TP8.0SMDJ Series

Surface Mount – 8000 W

AUTOMOTIVE GRADE HF RoHS Pb e3



Description

The TP8.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features and Benefits

- High reliability application and automotive grade AEC-Q101 qualified
- For surface mounted applications 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
- IEC-61000-4-2 ESD 30 kV(Air), 30 kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- 8 kW peak pulse power capability at 10/1000 µs waveform
- Fast response time: typically less than 1.0 ps from 0 V to V_{BR} min
- Excellent clamping capability
- Compact size with high power density in DO-214AB Package
- Low incremental surge resistance
- V_{BR} @ T_J= V_{BR}@25 °C x (1+αT x (T_J - 25))(αT:Temperature Coefficient, typical value is 0.1 %)
- UL recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 °C
- 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)

Maximum Ratings and Thermal Characteristics

(T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T_L = 25 °C by 10/1000 µs Waveform (Fig.2) (Note 1), (Note 2)	P_{PPM}	8000	W
Power Dissipation on Infinite Heat Sink at T_L = 50 °C	P_D	6.5	W
Operating Temperature Range	T_J	-65 to 150	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W

Notes:

1. Non-repetitive current pulse , per Fig. 4 and derated above T_J (initial) = 25 °C per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0 mm) to each terminal.

Functional Diagram



Bi-directional

Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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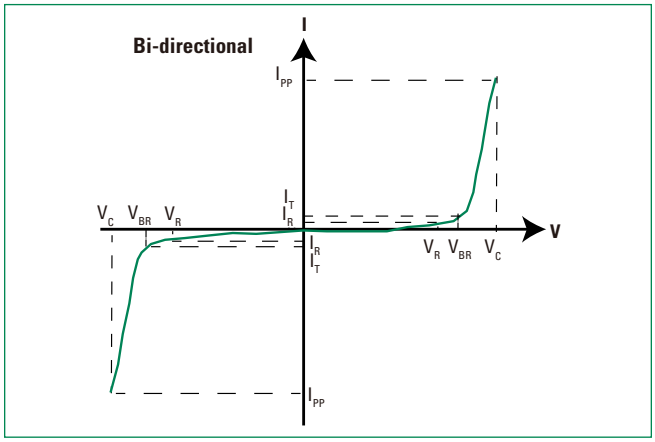
Electrical Characteristics (T_A = 25 °C unless otherwise noted)

Part Number (Bi)	Marking	Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (10/1000 µs) (V)	Maximum Peak Pulse Current I_{PP} (10/1000 µs) (A)	Maximum Clamping Voltage V_C @ I_{PP} (8/20 µs) (V)	Maximum Peak Pulse Current I_{PP} (8/20 µs) (A)	Maximum Reverse Leakage I_R @ V_R (µA)
			Min	Max						
TP8.0SMDJ24CA	T8BEZ	24	26.7	29.5	1	38.90	205.7	50.3	1336.8	5
TP8.0SMDJ26CA	T8BFE	26	28.9	31.9	1	42.10	190.0	54.4	1235.2	5
TP8.0SMDJ28CA	T8BFG	28	31.1	34.4	1	45.40	176.2	58.7	1145.4	5
TP8.0SMDJ30CA	T8BFK	30	33.3	36.8	1	48.40	165.3	62.5	1074.4	5
TP 8.0SMDJ33CA	T8BFM	33	36.7	40.6	1	53.30	150.1	64.5	975.6	5
TP8.0SMDJ36CA	T8BFP	36	40.0	44.2	1	58.10	137.7	66.3	895.0	5
TP8.0SMDJ40CA	T8BFR	40	44.4	49.1	1	64.50	124.0	73.7	806.2	5
TP8.0SMDJ43CA	T8BFT	43	47.8	52.8	1	69.40	115.3	79.2	749.3	5
TP8.0SMDJ45CA	T8BFV	45	50.0	55.3	1	72.70	110.0	83.0	715.3	5
TP8.0SMDJ48CA	T8BFX	48	53.3	58.9	1	77.40	103.4	88.4	671.8	5
TP 8.0SMDJ51CA	T8BFZ	51	56.7	62.7	1	82.40	97.1	94.1	631.1	5
TP8.0SMDJ54CA	T8BGE	54	60.0	66.3	1	87.10	91.8	99.5	597.0	5
TP 8.0SMDJ58CA	T8BGG	58	64.4	71.2	1	93.60	85.5	106.8	555.6	5
TP 8.0SMDJ60CA	T8BGK	60	66.7	73.7	1	96.80	82.6	110.6	537.2	5
TP8.0SMDJ64CA	T8BGM	64	71.1	78.6	1	103.00	77.7	117.9	504.9	5
TP8.0SMDJ70CA	T8BGB	70	77.8	86.0	1	113.00	70.8	120.4	460.2	5
TP8.0SMDJ75CA	T8BGR	75	83.3	92.1	1	121.00	66.1	121.0	429.8	5
TP8.0SMDJ78CA	T8BGT	78	86.7	95.8	1	126.00	63.5	126.0	412.7	5
TP8.0SMDJ85CA	T8BGV	85	94.4	104	1	137.00	58.4	137.0	379.6	5
TP8.0SMDJ90CA	T8BGX	90	100	111	1	146.00	54.8	146.0	356.2	5
TP8.0SMDJ100CA	T8BGZ	100	111	123	1	162.00	49.4	162.0	321.0	5
TP8.0SMDJ110CA	T8BHE	110	122	135	1	177.00	45.2	177.0	293.8	5
TP8.0SMDJ120CA	T8DHG	120	133	147	1	194.6	36.0	191.1	233.8	5
TP8.0SMDJ130CA	T8DHK	130	144	159	1	210.6	33.2	206.7	216	5
TP8.0SMDJ150CA	T8DHM	150	167	185	1	244.6	28.6	240.5	186	5
TP8.0SMDJ160CA	T8DHP	160	178	197	1	260.6	26.9	256.1	174.6	5
TP8.0SMDJ170CA	T8DHR	170	189	209	1	276.6	25.3	271.7	164.5	5
TP8.0SMDJ180CA	T8DHT	180	200	221	1	292.6	23.9	287.3	155.5	5
TP8.0SMDJ200CA	T8DHV	200	224	247	1	327.3	21.4	321.1	139	5
TP8.0SMDJ220CA	T8DHX	220	244	270	1	357.2	19.6	351	127.4	5
TP8.0SMDJ250CA	T8DHZ	250	279	309	1	408.7	17.1	401.7	111.3	5
TP8.0SMDJ300CA	T8DKI	300	335	371	1	490.7	12.2	482.3	79.5	5

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation I_{PP}xV_C -- Max power dissipation
V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage -- Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)
I_R Reverse Leakage Current -- Current measured at V_R

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Ratings and Characteristic Curves (T_A =2 5 °C unless otherwise noted)

Figure 1:
TVS Transients Clamping Waveform

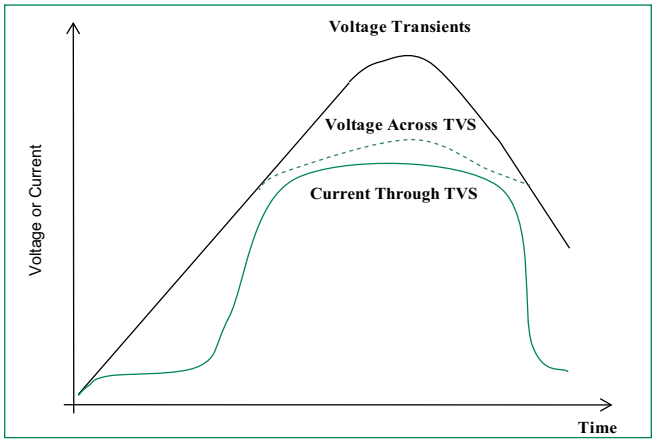


Figure 2:
Peak Pulse Power Rating

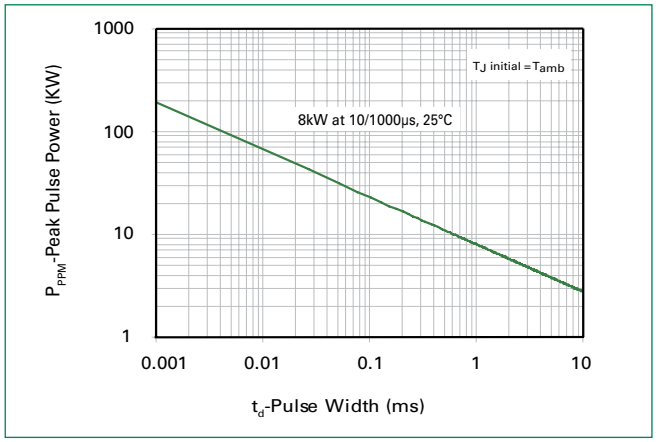


Figure 3:
Peak Pulse Power Derating Curve

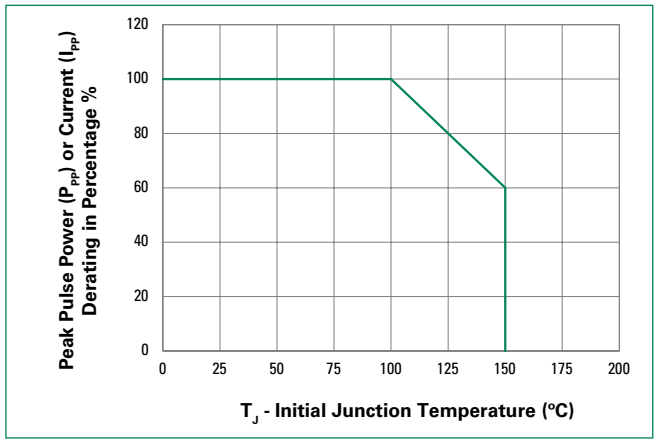


Figure 4:
Pulse Waveform

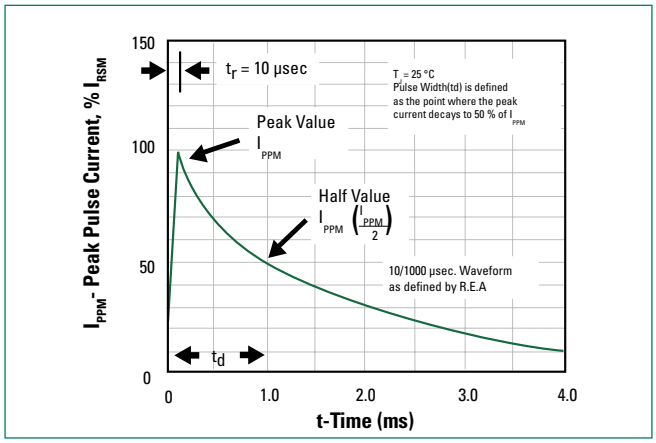
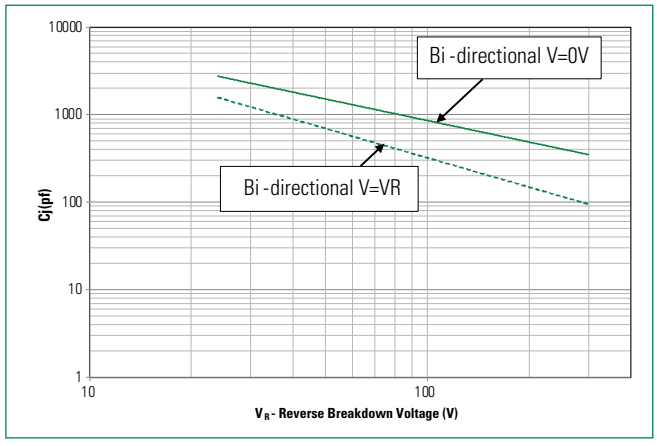


Figure 5:
Typical Junction Capacitance



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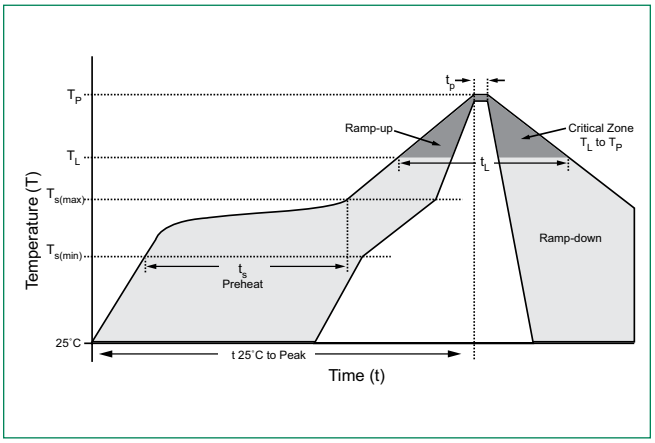
Soldering Parameters

Reflow Condition		Lead–free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150 °C
	- Temperature Max ($T_{s(max)}$)	200 °C
	- Time (min to max) (t_s)	60 – 120 seconds
Average Ramp Up Rate (Liquidus Temp (T_A) to Peak		3 °C/second max
$T_{S(max)}$ to T_A - Ramp-up Rate		3 °C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217 °C
	- Time (min to max) (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time Within 5 °C of Actual Peak Temperature (t_p)		30 seconds
Ramp-down Rate		6 °C/second max
Time 25 °C to Peak Temperature (T_P)		8 minutes max
Do Not Exceed		260 °C



Physical Specifications

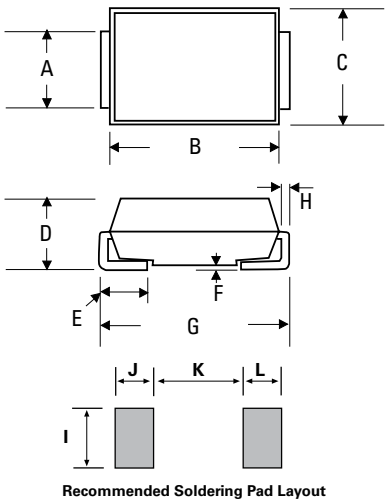
Weight	0.011 ounce ,0.3 grams
Case	JEDEC DO-214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, solderable per JESD22-B102

Environmental Specifications

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

Dimensions

DO-214AB (SMC J-Bend)



Recommended Soldering Pad Layout

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

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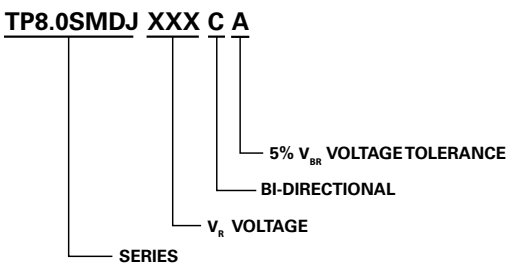
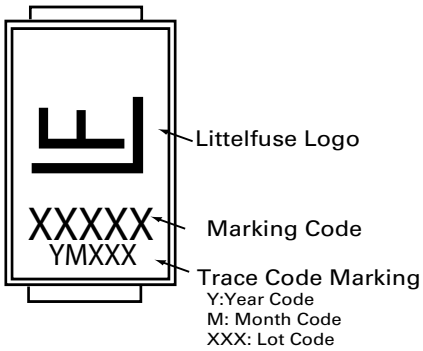
Part Numbering System



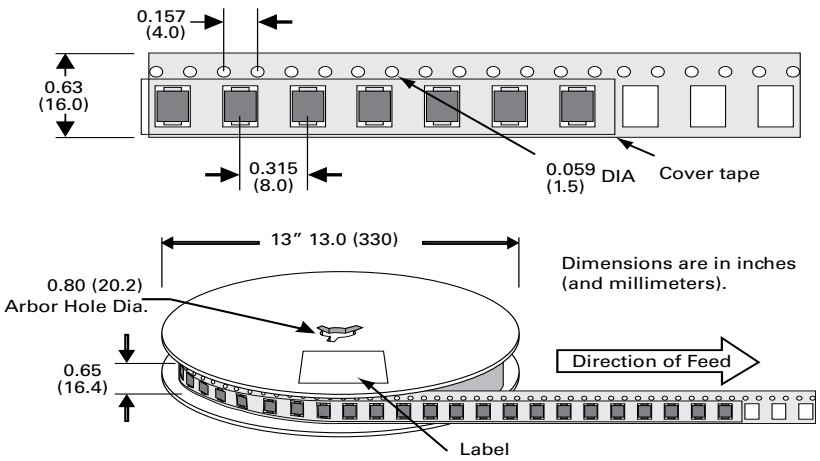
Part Marking System



Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TP8.0SMDJxxxCA	DO-214AB	3000	Tape & Reel - 16 mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification



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