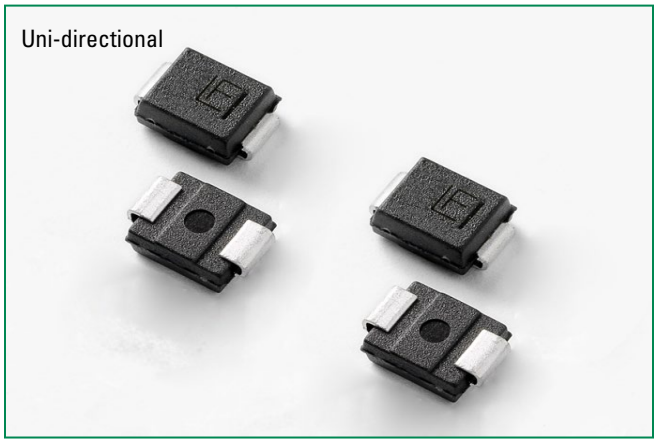
SMBLCE-HRA Series

Surface Mount - 600W

HF RoHS Pb e3



Agency Approvals

Agency	Agency File/Certificate Number
	E230531

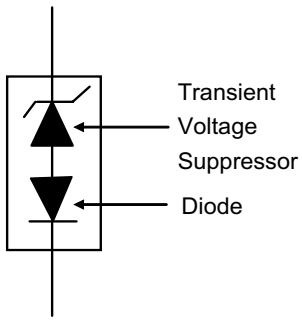
Maximum Ratings & Thermal Characteristics

(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation (I_{PP} x V_C) at T_L=25°C by 10/1000µs Waveform (fig.1)(Note 1)	P_{PPM}	600	W
Power Dissipation on Infinite Heat Sink at T_L=50°C	P_D	3.0	W
Operating Temperature Range	T_J	–65 to 150	°C
Typical Thermal Resistance Junction to Lead	T_{STG}	-65 to 175	°C

Notes:
1. Non-repetitive current pulse , per Fig. 3 and derated above T_J (initial) = 25°C per Fig. 2.

Schematic



Description

SMBLCE-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- 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 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Glass passivated chip junction
- Low incremental surge resistance
- 600W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01 %
- Fast response and excellent clamping capability
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, high temperature soldering guaranteed:260°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, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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Electrical Characteristics

Part Number	Marking Code	Stand-Off Voltage V_R (V)	Minimum Breakdown Voltage V_{BR}(V) @ I_T		Test Current I_T (mA)	Maximum Reverse Leakage at I_R @ V_R (µA)	Maximum Clamping Voltage @ I_{PP} V_C(V)	Maximum Peak Pulse Current per (Fig.3) I_{PP}(A)	Maximum Junction Capacitance at 0 Volts f=1MHZ (pF)	Working Inverse Blocking Voltage V_{WIB}(V)	Inverse Blocking Leakage Current at I_{IB}@ V_{WIB} (mA)	Peak Inverse Blocking Voltage V_{PIB} (V)	Agency Approval
			MIN	MAX									
SMBLCE6.5-HRA	SKKH	6.5	7.22	7.98	10	1000	11.2	53.58	50	75	1.0	100	
SMBLCE7.0-HRA	SKMH	7.0	7.78	8.60	10	500	12.0	50.00	50	75	1.0	100	
SMBLCE7.5-HRA	SKPH	7.5	8.33	9.21	10	250	12.9	46.52	50	75	1.0	100	
SMBLCE8.0-HRA	SKRH	8.0	8.89	9.83	1	100	13.6	44.12	50	75	1.0	100	
SMBLCE8.5-HRA	SKTH	8.5	9.44	10.40	1	50	14.4	41.67	50	75	1.0	100	
SMBLCE9.0-HRA	SKVH	9.0	10.00	11.10	1	10	15.4	38.97	50	75	1.0	100	
SMBLCE10-HRA	SKXH	10.0	11.10	12.30	1	5	17.0	35.30	50	75	1.0	100	
SMBLCE11-HRA	SKZH	11.0	12.20	13.50	1	0.96	18.2	32.97	50	75	1.0	100	
SMBLCE12-HRA	SLEH	12.0	13.30	14.70	1	0.96	19.9	30.16	50	75	1.0	100	
SMBLCE13-HRA	SLGH	13.0	14.40	15.90	1	0.96	21.5	27.91	50	75	1.0	100	
SMBLCE14-HRA	SLKH	14.0	15.60	17.20	1	0.96	23.2	25.87	50	75	1.0	100	
SMBLCE15-HRA	SLMH	15.0	16.70	18.50	1	0.96	24.4	24.59	50	75	1.0	100	
SMBLCE16-HRA	SLPH	16.0	17.80	19.70	1	0.96	26.0	23.10	50	75	1.0	100	
SMBLCE17-HRA	SLRH	17.0	18.90	20.90	1	0.96	27.6	21.74	50	75	1.0	100	
SMBLCE18-HRA	SLTH	18.0	20.00	22.10	1	0.96	29.2	20.55	50	75	1.0	100	
SMBLCE20-HRA	SLVH	20.0	22.20	24.50	1	0.96	32.4	18.52	50	75	1.0	100	
SMBLCE22-HRA	SLXH	22.0	24.40	26.90	1	0.96	35.5	16.91	50	75	1.0	100	
SMBLCE24-HRA	SLZH	24.0	26.70	29.50	1	0.96	38.9	15.43	50	75	1.0	100	
SMBLCE26-HRA	SMEH	26.0	28.90	31.90	1	0.96	42.1	14.26	50	75	1.0	100	
SMBLCE28-HRA	SMGH	28.0	31.10	34.40	1	0.96	45.5	13.19	50	75	1.0	100	
SMBLCE30-HRA	SMKH	30.0	33.30	36.80	1	0.96	48.4	12.40	50	75	1.0	100	
SMBLCE33-HRA	SMMH	33.0	36.70	40.60	1	0.96	53.3	11.26	50	75	1.0	100	
SMBLCE36-HRA	SMPH	36.0	40.00	44.20	1	0.96	58.1	10.33	50	75	1.0	100	
SMBLCE40-HRA	SMRH	40.0	44.40	49.10	1	0.96	64.5	9.31	50	75	1.0	100	
SMBLCE43-HRA	SMTH	43.0	47.80	52.80	1	0.96	69.4	8.65	50	75	1.0	100	
SMBLCE45-HRA	SMVH	45.0	50.00	55.30	1	0.96	72.7	8.26	50	75	1.0	100	
SMBLCE48-HRA	SMXH	48.0	53.30	58.90	1	0.96	77.4	7.76	50	75	1.0	100	
SMBLCE51-HRA	SMZH	51.0	56.70	62.70	1	0.96	82.4	7.29	50	75	1.0	100	
SMBLCE54-HRA	SNEH	54.0	60.00	66.30	1	0.96	87.1	6.90	50	100	1.0	125	
SMBLCE58-HRA	SNGH	58.0	64.40	71.20	1	0.96	93.6	6.42	50	100	1.0	125	
SMBLCE60-HRA	SNKH	60.0	66.70	73.70	1	0.96	96.8	6.20	50	100	1.0	125	
SMBLCE64-HRA	SNMH	64.0	71.10	78.60	1	0.96	103.0	5.83	50	100	1.0	125	
SMBLCE70-HRA	SNPH	70.0	77.80	86.00	1	0.96	113.0	5.31	50	125	1.0	150	

Screen Process

100% Vision Inspection	MIL-STD-750 method 2074
100% X-RAY inspection	MIL-STD-750 method 2076
100% Temperature Cycle Test (-55 to150°C, 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 150°C Bias=V_R (80% breakdown voltage, 96hrs)	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 by contacting Littelfuse customer service

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

Figure 1 - Peak Pulse Power Rating Curve

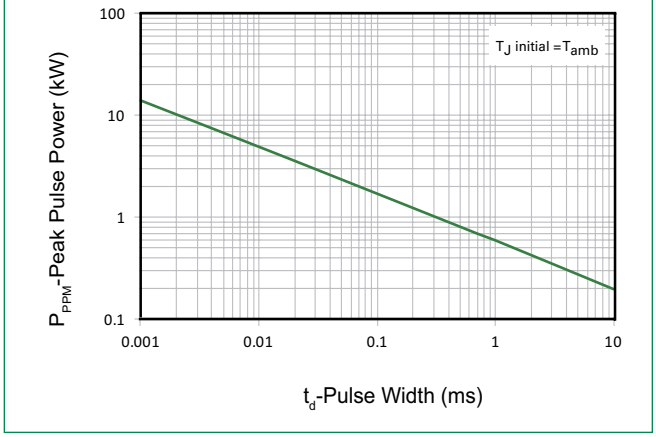


Figure 2 - Peak Pulse Power Derating Curve

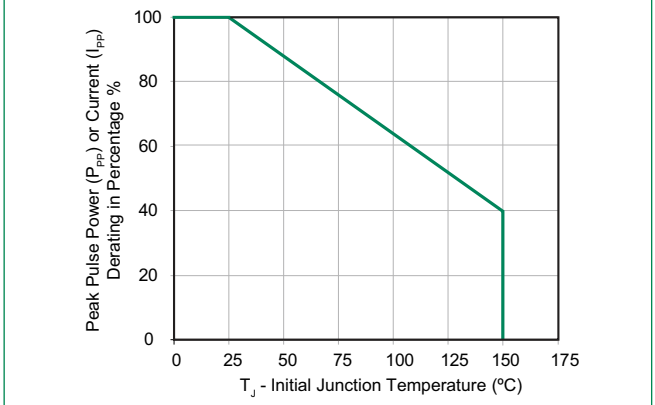


Figure 3 - Pulse Waveform

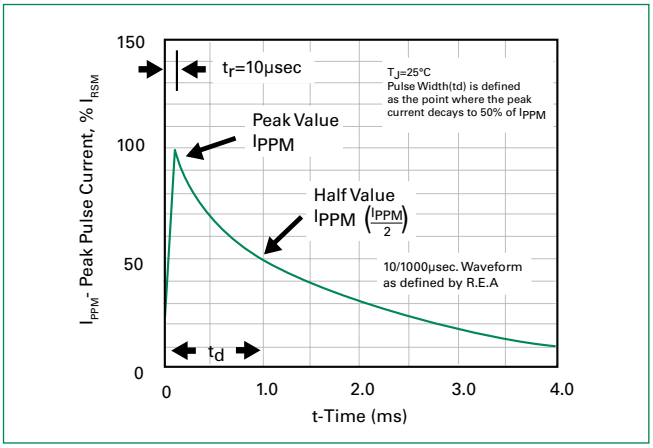
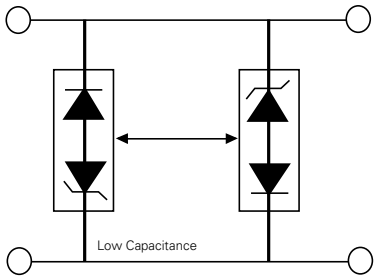


Figure 4 - AC Line Protection Application



Application Note: Device must be used with two units in parallel, opposite in polarity as shown in circuit for AC signal line protection.

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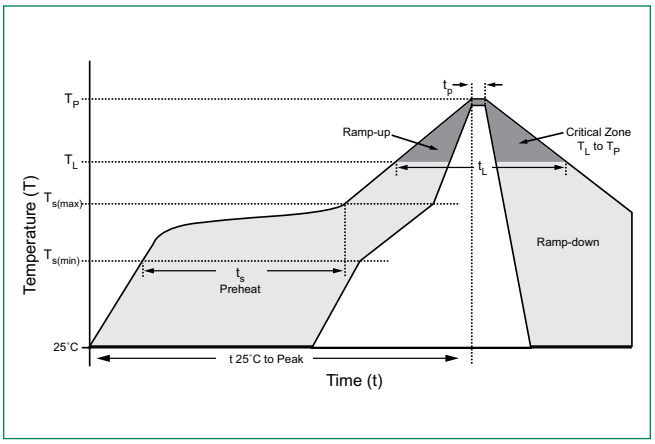
Soldering Parameters

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 – 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		260°C



Physical Specifications

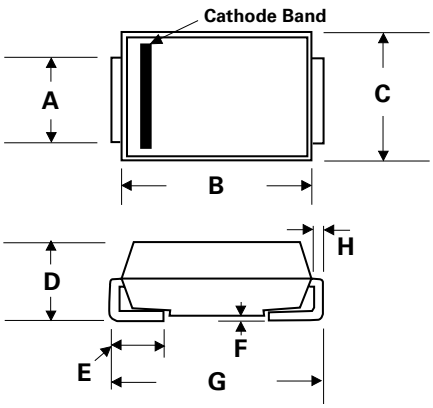
Weight	0.003oz., 0.093g
Case	JEDEC DO-214AA molded plastic body over glass passivated junction.
Polarity	Color band denotes cathode except Bidirectional
Terminal	Matte Tin-plated leads. Solderable per JESD22-B102

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-214AA (SMB J-Bend)



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

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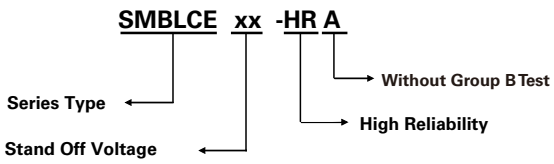
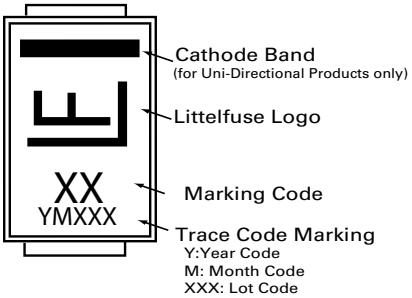
Part Numbering System



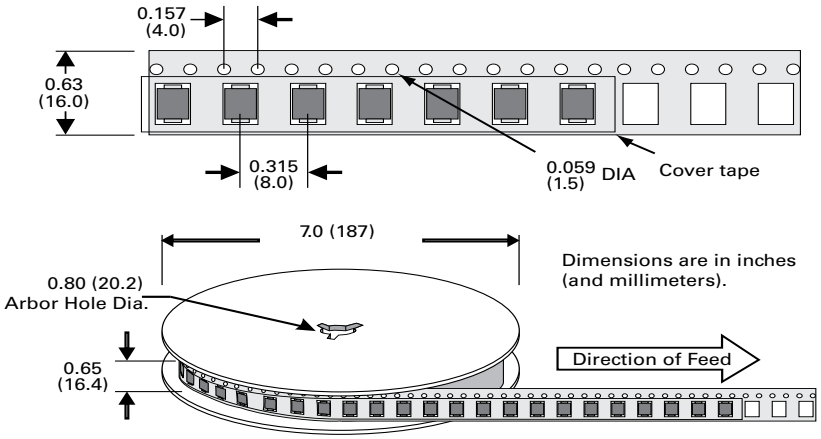
Part Marking System

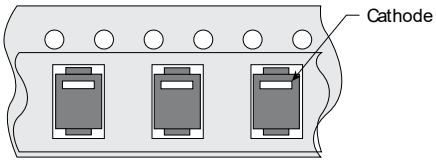


Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMBLCE-HRA	DO-214AA	500	Tape & Reel - 16mm tape/7" reel	EIA STD RS-481

Tape and Reel Specification





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