

**Small Signal Product**

**Bi-directional ESD Protection Diodes**

**FEATURES**

- Meet IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- Protects one Bi-directional I/O lines
- Low clamping voltage
- Working Voltage : 5, 12 and 24V
- High component density



**0603-B**



**MECHANICAL DATA**

**Case** : 0603-B standard package molded plastic

**Terminals** : Gold plated, solderable per MIL-STD-750, method 2026

**Weight** : 0.003g (approximately)



| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted) |           |                                              |                  |              |     |         |       |
|----------------------------------------------------------------------------------------------|-----------|----------------------------------------------|------------------|--------------|-----|---------|-------|
| PARAMETER                                                                                    |           | CONDITIONS                                   | SYMBOL           | MIN          | TYP | MAX     | UNITS |
| Diode breakdown voltage                                                                      | TESDUB5V0 | IR=1mA                                       | V <sub>BO</sub>  | 5.1          | 7   | -       | V     |
|                                                                                              | TESDUB12V |                                              |                  | 13           | 17  | -       |       |
|                                                                                              | TESDUB24V |                                              |                  | 25           | 28  | -       |       |
| Leakage current                                                                              | TESDUB5V0 | VR=5V                                        | I <sub>L</sub>   | -            | 0.1 | 2       | μA    |
|                                                                                              | TESDUB12V | VR=12V                                       |                  |              |     |         |       |
|                                                                                              | TESDUB24V | VR=24V                                       |                  |              |     |         |       |
| Junction capacitance                                                                         | TESDUB5V0 | VR=0V,<br>f=1MHz                             | C <sub>T</sub>   | -            | 15  | 20      | pF    |
|                                                                                              | TESDUB12V |                                              |                  |              | 12  | -       |       |
|                                                                                              | TESDUB24V |                                              |                  |              | 10  | -       |       |
| ESD capability                                                                               |           | IEC 61000-4-2(air)<br>IEC 61000-4-2(contact) | ESD              |              |     | 15<br>8 | KV    |
| Clamping voltage                                                                             | TESDUB5V0 | I <sub>pp</sub> =5A, T <sub>p</sub> =8/20us  | V <sub>c</sub>   | -            | -   | 15      | V     |
|                                                                                              | TESDUB12V | I <sub>pp</sub> =1A, T <sub>p</sub> =8/20us  |                  |              |     | 25      |       |
|                                                                                              | TESDUB24V | I <sub>pp</sub> =1A, T <sub>p</sub> =8/20us  |                  |              |     | 47      |       |
| Peak pulse power                                                                             | TESDUB5V0 | T <sub>p</sub> =8/20us                       | P <sub>pp</sub>  | -            | -   | 75      | W     |
|                                                                                              | TESDUB12V |                                              |                  |              |     | 25      |       |
|                                                                                              | TESDUB24V |                                              |                  |              |     | 47      |       |
| Junction temperature range                                                                   |           |                                              | T <sub>J</sub>   | -55 to + 125 |     |         | °C    |
| Storage temperature range                                                                    |           |                                              | T <sub>STG</sub> | -55 to + 150 |     |         | °C    |

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**ORDERING INFORMATION**

| PART NO.              | PACKING CODE | GREEN COMPOUND CODE | PACKAGE | PACKING     | MANUFACTURE CODE |
|-----------------------|--------------|---------------------|---------|-------------|------------------|
| TESDUBxxx<br>(Note 1) | R4           | Suffix "G"          | 0603-B  | 4000 / Reel | (Note 2)         |

Note 1: "xxx" defines voltage from 5V (TESDUB5V0) to 24V (TESDUB24V)

Note 2: Manufacture special control, if empty means no special control requirement.

**EXAMPLE**

| PREFERRED P/N | PART NO.  | PACKING CODE | GREEN COMPOUND CODE | MANUFACTURE CODE | DESCRIPTION    |
|---------------|-----------|--------------|---------------------|------------------|----------------|
| TESDUB5V0 R4  | TESDUB5V0 | R4           |                     |                  |                |
| TESDUB5V0 R4G | TESDUB5V0 | R4           | G                   |                  | Green compound |
| TESDUB5V0 R4  | TESDUB5V0 | R4           |                     | F0               |                |
| TESDUB5V0 R4G | TESDUB5V0 | R4           | G                   | F0               | Green compound |

**RATINGS AND CHARACTERISTICS CURVES**

(TA=25°C unless otherwise noted)

Fig. 1 8/20us Peak pulse current waveform acc. IEC 61000-4-5

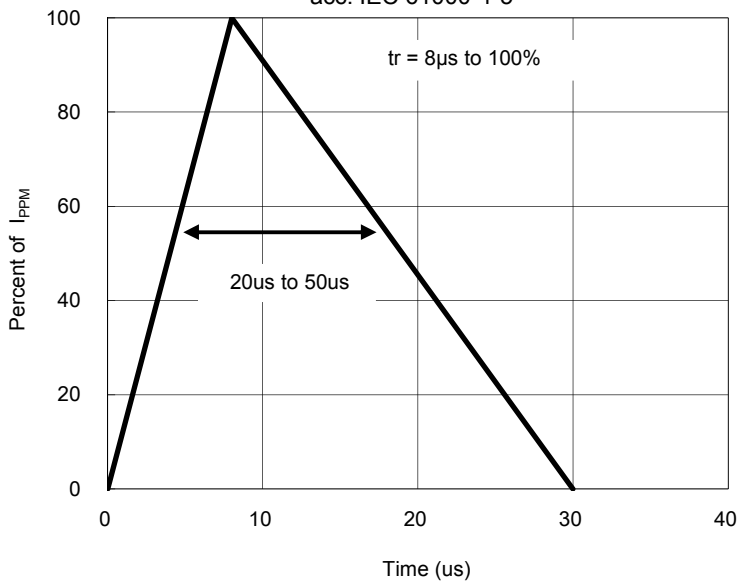


Fig. 2 Reverse characteristics

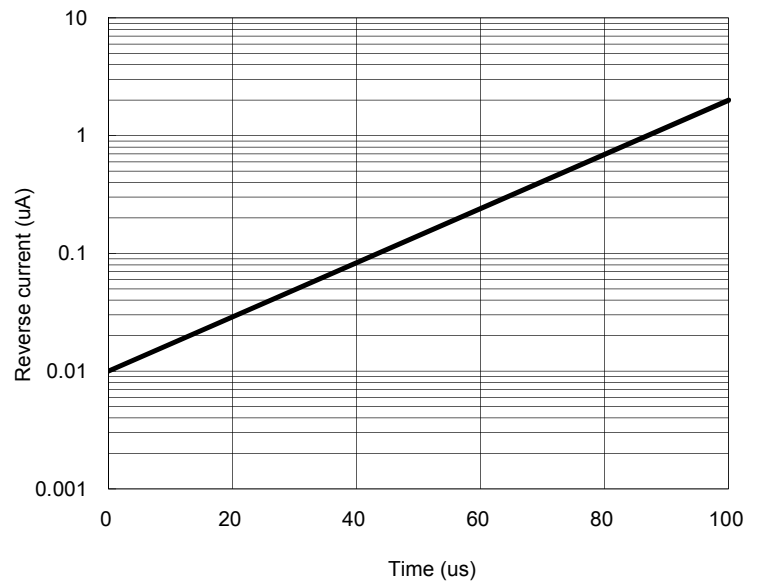


Fig. 3 Capacitance between terminals

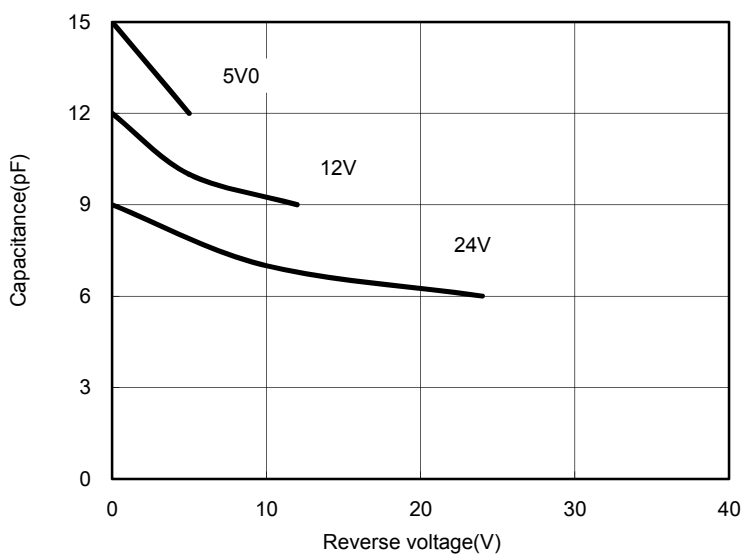
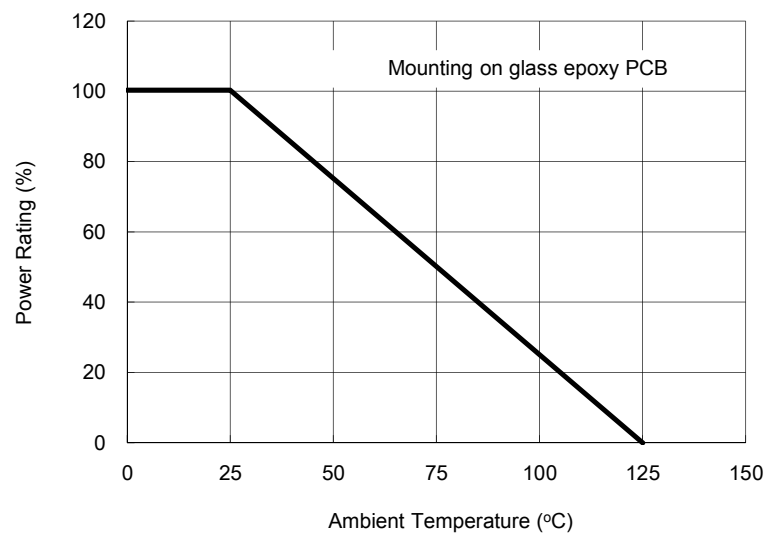
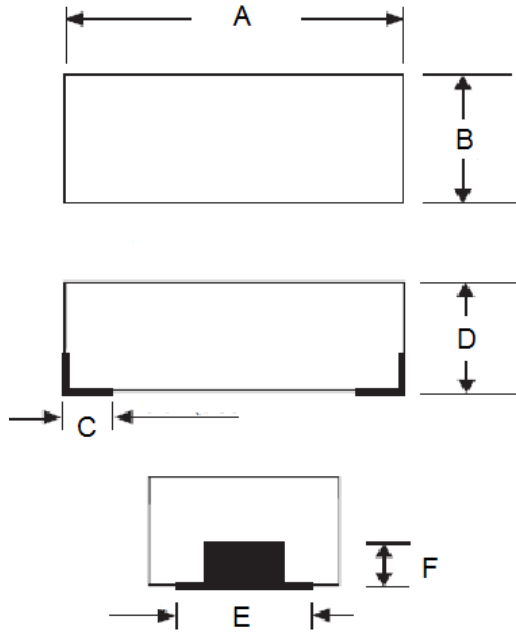


Fig.4 Power derating curve



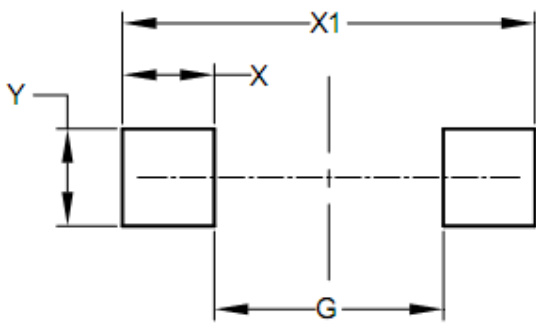
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DIMENSIONS



| DIM. | Unit(mm)  |      | Unit(inch) |       |
|------|-----------|------|------------|-------|
|      | Min       | Max  | Min        | Max   |
| A    | 1.60      | 1.80 | 0.063      | 0.071 |
| B    | 0.80      | 1.00 | 0.031      | 0.039 |
| C    | 0.35 Typ. |      | 0.014 Typ. |       |
| D    | 0.70      | 0.85 | 0.028      | 0.033 |
| E    | 0.70 Typ. |      | 0.028 Typ. |       |
| F    | 0.30 Typ. |      | 0.012 Typ. |       |

SUGGESTED PAD LAYOUT



| DIM. | Unit(mm) |
|------|----------|
| G    | 0.80     |
| X    | 0.60     |
| X1   | 2.00     |
| Y    | 0.80     |

MARKING

| Part No.  | Marking |
|-----------|---------|
| TESDUB5V0 | E05     |
| TESDUB12V | E12     |
| TESDUB24V | E24     |