

Axial Lead Transient Voltage Suppressors (TVS)

LCE Series 6.5 To 90 V 1500W Low Capacitance

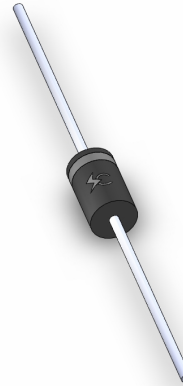
Description

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

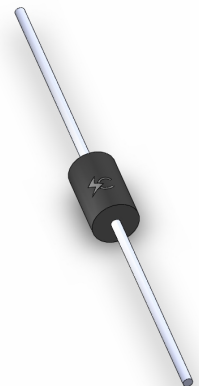
Features

- u Glass passivated chip
- u 1500W peak pulse power capability with a 10/1000µs waveform, repetitive rate (duty cycle): 0.01%
- u Low leakage
- u Excellent clamping capability
- u Very fast response time
- u RoHS compliant

Uni-directional



Bi-directional



Applications

TVS devices 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.

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with a 10/1000µs waveform ⁽¹⁾	P_{PPM}	1500	Watts
Peak Pulse Current with a 10/1000µs waveform.(Fig.2) ⁽¹⁾	I_{PP}	See Next Table	Amps
Power Dissipation on Infinite Heat Sink at $T_L=75^{\circ}\text{C}$ (Fig.2)	$P_{M(AV)}$	6.5	Watt
Operating junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

Notes:

1. Non-repetitive current pulse , per Fig. 3 and derated above $T_A= 25^{\circ}\text{C}$ per Fig. 2

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

Part Number	Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} @I _T (V)		Test Current I _T (mA)	Maximum Reverse Leakage I _R @V _{RWM} (μA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Junction Capacitance @0V (pF)	Working Inverse Blocking Voltage V _{WIB} (V)	Inverse Blocking Leakage Current I _{IB} @V _{WIB} (mA)	Peak Inverse Voltage V _{PIB} (V)
		Min	Max								
LCE6.5	6.5	7.22	8.82	10	1000	12.3	100	100	75	1	100
LCE6.5A	6.5	7.22	7.98	10	1000	11.2	100	100	75	1	100
LCE7.0	7.0	7.78	9.51	10	500	13.3	100	100	75	1	100
LCE7.0A	7.0	7.78	8.60	10	500	12.0	100	100	75	1	100
LCE7.5	7.5	8.33	10.20	10	250	14.3	100	100	75	1	100
LCE7.5A	7.5	8.33	9.21	10	250	12.9	100	100	75	1	100
LCE8.0	8.0	8.89	10.90	1	100	15.0	100	100	75	1	100
LCE8.0A	8.0	8.89	9.83	1	100	13.6	100	100	75	1	100
LCE8.5	8.5	9.44	11.50	1	50	15.9	94	100	75	1	100
LCE8.5A	8.5	9.44	10.40	1	50	14.4	100	100	75	1	100
LCE9.0	9.0	10.00	12.20	1	10	16.9	89	100	75	1	100
LCE9.0A	9.0	10.00	11.10	1	10	15.4	97	100	75	1	100
LCE10	10.0	11.10	13.60	1	5	18.8	80	100	75	1	100
LCE10A	10.0	11.10	12.30	1	5	17.0	88	100	75	1	100
LCE11	11.0	12.20	14.90	1	5	20.1	74	100	75	1	100
LCE11A	11.0	12.20	13.50	1	5	18.2	82	100	75	1	100
LCE12	12.0	13.30	16.30	1	5	22.0	68	100	75	1	100
LCE12A	12.0	13.30	14.70	1	5	19.9	75	100	75	1	100
LCE13	13.0	14.40	17.60	1	5	23.8	63	100	75	1	100
LCE13A	13.0	14.40	15.90	1	5	21.5	70	100	75	1	100
LCE14	14.0	15.60	19.10	1	5	25.8	58	100	75	1	100
LCE14A	14.0	15.60	17.20	1	5	23.2	65	100	75	1	100
LCE15	15.0	16.70	20.40	1	5	26.9	56	100	75	1	100
LCE15A	15.0	16.70	18.50	1	5	24.4	61	100	75	1	200
LCE16	16.0	17.80	21.80	1	5	28.8	52	100	75	1	200
LCE16A	16.0	17.80	19.70	1	5	26.0	57	100	75	1	200
LCE17	17.0	18.90	23.10	1	5	30.5	49	100	75	1	200
LCE17A	17.0	18.90	20.90	1	5	27.6	54	100	75	1	200
LCE18	18.0	20.00	24.40	1	5	32.2	46	100	75	1	200
LCE18A	18.0	20.00	22.10	1	5	29.2	51	100	75	1	200
LCE20	20.0	22.20	27.10	1	5	35.8	42	100	75	1	200
LCE20A	20.0	22.20	24.50	1	5	32.4	46	100	75	1	200
LCE22	22.0	24.40	29.80	1	5	39.4	38	100	75	1	200
LCE22A	22.0	24.40	26.90	1	5	35.5	42	100	75	1	200
LCE24	24.0	26.70	32.60	1	5	43.0	35	100	75	1	200
LCE24A	24.0	26.70	29.50	1	5	38.9	39	100	75	1	200
LCE26	26.0	28.90	35.30	1	5	46.6	32	100	75	1	200
LCE26A	26.0	28.90	31.90	1	5	42.1	36	100	75	1	200
LCE28	28.0	31.10	38.00	1	5	50.1	30	100	75	1	200
LCE28A	28.0	31.10	34.40	1	5	45.5	33	100	75	1	200
LCE30A	30.0	33.30	36.80	1	5	48.4	31	100	75	1	100
LCE33A	33.0	36.70	40.60	1	5	53.3	28	100	75	1	100
LCE36A	36.0	40.00	44.20	1	5	58.1	26	100	75	1	100
LCE40A	40.0	44.40	49.10	1	5	64.5	23	100	75	1	100
LCE43A	43.0	47.80	52.80	1	5	69.4	22	100	75	1	100
LCE45A	45.0	50.00	55.30	1	5	72.7	21	100	75	1	100
LCE48A	48.0	53.30	58.90	1	5	77.4	19	100	75	1	100
LCE51A	51.0	56.70	62.70	1	5	82.4	18	100	75	1	100
LCE54A	54.0	60.00	66.30	1	5	87.1	17	100	100	1	125
LCE58A	58.0	64.40	71.20	1	5	93.6	16	100	100	1	125
LCE60A	60.0	66.70	73.70	1	5	96.8	16	100	100	1	125
LCE64A	64.0	71.10	78.60	1	5	103.0	15	100	100	1	125
LCE70A	70.0	77.80	86.00	1	5	113.0	13	100	125	1	150
LCE75A	75.0	83.30	92.10	1	5	121.0	12	100	125	1	150
LCE85A	85.0	94.40	104.00	1	5	129.0	12	100	125	1	150
LCE90A	90.0	100.00	111.00	1	5	146.0	10	100	125	1	150

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

Figure 1 - Peak Pulse Power Rating Curve

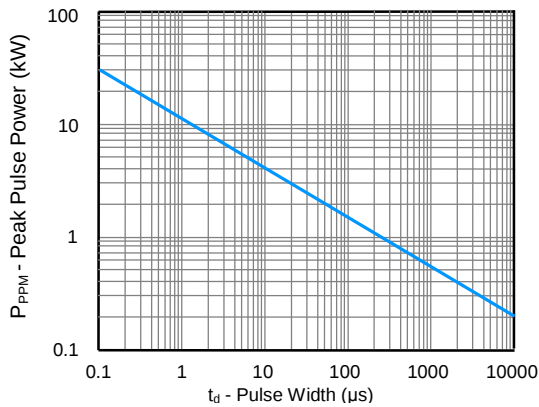


Figure 2 - Pulse Derating Curve

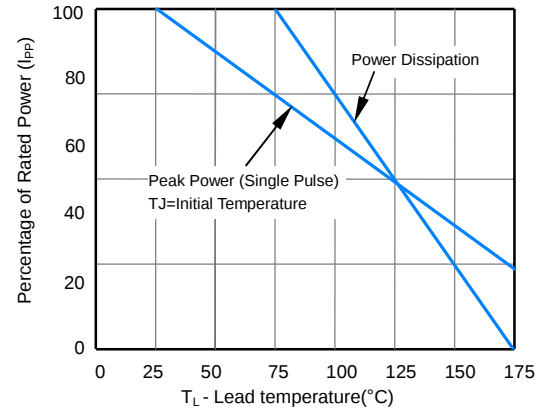


Figure 3 - Pulse Waveform

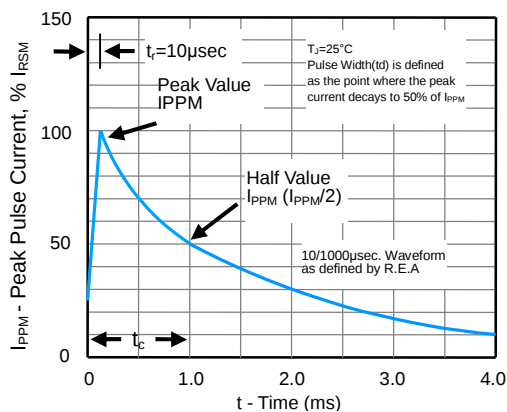
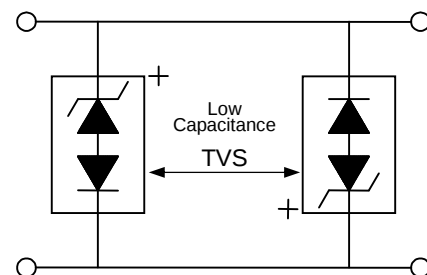


Figure 4 - AC Line Protection Application



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

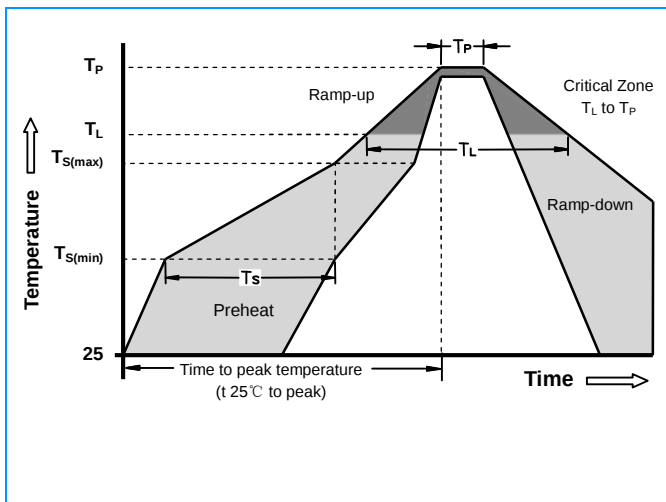
Physical Specifications

Weight	0.032 ounce, 0.9 gram
Case	JEDEC DO-201 Molded Plastic over glass passivated junction
Polarity	Color band denotes cathode except Bipolar
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102D

Environmental Specifications

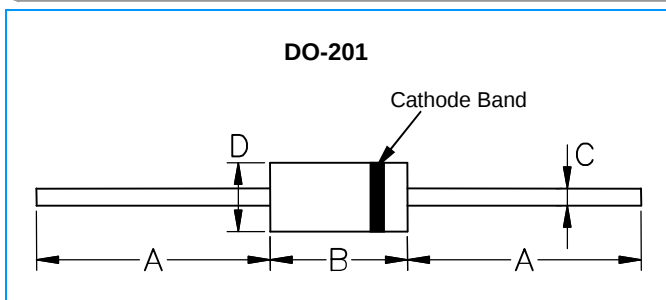
Temperature Cycle	JESD22-A104
Pressure Cooker	JESD22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

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 Seconds
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)		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

Dimensions

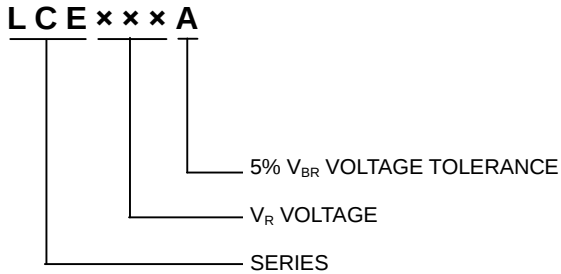


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.285	0.375	7.24	9.53
C	0.038	0.042	0.97	1.07
D	0.189	0.209	4.79	5.30

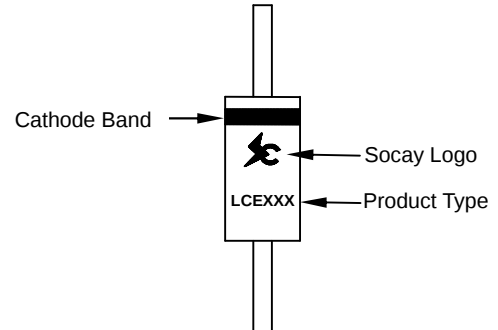
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Part Numbering



Part Marking



Packaging

Part Number	Component Package	Quantity	Packaging Option
LCEXXX	DO-201	1000	Box

Packaging Dimensions Unit: Inches (Millimeters)

