

# THOMSON SEMICONDUCTORS

## TRDV 125 → TRDV 1225 ALTERNISTORS T-25-15

New range of solid state AC - switches with very high commutating capability.

### FEATURES :

- $(dv/dt)_C \geq 200 \text{ V}/\mu\text{s}$  (50 Hz)
- $V_{DRM}$  up to 1200 V

### APPLICATIONS

- Power control on inductive load (motor, transformer...)
- High frequency or high  $(di/dt)_C$  level circuits.

Nouvelle gamme de commutateurs statiques pour l'alternatif à haute performance en commutation.

### CARACTÉRISTIQUES :

- $(dv/dt)_C \geq 200 \text{ V}/\mu\text{s}$  (50 Hz)
- $V_{DRM}$  jusqu'à 1200 V

### APPLICATIONS

- Contrôle de puissance sur charge inductive (moteur, transformateur...)
- Circuits à haute fréquence ou fort  $(di/dt)_C$ .

$$I_{TRMS} = 25 \text{ A} / T_{case} = 75^\circ\text{C}$$

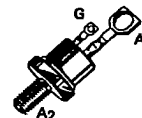
$$100 \text{ V} < V_{DRM} < 1200 \text{ V}$$

$$I_{GT} = 150 \text{ mA (Q I - II - III)}$$

$$(dv/dt)_C = 200 \text{ V}/\mu\text{s min @ } (di/dt)_C = 20 \text{ A/ms}$$

Standard type : 1/4" 28-UNF

On request, type number + suffix M : ISO M6



Case  
Boîtier : TO 48

| ABSOLUTE RATINGS (LIMITING VALUES)<br>VALEURS LIMITES ABSOLUES D'UTILISATION                                                                           |                               | Symbols            | TRDV 125 → TRDV 1225         | Units            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------|------------------------------|------------------|
| RMS on-state current (360° conduction angle)<br>Courant efficace à l'état passant (angle de conduction 360°)                                           | $T_{case} = 75^\circ\text{C}$ | $I_{TRMS}$         | 25                           | A                |
| Non repetitive surge peak on-state current<br>(on full cycle)<br>Courant non répétitif de surcharge accidentelle<br>à l'état passant (1 cycle complet) | $F = 50 \text{ Hz}$           | $I_{TSM}$          | 230                          | A                |
|                                                                                                                                                        | $F = 60 \text{ Hz}$           |                    | 250                          |                  |
|                                                                                                                                                        | $F = 400 \text{ Hz}$          |                    | 390                          |                  |
| $I_2 t$ value for fusing<br>Valeur de la constante $I_2 t$                                                                                             | $t = 10 \text{ ms}$           | $I_2 t$            | 265                          | A <sup>2</sup> s |
| Critical rate of rise of on-state current*<br>Vitesse critique de croissance du courant à l'état passant*                                              |                               | $di/dt$            | 100                          | A/ $\mu\text{s}$ |
| Storage and operating junction temperature range<br>Températures extrêmes de stockage et de jonction en fonctionnement                                 |                               | $T_{stg}$<br>$T_j$ | - 40 → + 125<br>- 40 → + 110 | °C               |

| ABSOLUTE RATINGS (LIMITING VALUES)<br>VALEURS LIMITES ABSOLUES D'UTILISATION     | Symbol    | TRDV 125 | TRDV 225 | TRDV 425 | TRDV 625 | TRDV 825 | TRDV 1025 | TRDV 1225 | Unit |
|----------------------------------------------------------------------------------|-----------|----------|----------|----------|----------|----------|-----------|-----------|------|
| Repetitive peak off-state voltage<br>Tension de crête répétitive à l'état bloqué | $V_{DRM}$ | ± 100    | ± 200    | ± 400    | ± 600    | ± 800    | ± 1000    | ± 1200    | V    |

| Thermal resistance<br>Résistance thermique | Symbols                                                                                                                       |                         | TRDV 125 → TRDV 1225 | Units |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------|-------|
|                                            | — Contact (case-heatsink)<br>Contact (boîtier-radiateur)                                                                      | $R_{th \text{ c-h}}$    | 0,4                  | °C/W  |
|                                            | — Junction-case for D.C.<br>Jonction - boîtier en continu                                                                     | $R_{th \text{ j-c DC}}$ | 1,1                  | °C/W  |
|                                            | — Junction-case for 50 Hz or 60 Hz (360° conduction angle)<br>Jonction-boîtier pour 50 Hz ou 60 Hz (angle de conduction 360°) | $R_{th \text{ j-c AC}}$ | 0,83                 | °C/W  |

\*Gate supply  
\*Générateur de gâchette : 20 V/20  $\Omega$  -  $t_r < 0,1 \mu\text{s}$  - Half sine wave 6,3  $\mu\text{s}$  -  $V_{DRM}$  specified  
Demi-sinusoïde de 6,3  $\mu\text{s}$  -  $V_{DRM}$  spécifié

October 1984 - 1/4

### THOMSON SEMICONDUCTORS

45, avenue de l'Europe - 78140 VÉLIZY - France  
Tél. : 946.97.19 / Télex : 698 866 F

397

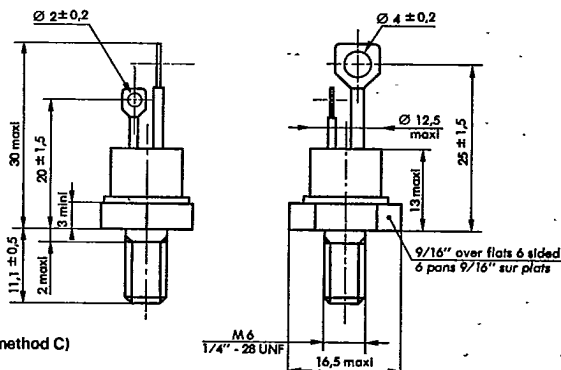


T-25-15

**GATE CHARACTERISTICS (MAXIMUM VALUES)**  
**CARACTÉRISTIQUES DE GACHETTE (VALEURS MAXIMALES)**
 $P_{GM} = 40 \text{ W}$  ( $t = 10 \mu\text{s}$ )     $P_{G(AV)} = 1 \text{ W}$      $I_{GM} = 8 \text{ A}$  ( $t = 10 \mu\text{s}$ )     $V_{GM} = 16 \text{ V}$  ( $t = 10 \mu\text{s}$ )

**ELECTRICAL CHARACTERISTICS**  
**CARACTÉRISTIQUES ÉLECTRIQUES**

| Symbols          | Quadrants    | Values |      |      | Units            | Test conditions               |                                                                                               |
|------------------|--------------|--------|------|------|------------------|-------------------------------|-----------------------------------------------------------------------------------------------|
|                  |              | Min.   | Typ. | Max. |                  |                               |                                                                                               |
| $I_{GT}^*$       | I - II - III |        |      | 150  | mA               | $T_j = 25^\circ\text{C}$      | $V_D = 12 \text{ V}$ $R_L = 33 \Omega$<br>Pulse duration $> 20 \mu\text{s}$                   |
|                  |              |        |      | 300  |                  | $T_j = -40^\circ\text{C}$     |                                                                                               |
| $V_{GT}^*$       |              |        |      | 2,5  | V                | $T_j = 25^\circ\text{C}$      | $V_D = 12 \text{ V}$ $R_L = 33 \Omega$<br>Pulse duration $> 20 \mu\text{s}$                   |
|                  |              |        |      | 3,5  |                  | $T_j = -40^\circ\text{C}$     |                                                                                               |
| $V_{GD}^{**}$    |              | -0,2   |      |      | V                | $T_j = 110^\circ\text{C}$     | $V_D = V_{DRM}$ $R_L = 3 \text{ k}\Omega$<br>Pulse duration $> 20 \mu\text{s}$                |
| $I_H^{**}$       |              |        | 50   |      | mA               | $T_j = 25^\circ\text{C}$      | $V_D = 12 \text{ V}$<br>$I_T = 1 \text{ A}$ Gate open                                         |
|                  |              |        | 75   |      |                  | $T_j = -40^\circ\text{C}$     |                                                                                               |
| $I_L^{**}$       | I - III      |        | 50   |      | mA               | $T_j = 25^\circ\text{C}$      | $V_D = 12 \text{ V}$<br>Gate pulse duration $> 100 \mu\text{s}$                               |
|                  |              |        | 75   |      |                  | $T_j = -40^\circ\text{C}$     |                                                                                               |
|                  | II           |        | 100  |      |                  | $T_j = 25^\circ\text{C}$      |                                                                                               |
|                  |              |        | 150  |      |                  | $T_j = -40^\circ\text{C}$     |                                                                                               |
| $V_{TM}^{**}$    |              |        |      | 2    | V                | $T_j = 25^\circ\text{C}$      | $I_{TM} = 35 \text{ A}$ $t_p \geq 1 \text{ ms}$ $\delta \leq 2 \%$                            |
| $I_{DRM}^{**}$   |              |        |      | 2    | mA               | $T_j = 110^\circ\text{C}$     | $V_{DRM}$ rated   Gate open                                                                   |
| $dv/dt^{**}$     |              | 200    |      |      | V/ $\mu\text{s}$ | $T_j = 110^\circ\text{C}$     | 0,67 $V_{DRM}$ rated<br>Gate open                                                             |
| $(dv/dt)_C^{**}$ |              | 200    |      |      | V/ $\mu\text{s}$ | $(di/dt)_C = 20 \text{ A/ms}$ | $T_{case} = 75^\circ\text{C}$<br>$I_{TRMS}$ and $V_{DRM}$ rated                               |
|                  |              | 10     |      |      |                  | $(di/dt)_C = 88 \text{ A/ms}$ |                                                                                               |
| $t_{gt}^*$       |              |        | 2,5  |      | $\mu\text{s}$    | $T_j = 25^\circ\text{C}$      | $I_{TRMS}$ and $V_{DRM}$ rated<br>$di_G/dt = 3,5 \text{ A}/\mu\text{s}$ $I_G = 0,5 \text{ A}$ |

\* For either polarity of gate voltage with reference to electrode A<sub>1</sub>.\*\* For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>.
**CASE DESCRIPTION**  
**DESCRIPTION DU BOITIER**


Cooling method : by conduction (method C)

Marking : type number

Weight :  $13,5 \pm 1 \text{ g}$ Stud torque :  $3,5 \text{ mAN min} - 3,8 \text{ mAN max}$ 

2/4

THOMSON SEMICONDUCTORS

TRDV 125 → TRDV 1225

78C 07958 D

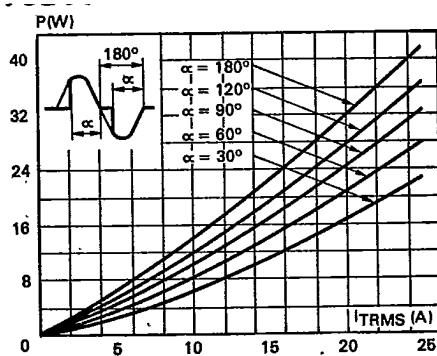


Fig. 1 - Maximum mean power dissipation versus RMS on-state current.

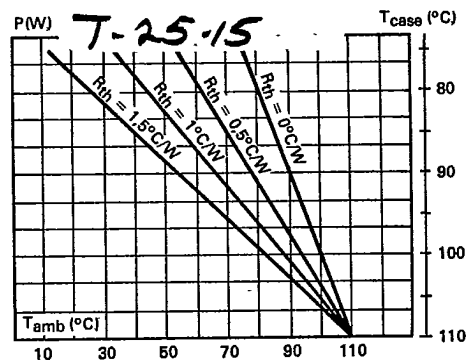


Fig. 2 - Correlation between maximum mean power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact.

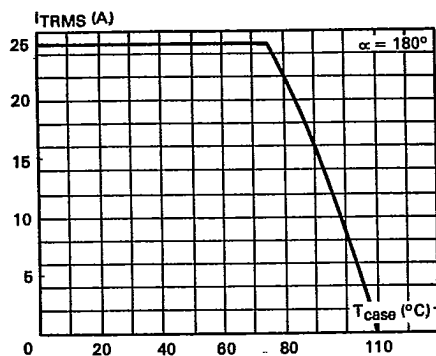


Fig. 3 - RMS on-state current versus case temperature.

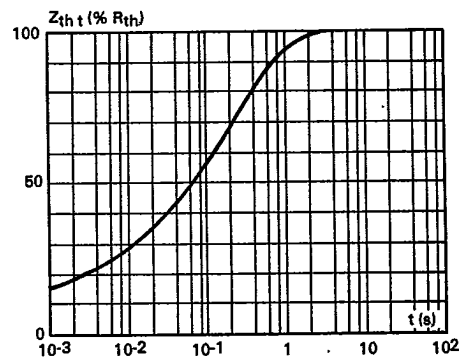


Fig. 4 - Thermal transient impedance junction to case versus pulse duration.

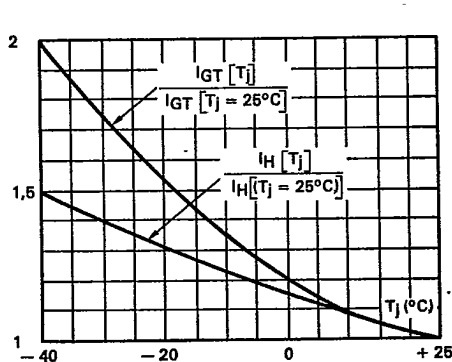


Fig. 5 - Relative variation of gate trigger current and holding versus junction temperature.

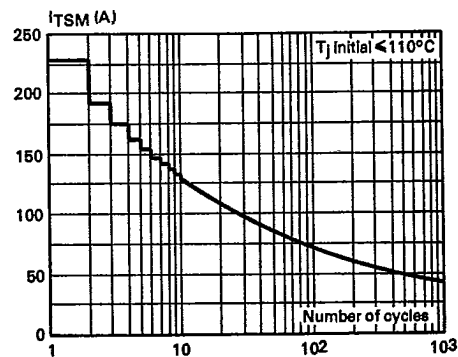


Fig. 6 - Non repetitive surge peak on-state current versus number of cycles.

THOMSON SEMICONDUCTORS

3/4

TRDV 125 → TRDV 1225

T-25-15  
78C 07959

D

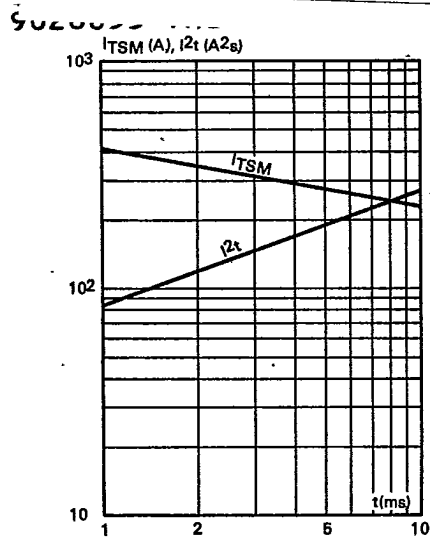


Fig. 7 - Non repetitive surge peak on-state for a sinusoidal pulse with width :  $t \leq 10$  ms, and corresponding value of  $I_2t$ .

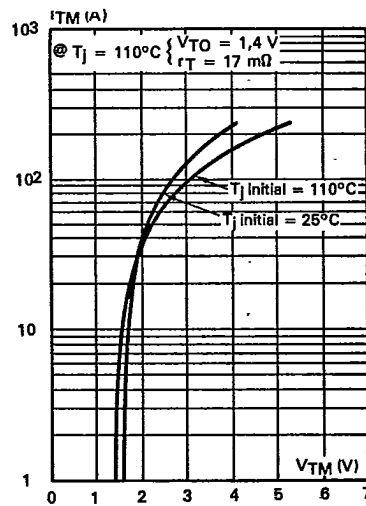


Fig. 8 - On-state characteristic (maximum values).

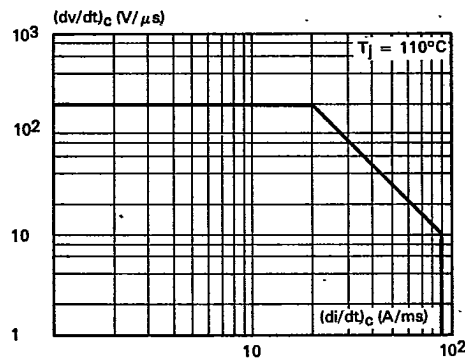


Fig. 9 - Safe operating area.