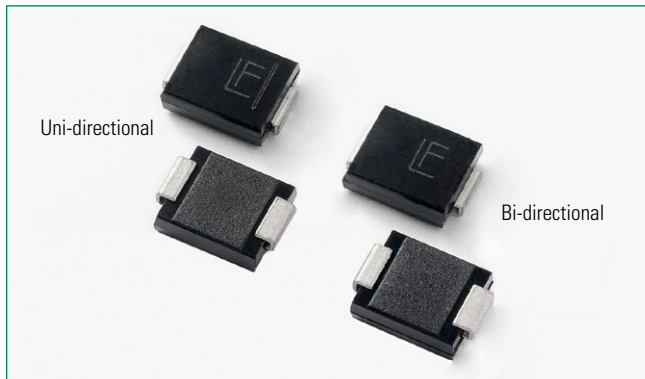


SMCJ-HRA Series



Agency Approvals

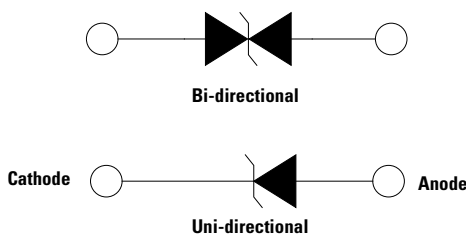
Agency	Agency File Number
	E230531

Maximum Ratings and Thermal Characteristics
($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_A = 25^\circ\text{C}$ by 10/1000 μs waveform (Fig. 1)(Note 1), (Note 2)	P_{PPM}	1500	W
Power Dissipation on infinite heat sink at $T_A = 50^\circ\text{C}$	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	200	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only (Note 4)	V_F	3.5/5.0	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-65 to 150	$^\circ\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

- Notes:**
1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig. 2.
 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 device only, duty cycle=4 per minute maximum.
 4. $V_F < 3.5\text{V}$ for $V_{BR} \leq 200\text{V}$ and $V_F < 5.0\text{V}$ for $V_{BR} \geq 201\text{V}$.

Functional Diagram



Description

The SMCJ-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of up-screening options for enhanced reliability.

Features

- High reliability devices with fabrication and assembly lots traceability
- Enhanced reliability screening options are available in reference to MIL-PRF-19500. Refer to screen process table for more detail on screening options
- For surface mounted applications to optimize board space
- Low profile package
- Built-in strain relief
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature Coefficient)
- Glass passivated chip junction
- 1500W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1 μA above 12V
- High Temperature soldering guaranteed: 260 $^\circ\text{C}$ /40 seconds at terminals
- Plastic package has Underwriters laboratory flammability 94V-0
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^\circ\text{C}$
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Applications

SMCJ-HRA devices are ideal for the high reliability protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Electrical Characteristics

Part Number (Uni)	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} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Agency Approval 
		Uni	Bi		Min	Max					
SMCJ5.0A-HRA	SMCJ5.0CA-HRA	GDEH	BDEH	5.0	6.40	7.00	10	9.2	163.0	800	X
SMCJ6.0A-HRA	SMCJ6.0CA-HRA	GDGH	BDGH	6.0	6.67	7.37	10	10.3	145.7	800	X
SMCJ6.5A-HRA	SMCJ6.5CA-HRA	GDKH	BDKH	6.5	7.22	7.98	10	11.2	134.0	500	X
SMCJ7.0A-HRA	SMCJ7.0CA-HRA	GDMH	BDMH	7.0	7.78	8.60	10	12.0	125.0	200	X
SMCJ7.5A-HRA	SMCJ7.5CA-HRA	GDPH	BDPH	7.5	8.33	9.21	1	12.9	116.3	100	X
SMCJ8.0A-HRA	SMCJ8.0CA-HRA	GDRH	BDRH	8.0	8.89	9.83	1	13.6	110.3	50	X
SMCJ8.5A-HRA	SMCJ8.5CA-HRA	GDTH	BDTH	8.5	9.44	10.40	1	14.4	104.2	20	X
SMCJ9.0A-HRA	SMCJ9.0CA-HRA	GDVH	BDVH	9.0	10.00	11.10	1	15.4	97.4	10	X
SMCJ10A-HRA	SMCJ10CA-HRA	GDXH	BDXH	10.0	11.10	12.30	1	17.0	88.3	5	X
SMCJ11A-HRA	SMCJ11CA-HRA	GDZH	BDZH	11.0	12.20	13.50	1	18.2	82.5	1	X
SMCJ12A-HRA	SMCJ12CA-HRA	GEEH	BEEH	12.0	13.30	14.70	1	19.9	75.4	1	X
SMCJ13A-HRA	SMCJ13CA-HRA	GEGH	BEGH	13.0	14.40	15.90	1	21.5	69.8	1	X
SMCJ14A-HRA	SMCJ14CA-HRA	GEKH	BEKH	14.0	15.60	17.20	1	23.2	64.7	1	X
SMCJ15A-HRA	SMCJ15CA-HRA	GEMH	BEMH	15.0	16.70	18.50	1	24.4	61.5	1	X
SMCJ16A-HRA	SMCJ16CA-HRA	GEPH	BEPH	16.0	17.80	19.70	1	26.0	57.7	1	X
SMCJ17A-HRA	SMCJ17CA-HRA	GERH	BERH	17.0	18.90	20.90	1	27.6	54.4	1	X
SMCJ18A-HRA	SMCJ18CA-HRA	GETH	BETH	18.0	20.00	22.10	1	29.2	51.4	1	X
SMCJ20A-HRA	SMCJ20CA-HRA	GEVH	BEVH	20.0	22.20	24.50	1	32.4	46.3	1	X
SMCJ22A-HRA	SMCJ22CA-HRA	GEXH	BEXH	22.0	24.40	26.90	1	35.5	42.3	1	X
SMCJ24A-HRA	SMCJ24CA-HRA	GEZH	BEZH	24.0	26.70	29.50	1	38.9	38.6	1	X
SMCJ26A-HRA	SMCJ26CA-HRA	GFEH	BFEH	26.0	28.90	31.90	1	42.1	35.7	1	X
SMCJ28A-HRA	SMCJ28CA-HRA	GFGH	BFGH	28.0	31.10	34.40	1	45.4	33.1	1	X
SMCJ30A-HRA	SMCJ30CA-HRA	GFKH	BFKH	30.0	33.30	36.80	1	48.4	31.0	1	X
SMCJ33A-HRA	SMCJ33CA-HRA	GFMH	BFMH	33.0	36.70	40.60	1	53.3	28.2	1	X
SMCJ36A-HRA	SMCJ36CA-HRA	GFPH	BFPH	36.0	40.00	44.20	1	58.1	25.9	1	X
SMCJ40A-HRA	SMCJ40CA-HRA	GFRH	BFRH	40.0	44.40	49.10	1	64.5	23.3	1	X
SMCJ43A-HRA	SMCJ43CA-HRA	GFTH	BFTH	43.0	47.80	52.80	1	69.4	21.7	1	X
SMCJ45A-HRA	SMCJ45CA-HRA	GFVH	BFVH	45.0	50.00	55.30	1	72.7	20.6	1	X
SMCJ48A-HRA	SMCJ48CA-HRA	GFXH	BFXH	48.0	53.30	58.90	1	77.4	19.4	1	X
SMCJ51A-HRA	SMCJ51CA-HRA	GFZH	BFZH	51.0	56.70	62.70	1	82.4	18.2	1	X
SMCJ54A-HRA	SMCJ54CA-HRA	GGEH	BGEH	54.0	60.00	66.30	1	87.1	17.3	1	X
SMCJ58A-HRA	SMCJ58CA-HRA	GGGH	BGGH	58.0	64.40	71.20	1	93.6	16.1	1	X
SMCJ60A-HRA	SMCJ60CA-HRA	GGKH	BGKH	60.0	66.70	73.70	1	96.8	15.5	1	X
SMCJ64A-HRA	SMCJ64CA-HRA	GGMH	BGMH	64.0	71.10	78.60	1	103.0	14.6	1	X
SMCJ70A-HRA	SMCJ70CA-HRA	GGPH	BGPH	70.0	77.80	86.00	1	113.0	13.3	1	X
SMCJ75A-HRA	SMCJ75CA-HRA	GGRH	BGRH	75.0	83.30	92.10	1	121.0	12.4	1	X
SMCJ78A-HRA	SMCJ78CA-HRA	GGTH	BGTH	78.0	86.70	95.80	1	126.0	11.9	1	X
SMCJ85A-HRA	SMCJ85CA-HRA	GGVH	BGVH	85.0	94.40	104.00	1	137.0	11.0	1	X
SMCJ90A-HRA	SMCJ90CA-HRA	GGXH	BGXH	90.0	100.00	111.00	1	146.0	10.3	1	X
SMCJ100A-HRA	SMCJ100CA-HRA	GGZH	BGZH	100.0	111.00	123.00	1	162.0	9.3	1	X
SMCJ110A-HRA	SMCJ110CA-HRA	GHEH	BHEH	110.0	122.00	135.00	1	177.0	8.5	1	X
SMCJ120A-HRA	SMCJ120CA-HRA	GHGH	BHGH	120.0	133.00	147.00	1	193.0	7.8	1	X
SMCJ130A-HRA	SMCJ130CA-HRA	GHKH	BHKH	130.0	144.00	159.00	1	209.0	7.2	1	X
SMCJ150A-HRA	SMCJ150CA-HRA	GHHH	BHHH	150.0	167.00	185.00	1	243.0	6.2	1	X
SMCJ160A-HRA	SMCJ160CA-HRA	GHPH	BHPH	160.0	178.00	197.00	1	259.0	5.8	1	X
SMCJ170A-HRA	SMCJ170CA-HRA	GHRH	BHRH	170.0	189.00	209.00	1	275.0	5.5	1	X

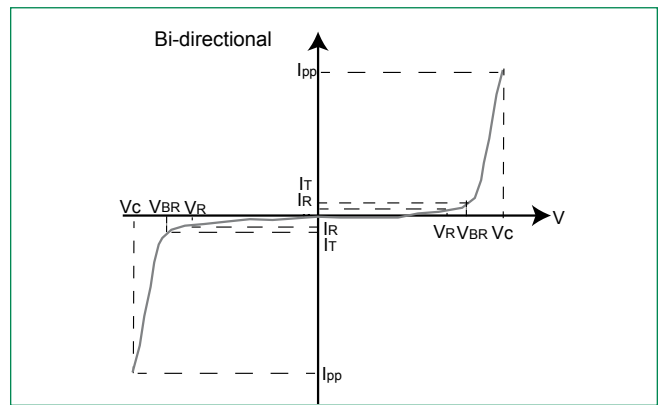
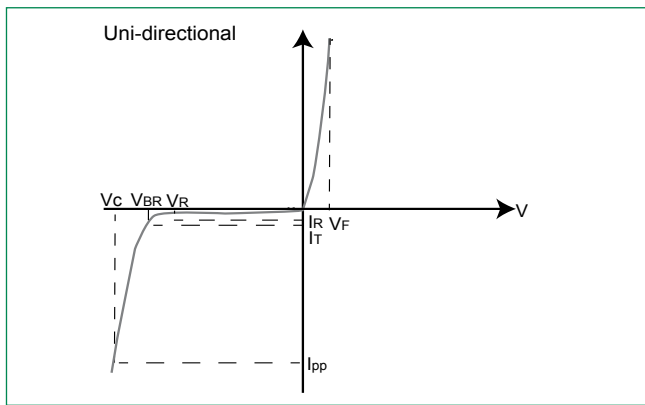
Note:
 1.SMCJ-HRA voltage binning can be specified by customer's request via contacting Littelfuse service

Screen Process

100% vision inspection	MIL-STD-750 method 2074
100% High Temperature Storage Life (168hrs, 150C)	MIL-STD-750 method 1031
100% X-RAY inspection	MIL-STD-750 method 2076
100% Temperature cycle test (-55-150C, 20 cycles, dwell time 15 min)	MIL-STD-750 method 1051
100% Reflow (2X)	JEDEC J-STD-020
100% surge test (2x)	MIL-STD-750 method 4066
100% HTRB(150C, Bias=VR(80% breakdown voltage), 96hrs), for Bi-direction products, 96hrs for each direction	MIL-STD-750 method 1038
Final electrical test(100% 3 sigma limit, 100% dynamic test and PAT limit)	MIL-STD-750 method 4016.4021.4011

Note: Up-screen program can be specified by customer's request via contacting Littelfuse service

I-V Curve Characteristics



- PPPM Peak Pulse Power Dissipation** – Max power dissipation
- VR Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- VBR Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current (I_T)
- Vc Clamping Voltage** – Peak voltage measured across the suppressor at a specified I_{ppm} (peak impulse current)
- IR Reverse Leakage Current** – Current measured at V_R
- VF Forward Voltage Drop for Uni-directional**

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

Figure 1 - TVS Transients Clamping Waveform

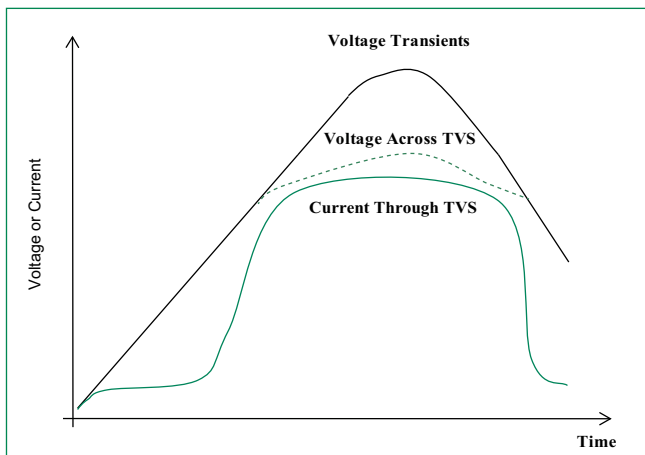
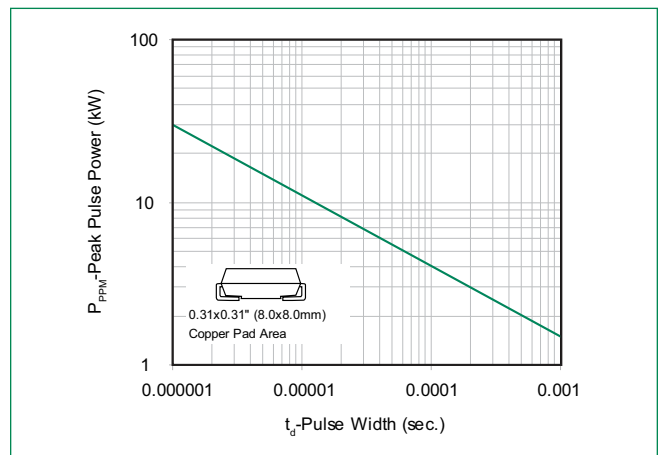


Figure 2 - Peak Pulse Power Rating



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

Figure 3 - Pulse Derating Curve

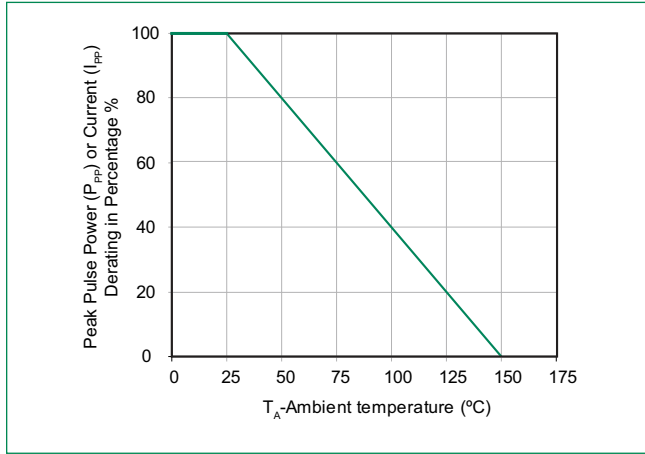


Figure 4 - Pulse Waveform

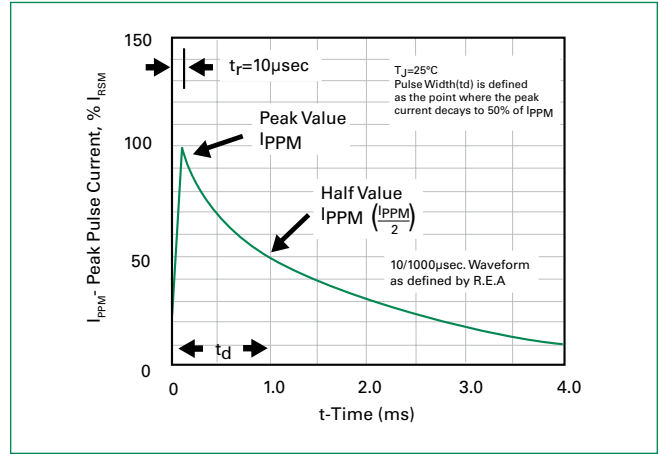


Figure 5 - Typical Junction Capacitance

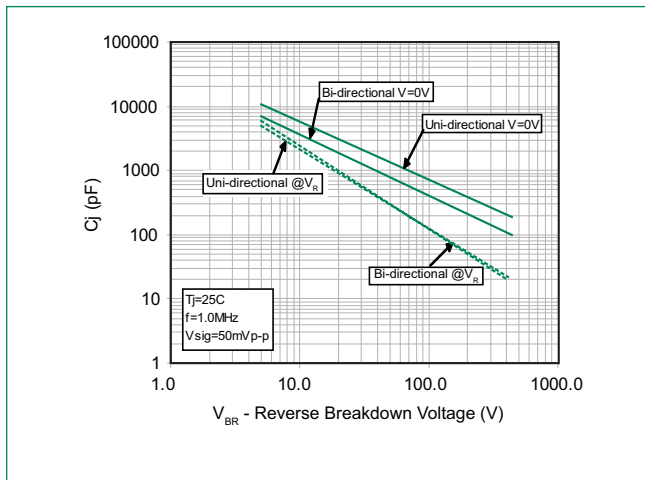


Figure 6 - Steady State Power Dissipation Derating Curve

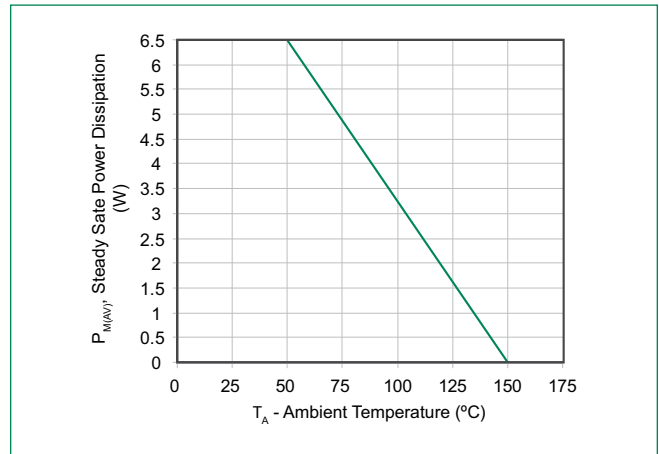
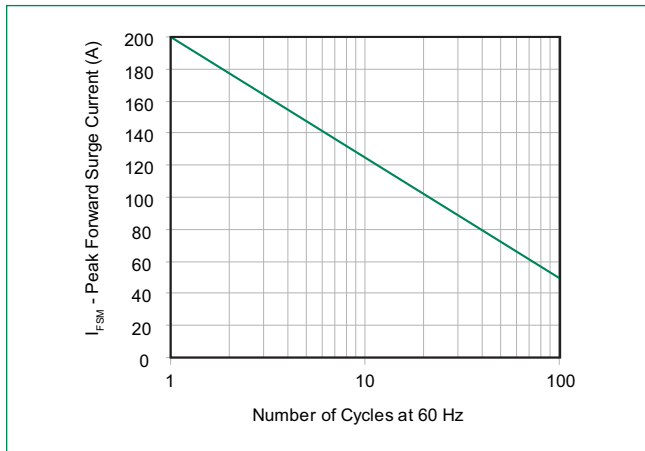
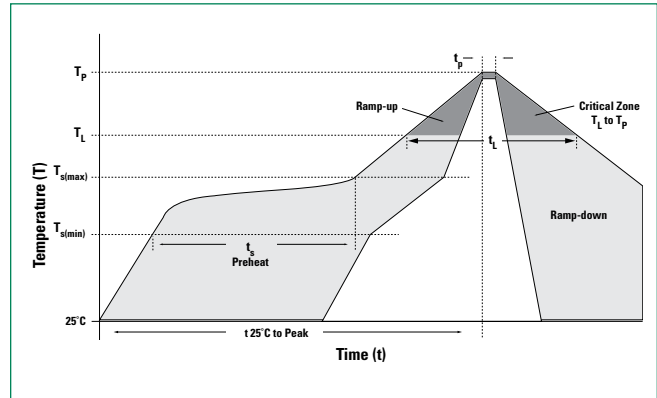


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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 – 180 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_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		280°C



Physical Specifications

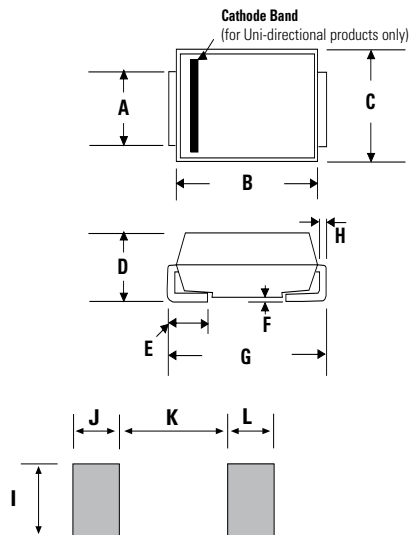
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-B106

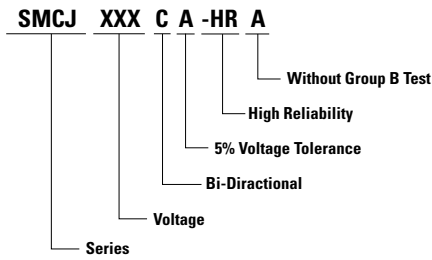
Dimensions

DO-214AB (SMC J-Bend)

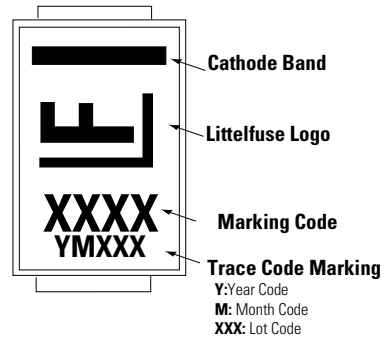


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	0.002	0.008	0.051	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Part Numbering System



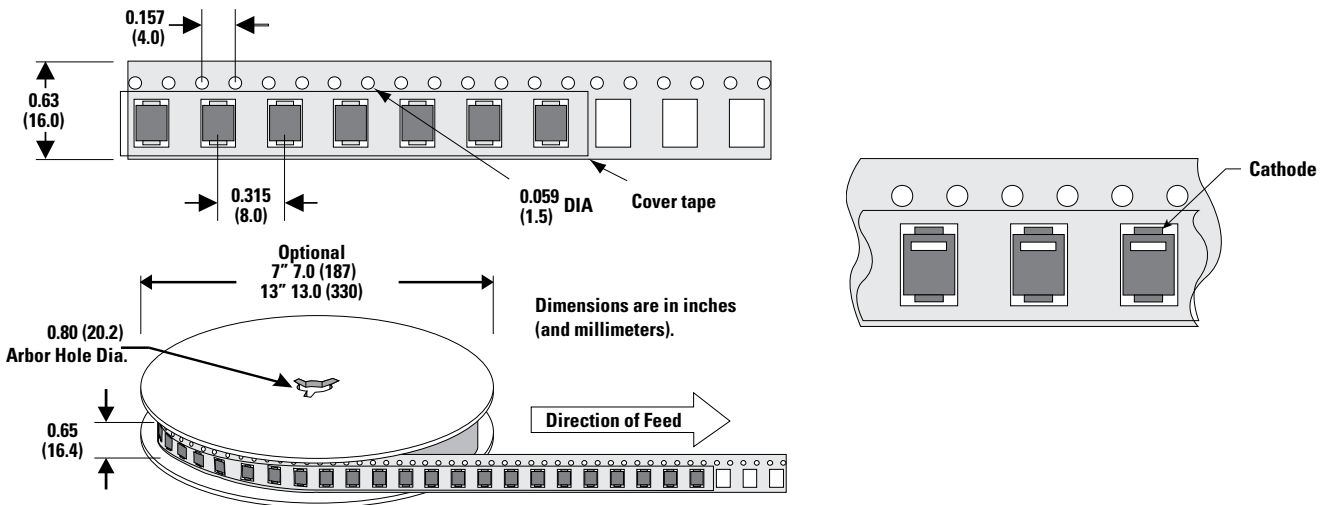
Part Marking System



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMCJxxxXX-HRA	DO-214AB	3000	Tape & Reel – 16mm tape /13" reel	EIA STD RS-481
SMCJxxxXX-HRAT7	DO-214AB	500	Tape & Reel – 16mm tape /7" reel	EIA STD RS-481

Tape and Reel Specification



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.

© 2020 Littelfuse, Inc.
Specifications are subject to change without notice.
Revised: 02/14/20

单击下面可查看定价，库存，交付和生命周期等信息

[>>Littelfuse\(美国力特\)](#)