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SPECIFICATION FOR APPROVAL

CUSTOMER	Blume-Newmatik-AAA-LUX BV
CERTIFIED MODEL/TYPE	TVR14681-U
PART NO.	TVR14681KSU(RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Aug.30.2023
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	Yuan Yuan
	APPROVED BY
	Huaifang Zhang





Zinc Oxide Varistor TVR Type
Part No. :TVR14681KSU

REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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Part Number Code

Example :

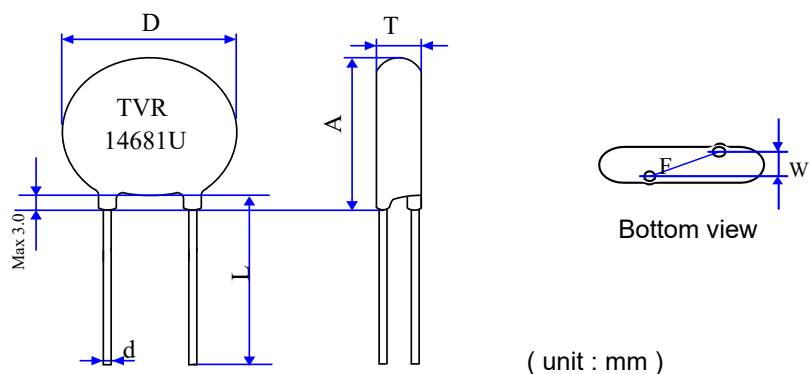
TVR **14** **681** **K** **S** **U**
 (1) (2) (3) (4) (5) (6)

No.	Item	Digit	Specification
(1)	Product Type	TVR	Thinking varistor TVR type
(2)	Body Size	14	φ 14 mm
(3)	Varistor Voltage	681	$68 \times 10^1 \text{ V} = 680\text{V} (V_{1\text{mA}})$
(4)	Tolerance of $V_{1\text{mA}}$	K	±10%
(5)	Appearance	S	Straight lead , epoxy coating
(6)	Optional Suffix	U	RoHS+HF Ultra high energy series



Zinc Oxide Varistor TVR Type
Part No. :TVR14681KSU

Structure and Dimensions



Body Size	Dmax	F	d	A max.	L min.	T	W
φ 14U	18	7.5±1	0.8±0.05	21.5	15	4.7-8.1	3.0±1.0

***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)
	V_{1mA} (V)	$V_{AC(rms)}$ (V)	V_{DC} (V)	V_p (V)	I_p (A)	I (A)
TVR14681KSU	680± 10 %	420	560	1120	100	10000

Part No.	Nominal Discharging Current (8/20us)	Max. Energy (10/1000μS)	Rated Power	Impulse Response Time	Max. Leakage Current at 75% V_{1mA}	Operating Temperature Range	Storage temperature Range
	I_n (A)	W (J)	P (W)	nSec	$I_L(\mu A)$	($^{\circ}\text{C}$)	($^{\circ}\text{C}$)
TVR14681KSU	5000	382	1	<25	20	-40 ~ +125	-40 ~ +150

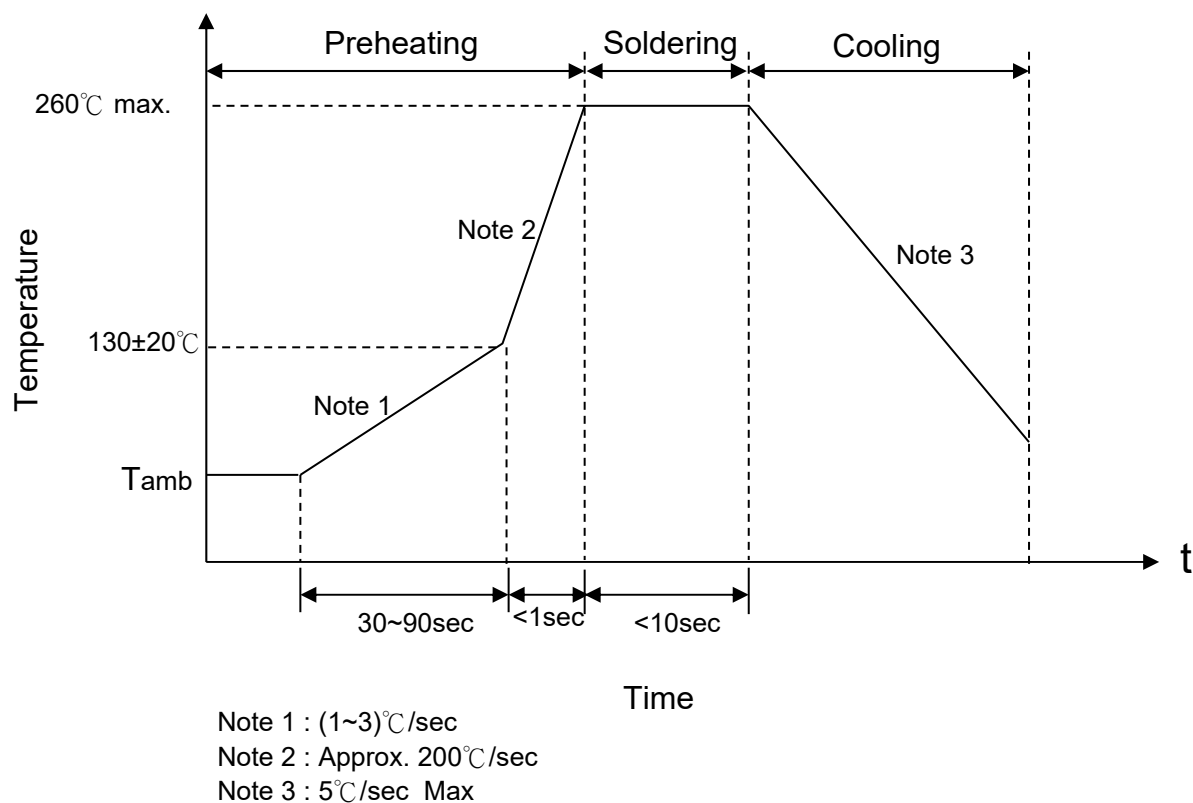
Reliability

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. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>0.5<d≤0.8</td><td>1.0</td></tr><tr><td>0.8<d≤1.25</td><td>2.0</td></tr><tr><td>1.25<d</td><td>4.0</td></tr></table>		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%							
Terminal diameter (mm)	Force (Kg)																		
0.5<d≤0.8	1.0																		
0.8<d≤1.25	2.0																		
1.25<d	4.0																		
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. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>0.5<d≤0.8</td><td>0.5</td></tr><tr><td>0.8<d≤1.25</td><td>1.0</td></tr><tr><td>1.25<d</td><td>2.0</td></tr></table>		Terminal diameter (mm)	Force (Kg)	0.5<d≤0.8	0.5	0.8<d≤1.25	1.0	1.25<d	2.0	No visible damage ΔV/V _{1mA} ≤5%							
Terminal diameter (mm)	Force (Kg)																		
0.5<d≤0.8	0.5																		
0.8<d≤1.25	1.0																		
1.25<d	2.0																		
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 , 9 0 ~ 95 % RH , 1344 hrs b.40 ± 2°C , 9 0 ~ 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 5 cycles <table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><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></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															

Item	Standard	Test conditions / Methods	Specifications
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, 2500 Vac 1 min	No visible damage

Soldering Recommendation

Wave Soldering Profile



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.)

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

Safety Approvals (Certified Model/Type :TVR14681-U)



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



- * TUV recognized (File J50531421)



- * CQC GB/T10193-1997 ` GB/T10194-1997 recognized
(File # CQC22001335731/CQC23001402248)

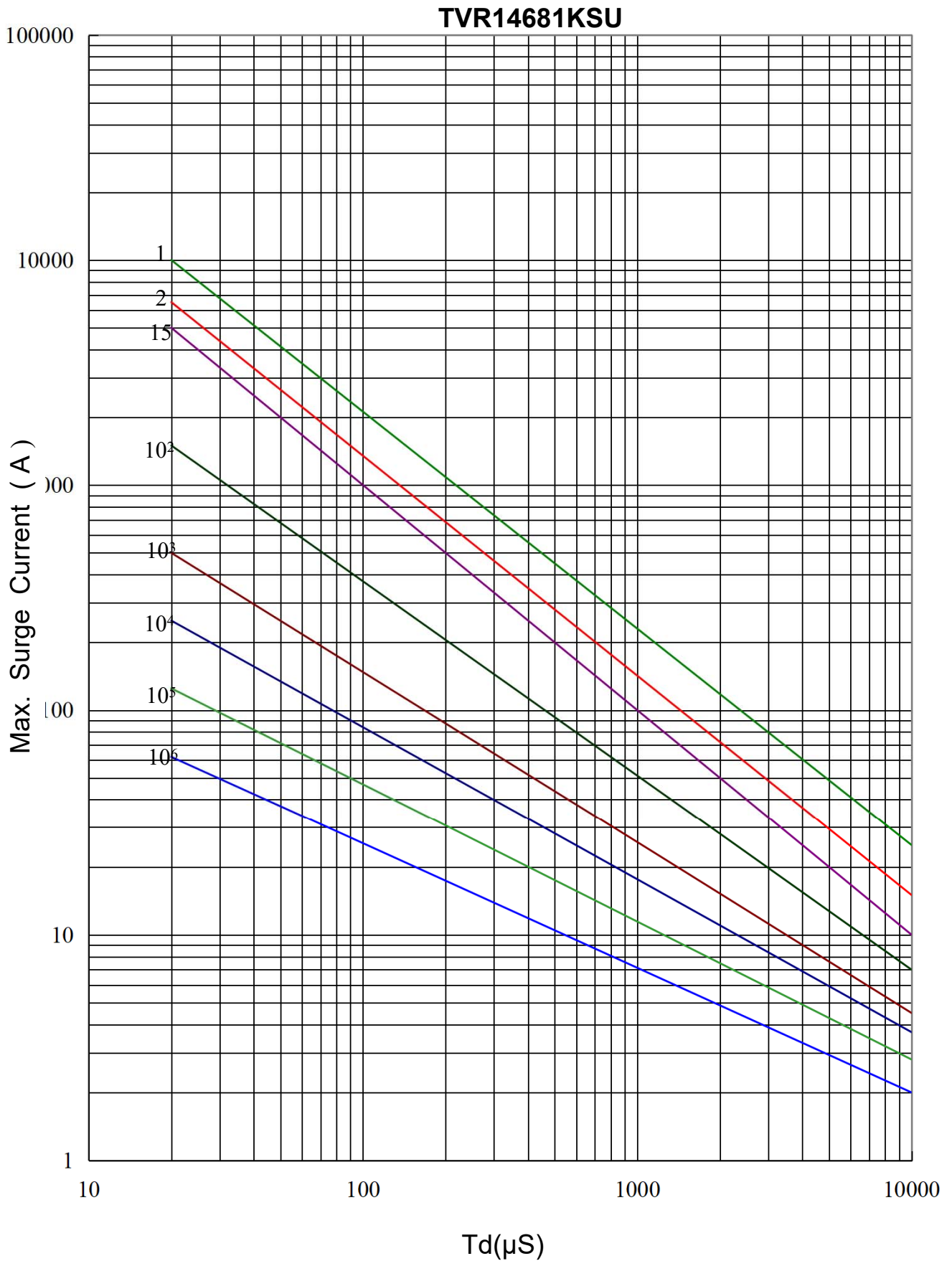
Certificates

- (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