



**UNI-AND BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS**

- HIGH SURGE CAPABILITY :  
700 W / 1 ms EXPO
- VERY FAST CLAMPING TIME :  
1 ps FOR UNIDIRECTIONAL TYPES  
5 ns FOR BIDIRECTIONAL TYPES
- LARGE VOLTAGE RANGE :  
10 V → 110 V
- ORDER CODE :  
TYPE NUMBER FOR UNIDIRECTIONAL TYPES, TYPE NUMBER + SUFFIX B FOR BIDIRECTIONAL TYPES



**DESCRIPTION**

Transient voltage suppressor diodes especially useful in protecting integrated circuits, MOS, hybrids and other voltage-sensitive semiconductors and components.

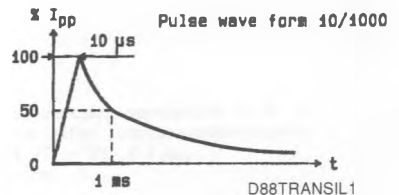
**ABSOLUTE RATINGS** (limiting values)

| Symbol             | Parameter  |                                      | Value              | Unit     |
|--------------------|--|--------------------------------------|--------------------|----------|
| $P_p$              | Peak Pulse Power for 1 ms Exponential Pulse                          | $T_j$ Initial = 25 °C<br>See note 1  | 700                | W        |
| P                  | Power Dissipation on Infinite Heatsink                               | $T_{amb} = 50$ °C                    | 5                  | W        |
| $I_{FSM}$          | Non Repetitive Surge Peak Forward Current for Unidirectional Types   | $T_j$ Initial = 25 °C<br>$t = 10$ ms | 120                | A        |
| $T_{stg}$<br>$T_j$ | Storage and Operating Junction Temperature Range                     |                                      | - 55 to 150<br>150 | °C<br>°C |
| $T_L$              | Maximum Lead Temperature for Soldering During 10 s at 4 mm from Case |                                      | 230                | °C       |

**THERMAL RESISTANCE**

| Symbol        | Parameter  | Value | Unit |
|---------------|--|-------|------|
| $R_{th(j-l)}$ | Junction-leads on Infinite Heatsink for $L_{lead} = 10$ mm | 20    | °C/W |

**Note :** 1. For surges upper than the maximum values, the diode will present a short-circuit anode-cathode.



**ELECTRICAL CHARACTERISTICS** ( $T_J = 25\text{ }^\circ\text{C}$ )

| Symbol         | Parameter                             |                      | Value      |
|----------------|---------------------------------------|----------------------|------------|
| $V_{RM}$       | Stand-off Voltage                     |                      | See tables |
| $V_{(BR)}$     | Breakdown Voltage                     |                      |            |
| $V_{(CL)}$     | Clamping Voltage                      |                      |            |
| $I_{pp}$       | Peak Pulse Current                    |                      |            |
| $\alpha_T$     | Temperature Coefficient of $V_{(BR)}$ |                      |            |
| C              | Capacitance                           |                      |            |
| $t_{clamping}$ | Clamping Time (0 volt to $V_{(BR)}$ ) | Unidirectional Types | 1 ps max.  |
|                |                                       | Bidirectional Types  | 5 ns max.  |

| Types          |               | $I_{RM}$ @ $V_{RM}$<br>max. |     | $V_{(BR)}^*$ @ $I_R$<br>(V) |      |      |      | $V_{(CL)}$ @ $I_{pp}$<br>max.<br>1 ms expo |     | $V_{(CL)}$ @ $I_{pp}$<br>max.<br>8-20 us expo |     | $\alpha_T$<br>max. | $C^{**}$<br>typ.<br>$V_R=0$<br>$f=1\text{ MHz}$ |
|----------------|---------------|-----------------------------|-----|-----------------------------|------|------|------|--|-----|---|-----|--------------------|---|
| Unidirectional | Bidirectional | ( $\mu\text{A}$ )           | (V) | min.                        | nom. | max. | (mA) | (V)  | (A) | (V)   | (A) | ( $10^{-4}$ °C)    | (pF)  |
| P7T-10         | P7T-10B       | 5                           | 10  | 13                          | 18   | 20   | 5    | 25   | 30  | 32  | 265 | 8.4                | 2600  |
| P7T-27         | P7T-27B       | 5                           | 27  | 29.6                        | 36   | 43.5 | 5    | 53   | 13  | 68  | 125 | 9.6                | 1100  |
| P7T-43         | P7T-43B       | 5                           | 43  | 50                          | 62   | 75   | 5    | 90   | 8   | 115   | 74  | 10.3               | 620   |
| P7T-110        | P7T-110B      | 5                           | 110 | 130                         | 160  | 200  | 5    | 235  | 3   | 300   | 28  | 10.8               | 370   |

\* Pulse test  $t_p \leq 50\text{ ms}$   $\delta < 2\%$ .

\*\* Divide these values by 2 for bidirectional types.

For bidirectional types, electrical characteristics apply in both directions.

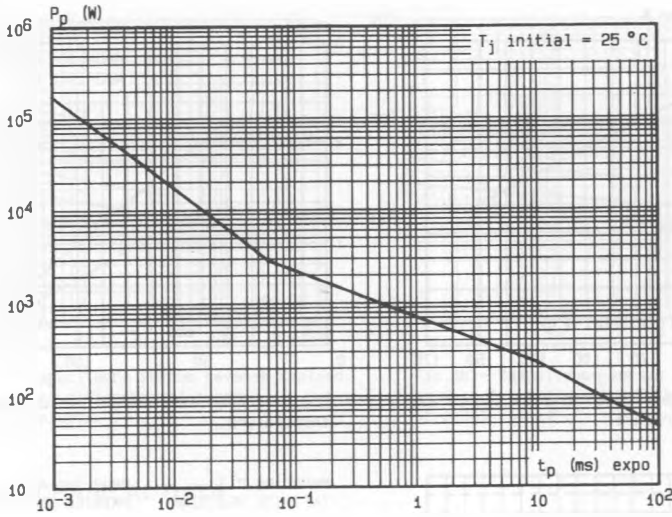


Fig.1 - Peak pulse power versus exponential pulse duration.

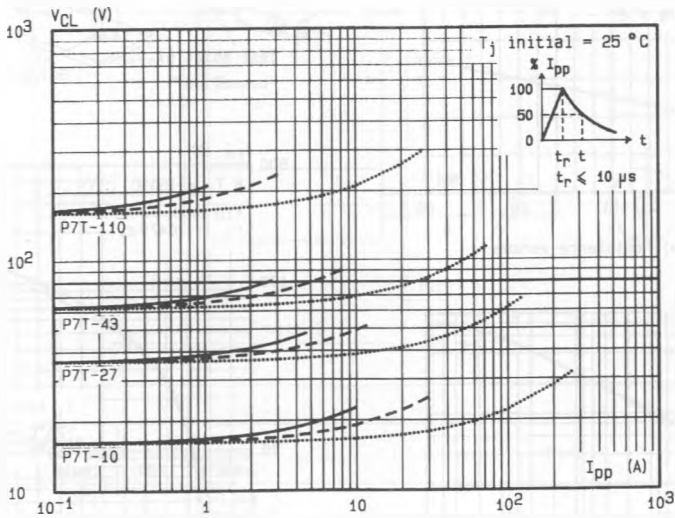


Fig.2 - Clamping voltage versus peak pulse current.  
 exponential waveform  $t = 20 \mu s$  .....  
 $t = 1 ms$  ----  
 $t = 10 ms$  ———

Note : The curves of the figure 2 are specified for a junction temperature of 25 °C before surge. The given results may be extrapolated for other junction temperatures by using the following formula :  $\Delta V (BR) = \alpha_T (V (BR)) \times [T_j - 25] \times V (BR)$   
 For intermediate voltages, extrapolate the given results.

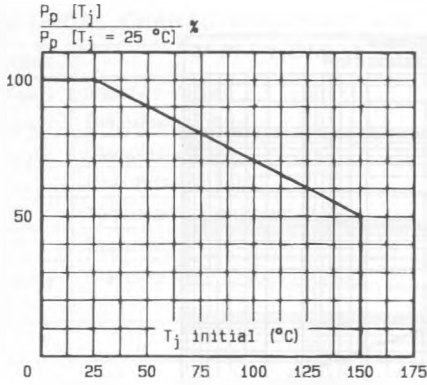


Fig. 3 - Allowable power dissipation versus initial junction temperature.

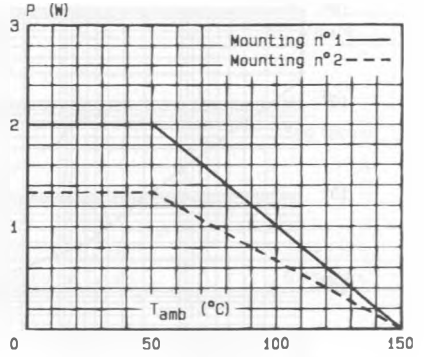


Fig. 4 - Power dissipation versus ambient temperature.

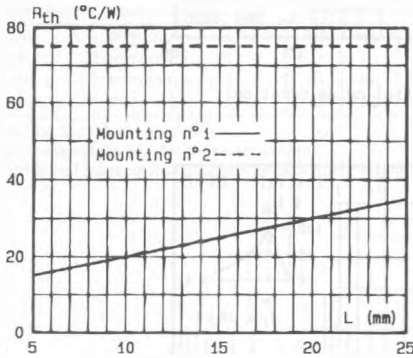


Fig. 5 - Thermal resistance versus lead length.

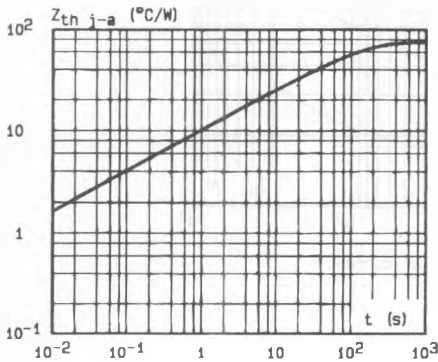


Fig. 6 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

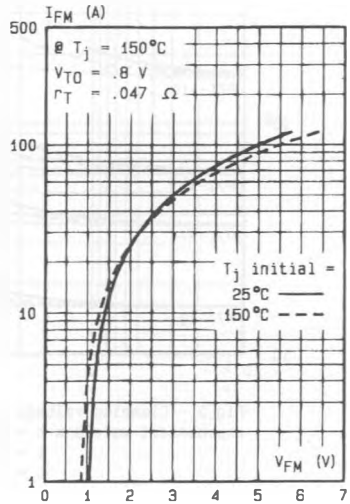
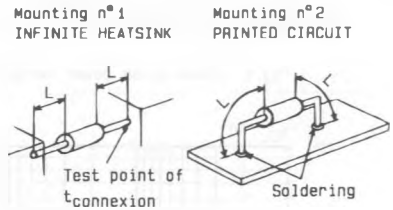


Fig. 7 - Peak forward current versus peak forward voltage drop (typical values for unidirectional types).

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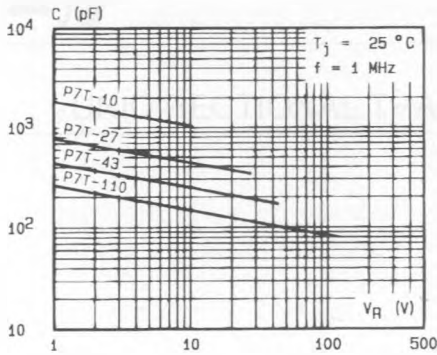


Fig.8a - Capacitance versus reverse applied voltage for unidirectional types (typical values).

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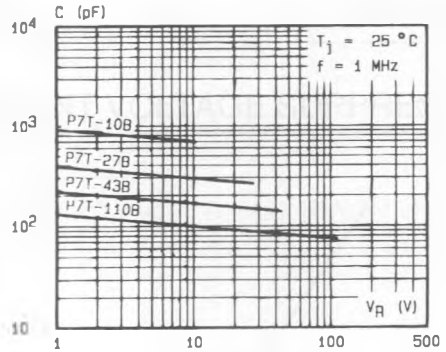
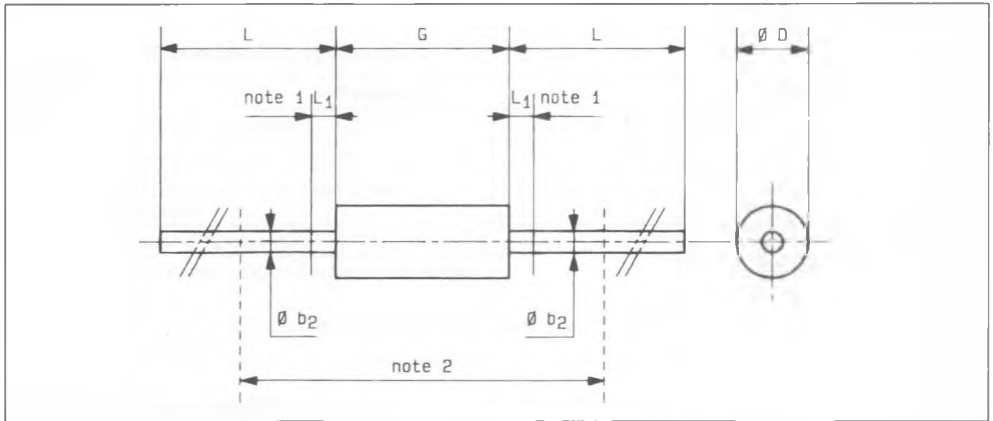


Fig.8b - Capacitance versus reverse applied voltage for bidirectional types (typical values).

**PACKAGE MECHANICAL DATA**

CB-417 Plastic



| Ref.             | Millimeters |       | Inches |       | Notes   |
|------------------|-------------|-------|--------|-------|---|
|                  | Min.        | Max.  | Min.   | Max.  |   |
| Ø b <sub>2</sub> | -           | 1.092 | -      | 0.043 | 1 - The lead diameter Ø b <sub>2</sub> is not controlled over zone L <sub>1</sub> .<br>2 - The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59" (15 mm). |
| Ø D              | -           | 3.683 | -      | 0.145 |   |
| G                | -           | 8.89  | -      | 0.350 |   |
| L                | 25.4        | -     | 1.000  | -     |   |
| L <sub>1</sub>   | -           | 1.25  | -      | 0.049 |   |

Cooling method : by convection (method A).

Marking : type number ; white band indicates cathode for unidirectional types.

Weight : 0.6 g.