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SPECIFICATION FOR APPROVAL

CUSTOMER	Ozdisan
CERTIFIED MODEL/TYPE	TVA22431-Q
PART NO.	TVA22431KQAPEU00(RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Feb.20.2024
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	Yuan Yuan
	APPROVED BY
	Huairfang Zhang





REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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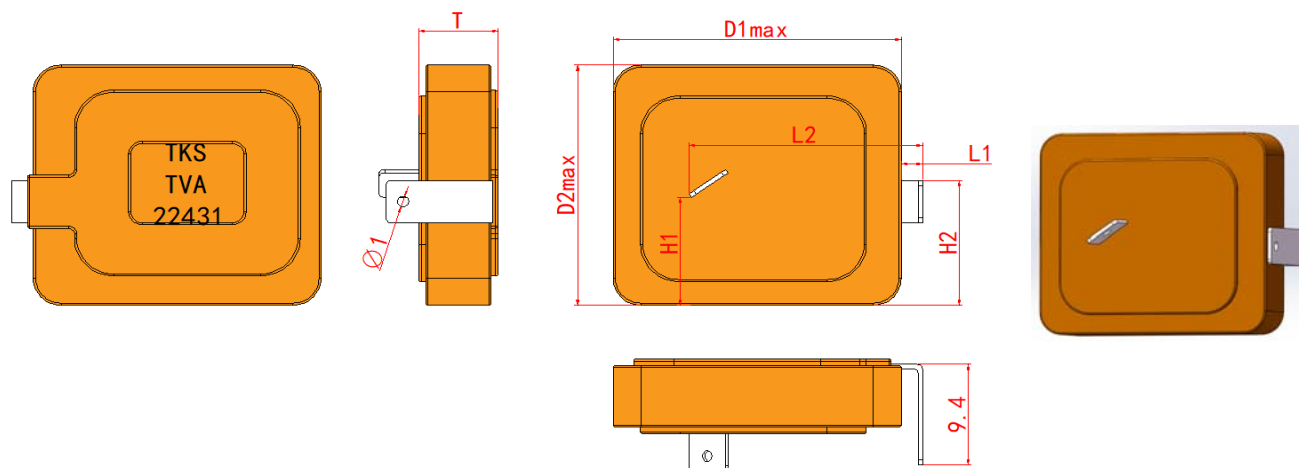
Part Number Code

Example :

TVA **22** **431** **K** **Q** **AP** **E** **U** **00**
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

No.	Item	Digit	Specification
(1)	Product Type	TVA	Thinking varistor TVA type
(2)	Size	22	22*25mm
(3)	Varistor Voltage	431	$43 \times 10^1 \text{ V} = 430\text{V} (V_{1\text{mA}})$
(4)	Tolerance of $V_{1\text{mA}}$	K	$\pm 10\%$
(5)	Structure Type	Q	Plate type terminals
(6)	Terminal Type	AP	Terminal type code
(7)	Coating Material	E	Epoxy
(8)	RoHS Compliance	U	RoHS+HF compliance
(9)	Optional Suffix	00	None special requirement

Structure and Dimensions



(unit : mm)

L1	L2	H1	H2	D1max	D2max	Tmax
2.9±0.5	21.1±0.5	10.8±0.5	11.5±0.5	26.2	23.2	5.8

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

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20 μ S)		Nominal Discharging Current (8/20 μ S)	Max. Surge Current (8/20 μ S)
	V_{1mA} (V)	$V_{AC(rms)}$ (V)	V_{DC} (V)	V_p (V)	I_p (A)	I_n (A)	I (A)
TVA22431KQAPEU00	430 ± 10%	275	350	710	150	10000	20000

Part No.	Max. Energy (2mS)	Rated Power	Impulse Response Time	Max. Leakage Current at 75% V_{1mA}	Reference Capacitance @1KHZ	Operating Temperature Range	Storage temperature Range
	W (J)	P (W)	nSec	$I_L(\mu A)$	C (pF)	($^\circ\text{C}$)	($^\circ\text{C}$)
TVA22431KQAPEU00	220	1	<25	20	1000	-40 ~ +85	-40 ~ +110



Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	<p>Gradually applying the force specified and keeping the unit fixed for 10±1 sec.</p> <table border="1"> <tr> <td>Terminal cross-sectional area(mm²)</td> <td>Terminal diameter (mm)</td> <td>Force (Kg)</td> </tr> <tr> <td>0.5<S≤1.2</td> <td>0.8<d≤1.25</td> <td>2.0</td> </tr> <tr> <td>1.2<S</td> <td>1.25<d</td> <td>4.0</td> </tr> </table>	Terminal cross-sectional area(mm ²)	Terminal diameter (mm)	Force (Kg)	0.5<S≤1.2	0.8<d≤1.25	2.0	1.2<S	1.25<d	4.0	<p>No visible damage $\Delta V/V_{1mA} \leq 5\%$</p>						
Terminal cross-sectional area(mm ²)	Terminal diameter (mm)	Force (Kg)																
0.5<S≤1.2	0.8<d≤1.25	2.0																
1.2<S	1.25<d	4.0																
Vibration	IEC 1051-1	<p>Frequency range:10~55Hz Amplitude:0.75mm or 98m/S² Direction:3 mutually perpendicular directions,2hrs each.</p>	<p> $\Delta V/V_{1mA} \leq 5\%$ No visible damage</p>															
Solderability	IEC60068-2-20	<p>1. Preheating: 100 ± 10 °C , at least 10min 2. Soldering Iron: 350 ± 10 °C , 5~10sec 3. Solder all</p>	<p>At least 95% of terminal electrode is covered by new solder</p>															
Resistance to Soldering Heat	IEC60068-2-20	<p>260 ± 3 °C , 10 ± 1 sec</p>	<p>No visible damage $\Delta V/V_{1mA} \leq 5\%$</p>															
High Temperature Storage	IEC60068-2-2	<p>110 ± 5 °C , 1000 ± 24 hrs</p>	<p>No visible damage $\Delta V/V_{1mA} \leq 5\%$</p>															
Damp Heat, Steady State	IEC 60068-2-78	<p>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</p>	<p>No visible damage $\Delta V/V_{1mA} \leq 5\%$ Insulation Resistance ≥ 100MΩ</p>															
Rapid Change of Temperature	IEC60068-2-14	<p>The conditions shown below shall be repeated 5 cycles</p> <table border="1"> <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>15 ± 3</td> </tr> <tr> <td>3</td> <td>85 ± 2</td> <td>30 ± 3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15 ± 3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40 ± 3	30 ± 3	2	Room temperature	15 ± 3	3	85 ± 2	30 ± 3	4	Room temperature	15 ± 3	<p>No visible damage $\Delta V/V_{1mA} \leq 5\%$</p>
Step	Temperature (°C)	Period (minutes)																
1	-40 ± 3	30 ± 3																
2	Room temperature	15 ± 3																
3	85 ± 2	30 ± 3																
4	Room temperature	15 ± 3																
Endurance at Upper Category Temperature	IEC61051-4.20	<p>85 ± 2 °C , 1000 ± 24 hrs, at V_{DC} or V_{rms}(Max. Operating Voltage)</p>	<p> $\Delta V/V_{1mA} \leq 10\%$ No visible damage</p>															
8/20μS Operating duty withstand test	IEC61643	<p>1. Preconditioning test : In , 15 times 2. Operating duty test : I_{max} , 1 time</p>	<p> $\Delta V/V_{1mA} \leq 10\%$ No visible damage</p>															

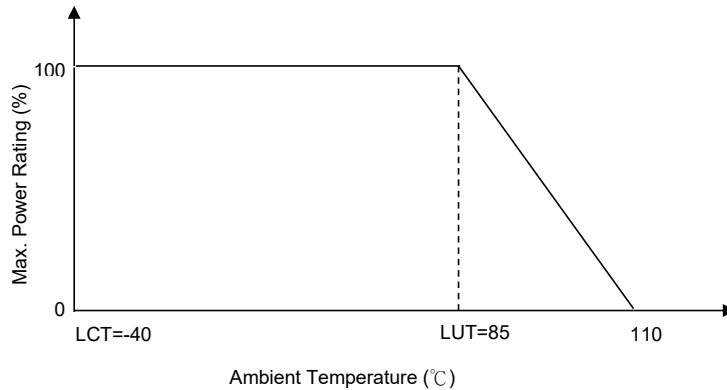


Reliability

Item	Standard	Test conditions / Methods	Specifications
10/1000μS Surge Life	CECC42000	10/1000μS waveform, 10 surge currents, unipolar, interval 2mins, amplitude corr. to max. surge current derating curves for 1000μS	$ \Delta V/V_{1mA} \leq 10\%$ No visible damage
Varistor Voltage Temp. Coefficient	Specification Standard	$\frac{V_{1mA} \text{ at } 85^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100 (\% / ^{\circ}\text{C})$ $\frac{V_{1mA} \text{ at } -40^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{65} \times 100 (\% / ^{\circ}\text{C})$	$-0.05 \leq TC \leq 0.05 (\% / ^{\circ}\text{C})$
Voltage Proof	IEC61051-4.8	Metal balls method, 2500 Vac 1 min	No visible damage

Power Derating Curve

When operating temperature exceeds 85°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.

Restriction of Weapon and Military End-Use

Thinking has established and implemented the fundamental policy on none of our product should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or goods or systems specially designed or intended for military end-use or utilization by military end-users.

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 :TVA22431-Q)



* UL 1449 4th / cUL recognized (File # E314979)

Certificates

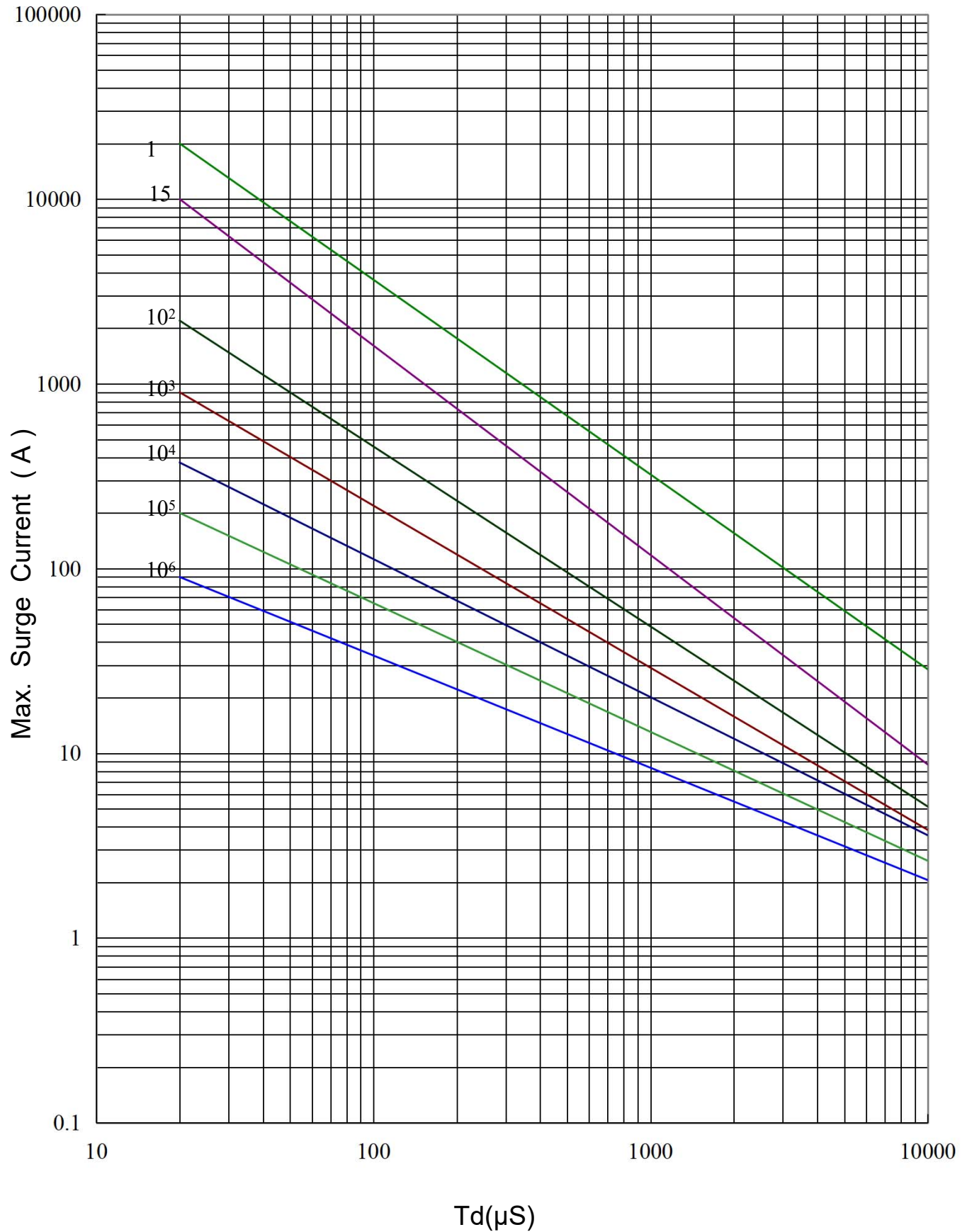
- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

Test Report

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

Max. Surge Current Derating Curves

TVA22431KQAPEU00



Max. Leakage Current and Max. Clamping Voltage Curve

