

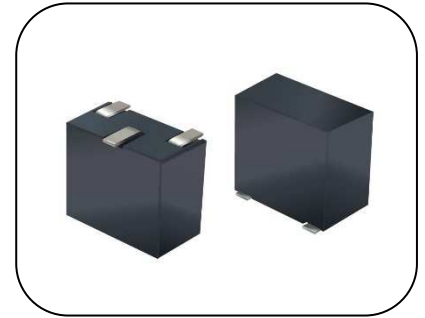
Metal Oxide Varistor: TVB-T Series

Plastic Encapsulated Type Varistor with 3 Pins



■ Features

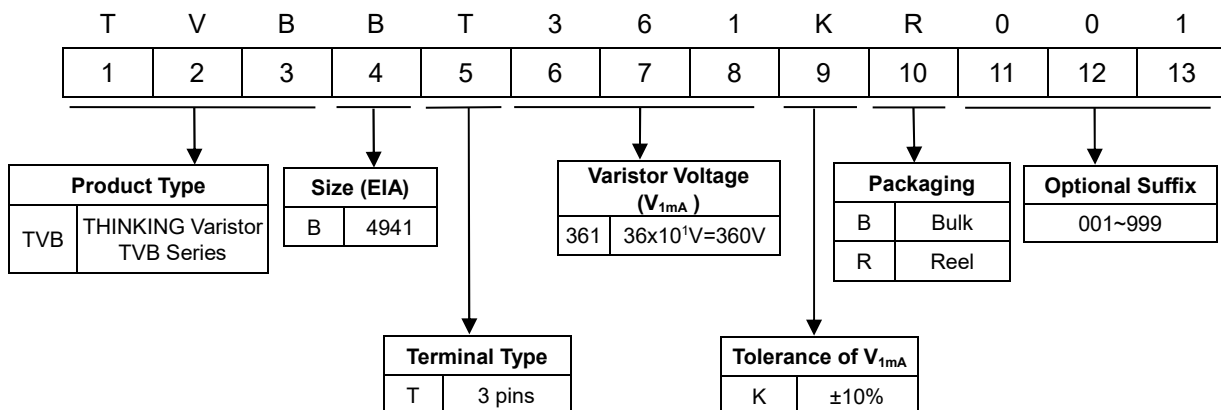
1. Space saving: installation space of the component is smaller than that of SMD type varistor
2. High design flexibility: components are connected in parallel for high surge capability, and they offer higher voltage when being connected in series
3. Automatic installation: suitable for surface mounted technology
4. Encapsulation material according to UL94-V0
5. Agency recognition: UL/cUL/TUV/CQC



■ Recommended Applications

1. Protection of switch ports
2. Protection of power terminals
3. Protection of wireless access point (AP) ports

■ Part Number Code



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Structures and Dimensions

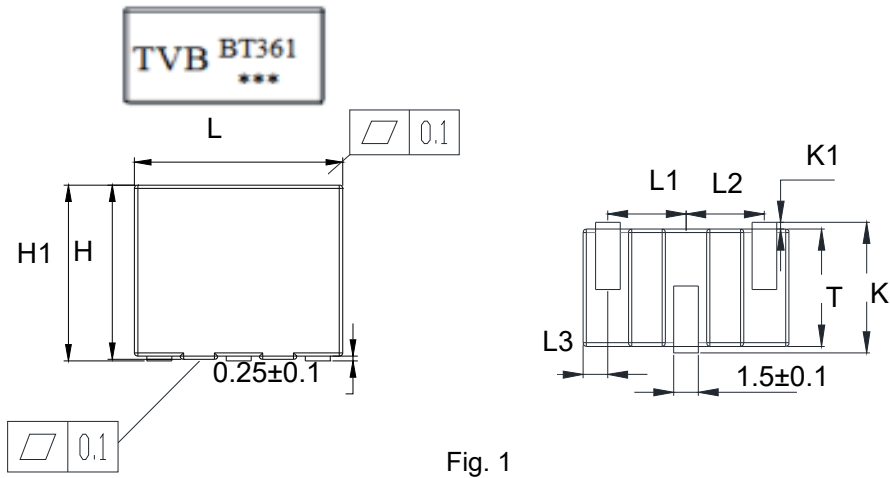


Fig. 1

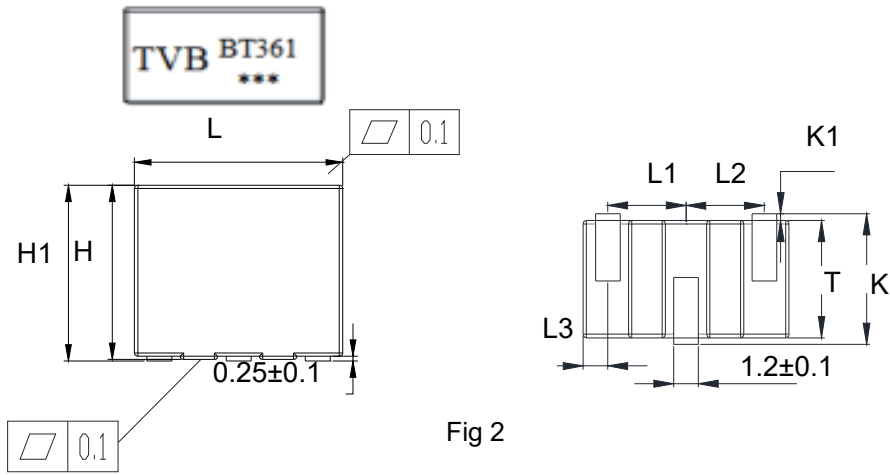


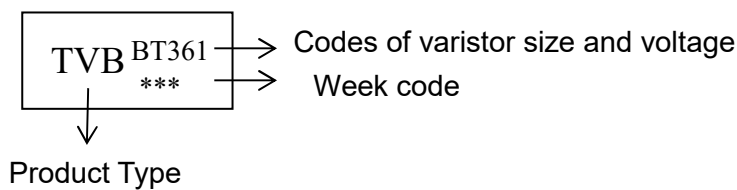
Fig. 2

(Unit::mm)

Item	L±0.2	H1max	H±0.2	T±0.2	K±0.4	K1±0.2	L1±0.3	L2±0.3	L3±0.3	Figure
TVBBT361	12.5	11.05	10.65	6.65	7.45	0.4	4.8	4.8	1.4	Fig. 1
TVBBT361-Miniaturization (mini)	9	11.05	10.65	6.65	7.45	0.4	3.2	3.2	1.3	Fig. 2

Marking

Marking is on the top of a component



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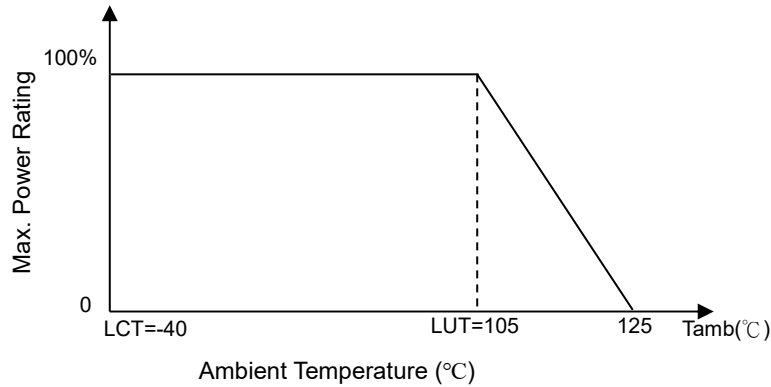
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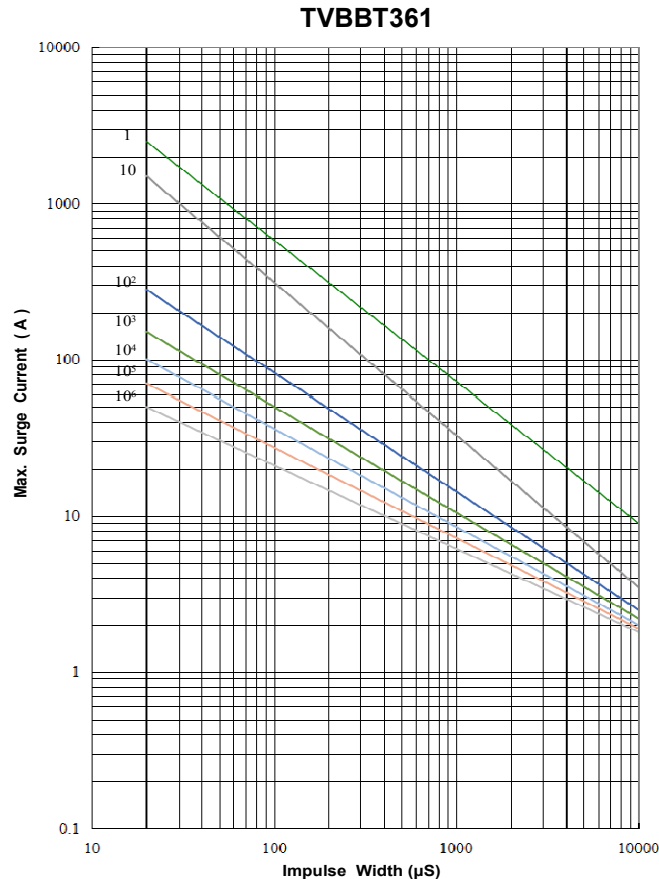
Electrical Characteristics

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20 μ s)		Max. Surge Current (8/20 μ s)	Max. Energy (10/1000 μ s)	Rated Power	Safety Approvals		
	V_{1mA} (V)	$V_{AC(ms)}$ (V)	V_{DC} (V)	V_P (V)	I_P (A)	I_{max} (A)	W_{max} (J)	P (W)	UL 1449 & cUL	TUV	CQC
TVBBT361	360 (324~396)	230	300	595	25	2500	47	0.4	√	√	√

Power Derating Curve



Max. Surge Current Derating Curves



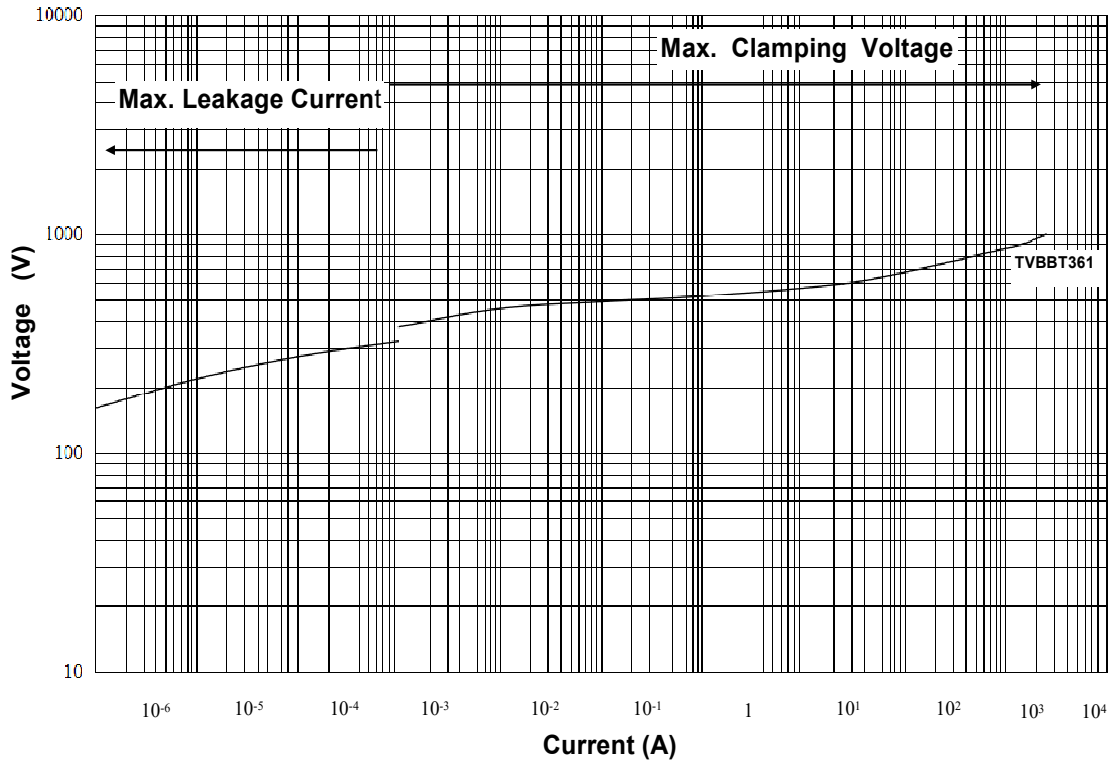
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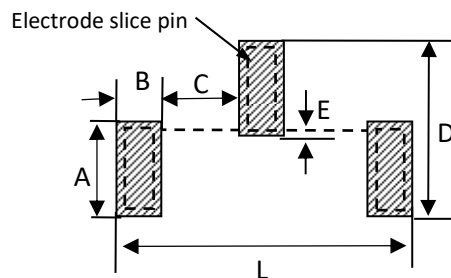
Max. Surge Current Derating Curves

Max. Surge Current Derating Curves (TVBBT 361)



Soldering Recommendation

Soldering Pad



(Unit: mm)

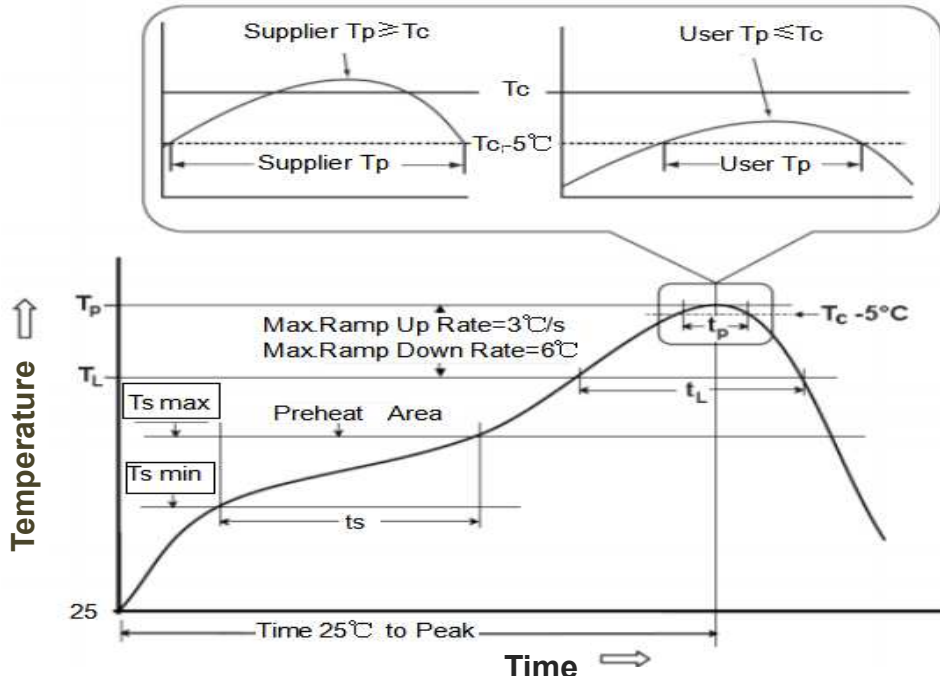
Item	A	B	C	D	E	L
Size TVBBT361	4.3	2.5	2.3	7.8	0.5	12.1

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- IR-reflow Soldering Profile



Curve Parameters		Lead Free Assembly
Temperature increase speed (T _{smax} -T _p)		≤3°C/s
Preheat	T _{smin}	150°C
	T _{smax}	200°C
	Time (t _s)	60~180s
Required time after melting point is reached	Melting point (T _L)	217°C
	Time (t _L)	60~150s
Peak temperature (T _p)		Please refer to the table below
Hold time for peak temperature (T _p) between 0~-5°C		30s
Cooling speed		≤6°C/s

- Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Diameter of Soldering Iron-tip	Φ3 mm (max.)

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■ Reliability

Item	Test conditions / Methods	Specifications
External Visual Inspection	Visual inspection	
Limited Voltage	8/20 specific current value	Within specification
Varistor Voltage	D.C 1mA	Within specification
Non-linear Coefficient	α	≥ 12 (18V~68V) ≥ 25 (82V~150V) ≥ 29 (180V~750V)
Leakage Current	75%V1mA	$\leq 50\mu\text{A}$ (18V~68V) $\leq 20\mu\text{A}$ (82V~750V)
Voltage Proof	Metal balls method, 2500 V, 1min	No visible damage
Max. Surge Current	8/20us, specific current value	$\Delta V/V \leq 10\%$ No visible damage
Operational Life	105°C, 1000 ± 24 hours, apply max. continuous dc (ac) operating voltage	$\Delta V/V \leq 10\%$ $R \geq 1000\text{M}\Omega$ No visible damage
8/20 μs Surge Life	8/20 μs waveform, 10 surge currents, unipolar, interval 30 secs, amplitude corresponding to max surge current derating curves for 20 μs .	$\Delta V/V \leq 10\%$ No visible damage
10/1000 μs Surge Life	Max energy, 10/1000 μs waveform, test one time	$\Delta V/V \leq 10\%$ No visible damage
Resistance to Soldering Heat	260°C±5°C 10±1S	$\Delta V/V \leq \pm 5\%$ No visible damage
Solderability	245°C±5°C, 3±0.3S	At least 95% of terminal electrode is covered by new solder
Varistor Voltage Temp. Coefficient	Varistor voltage is measured at -40°C, +105°C, and 25°C	$-0.05 \leq TC \leq 0.05$ (%/°C)
Rapid Change of Temperature	-40°C→+105°C, 5 cycles	$\Delta V/V \leq \pm 5\%$ No visible damage
85/85 Test	85°C/85% RH, Vdc, 1000h	$\Delta V/V \leq \pm 5\%$ No visible damage
Climatic Sequence	a. dry heat at +105°C, 16hrs b. damp heat, 1st cycle: 55°C, 95RH, 24hrs (IEC60068-2-30) c. cold, -40°C, 2 hrs d. damp heat, additional 5 cycles, 120 hrs	$\Delta V/V \leq \pm 5\%$ $R \geq 100\text{M}\Omega$
High Temperature Storage	125±2°C, 1000 hours	$\Delta V/V \leq \pm 5\%$ No visible damage
Damp Heat, Steady State	a. 40±2°C, 90 ~ 95 % RH, 1344 hrs b. 40±2°C, 90 ~ 95 % RH, at 10%Vdc, 1344 hrs	$\Delta V/V \leq \pm 5\%$ No visible damage
Vibration	10HZ-55HZ-10HZ/1 minute Amplitude: 0.75mm 6Hrs	$\Delta V/V \leq \pm 5\%$
Flammability	Needle flame, 10S (vertical position)	Flame lasts for 5S
Insulation Resistance Test	500V DC. 1min	$R \geq 1000\text{M}\Omega$
Maximum Power Capacity	1KHZ signal level $\leq 1\text{V}$, no bias voltage	Within specification
Maximum Dimensions	Output reading of vernier caliper is within 0.02mm	External dimension standard

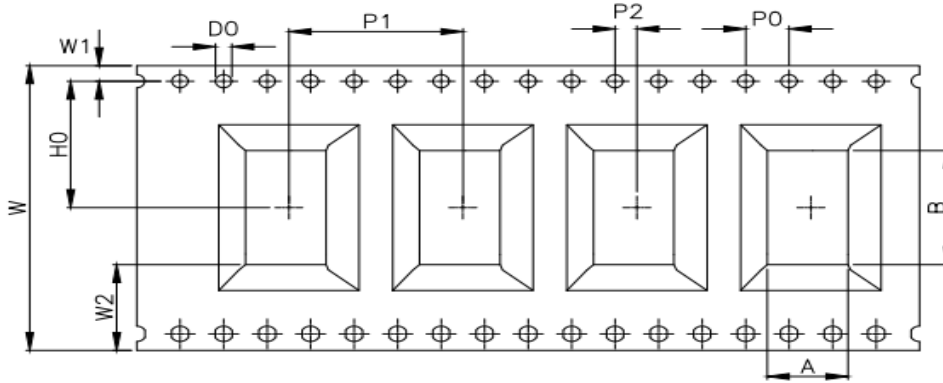
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■ Packaging

● Taping Specification

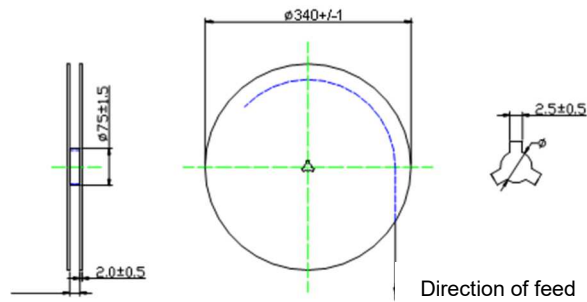


(Unit: mm)

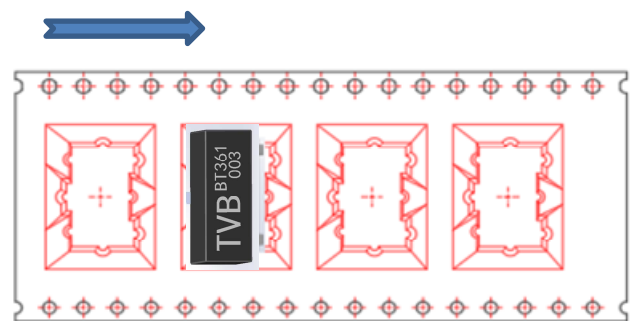
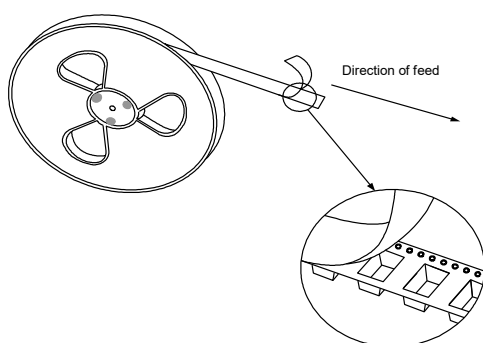
Item	A*B	P0	P1	P2	H0	W	W1	W2	D0	
Tolerance	±0.2	±0.1	±0.1	±0.05	±0.05	±0.3	±0.1	Min.	+0.1/0	
Size	TVBBT361	6.3*15.8	4	20	2	14.2	32	1.75	8.15	1.5

● Quantity

Reel Packing



Size	Quantity(pcs/reel)
TVBBT361	300



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■ Warehouse Storage Conditions of Products

- 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.
- Period of Storage: 1 year