

## 3225 Surface Mount Metal Oxide Varistor Spec Sheet

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### ※ Features

1. Advanced packaging technology, packaging materials meet UL94-V0
2. Compact structure, small size, space saving
3. Superior high temperature and high humidity performance
4. Strong ability to suppress high surge and high current
5. SMD reel packaging for lead-free reflow/wave soldering automatic placement
6. RoHS , REACH, H.F
7. Safety certification: CQC , TUV , UL
8. Replace 07D dip radial leaded varistor



### ※ Typical Application

1. LED circuit protection
2. Industrial equipment
3. Communication equipment
4. Automotive Electronics

### ※ Applicable Standards

1. UL1449
2. IEC61051-1, -2, -2-2, IEC60950-1 Annex Q
3. GB/T10193, GB/T10194, GB4943.1, GB8898
4. IEC61000-4-5

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### ※ Part Numbering

3225 K 471

SMD Dimension  
3225=8.2x6.3mm

Varistor voltage tolerance  $\pm 10\%$

Varistor Voltage(V1mA):  $47 \times 10^1 = 470V$

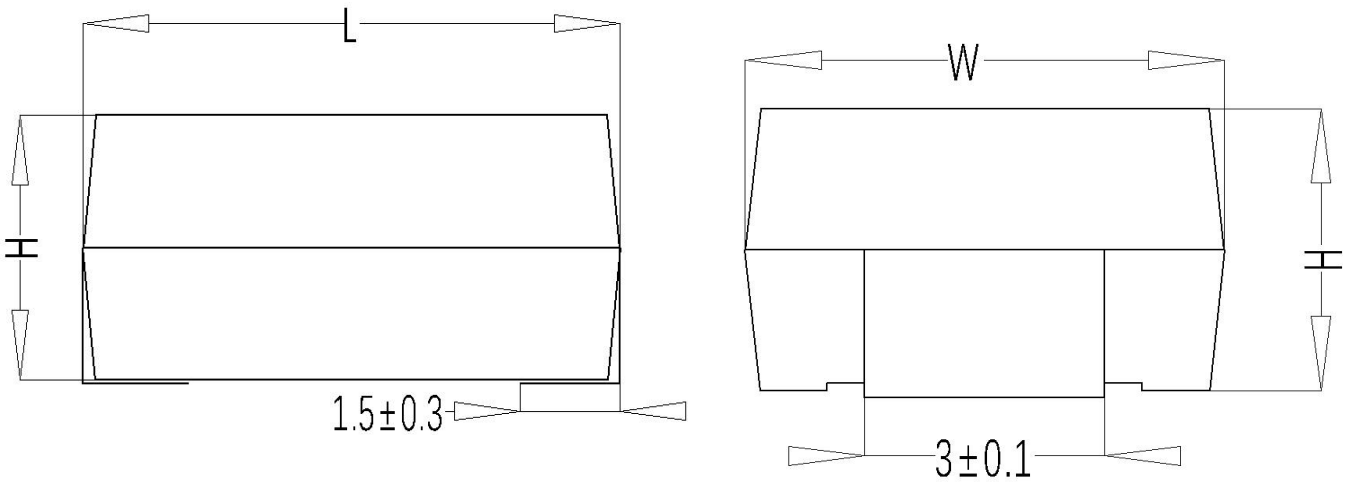
### ※ General Parameters

Parameter	Value	Unit
Operating Temperature	-40 ~ +125	°C
Storage Temperature	-40 ~ +125	°C
Withstand Voltage	$\geq 2.5$	KV <sub>RMS</sub>
Insulation Resistance	$\geq 100$	M $\Omega$

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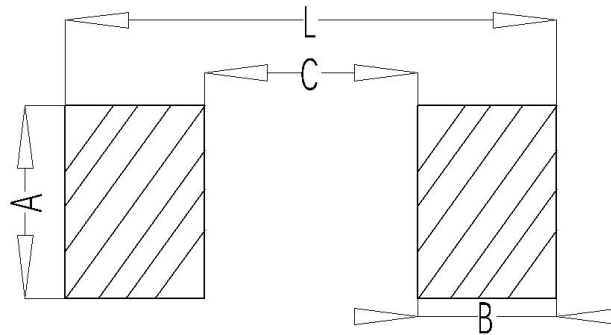
### ※ Structure And Size



(unit:mm)

Size	Varistor Voltage Range (V)	L	W	H
3225	V <sub>1ma</sub> =201—681	8.2 ± 0.3	6.3 ± 0.3	3.8--4.3 ± 0.3
	V <sub>1ma</sub> =751—821			5.2 ± 0.3

### ※ Pad Dimension



(unit:mm)

Size	A	B	C	L
3225	3.5	2.8	4.5	10.1

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### ※ Electrical Characteristics

P/N	Varistor Voltage (@1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20 $\mu$ s)		Max. Surge Current (8/20 $\mu$ s)	Max. Energy (10/1000 $\mu$ s)	Rated Power	Ref. Capacitance@1KHZ
	V <sub>1mA</sub> (V)	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>p</sub> (V)	I <sub>p</sub> (A)	I <sub>max</sub> (A)	W <sub>max</sub> (J)	P (W)	C(pF)
3225K201	200(180-220)	130	170	340	10	1200	11.0	0.25	200
3225K221	220(198-242)	140	180	360	10	1200	12.0	0.25	180
3225K241	240(216-264)	150	200	395	10	1200	13.0	0.25	170
3225K271	270(243-297)	175	225	455	10	1200	15.0	0.25	150
3225K301	300(270-330)	195	250	500	10	1200	17.0	0.25	150
3225K331	330(297-363)	210	275	550	10	1200	18.0	0.25	150
3225K361	360(324-396)	230	300	595	10	1200	20.0	0.25	115
3225K391	390(351-429)	250	320	650	10	1200	21.0	0.25	105
3225K431	430(387-473)	275	350	710	10	1200	23.0	0.25	95
3225K471	470(423-517)	300	385	775	10	1200	25.0	0.25	90
3225K511	510(459-561)	320	410	845	10	1200	25.0	0.25	85
3225K561	560(504-616)	350	450	930	10	1200	26.0	0.25	80
3225K621	620(558-682)	395	510	1020	10	1200	28.0	0.25	78
3225K681	680(612-748)	420	560	1120	10	1200	30.0	0.25	75
3225K751	750(675-825)	460	615	1235	10	1200	32.0	0.25	70

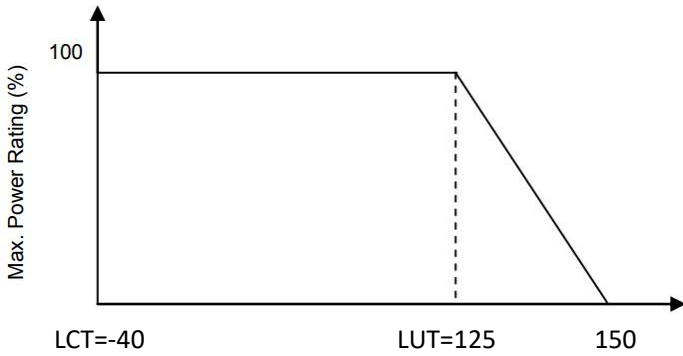
**Note:**

**\*1. UL1449 4th file on: E523420**

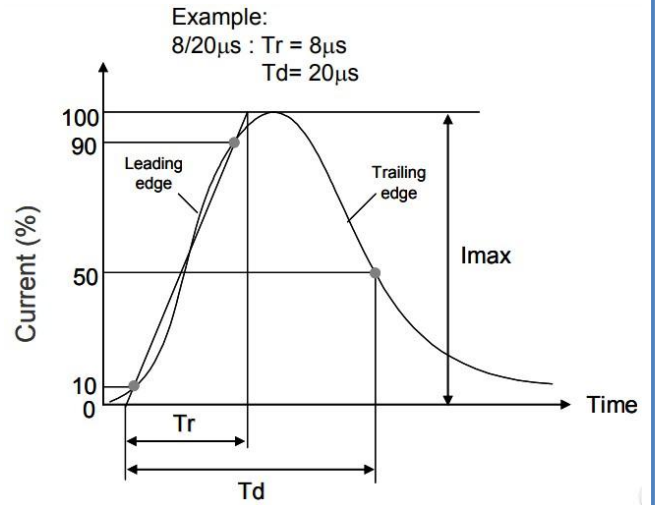
**\*2. TUV: IEC 61051 file no: B 112025 0001 REV.00**

# 3225 Surface Mount Metal Oxide Varistor Spec Sheet

## ※ Power Derating Curve

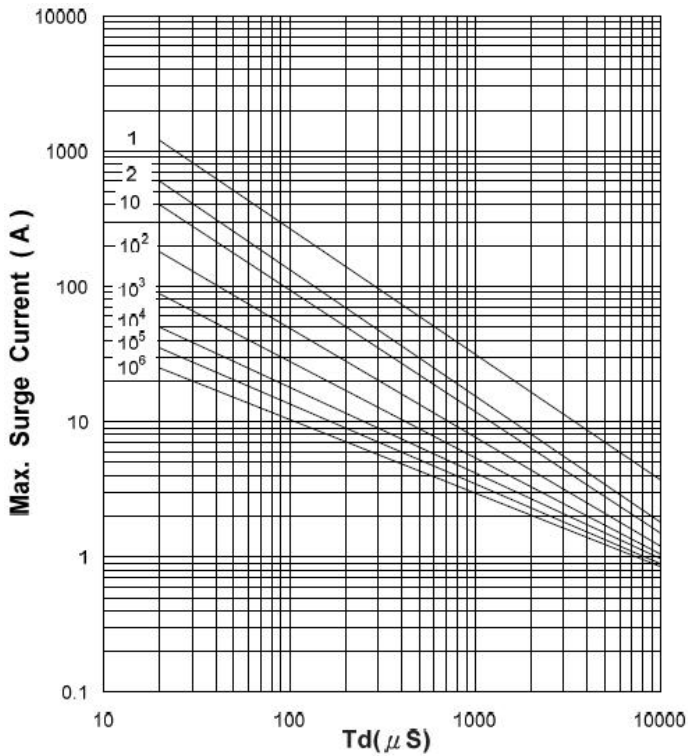


## ※ Surge Current Standard Waveform

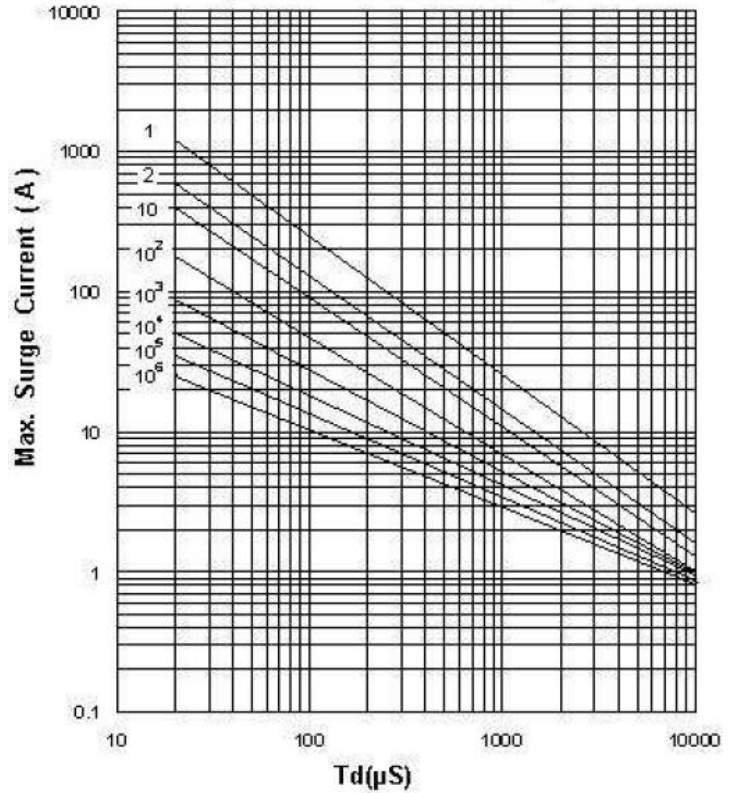


## ※ Max. Surge Current Derating Curves

3225K201 – 3225K471



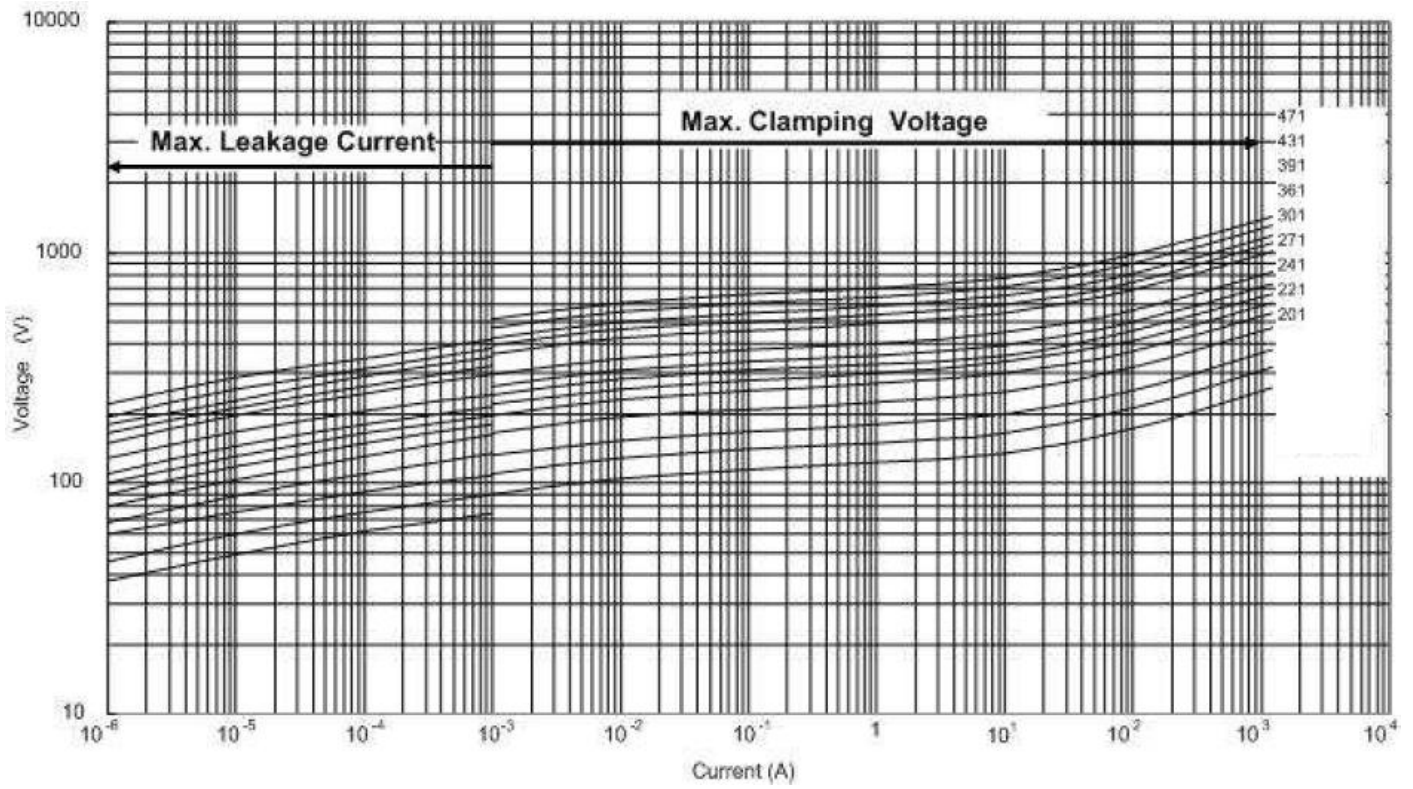
3225K511 – 3225K821



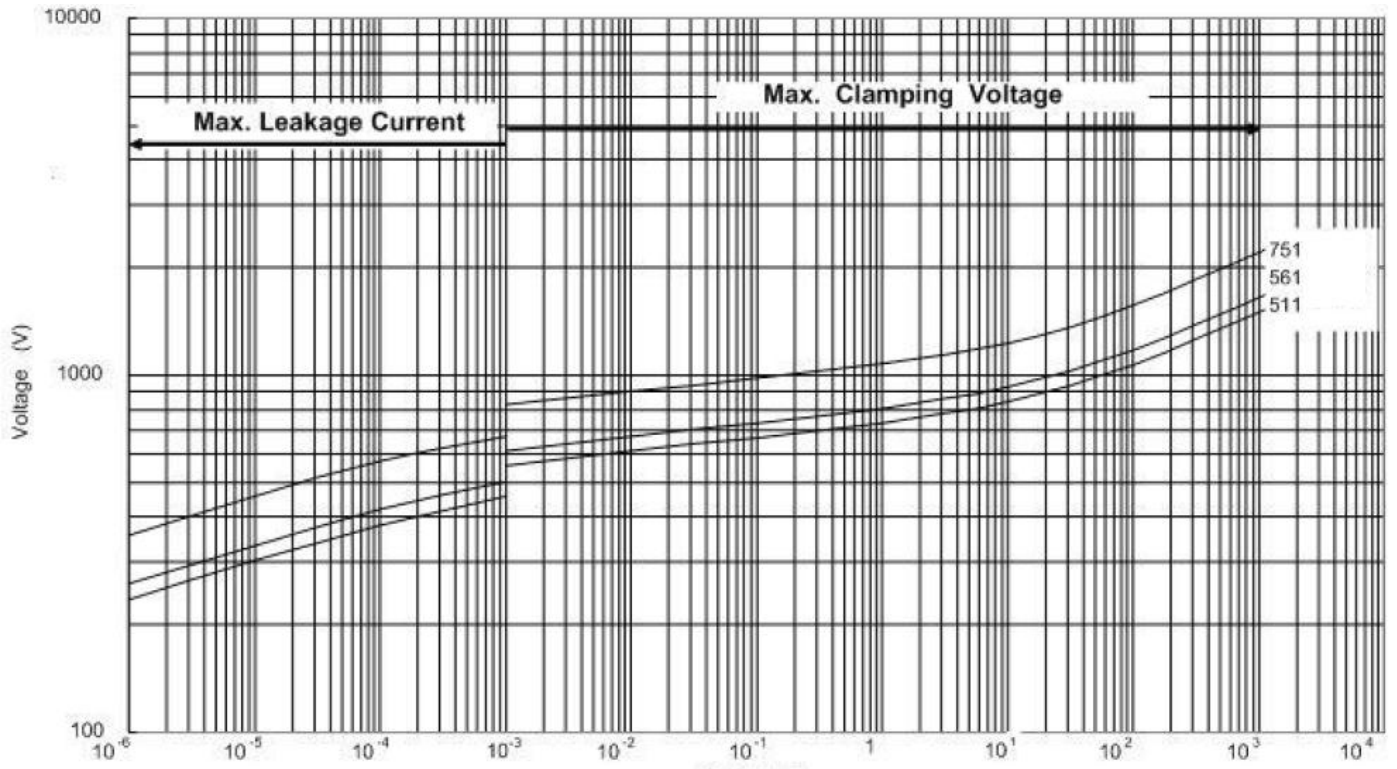
# 3225 Surface Mount Metal Oxide Varistor Spec Sheet

## ※ Max. Leakage Current and Max. Clamping Voltage Curves

3225K201 – 3225K471



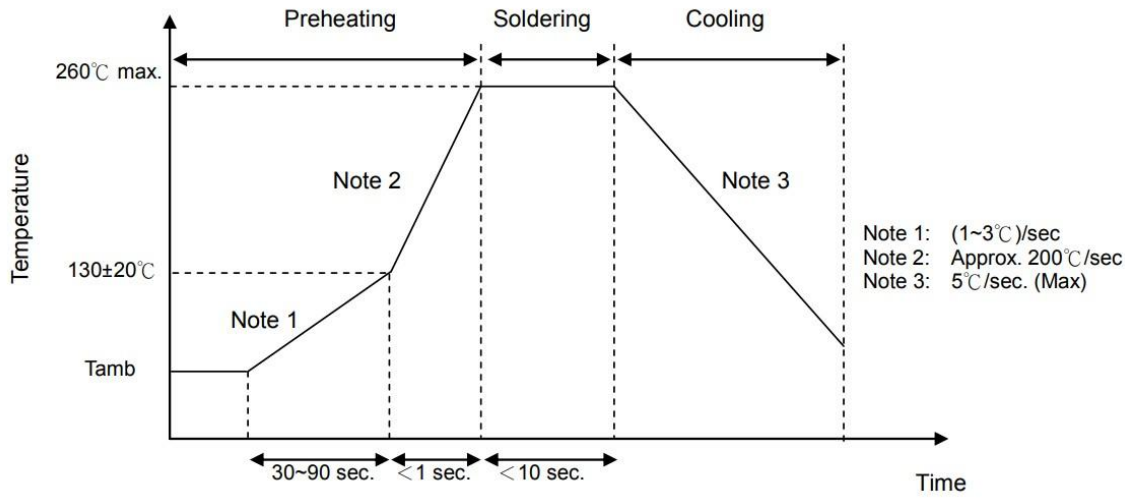
3225K511 – 3225K751



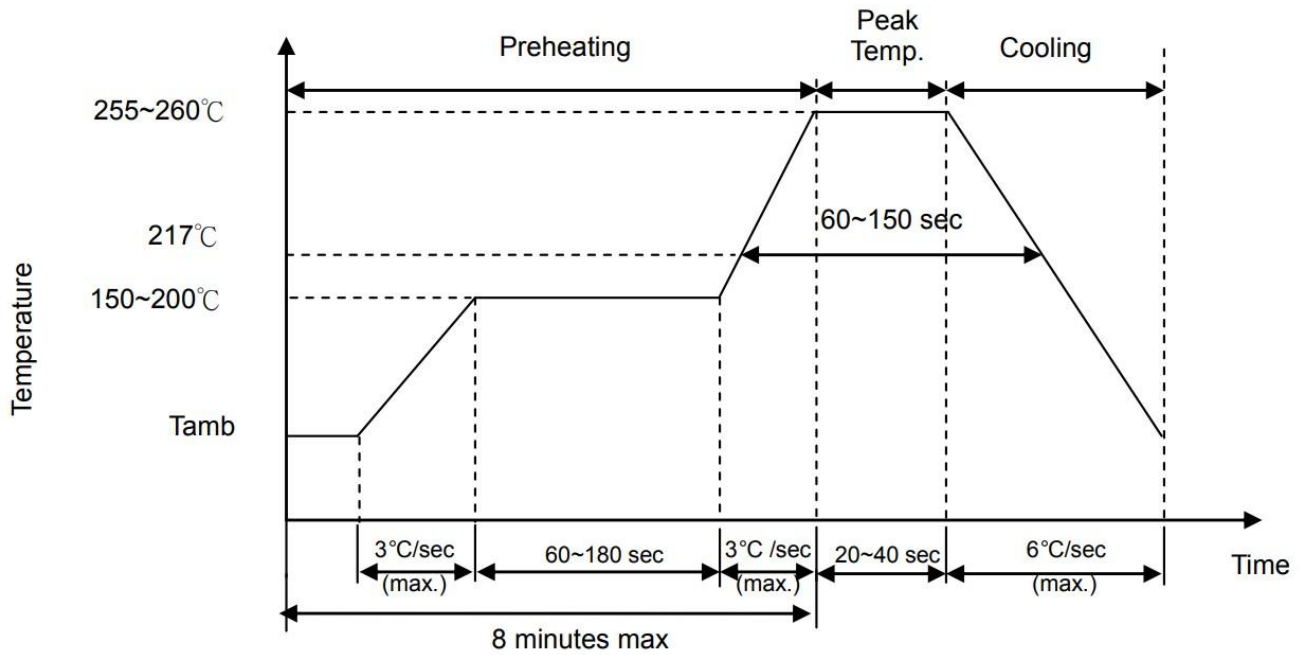
# 3225 Surface Mount Metal Oxide Varistor Spec Sheet

## ※ Soldering Recommendation

### ● Wave Soldering Profile



### ● IR-reflow Soldering Profile



### ● Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max)
Soldering Time	3s(max)
Diameter of Soldering Iron-tip	Φ3mm(max)

## 3225 Surface Mount Metal Oxide Varistor Spec Sheet

### ※ Reliability

Item	Standard	Test conditions / Methods	Specifications															
Vibration	IEC 1051-1	Place the finished product on the vibrating machine, apply a single vibration (amplitude: 0.75mm) and amplitude of 1.5mm, the vibration frequency cycle is 10Hz-55Hz-10Hz, test for 2 hours in each of the three vertical directions, and then detect the external appearance of the finished product damage	$ \Delta V/V1mA  \leq 5\%$ No visible damage															
Solderability	IEC 60068-2-20	Immerse the finished pins in the solder solution at $235^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for $2 \pm 0.5$ seconds and take them out	Tinned is uniform and the area is $\geq 95\%$															
Resistance to Soldering Heat	IEC 60068-2-20	Immerse the finished pins in the solder solution at $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for $10 \pm 1$ seconds and take them out	$ \Delta V/V1mA  \leq 5\%$															
High Temperature Storage	IEC 60068-2-2	Put the finished product in a $125 \pm 5^{\circ}\text{C}$ oven for 1000 hours, take it out and put it at room temperature for 1-2 hours, and then measure the varistor voltage	$ \Delta V/V1mA  \leq 5\%$															
Moisture Resistant	IEC60068-2-3	1. Put the finished product in an environment with a temperature of $40 \pm 2^{\circ}\text{C}$ and a humidity of 95% for 1000 hours 2. Put the finished product in an environment with a temperature of $40 \pm 2^{\circ}\text{C}$ and a humidity of 95%, and apply the maximum allowable working voltage for 1000 hours	No visible damage   $ \Delta V/V1mA  \leq 10\%$ Insulation resistance $\geq 100\text{M}\Omega$															
Thermal Shock	IEC 60068-2-14	Add it to the finished product 5 times with the temperature cycle in the following table, and then place it at room temperature for 1-2 hours to measure the varistor voltage <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature(<math>^{\circ}\text{C}</math>)</th> <th>Period(minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40 \pm 3</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td><math>5 \pm 3</math></td> </tr> <tr> <td>3</td> <td><math>+125 \pm 2</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td><math>5 \pm 3</math></td> </tr> </tbody> </table>	Step	Temperature( $^{\circ}\text{C}$ )	Period(minutes)	1	$-40 \pm 3$	$30 \pm 3$	2	Room temperature	$5 \pm 3$	3	$+125 \pm 2$	$30 \pm 3$	4	Room temperature	$5 \pm 3$	No visible damage   $ \Delta V/V1mA  \leq 5\%$
Step	Temperature( $^{\circ}\text{C}$ )	Period(minutes)																
1	$-40 \pm 3$	$30 \pm 3$																
2	Room temperature	$5 \pm 3$																
3	$+125 \pm 2$	$30 \pm 3$																
4	Room temperature	$5 \pm 3$																
High Temp. Load	IEC61051-4.20	Apply the maximum allowable AC voltage to the finished product and place it in an oven at a temperature of $125 \pm 2^{\circ}\text{C}$ for 1000 hours, then place it at room temperature for 1-2 hours to measure the varistor voltage	$ \Delta V/V1mA  \leq 10\%$															
Voltage Temp. Coefficient	Specification Standard	$\frac{V1mA \text{ at } 125^{\circ}\text{C} - V1mA \text{ at } 25^{\circ}\text{C}}{V1mA \text{ at } 25^{\circ}\text{C}} \times \frac{1}{100} \times 100 (\%/^{\circ}\text{C})$	$-0.05 \leq Tc \leq 0 (\%/^{\circ}\text{C})$															
Withstand Voltage	IEC61051-4.8	The finished surface package body is wound into a tight coil shape with metal wire, and the input voltage AC2500V is applied to the coil outlet end and the pin end for 1 minute	No visible damage															

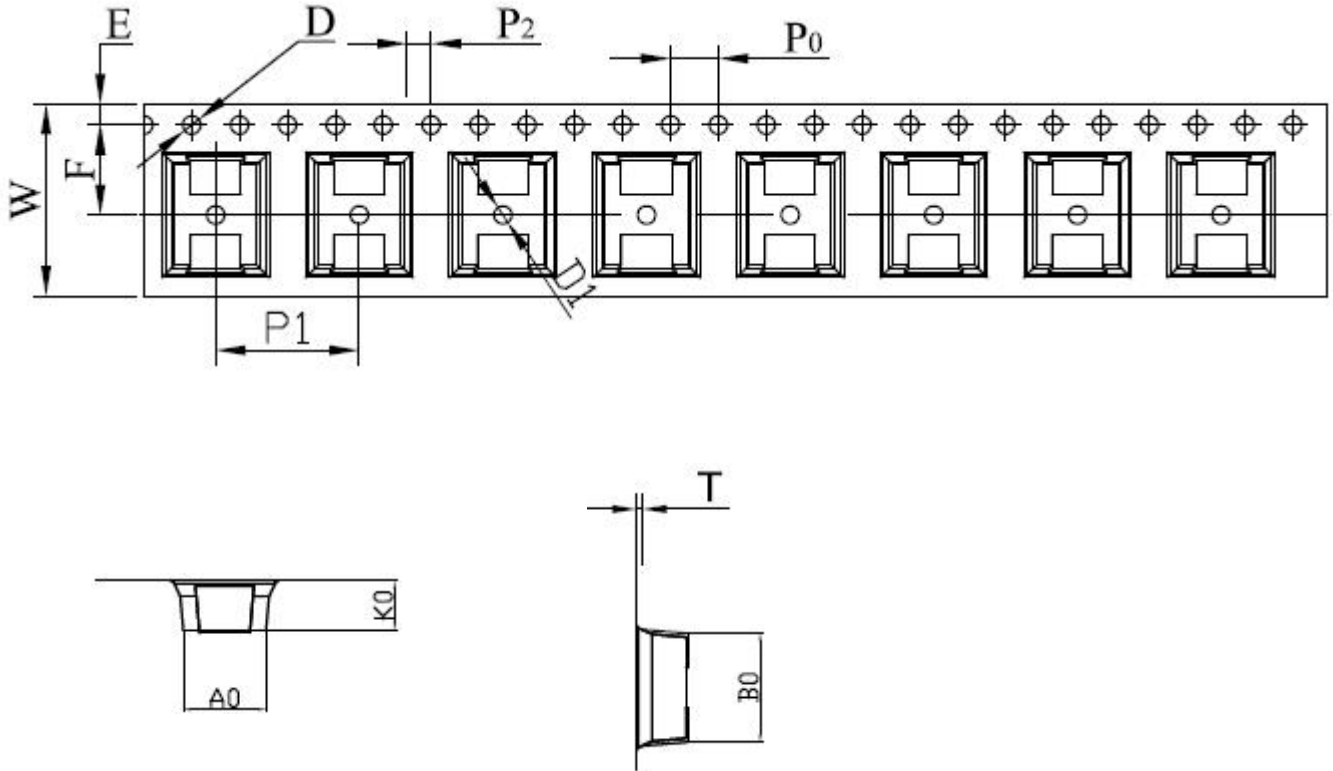


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### ※ Packaging

- Description of tape packaging

16mm plastic embossed

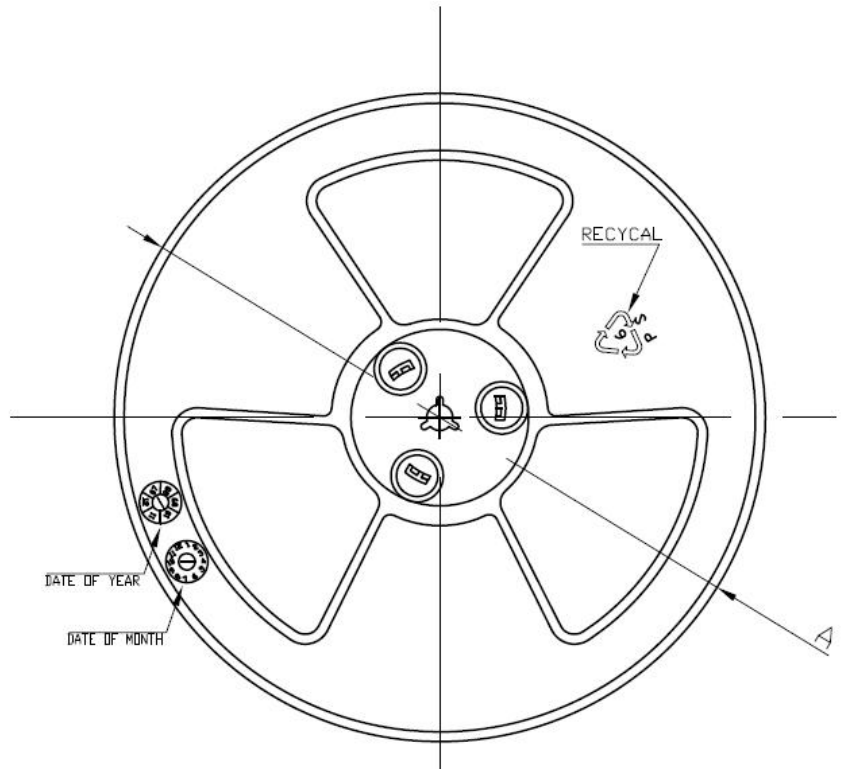
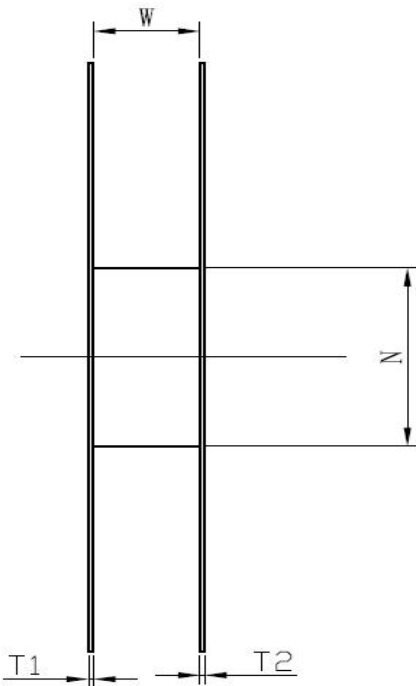


symbol	<b>AO</b>	<b>BO</b>	<b>KO</b>	<b>PO</b>	<b>P1</b>	<b>P2</b>	L Per Reel
Spec	6.60±0.1	8.70±0.1	4.50±0.1	4.00±0.10	12.0±0.10	2.00±0.10	24000mm
symbol	<b>W</b>	<b>T</b>	<b>E</b>	<b>F</b>	<b>DO</b>	<b>D1</b>	QTY / REEL
Spec	16.0±0.3	0.40±0.05	1.75±0.10	7.5±0.1	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50±0.10	1820 pcs

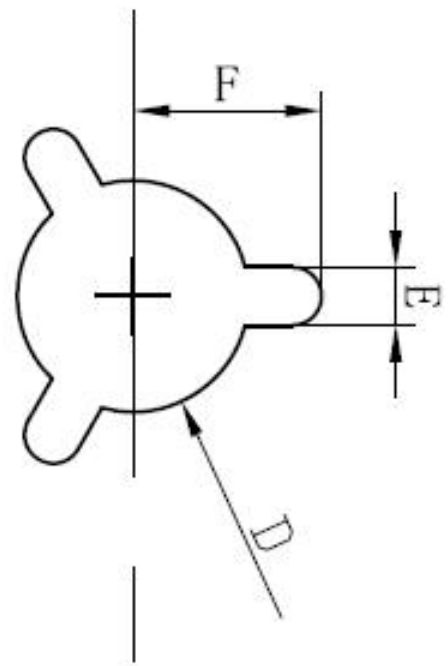
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● **Size Of 15 Inch Plastic Reel**



SPEC	16
$E \pm 0.5$	2.3
$F \pm 0.5$	10.75
$W \pm 0.2$	16.4
$T1 \pm 0.3$	2.2
$T2 \pm 0.3$	2.2
$A \begin{matrix} +0 \\ -2 \end{matrix}$	$\phi 380$
$N \pm 3.0$	$\phi 100$
$D \pm 0.3$	13.3



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- Outer Carton**

MPQ:1820PCS PER REEL  
11 REEL PER CARTON,TOTAL QUANTITY IS 20020PCS.  
CARTON MEAS : 42x42x25cm

