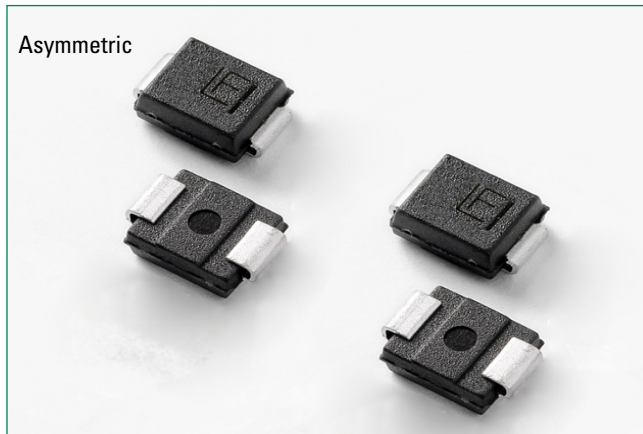


# TPSMB Asymmetric Series

## Surface Mount – 600W



### Maximum Ratings and Thermal Characteristics

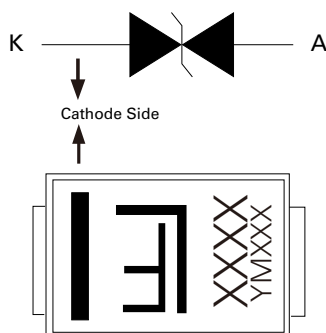
( $T_A=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation ( $I_{PP} \times V_C$ ) by 10/1000 $\mu\text{s}$ waveform (Fig.1)(Note 1), (Note 2)	$P_{PPM}^1$	600	W
	$P_{PPM}^2$		
Power Dissipation on infinite heat sink at $T_J=50^\circ\text{C}$	$P_{MAV}$	5.0	W
Operating Junction Temperature Range	$T_J$	-65 to 175	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to 175	
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	$^\circ\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
Typical Junction Capacitance	$C_J$	650	pF

#### Notes:

1. Non-repetitive current pulse, per Fig.4 and derated above  $T_A=25^\circ\text{C}$  per Fig. 3.
2. Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.

### Pin out & Functional Diagram



### Description

The TPSMB Asymmetric Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

### Features

- High reliability application and automotive grade AEC-Q101 qualified
- Surface mount component to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Glass passivated chip junction
- 600W  $P_{PPM}$  peak pulse power capability at 10/1000 $\mu\text{s}$  waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ns from 0V to  $V_{BR}$  min
- Excellent clamping capability
- Low incremental surge resistance
- UL Recognized compound meeting flammability rating V-0.
- Meet MSL level1, per J-STD-020, High temperature soldering guaranteed: 260 $^\circ\text{C}/10$  seconds at terminals
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

### Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Automotive applications.

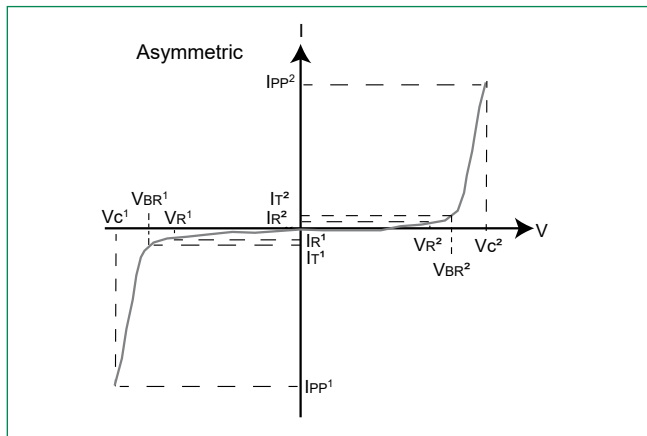
# TPSMB Asymmetric Series

## Surface Mount – 600W

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number	Marking	K $\rightarrow$ $\leftarrow$ A										Maximum Peak Pulse Current $I_{PP}^2$ (A)	Test Current $I_T^2$ (mA)				
		Maximum Reverse Leakage $I_R^1 @ V_R^1$ ( $\mu\text{A}$ )	Stand off Voltage $V_R^1$ (Volts)	Breakdown Voltage $V_{BR}^1$ (Volts) @ $I_T^1$		Maximum Clamping Voltage $V_C^1 @ I_{PP}^1$ (V)	Maximum Peak Pulse Current $I_{PP}^1$ (A)	Test Current $I_T^1$ (mA)	Maximum Reverse Leakage $I_R^2 @ V_R^2$ ( $\mu\text{A}$ )	Stand off Voltage $V_R^2$ (Volts)	Breakdown Voltage $V_{BR}^2$ (Volts) @ $I_T^2$			Maximum Clamping Voltage $V_C^2 @ I_{PP}^2$ (V)	Maximum Peak Pulse Current $I_{PP}^2$ (A)	Test Current $I_T^2$ (mA)	
				MIN	MAX						MIN						MAX
TPSMB2616CA	2616	1	26	28.9	31.9	42.1	14.3	1	1	16	17.8	19.7	26	23.1	1		

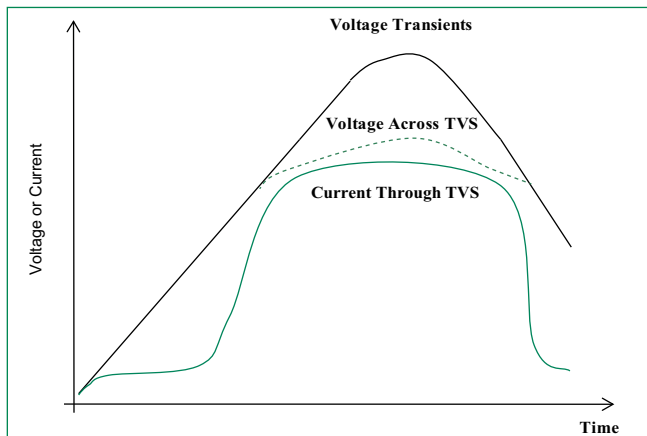
### I-V Curve Characteristics



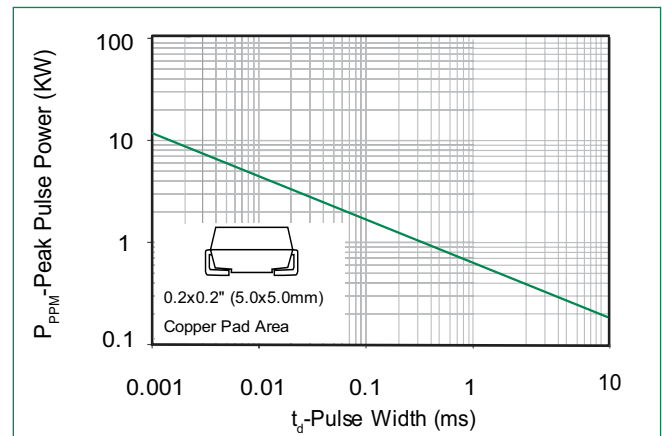
- $P_{PPM}$  Peak Pulse Power Dissipation** ( $I_{PP} \times V_C$ ) – Max power dissipation
- $V_R^1/V_R^2$  Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- $V_{BR}^1/V_{BR}^2$  Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
- $V_C^1/V_C^2$  Clamping Voltage** – Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)
- $I_R^1/I_R^2$  Reverse Leakage Current** – Current measured at  $V_R$

### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

**Figure 1:**  
TVS Transients Clamping Waveform



**Figure 2:**  
Peak Pulse Power Rating Curve

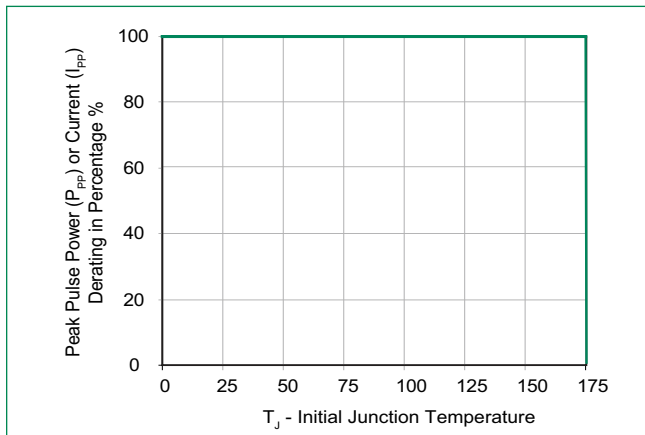


# TPSMB Asymmetric Series

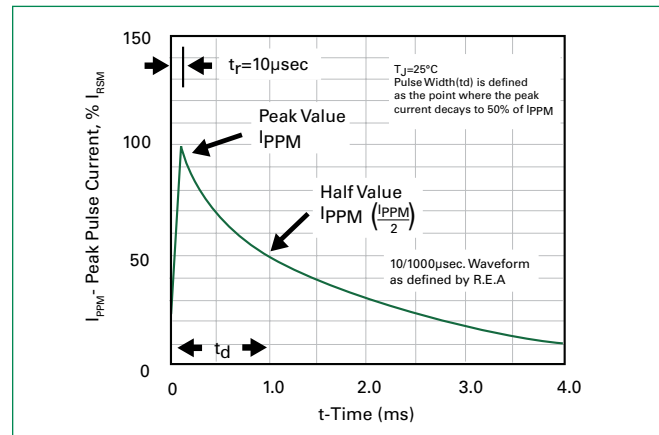
## Surface Mount – 600W

### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

**Figure 3:**  
Peak Pulse Power Derating Curve

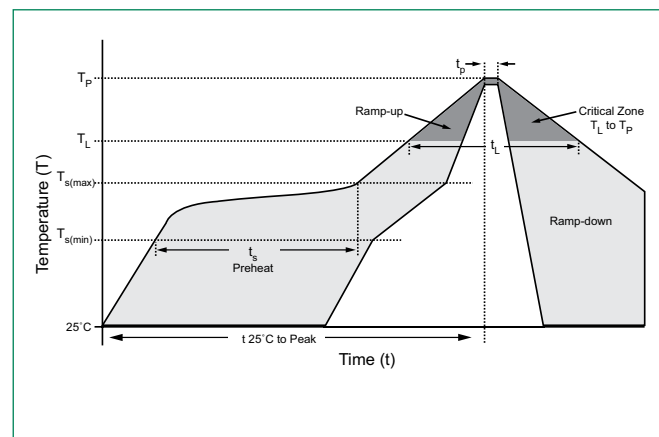


**Figure 4:**  
Pulse Waveform



### Soldering Parameters

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak)</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_s$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 $^{+0/-5}$ °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds max
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes max.
<b>Do not exceed</b>		260°C



### Physical Specifications

<b>Weight</b>	0.003 ounce, 0.093 grams
<b>Case</b>	JEDEC DO214AA. Molded plastic body over glass passivated junction. Color band denotes cathode for unidirectional components.
<b>Polarity</b>	Matte Tin-plated leads, Solderable per JESD22-B102
<b>Terminal</b>	

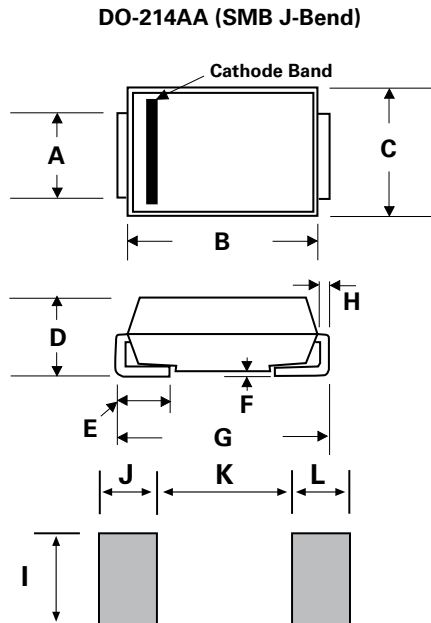
### Environmental Specifications

<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Temperature Cycling</b>	JESD22-A104
<b>MSL</b>	JEDEC-J-STD-020, Level 1
<b>H3TRB</b>	JESD22-A101
<b>RSH</b>	JESD22-A111

# TPSMB Asymmetric Series

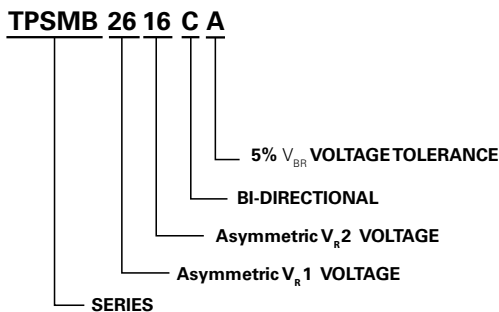
## Surface Mount – 600W

### Dimensions

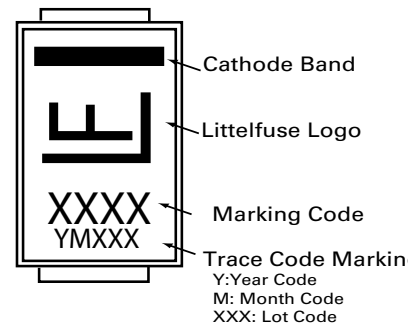


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.086	1.950	2.200
B	0.160	0.180	4.060	4.570
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.205	0.220	5.210	5.590
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

### Part Numbering System



### Part Marking System



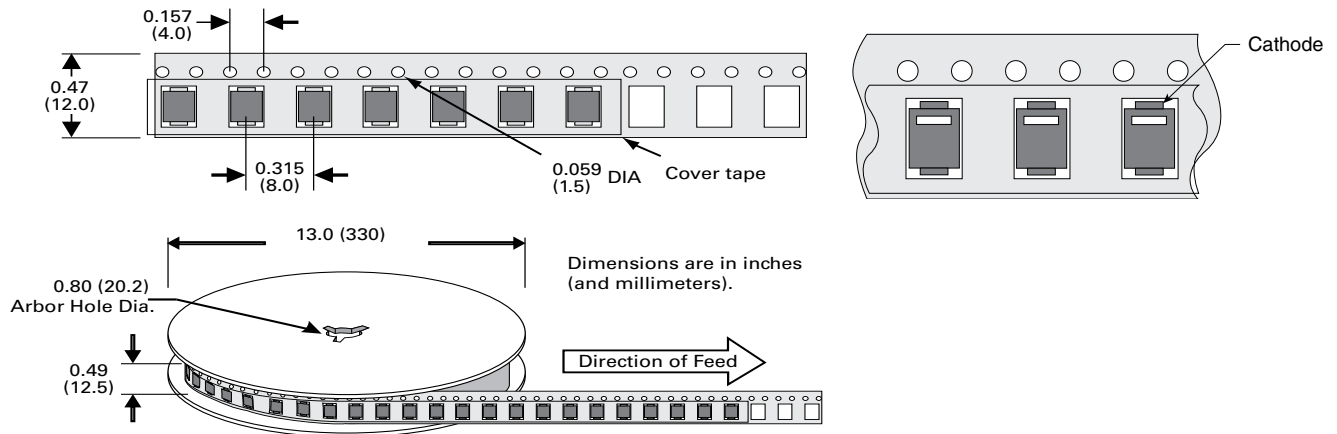
### Product Selector & Packaging Option

Part number	Marking Code	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMB2616CA	2616	DO-214AA	3000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

# TPSMB Asymmetric Series

## Surface Mount – 600W

### Tape and Reel Specification



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