



# ESDA25B1

Application Specific Discretes  
A.S.D.<sup>TM</sup>

TRANSIL<sup>TM</sup> ARRAY  
FOR ESD PROTECTION

## APPLICATIONS

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

- COMPUTER
- PRINTERS
- COMMUNICATION SYSTEMS

It is particularly recommended for RS232 I/O port protection where the line interface withstands only 2 kV ESD surges.

## FEATURES

- 6 BIDIRECTIONAL TRANSIL<sup>TM</sup> FUNCTIONS
- VERY LOW CAPACITANCE : C= 20 pF @ V<sub>RM</sub>
- 150 W peak pulse power (8/20 μs)

## DESCRIPTION

The ESDA25B1 is a monolithic voltage suppressor designed to protect components which are connected to data and transmission lines against EDS.

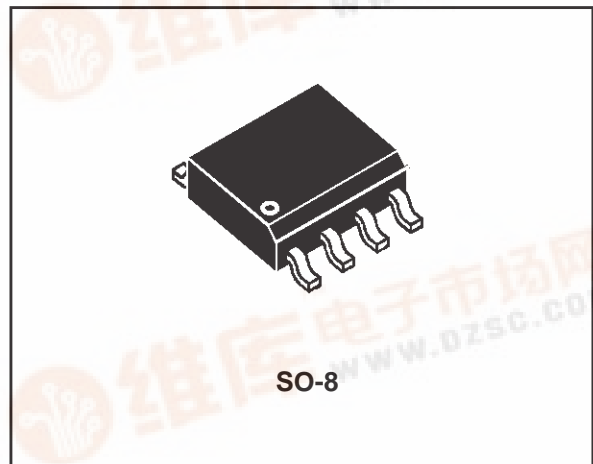
## BENEFITS

- High ESD protection level : up to 25 kV
- High integration
- Suitable for high density boards

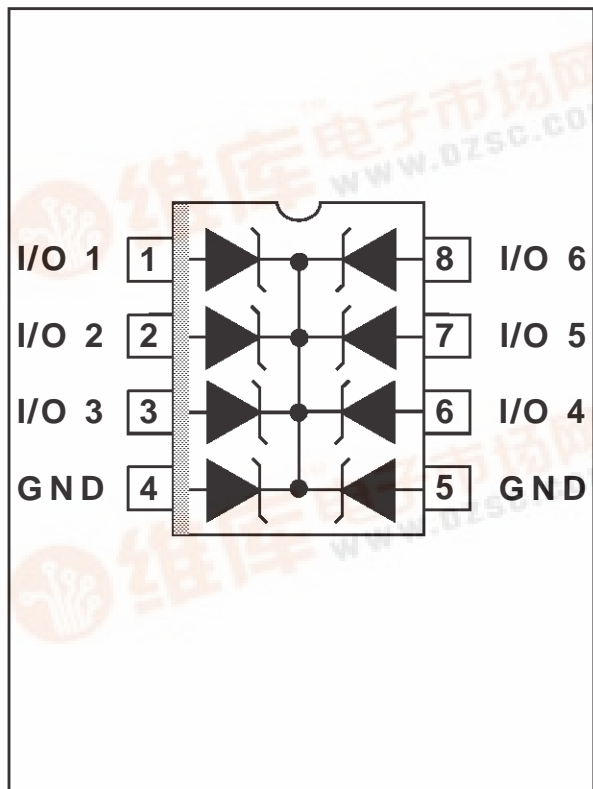
## COMPLIES WITH THE FOLLOWING STANDARDS :

IEC 1000-4-2 : level 4

MIL STD 883C-Method 3015-6 : class 3  
(human body model)



## FUNCTIONAL DIAGRAM



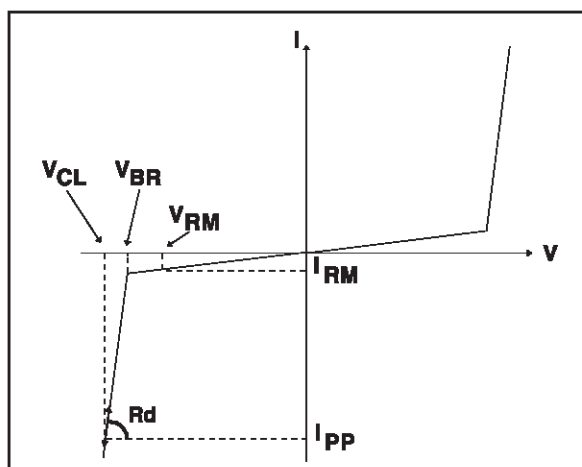
## ESDA25B1

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25°C)

Symbol	Parameter	Value	Unit
V <sub>PP</sub>	Electrostatic discharge MIL STD 883C - Method 3015-6	25	kV
P <sub>PP</sub>	Peak pulse power (8/20μs)	150	W
T <sub>stg</sub> T <sub>j</sub>	Storage temperature range Maximum junction temperature	- 55 to + 150 125	°C °C
T <sub>L</sub>	Maximum lead temperature for soldering during 10s	260	°C

### ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25°C)

Symbol	Parameter
V <sub>RM</sub>	Stand-off voltage
V <sub>BR</sub>	Breakdown voltage
V <sub>CL</sub>	Clamping voltage
I <sub>RM</sub>	Leakage current
I <sub>PP</sub>	Peak pulse current
α <sub>T</sub>	Voltage temperature coefficient
C	Capacitance
R <sub>d</sub>	Dynamic resistance



Types	V <sub>BR</sub> @		I <sub>R</sub>	I <sub>RM</sub> @ V <sub>RM</sub>		R <sub>d</sub> typ. note 2	α <sub>T</sub> max. note 3	C typ. 0V bias
	min. note 1	max. note 1		max. note 1	V			
	V	V	mA	μA	V	Ω	10 <sup>-4</sup> /°C	pF
ESDA25B1	25	30	1	2	24	1.5	9.7	15

**note 1** : Between any I/O pin and Ground

**note 2** : Square pulse, I<sub>pp</sub> = 25A, tp=2.5μs.

**note 3** : Δ V<sub>BR</sub> = α<sub>T</sub> \* (T<sub>amb</sub> - 25°C) \* V<sub>BR</sub> (25°C)

## CALCULATION OF THE CLAMPING VOLTAGE

### USE OF THE DYNAMIC RESISTANCE

The ESDA family has been designed to clamp fast spikes like ESD. Generally the PCB designers need to calculate easily the clamping voltage  $V_{CL}$ . This is why we give the dynamic resistance in addition to the classical parameters. The voltage across the protection cell can be calculated with the following formula:

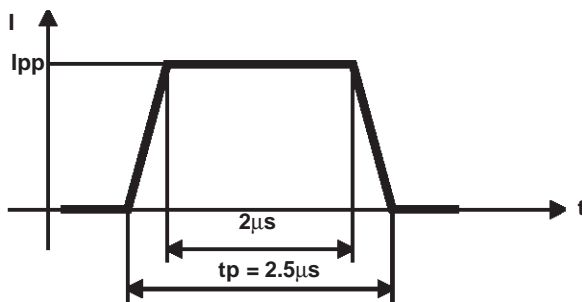
$$V_{CL} = V_{BR} + R_d I_{PP}$$

Where  $I_{PP}$  is the peak current through the ESDA cell.

As the value of the dynamic resistance remains stable for a surge duration lower than  $20\mu s$ , the  $2.5\mu s$  rectangular surge is well adapted. In addition both rise and fall times are optimized to avoid any parasitic phenomenon during the measurement of  $R_d$ .

### DYNAMIC RESISTANCE MEASUREMENT

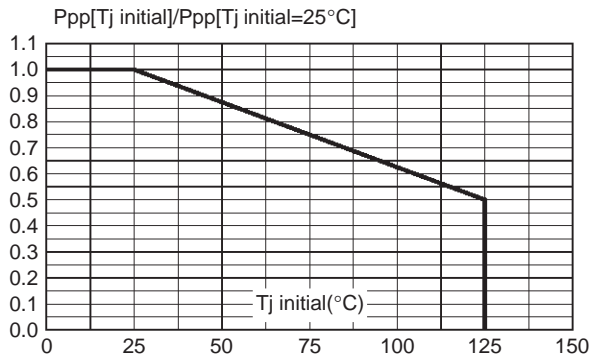
The short duration of the ESD has led us to prefer a more adapted test wave, as below defined, to the classical  $8/20\mu s$  and  $10/1000\mu s$  surges.



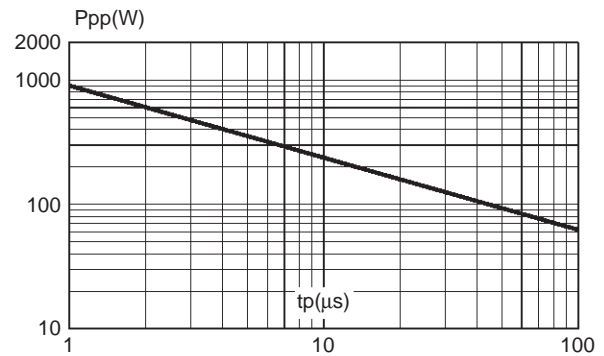
2.5 $\mu s$  duration measurement wave.

## ESDA25B1

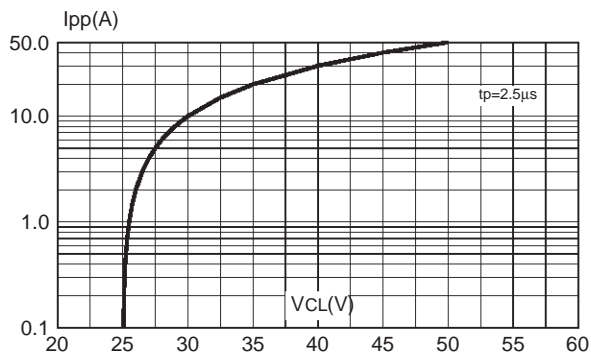
**Fig. 1** : Peak power dissipation versus initial junction temperature.



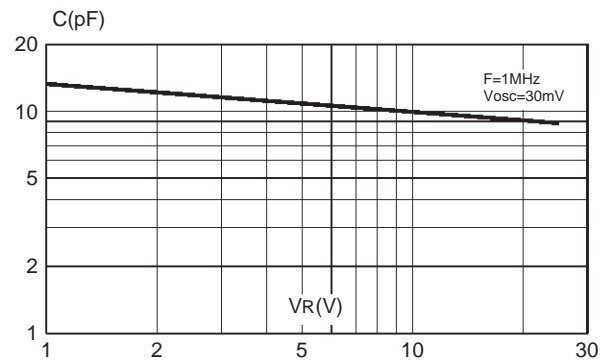
**Fig. 2** : Peak pulse power versus exponential pulse duration ( $T_j \text{ initial} = 25^\circ\text{C}$ ).



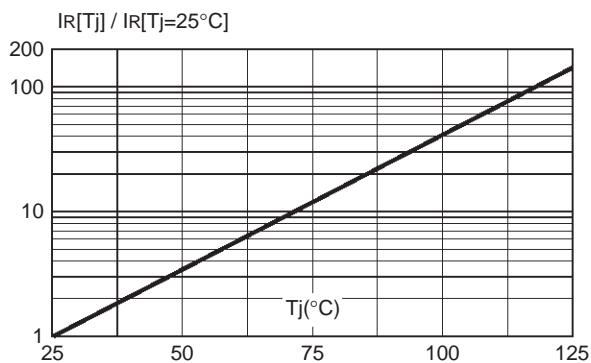
**Fig. 3** : Clamping voltage versus peak pulse current ( $T_j \text{ initial} = 25^\circ\text{C}$ ).  
Rectangular waveform  $t_p = 2.5 \mu\text{s}$ .



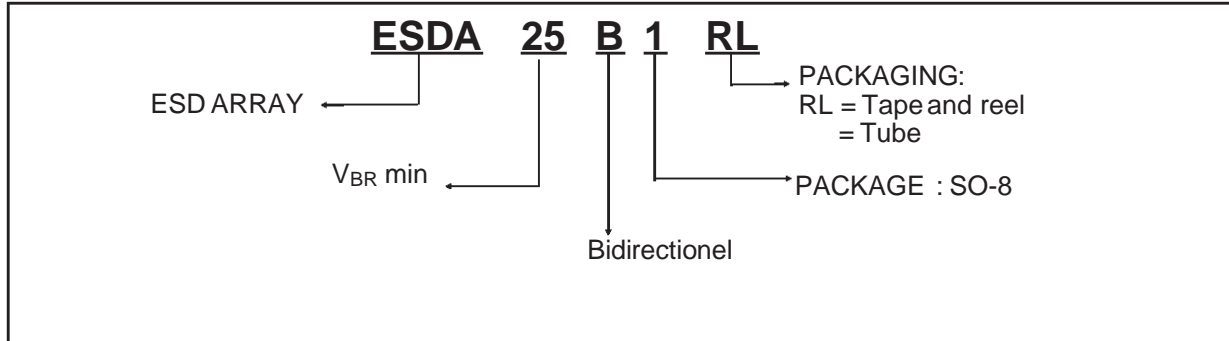
**Fig. 4** : Capacitance versus reverse applied voltage (typical values).



**Fig. 5** : Relative variation of leakage current versus junction temperature (typical values).



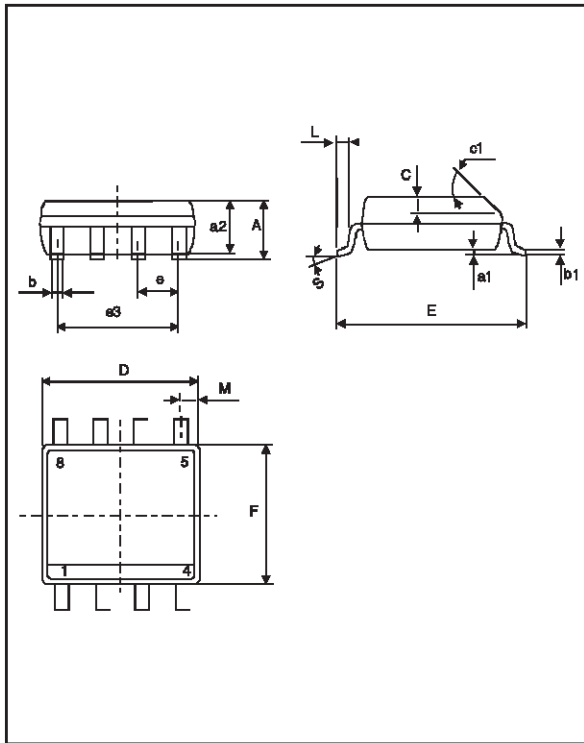
ORDER CODE



MARKING : Logo, Date Code, E25B1

PACKAGE MECHANICAL DATA

SO-8 Plastic



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max)					

Packaging : Preferred packaging is tape and reel.

Weight : 0.08g.

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