



## TPDV625 ---> TPDV1225

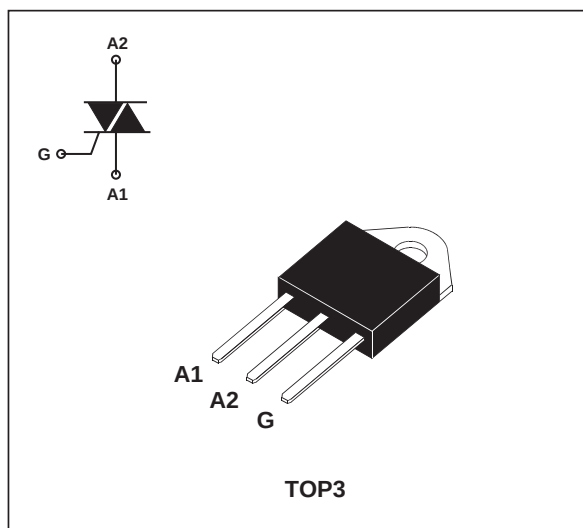
### ALTERNISTORS

#### FEATURES

- High commutation: > 88A/ms (400Hz)
- Insulating voltage = 2500V<sub>(RMS)</sub>  
(UL Recognized: EB81734)
- High voltage capability: V<sub>DRM</sub> = 1200V

#### DESCRIPTION

The TPDV625 ---> TPDV1225 use a high performance passivated glass alternistor technology. Featuring very high commutation levels and high surge current capability, this family is well adapted to power control on inductive load (motor, transformer...)



#### ABSOLUTE RATINGS (limiting values)

| Symbol                             | Parameter                                                                                                      |                        | Value                      | Unit             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------|----------------------------|------------------|
| I <sub>T(RMS)</sub>                | RMS on-state current (360° conduction angle)                                                                   | T <sub>c</sub> = 85°C  | 25                         | A                |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current<br>(T <sub>j</sub> initial = 25°C)                                  | tp = 2.5ms             | 390                        | A                |
|                                    |                                                                                                                | tp = 8.3ms             | 250                        |                  |
|                                    |                                                                                                                | tp = 10ms              | 230                        |                  |
| I <sup>2</sup> t                   | I <sup>2</sup> t value                                                                                         | tp = 10ms              | 265                        | A <sup>2</sup> s |
| di/dt                              | Critical rate of rise of on-state current<br>Gate supply: I <sub>G</sub> = 500mA   dI <sub>G</sub> /dt = 1A/μs | Repetitive<br>F = 50Hz | 20                         | A/μs             |
|                                    |                                                                                                                | Non repetitive         | 100                        |                  |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage and operating junction temperature range                                                               |                        | -40 to +150<br>-40 to +125 | °C               |
| TI                                 | Maximum lead soldering temperature during 10s at 4.5mm from case                                               |                        | 260                        | °C               |

| Symbol                               | Parameter                                                   | TPDV |     |      |      | Unit |
|--------------------------------------|-------------------------------------------------------------|------|-----|------|------|------|
|                                      |                                                             | 625  | 825 | 1025 | 1225 |      |
| V <sub>DRM</sub><br>V <sub>RRM</sub> | Repetitive peak off-state voltage<br>T <sub>j</sub> = 125°C | 600  | 800 | 1000 | 1200 | V    |

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### THERMAL RESISTANCES

| Symbol       | Parameter                                             | Value | Unit |
|--------------|-------------------------------------------------------|-------|------|
| Rth (j-a)    | Contact to ambient                                    | 50    | °C/W |
| Rth (j-c) DC | Junction to case for DC                               | 1.5   | °C/W |
| Rth (j-c) AC | Junction to case for 360° conduction angle (F = 50Hz) | 1.1   | °C/W |

### GATE CHARACTERISTICS (maximum values)

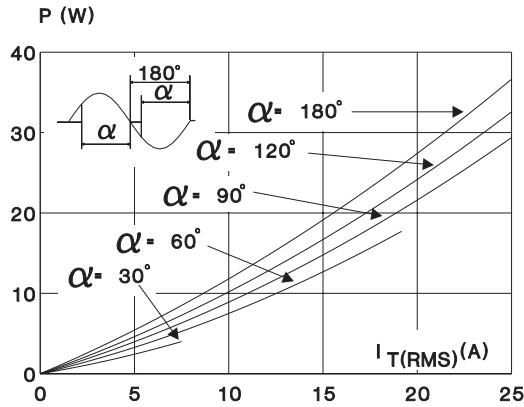
$P_{G(AV)} = 1W$   $P_{GM} = 40W$  (tp = 20μs)  $I_{GM} = 8A$  (tp = 20μs)  $V_{GM} = 16V$  (tp = 20μs)

### ELECTRICAL CHARACTERISTICS

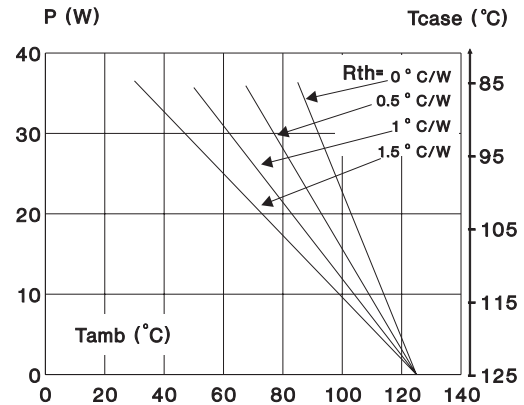
| Symbol                 | Test conditions                                                       | Quadrant            |      | Value | Unit |
|------------------------|-----------------------------------------------------------------------|---------------------|------|-------|------|
| $I_{GT}$               | $V_D = 12V$ (DC) $R_L = 33\Omega$ $T_j = 25^\circ C$                  | I - II - III        | MAX. | 150   | mA   |
| $V_{GT}$               | $V_D = 12V$ (DC) $R_L = 33\Omega$ $T_j = 25^\circ C$                  | I - II - III        | MAX. | 1.5   | V    |
| $V_{GD}$               | $V_D = V_{DRM}$ $R_L = 3.3k\Omega$ $T_j = 125^\circ C$                | I - II - III        | MIN. | 0.2   | V    |
| tgt                    | $V_D = V_{DRM}$ $I_G = 500mA$ $dl_G/dt = 3A/\mu s$ $T_j = 25^\circ C$ | I - II - III        | TYP. | 2.5   | μs   |
| $I_L$                  | $I_G = 1.2I_{GT}$ $T_j = 25^\circ C$                                  | I - III             | TYP. | 100   | mA   |
|                        |                                                                       | II                  |      | 200   |      |
| $I_H^*$                | $I_T = 500mA$ Gate open $T_j = 25^\circ C$                            |                     | TYP. | 50    | mA   |
| $V_{TM}^*$             | $I_{TM} = 35A$ tp = 380μs $T_j = 25^\circ C$                          |                     | MAX. | 1.8   | V    |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM}$ rated<br>$V_{RRM}$ rated $T_j = 25^\circ C$                 |                     | MAX. | 0.02  | mA   |
|                        |                                                                       | $T_j = 125^\circ C$ | MAX. | 8     |      |
| dV/dt *                | Linear slope up to $V_D = 67\% V_{DRM}$ gate open $T_j = 125^\circ C$ |                     | MIN. | 500   | V/μs |
| (di/dt)c*              | (dV/dt)c = 200V/μs $T_j = 125^\circ C$                                |                     | MIN. | 20    | A/ms |
|                        | (dV/dt)c = 10V/μs                                                     |                     |      | 88    |      |

\* For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>.

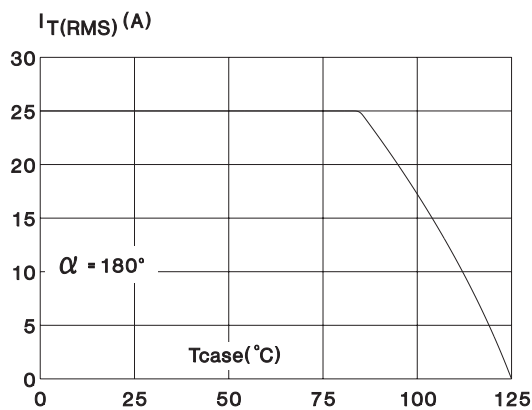
**Fig. 1:** Maximum RMS power dissipation versus RMS on-state current ( $F = 50\text{Hz}$ ). (Curves are cut off by  $(di/dt)_c$  limitation)



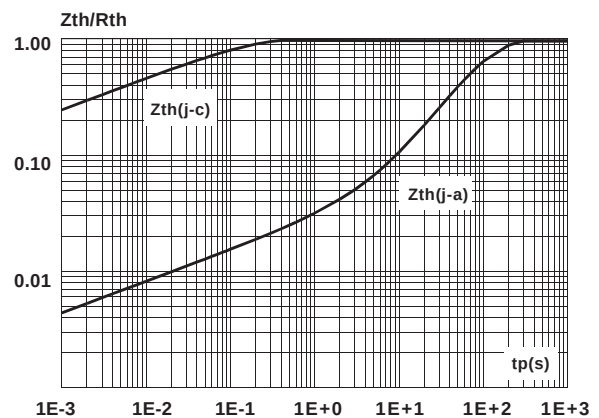
**Fig. 2:** Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact.



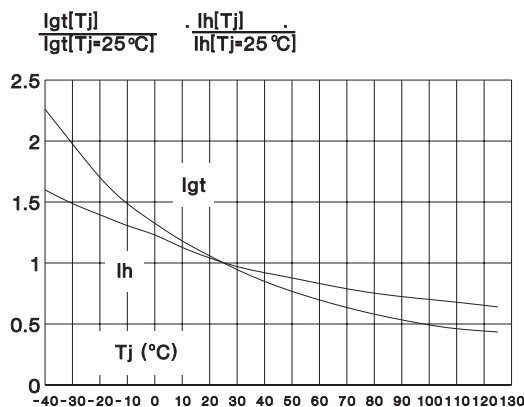
**Fig. 3:** RMS on-state current versus case temperature.



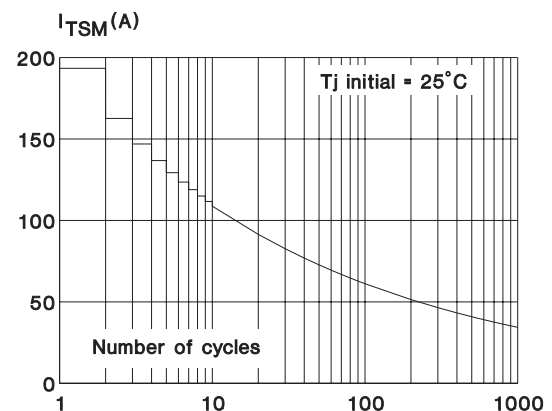
**Fig. 4:** Relative variation of thermal impedance versus pulse duration.



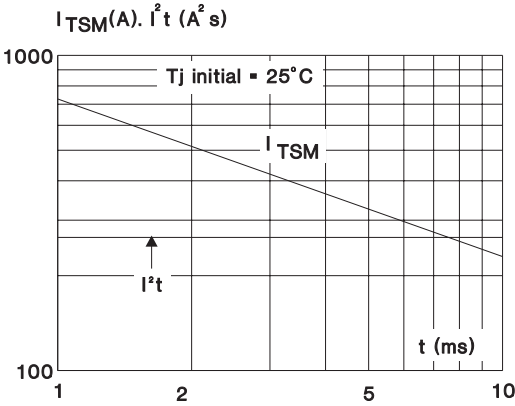
**Fig. 5:** Relative variation of gate trigger current and holding current versus junction temperature.



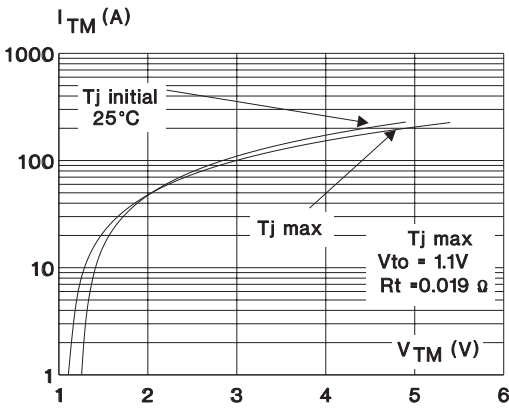
**Fig. 6:** Non repetitive surge peak on-state current versus number of cycles.



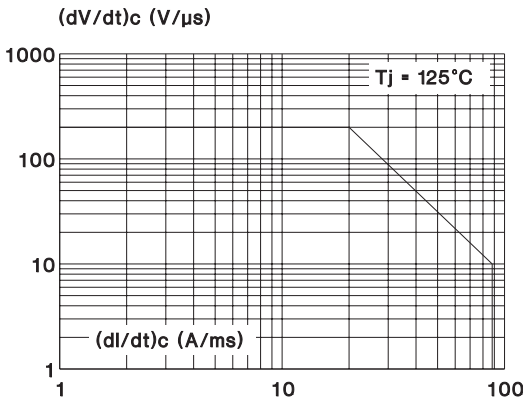
**Fig. 7:** Non repetitive surge peak on-state current for a sinusoidal pulse with width:  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



**Fig. 8:** On-state characteristics (maximum values).



**Fig. 9:** Safe operating area.



**PACKAGE MECHANICAL DATA**  
 TOP3 (Plastic)

| REF. | DIMENSIONS  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| A    | 4.4         | 4.6   | 0.173      | 0.181 |
| B    | 1.45        | 1.55  | 0.057      | 0.061 |
| C    | 14.35       | 15.60 | 0.565      | 0.614 |
| D    | 0.5         | 0.7   | 0.020      | 0.028 |
| E    | 2.7         | 2.9   | 0.106      | 0.114 |
| F    | 15.8        | 16.5  | 0.622      | 0.650 |
| G    | 20.4        | 21.1  | 0.815      | 0.831 |
| H    | 15.1        | 15.5  | 0.594      | 0.610 |
| J    | 5.4         | 5.65  | 0.213      | 0.222 |
| K    | 3.4         | 3.65  | 0.134      | 0.144 |
| L    | 4.08        | 4.17  | 0.161      | 0.164 |
| P    | 1.20        | 1.40  | 0.047      | 0.055 |
| R    | 4.60 Typ.   |       | 0.181 Typ. |       |

**OTHER INFORMATION**

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| TPDVx25       | TPDVx25 | TOP3    | 4.5 g  | 120      | Bulk          |

- Epoxy meets UL94,V0
- Cooling method: C
- Recommended torque value: 0.8 m.N.
- Maximum torque value: 1 m.N.

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