



# ESDA25B1

Application Specific Discretés  
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 :  $C = 20 \text{ pF @ } V_{RM}$
- 150 W peak pulse power (8/20  $\mu\text{s}$ )

### DESCRIPTION

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

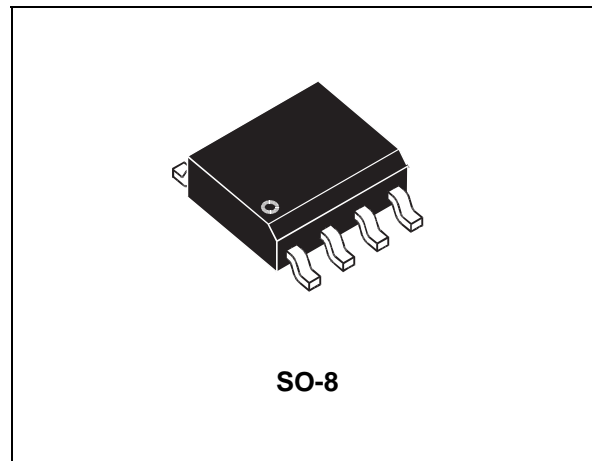
### BENEFITS

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

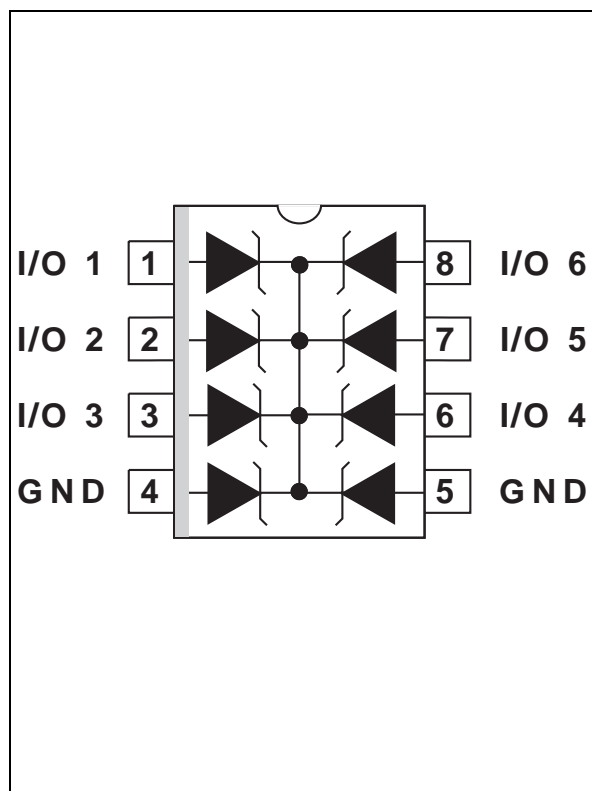
### COMPLIES WITH THE FOLLOWING STANDARDS :

IEC 1000-4-2 : level 4

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



### FUNCTIONAL DIAGRAM



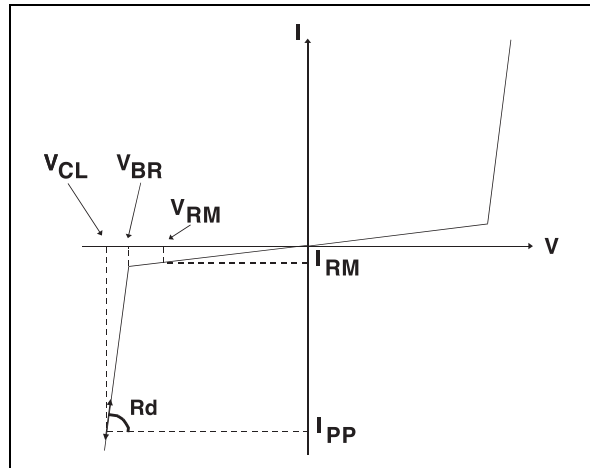
## ESDA25B1

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter	Value	Unit
$V_{PP}$	Electrostatic discharge MIL STD 883C - Method 3015-6	25	kV
$P_{PP}$	Peak pulse power (8/20 $\mu\text{s}$ )	150	W
$T_{stg}$ $T_j$	Storage temperature range Maximum junction temperature	- 55 to + 150 125	$^{\circ}\text{C}$ $^{\circ}\text{C}$
$T_L$	Maximum lead temperature for soldering during 10s	260	$^{\circ}\text{C}$

### ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter
$V_{RM}$	Stand-off voltage
$V_{BR}$	Breakdown voltage
$V_{CL}$	Clamping voltage
$I_{RM}$	Leakage current
$I_{PP}$	Peak pulse current
$\alpha T$	Voltage temperature coefficient
C	Capacitance
$R_d$	Dynamic resistance



Types	$V_{BR}$ @		$I_R$	$I_{RM}$ @ $V_{RM}$		$R_d$ typ. note 2	$\alpha T$ max. note 3	C typ. 0V bias
	min. note 1	max.		max. note 1	$V_{RM}$			
	V	V	mA	$\mu\text{A}$	V	$\Omega$	$10^{-4}/^{\circ}\text{C}$	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,  $I_{pp} = 25\text{A}$ ,  $t_p = 2.5\mu\text{s}$ .

note 3 :  $\Delta V_{BR} = \alpha T * (T_{amb} - 25^{\circ}\text{C}) * V_{BR}(25^{\circ}\text{C})$

## 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:

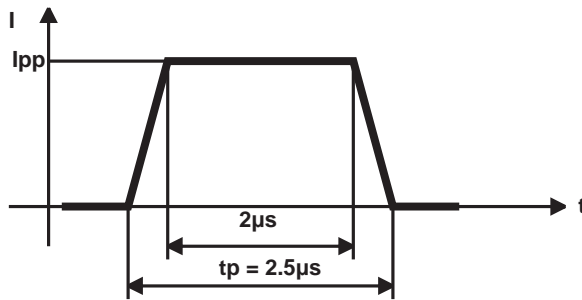
$$V_{CL} = V_{BR} + R_d I_{PP}$$

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

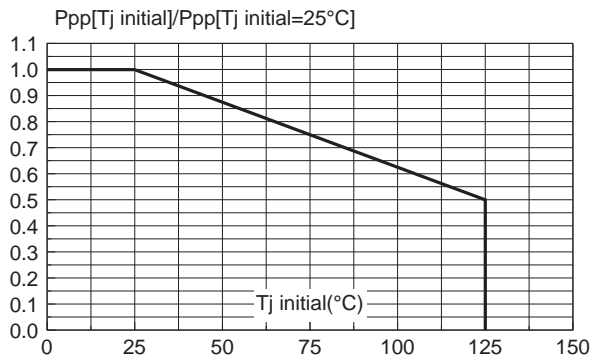
The short duration of the ESD has led us to prefer a more adapted test wave, as below defined, to the classical  $8/20\mu s$  and  $10/1000\mu s$  surges.



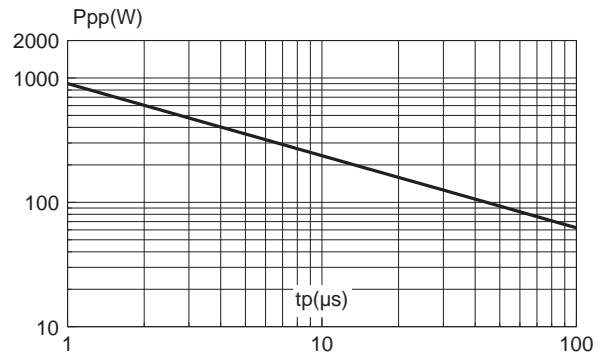
$2.5\mu s$  duration measurement wave.

## ESDA25B1

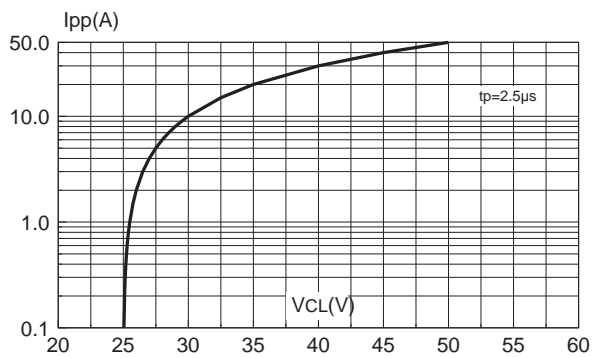
**Fig. 1 :** Peak power dissipation versus initial junction temperature.



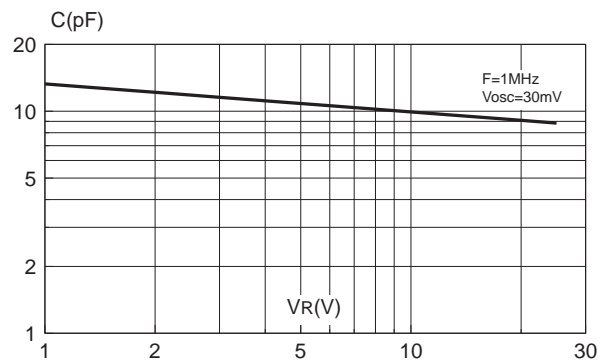
**Fig. 2 :** Peak pulse power versus exponential pulse duration ( $T_j \text{ initial} = 25^\circ\text{C}$ ).



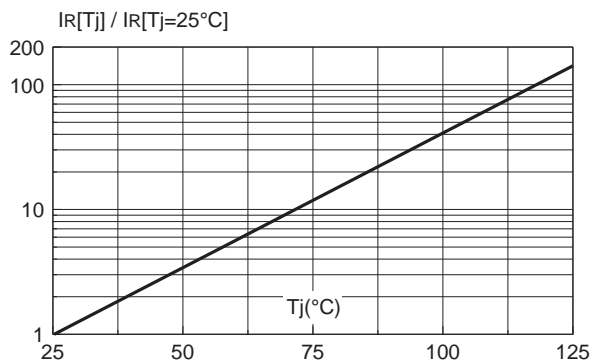
**Fig. 3 :** Clamping voltage versus peak pulse current ( $T_j \text{ initial} = 25^\circ\text{C}$ ). Rectangular waveform  $t_p = 2.5 \mu\text{s}$ .



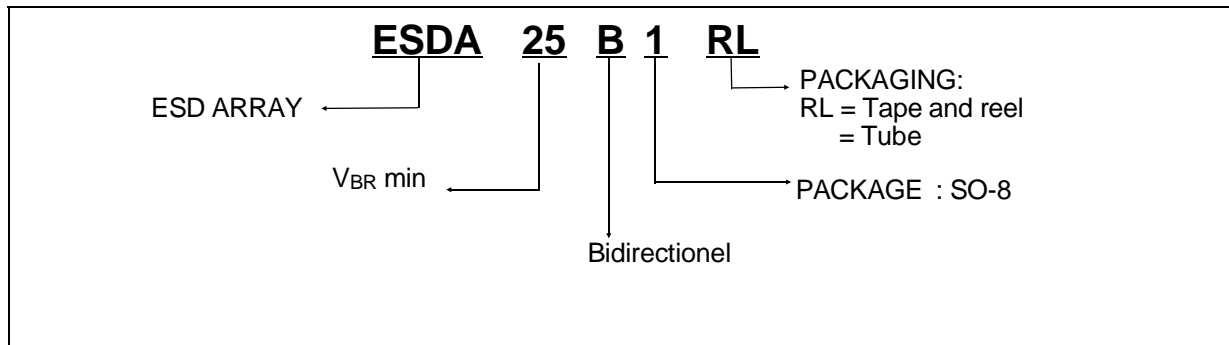
**Fig. 4 :** Capacitance versus reverse applied voltage (typical values).



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



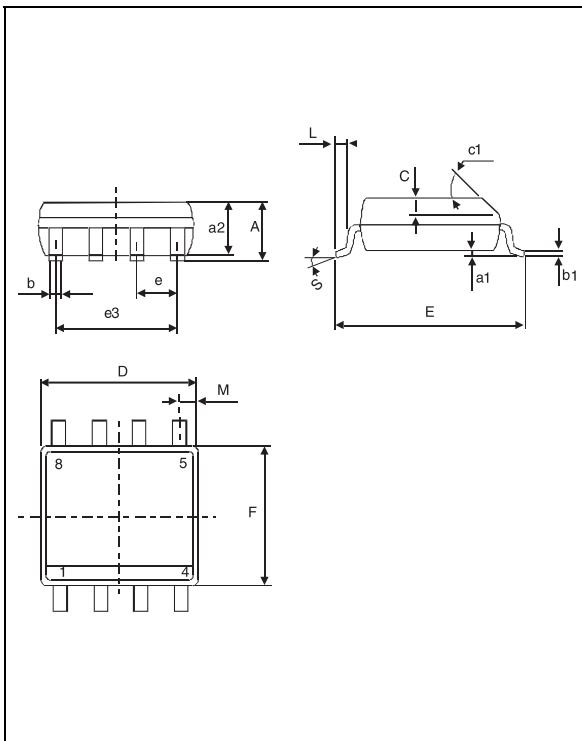
ORDER CODE



**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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