



# THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F, No.93, Dashun 1st Rd., Zuoying Dist., Kaohsiung, Taiwan  
TEL: 886-7-5577660 FAX: 886-7-5570560

## MANUFACTURING SITE

- KAOHSIUNG FACTORY 1: No. 51, Kaifa Rd., N.E.P.Z, Kaohsiung City 81170, Taiwan  
TEL: 886-7-9616668 FAX: 886-7-9616698
- KAOHSIUNG FACTORY 2: No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan  
TEL: 886-7-9630001 FAX: 886-7-3635113
- CHANGZHOU FACTORY: No.6 Longmen Rd., Wujin High & New-Tech Industrial  
Development Zone, Changzhou, Jiangsu, China 213161  
TEL: 86-519-86578999 FAX: 86-519-86558643
- DONG GUAN FACTORY: No.45, East Rd., Sha-Tao Dist., Chang-An Town,  
Dongguan City, Guangdong, China 523863  
TEL: 86-769-85542016 FAX: 86-769-85546890
- YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang  
City 443007, Hubei, China  
TEL: 86-717-6510010 FAX: 86-717-6511430



## SPECIFICATION FOR APPROVAL

CUSTOMER \_\_\_\_\_

CERTIFIED MODEL/TYPE TVR10181-M

PART NO. TVR10181KL200M(RoHS+HF)

APPLICATION \_\_\_\_\_

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

ISSUE DATE Apr.10.2018

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

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

<b>FOR CUSTOMER APPROVAL</b>	<b>CHECKED BY</b>
	Yuan Yuan
	<b>APPROVED BY</b>
	Huaifang Zhang





**REVISED RECORD SHEET**

REV. NO	REV. DATE	REVISED CONTENT



<b>INDEX</b>	<b>Page</b>
■ Part Number Code	1
■ Structure and Dimensions	2
■ Electrical Characteristics	2
■ Reliability	3 ~ 4
■ Soldering Recommendation	5
■ Power Derating Curve	6
■ RoHS Compliant Declaration	6
■ Warehouse Storage Conditions of Products	6
■ Safety Approvals	7
■ Certificates	7
■ Max. Surge Current Derating Curves	8
■ Max. Leakage Current and Max. Clamping Voltage Curve	9

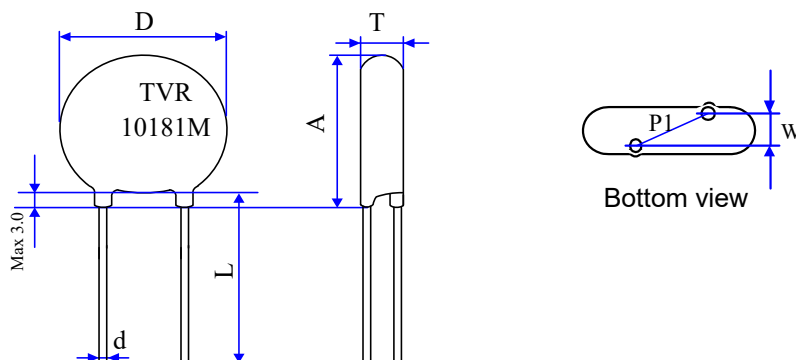
Part Number Code

Example :

**TVR**    **10**    **181**    **K**    **L**    **200M**  
 (1)        (2)        (3)        (4)        (5)        (6)

No.	Item	Digit	Specification
(1)	Product Type	TVR	Thinking varistor TVR type
(2)	Body Size	10	φ10 mm
(3)	Varistor Voltage	181	$18 \times 10^1 \text{ V} = 180\text{V} (V_{1\text{mA}})$
(4)	Tolerance of $V_{1\text{mA}}$	K	±10%
(5)	Appearance	L	Straight lead, Silicon Coating
(6)	Optional Suffix	200M	1.RoHS+HF compliance 2.Tmax:4.6mm 3.Max.Surge Current(8/20uS)(50times):500A

Structure and Dimensions



( unit : mm )

Body Size	Dmax	P 1	d	A max.	L min.	Tmax	W
φ 10	14	7.5±1	0.80±0.02	15.0	26.5	4.6	1.6±1.0

**\*Coating material rating:UL 94 V-0**

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

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)	
TVR10181KL200M	180 ± 10 %	115	150	300	25	2500	27	

Part No.	Rated Power	Impulse Response Time	Max. Leakage Current at 75% $V_{1mA}$	Operating Temperature Range	Storage temperature Range
	P (W)	nSec	$I_L(\mu A)$	( $^\circ\text{C}$ )	( $^\circ\text{C}$ )
TVR10181KL200M	0.4	<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

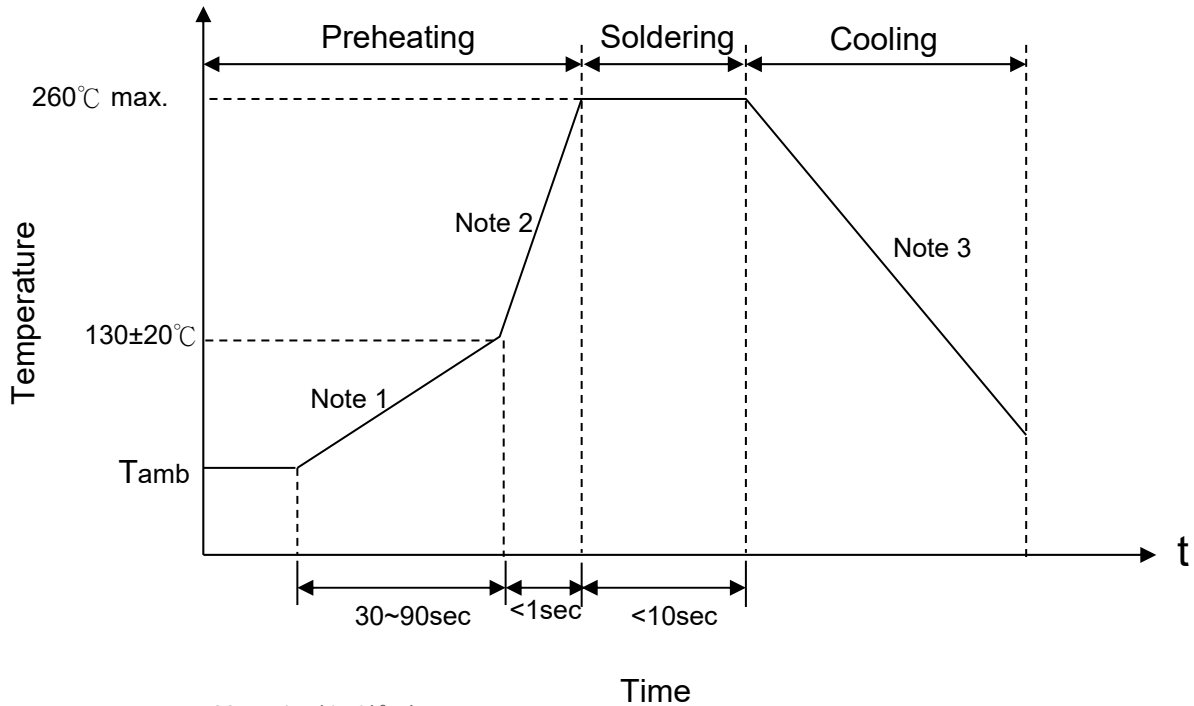
Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec.  Terminal diameter (mm)      Force (Kg) ----- 0.5<d≤0.8                      1.0 0.8<d≤1.25                      2.0 1.25<d                              4.0	No visible damage   ΔV/V <sub>1mA</sub>   ≤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 <sub>1mA</sub>   ≤5%															
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.	ΔV/V <sub>1mA</sub>   ≤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 <sub>1mA</sub>   ≤5%															
High Temperature Storage	IEC60068-2-2	150 ± 5 °C , 1000 ± 24 hrs	No visible damage   ΔV/V <sub>1mA</sub>   ≤5%															
Damp Heat, Steady State	IEC 60068-2-78	The test is divided into two groups . a.40 ± 2°C , 9 0 ~ 95 % RH , 1344 hrs b.40 ± 2°C , 9 0 ~ 95 % RH , at 10%V <sub>DC</sub> , 1344 hrs	No visible damage   ΔV/V <sub>1mA</sub>   ≤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="486 1552 1023 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 <sub>1mA</sub>   ≤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 <sub>DC</sub> or V <sub>rms</sub> (Max. Operating Voltage)	ΔV/V <sub>1mA</sub>   ≤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 <sup>3</sup> 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 $\mu$ S Surge Life	IEC 61051-1 4.6	10,000 pulses( 8/20 $\mu$ S ) , unipolar, interval 10 secs, amplitude corr. to max. Surge current derating curves for 20 $\mu$ S	$ \Delta V/V_{1mA}  \leq 10\%$ No visible damage
10/1000 $\mu$ S Surge Life	IEC 61051-1 4.6	10/1000 $\mu$ S waveform, 10 surge currents,unipolar,interval 2mins, amplitude corr. to max. surge current derating curves for 1000 $\mu$ 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

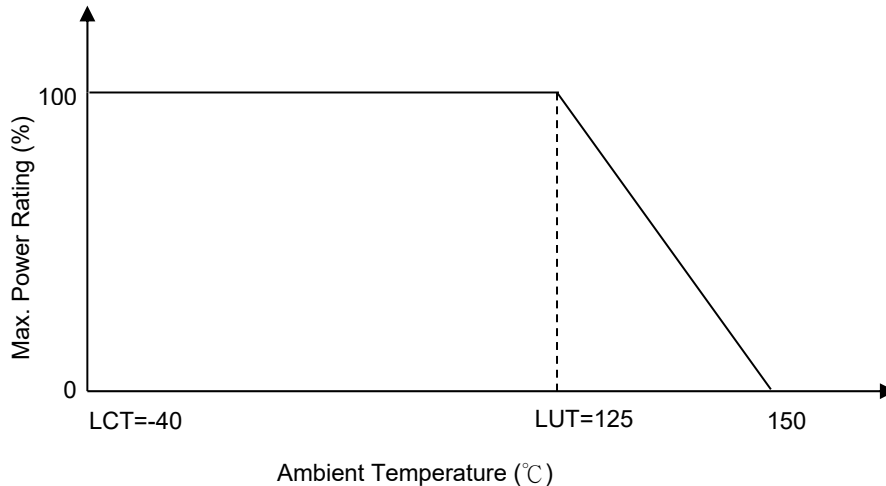
### Recommended Reworking Conditions with Soldering Iron

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  $125^{\circ}\text{C}$ , 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 2011/65/EU.

### Warehouse Storage Conditions of Products

(I) Storage Conditions :

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

(II) Period of Storage : 1 year

---

Safety Approvals (Certified Model/Type:TVR10181-M)



\* CQC GB/T10193-1997 ` GB/T10194-1997 recognized  
(File # CQC13001090357/CQC13001090356)

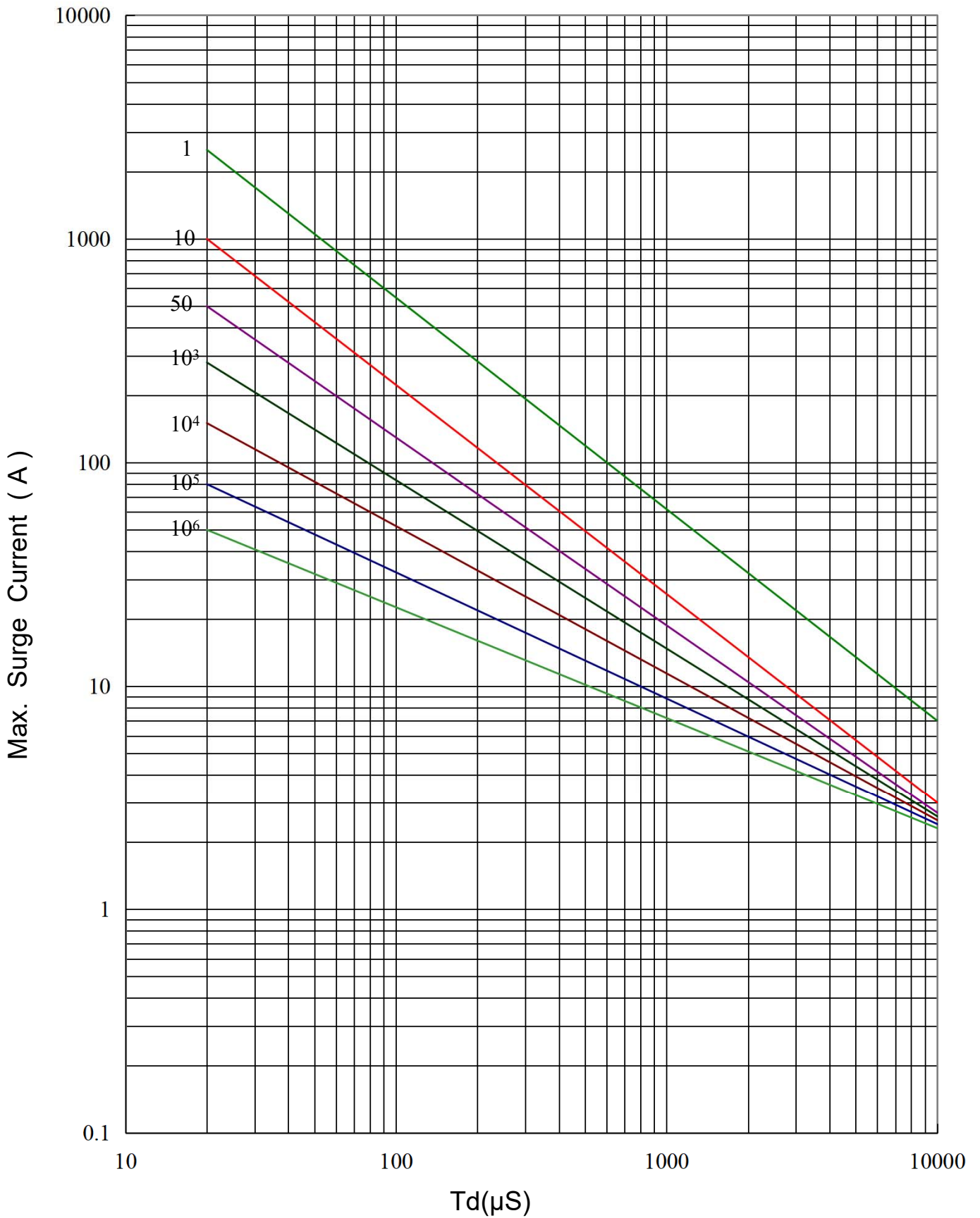
Certificates

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

Test Report

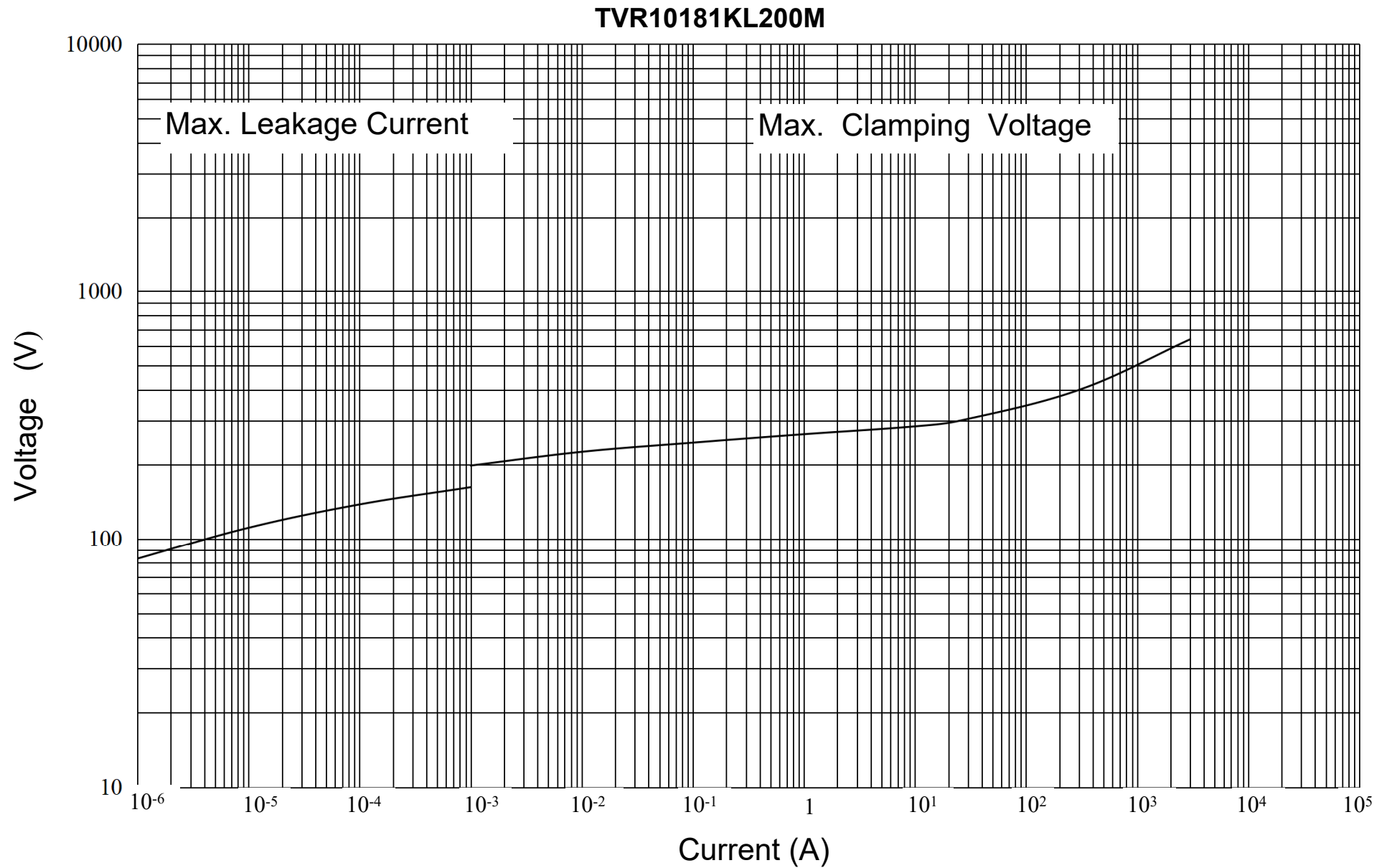
- (1) RoHS test report
- (2) Halogen-free test report

Max. Surge Current Derating Curves





Max. Leakage Current and Max. Clamping Voltage Curve



## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Varistors](#) category:*

*Click to view products by [TKS](#) manufacturer:*

Other Similar products are found below :

[820443211E](#) [MOV05131AIA](#) [MOV07231AQA](#) [MOV18131CZA](#) [R71ZOV151HC](#) [D58ZOV500RA01T1](#) [B72205S271K111](#)  
[B72214S110K151](#) [B72214S251K151](#) [B72232B131K1](#) [B72280B271K1](#) [B72530E1140S272](#) [B72540E250K62](#) [B72650M0151K093](#)  
[B72660M0271K093](#) [NTE1V020](#) [NTE1V130](#) [NTE2V010](#) [NTE2V130](#) [238159352716](#) [25FN511K](#) [S10K11G5S5](#) [ERZ-C14DK361U](#) [ERZ-](#)  
[C20DK221U](#) [ERZ-C32CK201B](#) [207869-1](#) [AS-13](#) [TMOV25SP625E](#) [TND10V-471KB00AAA0](#) [B72210S251K531](#) [B72214S200K551](#)  
[B72280B112K1](#) [B72280B381K1](#) [B72590D360A60](#) [B72650M301K93](#) [B72670M1140K72](#) [MOV07251ARA](#) [MOV10131EDA](#)  
[MOV10151EFA](#) [MOV14151CWA](#) [MOV20251DFA](#) [TVZ18EC271KBS](#) [TVZ20EB911KBS](#) [TVZ25D201KBS](#) [TVZ25D241KBS](#)  
[VDRH20X230BSE](#) [VZ07D220KBS](#) [VZ40D241K](#) [VZ25D511KBS-N](#) [VZ20E511KBSX](#)