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SPECIFICATION FOR APPROVAL

CUSTOMER	Blume - AVM
CERTIFIED MODEL/TYPE	TVBDS471
PART NO.	TVBDS471KR(RoHS)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Oct.24.2022
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	Yuan Yuan
	APPROVED BY
	Huaifang Zhang

REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT

INDEX

Part Number Code

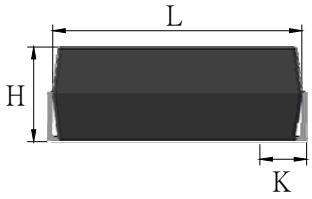
Example :

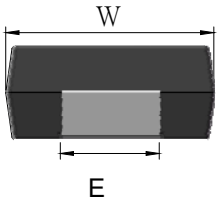
TVB D S 471 K R

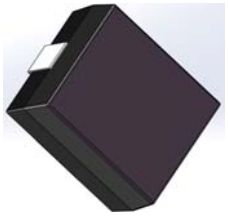
(1) (2) (3) (4) (5) (6)

No.	Item	Digit	Specification
(1)	Product Type	TVB	Thinking varistor TVB type
(2)	Body Size	D	14*12.2*6 mm
(3)	Application	S	Standard application
(4)	Varistor Voltage	471	47×10^{1} V = 470V (V_{1mA})
(5)	Tolerance of V_{1mA}	K	±10%
(6)	Packaging	R	Reel

Structure and Dimensions







(unit : mm)

L	W	H	K	E
14±0.3	12.2±0.3	6±0.3	2±0.3	3±0.3

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

Electrical Characteristics (Ambient Ta=25 ℃)

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μS)		Max. Surge Current (8/20uS)	Max. Energy (10/1000μS)
	V_{1mA} (V)	V_{AC}(rms) (V)	V_{DC} (V)	V_p (V)	I_P (A)	I (A)	W (J)
TVBDS471KR	470±10%	300	385	775	25	3500	85

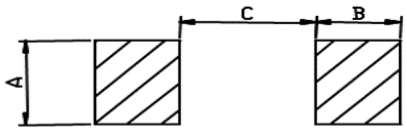
Part No.	Rated Power	Impulse Response Time	Max. Leakage Current at 75%V_{1mA}	Operating Temperature Range	Storage temperature Range
	P (W)	nSec	I_L(μA)	(℃)	(℃)
TVBDS471KR	0.4	<25	20	-40 ~ +105	-40 ~ +125

Reliability

Item	Standard	Test conditions / Methods	Specifications
Vibration	IEC 60068-2-6	Frequency range:10~55Hz Amplitude:0.75mm or 98m/s^2 Direction:3 mutually perpendicular directions,2hrs each.	$\lvert \triangle V/V_{1mA} \rvert \leqq 5\%$ No visible damage
Solderability	IEC60068-2-58	245 ± 5 ℃ , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	IEC60068-2-58	260 ± 5 ℃ , 10 ± 1 sec	No visible damage $\lvert \triangle V/V_{1mA} \rvert \leqq 5\%$
High Temperature Storage	IEC60068-2-2	125 ± 5 ℃ , 1000 ± 24 hrs	No visible damage $\lvert \triangle V/V_{1mA} \rvert \leqq 5\%$
Damp Heat , Steady State	IEC60068-2-3	The test is divided into two groups . a.40 ± 2℃ , 9 0 ~ 95 % RH , 1344 hrs b.40 ± 2℃ , 9 0 ~ 95 % RH , at 10%V_{DC}, 1344 hrs	No visible damage $\lvert \triangle V/V_{1mA} \rvert \leqq 10\%$ Insulation Resistance ≧100MΩ
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles Step / Temperature (℃) / Period (minutes) 1 / -40 ± 3 / 30 ± 3 2 / Room temperature / 5 ± 3 3 / 105 ±2 / 30 ± 3 4 / Room temperature / 5 ± 3	No visible damage $\lvert \triangle V/V_{1mA} \rvert \leqq 5\%$
High Temp. Load	MIL-STD-202 Method 108	105 ± 2 ℃, 1000 ± 24 hrs, at V_{DC} or V_{rms}(Max. Operating Voltage)	$\lvert \triangle V/V_{1mA} \rvert \leqq 10\%$ No visible damage
8/20μS Surge Life	IEC 61051-1 4.6	10,000 pulses (8/20μS), unipolar, interval 10 secs, amplitude corr. to max. Surge current derating curves for 20μS	$\lvert \triangle V/V_{1mA} \rvert \leqq 10\%$ No visible damage
10/1000μS Surge Life	IEC 61051-1 4.6	10/1000μS waveform, 10 surge currents,unipolar,interval 2mins, amplitude corr. to max. surge current derating curves for 1000μS	$\lvert \triangle V/V_{1mA} \rvert \leqq 10\%$ No visible damage
Varistor Voltage Temp. Coefficient	Specification Standard	$\frac{V_{1mA}\text{ at}105℃ - V_{1mA}\text{ at }25℃}{V_{1mA}\text{ at }25℃} \times \frac{1}{80} \times 100\ (\%/℃)$ $\frac{V_{1mA}\text{ at }-40℃ - V_{1mA}\text{ at }25℃}{V_{1mA}\text{ at }25℃} \times \frac{1}{65} \times 100\ (\%/℃)$	-0.05≦TC≦0.05(%/℃)
Voltage Proof	IEC 61051-1 4.9	Metal balls method, 2500 Vac 1 min	No visible damage

Soldering Recommendation and pads

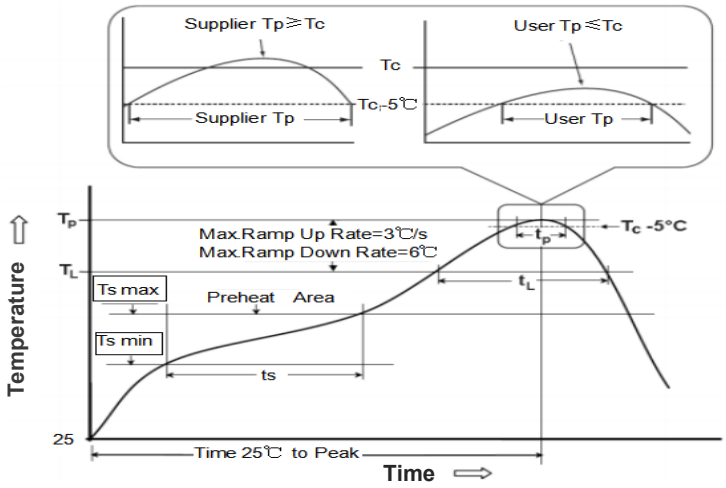
■ Soldering Pads



(unit : mm)

A	B	C
3.5	3.3	8.4

■ Reflow Soldering Profile



Curve parameters		Assembling
Heating rate（Tsmax-Tp）		≤3℃
Preheat	Tsmin	150℃
	Tsmax	200℃
	Time（ts）	60~180s
Time above melting	Melting point（TL）	217℃
	Time（tL）	60~150s
Peak temperature（Tp）		Refer to the table below
Peak temperature（0~-5℃）holding time in range（Tp）		30s
Cool rate		≤6℃

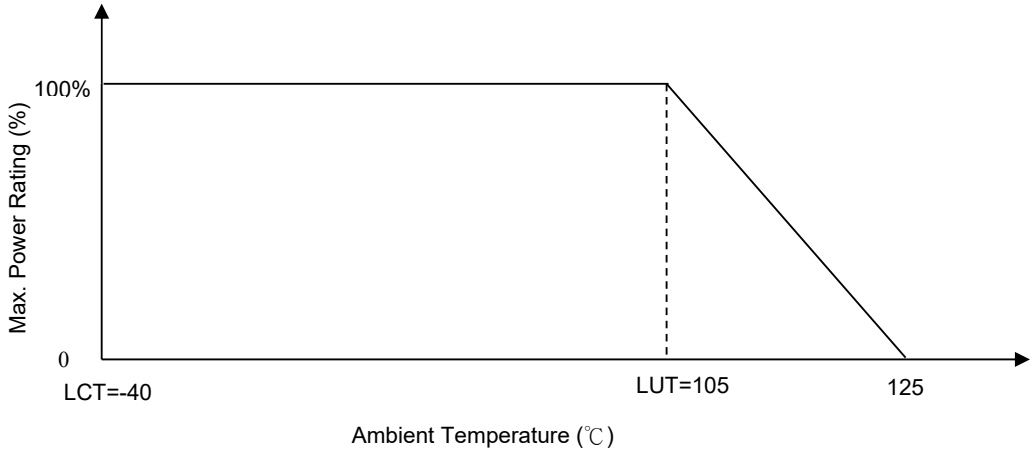
Maximum temperature requirements for component body(Tc)			
Package thickness	Volume mm³(＜350)	Volume mm³(350~2000)	Volume mm³(＞2000)
<1.6mm	260	260	260
1.6mm-2.5mm	260	250	245
≥2.5mm	250	245	245

■ Recommended Reworking Conditions with Soldering Iron

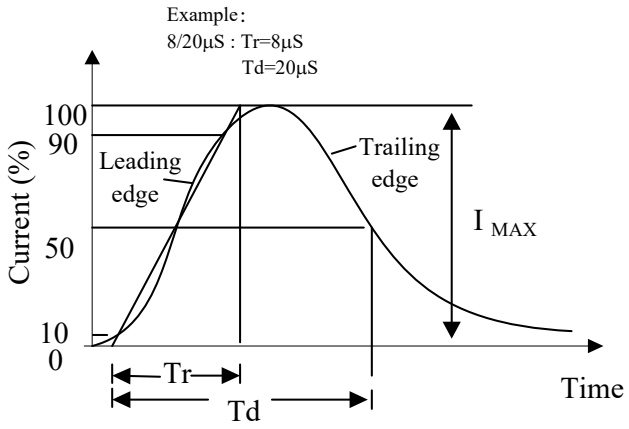
Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 sec (max.)
Distance from Varistor	2 mm (min.)

Power Derating Curve

When operating temperature exceeds 105℃, 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 -5%.



Surge Current Standard Waveform



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 :

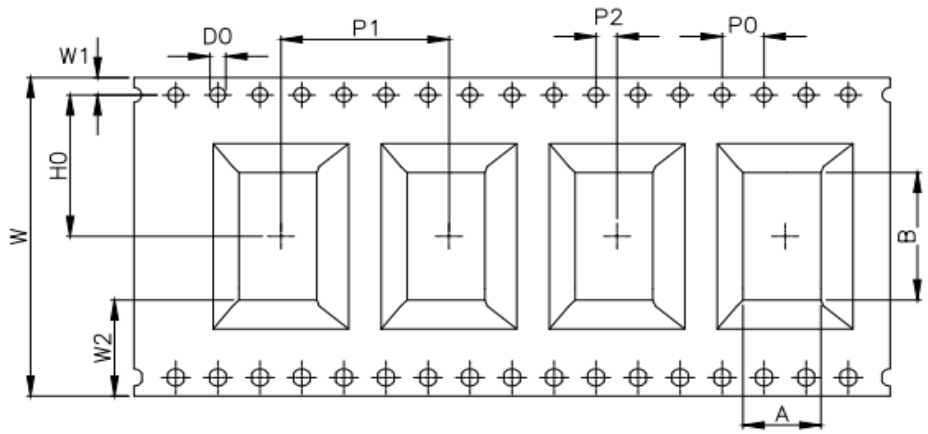
1.Storage Temperature : -10℃~+40℃

2.Relative Humidity : ≦75%RH

3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

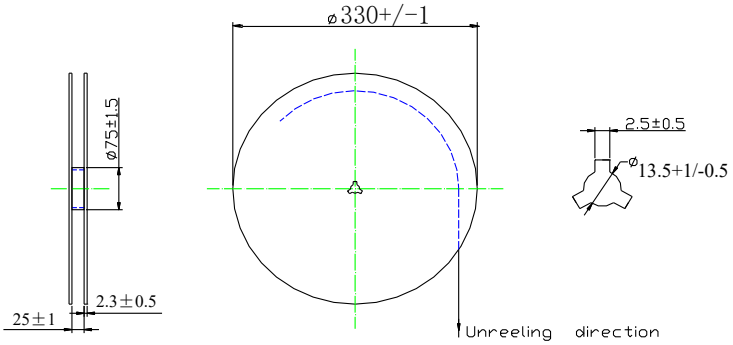
Taping and Dimensions



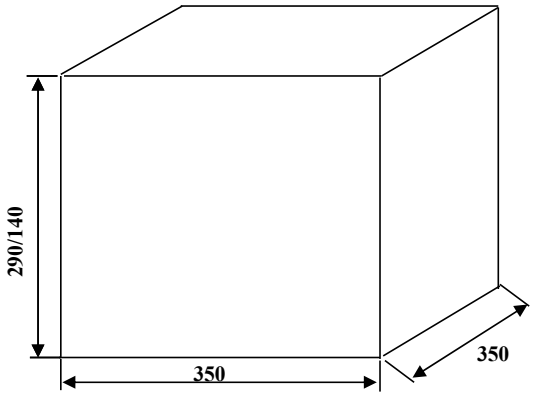
	A*B	P0	P1	P2	H0	W	W1	W2	D0
Size	12.5*14.3	4	20	2	11.5	24	1.75	3.6	1.5
Tolerance	+/- 0.2	+/- 0.1	+/- 0.3	+/- 0.1	+/- 0.1	+/- 0.3	+/- 0.1	Min.	0.1 0

Standard Packaging

(1) SPQ: 500 pcs/ reel



(2) Outer Box: 7/3 reels/ carton



(Unit：mm)

Safety Approvals (Certified Model/Type :TVBDS471)

* UL 1449 5th / cUL recognized (File # E314979)

* TUV :recognized (File J50517635)

*CQC:recognized (File CQC21001325226)

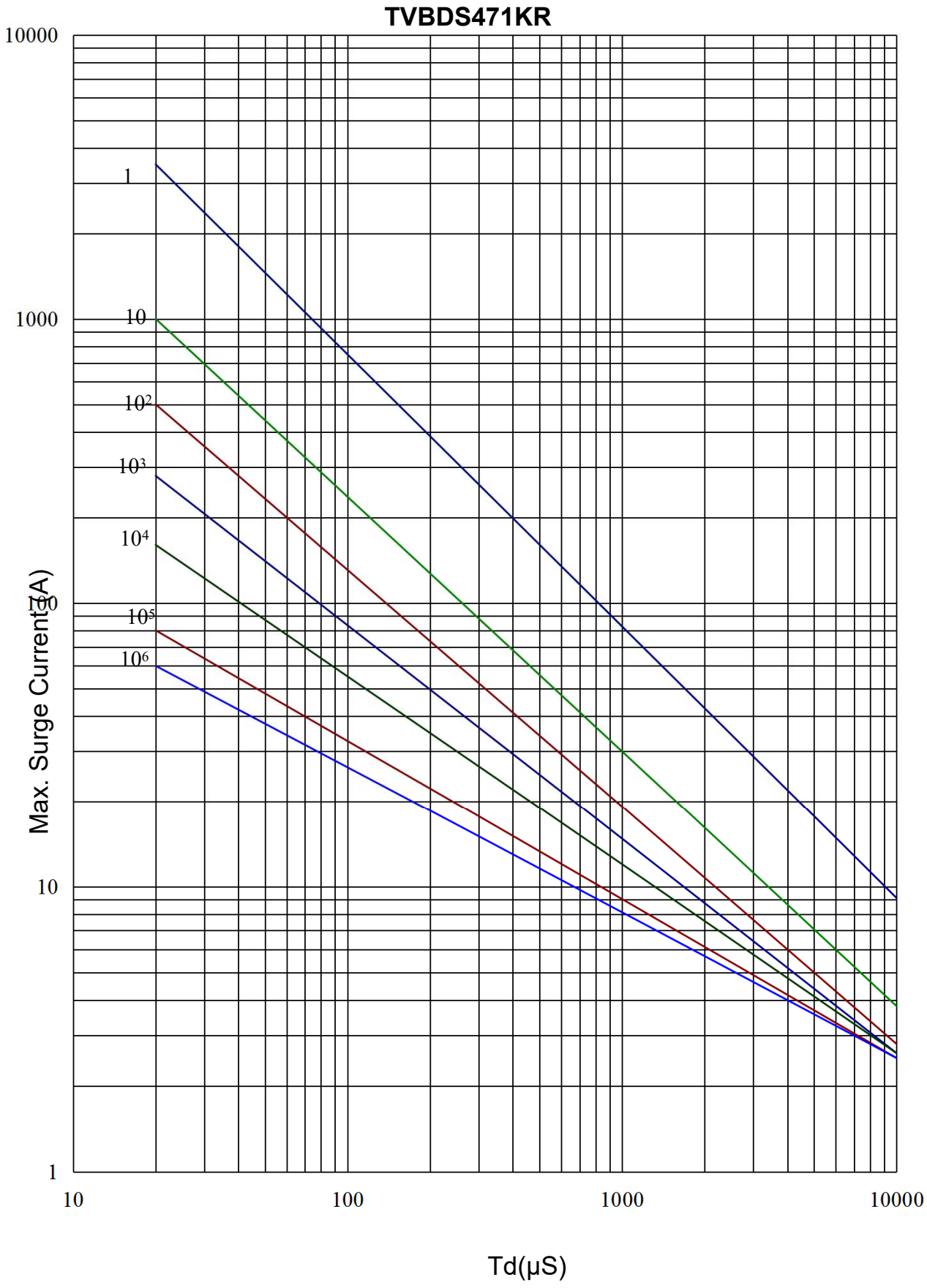
Certificates

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

Test Report

(1) RoHS test report

Max. Surge Current Derating Curves



Max. Leakage Current and Max. Clamping Voltage Curve