Microsemi
SCOTTSDALE DIVISION

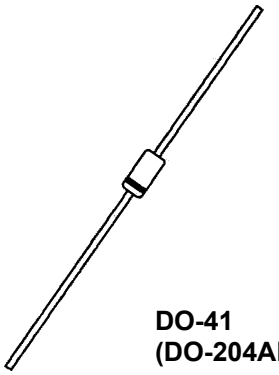
14KESD5.0 thru 14KESD170CA

AXIAL-LEAD TVS

DESCRIPTION

These small axial-leaded TVS devices feature the ability to clamp dangerous high voltage, short-term transients such as produced by directed or radiated electrostatic 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 illustrated in Figure #1.

APPEARANCE



DO-41
(DO-204AL)

IMPORTANT: For the most current data, consult *MICROSEMI's* website: http://www.microsemi.com

FEATURES

- Excellent protection in clamping direct ESD level transients in excess of 40,000 V per MIL-STD-750, Method 1020 (approx. 150 ns exponential wave)
- Absorbs ESD level transients* of 14,000 Watts per MIL-STD-750, Method 1020 (approximately 150 ns exponential wave, or one microsecond transients up to 4000 watts. See Figure #1 and #2 for overall transient Peak Pulse Power.
- Clamps Transients in less than 100 picoseconds
- Working Stand-off Voltage range of 5V to 170V
- Hermetic DO-41 Package. Also available in surface mount DO-213AB MELF package (see separate data sheet)

APPLICATIONS / BENEFITS

- Protects Sensitive circuits from short duration fast rise time transients such as Electrostatic Discharge (ESD) or Electrical Fast Transients (EFT)
- Minimal capacitance (See Figure #3)
- Flexible axial-lead mounting terminals
- Bidirectional features available by adding a "C" or "CA" suffix

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°C to 175°C
- THERMAL RESISTANCE: Less than 83°C/Watt junction to lead at 0.375 inches from body.
- DC power dissipation 1500 mW at T_L = 75°C at 3/8 inch (10 mm) lead length from body.
- Derate at 22.8 W/°C above 25°C for P_{PP} (1μs) and at 15 mW/°C above 75°C for dc power.
- Forward Surge Current 500 amps for 1μs at T_L = 25°C (rise time ≥ 100 ns).

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed axial-lead glass DO-41 (DO-204AL) package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Banded end is cathode
- WEIGHT: 0.378 grams (typical)
- MARKING: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- See package dimension on last page

Microsemi
Scottsdale Division
8700 E. Thomas Rd. PO Box 1390, Scottsdale, AZ 85252 USA, (480) 941-6300, Fax: (480) 947-1503

ELECTRICAL CHARACTERISTICS

TYPE NUMBER*	REVERSE STAND-OFF VOLTAGE V_{WM}	BREAKDOWN VOLTAGE V_{BR} MINIMUM $V_{(BR)}$	BREAKDOWN CURRENT $I_{(BR)}$	MAXIMUM STANDBY CURRENT I_D @ V_{WM}	MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP}	PEAK PULSE CURRENT I_{PP}**
	VOLTS	VOLTS	mA	µA	VOLTS	AMPS
14KESD5.0	5.0	6.40	10	600	17.1	233.6
14KESD5.0A	5.0	6.40	10	600	16.8	238.8
14KESD6.0	6.0	6.67	10	600	18.5	215.9
14KESD6.0A	6.0	6.67	10	600	17.6	227.9
14KESD6.5	6.5	7.22	10	400	20.1	199.5
14KESD6.5A	6.5	7.22	10	400	19.0	210.5
14KESD7.0	7.0	7.78	10	150	21.6	185.0
14KESD7.0A	7.0	7.78	10	150	20.5	195.4
14KESD7.5	7.5	8.33	1.0	50	23.2	172.6
14KESD7.5A	7.5	8.33	1.0	50	21.9	182.4
14KESD8.0	8.0	8.89	1.0	25	24.8	161.6
14KESD8.0A	8.0	8.89	1.0	25	23.4	170.9
14KESD8.5	8.5	9.44	1.0	5	26.2	152.8
14KESD8.5A	8.5	9.44	1.0	5	24.8	161.3
14KESD9.0	9.0	10.0	1.0	1.0	27.8	144.1
14KESD9.0A	9.0	10.0	1.0	1.0	26.4	151.7
14KESD10	10	11.1	1.0	1.0	30.9	129.5
14KESD10A	10	11.1	1.0	1.0	29.3	136.8
14KESD11	11	12.2	1.0	1.0	33.9	118.0
14KESD11A	11	12.2	1.0	1.0	32.1	124.5
14KESD12	12	13.3	1.0	1.0	37.0	108.1
14KESD12A	12	13.3	1.0	1.0	35.0	114.3
14KESD13	13	14.4	1.0	1.0	40.0	100.0
14KESD13A	13	14.4	1.0	1.0	37.9	105.6
14KESD14	14	15.6	1.0	1.0	43.4	92.2
14KESD14A	14	15.6	1.0	1.0	41.0	97.6
14KESD15	15	16.7	1.0	1.0	46.4	86.2
14KESD15A	15	16.7	1.0	1.0	42.2	94.7
14KESD16	16	17.8	1.0	1.0	45.5	87.8
14KESD16A	16	17.8	1.0	1.0	41.3	97.0
14KESD17	17	18.9	1.0	1.0	41.8	95.7
14KESD17A	17	18.9	1.0	1.0	39.8	100.5
14KESD18	18	20.0	1.0	1.0	42.2	94.8
14KESD18A	18	20.0	1.0	1.0	37.9	105.6
14KESD20	20	22.2	1.0	1.0	41.9	95.4
14KESD20A	20	22.2	1.0	1.0	37.4	107.1
14KESD22	22	24.4	1.0	1.0	40.7	98.4
14KESD22A	22	24.4	1.0	1.0	38.5	103.9
14KESD24	24	26.7	1.0	1.0	44.5	89.9
14KESD24A	24	26.7	1.0	1.0	42.2	94.9
14KESD26	26	28.9	1.0	1.0	48.2	83.1
14KESD26A	26	28.9	1.0	1.0	45.6	87.7
14KESD28	28	31.1	1.0	1.0	51.8	77.2
14KESD28A	28	31.1	1.0	1.0	49.1	81.4
14KESD30	30	33.3	1.0	1.0	55.5	72.1
14KESD30A	30	33.3	1.0	1.0	52.6	76.1
14KESD33	33	36.7	1.0	1.0	61.2	65.4
14KESD33A	33	36.7	1.0	1.0	58.0	69.0
14KESD36	36	40.0	1.0	1.0	66.7	60.0
14KESD36A	36	40.0	1.0	1.0	63.2	63.3
14KESD40	40	44.4	1.0	1.0	74.0	54.0
14KESD40A	40	44.4	1.0	1.0	70.1	57.0
14KESD43	43	47.8	1.0	1.0	79.7	50.2
14KESD43A	43	47.8	1.0	1.0	75.5	53.0
14KESD45	45	50.0	1.0	1.0	83.3	48.0
14KESD45A	45	50.0	1.0	1.0	79.0	50.6
14KESD48	48	53.3	1.0	1.0	88.8	45.0
14KESD48A	48	53.3	1.0	1.0	84.2	47.5
14KESD51	51	56.7	1.0	1.0	94.5	42.3
14KESD51A	51	56.7	1.0	1.0	89.6	44.6

TYPE NUMBER*	REVERSE STAND-OFF VOLTAGE V_{WM}	BREAKDOWN VOLTAGE V_{BR} MINIMUM $V_{(BR)}$	BREAKDOWN CURRENT $I_{(BR)}$	MAXIMUM STANDBY CURRENT I_D @ V_{WM}	MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP}	PEAK PULSE CURRENT I_{PP}**
	VOLTS	VOLTS	mA	µA	VOLTS	AMPS
14KESD54	54	60.0	1.0	1.0	100.0	40.0
14KESD54A	54	60.0	1.0	1.0	94.7	42.2
14KESD58	58	64.4	1.0	1.0	107.4	37.2
14KESD58A	58	64.4	1.0	1.0	101.7	39.3
14KESD60	60	66.7	1.0	1.0	111.2	36.0
14KESD60A	60	66.7	1.0	1.0	105.3	38.0
14KESD64	64	71.1	1.0	1.0	118.5	33.7
14KESD64A	64	71.1	1.0	1.0	112.3	35.6
14KESD70	70	77.8	1.0	1.0	129.7	30.8
14KESD70A	70	77.8	1.0	1.0	122.9	32.5
14KESD75	75	83.3	1.0	1.0	139.0	28.8
14KESD75A	75	83.3	1.0	1.0	131.5	30.4
14KESD78	78	86.7	1.0	1.0	144.5	27.7
14KESD78A	78	86.7	1.0	1.0	136.9	29.2
14KESD85	85	94.4	1.0	1.0	157.1	25.4
14KESD85A	85	94.4	1.0	1.0	148.8	26.9
14KESD90	90	100.0	1.0	1.0	166.5	24.0
14KESD90A	90	100.0	1.0	1.0	158.3	25.3
14KESD100	100	111.0	1.0	1.0	185.3	21.6
14KESD100A	100	111.0	1.0	1.0	175.5	22.8
14KESD110	110	122.0	1.0	1.0	203.3	19.7
14KESD110A	110	122.0	1.0	1.0	192.8	20.7
14KESD120	120	133.0	1.0	1.0	222.0	18.0
14KESD120A	120	133.0	1.0	1.0	210.0	19.0
14KESD130	130	144.0	1.0	1.0	240.0	16.7
14KESD130A	130	144.0	1.0	1.0	227.3	17.6
14KESD150	150	167.0	1.0	1.0	278.3	14.4
14KESD150A	150	167.0	1.0	1.0	264.0	15.2
14KESD160	160	178.0	1.0	1.0	297.0	13.5
14KESD160A	160	178.0	1.0	1.0	281.2	14.2
14KESD170	170	189.0	1.0	1.0	315.0	12.7
14KESD170A	170	189.0	1.0	1.0	298.5	13.4

* For bidirectional, add a "C" or "CA" suffix after the part number, e.g. 14KESD5.0C or 14KESD5.0CA for the 14KESD5.0 or 14KESD5.0A part numbers respectively. Capacitance will be one-half that shown in Figure 3 for zero volts.

** At 4000 watts 1µs square wave rating (See Figures 1 and 2).

GRAPHS

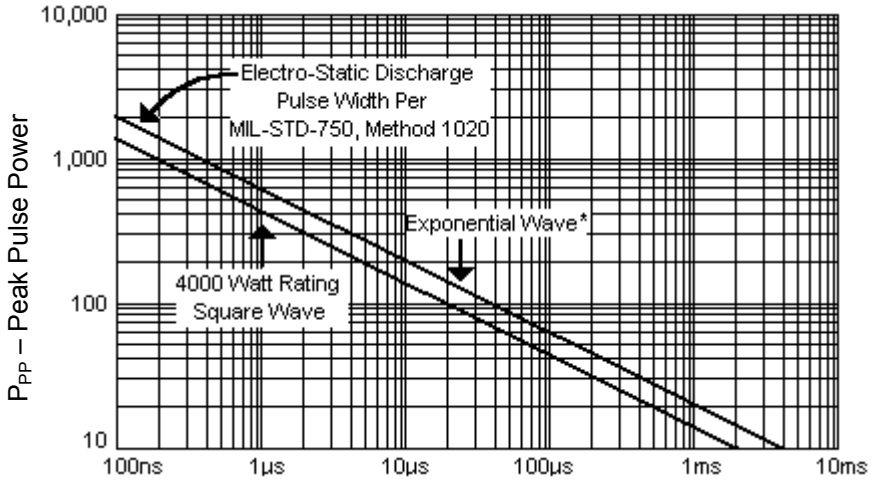


FIGURE 1

Peak Pulse Power vs. Pulse Width

(*Exponential Wave Form Pulse Width to 50% Decay of Peak.)

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Scottsdale Division
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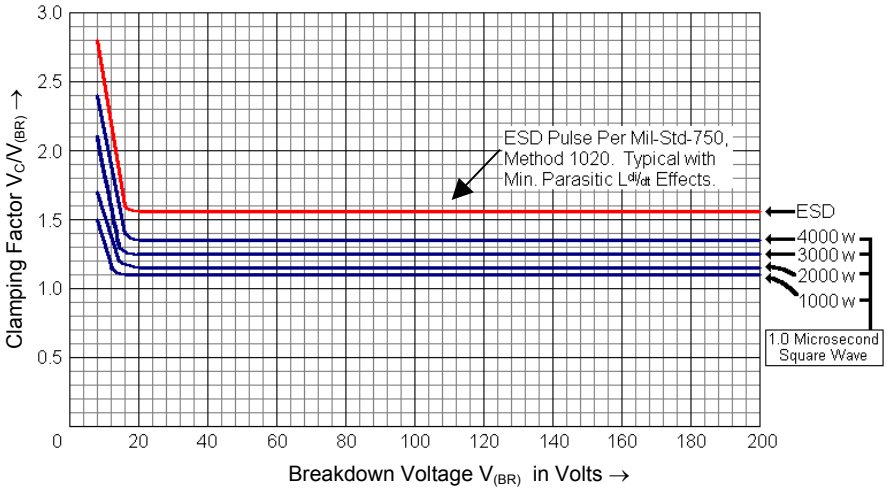


FIGURE 2

Clamping Factor vs. Breakdown Voltage for Various Power Levels

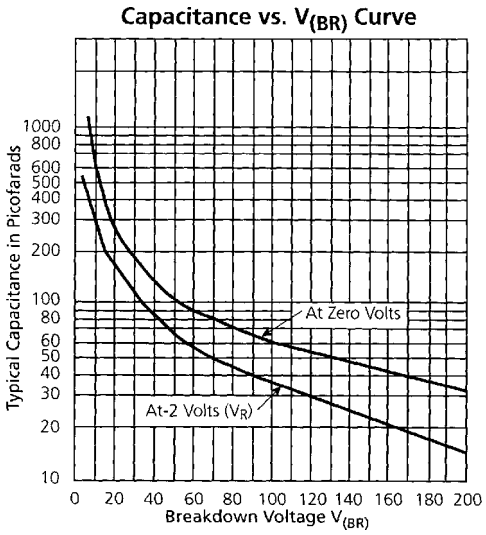
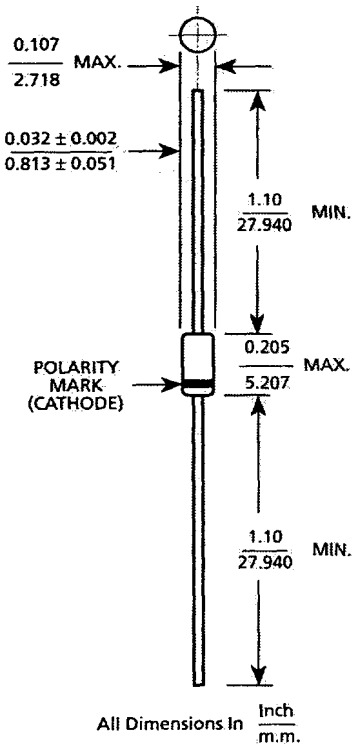


FIGURE 3

Capacitance vs. $V_{(BR)}$ for unidirectional. For bidirectional, value is one-half that shown at zero volts.

PACKAGE DIMENSIONS



DO-41