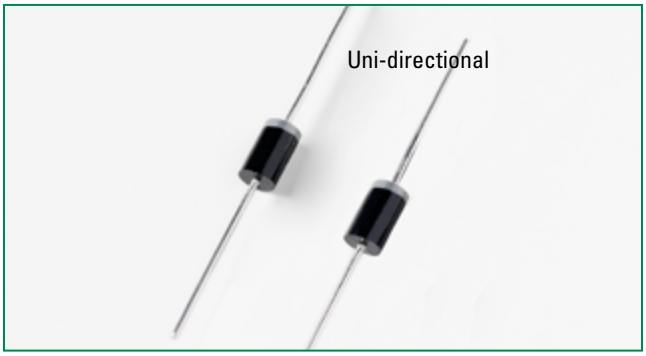
Transient Voltage Suppression Diodes

Axial Leaded – 1500W > LCE series

Littelfuse
Expertise Applied | Answers Delivered

LCE 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 by 10/1000µs Test Waveform (Fig.1) (Note 1)	P_{PPM}	1500	W
Steady State Power Dissipation on Infinite Heat Sink at T_L=75°C (Fig. 5)	P_D	6.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-65 to 175	°C

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

Additional Infomarion

Datasheet | **Resources** | **Samples**

Description

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

Features

- 1500W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01 %
- Glass passivated chip junction in DO-201 Package
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- 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 30kV(Air), 30kV (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
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: 260°C/40sec / 0.375",(9.5mm) lead length, 5 lbs., (2.3kg) tension
- Plastic package is flammability rated V-0 per Underwriters Laboratories
- Matte tin lead–free plated
- Ideal for data line applications
- 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 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.

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

Part Number	Reverse Stand off Voltage V_R (V)	Breakdown Voltage V_{BR} (V)		Test Current I_T (mA)	Maximum Reverse Leakage I_R @ V_R (µA)	Maximum Clamping Voltage at I_{pp} V_C (V)	Maximum Peak Pulse Current (Fig.3) I_{PPM} (A)	Maximum Junction Capacitance @ 0 Volts (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									
LCE6.5A	6.5	7.22	7.98	10	1000	11.2	100.0	100	75	1.0	100	X
LCE7.0A	7.0	7.78	8.60	10	500	12.0	100.0	100	75	1.0	100	X
LCE7.5A	7.5	8.33	9.21	10	250	12.9	100.0	100	75	1.0	100	X
LCE8.0A	8.0	8.89	9.83	1	100	13.6	100.0	100	75	1.0	100	X
LCE8.5A	8.5	9.44	10.40	1	50	14.4	100.0	100	75	1.0	100	X
LCE9.0A	9.0	10.00	11.10	1	10	15.4	97.0	100	75	1.0	100	X
LCE10A	10.0	11.10	12.30	1	5	17.0	88.0	100	75	1.0	100	X
LCE11A	11.0	12.20	13.50	1	1	18.2	82.0	100	75	1.0	100	X
LCE12A	12.0	13.30	14.70	1	1	19.9	75.0	100	75	1.0	100	X
LCE13A	13.0	14.40	15.90	1	1	21.5	70.0	100	75	1.0	100	X
LCE14A	14.0	15.60	17.20	1	1	23.2	65.0	100	75	1.0	100	X
LCE15A	15.0	16.70	18.50	1	1	24.4	61.0	100	75	1.0	100	X
LCE16A	16.0	17.80	19.70	1	1	26.0	57.0	100	75	1.0	100	X
LCE17A	17.0	18.90	20.90	1	1	27.6	54.0	100	75	1.0	100	X
LCE18A	18.0	20.00	22.10	1	1	29.2	51.0	100	75	1.0	100	X
LCE20A	20.0	22.20	24.50	1	1	32.4	46.0	100	75	1.0	100	X
LCE22A	22.0	24.40	26.90	1	1	35.5	42.0	100	75	1.0	100	X
LCE24A	24.0	26.70	29.50	1	1	38.9	39.0	100	75	1.0	100	X
LCE26A	26.0	28.90	31.90	1	1	42.1	36.0	100	75	1.0	100	X
LCE28A	28.0	31.10	34.40	1	1	45.5	33.0	100	75	1.0	100	X
LCE30A	30.0	33.30	36.80	1	1	48.4	31.0	100	75	1.0	100	X
LCE33A	33.0	36.70	40.60	1	1	53.3	28.1	100	75	1.0	100	X
LCE36A	36.0	40.00	44.20	1	1	58.1	25.8	100	75	1.0	100	X
LCE40A	40.0	44.40	49.10	1	1	64.5	23.3	100	75	1.0	100	X
LCE43A	43.0	47.80	52.80	1	1	69.4	21.6	100	75	1.0	100	X
LCE45A	45.0	50.00	55.30	1	1	72.7	20.6	100	75	1.0	100	X
LCE48A	48.0	53.30	58.90	1	1	77.4	19.4	100	75	1.0	100	X
LCE51A	51.0	56.70	62.70	1	1	82.4	18.2	100	75	1.0	100	X
LCE54A	54.0	60.00	66.30	1	1	87.1	17.2	100	100	1.0	125	X
LCE58A	58.0	64.40	71.20	1	1	93.6	16.0	100	100	1.0	125	X
LCE60A	60.0	66.70	73.70	1	1	96.8	15.5	100	100	1.0	125	X
LCE64A	64.0	71.10	78.60	1	1	103.0	14.6	100	100	1.0	125	X
LCE70A	70.0	77.80	86.00	1	1	113.0	13.3	100	125	1.0	150	X
LCE75A	75.0	83.30	92.10	1	1	121.0	12.4	100	125	1.0	150	X
LCE85A	85.0	94.40	104.00	1	1	129.0	11.6	100	125	1.0	150	X
LCE90A	90.0	100.00	111.00	1	1	146.0	10.3	100	125	1.0	150	X

Note: For parts without A, the V_{BR} is ±10% and V_C is 5% higher than with A parts.

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

Figure 1 - Peak Pulse Power Rating

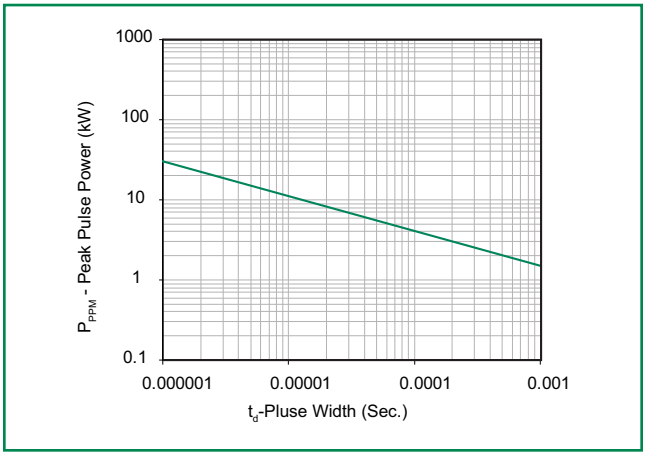


Figure 2 - Peak Pulse Power Derating Curve

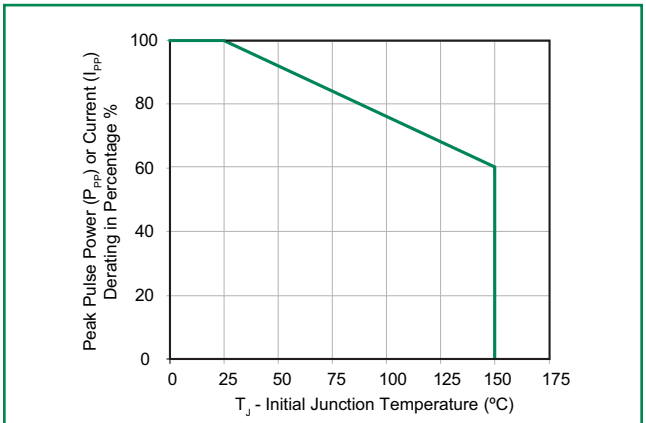


Figure 3 - Pulse Waveform

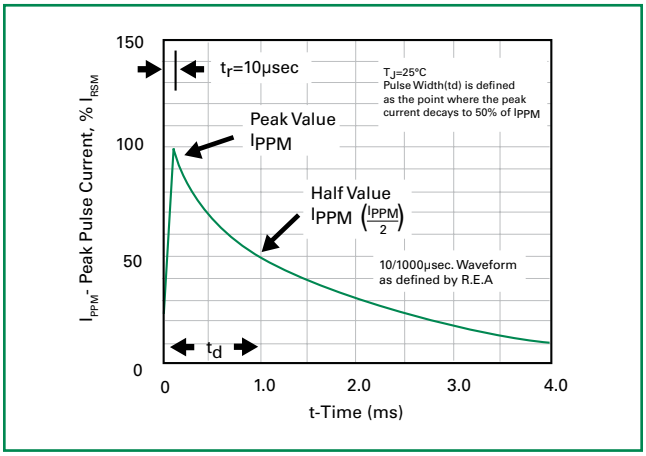
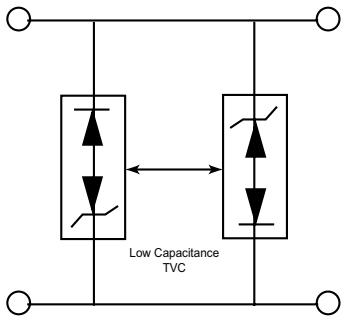


Figure 4 - AC Line Protection Application



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

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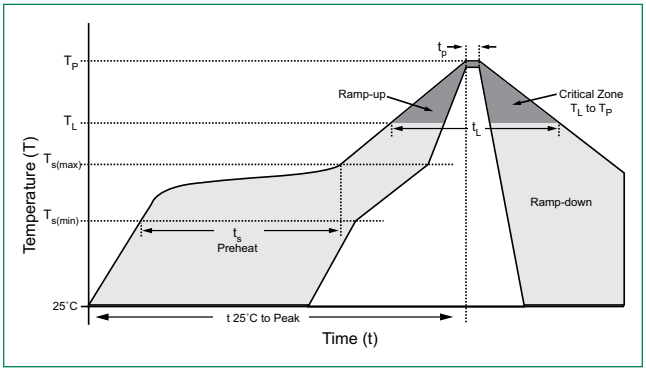
Soldering Parameters

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_A) to peak		3°C/second max
$T_{S(max)}$ to T_A - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_A) (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



Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	265°C
Dipping Time :	10 seconds
Soldering :	1 time

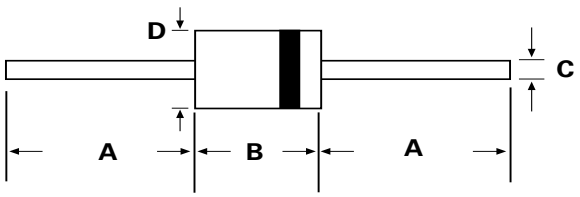
Physical Specifications

Weight	0.045oz., 1.2g
Case	JEDEC DO-201 molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102.

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
H3TRB	JESD22-A101
RSH	JESD22-B106

Dimensions



DO-201

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.285	0.375	7.20	9.50
C	0.038	0.042	0.96	1.07
D	0.190	0.210	4.80	5.30

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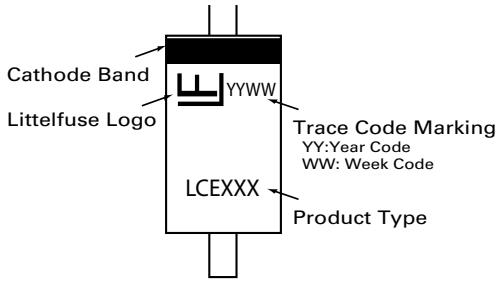
Part Numbering System

LCE xxx A X

- **OPTION CODE:**
  - **BLANK** Reel Tape
  - **-B** Bulk Packaging
- **TYPE CODE:**
  - **A** Uni-Directional (5% V_{BR} Voltage Tolerance)
- **V_R VOLTAGE CODE**
  (Refer to the Electrical Characteristics table)
- **SERIES CODE**

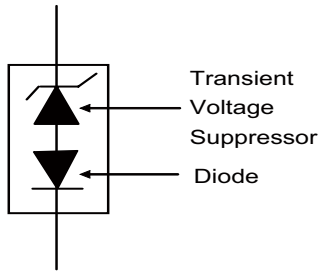
Part Marking System



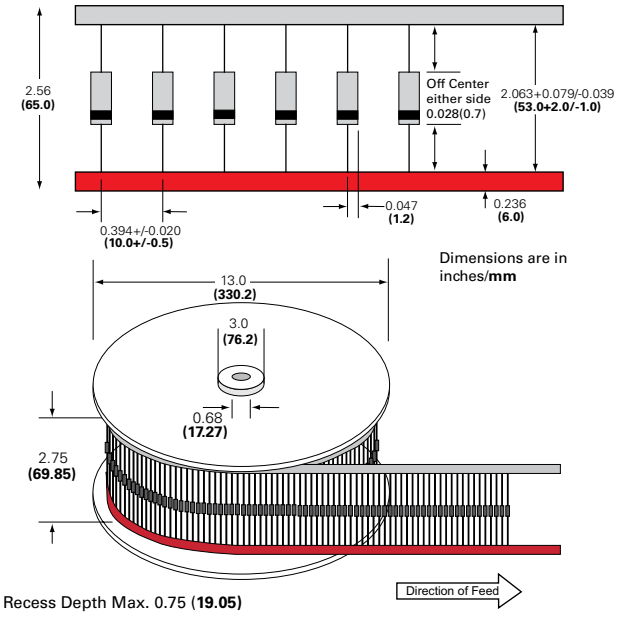
Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
LCExxxXX	DO-201	1200	Tape & Reel	EIA STD RS-296
LCExxxXX-B	DO-201	500	BULK	Littelfuse Spec.

Schematic



Tape and Reel Specification



Recess Depth Max. 0.75 (**19.05**)

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Mouser Electronics

Authorized Distributor

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Littelfuse:

LCE11 LCE22 LCE24 LCE26A LCE6.5 LCE10 LCE15A LCE26 LCE7.5A LCE14A LCE6.5A-B LCE48A LCE7.0 LCE8.0A LCE11A LCE12 LCE8.0 LCE16A LCE8.5 LCE18A LCE13 LCE7.0A LCE9.0 LCE16 LCE10A LCE7.5 LCE28 LCE13A LCE22A LCE15 LCE28A LCE9.0A LCE20A LCE8.5A LCE17 LCE12A LCE14 LCE20 LCE6.5A LCE18 LCE24A LCE17A LCE58 LCE60A LCE75A-C LCE70 LCE45 LCE48 LCE51A LCE36 LCE54 LCE58A LCE30A LCE36A LCE40A LCE33 LCE43 LCE75A LCE90 LCE90A LCE45A LCE30 LCE33A LCE64 LCE70A LCE75 LCE51 LCE60 LCE64A LCE54A LCE40 LCE43A LCE80 LCE80A LCE48A-B LCE85A