Microsemi
SCOTTSDALE DIVISION

1N6102 thru 1N6137A and 1N6138 thru 1N6173A

Voidless-Hermetically-Sealed Bidirectional Transient Suppressors

ALSO AVAILABLE IN SURFACE MOUNT

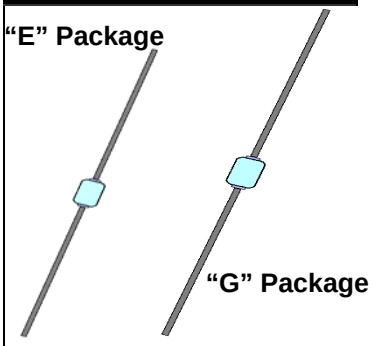
www.Microsemi.COM

DESCRIPTION

This series of industry recognized voidless-hermetically-sealed Bidirectional Transient Voltage Suppressor (TVS) designs is military qualified to MIL-PRF-19500/516 and are ideal for high-reliability applications where a failure cannot be tolerated. They provide a Working Peak "Standoff" Voltage selection from 5.2 to 152 Volts with two package sizes for 500 W and 1500 W ratings. They are very robust in hard-glass construction and also use an internal metallurgical bond identified as Category I for high reliability applications. Both of these are also military qualified to MIL-PRF-19500/516. These devices are available as both a non-suffix part and an "A" suffix part involving different voltage tolerances as further described in note 4 on page 2. These devices are also available in a surface mount MELF package configuration by adding a "US" suffix (see separate data sheet for 1N6102US thru 1N6173AUS). Microsemi also offers numerous other TVS products to meet higher and lower peak pulse power and voltage ratings in both through-hole and surface-mount packages.

APPEARANCE

"E" Package



"G" Package

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

FEATURES

- High surge current and peak pulse power provides transient voltage protection for sensitive circuits
- Triple-layer passivation
- Internal "*Category I*" metallurgical bonds
- Voidless hermetically sealed glass package
- JAN/TX/TXV military qualifications available per MIL-PRF-19500/516 by adding JAN, JANTX, or JANTXV prefix (consult factory for 1N6102 and 1N6138)
- JANS available for 1N6103A thru 1N6118A per MIL-PRF-19500/516 as well as further options for screening in accordance with MIL-PRF-19500 for JANS on all others in this series by using a "SP" prefix, e.g. SP6119A, SP6143A, etc.
- Surface Mount equivalents are also available in a square-end-cap MELF configuration with a "US" suffix (see separate data sheet)

APPLICATIONS / BENEFITS

- Military and other high reliability transient protection
- Extremely robust construction
- Extensive range in Working Peak "Standoff" Voltage (V_{WM}) from 5.2 to 152 V
- Available as either 500 W or 1500 W Peak Pulse Power (P_{PP}) using two different size packages
- ESD and EFT protection per IEC6100-4-2 and IEC61000-4-4 respectively
- Secondary lightning protection per select levels in IEC61000-4-5
- Flexible axial-leaded mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating & Storage Temperature: -55°C to +175°C
- Peak Pulse Power at 25°C: 500 Watts for 1N6102 to 1N6137A and 1500 Watts for 1N6138 to 1N6173A @ 10/1000 µs (also see Figures 1,2 and 3)
- Impulse repetition rate (duty factor): 0.01%
- Steady-State Power: 3.0 W for 1N6102 to 1N6137A and 5.0 W for 1N6138 to 1N6173A @ T_L = 75°C @3/8 inch lead length from body (see Figure 4)
- Steady-State Power: 2.0 W for 1N6102 to 1N6137A and 3.0 W for 1N6138 to 1N6173A @ T_A=25°C (see note below and Figure 5)
- Thermal Resistance @ 3/8 inch lead length: 33.5 °C/W for 1N6102 to 1N6137A and 20.0 °C/W for 1N6138 thru 1N6173A
- Solder Temperatures: 260°C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed voidless hard glass with Tungsten slugs
- TERMINATIONS: Axial-leads are Tin/Lead (Sn/Pb) over copper except for JANS with solid Silver (Ag) and no finish
- MARKING: Body painted and part number, etc.
- POLARITY: No polarity marking for these bidirectional TVSs
- Tape & Reel option: Standard per EIA-296
- Weight: 750 mg for 500 Watt (E Package)
  1270 mg for 1500 Watt (G Package)
- See package dimensions on last page for both the "E" and "G" size packages

JANS

1N6102 – 1N6137A
1N6138 – 1N6173A

NOTE: Steady-state power ratings with reference to ambient are for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where T_{OP} or $T_{J(MAX)}$ is not exceeded.

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ELECTRICAL CHARACTERISTICS

INDUSTRY TYPE NUMBER (Note 4) P_{PP} Rating		MINIMUM BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$		RATED STANDOFF VOLTAGE V_{WM}	MAXIMUM STANDBY CURRENT I_D@ V_{WM} 500W	1500W	MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP}	MAXIMUM PEAK PULSE CURRENT I_{PP} 500 W	1500 W	MAXIMUM TEMP. COEF. OF $V_{(BR)}$
500W	1500W	Volts	mA	V	uA	uA	Volts	Amps	Amps	%/°C
1N6102A	1N6138A	6.12	175	5.2	100	500	10.5	47.6	142.8	.05
1N6103A	1N6139A	7.13	175	5.7	50	300	11.2	44.6	133.9	.06
1N6104A	1N6140A	7.79	150	6.2	20	100	12.1	41.3	124.0	.06
1N6105A	1N6141A	8.65	150	6.9	20	100	13.4	37.3	111.9	.06
1N6106A	1N6142A	9.50	125	7.6	20	100	14.5	34.5	103.4	.07
1N6107A	1N6143A	10.45	125	8.4	20	20	15.6	32.0	96.2	.07
1N6108A	1N6144A	11.40	100	9.1	20	20	16.9	29.6	88.8	.07
1N6109A	1N6145A	12.35	100	9.9	20	20	18.2	27.5	82.4	.08
1N6110A	1N6146A	14.25	75	11.4	20	20	21.0	23.8	71.4	.08
1N6111A	1N6147A	15.20	75	12.2	20	20	22.3	22.4	67.3	.08
1N6112A	1N6148A	17.10	65	13.7	1	10	25.1	19.9	59.8	.085
1N6113A	1N6149A	19.0	65	15.2	1	5	27.7	18.0	54.2	.085
1N6114A	1N6150A	20.9	50	16.7	1	5	30.5	16.4	49.2	.085
1N6115A	1N6151A	22.8	50	18.2	1	5	33.3	15.0	45.0	.09
1N6116A	1N6152A	25.7	50	20.6	1	5	37.4	13.4	40.1	.09
1N6117A	1N6153A	28.5	40	22.8	1	5	41.6	12.0	36.0	.09
1N6118A	1N6154A	31.4	40	25.1	1	5	45.7	10.9	32.8	.095
1N6119A	1N6155A	34.2	30	27.4	1	5	49.9	10.0	30.1	.095
1N6120A	1N6156A	37.1	30	29.7	1	5	53.6	9.3	28.0	.095
1N6121A	1N6157A	40.9	30	32.7	1	5	59.1	8.5	25.4	.095
1N6122A	1N6158A	44.7	25	35.8	1	5	64.6	7.7	23.2	.095
1N6123A	1N6159A	48.5	25	38.8	1	5	70.1	7.1	21.4	.095
1N6124A	1N6160A	53.2	20	42.6	1	5	77.0	6.5	19.5	.095
1N6125A	1N6161A	58.9	20	47.1	1	5	85.3	5.9	17.6	.100
1N6126A	1N6162A	64.6	20	51.7	1	5	97.1	5.1	15.4	.100
1N6127A	1N6163A	71.3	20	56.0	1	5	103.1	4.8	14.5	.100
1N6128A	1N6164A	77.9	15	62.2	1	5	112.8	4.4	13.3	.100
1N6129A	1N6165A	86.5	15	69.2	1	5	125.1	4.0	12.0	.100
1N6130A	1N6166A	95.0	12	76.0	1	5	137.6	3.6	10.9	.100
1N6131A	1N6167A	104.5	12	86.6	1	5	151.3	3.3	9.9	.100
1N6132A	1N6168A	114.0	10	91.2	1	5	165.1	3.0	9.1	.100
1N6133A	1N6169A	123.5	10	98.8	1	5	178.8	2.8	8.4	.105
1N6134A	1N6170A	142.5	8	114.0	1	5	206.3	2.4	7.3	.105
1N6135A	1N6171A	152.0	8	121.6	1	5	218.4	2.3	6.9	.105
1N6136A	1N6172A	171.0	5	136.8	1	5	245.7	2.0	6.1	.110
1N6137A	1N6173A	190.0	5	152.0	1	5	273.0	1.8	5.5	.110
Note: 4		**1**	**1**	**1**	**2**	**3**	**1**	**2**	**3**	**1**

Notes: 1. Applies to both 500 W and 1500 W series for devices shown (see note 4)
2. Applies only to 500 W series (1N6102 thru 1N6137A).
3. Applies only to 1500 W series (1N6138 thru 1N6173A).
4. Part number without the A suffix has 5% higher V_C, 5% lower minimum $V_{(BR)}$, and 5% lower I_{PP}.

SYMBOLS & DEFINITIONS

Symbol	Definition
V_{BR}	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
V_{WM}	Working Peak Voltage: The maximum peak voltage that can be applied over the operating temperature range. This is also referred to as Standoff Voltage.
I_D	Maximum Standoff Current: The maximum current that will flow at the specified voltage and temperature.
V_C	Maximum clamping voltage at specified I_{PP} (Peak Pulse Current) at the specified pulse conditions.
P_{PP}	Peak Pulse Power: The peak power dissipation resulting from the peak impulse current I_{PP}.

GRAPHS

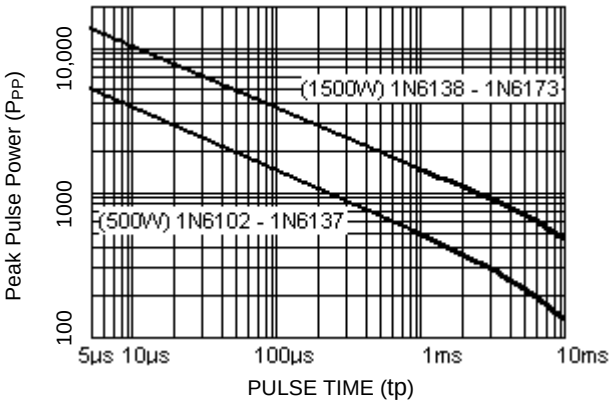


FIGURE 1
PEAK PULSE POWER vs. PULSE TIME

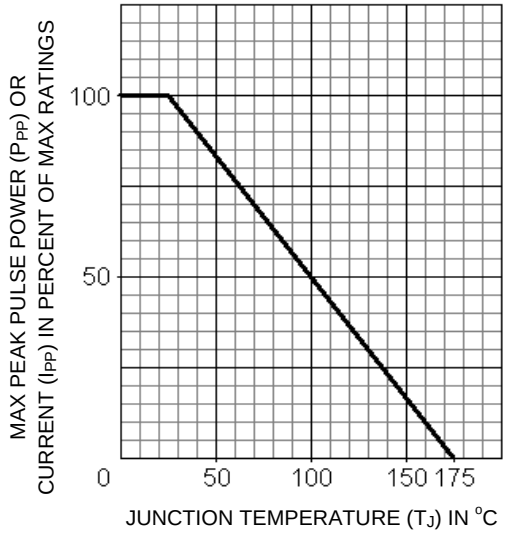


FIGURE 2
PEAK PULSE POWER vs. T_J
(prior to impulse)

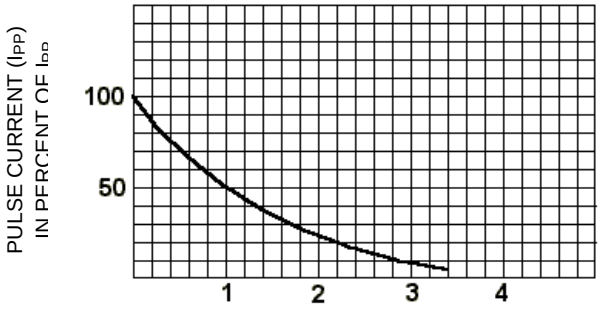
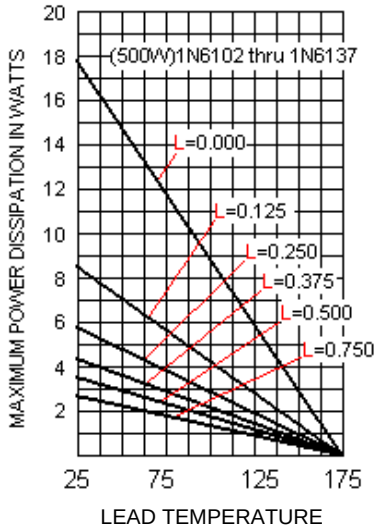


FIGURE 3
PULSE WAVE FORM



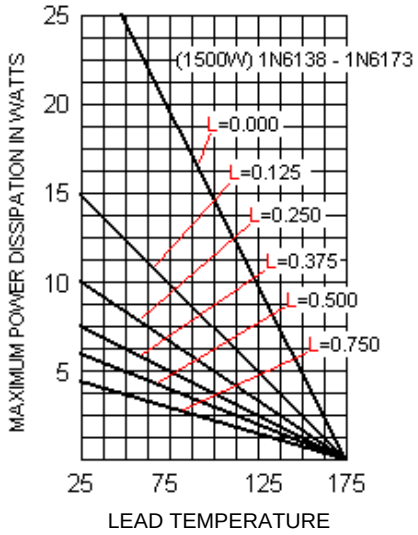


FIGURE 4
MAXIMUM POWER vs. LEAD TEMPERATURE

Maximum lead temperature in °C (T_L) at point "L" from body
(for maximum operating junction temperature with equal two-lead conditions.)

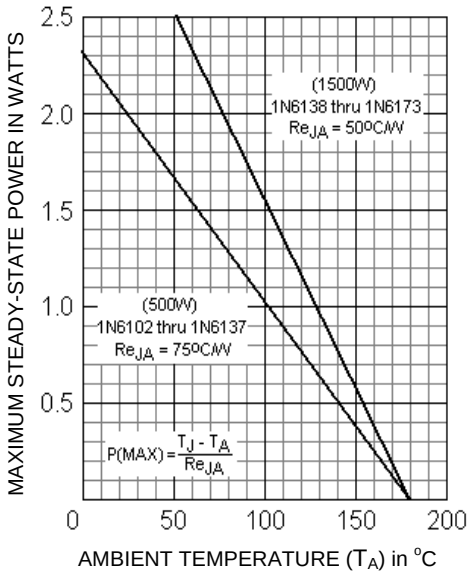
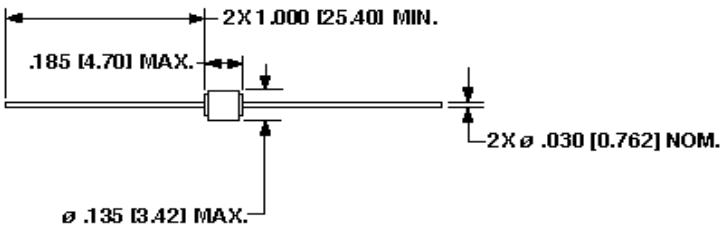


FIGURE 5
STEADY-STATE DERATING CURVE
FOR FREE-AIR MOUNTING

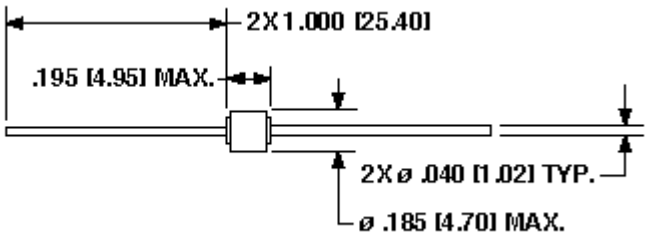
(For PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where T_{OP} or $T_{J(MAX)}$ rating is not exceeded)

PACKAGE DIMENSIONS Inches [mm]



NOTE: DIMENSIONS IN INCHES [MM]

PACKAGE E for 1N6102 thru 1N6137A (500 W)
Note: Package E lead dimension diameter is 0.030 inch nominal with –.004 +.003 inch tolerance



PACKAGE G for 1N6138 thru 1N6173A (1500 W)
Note: Package G lead dimension diameter is 0.040 inch nominal with –.004 +.002 inch tolerance