

APPLICATIONS

- RS-232 & RS-423 Data Lines
- Telecommunication T/R Protection:
ISDN, ADSL, V.34/V.90, HDLC, T1/E1 & T3/E3
- Low & High Speed Data Lines: Ethernet,
Token Ring, USB, FireWire
- LAN/WAN Network Interface

FEATURES

- Meets IEC 1000-4-2, -4 & -5 Industry Requirements
- Series A: 500 Watts Peak Pulse Power Dissipation (8/20μs)
- Series B: 3,400 Watts Peak Pulse Power Dissipation (8/20μs)
- Available in 4 Voltage Ranges from 5.0V to 24V
- Variable Lead Spacing & Customer Designed Ground
- High Surge Capability & Low Capacitance Option
- ESD Protection > 40 kilovolts
- UL 94V-0 Flammability Classification

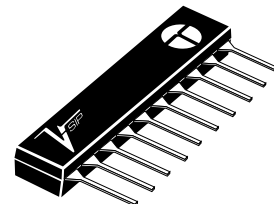
DESCRIPTION

The VSIP® (Variable Single In-line Package) is a multiple TVS array platform which facilitates the design and manufacture of application specific transient voltage suppressors to customer specific designs. The VSIP® allows for electrical variables with respect to voltage, power and capacitance together with variable physical characteristics for lead spacing and terminations.

The VSIP® is ideal for bread board designs, low to medium volume production runs and retrofit requirements. The VSIP® family consists of 2 basic series for board level protection. The primary characterization is to the industry standard 8/20μs waveform. Table 1 shows the series relationships to other standard waveforms.

MAXIMUM RATINGS	
P_{PP} @ 25°C (See Figure 1)	500 Watts & 3,500 Watts, 8/20 μs Waveshape
Operating & Storage Temperature	-55° to +150°C
Repetition Rate (Duty Cycle)	0.01%
t_{Clamping} (0 Volts to V_(BR) Min.)	Unidirectional: < 1 x 10 ⁻¹² seconds Bidirectional: < 5 x 10 ⁻⁹ seconds
MECHANICAL CHARACTERISTICS	
Package	Molded Plastic VSIP Package
Approximate Weight	1.5 grams
Device Markings	Logo & Part Number
Miscellaneous	Pin No. 1 Indicated by Dot over Pin 1

IEC 1000-4 COMPATIBLE



VSIP® PACKAGE

POWER MATRIX vs SERIES

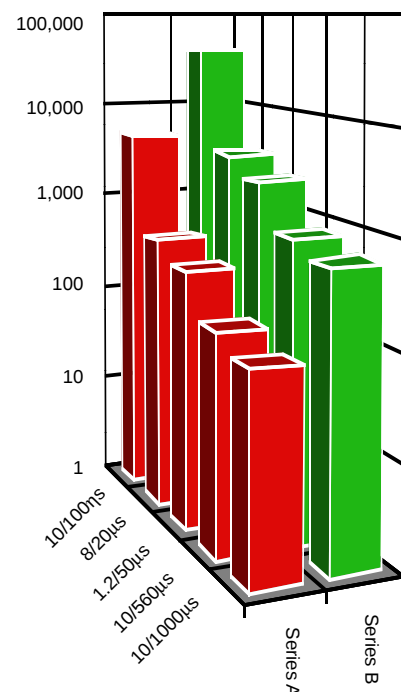


TABLE 1

Waveform	Series A	Series B
10/100ns	5,000 W	40,000 W
8/20μs	500 W	3,400 W
1.2/50μs	333 W	2,200 W
10/560μs	125 W	800 W
10/1000μs	90 W	600 W

ELECTRICAL CHARACTERISTICS @ 25° C Ambient Temperature

PROTEK PART NUMBER (Note 1 & 2)	RATED STAND-OFF VOLTAGE (Note 3) V_{WM} VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1 mA $V_{(BR)}$ VOLTS	SERIES A				SERIES B			
			MAXIMUM CLAMPING VOLTAGE (See Fig. 3) V_C VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 3) V_C VOLTS	MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA	MAXIMUM PEAK PULSE CURRENT (See Fig. 3) I_{PP} AMPS	MAXIMUM CLAMPING VOLTAGE (See Fig. 3) V_C VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 3) V_C VOLTS	MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA	MAXIMUM PEAK PULSE CURRENT (See Fig. 3) I_{PP} AMPS
5	5.0	6.0	9.8	12.5	100	40	8.6	9.1	300	300
8	8.0	8.5	13.4	16.6	10	28	10.9	12.0	200	258
12	12.0	13.3	19.5	22.7	1	20	17.0	18.8	2	184
15	15.0	16.7	24.4	28.5	1	15	21.4	23.6	2	147
24	24.0	26.7	39.1	45.6	1	10	34.2	37.8	2	93

Note 1: For voltage types not shown on the product data sheet, consult the factory.

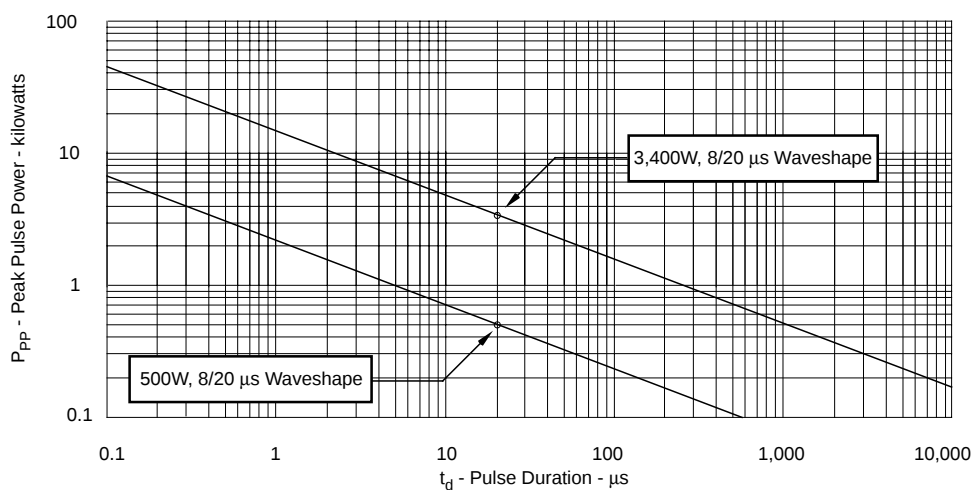
Note 2: The low capacitance configuration values for each bidirectional line pair is as follows:

Series "A": C = 25 pF Series "B": C = 100 pF

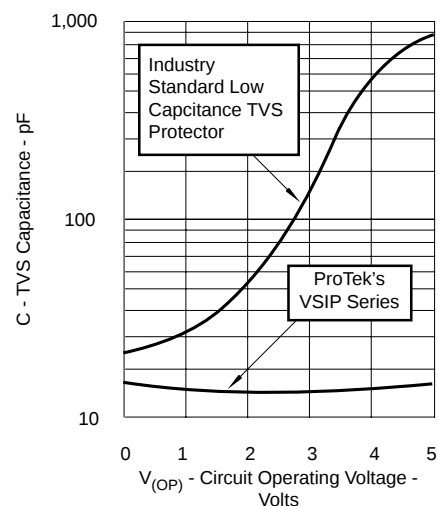
Note 3: Forward Voltage (unidirectional configurations only):

Series "A": $V_F = 1.5V @ 200mA$ Series "B": $V_F = 1.5V @ 200mA$

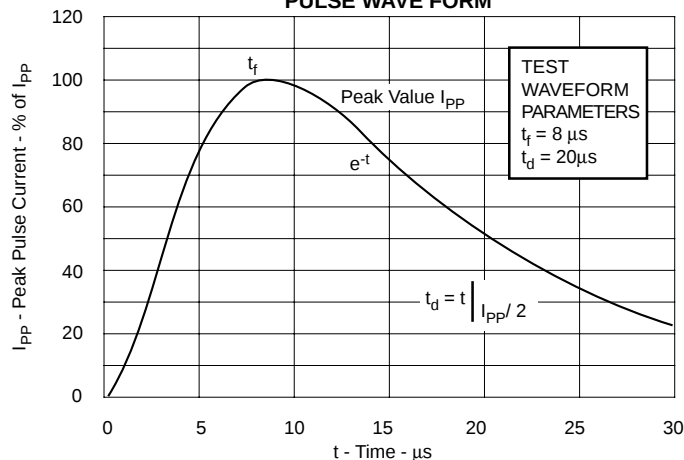
**FIGURE 1
PEAK PULSE POWER VS PULSE TIME**



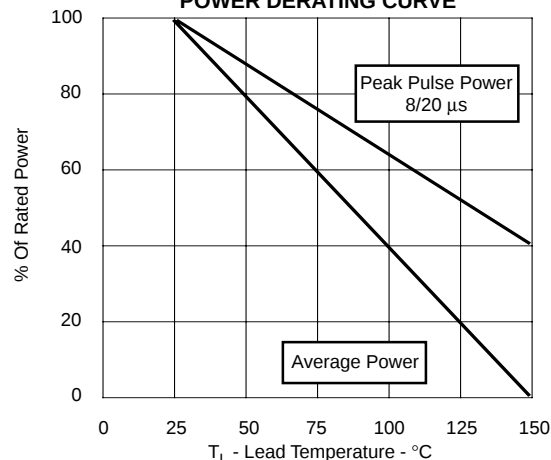
**FIGURE 2
TYPICAL LOW CAPACITANCE CURVE**



**FIGURE 3
PULSE WAVE FORM**



**FIGURE 4
POWER DERATING CURVE**





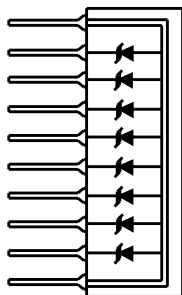
STANDARD PRODUCTS



UNIDIRECTIONAL	BIDIRECTIONAL	LOW CAPACITANCE	LC* ISOLATED	NOTES
VS10P05 VS10P08 VS10P12 VS10P15 VS10P24	VS10P05C VS10P08C VS10P12C VS10P15C VS10P24C	VS10P05LC VS10P08LC VS10P12LC VS10P15LC VS10P24LC	VS10P05LCI VS10P08LCI VS10P12LCI VS10P15LCI VS10P24LCI	Series "A" devices are identified by the prefix "VS". Series "B" devices are identified by the prefix "VSB". All standard devices are 10 pin with the two outside pins being ground. It is recommended that an additional ground pin be added for every four lines of protection. Contact the factory for the part number of other voltage types.
VSB10P05 VSB10P08 VSB10P12 VSB10P15 VSB10P24	VSB10P05C VSB10P08C VSB10P12C VSB10P15C VSB10P24C	VSB10P05LC VSB10P08LC VSB10P12LC VSB10P15LC VSB10P24LC	VSB10P05LCI VSB10P08LCI VSB10P12LCI VSB10P15LCI VSB10P24LCI	
LC* = Low Capacitance				

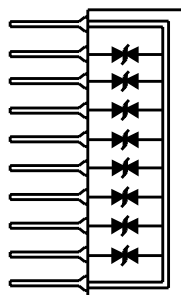
UNIDIRECTIONAL

Standard Configuration



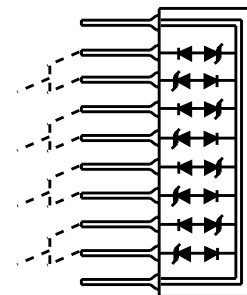
BIDIRECTIONAL

Standard Configuration

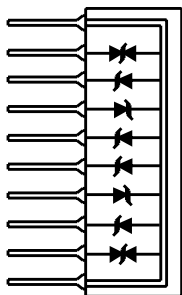


LOW CAPACITANCE

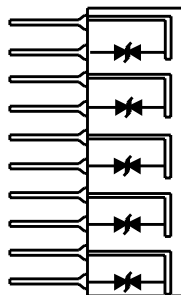
Standard Configuration



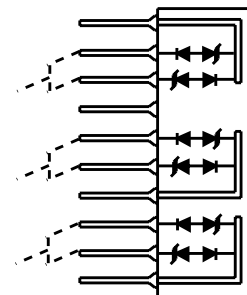
Mixed Configuration
+ 5.0V
- 5.0V
+ 8.0V
 $\pm 12.0V$



Line-to-Line Isolated

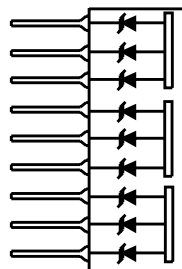


Isolated Low Crosstalk



Bidirectional
(Line-to-Line &
Line-to-Ground)

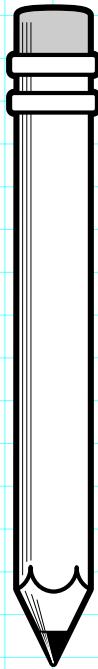
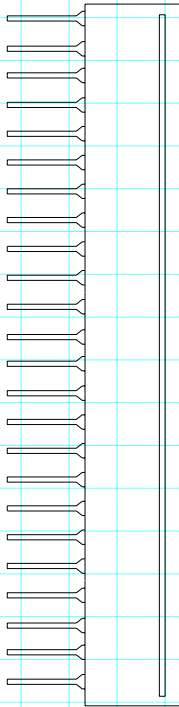
3 Individual Circuits



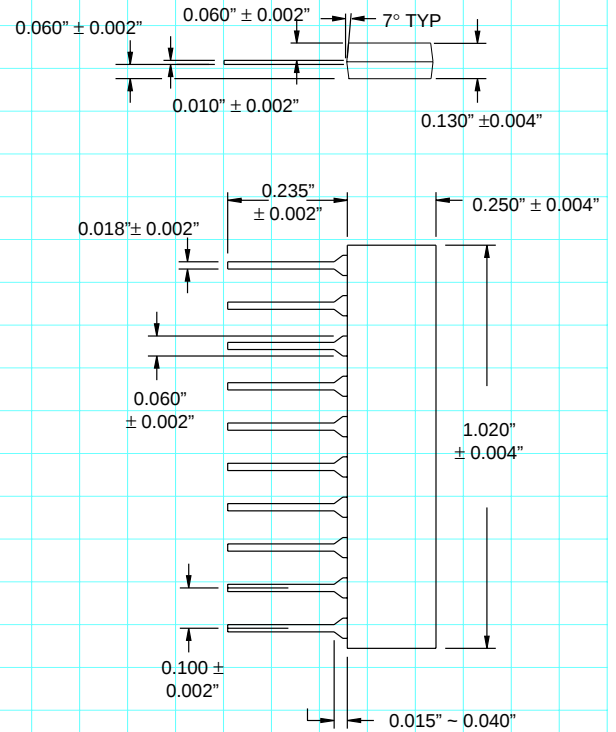
SERIES		TVS TYPE	VOLTAGE	DIRECTIONS
A	500 Watts	D Cathode	i.e. 5 8 10 15 etc...	Specify each pin by the codes as shown in the adjacent table. Example: 2AD10 is 500W, Cathode-out, 10V TVS located at pin 2. 1G is a ground connection located at pin 1. 3BF24 is a 3,400W, Bidirectional, 24V TVS located at pin 3. As an option, the appropriate symbol, voltages and series can be drawn at each pin location.
B	3,400 Watts	E Anode		
G	Ground	F Bidirectional		
		H - Low Cap.		
		K + Low Cap.		

100 mil Centers

PIN 1



VSIP PACKAGE OUTLINE



It is recommended that devices on 0.100 inch centers be limited to a pin count of no greater than 24 and no greater than 12 for devices on 0.200 inch centers. It is recommended that a ground pin be added for every four (4) lines of protection. This is to minimize the lead inductance for fast rise transient pulses such as ESD.