ESDA6V1-4BC6

QUAD BIDIRECTIONAL TRANSIL™ SUPPRESSOR FOR ESD PROTECTION

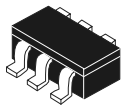
ASD™

MAIN APPLICATIONS

Where transient overvoltage protection in ESD sensitive equipment is required, such as:

- Computers
- Printers
- Communication systems
- Video equipment

This device is particularly adapted to the protection of symmetrical signals



SOT23-6L

FEATURES

- 4 Bidirectional Transil functions
- ESD Protection for data, Signal and V_{CC} Bus
- Stand off voltage range: 5 V
- Low leakage current
- Peak pulse power (8/20µs); 80W
- Channel separation: 80dB typ.@20KHz

DESCRIPTION

The ESDA6V1-4BC6 is a monolithic array designed to protect up to 4 lines in a bidirectional way against ESD transients.

The device is ideal for situations where board space is at a premium.

BENEFITS

- High ESD protection level
- High integration
- Suitable for high density boards

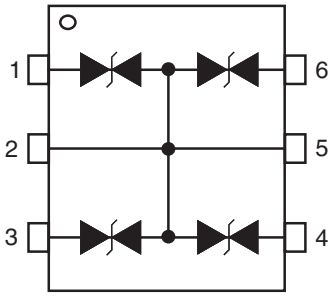
COMPLIES WITH THE FOLLOWING STANDARDS:

- IEC61000-4-2 level 4:
  - 15kV (air discharge)
  - 8kV (contact discharge)
- MIL STD 883E-Method 3015-7: class3B (Human Body Model)

Table 1: Order Code

Part Number	Marking
ESDA6V1-4BC6	BS77

Figure 1: Functional Diagram



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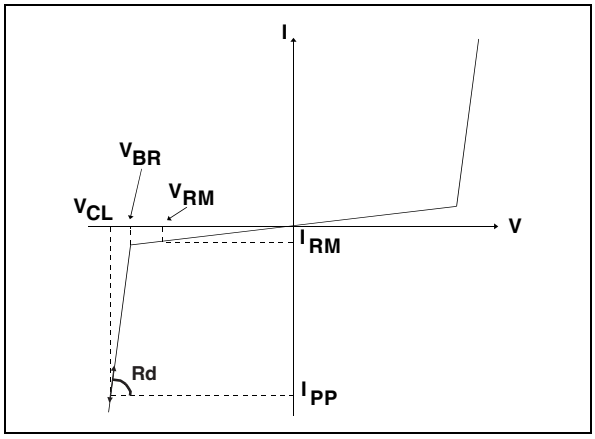
Table 2: Absolute Maximum Ratings (T_{amb} = 25°C)

Symbol	Parameter		Value	Unit
V_{PP}	ESD discharge	MIL STD 883C - Method 3015-6 IEC61000-4-2 air discharge IEC61000-4-2 contact discharge	25 15 8	kV
P_{PP}	Peak pulse power (8/20µs)		80	W
T_j	Junction temperature		150	°C
T_{stg}	Storage temperature range		-55 to +150	°C
T_L	Maximum lead temperature for soldering during 10 s at 5mm for case		260	°C
T_{op}	Operating temperature range (note 1)		-40 to +125	°C

Note 1: Variation of parameters is given by curves.

Table 3: Electrical Characteristics (T_{amb} = 25°C)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop
C	Capacitance
R_d	Dynamic resistance



Type	V_{BR} @ I_R			I_{RM} @ V_{RM}		R_d	αT	C
	min.	max.		max.		typ. note 2	max.	typ. 0V bias
	V	V	mA	µA	V	Ω	10^{-4}/°C	pF
ESDA6V1-4BC6	6.1	8	1	1	3	0.45	3	45

Note 2: Square pulse, I_{PP} = 3A, t_p=2.5µs.

Figure 2: Relative variation of peak pulse power versus initial junction temperature

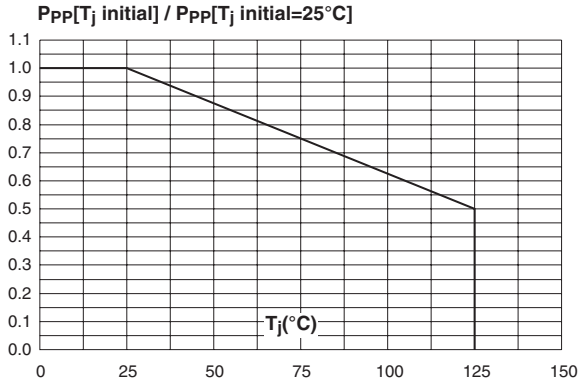


Figure 3: Peak pulse power versus exponential pulse duration

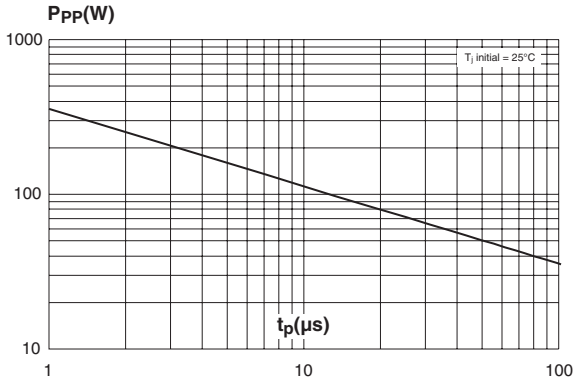


Figure 4: Clamping voltage versus peak pulse current (typical values, rectangular waveform)

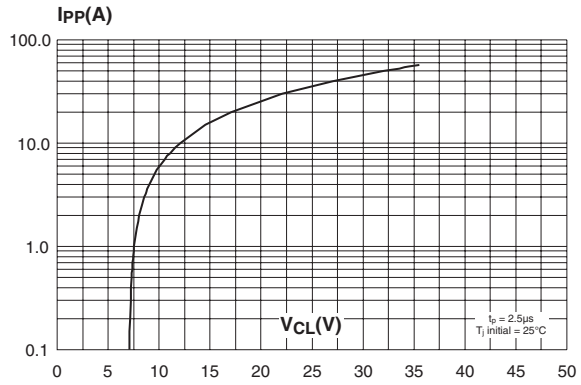


Figure 5: Junction capacitance versus line voltage applied (typical values

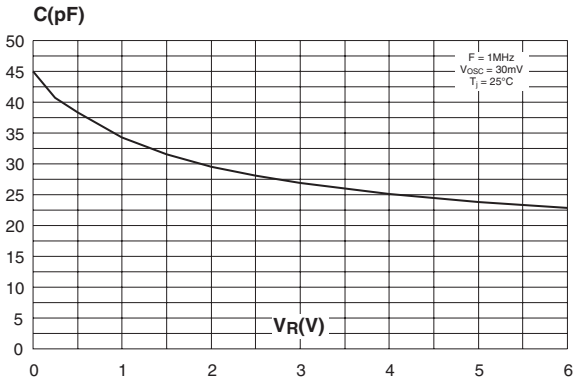


Figure 6: Relative variation of leakage current versus junction temperature (typical values)

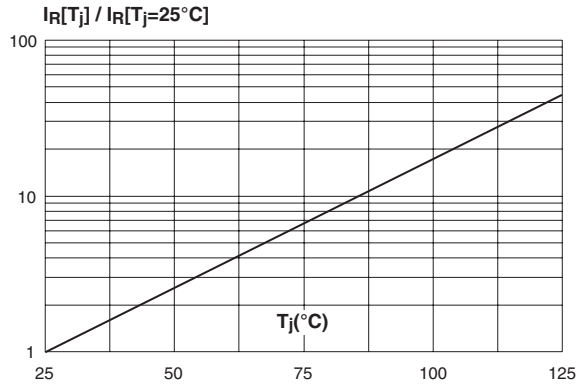
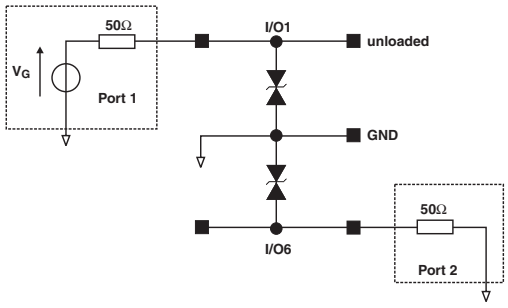


Figure 7: Analog crosstalk test configuration

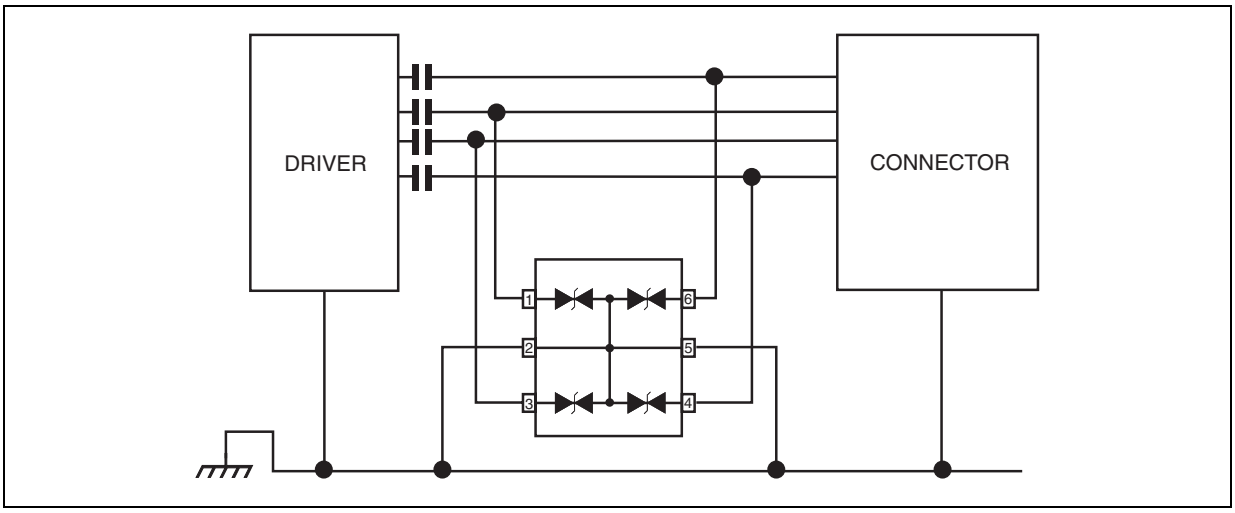


1. ESD protection by ESDA6V1-4BC6

With the focus of lowering the operation levels, the problem of malfunction caused by the environment is critical. Electrostatic discharge (ESD) is a major cause of failure in electronic system.
Transient Voltage Suppressors are an ideal choice for ESD protection and have proven capable in suppressing ESD events. They are capable of clamping the incoming transient to a low enough level such that damage to the protected semiconductor is prevented.

Surface mount TVS arrays offer the best choice for minimal lead inductance.
They serve as parallel protection elements, connected between the signal line to ground. As the transient rises above the operating voltage of the device, the TVS array becomes a low impedance path diverting the transient current to ground.

Figure 8: Bidirectional protection for 0V biased signals



The ESDA6V1-4BC6 array is the ideal product for use as board level protection of ESD sensitive semiconductor components.
The tiny SOT23-6L package allows design flexibility in the design of “crowded” boards where the space saving is at a premium. This enables to shorten the routing and can contribute to improve ESD performance.

2. Circuit Board Layout

Circuit board layout is a critical design step in the suppression of ESD induced transients. The following guidelines are recommended :

- The ESDA6V1-4BC6 should be placed as near as possible to the input terminals or connectors.
- Minimise the path length between the ESD suppressor and the protected device
- Minimise all conductive loops, including power and ground loops
- The ESD transient return path to ground should be kept as short as possible.
- Use ground planes whenever possible.

Figure 9: Ordering information scheme

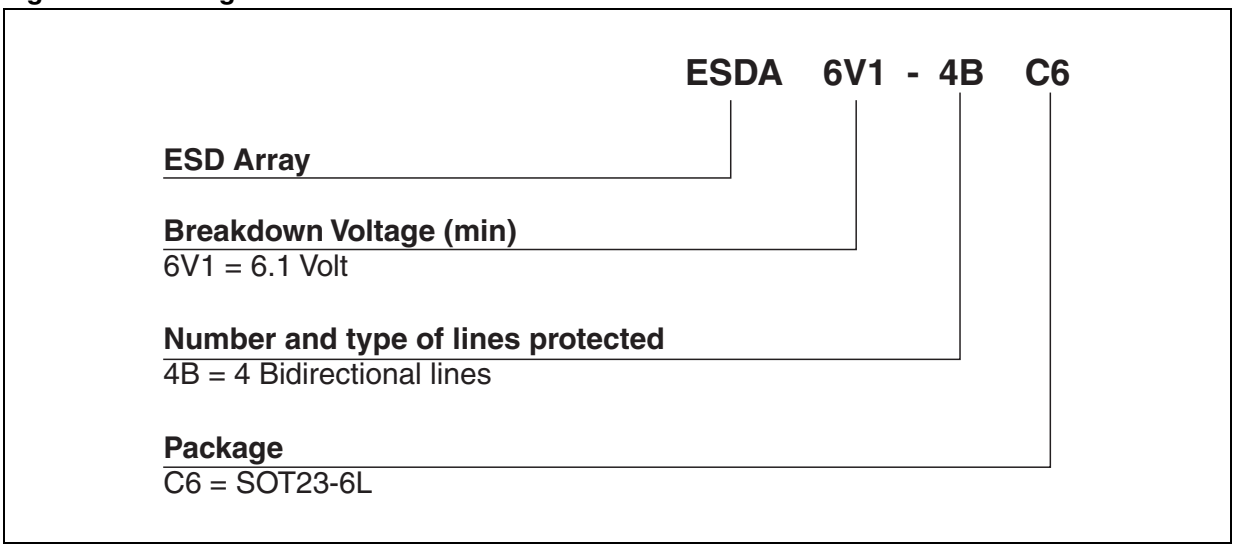
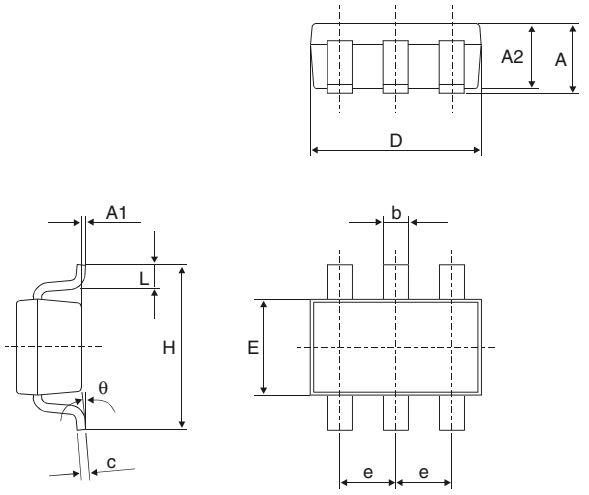


Figure 10: SOT23-6L Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.45	0.035		0.057
A1	0		0.10	0		0.004
A2	0.90		1.30	0.035		0.051
b	0.35		0.50	0.014		0.02
C	0.09		0.20	0.004		0.008
D	2.80		3.05	0.110		0.120
E	1.50		1.75	0.059		0.069
e		0.95			0.037	
H	2.60		3.00	0.102		0.118
L	0.10		0.60	0.004		0.024
θ			10°			10°

Figure 11: Foot Print Dimensions (in millimeters)

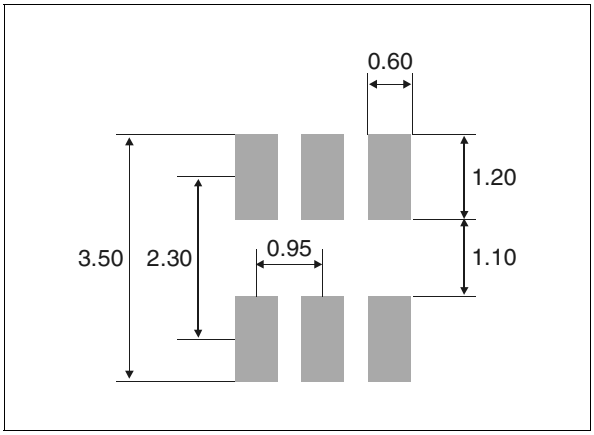


Table 4: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
ESDA6V1-4BC6	BS77	SOT23-6L	16.7 mg	3000	Tape & reel

Table 5: Revision History

Date	Revision	Description of Changes
Nov-2002	1A	First issue.
4-Nov-2004	2	SOT23-6L package dimensions change for reference “D” from 3.0 millimeters (0.118 inches) to 3.05 millimeters (0.120 inches).

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