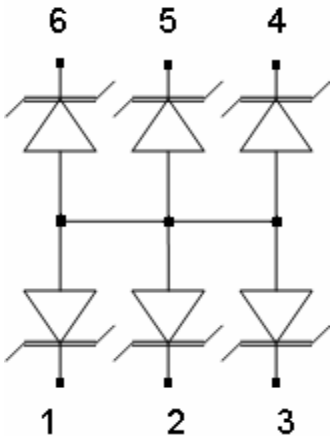
SPE0523
5-Line ESD Protection Array

DESCRIPTION
The SPE0523 are designed by TVS bi-direction device that is to protect sensitive electronics from damage or latch-up due to ESD. They are designed for use in applications where board space is at a premium. SPE0523 is bidirectional devices that will protect up to five lines, and may be used on lines where the signal polarities swing above and below ground .
SPE0523 offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.
SPE0523 may be used to meet the immunity requirements of IEC 61000-4-2, level 4. The small SOT-363 package makes them ideal for use in portable electronics such as cell phones, PDA's, notebook computers, and digital cameras.

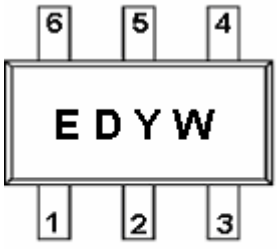
APPLICATIONS
- Cellular Handsets and Accessories
- Cordless Phone
- PDA
- Notebooks and Handhelds
- Portable Instrumentation
- Digital Cameras
- MP3 Player

FEATURES
- Transient protection for data lines to
  IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
  IEC 61000-4-4 (EFT) 40A (5/50ns)
- Protects five bidirectional I/O lines
- Working voltage: 5V
- Low leakage current
- Low operating and clamping voltages

PIN CONFIGURATION (SOT-363)



PART MARKING



Y : Year Code
W : Week Code

SPE0523
5-Line ESD Protection Array

ORDERING INFORMATION

Part Number	Package	Part Marking
SPE0523S36RGB	SOT-363	EDYW

※ Week Code : A ~ Z(1 ~ 26) ; a ~ z(27 ~ 52)
※ SPE0523S36RGB : Tape Reel ; Pb – Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

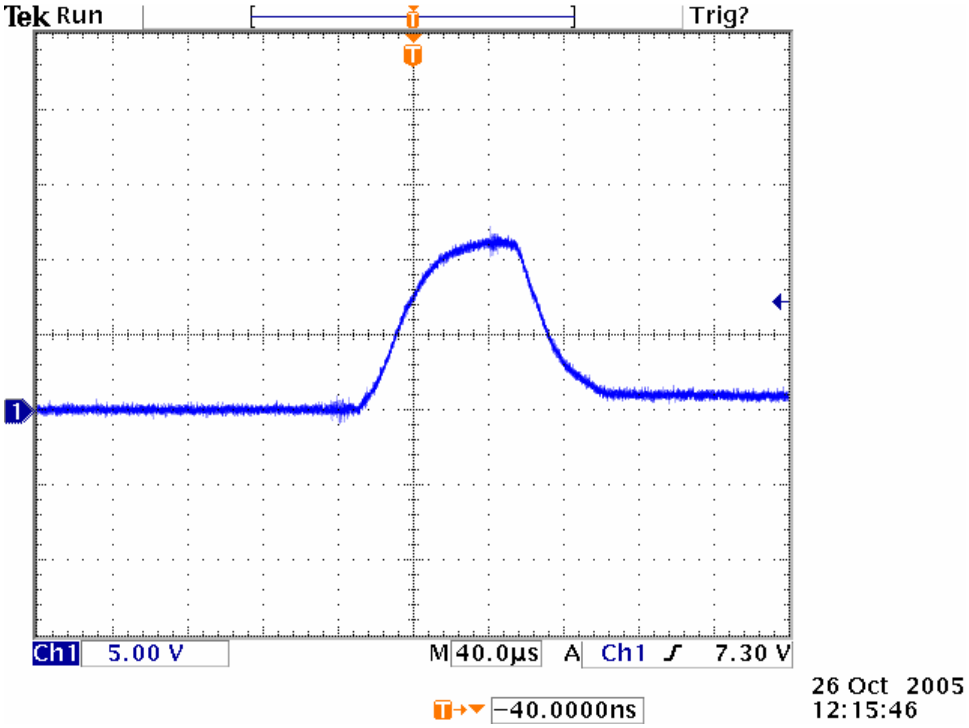
Parameter	Symbol	Typical	Unit
Peak Pulse Power (tp = 8/20 μs)	Ppk	250	W
Maximum Peak Pulse Current (tp = 8/20 μs)	Ipp	7	A
ESD per ICE 61000 – 4 – 2 (Air)	Vpp	±15	KV
ESD per ICE 61000 – 4 – 2 (Contact)	Vpp	±8	KV
Operating Junction Temperature	T_J	-55 ~ 150	℃
Storage Temperature Range	T_{STG}	-55 ~ 150	℃
Lead Soldering Temperature	T_L	260 (10sec)	℃

ELECTRICAL CHARACTERISTICS

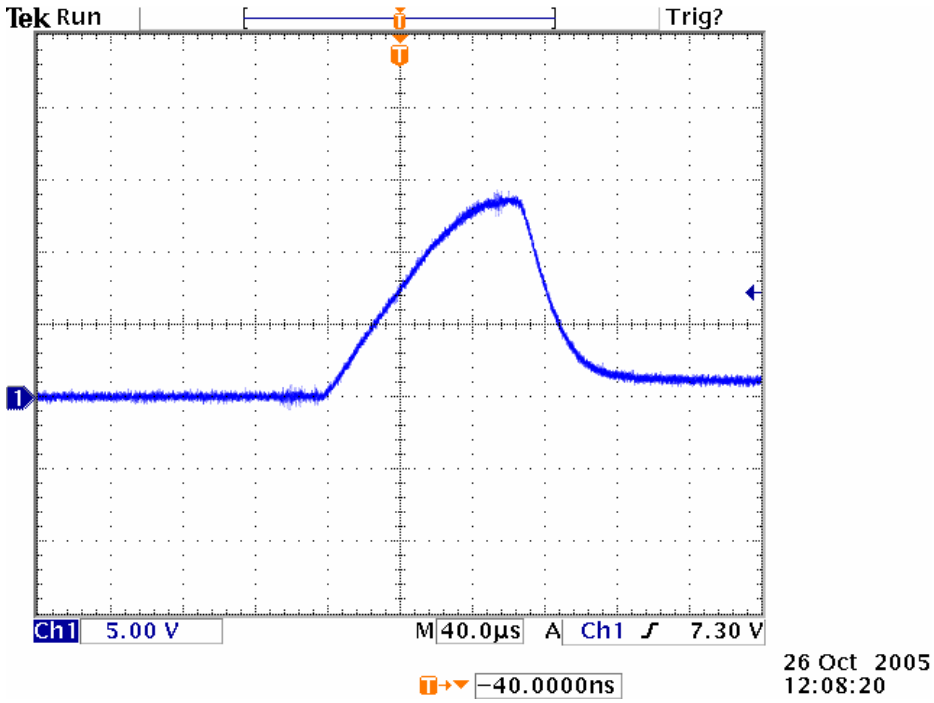
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Reverse Stand – Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	It = 1mA	6		8.5	V
Reverse Leakage Current	I_R	V_{RWM} = 5V , T=25℃		0.01	1	μA
Reverse Leakage Current	I_R	V_{RWM} = 3V , T=25℃		0.01	0.5	μA
Clamping Voltage	V_C	Ipp = 1A , tp = 8/20 μs			11.5	V
Clamping Voltage	V_C	Ipp = 7A , tp = 8/20 μs			15	V
Junction Capacitance	Cj	Between I/O Pin and GND V_R = 0V , f = 1MHz		2	3	pF

TYPICAL CHARACTERISTICS



Clamping Voltage (Ipp = 1A , tp = 8/20 µs)



Clamping Voltage (Ipp = 7A , tp = 8/20 µs)

TYPICAL CHARACTERISTICS

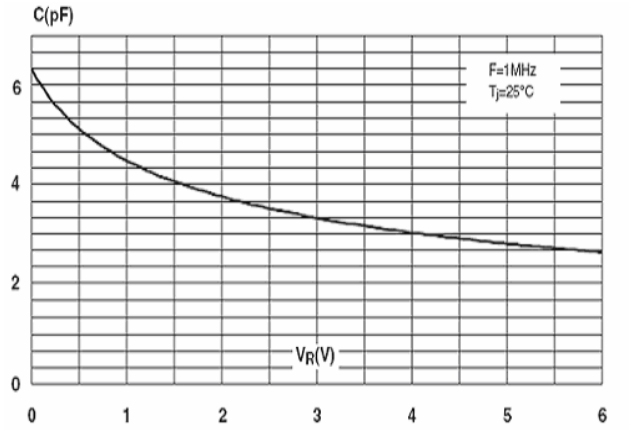


Fig 1 : Junction Capacitance V.S Reverse Voltage Applied

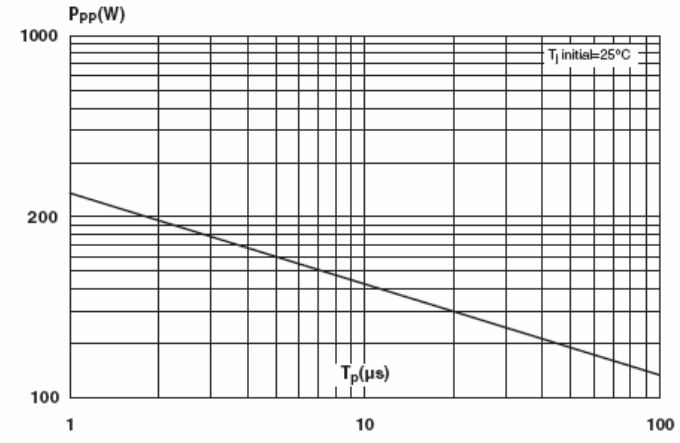


Fig 2 : Peak Plus Power V.S Exponential Plus Duration

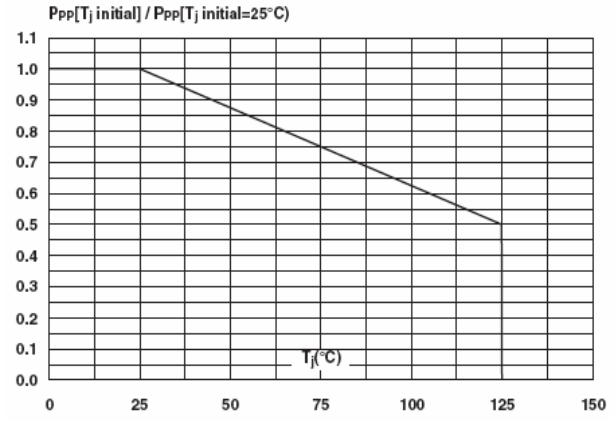


Fig 3 : Relative Variation of Peal Plus Power V.S Initial Junction Temperature

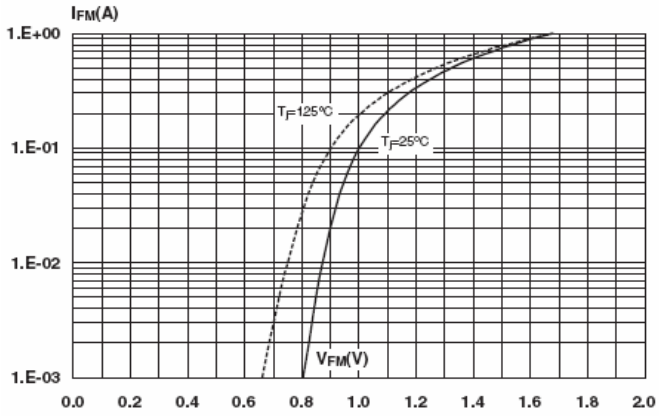


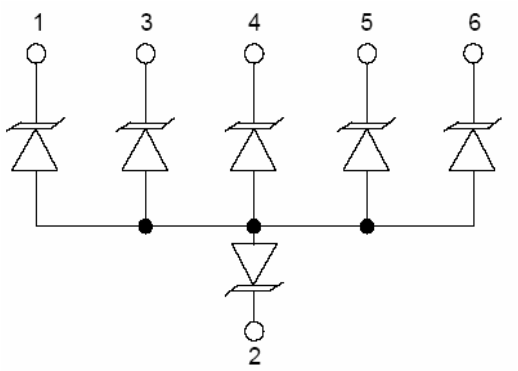
Fig 4 : Forward Voltage Drop V.S Peak Forward Current

APPLICATION NOTE

Device Connection for Protection of Five Data Lines

SPE0523 is designed to protect up to five bidirectional data lines. The device is connected as follows:

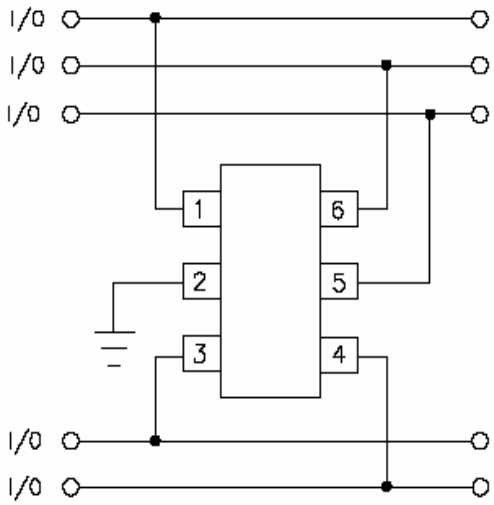
1. Bidirectional protection of five I/O lines is achieved by connecting pins 1, 3, 4, 5, and 6 to the data lines. Pin 2 is connected to ground. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.



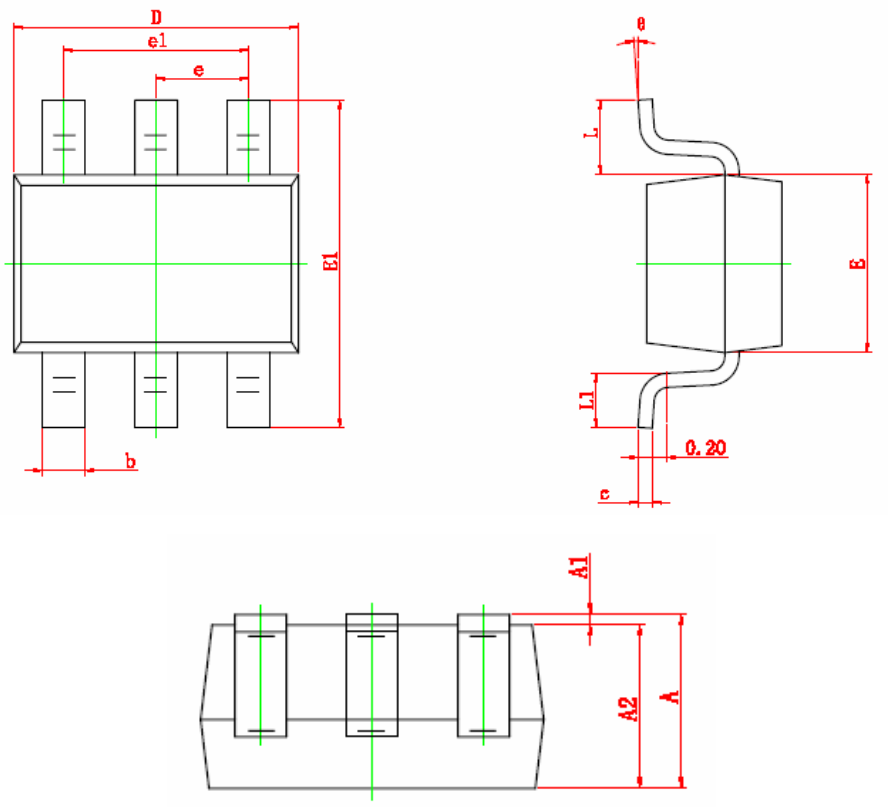
Circuit Board Layout Recommendations for Suppression of ESD

Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

1. Place the TVS near the input terminals or connectors to restrict transient coupling.
2. Minimize the path length between the TVS and the protected line.
3. Minimize all conductive loops including power and ground loops.
4. The ESD transient return path to ground should be kept as short as possible.
5. Never run critical signals near board edges.
6. Use ground planes whenever possible.



SOT-363 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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