

DESCRIPTION

Microsemi's proprietary Zener process provides low standoff voltages and the lowest standby current in the industry of 0.1µA. This 3 pin unidirectional array is designed for use in applications where protection is required at the board level from voltage transients caused by electrostatic discharge (ESD) as defined by IEC 61000-4-2, electrical fast transients (EFT) per IEC 61000-4-4 and effects of secondary lighting.

This product is designed to provide protection in the unidirectional mode for 1 line as defined in (Fig 1). Two device in an anti parallel configuration will provide low capacitance bidirectional protection as defined (Fig 2), and low capacitance bidirectional one line differential line pair protection as defined in (Fig 3).

These Transient Voltage Suppressor (TVS) diode arrays protect 2.8 volt components such as DRAM's SRAM's CMOS, HCMOS, HSIC, and low voltage interfaces. Because of the physical size, weight and protection capabilities, this product is ideal for use in but not limited to miniaturize electronic equipment such as hand held instruments, computers, computer peripherals and cell phones and PDA's.

TVS array™ SERIES



APPLICATIONS

- EIA-RS232 data rates 19.6kbs
- EIA-RS422 data rates 10Mbps
- EIA-RS423 data rates 100kbs
- 200 MHz maximum

FEATURES

- Protects 2.8 voltage components
- Protects 1 unidirectional line to ground
- Unidirectional single line capacitance 5.0 pF
- **LOW LEAKAGE 0.1 µA**

PACKAGING

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

MAXIMUM RATINGS

- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- **Peak Pulse current 24 Amps at 8/20 µs (FIGURE 2)**

MECHANICAL

- Molded SOT23 Surface Mount
- Weight .014 grams (approximate)
- Body Marked with device number

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless otherwise specified

PART NUMBER	DEVICE MARKING	REVERSE STAND-OFF VOLTAGE V_{WM} Pin 3 to 1 OR Pin 2 to 1 VOLTS	PUNCH-THROUGH VOLTAGE V_{PT} $I_{PT} = 2\mu A$ Pin 3 to 1 VOLTS	SNAP-BACK VOLTAGE V_{SB} $I_{SB} = 50mA$ Pin 3 to 1 VOLTS	CLAMPING VOLTAGE V_C @ 2 Amp Pin 3 to 1 VOLTS	CLAMPING VOLTAGE V_C @ 5 Amp Pin 3 to 1 VOLTS	CLAMPING VOLTAGE V_C @ 24 Amp Pin 3 to 1 VOLTS	CLAMPING VOLTAGE V_C @ 2 Amp Pin 2 to 1 VOLTS
		MAX	MIN	MIN	MAX	MAX	MAX	MAX
SLVU2.8K	U2.8	2.8	3.0	2.8	3.9	7.0	12.5	5.5

CLAMPING VOLTAGE V_C @ 5 Amp Pin 2 to 1 VOLTS	CLAMPING VOLTAGE V_C @ 24 Amp Pin 2 to 1 VOLTS	STANDBY (LEAKAGE) CURRENT I_D $V_{WM} = 2.8V$ $T = 25^\circ C$ Pin 3 to 1 or 2 to 1 µA	CAPACITANCE (f=1 MHz) @0V C Pin 3 to 1 & 2 pF	CAPACITANCE (f=1 MHz) @0V C Pin 2 to 1 (3 N.C.) pF
MAX	MAX	MAX	TYP	TYP
8.5	15	0.1	50	5.0

REVERSE BREAKDOWN V_{BR} @ $I_T = 10\mu A$ Pin 3 to 2 VOLTS	REVERSE LEAKAGE CURRENT I_{RD} $V_{WM} = 2.8V$ $T = 25^\circ C$ Pin 3 to 2 µA	FORWARD VOLTAGE $I_F = 1A, t_p = 120 \mu s$ Pin 2 to 3 VOLTS
MIN	MAX	MAX
40	0.1	2

"ELECTRICAL CHARACTERISTICS FOR STEERING DIODE"

SYMBOLS & DEFINITIONS

Symbol	DEFINITION
V_{WM}	Rated 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_{PT}	Punch-Thru Voltage: The minimum voltage the device will exhibit at a specified current
V_{SB}	Snap-Back Voltage: The minimum snap-back 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 μs .
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 pico Farads.

GRAPHS

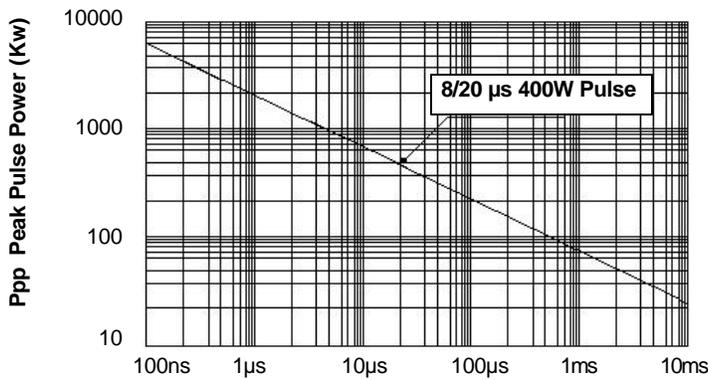


FIGURE 1
Peak Pulse Power Vs Pulse Time

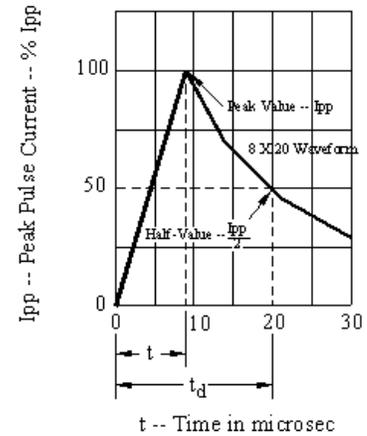
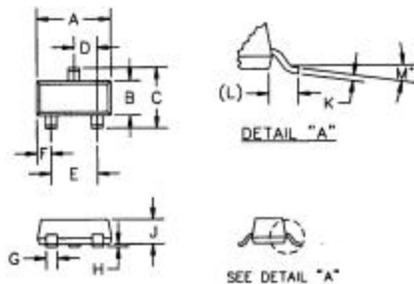
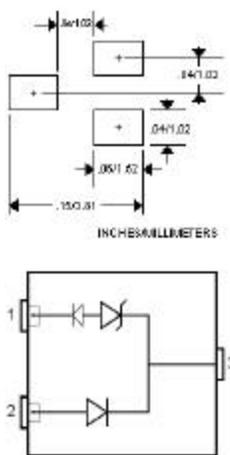


FIGURE 2
Pulse Wave Form

PACKAGING AND SCHEMATIC



DIM*	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.119	2.8	3.04	--
B	.047	.055	1.20	1.40	--
C	.083	.104	2.10	2.64	--
D	.035	.040	0.88	1.02	--
E	.070	.081	1.78	2.05	--
F	.017	.024	.44	.60	--
G	.014	.020	.37	.51	--
H	.0005	.004	.013	0.10	--
J	.034	.040	.87	1.02	--
K	.003	.007	.085	.180	--
L	--	.022	--	0.55	REF
M	O	B'	D'	B''	--

APPLICATION NOTES

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.

All electronic equipment are susceptible to damage generated by ESD, EFT and lightning interference. With this in mind the SLVU2.8K was designed to provide a level of component protection that meets or exceeds IEC standards 61000-4-2 and 61000-4-4 plus moderate levels of induced lightning. This device can be used for protection on one unidirectional line, one common mode bi-directional line or one differential line pair. The following description defines the varieties of product configurations.

Unidirectional one line

For unidirectional protection pin 3 must be connected to the protected line and pin 1 and 2 to ground. The loading capacitance for this configuration is no more than 50 pf maximum. When positive transients are on the line the TVS diode will be reversed biased thus taking the threat from pin 3 to ground and clamping the voltage at the rated V_C of the device. If a negative transient occurs the threat is handled by the internal diode and is clamped at the forward-voltage drop of the diode.

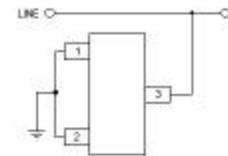


Figure 1
Capacitance 50 pf

Bi-directional one common mode line

For common mode bi-directional protection, two devices are used in an anti parallel configuration. Device (D1) pin 1 is connected to the protected line and pin 2 to ground. Device (D2) pin 2 is connected to the protected line and pin 1 to ground. The loading capacitance for this configuration is 5 pf maximum for each device (10 pF total). If positive transients are felt on the line, the TVS diode (D2) would be reversed biased thus taking the threat from line to ground clamping the voltage at the rated clamping voltage (V_C) of the device. If a negative transient is felt on the line, the TVS diode D1 would be reversed biased thus taking the threat from line to ground and clamping the voltage at the rated clamping voltage V_C of the device.

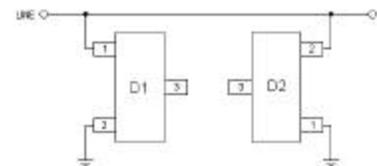


Figure 2
Capacitance 10 pf

Bi-directional one differential line pair

Bi-directional protection of one differential line pair requires two devices connected in an anti parallel configuration. Device (D1) pin 1 is connected to line 1 and pin 2 to line 2. Device (D2) pin 2 is connected to the line 1 and pin 1 to line 2. During negative transients, D1 will conduct from pin 2 to pin 1. During positive transients D2 will conduct from pin 2 to pin 1. The loading capacitance for this bidirectional configuration is no more than 10 pF maximum.

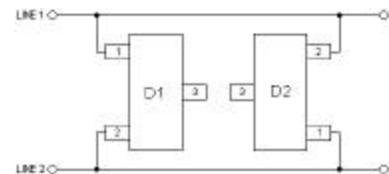


Figure 3
Capacitance 10 pf