1.4KESD5.0 thru 1.4KESD170CA

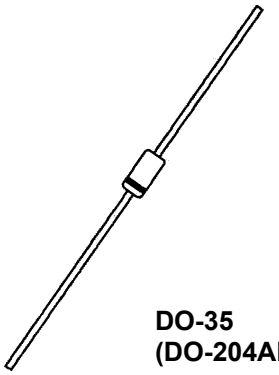
AXIAL-LEAD TVS

Microsemi
SCOTTSDALE DIVISION

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-35
(DO-204AH)

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 15,000 V per MIL-STD-750, Method 1020 (approx. 150 ns exponential wave)
- Absorbs ESD level transients* of 1400 Watts per MIL-STD-750, Method 1020 (approx. 150 ns exponential wave, or one microsecond transients up to 400 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 5 V to 170 V
- Hermetic DO-35 Package. Also available in surface mount DO-213AA 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)
- Low inherent capacitance for high-frequency applications (See Figure #4)
- Flexible axial-lead mounting terminals
- Bidirectional features available by adding a "C" or "CA" suffix

MAXIMUM RATINGS

- 400 Watts for One Microsecond Square Wave or 1400 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 250°C/W junction to lead at 0.375 inches from body.
- DC power dissipation 500 mW at T_L = 75°C at 3/8 inch (10 mm) lead length from body.
- Derate at 2.3 W/°C above 25°C for P_{PP} (1μs) and at 5 mW/°C above 100°C for dc power.
- Forward Surge Current 50 amps for 1μs at T_L = 25°C (rise time ≥ 100 ns).

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed axial-lead glass DO-35 (DO-204AH) package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Banded end is cathode
- WEIGHT: 0.2 grams (typical)
- MARKING: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- See package dimension on last page

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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
1.4KESD5.0	5.0	6.40	10	600	13.7	29.20
1.4KESD5.0A	5.0	6.40	10	600	13.2	29.85
1.4KESD6.0	6.0	6.67	10	600	14.8	27.00
1.4KESD6.0A	6.0	6.67	10	600	14.0	28.50
1.4KESD6.5	6.5	7.22	10	400	16.0	24.94
1.4KESD6.5A	6.5	7.22	10	400	15.2	26.32
1.4KESD7.0	7.0	7.78	10	150	17.3	23.12
1.4KESD7.0A	7.0	7.78	10	150	16.4	24.42
1.4KESD7.5	7.5	8.33	1.0	50	18.5	21.57
1.4KESD7.5A	7.5	8.33	1.0	50	17.5	22.81
1.4KESD8.0	8.0	8.89	1.0	25	19.8	20.20
1.4KESD8.0A	8.0	8.89	1.0	25	18.7	21.37
1.4KESD8.5	8.5	9.44	1.0	5	20.9	19.10
1.4KESD8.5A	8.5	9.44	1.0	5	19.8	20.16
1.4KESD9.0	9.0	10.0	1.0	1.0	22.2	18.02
1.4KESD9.0A	9.0	10.0	1.0	1.0	21.1	18.96
1.4KESD10	10	11.1	1.0	1.0	24.7	16.19
1.4KESD10A	10	11.1	1.0	1.0	23.4	17.09
1.4KESD11	11	12.2	1.0	1.0	27.1	14.76
1.4KESD11A	11	12.2	1.0	1.0	25.7	15.56
1.4KESD12	12	13.3	1.0	1.0	29.6	13.51
1.4KESD12A	12	13.3	1.0	1.0	28.0	14.29
1.4KESD13	13	14.4	1.0	1.0	32.0	12.50
1.4KESD13A	13	14.4	1.0	1.0	30.3	13.20
1.4KESD14	14	15.6	1.0	1.0	31.2	12.81
1.4KESD14A	14	15.6	1.0	1.0	29.5	13.60
1.4KESD15	15	16.7	1.0	1.0	33.4	11.98
1.4KESD15A	15	16.7	1.0	1.0	31.7	12.63
1.4KESD16	16	17.8	1.0	1.0	35.6	11.22
1.4KESD16A	16	17.8	1.0	1.0	33.8	11.85
1.4KESD17	17	18.9	1.0	1.0	37.8	10.58
1.4KESD17A	17	18.9	1.0	1.0	35.8	11.17
1.4KESD18	18	20.0	1.0	1.0	40.0	10.00
1.4KESD18A	18	20.0	1.0	1.0	37.9	10.56
1.4KESD20	20	22.2	1.0	1.0	44.4	9.02
1.4KESD20A	20	22.2	1.0	1.0	42.0	9.52
1.4KESD22	22	24.4	1.0	1.0	48.8	8.20
1.4KESD22A	22	24.4	1.0	1.0	46.2	8.66
1.4KESD24	24	26.7	1.0	1.0	53.4	7.49
1.4KESD24A	24	26.7	1.0	1.0	50.6	7.91
1.4KESD26	26	28.9	1.0	1.0	57.8	6.93
1.4KESD26A	26	28.9	1.0	1.0	54.7	7.31
1.4KESD28	28	31.1	1.0	1.0	62.2	6.43
1.4KESD28A	28	31.1	1.0	1.0	59.0	6.79
1.4KESD30	30	33.3	1.0	1.0	66.6	6.01
1.4KESD30A	30	33.3	1.0	1.0	63.1	6.34
1.4KESD33	33	36.7	1.0	1.0	73.4	5.45
1.4KESD33A	33	36. 7	1.0	1.0	69.6	5.75
1.4KESD36	36	40.0	1.0	1.0	80.0	5.00
1.4KESD36A	36	40.0	1.0	1.0	75.8	5.28
1.4KESD40	40	44.4	1.0	1.0	88.8	4.50
1.4KESD40A	40	44.4	1.0	1.0	84.2	4.75
1.4KESD43	43	47.8	1.0	1.0	95.6	4.18
1.4KESD43A	43	47.8	1.0	1.0	90.5	4.42
1.4KESD45	45	50.0	1.0	1.0	100.0	4.00
1.4KESD45A	45	50.0	1.0	1.0	94.8	4.22
1.4KESD48	48	53.3	1.0	1.0	106.6	3.75
1.4KESD48A	48	53.3	1.0	1.0	101.0	3.96
1.4KESD51	51	56.7	1.0	1.0	113.4	3.53
1.4KESD51A	51	56.7	1.0	1.0	107.5	3.72

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	VOLTS	VOLTS	mA	µA	VOLTS	AMPS
1.4KESD54	54	60.0	1.0	1.0	120.0	3.33
1.4KESD54A	54	60.0	1.0	1.0	113.7	3.52
1.4KESD58	58	64.4	1.0	1.0	128.9	3.10
1.4KESD58A	58	64.4	1.0	1.0	122.0	3.28
1.4KESD60	60	66.7	1.0	1.0	133.4	3.00
1.4KESD60A	60	66.7	1.0	1.0	126.4	3.17
1.4KESD64	64	71.1	1.0	1.0	142.2	2.81
1.4KESD64A	64	71.1	1.0	1.0	134.7	2.97
1.4KESD70	70	77.8	1.0	1.0	155.6	2.57
1.4KESD70A	70	77.8	1.0	1.0	147.4	2.71
1.4KESD75	75	83.3	1.0	1.0	166.8	2.40
1.4KESD75A	75	83.3	1.0	1.0	158.0	2.53
1.4KESD78	78	86.7	1.0	1.0	173.4	2.31
1.4KESD78A	78	86.7	1.0	1.0	164.3	2.44
1.4KESD85	85	94.4	1.0	1.0	188.5	2.12
1.4KESD85A	85	94.4	1.0	1.0	178.6	2.24
1.4KESD90	90	100.0	1.0	1.0	199.8	2.00
1.4KESD90A	90	100.0	1.0	1.0	189.9	2.11
1.4KESD100	100	111.0	1.0	1.0	222.3	1.80
1.4KESD100A	100	111.0	1.0	1.0	210.6	1.90
1.4KESD110	110	122.0	1.0	1.0	243.9	1.64
1.4KESD110A	110	122.0	1.0	1.0	213.3	1.73
1.4KESD120	120	133.0	1.0	1.0	266.4	1.50
1.4KESD120A	120	133.0	1.0	1.0	252.0	1.59
1.4KESD130	130	144.0	1.0	1.0	288.0	1.39
1.4KESD130A	130	144.0	1.0	1.0	273.0	1.47
1.4KESD150	150	167.0	1.0	1.0	333.9	1.20
1.4KESD150A	150	167.0	1.0	1.0	316.8	1.26
1.4KESD160	160	178.0	1.0	1.0	356.4	1.12
1.4KESD160A	160	178.0	1.0	1.0	337.5	1.19
1.4KESD170	170	189.0	1.0	1.0	378.0	1.06
1.4KESD170A	170	189.0	1.0	1.0	358.2	1.12

* For bidirectional, add a "C" or "CA" suffix after the part number, e.g. 1.4KESD5.0C or 1.4KESD5.0CA for the 1.4KESD5.0 or 1.4KESD5.0A part numbers respectively. Capacitance will be one-half that shown in Figure 4 at zero volts.

** At 400 watts 1µs square wave rating (See Figures 1 and 2).

OUTLINE AND CIRCUIT

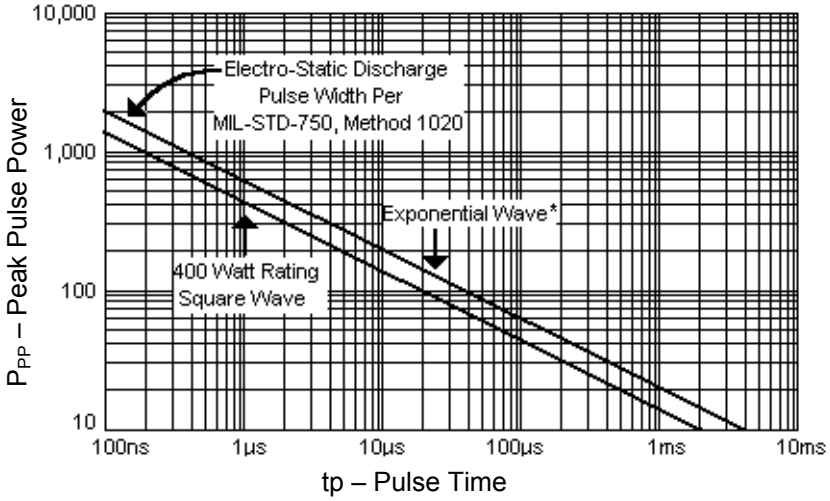


FIGURE 1

Peak Pulse Power vs. Pulse Width

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

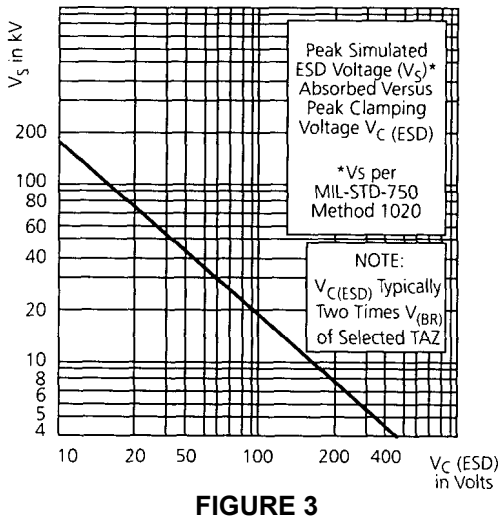


FIGURE 3

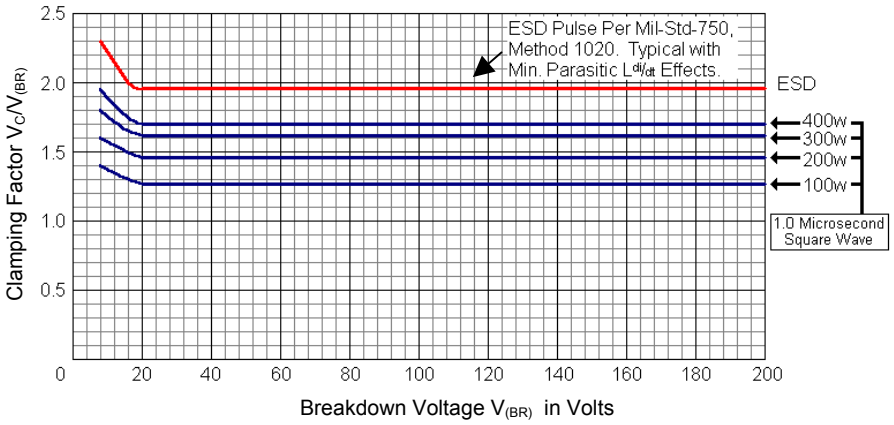


FIGURE 2

Clamping Factor vs. Breakdown Voltage for Various Power Levels

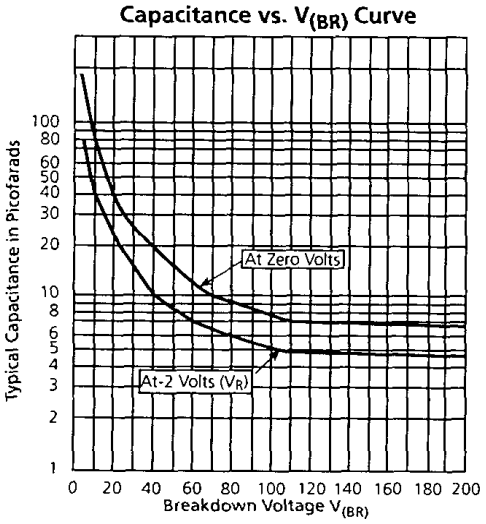
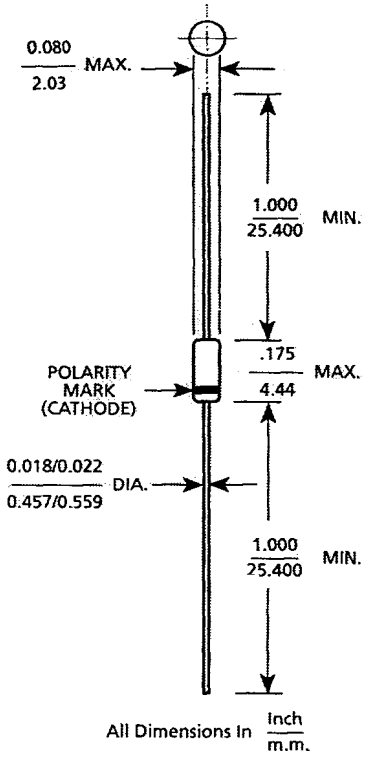


FIGURE 4

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

PACKAGE DIMENSIONS



DO-35