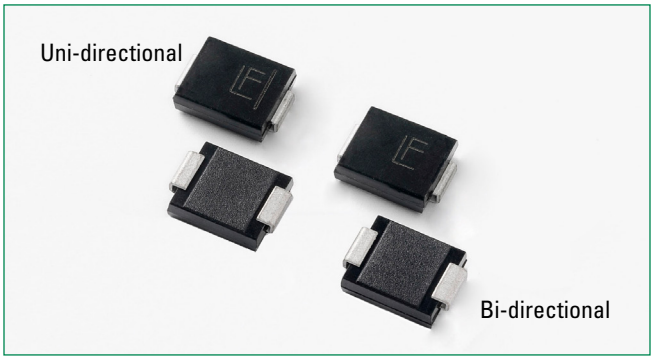
SMDJ Series



Agency Approvals

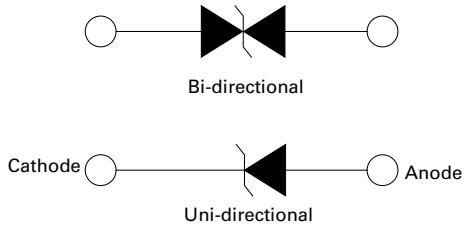
Agency	Agency File Number
	E230531

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation(Fig.2) by 10/1000us Test Waveform(Fig.4) (Note 1),(Note 2) -Single Die Parts	P_{PPM}	3000	W
Peak Pulse Power Dissipation(Fig.2) by 10/1000us Test Waveform(Fig.4) (Note 1), (Note 2) -Stacked Die Parts (Note 5)	P_{PPM}	4000	W
Power Dissipation on Infinite Heat Sink at T_L=50°C	P_D	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only(Note 4)	V_F	3.5/5.0	V
Operating Temperature Range	T_J	-65 to 150	°C
Storage Temperature Range	T_{STG}	-65 to 175	°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 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.
4. V_F < 3.5V for single die parts and V_F< 5.0V for stacked-die parts.
5. For stacked die component details, please refer to part numbers labeled by * in Electrical Characteristics.

Functional Diagram



Description

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

Features

- 3000 W P_{PPM} capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- For surface mounted applications in order to optimize board space
- 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 pass class 1 and 2
- Glass passivated chip junction
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- Low dynamic 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
- 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)
- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Products manufactured in the Philippines are available. -Parts with an E suffix are manufactured outside China. (See Ordering and Packaging Options section for details)

Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in telecom, computer, Industrial and consumer electronic applications.

Additional Infomarion

Datasheet | Resources | Samples

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TVS Diodes

Surface Mount – 3000W > SMDJ series

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

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V	Breakdown Voltage V		Test Current I_T (mA)	Maximum Clamping Voltage VC @ Ipp(10/1000µs) (V)	Maximum Peak Pulse Current Ipp(10/1000µs) (A)	Maximum Clamping Voltage VC @ Ipp(8/20µs) (V)	Maximum Peak Pulse Current Ipp(8/20µs) (A)	Maximum Reverse Leakage IR @ VR (µA)	Maximum Temperature coefficient of VBR (%/C)	Agency Approval
		UNI	BI		MIN	MAX								
SMDJ5.0A	SMDJ5.0CA	RDE	DDE	5.0	6.40	7.00	10	9.2	326.1	11.89	1630.5	800	0.041	X
SMDJ6.0A	SMDJ6.0CA	RDG	DDG	6.0	6.67	7.37	10	10.3	291.3	13.31	1456.5	800	0.046	X
SMDJ6.5A	SMDJ6.5CA	RDK	DDK	6.5	7.22	7.98	10	11.2	267.9	14.47	1339.5	500	0.052	X
SMDJ7.0A	SMDJ7.0CA	PDM	DDM	7.0	7.78	8.60	10	12.0	250.0	15.50	1250.0	200	0.058	X
SMDJ7.5A	SMDJ7.5CA	PDP	DDP	7.5	8.33	9.21	1	12.9	232.6	16.67	1163.0	100	0.061	X
SMDJ8.0A	SMDJ8.0CA	PDR	DDR	8.0	8.89	9.83	1	13.6	220.6	17.57	1103.0	50	0.064	X
SMDJ8.5A	SMDJ8.5CA	PDT	DDT	8.5	9.44	10.40	1	14.4	208.3	18.60	1041.5	20	0.066	X
SMDJ9.0A	SMDJ9.0CA	PDV	DDV	9.0	10.00	11.10	1	15.4	194.8	19.90	974.0	10	0.069	X
SMDJ10A	SMDJ10CA	PDX	DDX	10.0	11.10	12.30	1	17.0	176.5	21.96	882.5	5	0.071	X
SMDJ11A	SMDJ11CA	PDZ	DDZ	11.0	12.20	13.50	1	18.2	164.8	23.51	824.0	2	0.074	X
SMDJ12A	SMDJ12CA	PEE	DEE	12.0	13.30	14.70	1	19.9	150.8	25.71	754.0	2	0.075	X
SMDJ13A	SMDJ13CA	PEG	DEG	13.0	14.40	15.90	1	21.5	139.5	27.78	697.5	2	0.076	X
SMDJ14A	SMDJ14CA	PEK	DEK	14.0	15.60	17.20	1	23.2	129.3	29.97	646.5	2	0.08	X
SMDJ15A	SMDJ15CA	PEM	DEM	15.0	16.70	18.50	1	24.4	123.0	31.52	615.0	2	0.083	X
SMDJ16A	SMDJ16CA	PEP	DEP	16.0	17.80	19.70	1	26.0	115.4	33.59	577.0	2	0.084	X
SMDJ17A	SMDJ17CA	PER	DER	17.0	18.90	20.90	1	27.6	108.7	35.66	543.5	2	0.085	X
SMDJ18A	SMDJ18CA	PET	DET	18.0	20.00	22.10	1	29.2	102.7	37.73	513.5	2	0.088	X
SMDJ20A	SMDJ20CA	PEV	DEV	20.0	22.20	24.50	1	32.4	92.6	41.86	463.0	2	0.091	X
SMDJ22A	SMDJ22CA	PEX	DEX	22.0	24.40	26.90	1	35.5	84.5	45.87	422.5	2	0.092	X
SMDJ24A	SMDJ24CA	PEZ	DEZ	24.0	26.70	29.50	1	38.9	77.1	50.26	385.5	2	0.092	X
SMDJ26A	SMDJ26CA	PFE	DFE	26.0	28.90	31.90	1	42.1	71.3	54.39	356.5	2	0.093	X
SMDJ28A	SMDJ28CA	PFG	DFG	28.0	31.10	34.40	1	45.4	66.1	58.66	330.5	2	0.094	X
SMDJ30A	SMDJ30CA	PFK	DFK	30.0	33.30	36.80	1	48.4	62.0	62.53	310.0	2	0.096	X
SMDJ33A	SMDJ33CA	PFM	DFM	33.0	36.70	40.60	1	53.3	56.3	68.86	281.5	2	0.097	X
SMDJ36A	SMDJ36CA	PFP	DFP	36.0	40.00	44.20	1	58.1	51.6	75.06	258.0	2	0.098	X
SMDJ40A	SMDJ40CA	PFR	DFR	40.0	44.40	49.10	1	64.5	46.5	83.33	232.5	2	0.099	X
SMDJ43A	SMDJ43CA	PFT	DFT	43.0	47.80	52.80	1	69.4	43.2	89.66	216.0	2	0.1	X
SMDJ45A	SMDJ45CA	PFV	DFV	45.0	50.00	55.30	1	72.7	41.3	93.93	206.5	2	0.101	X
SMDJ48A	SMDJ48CA	PFX	DFX	48.0	53.30	58.90	1	77.4	38.8	100.00	194.0	2	0.101	X
SMDJ51A	SMDJ51CA	PFZ	DFZ	51.0	56.70	62.70	1	82.4	36.4	106.46	182.0	2	0.101	X
SMDJ54A	SMDJ54CA	RGE	DGE	54.0	60.00	66.30	1	87.1	34.4	112.53	172.0	2	0.102	X
SMDJ58A	SMDJ58CA	PGG	DGG	58.0	64.40	71.20	1	93.6	32.1	120.93	160.5	2	0.103	X
SMDJ60A	SMDJ60CA	PGK	DGK	60.0	66.70	73.70	1	96.8	31.0	125.06	155.0	2	0.103	X
SMDJ64A	SMDJ64CA	PGM	DGM	64.0	71.10	78.60	1	103.0	29.1	133.07	145.5	2	0.104	X
SMDJ70A	SMDJ70CA	PGP	DGP	70.0	77.80	86.00	1	113.0	26.5	145.99	132.5	2	0.105	X
SMDJ75A	SMDJ75CA	PGR	DGR	75.0	83.30	92.10	1	121.0	24.8	156.33	124.0	2	0.106	X
SMDJ78A	SMDJ78CA	PGT	DGT	78.0	86.70	95.80	1	126.0	23.8	162.79	119.0	2	0.106	X
SMDJ85A	SMDJ85CA	PGV	DGV	85.0	94.40	104.00	1	137.0	21.9	177.00	109.5	2	0.106	X
SMDJ90A	SMDJ90CA	PGX	DGX	90.0	100.00	111.00	1	146.0	20.5	188.63	102.5	2	0.107	X
SMDJ100A	SMDJ100CA	PGZ	DGZ	100.0	111.00	123.00	1	162.0	18.5	209.30	92.5	2	0.107	X
SMDJ110A	SMDJ110CA	PHE	DHE	110.0	122.00	135.00	1	177.0	16.9	228.68	84.5	2	0.107	X
SMDJ120A	SMDJ120CA	PHG	DHG	120.0	133.00	147.00	1	193.0	15.5	249.35	77.5	2	0.108	X
SMDJ130A	SMDJ130CA	PHK	DHK	130.0	144.00	159.00	1	209.0	14.4	270.03	72.0	2	0.108	X
SMDJ150A	-	PHM	-	150.0	167.00	185.00	1	243.0	12.3	313.95	61.5	2	0.108	X
-	SMDJ150CA*	-	DHM	150.0	167.00	185.00	1	243.0	16.5	313.95	61.5	2	0.108	X
SMDJ160A	-	PHP	-	160.0	178.00	197.00	1	259.0	11.6	334.63	58.0	2	0.108	X
-	SMDJ160CA*	-	DHP	160.0	178.00	197.00	1	259.0	15.5	334.63	58.0	2	0.108	X
SMDJ170A	-	PHR	-	170.0	189.00	209.00	1	275.0	10.9	355.30	54.5	2	0.108	X
-	SMDJ170CA*	-	DHR	170.0	189.00	209.00	1	275.0	14.6	355.30	54.5	2	0.108	X
SMDJ180A*	SMDJ180CA*	PHT	DHT	180.0	200.00	221.00	1	292.0	13.7	377.26	51.5	2	0.108	X
SMDJ200A*	SMDJ200CA*	PHV	DHV	200.0	224.00	247.00	1	324.0	12.4	418.60	46.5	2	0.11	X
SMDJ220A*	SMDJ220CA*	PKE	DKE	220.0	244.00	270.00	1	356.0	11.3	459.95	42.0	2	0.11	X
SMDJ250A*	SMDJ250CA*	PKG	DKG	250.0	279.00	309.00	1	405.0	9.9	523.26	37.5	2	0.11	X
SMDJ300A*	SMDJ300CA*	PKI	DKI	300.0	335.00	371.00	1	486.0	8.3	627.91	31.0	2	0.112	X
SMDJ350A*	SMDJ350CA*	PKJ	DKJ	350.0	391.00	432.00	1	567.0	7.1	732.56	26.5	2	0.112	X
SMDJ400A*	SMDJ400CA*	PKL	DKL	400.0	447.00	494.00	1	648.0	6.2	837.21	23.5	2	0.112	X
SMDJ440A*	SMDJ440CA*	PKN	DKN	440.0	492.00	543.00	1	713.0	5.7	921.19	21.5	2	0.112	X

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

For stack-die parts, use * to label the part number.

For uni-directional 5 V to 170 V, bi-directional 5 V to 130 V, add "-E" to the part number for COO Ex-China Site.

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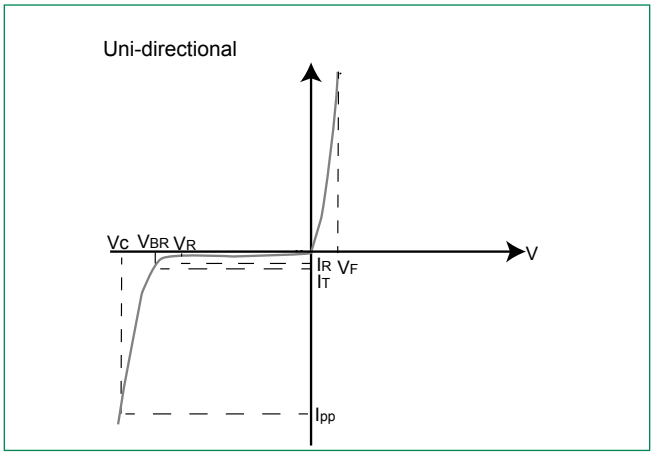
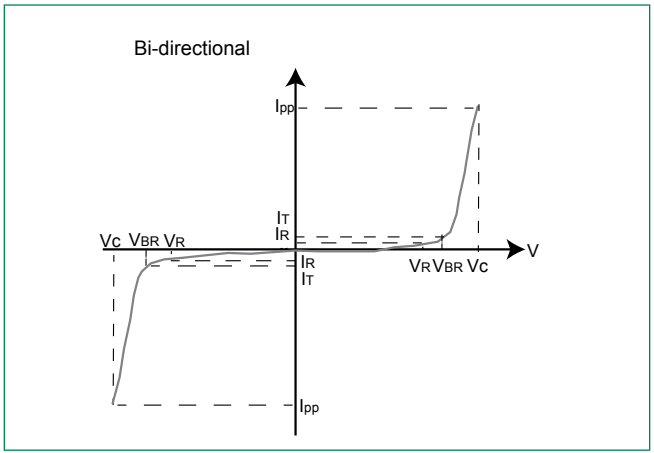
I-V Curve Characteristics





P_{PPM} Peak Pulse Power Dissipation (IPP x Vc) – 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 Ippm (peak impulse current)
I_R Reverse Leakage Current – Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

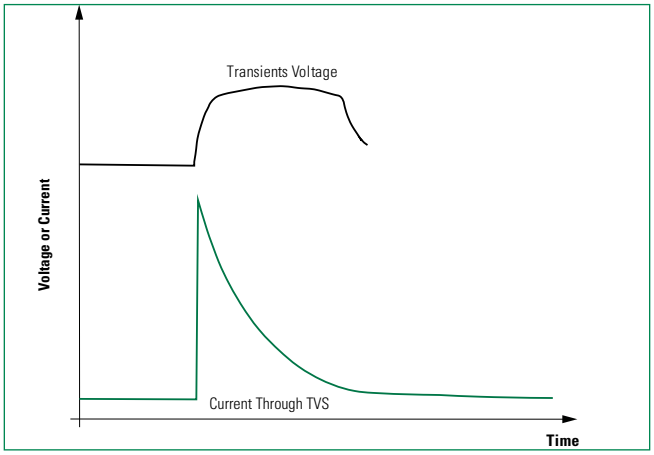
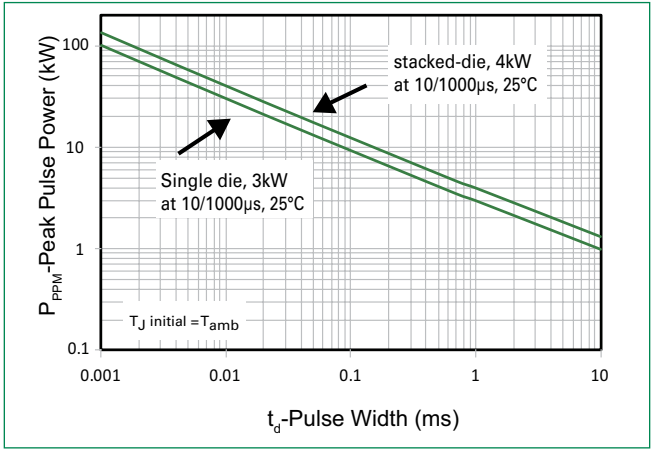


Figure 2 - Peak Pulse Power Rating



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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 3 - Peak Pulse Power Derating Curve

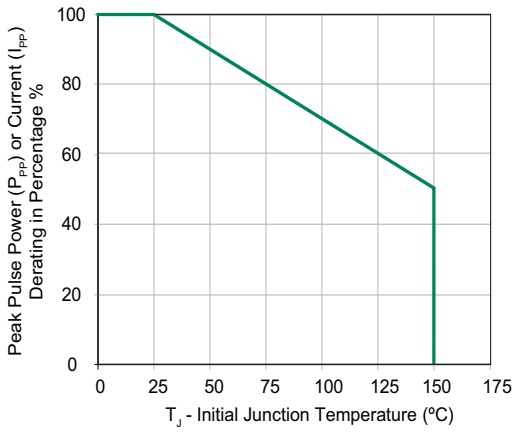


Figure 4 - Pulse Waveform

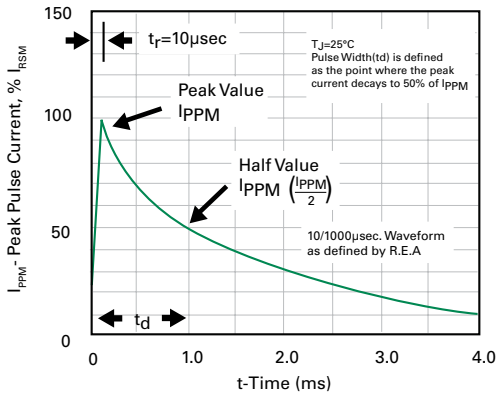


Figure 5 - Typical Junction Capacitance

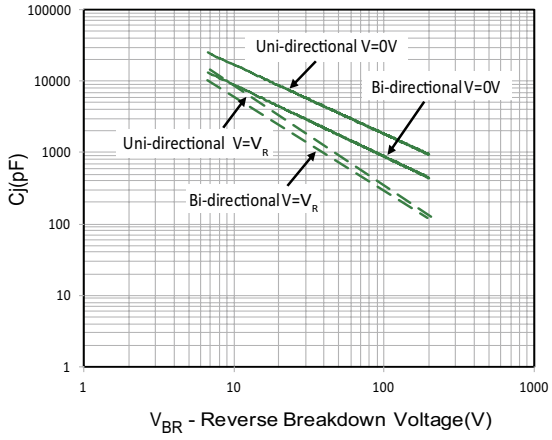


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

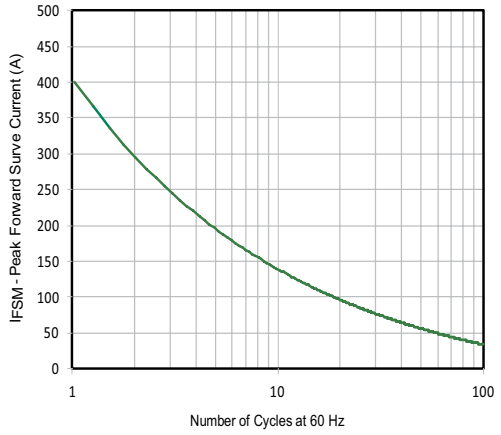
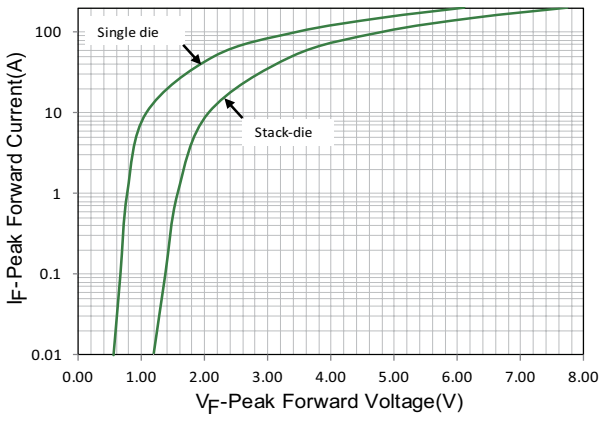
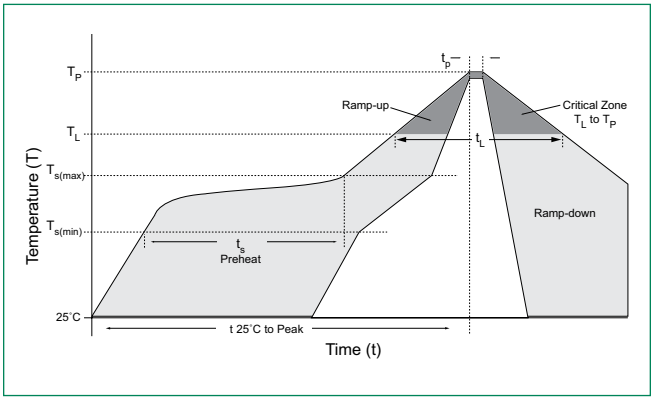


Figure 7 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



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 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - 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

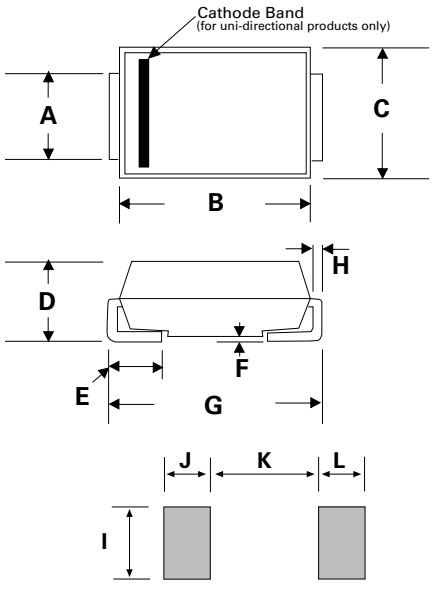
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except for bidirectional versions.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp Voltage Blocking (HTRB)	100 % DC reverse voltage rated 150 °C, 1008 hours JEDEC, JESD22-A-108
Biased Temp & Humidity (H3TRB)	80 % breakdown voltage (+85 °C) 85 %RH, 1008 hours JEDEC, JESD22-A-101
Unbiased Highly Accelerated Stress Test (UHAST)	96 hours at T_A = 130 °C/85 %RH. JEDEC, JESD22-A-118
Temp Cycling (TC)	-55 °C to +150 °C, 15 min. dwell, 1000 cycles. JEDEC, JESD22-A104
Moisture Sensitivity Level (MSL)	85 %RH, +85 °C, 168 hours, 3 reflow cycles (+260 °C Peak). JEDEC, JEDEC-J-STD-020, Level 1
Resistance to Solder Heat (RSH)	+260 °C, 30 seconds JEDEC, JEDEC JESD22-A-111

Dimensions

DO-214AB (SMC J-Bend)



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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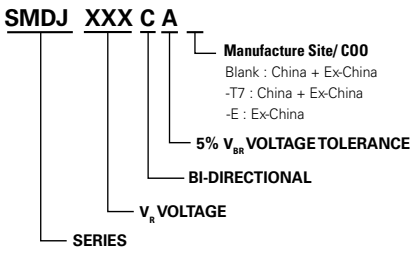
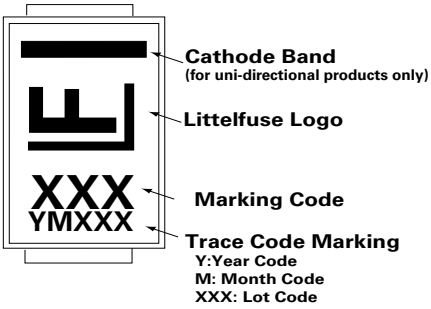
Part Numbering System



Part Marking System



Ordering and Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging	Manufacture Site/ COO
SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481	China + Ex-China
SMDJxxxXX-T7	DO-214AB	500	Tape & Reel – 16mm tape/7" reel	EIA STD RS-481	China + Ex-China
SMDJxxxXX-E (1)(2)	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481	Ex-China

Footnote:
1. Uni-directional product voltage range from 5 V to 170 V
2. Bi-directional product voltage range from 5 V to 130 V

Tape and Reel Specification