



Application Specific Discretes
A.S.D.TM

ESDA25B1

TRANSILTM 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 TRANSILTM FUNCTIONS
- VERY LOW CAPACITANCE : $C = 20 \text{ pF @ } V_{RM}$
- 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.

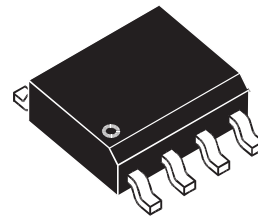
BENEFITS

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

COMPLIES WITH THE FOLLOWING STANDARDS :

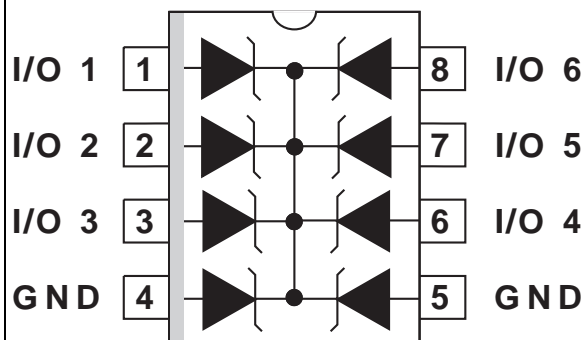
IEC 1000-4-2 : level 4

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



SO-8

FUNCTIONAL DIAGRAM



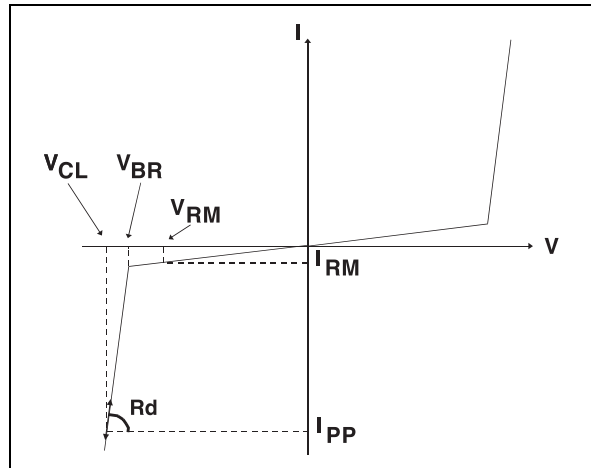
ESDA25B1

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 μs) | 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 |
| αT | Voltage temperature coefficient |
| C | Capacitance |
| R_d | Dynamic resistance |



| Types | V_{BR} @ I_R | | | I_{RM} @ V_{RM} | | R_d | αT | C |
|----------|------------------|------|----|---------------------|----|----------|---------------------|---------|
| | min. | max. | | max. | | typ. | max. | typ. |
| | note 1 | | | note 1 | | note 2 | note 3 | 0V bias |
| | V | V | mA | μA | V | Ω | $10^{-4}/^{\circ}C$ | 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:

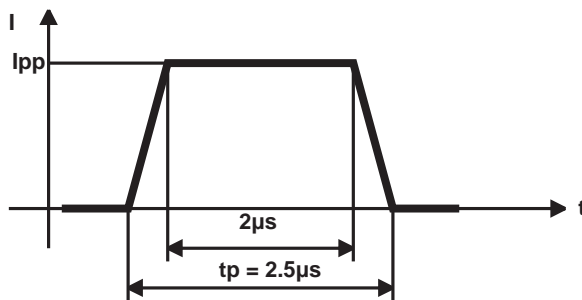
$$V_{CL} = V_{BR} + R_d I_{PP}$$

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 μs duration measurement wave.

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

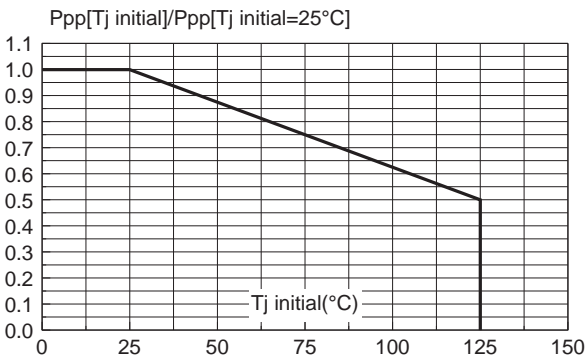


Fig. 2 : Peak pulse power versus exponential pulse duration ($T_j \text{ initial} = 25^\circ\text{C}$).

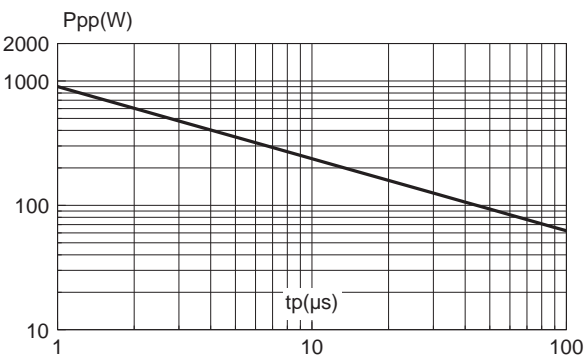


Fig. 3 : Clamping voltage versus peak pulse current ($T_j \text{ initial} = 25^\circ\text{C}$). Rectangular waveform $t_p = 2.5 \mu\text{s}$.

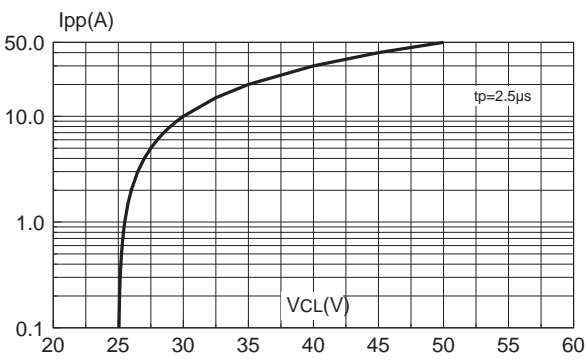


Fig. 4 : Capacitance versus reverse applied voltage (typical values).

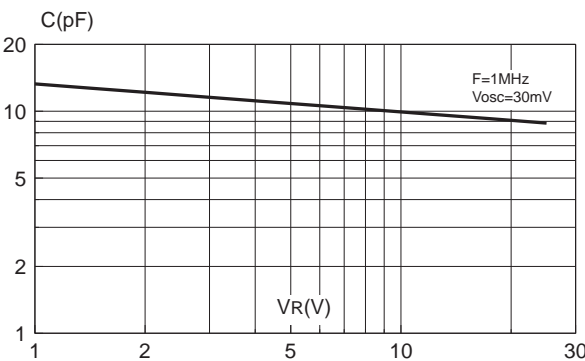
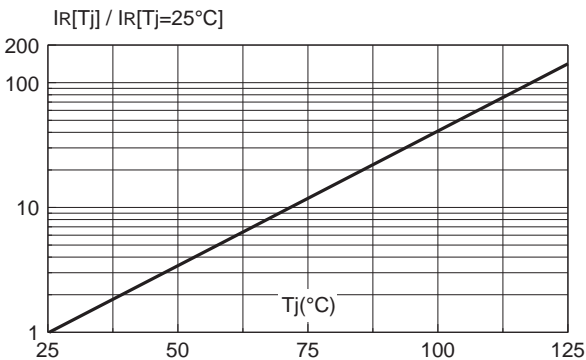
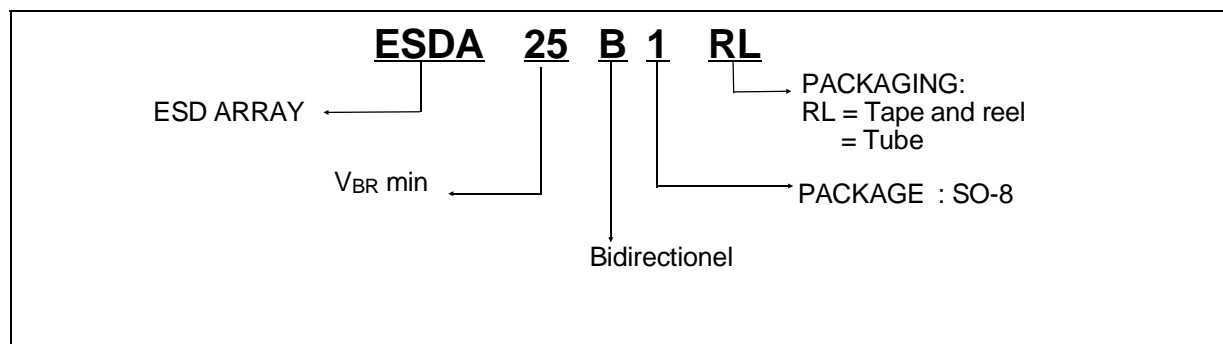


Fig. 5 : Relative variation of leakage current versus junction temperature (typical values).



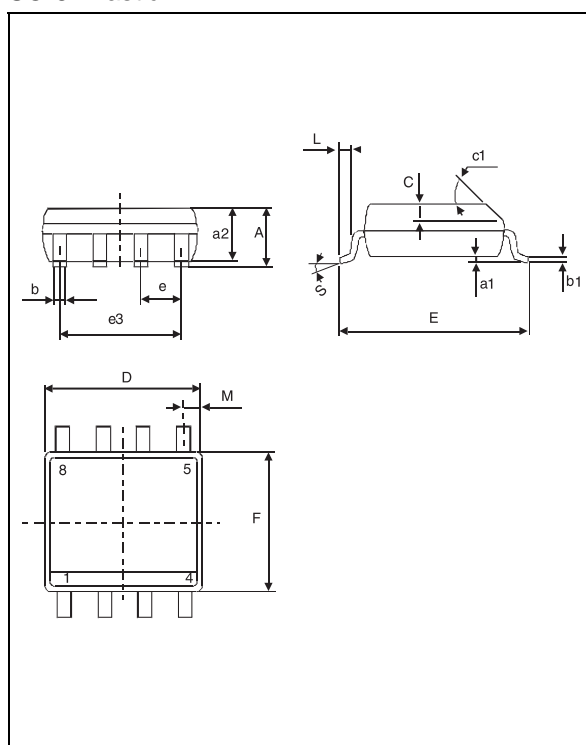
ORDER CODE



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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