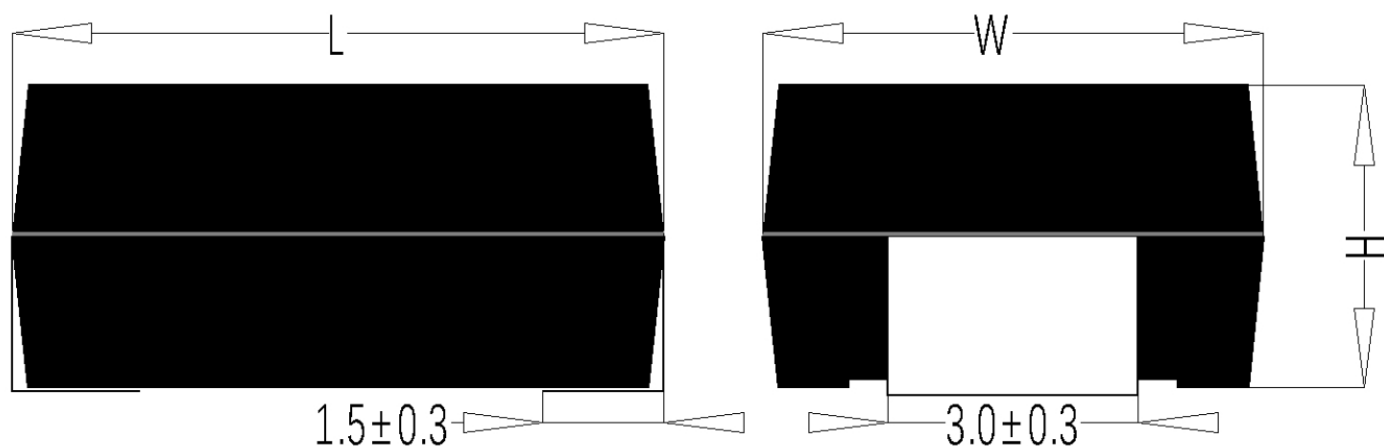
4、品名说明 Part No. Explain

<p style="font-size: 2em; margin: 0;">JQ 3225 K 471 G2</p> <p style="font-size: 2em; margin: 0;">4032</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="font-size: 1.2em; margin: 0;">JING IN[®]</p> <p style="font-size: 1.2em; margin: 0;">贴片尺寸: SMD Size: 3225≈8.2×6.3mm 4032≈11.0×8.2mm</p> <p style="font-size: 1.2em; margin: 0;">压敏电压公差: ±10% Varistor voltage tolerance: ±10%</p> </div>	<p style="font-size: 1.5em; margin: 0;">15寸料盘卷装: 15" Reel packing: 3225: 1820PCS/reel 4032: 1500PCS/reel</p> <p style="font-size: 1.5em; margin: 0;">压敏电压 (V_{1mA}): 47×10¹=470V Varistor voltage (V_{1mA}): 47×10¹=470V</p>
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5、通用参数 General Technical data

参数名称 Parameter Name	参数值 Parameter value	单位 Unit
工作温度 Operating temperature	-40 — +125	°C
储存温度 Storage temperature	-40 — +125	°C
耐电压 Voltage Proof	≥2.5	KV _{RMS}
绝缘电阻 Insulation Resistance	≥100	MΩ

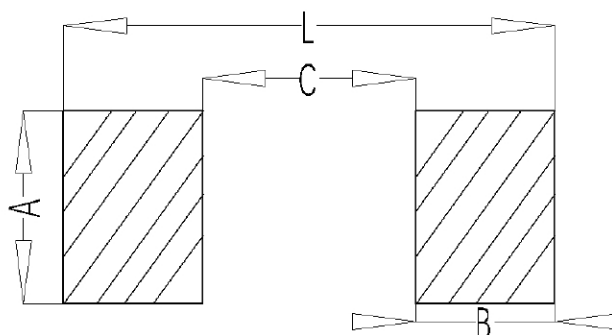
6、结构与尺寸 Structure and Dimensions



(单位 Unit: mm)

尺寸 Size Code	压敏电压范围 (V) Varistor Voltage (V)	L	W	H
3225	V _{1mA} =201—681	8.2±0.3	6.3±0.3	4.3±0.3
	V _{1mA} =751—821			5.2±0.3
4032	V _{1mA} =201—681	11.0±0.3	8.2±0.3	4.8±0.3
	V _{1mA} =751—821			5.5±0.3

7、焊盘尺寸 Dimensions



(单位 unit: mm)

尺寸 Model number	A	B	C	L
3225	3.5	2.8	4.5	10.1
4032	3.5	2.8	6.5	12.1

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8、电气特性 Electrical Characteristics

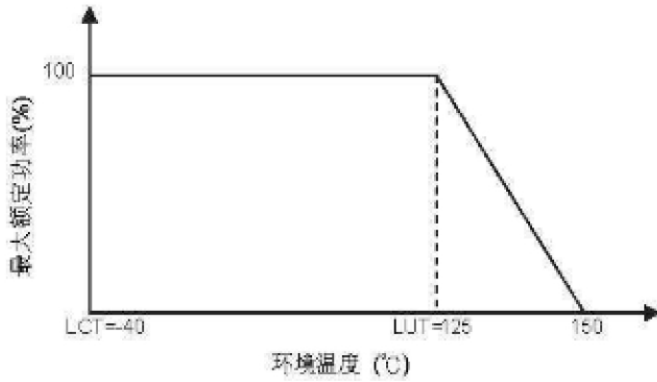
型号 Part No.	压敏电压 Varistor Voltage (@1mA DC)	最大连续 工作电压 Max. Allowable Voltage		最大 限制电压 Max. Clamping Voltage (8/20 μ s)		最大 冲击电流 Max. Impulse Current (8/20 μ s)	最大 通流能量 Max. flow Circulation Energy (40 Times)	最大能量 Max. Energy (10/1000 μ s)	额定 功率 Rated Power	参考电容 Typical capacitance Reference @1KHZ
		V _{AC} (V)	V _{DC} (V)	V _p (V)	I _p (A)					
3225K201	200(180-220)	130	170	340	10	1200/1750	2KV/1KA	11.0	0.25	200
3225K221	220(198-242)	140	180	360	10	1200/1750	2KV/1KA	12.0	0.25	180
3225K241	240(216-264)	150	200	395	10	1200/1750	2KV/1KA	13.0	0.25	170
3225K271	270(243-297)	175	225	455	10	1200/1750	2KV/1KA	15.0	0.25	150
3225K301	300(270-330)	195	250	500	10	1200/1750	2KV/1KA	17.0	0.25	150
3225K331	330(297-363)	210	275	550	10	1200/1750	2KV/1KA	18.0	0.25	150
3225K361	360(324-396)	230	300	595	10	1200/1750	2KV/1KA	20.0	0.25	115
3225K391	390(351-429)	250	320	650	10	1200/1750	2KV/1KA	21.0	0.25	105
3225K431	430(387-473)	275	350	710	10	1200/1750	2KV/1KA	23.0	0.25	95
3225K471	470(423-517)	300	385	775	10	1200/1750	2KV/1KA	25.0	0.25	90
3225K511	510(459-561)	320	410	845	10	1200/1750	2KV/1KA	25.0	0.25	85
3225K561	560(504-616)	350	450	930	10	1200/1750	2KV/1KA	26.0	0.25	80
3225K621	620(558-682)	395	510	1020	10	1200/1750	2KV/1KA	28.0	0.25	78
3225K681	680(612-748)	420	560	1120	10	1200/1750	2KV/1KA	30.0	0.25	75

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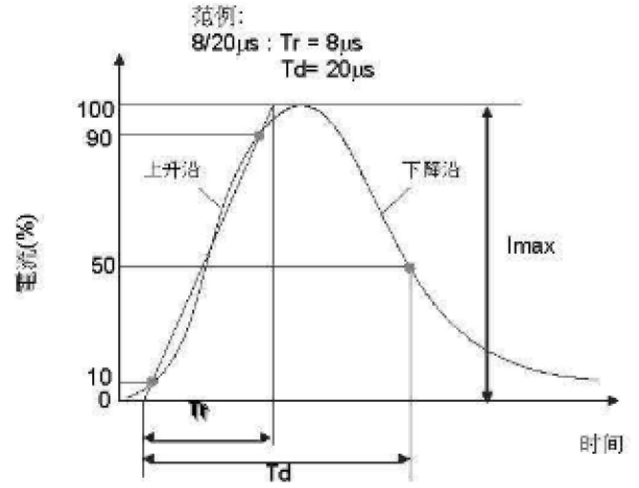


4032K201	200(180-220)	130	170	340	25	2500/3500	4KV/2KA	25.0	0.4	500
4032K221	220(198-242)	140	180	360	25	2500/3500	4KV/2KA	27.0	0.4	450
4032K241	240(216-264)	150	200	395	25	2500/3500	4KV/2KA	30.0	0.4	420
4032K271	270(243-297)	175	225	455	25	2500/3500	4KV/2KA	35.0	0.4	370
4032K301	300(270-330)	195	250	500	25	2500/3500	4KV/2KA	40.0	0.4	330
4032K331	330(297-363)	210	275	550	25	2500/3500	4KV/2KA	42.0	0.4	300
4032K361	360(324-396)	230	300	595	25	2500/3500	4KV/2KA	45.0	0.4	280
4032K391	390(351-429)	250	320	650	25	2500/3500	4KV/2KA	50.0	0.4	260
4032K431	430(387-473)	275	350	710	25	2500/3500	4KV/2KA	55.0	0.4	230
4032K471	470(423-517)	300	385	775	25	2500/3500	4KV/2KA	60.0	0.4	210
4032K511	510(459-561)	320	410	845	25	2500/3500	4KV/2KA	67.0	0.4	200
4032K561	560(504-616)	350	450	930	25	2500/3500	4KV/2KA	69.0	0.4	180
4032K621	620(558-682)	395	510	1020	25	2500/3500	4KV/2KA	70.0	0.4	160
4032K681	680(612-748)	420	560	1120	25	2500/3500	4KV/2KA	72.0	0.4	150

功率减额曲线 Power derating curve



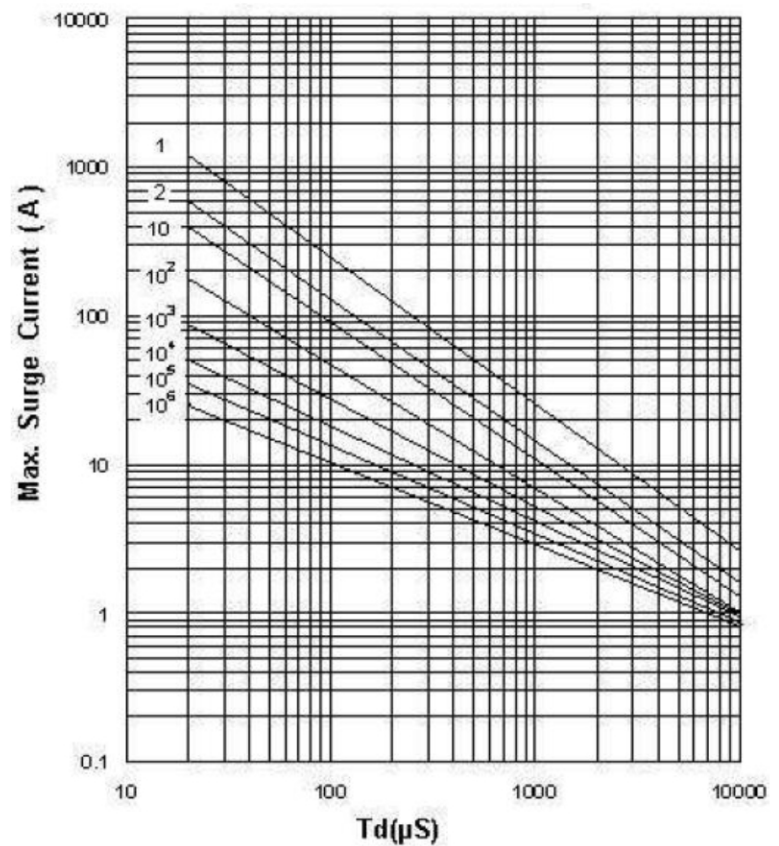
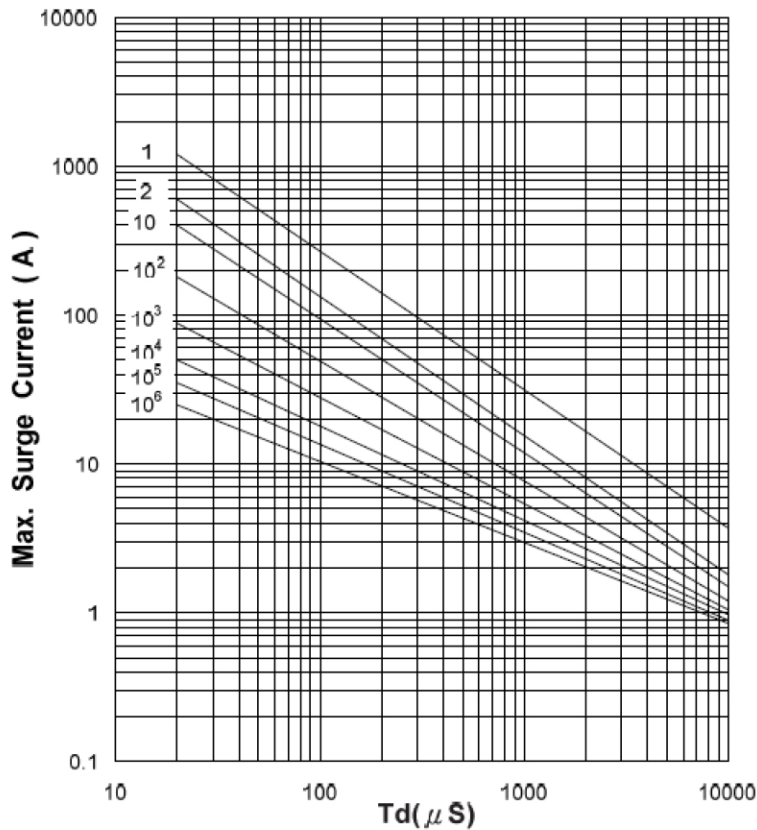
冲击电流标准波形 Standard Waveform of Impulse Current



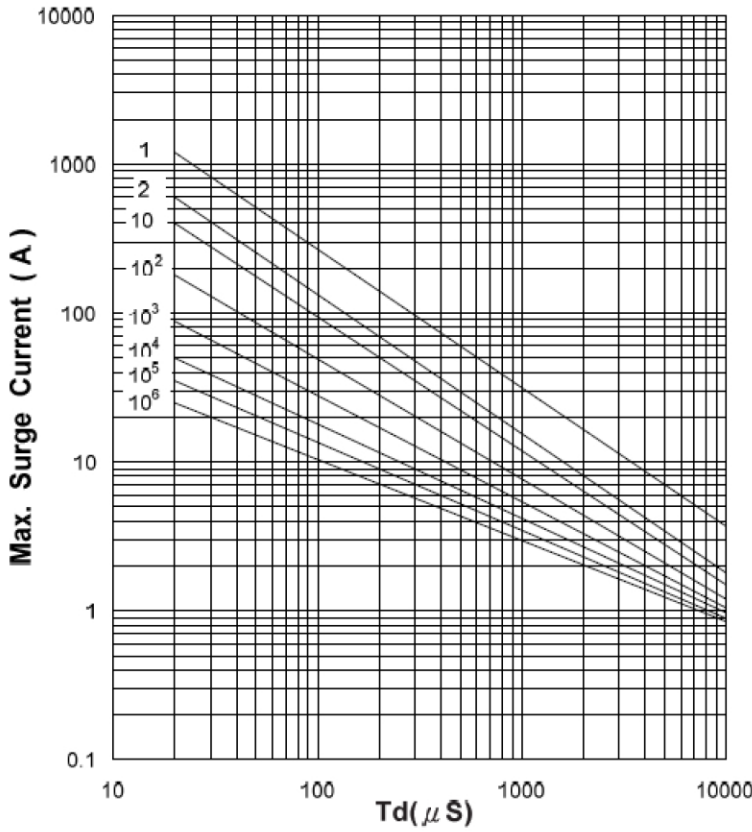
最大冲击电流减额曲线 Maximum impulse current derating curve

3225K201 – 3225K471

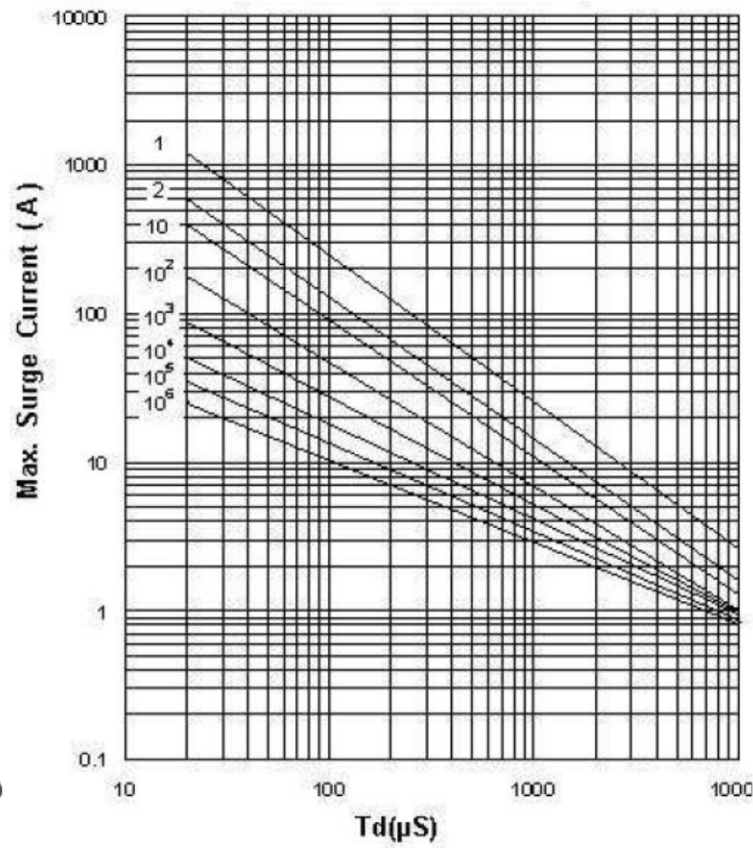
3225K511 – 3225K681



4032K201 – 4032K471

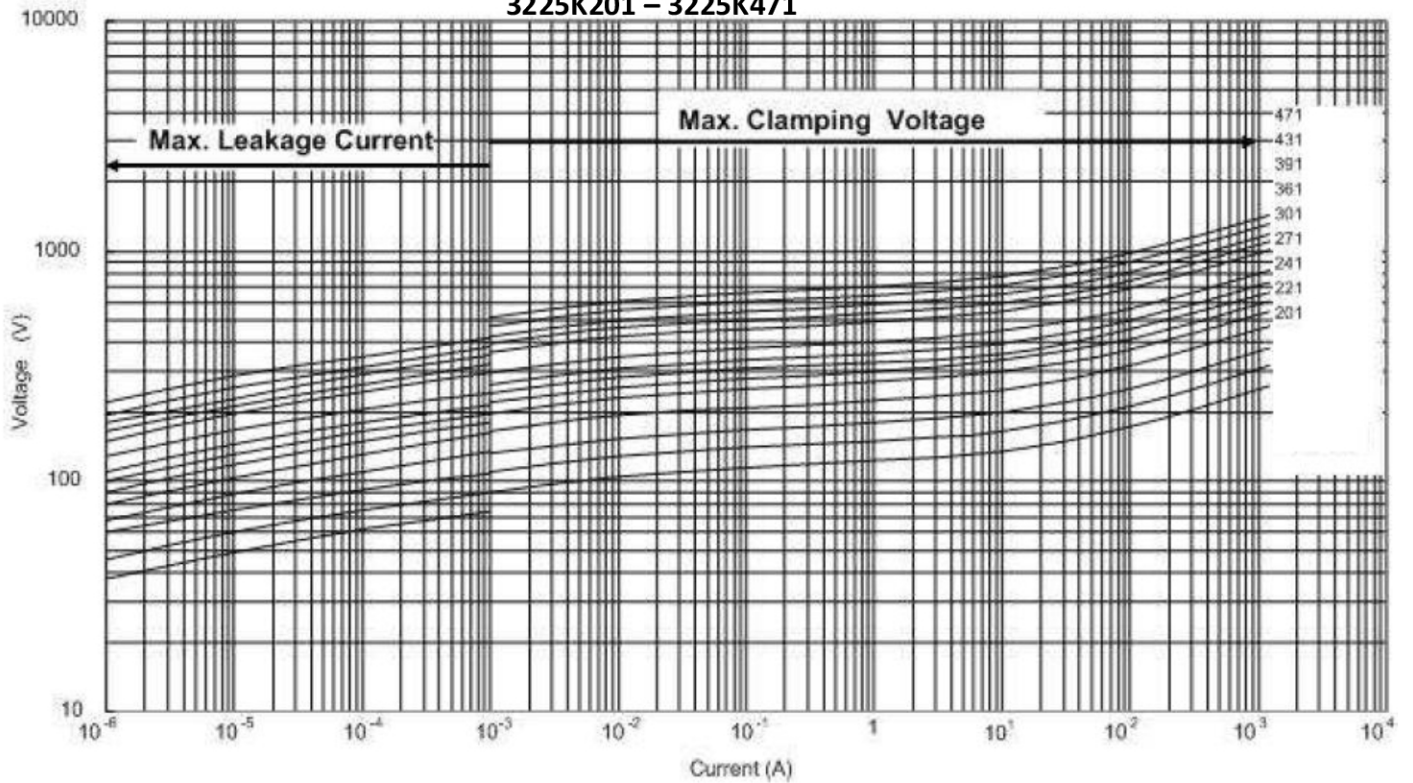


4032K511 – 4032K681

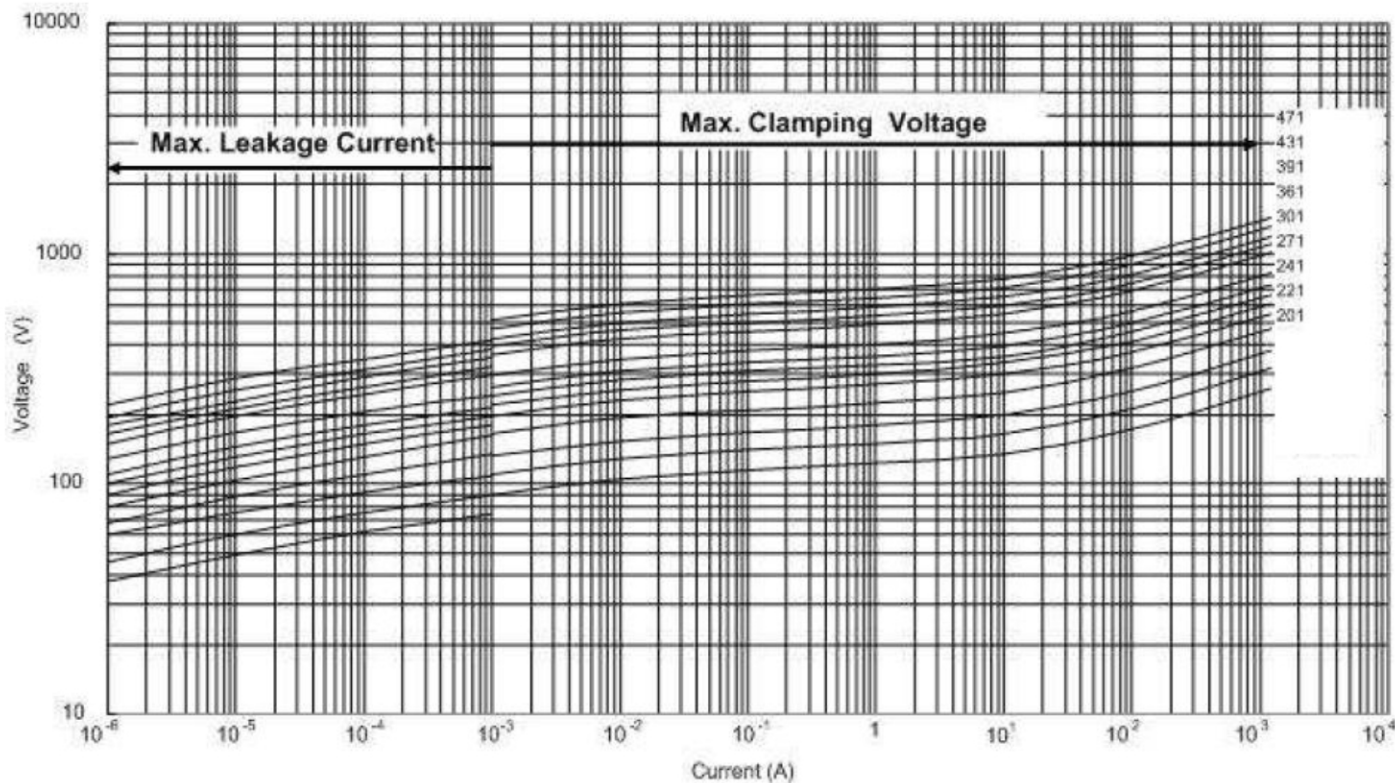


最大漏电流与最大限制电压曲线 Maximum leakage current and maximum allowable voltage

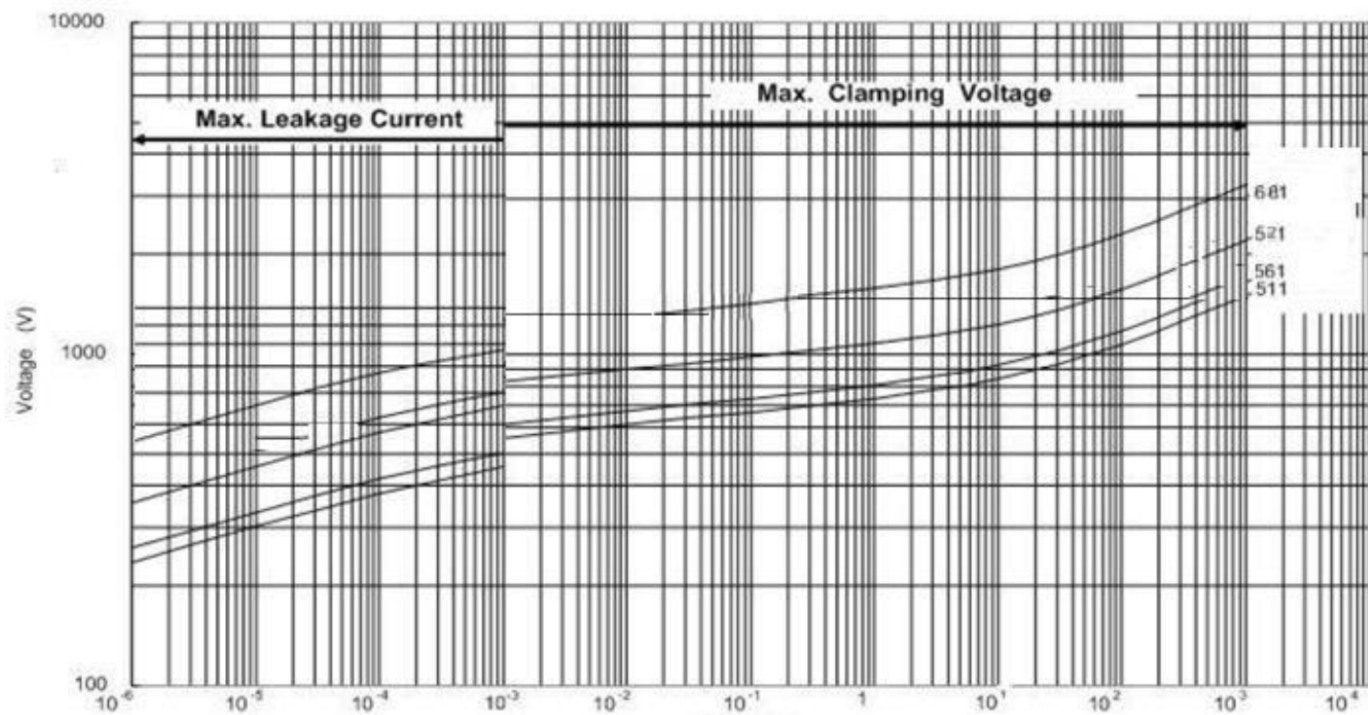
3225K201 – 3225K471



4032K201 – 4032K471



3225K511 – 3225K681



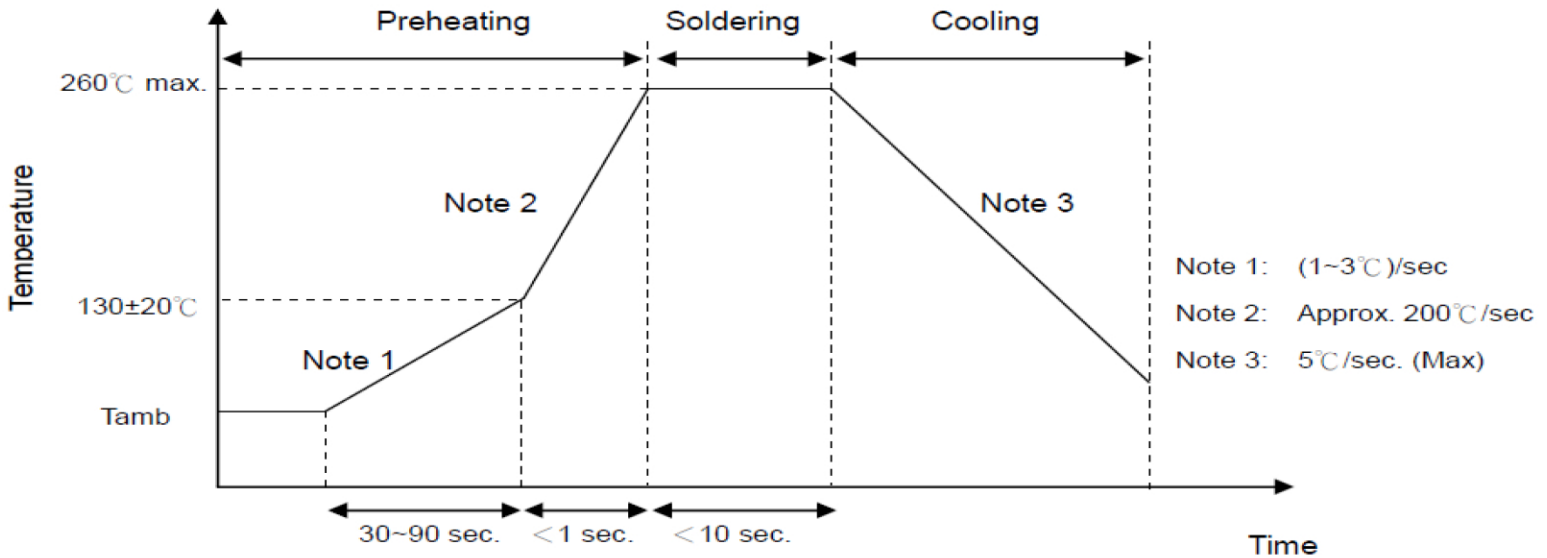
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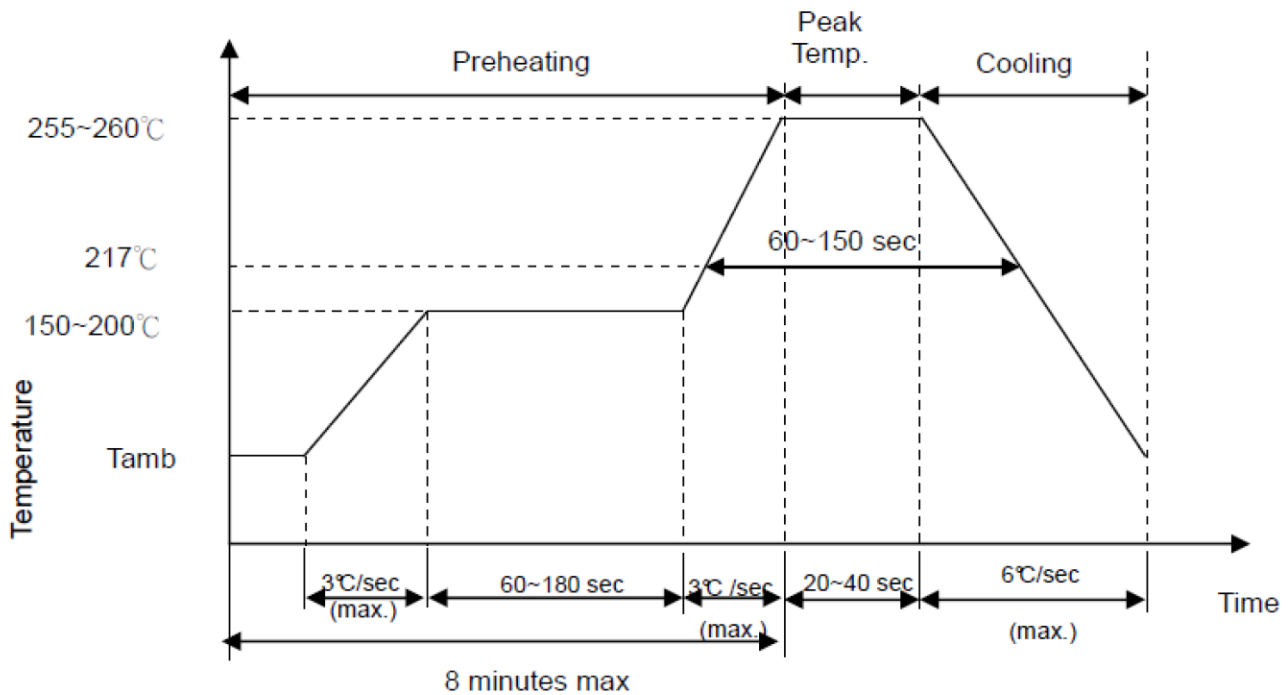


9、推荐焊接条件 Recommended soldering conditions

9.1 波峰焊曲线 Wave soldering



9.2 无铅回流焊曲线 Lead-free reflow soldering



烙铁重工焊接条件 Soldering iron heavy industry welding conditions

项目 Item	温度 Temperature
烙铁头部温度 Soldering iron tip temperature	360°C (max)
焊接时间 Welding time	3s(max)
烙铁头直径 Diameter of soldering iron tip	Φ3mm(max)

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10、可靠性试验 Reliability

项目 Item	测试项目标准 Standard	测试方法 Test condition / Method	规格值 Specifications															
耐振性 Vibration	IEC 61051-1	将成品置于振动机上，施与一单谐振动（振幅：0.75mm）和振幅 1.5mm，振动频率周期为 10Hz—55Hz—10Hz，对三个垂直方向各试验 2 个小时，然后检测成品外在损伤。 Frequency range:10-55-10Hz Amplitude:0.75mm and 1.5mm Direction: 3 mutually perpendicular directions,2 hrs each.	$ \Delta V/V_{1mA} \leq 5\%$ 无外在损伤 No visible damage															
可焊性 Solderability	IEC60068-2-20	将成品引脚浸入 245℃±3℃的焊锡液中 3±0.3 秒取出 Dip in solder pot with condition 245±3℃, 3±0.3 sec	上锡均匀且面积≥95% Solder coverage≥95%															
耐焊接热性 Resistance to Soldering Heat	IEC60068-2-20	将成品引脚浸入 260℃±3℃的焊锡液中 10±1 秒取出 Dip in solder pot with condition 260±3℃, 10±1 sec	$ \Delta V/V_{1mA} \leq 5\%$															
高温储存 High temperature storage	IEC 60068-2-2	将成品置于 125±5℃烤箱中 1000±24 小时，取出后置于常温 1-2 个小时，然后测量压敏电压 Oven condition 125±5℃ x 1000±24 hrs, measure after complete test 1-2H	$ \Delta V/V_{1mA} \leq 5\%$															
耐湿性 Damp Heat, Steady State	IEC60068-2-78	1、将成品置于温度 40±2℃湿度 95%环境中 1000 个小时 2、将成品置于温度 40±2℃湿度 95%环境中，且施加最大允许工作电压 1000 个小时 1. 40±2℃, 90-95% RH, 1000hrs 2. 40±2℃, 90-95% RH, at MAV, 1000hrs	无外在损伤 No visible damage $ \Delta V/V_{1mA} \leq 10\%$ 绝缘电阻≥100MΩ IR≥100MΩ															
冷热冲击 Rapid change of Temperature	IEC60068-2-14	以如下表的温度周期加于成品 5 次，然后置于室温 1-2 小时测量压敏电压 The conditions shown below shall be repeated 5 cycles <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Period(minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5±3</td> </tr> <tr> <td>3</td> <td>+125±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>5±3</td> </tr> </tbody> </table>	Step	Temperature(°C)	Period(minutes)	1	-40±3	30±3	2	Room temperature	5±3	3	+125±2	30±3	4	Room temperature	5±3	无外在损伤 No visible damage $ \Delta V/V_{1mA} \leq 5\%$
Step	Temperature(°C)	Period(minutes)																
1	-40±3	30±3																
2	Room temperature	5±3																
3	+125±2	30±3																
4	Room temperature	5±3																
高温负荷 High Temperature load	IEC61051-4.20	将成品施加最大允许 AC 电压置于温度 125±2℃烤箱中 1000±24 小时，然后置于室温 1-2 小时测量压敏电压 125±2℃, 1000±24hrs at Max VaC, measure after 1-2H	$ \Delta V/V_{1mA} \leq 10\%$															
电压温度系数 Voltage temperature coefficient	规格标准 Specification Standard	$\frac{V_{1mA} \text{ at } 125^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{100} \times 100 (\%/^{\circ}\text{C})$	$-0.05 \leq T_c \leq 0.05 (\%/^{\circ}\text{C})$															
耐电压 Voltage	IEC61051-4.8	将成品表面封装体，以金属线绕成紧密线圈状，于线圈出头端与引脚端输入电压 AC2500V 施加 1 分钟	无外在损伤 No visible damage															

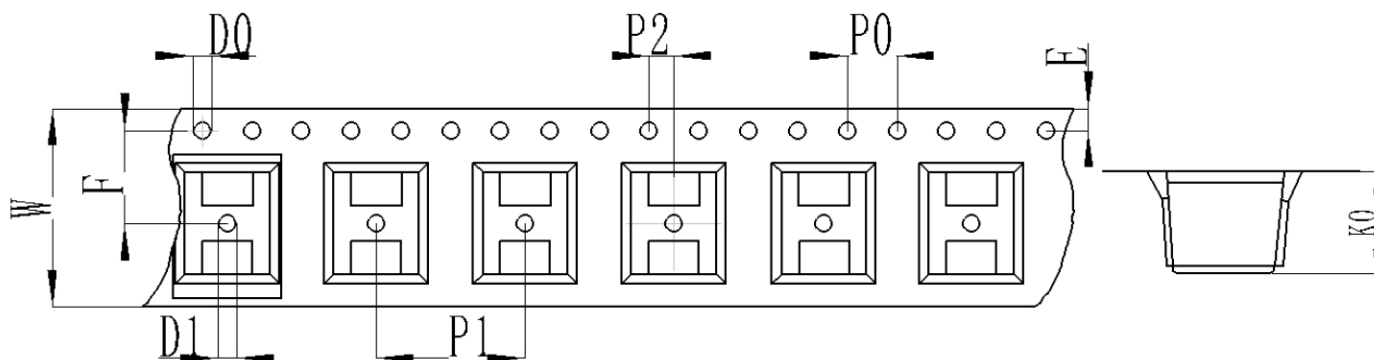
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		Metal balls method, 2500 Vac 1min	
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11、包装 Packing

(单位 Unit: mm)

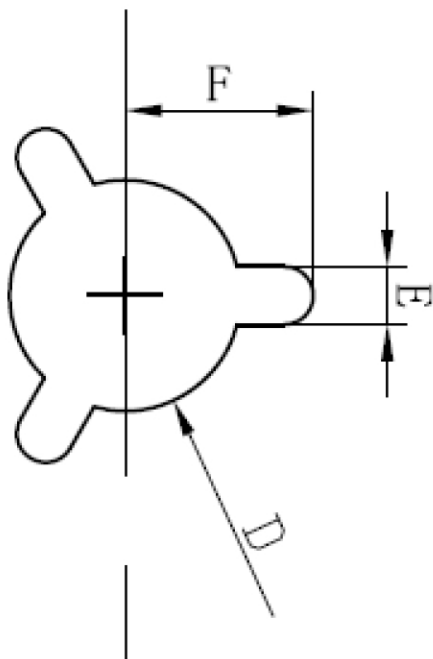
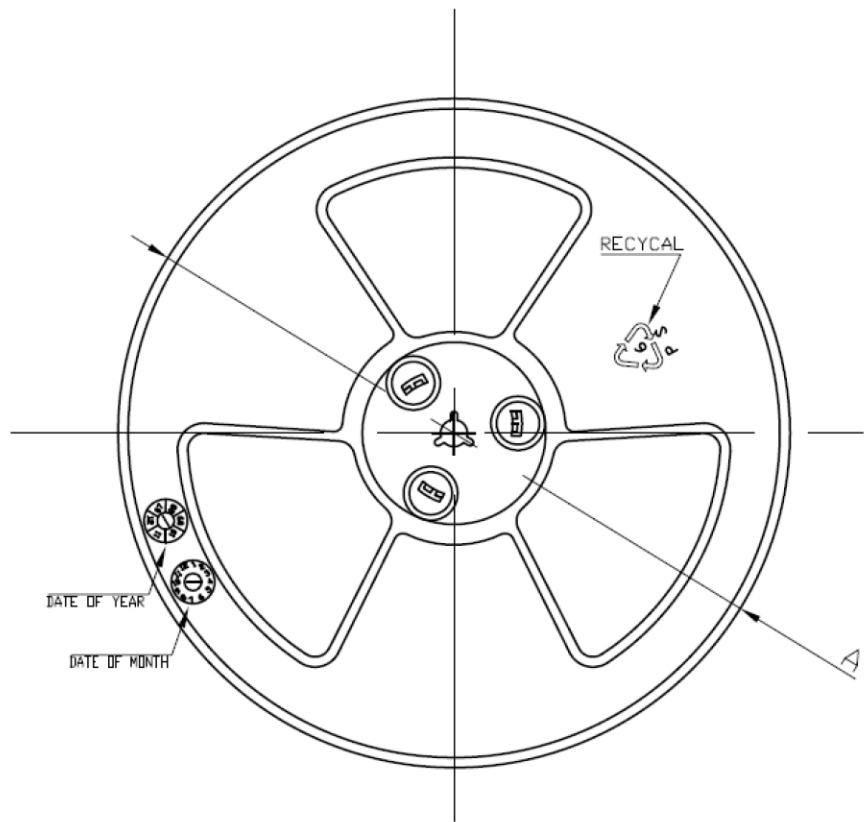
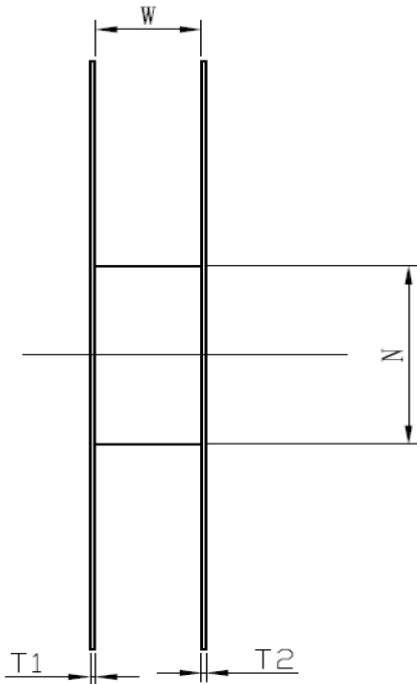
11.1 编带包装方式说明 Taping Packaging



3225	Symbol	w	F	E	P0	P1	P2
	Spec	16.0 ± 0.3	7.5 ± 0.1	1.75 ± 0.1	4.00 ± 0.1	12.0 ± 0.1	2.00 ± 0.1
	Symbol	D0	D1	K0	数量/盘 : PCS/Reel		
	Spec	1.50 ± 0.1	1.50 ± 0.1	4.5 ± 0.1	1820		
4032	Symbol	w	F	E	P0	P1	P2
	Spec	24.0 ± 0.3	11.5 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	12.0 ± 0.1	2.0 ± 0.1
	Symbol	D0	D1	K0	数量/盘 : PCS/Reel		
	Spec	1.5 ± 0.1	1.5 ± 0.1	5.3 ± 0.1	1500		

11.2 15 寸胶盘尺寸 15 inch plastic tray size

(单位 Unit: mm)



SPEC	3225	4032
W	16.4 ± 0.3	24.4 ± 0.3
N	Φ100 ± 3.0	Φ100 ± 3.0
T1	2.2 ± 0.3	2.2 ± 0.3
T2	2.2 ± 0.3	2.2 ± 0.3
A	Φ380 ± 3.0	Φ380 ± 3.0
D	13.3 ± 0.3	13.3 ± 0.3
E	2.3 ± 0.5	2.3 ± 0.5
F	10.75 ± 0.5	10.75 ± 0.5

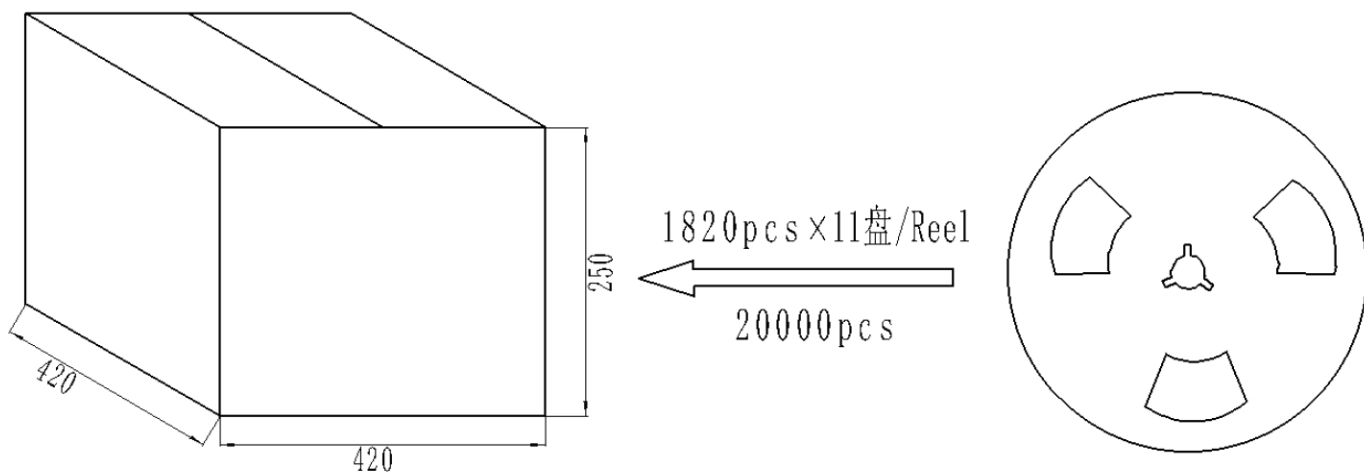
12、包装纸箱 Carton Packing

(单位 Unit: mm)

3225

重量: 20 千克/箱

Weight: 20kg/Box



4032

重量: 16 千克/箱

Weight: 16kg/Box

