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## SPECIFICATION FOR APPROVAL

CUSTOMER 立創電子

CERTIFIED \_\_\_\_\_

MODEL/TYPE \_\_\_\_\_

PART NO. TVM0B110M161RY (RoHS+HF)

APPLICATION \_\_\_\_\_

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE Jul. 22, 2022

REV. NO. \_\_\_\_\_

REV. DATE \_\_\_\_\_

FOR CUSTOMER APPROVAL	CHECKED BY
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**REVISED RECORD SHEET**

REV. NO	REV. DATE	REVISED CONTENT



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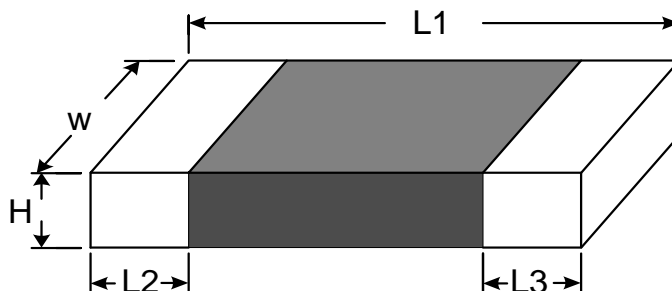
Part Number Code

Example :

**TVM**   **0**   **B**   **110**   **M**   **161**   **R**   **Y**  
 (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)

No.	Item	Digit	Specification
(1)	Product Type	TVM	SMD Varistor TVM Type
(2)	Size (EIA)	0	0402
(3)	Series	B	B series
(4)	Varistor Voltage( $V_{1mA}$ )	110	$11 \times 10^0 V = 11V$
(5)	Tolerance of $V_{1mA}$	M	$\pm 20 \%$
(6)	Typical Capacitance (@1KHz)	161	$16 \times 10^1 pF = 160 pF$
(7)	Packaging	R	Reel
(8)	Optional Suffix	Y	RoHS+HF compliance

### Structure and Dimensions



( unit : mm )

L1	W	H	L2 and L3
1.00±0.15	0.50±0.10	0.50±0.10	0.20±0.10

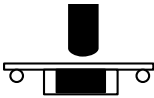
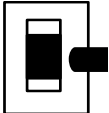
### Electrical Characteristics

Part No.	Max. Continuous Voltage		Varistor Voltage		Max. Clamping Voltage (8 / 20μS)		Typical Capacitance @1KHz	Leakage Current @ V <sub>DC</sub>
	V <sub>AC</sub> (rms) (V)	V <sub>DC</sub> (V)	V <sub>1mA</sub> (V)	ΔV <sub>1mA</sub> (±%)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	C (pF)	I <sub>L</sub> (μA)
TVM0B110M161RY	6	8	11	20	27	1	160±20%	≤20

Part No.	Max. Surge Current (8 / 20μS)	Max. Energy (10 / 1000μS)	Operating Temperature Range	Storage Temperature Range
	I <sub>max</sub> (A)	W <sub>max</sub> (J)	(°C)	(°C)
TVM0B110M161RY	10	0.05	-40 ~ +85	-40 ~ +125



Reliability

Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage															
Adhesion	IEC 60068-2-21	Speed < 0.5mm/sec. on PCB 	$W \geq 0.5Kgf$ the terminal electrode shall be break off not the chip element															
Damp Heat Load, Steady State	IEC 60068-2-78	$40 \pm 2 \text{ }^\circ\text{C}$ , 90~95% RH , $500 \pm 24$ hrs at $V_{DC}$	$ \Delta V_{1mA}/V_{1mA}  \leq 10\%$ No visible damage															
High Temp. Storage	IEC 60068-2-2	$125 \pm 5 \text{ }^\circ\text{C}$ , $1000 \pm 24$ hrs	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage															
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB <table border="1" data-bbox="550 1086 1201 1395"> <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 5</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 5</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	$-40 \pm 5$	$30 \pm 3$	2	Room temperature	$5 \pm 3$	3	$125 \pm 5$	$30 \pm 3$	4	Room temperature	$5 \pm 3$	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage
Step	Temperature ( $^\circ\text{C}$ )	Period (minutes)																
1	$-40 \pm 5$	$30 \pm 3$																
2	Room temperature	$5 \pm 3$																
3	$125 \pm 5$	$30 \pm 3$																
4	Room temperature	$5 \pm 3$																
High Temp. Load	MIL-STD-202 Method 108	$85 \pm 2 \text{ }^\circ\text{C}$ , $1000 \pm 24$ hrs at $V_{DC}$	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage															
Low Temp. Load	IEC 60068-2-1	$-40 \pm 5 \text{ }^\circ\text{C}$ , $1000 \pm 24$ hrs at $V_{DC}$	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage															
Max. Energy	IEC 61051-1 4.6	10/1000 $\mu\text{S}$ Waveform, $W_{max}$ , 1 surge current	$ \Delta V_{1mA}/V_{1mA}  \leq 10\%$ No visible damage															
Vibration	IEC 60068-2-6	Frequency range : 10~55Hz Amplitude : 0.75mm or 98m/s <sup>2</sup> Direction : 3 mutually perpendicular directions, 2hrs each	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage															

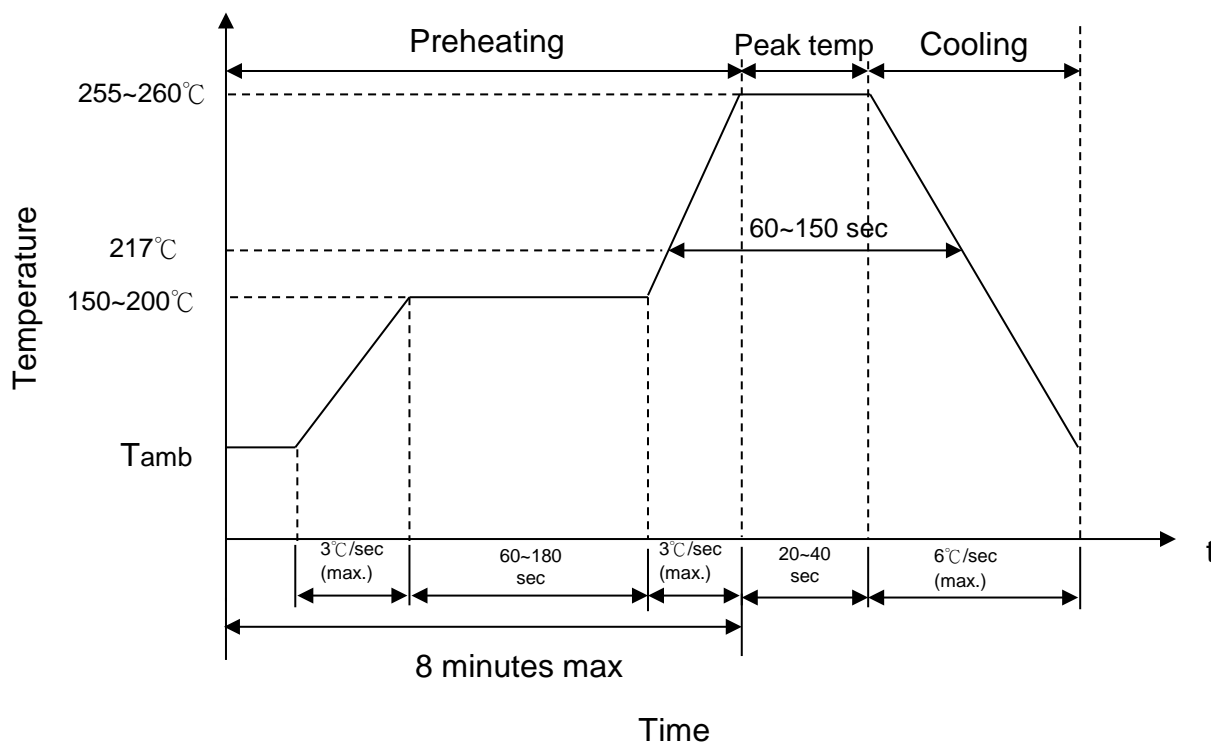


### Reliability

Item	Standard	Test conditions / Methods	Specifications
Varistor Voltage Temp. Coefficient	Specification Standard	measure $V_{1mA}$ at $-40^{\circ}\text{C}$ 、 $25^{\circ}\text{C}$ 、 $125^{\circ}\text{C}$	$ T_c  \leq 0.05\%/^{\circ}\text{C}$
Climatic Sequence	IEC 61051-1 4.18	a. $125^{\circ}\text{C}$ x 16 hrs b. 1st cycle : $55^{\circ}\text{C}$ 93 %RH x 24 hrs c. $-40^{\circ}\text{C}$ x 2 hrs d. 5 cycles : $55^{\circ}\text{C}$ 93% RH x 24 hrs / Cycle	$ \Delta V_{1mA}/V_{1mA}  \leq 10\%$ No visible damage
Max. Surge Current	IEC 61051-1 4.6	8/20 $\mu\text{S}$ waveform , $I_{max}$ , 1 surge current	$ \Delta V_{1mA}/V_{1mA}  \leq 10\%$ No visible damage
Solderability	IEC 60068-2-58	$245 \pm 5^{\circ}\text{C}$ , $3 \pm 0.3$ sec	at least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	IEC 60068-2-58	$260 \pm 5^{\circ}\text{C}$ , $10 \pm 1$ sec	$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$ No visible damage

## Soldering Recommendation

### ■ IR-reflow soldering profile



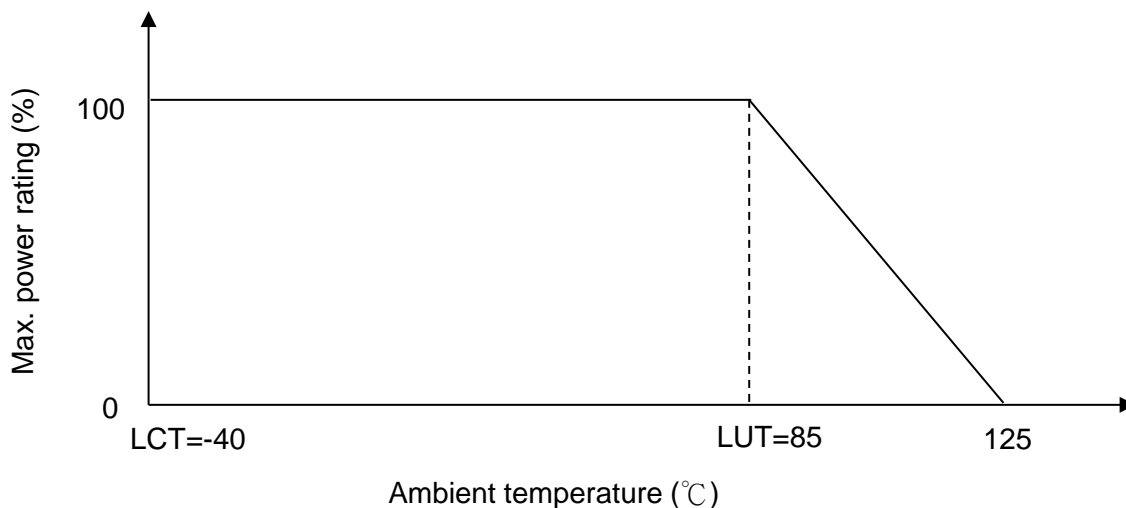
### ■ Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Diameter of Soldering Iron-tip	φ 3mm (max.)
Caution: Not to touch the component surface with soldering iron directly to prevent component damage.	

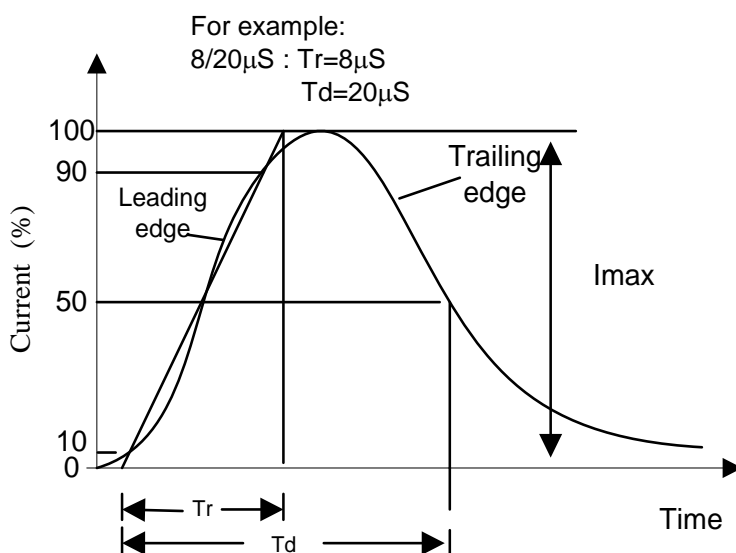


### Power Derating Curve

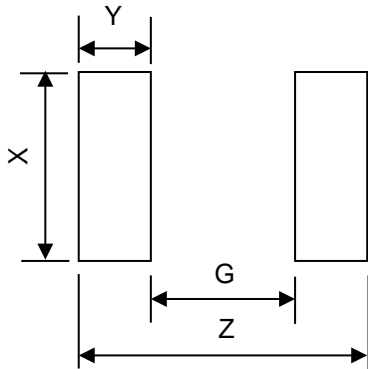
When operating temperature exceeds 85°C, the power should be derated as below figure.



### Surge Current Standard Waveform



Recommended Soldering Pad Dimensions



Size (EIA)	0402
Z	1.7 mm
G	0.5 mm
X	0.6 mm
Y	0.6 mm

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

Warehouse Storage Conditions of Products

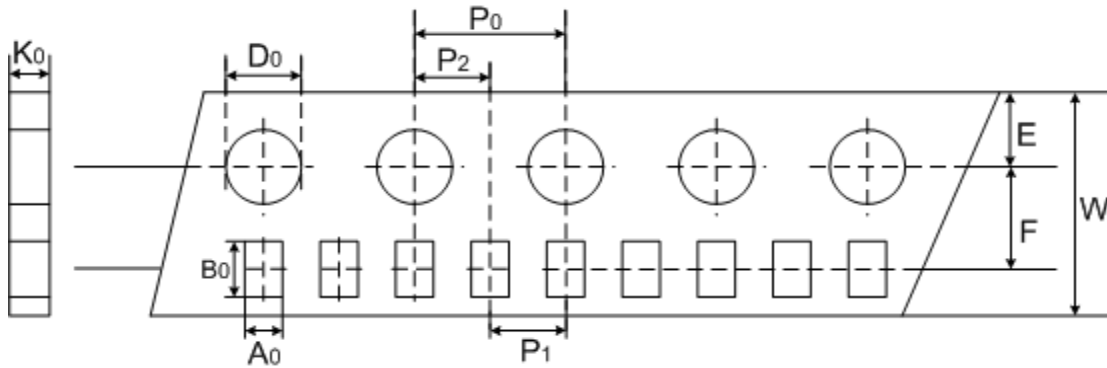
(I) Storage Conditions :

- 1.Storage Temperature : -10°C ~+40°C
- 2.Relative Humidity :  $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

## Packaging

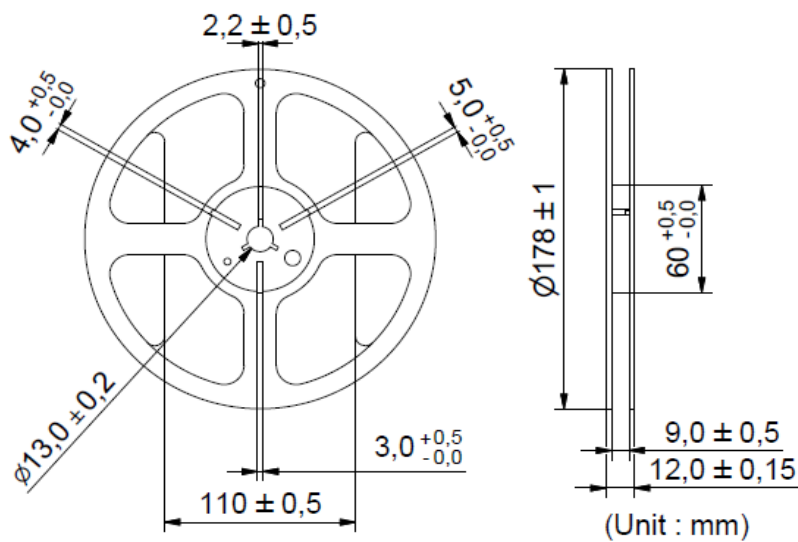
### ■ Taping Specification ( 0402 Series)



(Unit : mm)

Index	$A_0$	$B_0$	$W$	$E$	$F$	$P_1$	$P_2$	$P_0$	$D_0$	$K_0$
Size	$\pm 0.05$	$\pm 0.12$	$\pm 0.2$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$
0402	0.62	1.12	8	1.75	3.5	2	2	4	1.55	0.60

### ■ Quantity ( 10000 pcs / reel )



### Certificates

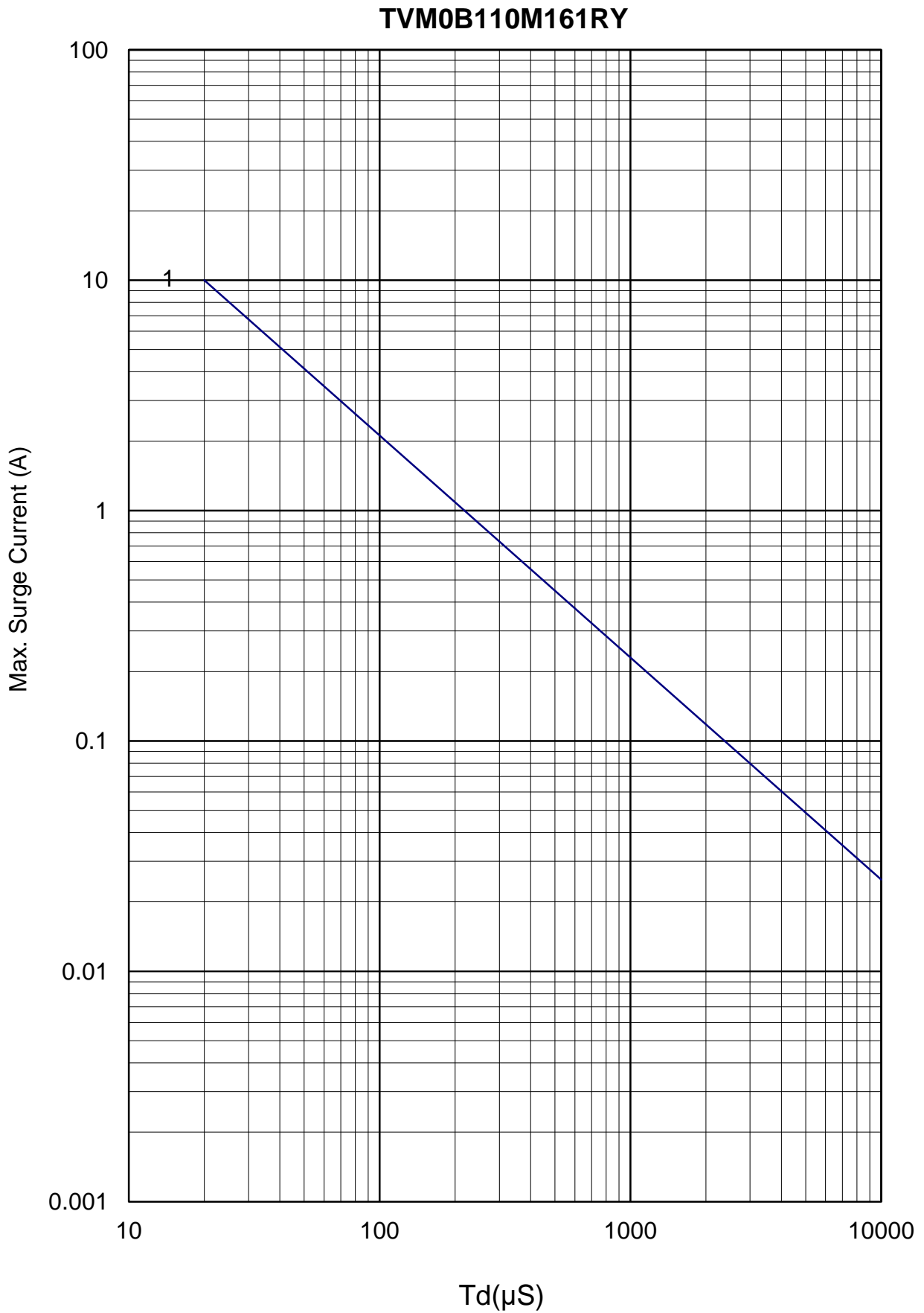
- (1) IATF 16949 certificate
- (2) ISO 9001 certificate
- (3) QC 080000 certificate

### Test Report

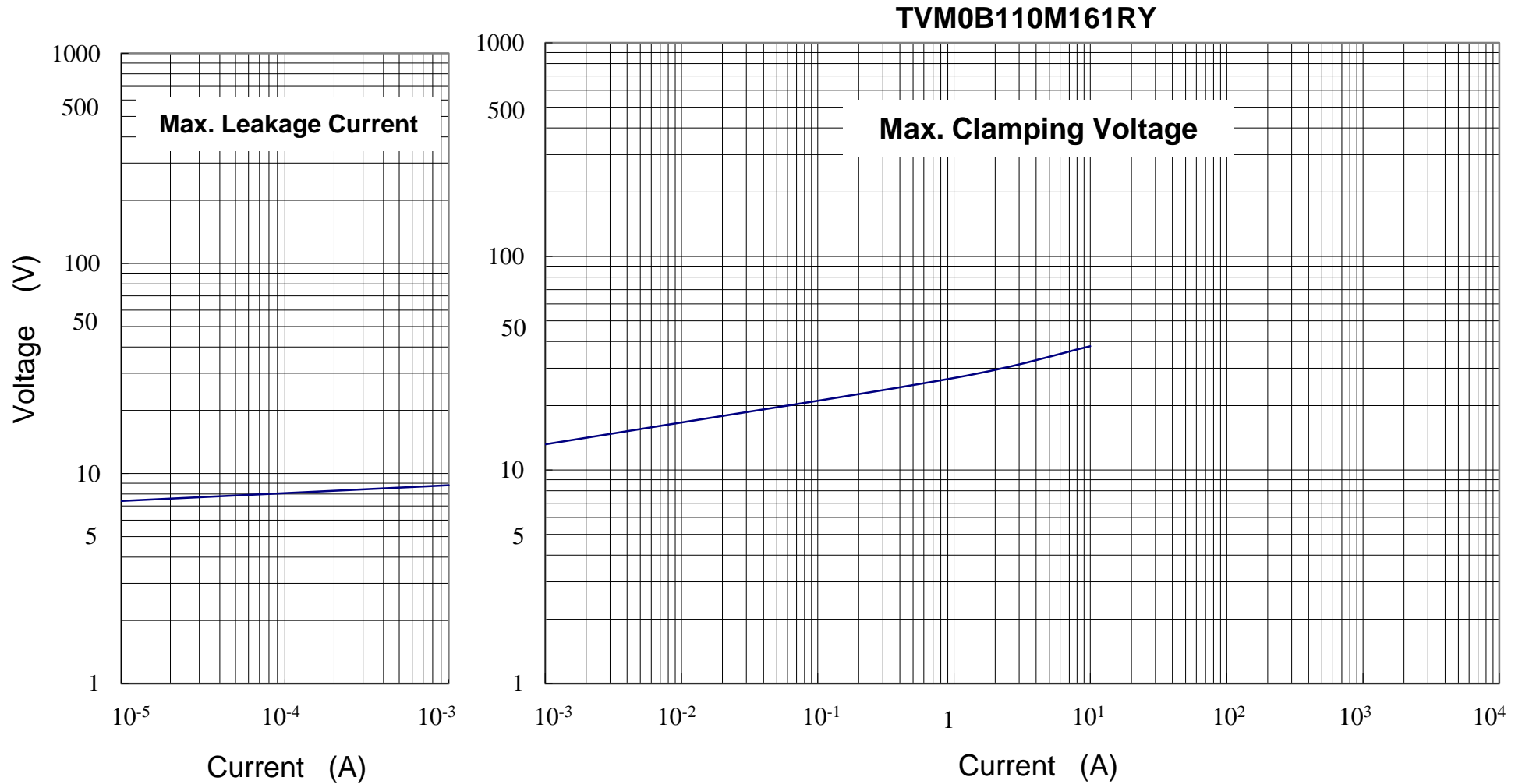
- (1) RoHS test report
- (2) Halogen-free test report



Max. Surge Current Derating Curve



Max. Leakage Current and Max. Clamping Voltage Curve



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