

**Unidirectional TVSarray™**

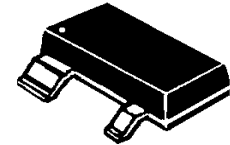
**PRODUCT PREVIEW**

**DESCRIPTION**

This TRANSIENT VOLTAGE SUPPRESSOR (TVS) is packaged in an SOT-143 configuration giving protection to 1 Unidirectional data or interface line. It is designed for use in applications where protection is required at the board level from voltage transients caused by electrostatic discharge (ESD) as defined in IEC 61000-4-2, electrical fast transients (EFT) per IEC 61000-4-4 and effects of secondary lightning.

These TVS arrays have a peak power rating of 500 watts for an 8/20  $\mu$ sec pulse. This array is suitable for protection of sensitive circuitry consisting of TTL, CMOS DRAM's, SRAM's, HCMOS, HSIC microprocessors, **UNIVERSAL SERIAL BUS (USB)** and I/O transceivers. The USB504xx product provides board level protection from static electricity and other induced voltage surges that can damage or upset sensitive circuitry.

**TVSarray™ SERIES**



**APPLICATIONS**

- EIA-RS485 data rates: 5 Mbs
- 10 Base T Ethernet
- USB data rate: 900 Mbs

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

**FEATURES**

- Protects 1 unidirectional line
- Surge protection per IEC 61000-4-2, IEC 61000-4-4
- Provides electrically isolated protection
- UL 94V-0 Flammability Classification
- **ULTRA LOW CAPACITANCE 3 pF per line pair**
- **ULTRA LOW LEAKAGE**

**PACKAGING**

- Tape & Reel per EIA Standard 481-1-A
- 7 inch reel; 3,000 pieces per reel

**MAXIMUM RATINGS**

- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- Peak Pulse Power: 500 watts (8/20  $\mu$ s, Figure 1)
- Pulse Repetition Rate: < .01%

**MECHANICAL**

- Molded SOT-143 Surface Mount
- Weight: 0.035 grams (approximate)
- Body marked with device marking code
- Pin #1 defined by dot on top of package

**ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless otherwise specified**

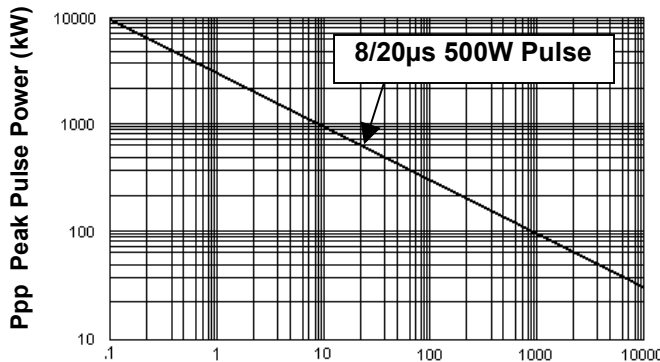
PART NUMBER	DEVICE MARKING	STAND OFF VOLTAGE	BREAKDOWN VOLTAGE	CLAMPING VOLTAGE	CLAMPING VOLTAGE	STANDBY CURRENT	CAPACITANCE	TEMPERATURE
		$V_{WM}$	$V_{BR}$	$V_C$	$V_C$	$I_D$	(f=1 MHz)	COEFFICIENT
		VOLTS	@1 mA	@ 1 Amp	@ 5 Amp	@ $V_{WM}$	C	OF $V_{BR}$
				(Figure 2)	(Figure 2)	$\mu$ A	pF	$\alpha_{VBR}$
		MAX	MIN	MAX	MAX	MAX	MAX	MAX
USB50403	AA	3.3	4	8	11	200	3	-5
USB50405	AB	5.0	6.0	10.8	13	20	3	1
USB50412	AC	12.0	13.3	19	26	1	3	8
USB50415	AD	15.0	16.7	24	32	1	3	11
USB50424	AE	24.0	26.7	43	57	1	3	28

Note: Transient Voltage Suppressor (TVS) product is normally selected based on its stand off voltage  $V_{WM}$ . Product selected voltage should be equal to or greater than the continuous peak operating voltage of the circuit to be protected.

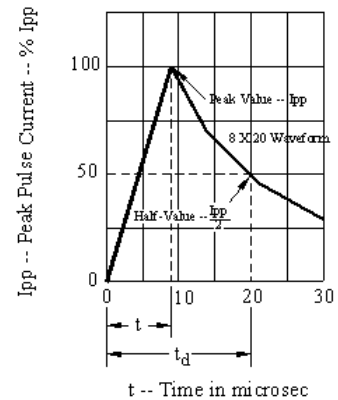
**SYMBOLS & DEFINITIONS**

Symbol	DEFINITION
$V_{WM}$	Stand Off Voltage: Maximum dc voltage that can be applied over the operating temperature range. $V_{wm}$ must be selected to be equal or be greater than the operating voltage of the line to be protected.
$V_{BR}$	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current
$V_C$	Clamping Voltage: Maximum clamping voltage across the TVS device when subjected to a given current at a pulse time of 20 $\mu s$ .
$I_D$	Standby Current: Leakage current at $V_{WM}$ .
C	Capacitance: Capacitance of the TVS as defined @ 0 volts at a frequency of 1 MHz and stated in picofarads.

**GRAPHS**

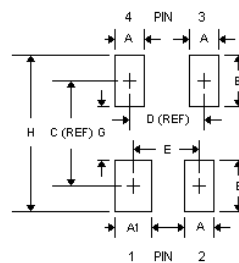
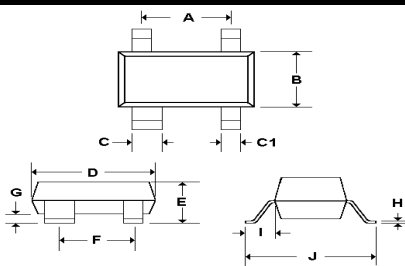


**Figure 1**  
Peak Pulse Power Vs Pulse Time  $t = \mu sec$



**Figure 2**  
Pulse Wave Form

**OUTLINE AND SCHEMATIC**

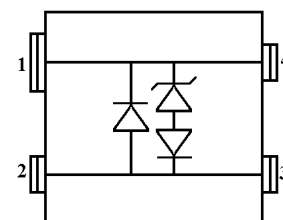


DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	.032	.040	0.80	1.00
A1	.040	.048	1.00	1.20
B	---	.057	---	1.44
C	---	.087	---	2.20
D	.075 BSC		1.90 BSC	
E	.067 BSC		1.70 BSC	
G	.032	.040	0.80	1.00
H	.134	.140	3.40	3.60

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.070	0.080	1.78	2.03
B	0.047	0.055	1.20	1.40
C	0.030	0.037	0.77	0.94
C1	0.015	0.020	0.37	0.50
D	0.110	0.119	2.80	3.04
E	0.035	0.044	0.89	1.17
F	0.071	0.079	1.80	2.00
G	0.0006	0.006	0.013	0.05
H	0.003	0.007	0.085	0.17
I	0.018	0.023	0.45	0.60
J	0.083	0.093	2.10	2.50

**OUTLINE**

**PAD LAYOUT**



**SCHEMATIC**