

## ESDA25B1

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

# TRANSIL™ ARRAY FOR ESD PROTECTION

#### **APPLICATIONS**

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

- COMPUTER
- PRINTERS
- COMMUNICATION SYSTEMS

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

#### **FEATURES**

- 6 BIDIRECTIONAL TRANSIL™ 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.

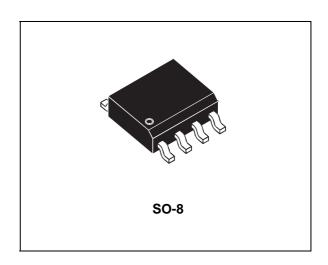
## **BENEFITS**

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

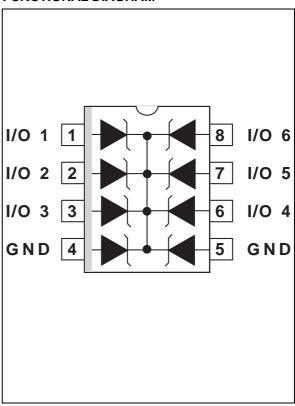
## **COMPLIES WITH THE FOLLOWING STANDARDS:**

IEC 1000-4-2: level 4

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



#### **FUNCTIONAL DIAGRAM**



October 1999 - Ed : 2

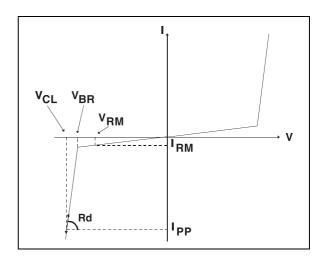
## ESDA25B1

## ABSOLUTE MAXIMUM RATINGS (Tamb = 25°C)

| Symbol                             | Parameter   | Value                | Unit   |
|------------------------------------|---|----------------------|--------|
| V <sub>PP</sub>                    | Electrostatic discharge<br>MIL STD 883C - Method 3015-6   | 25                   | kV     |
| P <sub>PP</sub>                    | Peak pulse power (8/20μs)                                 | 150                  | W      |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage temperature range<br>Maximum junction temperature | - 55 to + 150<br>125 | ္ခိုင္ |
| TL                                 | 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               |  |  |  |  |
| $V_{BR}$        | Breakdown voltage               |  |  |  |  |
| VcL             | Clamping voltage                |  |  |  |  |
| I <sub>RM</sub> | Leakage current                 |  |  |  |  |
| l <sub>PP</sub> | Peak pulse current              |  |  |  |  |
| αΤ              | Voltage temperature coefficient |  |  |  |  |
| С               | Capacitance                     |  |  |  |  |
| Rd              | Dynamic resistance              |  |  |  |  |



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

 $\begin{array}{l} \textbf{note 1}: \mbox{Between any I/O pin and Groung} \\ \textbf{note 2}: \mbox{Square pulse}, \mbox{ Ipp} = 25\mbox{A}, \mbox{tp=2.5}\mbox{\mus}. \\ \textbf{note 3}: \mbox{ } \Delta \mbox{ } V_{BR} = \mbox{ } \alpha \mbox{T}^* \mbox{ } (\mbox{Tamb -}25^\circ\mbox{C}) \mbox{ } ^* \mbox{ } V_{BR} \mbox{ } (25^\circ\mbox{C}) \end{array}$ 

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#### **CALCULATION OF THE CLAMPING VOLTAGE**

### **USE OF THE DYNAMIC RESISTANCE**

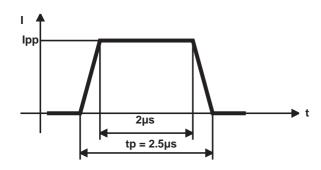
The ESDA family has been designed to clamp fast spikes like ESD. Generally the PCB designers need to calculate easily the clamping voltage  $V_{\text{CL}}$ . This is why we give the dynamic resistance in addition to the classical parameters. The voltage across the protection cell can be calculated with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

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

Where Ipp is the peak current through the ESDA cell.

## 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.

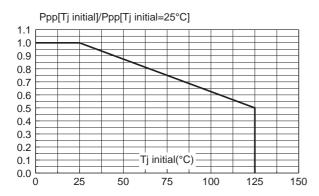


2.5µs duration measurement wave.

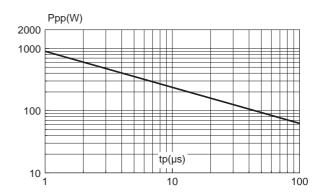
As the value of the dynamic resistance remains stable for a surge duration lower than  $20\mu s$ , the  $2.5\mu s$  rectangular surge is well adapted. In addition both rise and fall times are optimized to avoid any parasitic phenomenon during the measurement of Rd.

## ESDA25B1

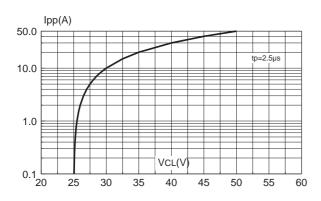
**Fig. 1**: Peak power dissipation versus initial junction temperature.



**Fig. 2**: Peak pulse power versus exponential pulse duration (Tj initial = 25 °C).



**Fig. 3** : Clamping voltage versus peak pulse current (Tj initial = 25 °C). Rectangular waveform tp =  $2.5 \,\mu s$ .



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

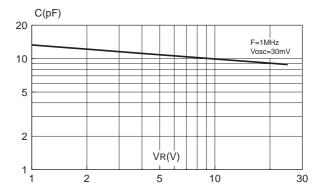
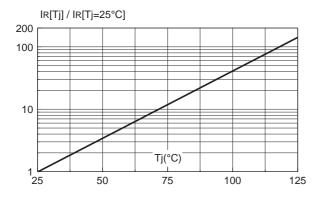
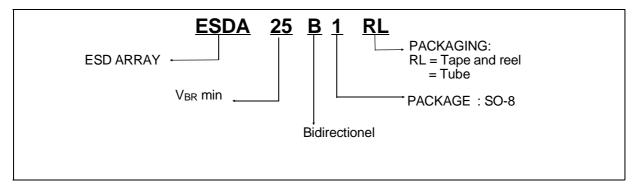


Fig. 5: Relative variation of leakage current versus junction temperature (typical values).



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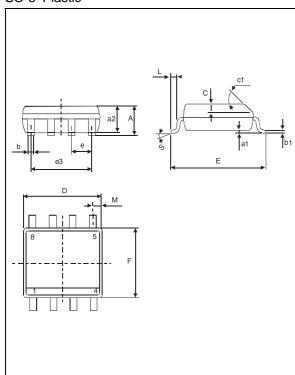
## **ORDER CODE**



MARKING: Logo, Date Code, E25B1

## **PACKAGE MECHANICAL DATA**

SO-8 Plastic



|      | DIMENSIONS |         |      |        |       |       |  |
|------|------------|---------|------|--------|-------|-------|--|
| REF. | Mi         | Ilimete | ers  | Inches |       |       |  |
|      | Min.       | Тур.    | Max. | Min.   | Тур.  | Max.  |  |
| Α    |            |         | 1.75 |        |       | 0.069 |  |
| a1   | 0.1        |         | 0.25 | 0.004  |       | 0.010 |  |
| a2   |            |         | 1.65 |        |       | 0.065 |  |
| а3   | 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 |  |
| С    | 0.25       |         | 0.5  | 0.010  |       | 0.020 |  |
| c1   | 45° (typ)  |         |      |        |       |       |  |
| D    | 4.8        |         | 5.0  | 0.189  |       | 0.197 |  |
| Е    | 5.8        |         | 6.2  | 0.228  |       | 0.244 |  |
| е    |            | 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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