Microsemi

SCOTTSDALE DIVISION

1N6373 thru 1N6389 or MPTE-5 thru MPTE-45C

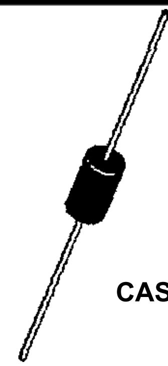
ALSO AVAILABLE IN SURFACE MOUNT

1500 WATT LOW CLAMPING FACTOR TRANSIENT VOLTAGE SUPPRESSOR

DESCRIPTION

This Transient Voltage Suppressor (TVS) series for 1N6373 thru 1N6389 are JEDEC registered selections for both unidirectional and bidirectional devices. The 1N6373 thru 1N6381 are unidirectional and the 1N6382 thru 1N6389 are bi-directional where they all provide a very low specified clamping factor for minimal clamping voltages (V_C) above their respective breakdown voltages (V_{BR}) as specified herein. They are most often used in protecting sensitive components from inductive switching transients or induced secondary lightning effects as found in lower surge levels of IEC61000-4-5 . They are also very successful in protecting airborne avionics and electrical systems. Since their response time is virtually instantaneous, they can also protect from ESD and EFT per IEC61000-4-2 and IEC61000-4-4.

APPEARANCE



CASE 1

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

FEATURES

- Unidirectional and bidirectional TVS series for thru-hole mounting
- Suppresses transients up to 1500 watts @ 10/1000 μs
- $t_{clamping}$ (0 volts to $V_{(BR)}$ min):
  Unidirectional – Less than 100 pico seconds.
  Bidirectional – Less than 5 nano seconds.
- Working voltage (V_{WM}) range 5 V to 45 V
- Low clamping factor (ratio of actual V_C/V_{BR}): 1.33 @ full rated power and 1.20 @ 50% rated power
- Economical plastic encapsulated TVS for thru-hole mount
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are also available by adding MQ, MX, MV, MSP prefixes respectively to part numbers, e.g. MX1N6373, etc.
- Surface mount equivalent packages also available as SMCJ6373 – SMCJ6389 (consult factory for other surface mount options)
- Metal package axial-leaded equivalents available in the 1N6373 – 1N6389 series (see separate data sheet)

APPLICATIONS / BENEFITS

- Designed to protect Bipolar and MOS Microprocessor based systems.
- Protection from switching transients and induced RF
- ESD & EFT protection per IEC 61000-4-2 and -4-4
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  Class 1, 2 & 3 1N6356 to 1N6372
  Class 4: 1N6356 to 1N6362
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  Class 1 & 2: 1N6356 to 1N6372
  Class 3: 1N6356 to 1N6362
  Class 4: 1N6356 to 1N6358
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
  Class 2: 1N6356 to 1N6361
  Class 3: 1N6356 to 1N6358

MAXIMUM RATINGS

- 1500 Watts for 10/1000 μs with repetition rate of 0.01% or less* at lead temperature (T_L) 25°C (See Figs. 1, 2, & 4)
- Operating & Storage Temperatures: -65° to +150°C
- Thermal Resistance: 22°C/W junction to lead at 3/8 inch (10 mm) from body, or 82°C/W junction to ambient when mounted on FR4 PC board with 4 mm^2 copper pads (1oz) and track width 1 mm, length 25 mm
- Steady-State Power dissipation*: 5 watts at $T_L \le 40$°C, or 1.52 watts at $T_A = 25$°C when mounted on FR4 PC board described for thermal resistance
- Solder Temperatures: 260 °C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINATIONS: Tin-Lead plated and solderable per MIL-STD-750 method 2026
- POLARITY: Cathode indicated by band
- MARKING: Part number and polarity diode symbol
- WEIGHT: 1.5 grams. (Approx)
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- See "CASE 1" package dimension on last page

* TVS devices are not typically used for dc power dissipation and are instead operated at or less than their rated standoff voltage (V_{WM}) except for transients that briefly drive the device into avalanche breakdown (V_{BR} to V_C region).

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1N6373 thru 1N6389 or MPTE-5 thru MPTE-45C

1500 WATT LOW CLAMPING FACTOR TRANSIENT VOLTAGE SUPPRESSOR

ELECTRICAL CHARACTERISTICS @ 25°C (Unidirectional)

MICROSEMI PART NUMBER		STAND-OFF VOLTAGE (NOTE 1) V_{WM} VOLTS	MAXIMUM REVERSE LEAKAGE @V_{WM} I_D µA	MINIMUM* BREAKDOWN VOLTAGE @ 1.0 mA $V_{(BR)}$ (min) VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2) I_{PP1} = 1A V_C VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_{PP2} = 10A V_C VOLTS	MAXIMUM PEAK PULSE CURRENT I_{PP3} A
1N6373	MPTE-5	5.0	300	6.0	7.1	7.5	160
1N6374	MPTE-8	8.0	25	9.4	11.3	11.5	100
1N6375	MPTE-10	10.0	2	11.7	13.7	14.1	90
1N6376	MPTE-12	12.0	2	14.1	16.1	16.5	70
1N6377	MPTE-15	15.0	2	17.6	20.1	20.6	60
1N6378	MPTE-18	18.0	2	21.2	24.2	25.2	50
1N6379	MPTE-22	22.0	2	25.9	29.8	32.0	40
1N6380	MPTE-36	36.0	2	42.4	50.6	54.3	23
1N6381	MPTE-45	45.0	2	52.9	63.3	70.0	19

V_F at 100 amps peak, 8.3 msec sine wave equals 3.5 volts maximum.

ELECTRICAL CHARACTERISTICS @ 25°C (Bidirectional)

	MPTE-5C	5.0	300	6.0	7.1	7.5	160
1N6382	MPTE-8C	8.0	25	9.4	11.4	11.6	100
1N6383	MPTE-10C	10.0	2	11.7	14.1	14.5	90
1N6384	MPTE-12C	12.0	2	14.1	16.7	17.1	70
1N6385	MPTE-15C	15.0	2	17.6	20.8	21.4	60
1N6386	MPTE-18C	18.0	2	21.2	24.8	25.5	50
1N6387	MPTE-22C	22.0	2	25.9	30.8	32.0	40
1N6388	MPTE-36C	36.0	2	42.4	50.6	54.3	23
1N6389	MPTE-45C	45.0	2	52.9	63.3	70.0	19

C Suffix indicates Bidirectional

NOTE 1: TVS devices are normally selected according to the reverse "Stand Off Voltage" (V_{WM}) which should be equal to or greater than the dc or continuous peak operating voltage level.

* The minimum breakdown voltage as shown takes into consideration the ±1 volt tolerance normally specified for power supply regulation on most integrated circuit manufacturers data sheets. Similar devices are available with reduced clamping voltages where tighter regulated power supply voltages are employed.

GRAPHS

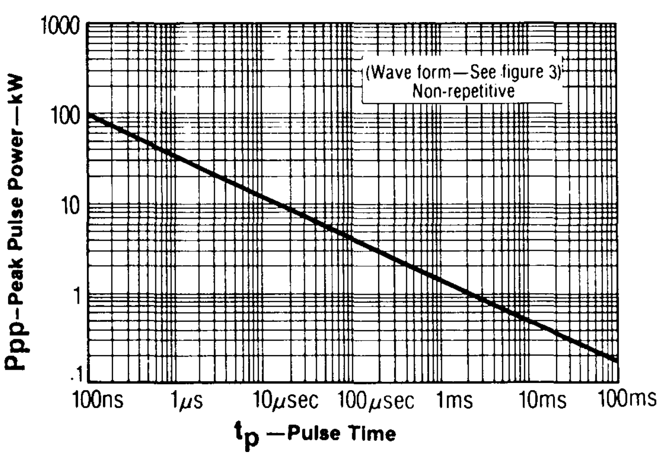

FIGURE 1
Peak Pulse Power vs. Pulse Time

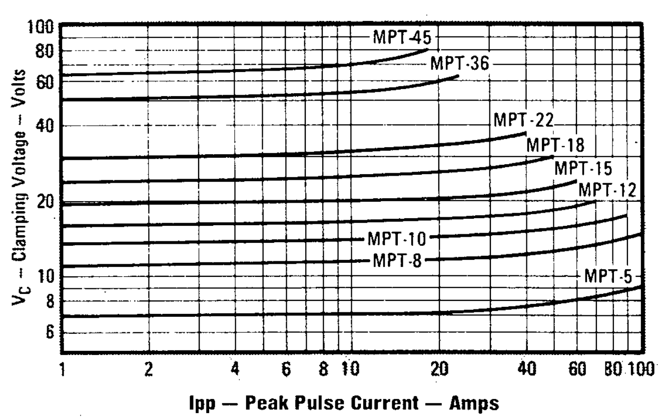

FIGURE 2
Typical Characteristic Clamping Voltage vs. Peak Pulse Current

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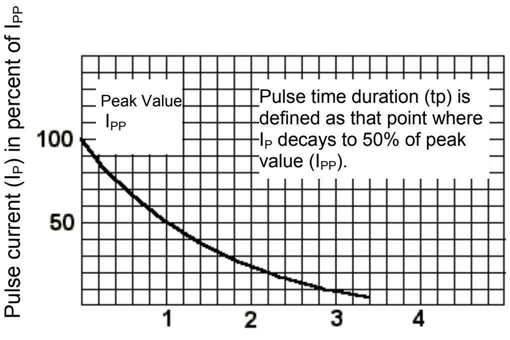


FIGURE 3
Pulse wave form for exponential surge

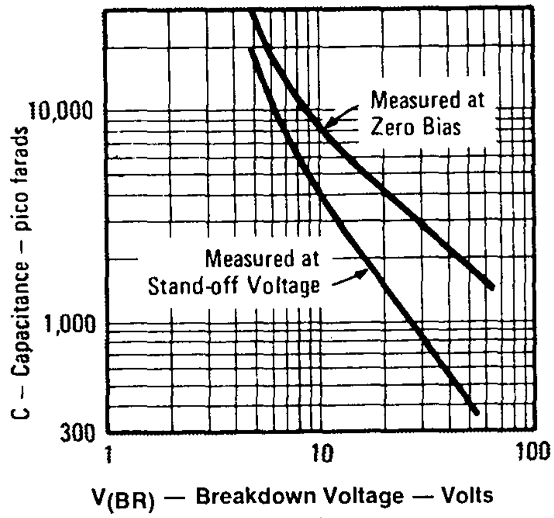


FIGURE 4
Typical Capacitance vs. Breakdown Voltage
(Unidirectional Types)

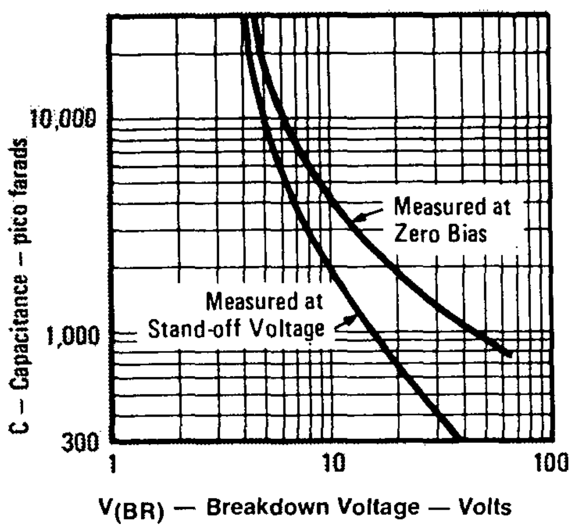
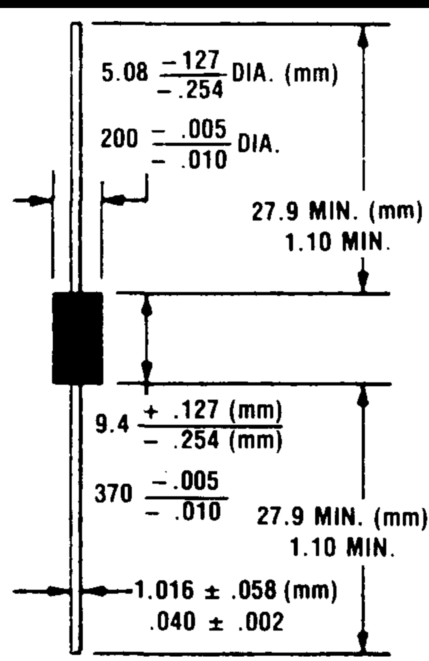


FIGURE 5
Typical Capacitance vs. Breakdown Voltage
(Bidirectional Types)

PACKAGE DIMENSIONS



CASE 1