



## ESDA25DB3

Application Specific Discretes  
A.S.D.™

TRANSIL ARRAY  
FOR ESD PROTECTION

### APPLICATIONS

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

- COMPUTERS
- PRINTERS
- COMMUNICATION SYSTEMS

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

### FEATURES

- 18 BIDIRECTIONAL TRANSIL FUNCTIONS
- LOW CAPACITANCE :  $C = 30\text{pF @ } V_{RM}$
- 500 W peak pulse power (8/20  $\mu\text{s}$ )

### DESCRIPTION

The ESDA25DB3 is a dual monolithic voltage suppressor designed to protect components which are connected to data and transmission lines against ESD.

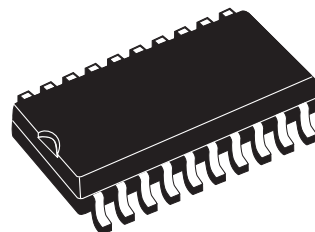
### BENEFITS

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

### COMPLIES WITH THE FOLLOWING STANDARDS :

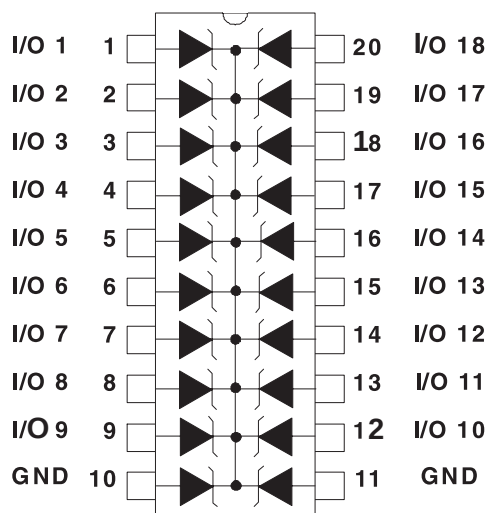
IEC 1000-4-2 : level 4

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



SO-20

### FUNCTIONAL DIAGRAM

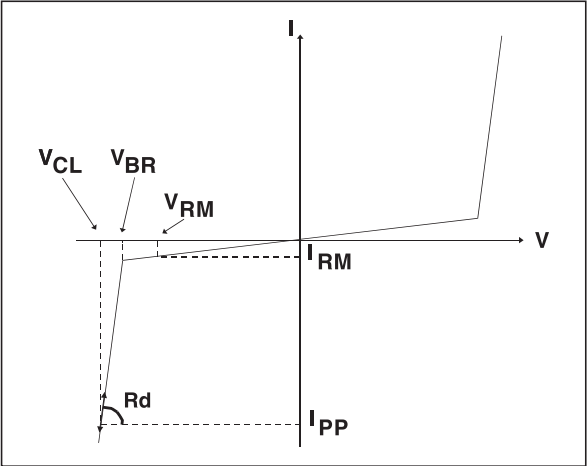


ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25°C)

| 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)                                 | 500                  | W        |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage temperature range<br>Maximum junction temperature | - 55 to + 150<br>125 | °C<br>°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              |
| αT              | Voltage temperature coefficient |
| C               | Capacitance                     |



| Types     | V <sub>BR</sub> @ I <sub>R</sub> |      |    | I <sub>RM</sub> @ V <sub>RM</sub> |    | R <sub>d</sub> | αT                   | C       |
|-----------|----------------------------------|------|----|-----------------------------------|----|----------------|----------------------|---------|
|           | min.                             | max. |    | max.                              |    | typ.           | max.                 | typ.    |
|           | note1                            |      |    | note1                             |    | note 2         | note 3               | 0V bias |
|           | V                                | V    | mA | μA                                | V  | Ω              | 10 <sup>-4</sup> /°C | pF      |
| ESDA25DB3 | 25                               | 30   | 1  | 2                                 | 24 | 0.5            | 9.7                  | 50      |

note 1 : Betwenn any I/O pin Ground  
note 2 : Square pulse, I<sub>pp</sub> = 25A, t<sub>p</sub>=2.5μs.  
note 3 : Δ V<sub>BR</sub> = αT\* (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:

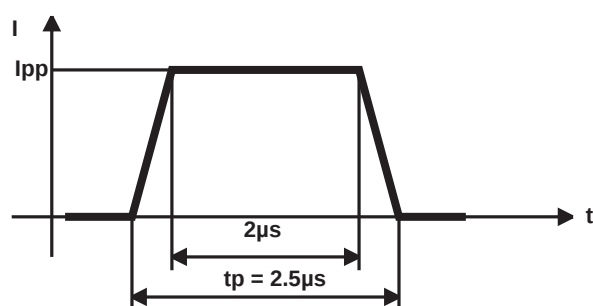
$$V_{CL} = V_{BR} + R_d I_{PP}$$

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  $R_d$ .

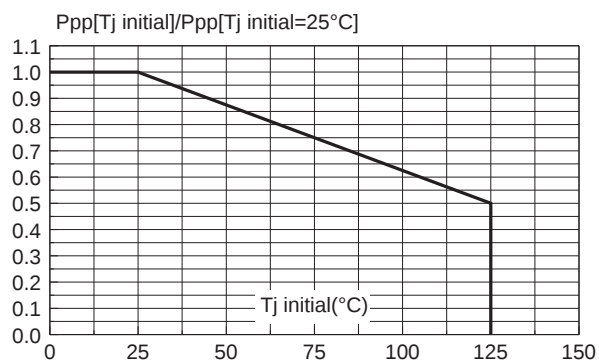
### DYNAMIC RESISTANCE MEASUREMENT

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.

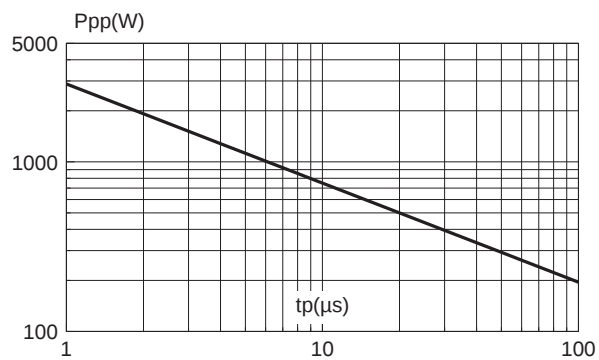


2.5 $\mu s$  duration measurement wave.

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

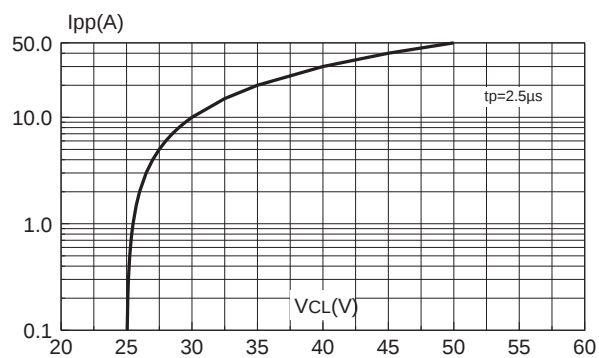


**Fig. 2 :** Peak pulse power versus exponential pulse duration ( $T_J \text{ initial} = 25^\circ\text{C}$ ).

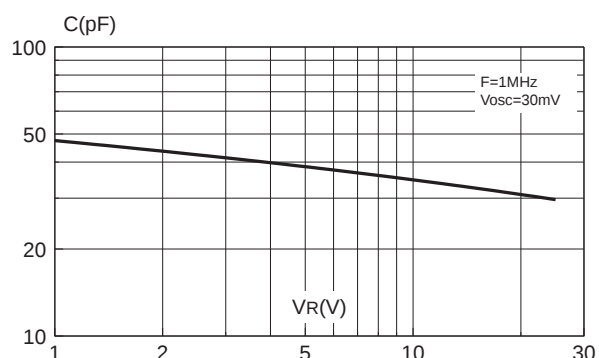


**Fig. 3 :** Clamping voltage versus peak pulse current ( $T_J \text{ initial} = 25^\circ\text{C}$ ).

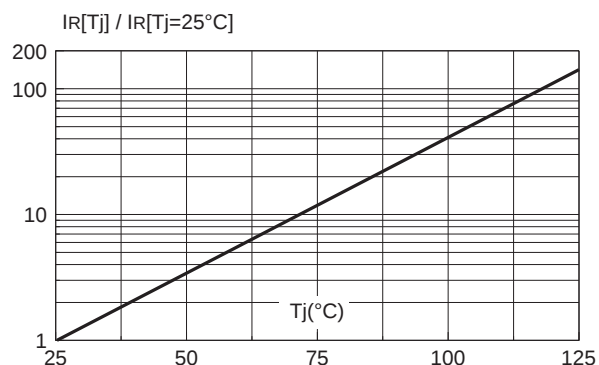
Rectangular waveform  $t_p = 2.5 \mu\text{s}$ .



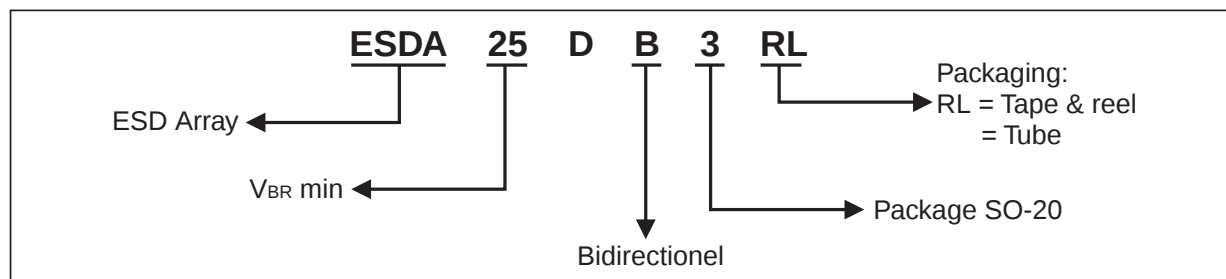
**Fig. 4 :** Capacitance versus reverse applied voltage (typical values).



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



## ORDER CODE



## PACKAGE MECHANICAL DATA

SO-20 Plastic

| REF. | DIMENSIONS  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimetres |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    |             |      | 2.65  |        |       | 0.104 |
| A1   | 0.10        |      | 0.20  | 0.004  |       | 0.008 |
| B    | 0.33        |      | 0.51  | 0.013  |       | 0.020 |
| C    | 0.23        |      | 0.32  | 0.009  |       | 0.013 |
| D    | 12.6        |      | 13.0  | 0.484  |       | 0.512 |
| E    | 7.40        |      | 7.60  | 0.291  |       | 0.299 |
| e    |             | 1.27 |       |        | 0.050 |       |
| H    | 10.0        |      | 10.65 | 0.394  |       | 0.419 |
| h    |             | 0.50 |       |        | 0.020 |       |
| L    | 0.50        |      | 1.27  | 0.020  |       | 0.050 |
| K    | 8° (max)    |      |       |        |       |       |

**Marking:** Logo, Date Code, E25DB3**Packaging:** Preferred packaging is tape and reel.**Weight:** 0.55g.

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