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SPECIFICATION FOR APPROVAL

CUSTOMER _____

CERTIFIED
MODEL/TYPE

TVR07471-M

PART NO.

TVR07471KYARM-H(RoHS+HF)

APPLICATION _____

CUSTOMER P/N _____

ISSUE DATE

Jun.03.2021

REV. NO. _____

REV. DATE _____

FOR CUSTOMER APPROVAL	CHECKED BY
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	APPROVED BY
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REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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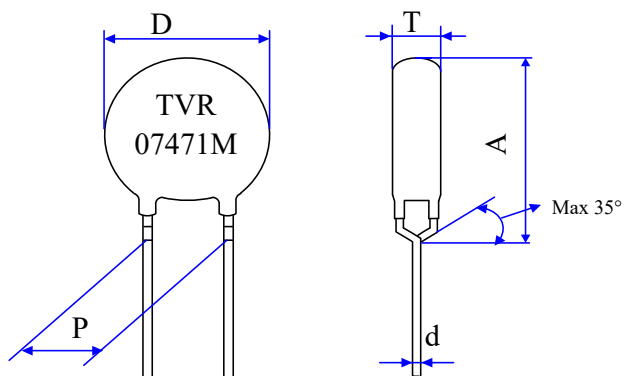
Part Number Code

Example :

TVR **07** **471** **K** **Y** **AR** **M** **-H**
 (1) (2) (3) (4) (5) (6) (7) (8)

No.	Item	Digit	Specification
(1)	Product Type	TVR	Thinking varistor TVR type
(2)	Body Size	07	φ 07 mm
(3)	Varistor Voltage	471	$47 \times 10^1 \text{ V} = 470\text{V} (V_{1\text{mA}})$
(4)	Tolerance of $V_{1\text{mA}}$	K	±10%
(5)	Appearance	Y	Y Kink Lead, Silicone Coating
(6)	Packaging	A	Repositioning tapping (hole pitch: 12.7mm)
		R	reel
(7)	Optional Suffix	M	RoHS+HF compliance
(8)	Customer code	-H	Design Location Region

Structure and Dimensions



(unit : mm)

Body Size	D	P	d	A max.	T
φ 07	7.5~9.6	5.0±0.5	0.6±0.02	11.5	4.24~5.76

*Coating material rating:UL 94 V-0

Electrical Characteristics (Ambient $T_a=25^\circ\text{C}$)

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μS)		Max. Surge Current (8/20μS)	Max. Energy (10/1000μS)
	V_{1mA} (V)	$V_{AC}(rms)$ (V)	V_{DC} (V)	V_p (V)	I_p (A)	I (A)	W (J)
TVR07471KYARM-H	470 ± 10 %	300	385	775	10	1750	42

Part No.	Rated Power	Impulse Response Time	Max. Leakage Current at 75% V_{1mA}	Operating Temperature	Storage Temperature
	P (W)	nSec	$I_L(\mu A)$	($^\circ\text{C}$)	($^\circ\text{C}$)
TVR07471KYARM-H	0.25	<25	20	-40 ~ +125	-40 ~ +150

The mechanical force acted on the wire lead may cause cracks and chips of the coating but which does not affect the performance of the component

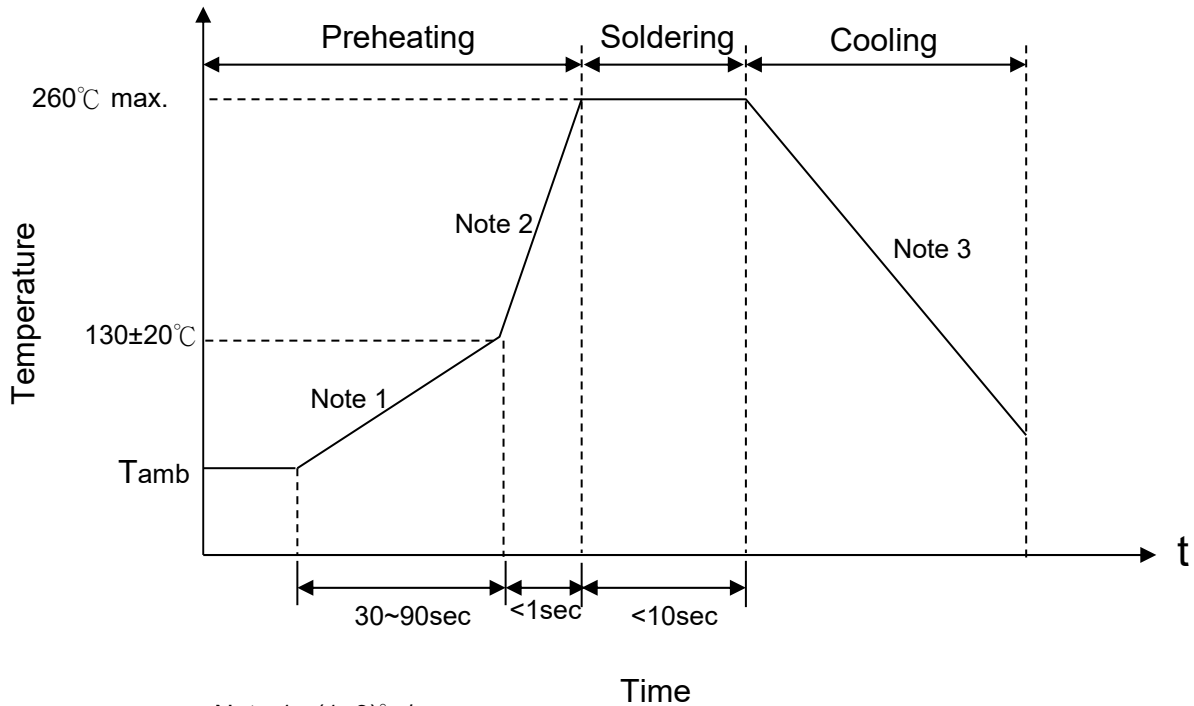
Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. Terminal diameter (mm) Force (Kg) ----- 0.5<d≤0.8 1.0 0.8<d≤1.25 2.0 1.25<d 4.0	No visible damage ΔV/V _{1mA} ≤5%															
Bending Strength of Terminals	IEC60068-2-21	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. Terminal diameter (mm) Force (Kg) ----- 0.5<d≤0.8 0.5 0.8<d≤1.25 1.0 1.25<d 2.0	ΔV/V _{1mA} ≤5%															
Vibration	IEC 60068-2-6	Frequency range:10~55Hz Amplitude:0.75mm or 98m/S ² Direction:3 mutually perpendicular directions,2hrs each.	ΔV/V _{1mA} ≤5% No visible damage															
Solderability	IEC60068-2-20	245 ± 3 °C , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-20	260 ± 3 °C , 10 ± 1 sec	No visible damage ΔV/V _{1mA} ≤5%															
High Temperature Storage	IEC60068-2-2	150 ± 5 °C , 1000 ± 24 hrs	No visible damage ΔV/V _{1mA} ≤5%															
Damp Heat, Steady State	IEC 60068-2-78	The test is divided into two groups . a.40 ± 2°C , 90 ~ 95 % RH , 1344 hrs b.40 ± 2°C , 90 ~ 95 % RH , at 10%V _{DC} , 1344 hrs	No visible damage ΔV/V _{1mA} ≤10% Insulation Resistance ≥ 100MΩ															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 1000 cycles <table border="1" data-bbox="470 1556 1005 1720"> <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	No visible damage ΔV/V _{1mA} ≤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																
High Temp. Load	MIL-STD-202 Method 108	125 ± 2 °C , 1000 ± 24 hrs, at V _{DC} or V _{rms} (Max. Operating Voltage)	ΔV/V _{1mA} ≤10% No visible damage															
Flammability test	Specification Standard	The varistor shall be subjected to 60sec.applications of test flame. Burner:Bunsen gas burner 9000kcal/m ³ Diameter of flame nozzle: Φ9.5mm Position : the specimen shall be fixed horizontal Point of application shall be approximately center of the specimen	No catching fire,and no flaming drops															

Item	Standard	Test conditions / Methods	Specifications
8/20 μ S Surge Life	IEC 61051-1 4.6	10 pulses(8/20 μ S) , unipolar, interval 30 secs,amplitude corr. to max. Surge current derating curves for 20 μ S.	$ \Delta V/V_{1mA} \leq 10\%$ No visible damage
10/1000 μ S Surge Life	IEC 61051-1 4.6	10/1000 μ S waveform, 10 surge currents,unipolar,interval 2mins, amplitude corr. to max. surge current derating curves for 1000 μ S	$ \Delta V/V_{1mA} \leq 10\%$ No visible damage
Varistor Voltage Temp. Coefficient	Specification Standard	$\frac{V_{1mA} \text{ at } 125^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{100} \times 100 (\% / ^{\circ}\text{C})$ $\frac{V_{1mA} \text{ at } -40^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{65} \times 100 (\% / ^{\circ}\text{C})$	$-0.05 \leq TC \leq 0.05(\%/^{\circ}\text{C})$
Voltage Proof	IEC 61051-1 4.9	Metal balls method, 1000 Vac 1 min	No visible damage

Soldering Recommendation

Wave Soldering Profile



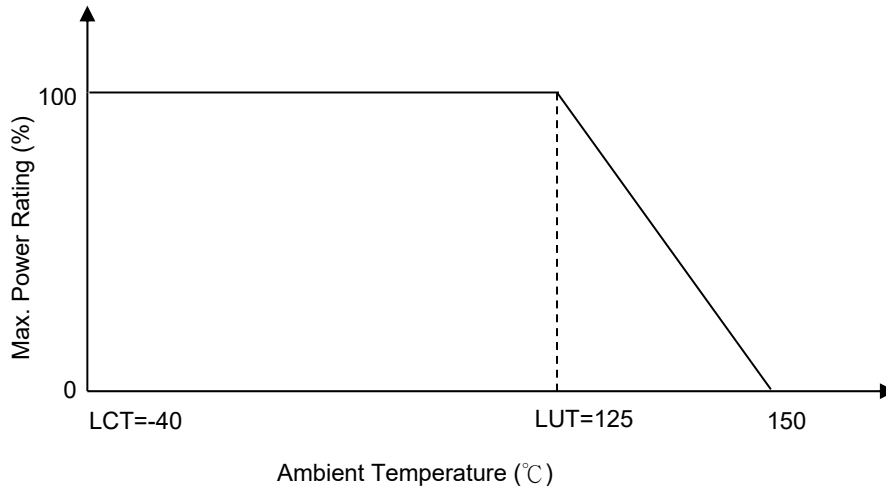
- Note 1 : (1~3)°C/sec
 Note 2 : Approx. 200°C/sec
 Note 3 : 5°C/sec Max

Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Distance from Varistor	2 mm (min.)

Power Derating Curve

When operating temperature exceeds 125°C , the power, the Max.continuous operation Voltage, the Max.Surge Current and the Max.Energy should be derated as below figure, the derated coefficient is -4%.



RoHS Compliant Declaration

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

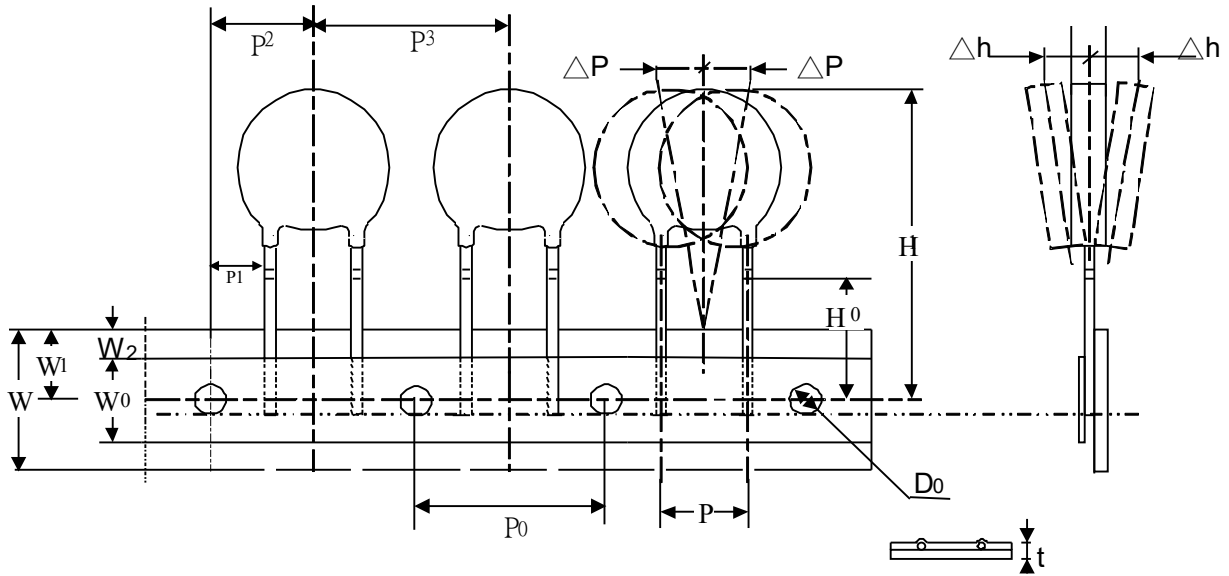
Warehouse Storage Conditions of Products

(I) Storage Conditions :

- 1.Storage Temperature : $-10^{\circ}\text{C}\sim+40^{\circ}\text{C}$
- 2.Relative Humidity : $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Taping and Dimensions

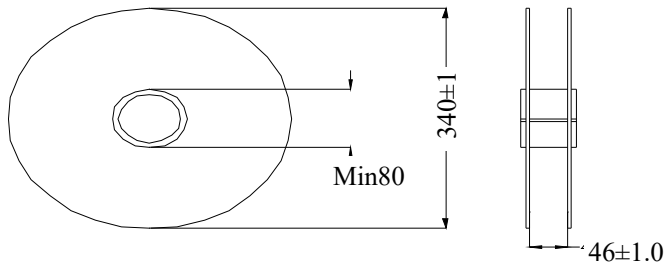


(Unit : mm)

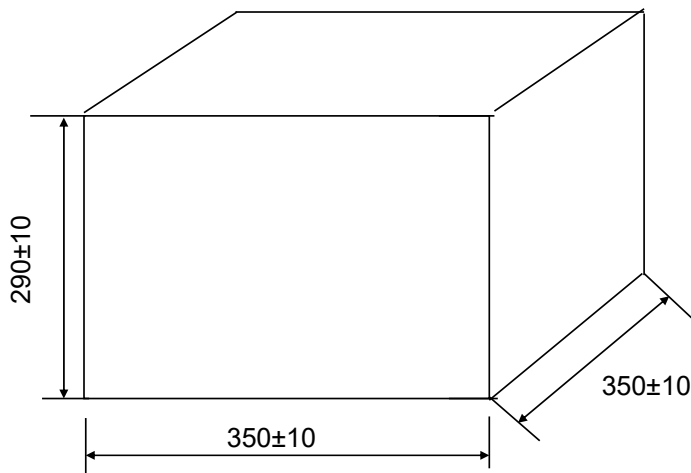
ITEM.	P ₀	P	P ₁	P ₂	P ₃	H ₀	H ₁ Max	W ₀	W ₁	W ₂ Max	W	Δp Max	Δh Max	D ₀	t
Nor.	12.7	5.0	3.55	6.35	12.7	16	31	12	9	3	18	1.0	2.0	4	0.6
ToL.	±0.3	±0.5	±0.7	±1.3	±1	±0.5	---	±1	+0.75/ -0.5	---	+1/ -0.5	---	---	±0.2	±0.2

Packaging

(1) SPQ: 1000 Pcs/ Reel



(2) Outer Box: 5Reels/ Carton



(Unit:mm)

Safety Approvals (Certified Model/Type:TVR07471-M)

- * UL 1449 4th / cUL recognized (File # E314979)
- UL1449 (file number E314979) for use in SPD Type 5



- *VDE IEC 61051-1:2007/IEC 61051-2:1991/ IEC 61051-2-2:1991
- DIN EN 61051-1:2009/IEC 61051-2 AMD1:2009(File # 40036061)



- * CQC GB/T10193-1997 ` GB/T10194-1997 recognized
- (File #CQC15001128788/CQC15001128790)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

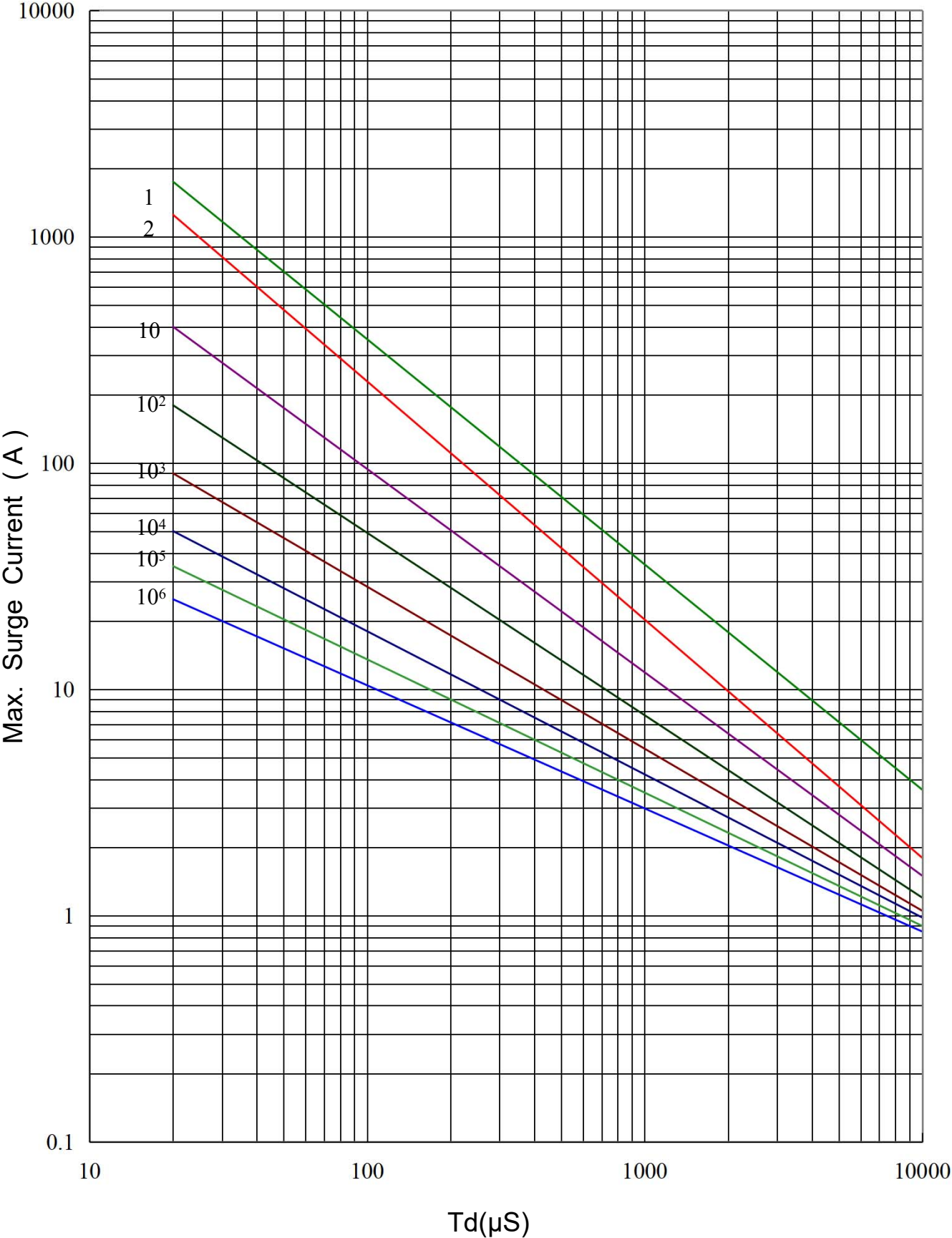
Test Report

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



Max. Surge Current Derating Curves

TVR07471KYARM-H



Max. Leakage Current and Max. Clamping Voltage Curve

