

**MLL14KESD5.0
thru
MLL14KESD170A
SURFACE MOUNT**

Features

- Protects Sensitive Circuits From Short Duration Fast Rise Time Transients such as Electro-Static-Discharge (ESD) or Electrical Fast Transients (EFT).
- Excellent Protection in Clamping Direct ESD Level Transients* in Excess of 40,000 Volts.
- Absorbs ESD Level Transients* of 14,000 Watts or One Microsecond Transients** up to 4000 Watts. See Figure #1 For Overall Transient Peak Pulse Power.
- Clamps Transients in 1 Pico Second.
- 2.5 Watt Continuous Power Dissipation.
- Working (Stand-off) Voltage Range of 5V to 170V.
- Hermetic Surface Mount DO-213AB (MELF) Package. Also Available in Axial Lead DO-41.
- Low Inherent Capacitance for High Frequency Application (See Figure #3).

These devices feature the ability to clamp dangerous high voltage short term transients such as produced by directed or radiated electro-static-discharge phenomena before entering sensitive component regions of a circuit design. They are small economical transient voltage suppressors targeted primarily for short term transients below a few microseconds while still achieving significant peak-pulse-power capability as seen in Figure #1.

Maximum Ratings

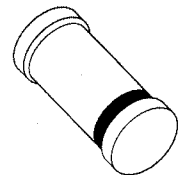
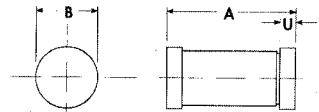
- 4000 Watts for One Microsecond Square Wave or 14,000 Watts Per ESD Wave Form of MIL-STD-750, Method 1020.
- See Surge Rating Curve in Figures #1 and 2.
- Operating and Storage Temperature -65° to 200°C
- DC Power Dissipation 2500 mW at $T_C = 75^\circ\text{C}$.
- Derate at 22.8 W / °C Above 25°C For P_{PP} (1 μs) and at 20 mW / °C Above 75°C For dc Power.
- Forward Surge Current 500 amp for 1 μs at $T_C = 25^\circ\text{C}$ (rise time $\geq 100\text{ ns}$).

Electrical Characteristics

TYPE NUMBER	REVERSE STAND-OFF VOLTAGE	BREAK DOWN VOLTAGE VBR MINIMUM	TEST CURRENT	MAXIMUM REVERSE LEAKAGE	MAXIMUM CLAMPING VOLTAGE	PEAK PULSE CURRENT
	V_{WM}	$V_{(BR)}$	I_T	$I_D @ V_{WM}$	$V_C @ I_{PP}$	I_{PP}^{**}
	VOLTS	VOLTS	mA	μA	VOLTS	AMPS
MLL14KESD5.0	5.0	6.40	10	600	17.1	233.6
MLL14KESD5.0A	5.0	6.40	10	600	16.8	238.8
MLL14KESD6.0	6.0	6.67	10	600	18.5	215.9
MLL14KESD6.0A	6.0	6.67	10	600	17.6	227.9
MLL14KESD6.5	6.5	7.22	10	400	20.1	199.5
MLL14KESD6.5A	6.5	7.22	10	400	19.0	210.5
MLL14KESD7.0	7.0	7.78	10	150	21.6	185.0
MLL14KESD7.0A	7.0	7.78	10	150	20.5	195.4
MLL14KESD7.5	7.5	8.33	1.0	50	23.2	172.6
MLL14KESD7.5A	7.5	8.33	1.0	50	21.9	182.4
MLL14KESD8.0	8.0	8.89	1.0	25	24.8	161.6
MLL14KESD8.0A	8.0	8.89	1.0	25	23.4	170.9
MLL14KESD8.5	8.5	9.44	1.0	5	26.2	152.8
MLL14KESD8.5A	8.5	9.44	1.0	5	24.8	161.3
MLL14KESD9.0	9.0	10.0	1.0	1.0	27.8	144.1

**At 4000 watts 1 μs square wave rating (See Figures 1 and 2).
* Pulse wave form of MIL-STD-750, Method 1020. (Approximately 150 ns exponential wave.)

Package Dimensions



DO-213AB

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.20	0.189	0.205
B	2.32	2.66	0.094	0.102
U	0.41	0.55	0.016	0.022

Mechanical Characteristics

CASE: Hermetically sealed glass MELF (DO-213AB) with solder contact tabs at each end.

FINISH: All external surfaces are corrosion resistant, readily solderable.

THERMAL RESISTANCE: 50°C / Watt typical junction to contact (case) tabs.

POLARITY: Banded end is cathode.

MOUNTING POSITION: Any

MLL14KESD5.0 thru MLL14KESD170A

Electrical Characteristics

TYPE NUMBER	REVERSE STAND-OFF VOLTAGE	BREAK DOWN VOLTAGE V _{BR} MINIMUM	TEST CURRENT	MAXIMUM REVERSE LEAKAGE	MAXIMUM CLAMPING VOLTAGE	PEAK PULSE CURRENT
	V _{RM}	V _{BR}	I _T	I _P @ V _{RM}	V _C @ I _{PP}	I _{PP} **
	VOLTS	VOLTS	mA	μA	VOLTS	AMPS
MLL14KESD9.0A	9.0	10.0	1.0	1.0	26.4	151.7
MLL14KESD10	10	11.1	1.0	1.0	30.9	129.5
MLL14KESD10A	10	11.1	1.0	1.0	29.3	136.8
MLL14KESD11	11	12.2	1.0	1.0	33.9	118.0
MLL14KESD11A	11	12.2	1.0	1.0	32.1	124.5
MLL14KESD12	12	13.3	1.0	1.0	37.0	108.1
MLL14KESD12A	12	13.3	1.0	1.0	35.0	114.3
MLL14KESD13	13	14.4	1.0	1.0	40.0	100.0
MLL14KESD13A	13	14.4	1.0	1.0	37.9	105.6
MLL14KESD14	14	15.6	1.0	1.0	43.4	92.2
MLL14KESD14A	14	15.6	1.0	1.0	41.0	97.6
MLL14KESD15	15	16.7	1.0	1.0	46.4	86.2
MLL14KESD15A	15	16.7	1.0	1.0	42.2	94.7
MLL14KESD16	16	17.8	1.0	1.0	45.5	87.8
MLL14KESD16A	16	17.8	1.0	1.0	41.3	97.0
MLL14KESD17	17	18.9	1.0	1.0	41.8	95.7
MLL14KESD17A	17	18.9	1.0	1.0	39.8	100.5
MLL14KESD18	18	20.0	1.0	1.0	42.2	94.8
MLL14KESD18A	18	20.0	1.0	1.0	37.9	105.6
MLL14KESD20	20	22.2	1.0	1.0	41.9	95.4
MLL14KESD20A	20	22.2	1.0	1.0	37.4	107.1
MLL14KESD22	22	24.4	1.0	1.0	40.7	98.4
MLL14KESD22A	22	24.4	1.0	1.0	38.5	103.9
MLL14KESD24	24	26.7	1.0	1.0	44.5	89.9
MLL14KESD24A	24	26.7	1.0	1.0	42.2	94.9
MLL14KESD26	26	28.9	1.0	1.0	48.2	83.1
MLL14KESD26A	26	28.9	1.0	1.0	45.6	87.7
MLL14KESD28	28	31.1	1.0	1.0	51.8	77.2
MLL14KESD28A	28	31.1	1.0	1.0	49.1	81.4
MLL14KESD30	30	33.3	1.0	1.0	55.5	72.1
MLL14KESD30A	30	33.3	1.0	1.0	52.6	76.1
MLL14KESD33	33	36.7	1.0	1.0	61.2	65.4
MLL14KESD33A	33	36.7	1.0	1.0	58.0	69.0
MLL14KESD36	36	40.0	1.0	1.0	66.7	60.0
MLL14KESD36A	36	40.0	1.0	1.0	63.2	63.3
MLL14KESD40	40	44.4	1.0	1.0	74.0	54.0
MLL14KESD40A	40	44.4	1.0	1.0	70.1	57.0
MLL14KESD43	43	47.8	1.0	1.0	79.7	50.2
MLL14KESD43A	43	47.8	1.0	1.0	75.5	53.0
MLL14KESD45	45	50.0	1.0	1.0	83.3	48.0
MLL14KESD45A	45	50.0	1.0	1.0	79.0	50.6
MLL14KESD48	48	53.3	1.0	1.0	88.8	45.0
MLL14KESD48A	48	53.3	1.0	1.0	84.2	47.5
MLL14KESD51	51	56.7	1.0	1.0	94.5	42.3
MLL14KESD51A	51	56.7	1.0	1.0	89.6	44.6
MLL14KESD54	54	60.0	1.0	1.0	100.0	40.0
MLL14KESD54A	54	60.0	1.0	1.0	94.7	42.2
MLL14KESD58	58	64.4	1.0	1.0	107.4	37.2
MLL14KESD58A	58	64.4	1.0	1.0	101.7	39.3
MLL14KESD60	60	66.7	1.0	1.0	111.2	36.0
MLL14KESD60A	60	66.7	1.0	1.0	105.3	38.0
MLL14KESD64	64	71.1	1.0	1.0	118.5	33.7
MLL14KESD64A	64	71.1	1.0	1.0	112.3	35.6
MLL14KESD70	70	77.8	1.0	1.0	129.7	30.8
MLL14KESD70A	70	77.8	1.0	1.0	122.9	32.5
MLL14KESD75	75	83.3	1.0	1.0	139.0	28.8
MLL14KESD75A	75	83.3	1.0	1.0	131.5	30.4
MLL14KESD78	78	86.7	1.0	1.0	144.5	27.7
MLL14KESD78A	78	86.7	1.0	1.0	136.9	29.2
MLL14KESD85	85	94.4	1.0	1.0	157.1	25.4
MLL14KESD85A	85	94.4	1.0	1.0	148.8	26.9
MLL14KESD90	90	100.0	1.0	1.0	166.5	24.0
MLL14KESD90A	90	100.0	1.0	1.0	158.3	25.3
MLL14KESD100	100	111.0	1.0	1.0	185.3	21.6
MLL14KESD100A	100	111.0	1.0	1.0	175.5	22.8
MLL14KESD110	110	122.0	1.0	1.0	203.3	19.7
MLL14KESD110A	110	122.0	1.0	1.0	192.8	20.7
MLL14KESD120	120	133.0	1.0	1.0	222.0	18.0
MLL14KESD120A	120	133.0	1.0	1.0	210.0	19.0
MLL14KESD130	130	144.0	1.0	1.0	240.0	16.7
MLL14KESD130A	130	144.0	1.0	1.0	227.3	17.6
MLL14KESD150	150	167.0	1.0	1.0	278.3	14.4
MLL14KESD150A	150	167.0	1.0	1.0	264.0	15.2
MLL14KESD160	160	178.0	1.0	1.0	297.0	13.5
MLL14KESD160A	160	178.0	1.0	1.0	281.2	14.2
MLL14KESD170	170	189.0	1.0	1.0	315.0	12.7
MLL14KESD170A	170	189.0	1.0	1.0	298.5	13.4

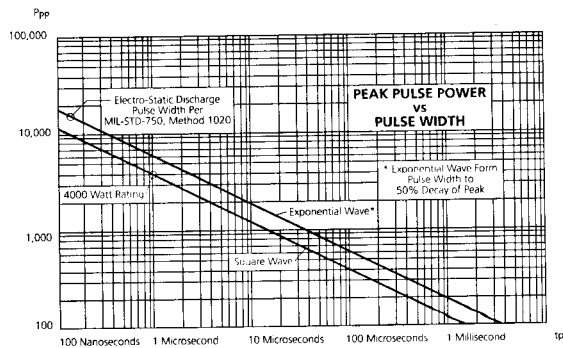


Figure 1

Clamping Factor vs Breakdown Voltage For Various Power Levels

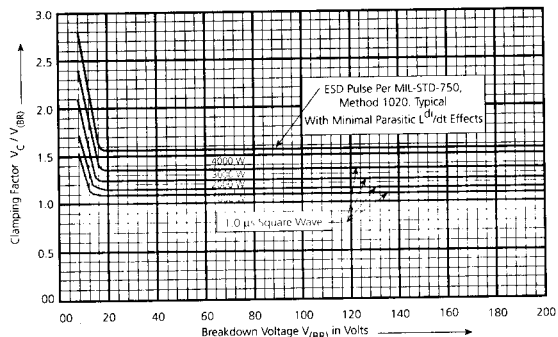


Figure 2

Capacitance vs. V_{BR} Curve

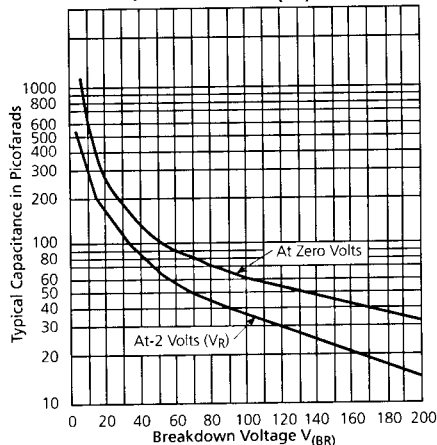


Figure 3