SAC5.0 thru SAC50, e3

500 WATT LOW CAPACITANCE TRANSIENT VOLTAGE SUPPRESSOR

ALSO AVAILABLE IN SURFACE MOUNT

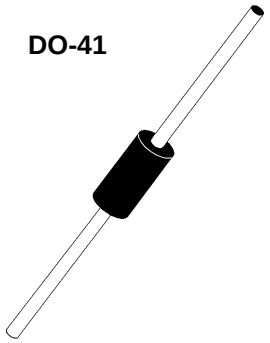
SCOTTSDALE DIVISION

DESCRIPTION

This SAC5.0 thru SAC50 transient voltage suppressor (TVS) series rated at 500 watts provides an added rectifier element as shown in Figure 4 to achieve low capacitance in applications for higher speed data or signal lines. The low capacitance rating of 30 pF may be used for protecting higher frequency applications in inductive switching environments or electrical systems involving secondary lightning effects per IEC61000-4-5 as well as RTCA/DO-160D or ARINC 429 for airborne avionics. If bidirectional protection is needed, two SAC devices in anti-parallel configuration are required as shown in Figure 6. With their very fast response time, they also provide ESD and EFT protection per IEC61000-4-2 and IEC61000-4-4 respectively.

APPEARANCE

DO-41



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

FEATURES

- Unidirectional low-capacitance TVS series for flexible thru-hole mounting (for bidirectional see Figure 6)
- Improved performance in low capacitance of 30 pF
- Economical plastic series in flexible axial-leaded DO-41 package
- Optional 100% **screening for avionics grade** is available by adding MA prefix to part number for added 100% temperature cycle -55°C to +125°C (10X) as well as surge (3X) and 24 hours HTRB with post test V_Z & I_R
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, and JANTXV are also available by adding MQ, MX, or MV prefixes respectively to part number, e.g. MXSAC5.0, MVSAC18, etc.
- Also available in surface mount with HSMBJ prefix for part numbers (ex. HSMBJSAC5.0)
- RoHS Compliant devices available by adding "e3" suffix

APPLICATIONS / BENEFITS

- Suppresses transient up to 500 Watts Peak Pulse Power @ 10/1000 µs
- Low Capacitance for data-line protection to 10 MHz
- Protection for aircraft fast data rate lines up to Level 3 Waveform 4 and Level 1 Waveform 5A in RTCA/DO-160D (also see MicroNote 130) & ARINC 429 with bit rates of 100 kb/s (per ARINC 429, Part 1, par 2.4.1.1)
- ESD and EFT protection per IEC61000-4-2 and IEC61000-4-4 respectively
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1: SAC5.0 to SAC50
  - Class 2: SAC5.0 to SAC45
  - Class 3: SAC5.0 to SAC22
  - Class 4: SAC5.0 to SAC10
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance
  - Class 1: SAC5.0 to SAC26
  - Class 2: SAC5.0 to SAC15
  - Class 3: SAC5.0 to SAC7.0

MAXIMUM RATINGS

- Peak Pulse Power Dissipation at 25°C: 500 Watts @ 10/1000 µs with repetition rate of 0.01% or less*
- Steady State Power Dissipation* at T_L = +75°C: 2.5 Watts (Lead Length = 3/8").
- Clamping Speed (0 volts to $V_{(BR)}$ Min.) less than 5 nanoseconds.
- Operating and Storage Temperature: -65°C to +150°C.

MECHANICAL AND PACKAGING

- CASE: Void Free Transfer Molded Thermosetting Plastic epoxy meeting UL94V-0
- TERMINATIONS: Tin-lead or RoHS Compliant annealed matte-Tin plating readily solderable per MIL-STD-750 method 2026
- POLARITY: Cathode indicated by band
- MARKING: Part number and cathode band
- WEIGHT: 0.7 Grams (Approx.)
- See package dimensions on last page

* TVS devices are not typically used for dc power dissipation and are instead operated ≤ V_{WM} (rated standoff voltage) except for transients that briefly drive the device into avalanche breakdown (V_{BR} to V_C region) of the TVS element. Also see Figures 5 and 6 for further protection details in rated peak pulse power for unidirectional and bidirectional configurations respectively.

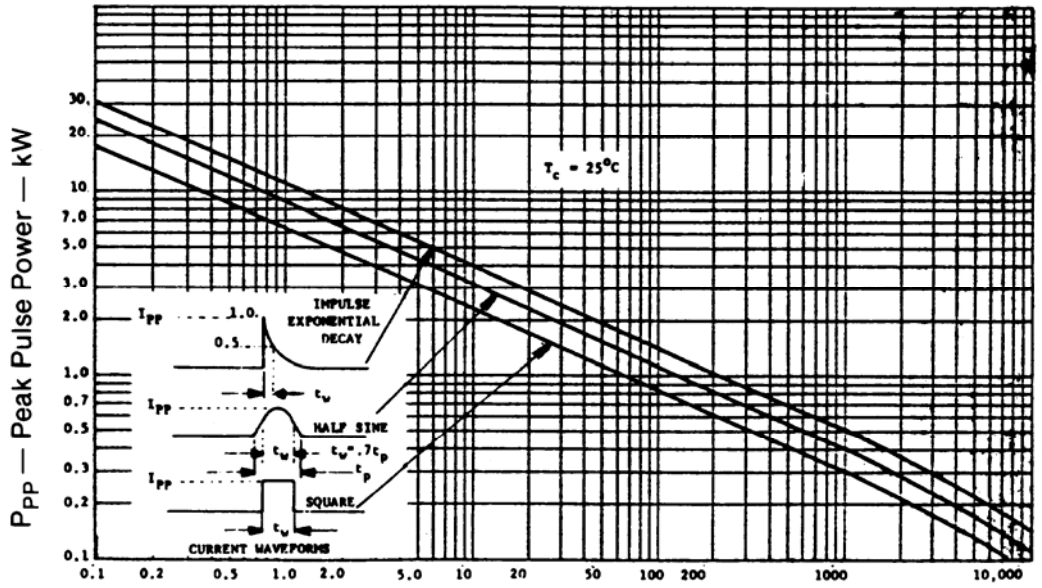
ELECTRICAL CHARACTERISTICS @ 25°C

MICROSEMI PART NUMBER	REVERSE STAND-OFF VOLTAGE (Note 1) V_{WM} Volts	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$ 1.0mA $V_{(BR)}$ Volts Min.	MAXIMUM STANDBY CURRENT I_D @V_{WM} µA	MAXIMUM CLAMPING VOLTAGE V_C @ I_P = 5.0A Volts	MAXIMUM PEAK PULSE CURRENT RATING (Note 2) I_{PP} Amps	MAXIMUM CAPACITANCE @ O Volts pF	WORKING INVERSE BLOCKING VOLTAGE V_{WIB} Volts	INVERSE BLOCKING LEAKAGE CURRENT @ V_{WIB} I_{IB} µA	PEAK INVERSE BLOCKING VOLTAGE V_{PIB} Volts
SAC5.0	5.0	7.60	300	10.0	44	30	75	10	100
SAC6.0	6.0	7.90	300	11.2	41	30	75	10	100
SAC7.0	7.0	8.33	300	12.6	38	30	75	10	100
SAC8.0	8.0	8.89	100	13.4	36	30	75	10	100
SAC8.5	8.5	9.44	50	14.0	34	30	75	10	100
SAC10	10	11.10	5.0	16.3	29	30	75	10	100
SAC12	12	13.30	5.0	19.0	25	30	75	10	100
SAC15	15	16.70	5.0	23.6	20	30	75	10	100
SAC18	18	20.00	5.0	28.8	15	30	75	10	100
SAC22	22	24.40	5.0	35.4	14	30	75	10	100
SAC26	26	28.90	5.0	42.3	11.1	30	75	10	100
SAC36	36	40.0	5.0	60.0	8.6	30	75	10	100
SAC45	45	50.00	5.0	77.0	6.8	30	150	10	200
SAC50	50	55.50	5.0	88.0	5.8	30	150	10	200

Note 1: A transient voltage suppressor is normally selected according to voltage (V_{WM}), which should be equal to or greater than the dc or continuous peak operating voltage level.

Note 2: Test in TVS avalanche direction. Do not pulse in "forward" direction. See section for "Schematic Applications" herein.

GRAPHS



t_w – Pulse Width µs

FIGURE 1

500 WATT LOW CAPACITANCE TRANSIENT VOLTAGE SUPPRESSOR

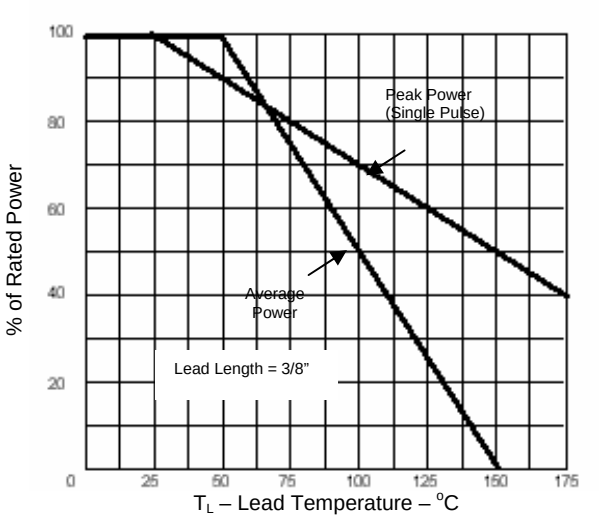


FIGURE 2

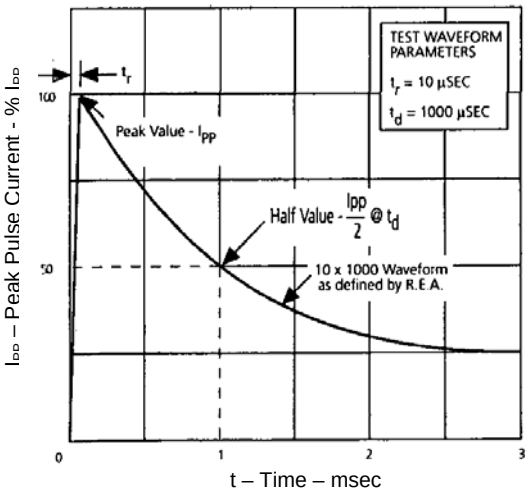


FIGURE 3

SCHEMATIC APPLICATIONS

The TVS low capacitance device configuration is shown in Figure 4. As a further option for unidirectional applications, an additional low capacitance rectifier diode may be used in parallel in the same polarity direction as the TVS as shown in Figure 5. In applications where random high voltage transients occur, this will prevent reverse transients from damaging the internal low capacitance rectifier diode and also provide a low voltage conducting direction. The added rectifier diode should be of similar low capacitance and also have a higher reverse voltage rating than the TVS clamping voltage V_C. The Microsemi recommended rectifier part number is the “LCR60” for the application in Figure 5. If using two (2) low capacitance TVS devices in anti-parallel for bidirectional applications, this added protective feature for both directions (including the reverse of each rectifier diode) is also provided. The unidirectional and bidirectional configurations in Figure 5 and 6 will both result in twice the capacitance of Figure 4.

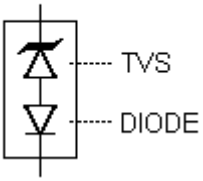


FIGURE 4
TVS with internal Low Capacitance Diode

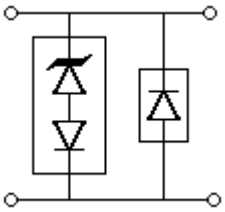


FIGURE 5
Optional Unidirectional configuration (TVS and separate rectifier diode) in parallel)

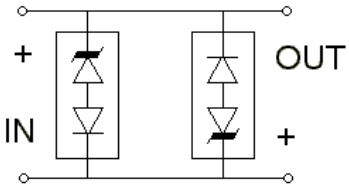
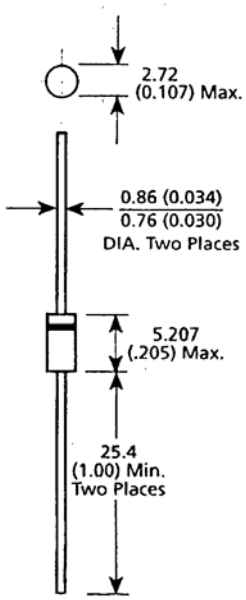


FIGURE 6
Optional Bidirectional configuration (two TVS devices in anti-parallel)

PACKAGE DIMENSIONS



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