Gort Road Business Park, Ennis, Co. Clare, Ireland.
Tel: +353 (0) 65 6840044, Fax: +353 (0) 65 6822298

Website: http://www.microsemi.com

6 Lake Street, Lawrence, MA 01841
Tel: 1-800-446-1158 / (978) 794-1666, Fax: (978) 6890803

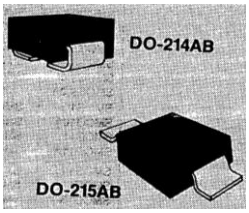
TECHNICAL DATA SHEET

SURFACE MOUNT
1500 Watt Low Capacitance
Transient Voltage Suppressor

- **High Reliability controlled devices**
- **Unidirectional (A) construction**
- **Available in both J-bend and Gull-wing terminations**
- **Selections for 6.5 to 170 V standoff voltages (V_{WM})**

DEVICES **MSMCJLCE6.5A thru MSMCJLCE170A, e3 and MSMCGLCE6.5A thru MSMCGLCE170A, e3**

LEVELS
M, MA, MX, MXL



FEATURES

- High reliability controlled devices with fabrication and assembly lot traceability
- 100% surge tested devices
- Low capacitance of 100 pF or less
- Optional upscreening available by replacing the M prefix with MA, MX or MXL. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer to MicroNote 129 for more details on the screening options.
- Axial-lead equivalent packages for thru-hole mounting available as MLCE6.5A to MLCE170CA
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant devices available by adding an “e3” suffix
- 3σ lot norm screening performed on Standby Current I_D

APPLICATIONS / BENEFITS

- 1500 Watts of Peak Pulse Power at 10/1000 μs
- Low capacitance for data line protection to 1 MHz
- Protection for aircraft fast data rate lines up to Level 5 Waveform 4 and Level 2 Waveform 5A in RTCA/DO-160D (also see MicroNote 130) & ARINC 429 with bit rates of 100 kb/s (per ARINC 429, Part 1, par 2.4.1.1)
- IEC 61000-4-2 ESD 15 kV (air), 8 kV (contact)
- IEC 61000-4-5 (lightning) as further detailed in MLCE6.5 thru MLCE170A data sheet
- T1/E1 Line Cards
- Base Stations, WAN & XDSL Interfaces
- CSU/DSU Equipment

MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 ºC: 1500 watts at 10/1000 μs (also see Figures 1,2, and 3) with impulse repetition rate (duty factor) of 0.01 % or less
- Clamping Factor: 1.40 @ Full Rated power:
  1.30 @ 50 % Rated power
- $t_{clamping}$ (0 V to V_{BR} min): Less than $5x10^{-9}$ seconds
- Operating and Storage temperatures: -65 ºC to +150 ºC
- Steady State power dissipation: 5.0W @ TL = 50 ºC
- Thermal Resistance: 20 ºC /W (typical junction to lead (tab) at mounting plane
- When pulse testing, do not pulse in opposite direction. (See “Schematic Applications” section herein and Figures 5 & 6 for further protection in both directions)
- Solder temperatures: 260 ºC for 10 s (maximum)

Gort Road Business Park, Ennis, Co. Clare, Ireland.
Tel: +353 (0) 65 6840044, Fax: +353 (0) 65 6822298

6 Lake Street, Lawrence, MA 01841
Tel: 1-800-446-1158 / (978) 794-1666, Fax: (978) 6890803

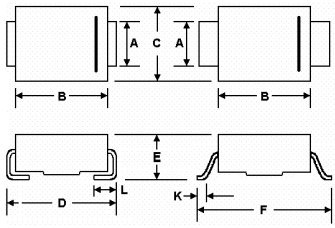
Website: http://www.microsemi.com

MECHANICAL AND PACKAGING

- Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- Gull-wing or J-bend tin-lead (90 % Sn, 10 % Pb) or RoHS (100 % Sn) compliant annealed matte-tin plating solderable per MIL-STD-750, method 2026
- Cathode indicated by band. No cathode band on bi-directional devices.
- Part number marked on package
- Available in bulk or custom tape-and-reel packaging
- TAPE-AND-REEL option available with up to 750 per 7 inch reel or up to 2500 per 13 inch reel EIA-481-B with 16 mm tape. Add "TR" suffix to part number.
- Weight: 0.25 gram (approximately)

PACKAGE DIMENSIONS

(SMCJ) (SMCG)

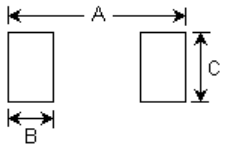


(DO-214AB) (DO-215AB)

DIMENSIONS IN INCHES								
	A	**B**	**C**	**D**	**E**	**F**	**K**	**L**
MIN	.115	.260	.220	.305	.077	.380	.025	.030
MAX	.121	.280	.245	.320	.104	.400	.040	.060
DIMENSIONS IN MILLIMETERS								
MIN	2.92	6.60	5.59	7.75	1.95	9.65	0.635	.760
MAX	3.07	7.11	6.22	8.13	2.65	10.16	1.016	1.520

Typical Standoff Height: 0.004" – 0.008" (0.1mm – 0.2mm)

PAD LAYOUT



SMCJ (DO-214AB)

	INCHES	mm
A	0.390	9.90
B	0.110	2.79
C	0.150	3.81

SMCG (DO-215AB)

	INCHES	mm
A	0.510	12.95
B	0.110	2.79
C	0.150	3.81

SYMBOLS & DEFINITIONS

Symbol	Definition	Symbol	Definition
V_{WM}	Working Peak (Standoff) Voltage	I_{PP}	Peak Pulse Current
P_{PP}	Peak Pulse Power	V_C	Clamping Voltage
V_{BR}	Breakdown Voltage	I_{BR}	Breakdown Current for V_{BR}
I_D	Standby Current		

Gort Road Business Park, Ennis, Co. Clare, Ireland.
Tel: +353 (0) 65 6840044, Fax: +353 (0) 65 6822298

6 Lake Street, Lawrence, MA 01841
Tel: 1-800-446-1158 / (978) 794-1666, Fax: (978) 6890803

Website: http://www.microsemi.com

TECHNICAL DATA SHEET

ELECTRICAL CHARACTERISTICS @ 25°C

MICROSEMI PART NUMBER		Reverse Stand-Off Voltage V_{WM}	Breakdown Voltage V_{BR} @ I_{BR}			Maximum Reverse Leakage I_D @ V_{WM}	Maximum Clamping Voltage V_C @ I_{PP}	Maximum Peak Pulse Current I_{PP} @10/1000	Maximum Capacitance @ 0 Volts, f = 1 MHz	Working Inverse Blocking Voltage V_{WIB}	Inverse Blocking Leakage Current I_{IB}	Peak Inverse Blocking Voltage V_{PIB}
GULL-WING	**J-BEND**	**V**	**V_{MIN}**	**V_{MAX}**	**mA**	**µA**	**V**	**A**	**pF**	**V**	**µA**	**V**
MSMCGLCE6.5A	MSMCJLCE6.5A	6.5	7.22	7.98	10	1000	11.2	100	100	75	10	100
MSMCGLCE7.0A	MSMCJLCE7.0A	7.0	7.78	8.60	10	500	12.0	100	100	75	10	100
MSMCGLCE7.5A	MSMCJLCE7.5A	7.5	8.33	10.2	10	250	14.3	100	100	75	10	100
MSMCGLCE8.0A	MSMCJLCE8.0A	8.0	8.89	9.83	1	100	13.6	100	100	75	10	100
MSMCGLCE8.5A	MSMCJLCE8.5A	8.5	9.44	10.4	1	50	14.4	100	100	75	10	100
MSMCGLCE9.0A	MSMCJLCE9.0A	9.0	10.0	11.1	1	10	15.4	97	100	75	10	100
MSMCGLCE10A	MSMCJLCE10A	10	11.1	12.3	1	5	17.0	88	100	75	10	100
MSMCGLCE11A	MSMCJLCE11A	11	12.2	13.5	1	5	18.2	82	100	75	10	100
MSMCGLCE12A	MSMCJLCE12A	12	13.3	14.7	1	5	19.9	75	100	75	10	100
MSMCGLCE13A	MSMCJLCE13A	13	14.4	15.9	1	5	21.5	70	100	75	10	100
MSMCGLCE14A	MSMCJLCE14A	14	15.6	17.2	1	5	23.2	65	100	75	10	100
MSMCGLCE15A	MSMCJLCE15A	15	16.7	18.5	1	5	24.4	61	100	75	10	100
MSMCGLCE16A	MSMCJLCE16A	16	17.8	19.7	1	5	26.0	57	100	75	10	100
MSMCGLCE17A	MSMCJLCE17A	17	18.9	20.9	1	5	27.6	54	100	75	10	100
MSMCGLCE18A	MSMCJLCE18A	18	20.0	22.1	1	5	29.2	51	100	75	10	100
MSMCGLCE20A	MSMCJLCE20A	20	22.2	24.5	1	5	32.4	46	100	75	10	100
MSMCGLCE22A	MSMCJLCE22A	22	24.4	26.9	1	5	35.5	42	100	75	10	100
MSMCGLCE24A	MSMCJLCE24A	24	26.7	29.5	1	5	38.9	39	100	75	10	100
MSMCGLCE26A	MSMCJLCE26A	26	28.9	31.9	1	5	42.1	36	100	75	10	100
MSMCGLCE28A	MSMCJLCE28A	28	31.1	34.4	1	5	45.5	33	100	75	10	100
MSMCGLCE30A	MSMCJLCE30A	30	33.3	36.8	1	5	48.4	31	100	75	10	100
MSMCGLCE33A	MSMCJLCE33A	33	36.7	40.6	1	5	53.3	28.1	100	75	10	100
MSMCGLCE36A	MSMCJLCE36A	36	40.0	44.2	1	5	58.1	25.8	100	75	10	100
MSMCGLCE40A	MSMCJLCE40A	40	44.4	49.1	1	5	64.5	23.3	100	75	10	100
MSMCGLCE43A	MSMCJLCE43A	43	47.8	52.8	1	5	69.4	21.6	100	150	10	200
MSMCGLCE45A	MSMCJLCE45A	45	50.0	55.3	1	5	72.7	20.6	100	150	10	200
MSMCGLCE48A	MSMCJLCE48A	48	53.3	58.9	1	5	77.4	19.4	100	150	10	200
MSMCGLCE51A	MSMCJLCE51A	51	56.7	62.7	1	5	82.4	18.2	100	150	10	200
MSMCGLCE54A	MSMCJLCE54A	54	60.0	66.3	1	5	87.1	17.2	100	150	10	200
MSMCGLCE58A	MSMCJLCE58A	58	64.4	71.2	1	5	93.6	16.0	100	150	10	200
MSMCGLCE60A	MSMCJLCE60A	60	66.7	73.7	1	5	96.8	15.5	90	150	10	200
MSMCGLCE64A	MSMCJLCE64A	64	71.1	78.6	1	5	103	14.6	90	150	10	200
MSMCGLCE70A	MSMCJLCE70A	70	77.8	85.0	1	5	113	13.3	90	150	10	200
MSMCGLCE75A	MSMCJLCE75A	75	83.3	92.1	1	5	121	12.4	90	150	10	200
MSMCGLCE80A	MSMCJLCE80A	80	88.7	98.0	1	5	129	11.6	90	150	10	200
MSMCGLCE90A	MSMCJLCE90A	90	100	111	1	5	146	10.3	90	300	10	200
MSMCGLCE100A	MSMCJLCE100A	100	111	123	1	5	162	9.3	90	300	10	200
MSMCGLCE110A	MSMCJLCE110A	110	122	135	1	5	178	8.4	90	300	10	400
MSMCGLCE120A	MSMCJLCE120A	120	133	147	1	5	193	7.8	90	300	10	400
MSMCGLCE130A	MSMCJLCE130A	130	144	159	1	5	209	7.2	90	300	10	400
MSMCGLCE150A	MSMCJLCE150A	150	167	185	1	5	243	6.2	90	300	10	400
MSMCGLCE160A	MSMCJLCE160A	160	178	197	1	5	259	5.8	90	300	10	400
MSMCGLCE170A	MSMCJLCE170A	170	189	231	1	5	304	4.9	90	300	10	400

NOTE 1: TVS are normally selected according to the reverse “Stand Off Voltage” (VWM) which should be equal to or greater than the dc or continuous peak operating voltage level.

Gort Road Business Park, Ennis, Co. Clare, Ireland.
Tel: +353 (0) 65 6840044, Fax: +353 (0) 65 6822298

6 Lake Street, Lawrence, MA 01841
Tel: 1-800-446-1158 / (978) 794-1666, Fax: (978) 6890803

Website: http://www.microsemi.com

GRAPHS

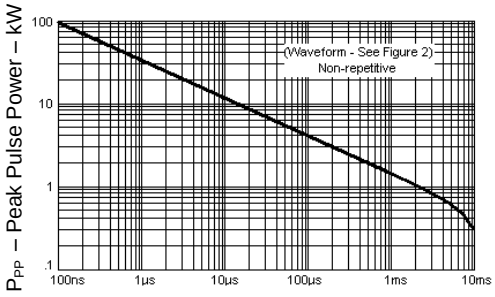


FIGURE 1 Peak Pulse Power vs. Pulse Time

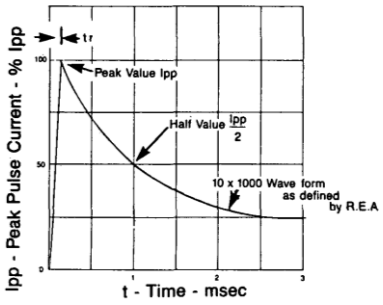


FIGURE 2 Pulse Waveform

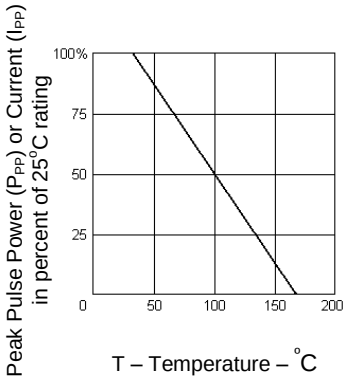


FIGURE 3 Derating curve

SCHEMATIC APPLICATIONS

The TVS low capacitance device configuration is shown in Figure 4. As a further option for unidirectional applications, an additional low capacitance rectifier diode may be used in parallel in the same polarity direction as the TVS as shown in Figure 5. In applications where random high voltage transients occur, this will prevent reverse transients from damaging the internal low capacitance rectifier diode and also provide a low voltage conducting direction. The added rectifier diode should be of similar low capacitance and also have a higher reverse voltage rating than the TVS clamping voltage V_C. The Microsemi recommended rectifier part number for the application in Figure 5 is the "SMBJLCR80" or "SMBGLCR80" depending on the terminal configuration desired. If using two (2) low capacitance TVS devices in anti-parallel for bidirectional applications, this added protective feature for both directions (including the reverse of each rectifier diode) is inherently provided in Figure 6. The unidirectional and bidirectional configurations in Figure 5 and 6 will both result in twice the capacitance of Figure 4.

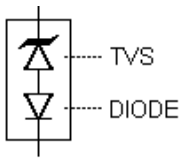


FIGURE 4
TVS with internal low capacitance rectifier diode

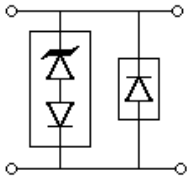


FIGURE 5
Optional Unidirectional configuration (TVS and separate rectifier diode in parallel)

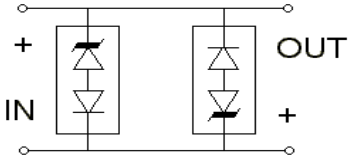


FIGURE 6
Optional Bidirectional configuration (two TVS devices in anti-parallel)