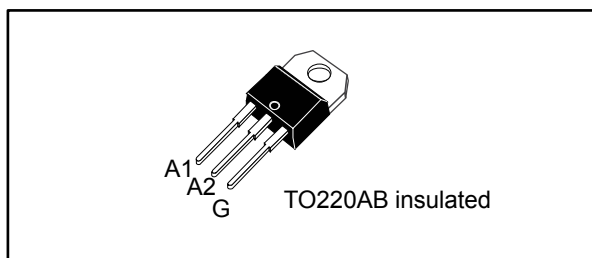


## 12 A Snubberless™ Triac

Datasheet -production data



### Features

- High static  $dV/dt$
- High dynamic turn-off commutation ( $di/dt$ )<sub>c</sub>
- 150 °C maximum  $T_j$
- Three quadrants
- Built-in ceramic for tab insulation
- Compliance to UL1557 standard (ref : E81734)
- ECOPACK®2 compliant component
- Complies with UL94,V0
- Surge capability  $V_{DSM}$ ,  $V_{RSM}$  = 900 V

### Benefits

- High immunity to false turn-on thanks to high static  $dV/dt$
- Better turn-off in high temperature environments thanks to ( $di/dt$ )<sub>c</sub>
- Increase of thermal margin due to extended working  $T_j$  up to 150 °C
- Better thermal resistance due to the ceramic inside the package

### Applications

- General purpose AC line load switching
- Motor control circuits
- Home appliances
- Heating
- Lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

### Description

Available in through-hole package, the T1235T-8I Triac can be used for the on/off or phase angle control function in general purpose AC switching where high commutation capability is required. This device can be used without a snubber RC circuit when the limits defined are respected.

TO-220AB insulated provides tab insulation, UL1557 certified, rated at 2.5 kV RMS and UL-94, V0 resin compliance.

Package environmentally friendly Ecopack®2 graded (RoHS and Halogen Free compliance).

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Figure 1: Functional diagram

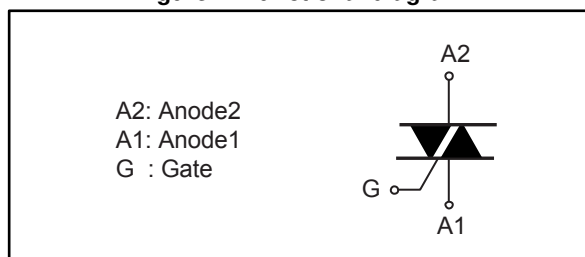


Table 1: Device summary

| Symbol            | Value | Unit |
|-------------------|-------|------|
| $I_{T(RMS)}$      | 12    | A    |
| $V_{DRM}/V_{RRM}$ | 800   | V    |
| $V_{DSM}/V_{RSM}$ | 900   | V    |
| $I_{GT}$          | 35    | mA   |

# 1 Characteristics

**Table 2: Absolute maximum ratings (limiting values)**

| Symbol            | Parameter  |                         | Value                        | Unit             |
|-------------------|--|-------------------------|------------------------------|------------------|
| $I_{T(RMS)}$      | RMS on-state current (full sine wave)  |                         | $T_c = 114\text{ °C}$<br>12  | A                |
| $I_{TSM}$         | Non repetitive surge peak on-state current,<br>$T_j$ initial = 25 °C                             |                         | $t_p = 16.7\text{ ms}$<br>95 | A                |
|                   |  |                         | $t_p = 20\text{ ms}$<br>90   |                  |
| $I^2t$            | $I^2t$ value for fusing  |                         | $T_j$ initial = 25 °C<br>54  | A <sup>2</sup> s |
| $di/dt$           | Critical rate of rise of on-state current,<br>$I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$ |                         | $f = 100\text{ Hz}$<br>100   | A/ $\mu$ s       |
| $V_{DRM}/V_{RRM}$ | Repetitive peak off-state voltage  |                         | $T_j = 150\text{ °C}$<br>600 | V                |
|                   |  |                         | $T_j = 125\text{ °C}$<br>800 | V                |
| $V_{DSM}/V_{RSM}$ | Non Repetitive peak off-state voltage  |                         | $t_p = 10\text{ ms}$<br>900  | V                |
| $I_{GM}$          | Peak gate current  | $t_p = 20\text{ }\mu$ s | $T_j = 150\text{ °C}$<br>4   | A                |
| $P_{G(AV)}$       | Average gate power dissipation   |                         | $T_j = 150\text{ °C}$<br>1   | W                |
| $T_{stg}$         | Storage junction temperature range   |                         |                              | -40 to +150 °C   |
| $T_j$             | Operating junction temperature range   |                         |                              | -40 to +150 °C   |
| $T_L$             | Maximum lead temperature for soldering during 10 s   |                         |                              | 260 °C           |
| $V_{ins}$         | Insulation RMS voltage, 1 minute, UL1557 certified (E81734)                                      |                         |                              | 2.5 kV           |

**Table 3: Electrical characteristics ( $T_j = 25\text{ °C}$ , unless otherwise specified)**

| Symbol            | Test conditions  | Quadrants; $T_j$      |                       | Value | Unit       |      |
|-------------------|--|-----------------------|-----------------------|-------|------------|------|
| $I_{GT}$          | $V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$                       | I - II - III          | Min.                  | 1.75  | mA         |      |
|                   | $V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$                       | I - II - III          | Max.                  | 35    | mA         |      |
| $V_{GT}$          | $V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$                       | I - II - III          | Max.                  | 1.3   | V          |      |
| $V_{GD}$          | $V_D = V_{DRM}$ , $R_L = 3.3\text{ k}\Omega$ , $T_j = 150\text{ °C}$ | I - II - III          | Min.                  | 0.2   | V          |      |
| $I_L$             | $I_G = 1.2 \times I_{GT}$  | I - III               | Max.                  | 60    | mA         |      |
|                   | $I_G = 1.2 \times I_{GT}$  | II                    | Max.                  | 80    | mA         |      |
| $I_H^{(1)}$       | $I_T = 500\text{ mA}$ , gate open                                    |                       | Max.                  | 40    | mA         |      |
| $dV/dt^{(1)}$     | $V_D = 536\text{ V}$ , gate open                                     | $T_j = 125\text{ °C}$ | Min.                  | 2000  | V/ $\mu$ s |      |
|                   | $V_D = 402\text{ V}$ , gate open                                     | $T_j = 150\text{ °C}$ | Min.                  | 1000  | V/ $\mu$ s |      |
| $(di/dt)_c^{(1)}$ | Without snubber, $(dV/dt)_c > 20\text{ V}/\mu$ s                     |                       | $T_j = 125\text{ °C}$ | Min.  | 12         | A/ms |
|                   |  |                       | $T_j = 150\text{ °C}$ | Min.  | 6          | A/ms |

**Notes:**

<sup>(1)</sup>For both polarities of A2 referenced to A1.

Table 4: Static characteristics

| Symbol                             | Test conditions                                | T <sub>j</sub> |      | Value | Unit |
|------------------------------------|--|----------------|------|-------|------|
| V <sub>TM</sub> <sup>(1)</sup>     | I <sub>T</sub> = 17 A, t <sub>p</sub> = 380 μs | 25 °C          | Max. | 1.60  | V    |
| V <sub>TO</sub> <sup>(1)</sup>     | Threshold on-state voltage                     | 150 °C         | Max. | 0.85  | V    |
| R <sub>D</sub> <sup>(1)</sup>      | Dynamic resistance                             | 150 °C         | Max. | 50    | mΩ   |
| I <sub>DRM</sub> /I <sub>RPM</sub> | V <sub>DRM</sub> = V <sub>RPM</sub> = 800 V    | 25 °C          | Max. | 5     | μA   |
|                                    |  | 125 °C         |      | 1     | mA   |
|                                    | V <sub>DRM</sub> = V <sub>RPM</sub> = 600 V    | 150 °C         | Max. | 3.1   | mA   |

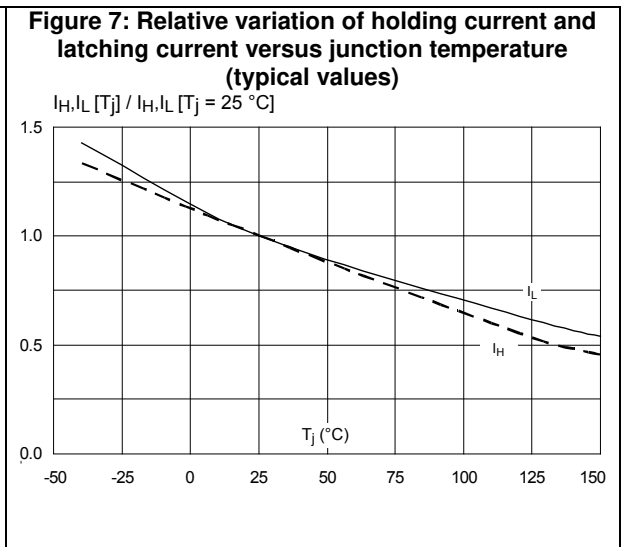
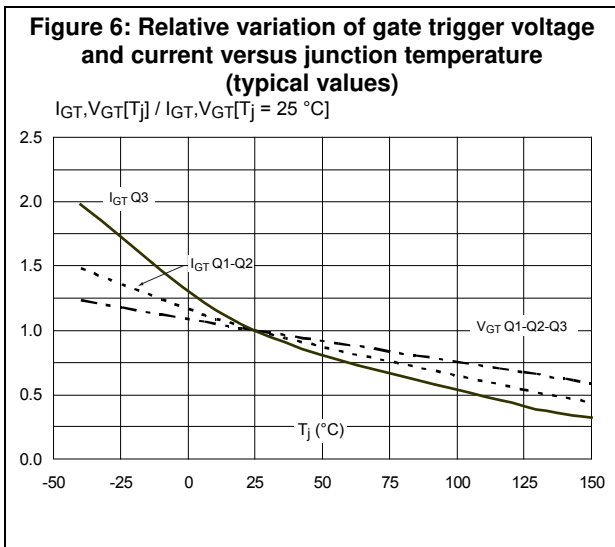
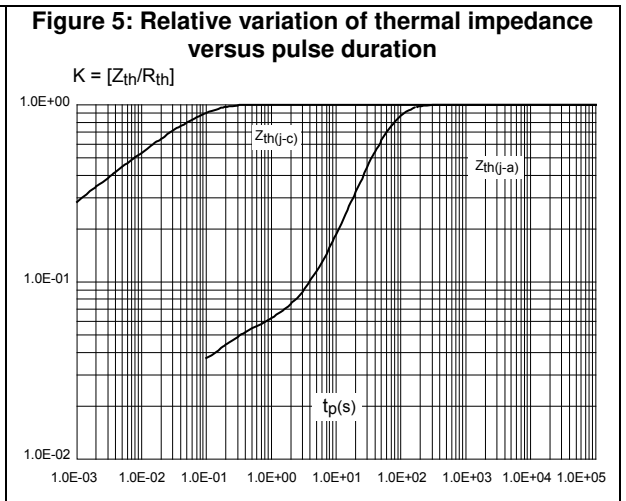
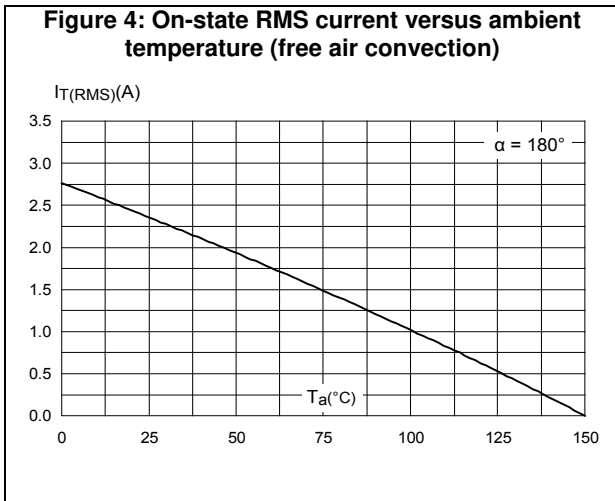
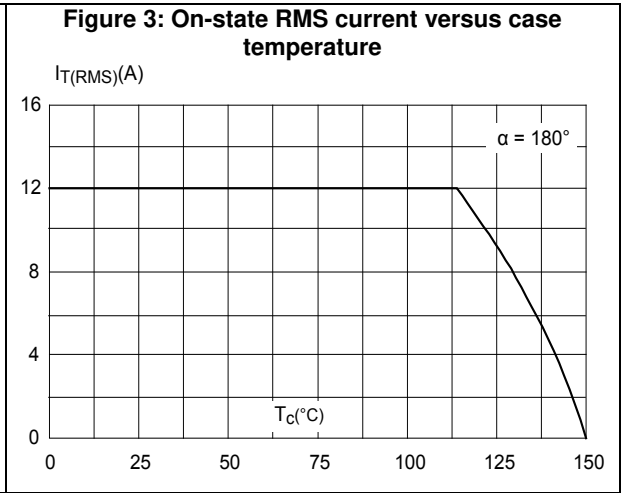
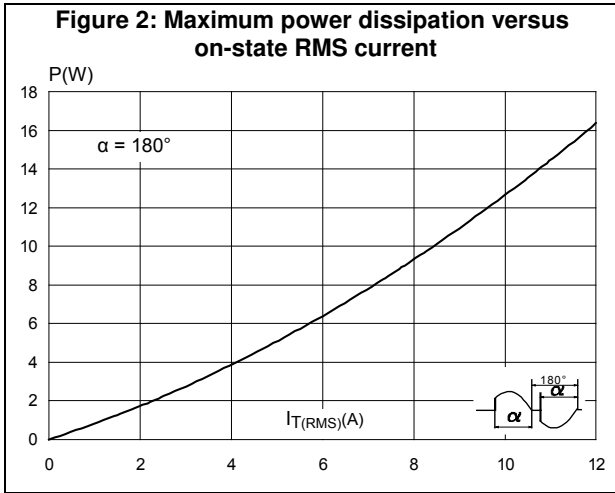
**Notes:**

<sup>(1)</sup>For both polarities of A2 referenced to A1.

Table 5: Thermal resistance

| Symbol               | Parameter             |      | Value | Unit |
|----------------------|-----------------------|------|-------|------|
| R <sub>th(j-c)</sub> | Junction to case (AC) | Max. | 2.6   | °C/W |
| R <sub>th(j-a)</sub> | Junction to ambient   | Typ. | 60    |      |

# 1.1 Characteristics (curves)



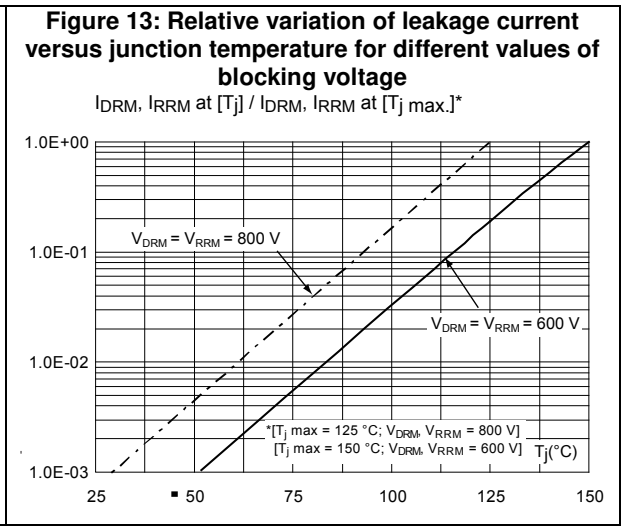
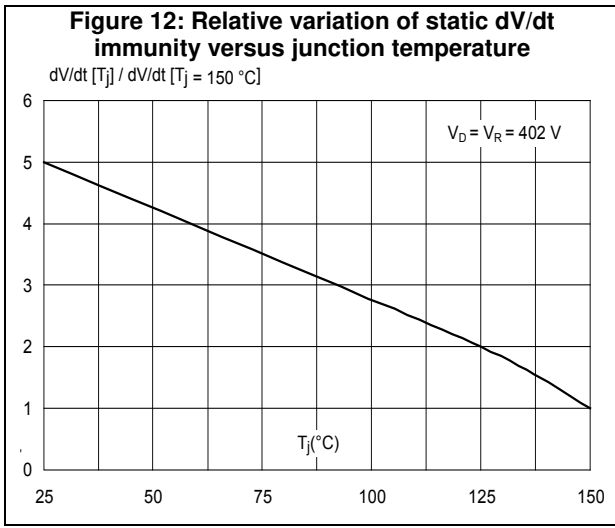
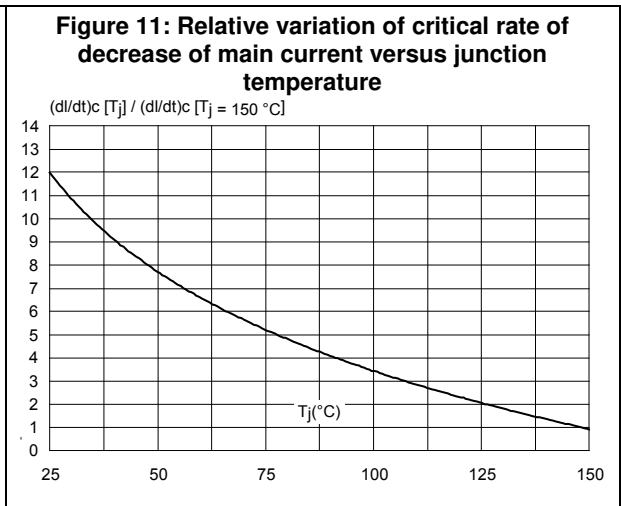
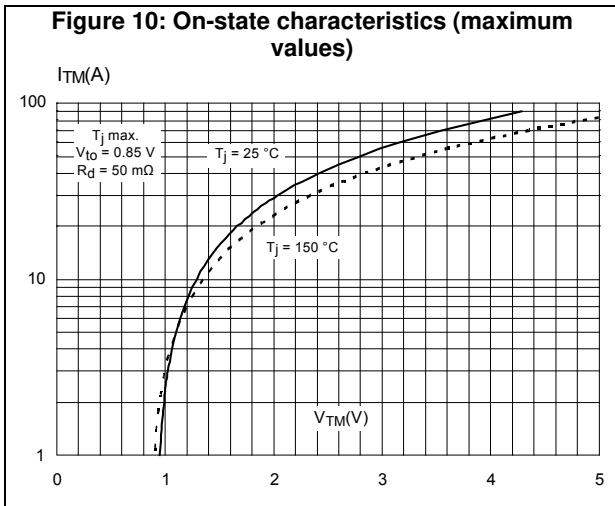
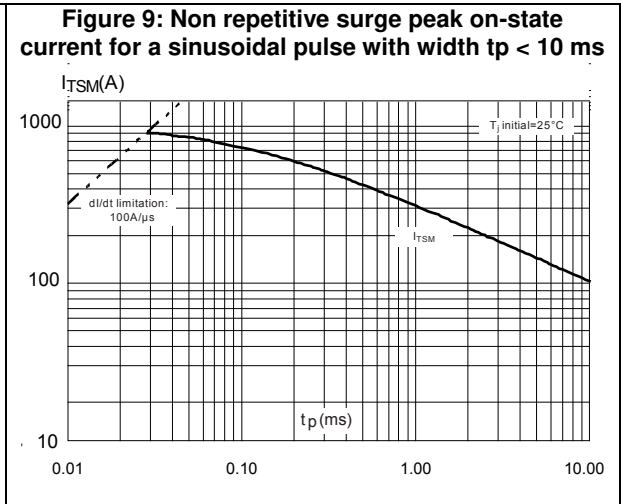
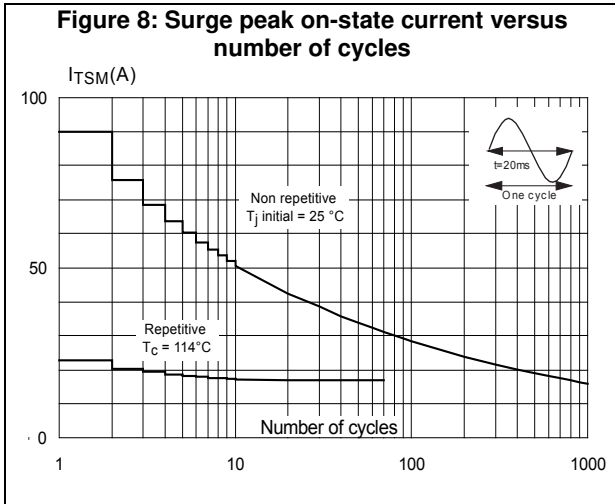




Table 6: TO-220AB Insulated package mechanical data

| Ref. | Dimensions  |       |       |                       |        |        |
|------|-------------|-------|-------|-----------------------|--------|--------|
|      | Millimeters |       |       | Inches <sup>(1)</sup> |        |        |
|      | Min.        | Typ.  | Max.  | Min.                  | Typ.   | Max.   |
| A    | 15.20       |       | 15.90 | 0.5984                |        | 0.6260 |
| a1   |             | 3.75  |       |                       | 0.1476 |        |
| a2   | 13.00       |       | 14.00 | 0.5118                |        | 0.5512 |
| B    | 10.00       |       | 10.40 | 0.3937                |        | 0.4094 |
| b1   | 0.61        |       | 0.88  | 0.0240                |        | 0.0346 |
| b2   | 1.23        |       | 1.32  | 0.0484                |        | 0.0520 |
| C    | 4.40        |       | 4.60  | 0.1732                |        | 0.1811 |
| c1   | 0.49        |       | 0.70  | 0.0193                |        | 0.0276 |
| c2   | 2.40        |       | 2.72  | 0.0945                |        | 0.1071 |
| e    | 2.40        |       | 2.70  | 0.0945                |        | 0.1063 |
| F    | 6.20        |       | 6.60  | 0.2441                |        | 0.2598 |
| I    | 3.73        |       | 3.88  | 0.1469                |        | 0.1528 |
| L    | 2.65        |       | 2.95  | 0.1043                |        | 0.1161 |
| I2   | 1.14        |       | 1.70  | 0.0449                |        | 0.0669 |
| I3   | 1.14        |       | 1.70  | 0.0449                |        | 0.0669 |
| I4   | 15.80       | 16.40 | 16.80 | 0.6220                | 0.6457 | 0.6614 |
| M    |             | 2.6   |       |                       | 0.1024 |        |

**Notes:**

<sup>(1)</sup>Inch dimensions are for reference only.

### 3 Ordering information

Figure 15: Ordering information scheme

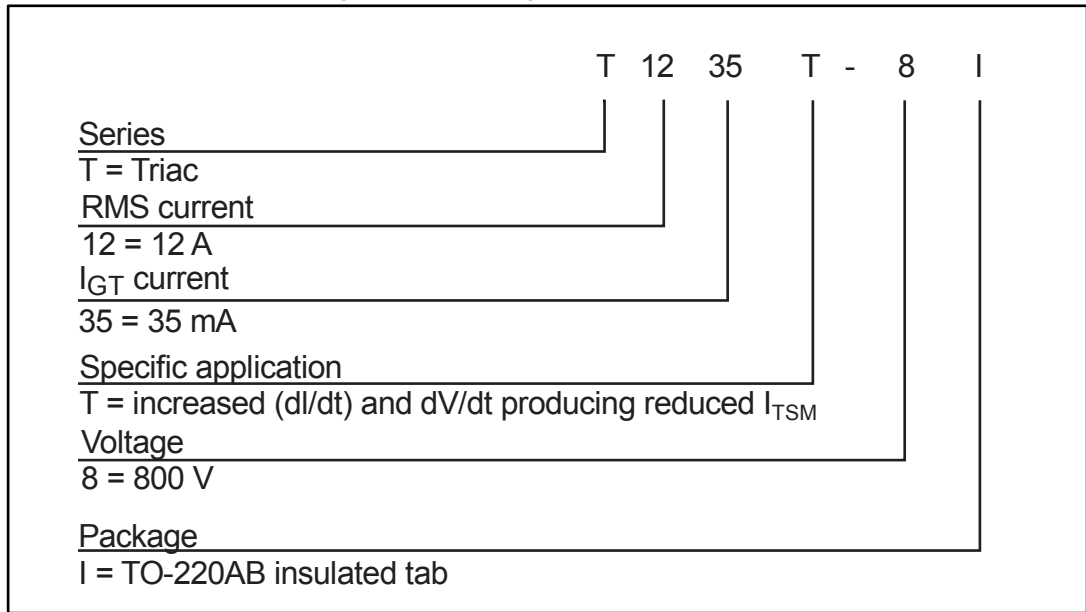


Table 7: Ordering information

| Order code | Marking   | Package            | Weight | Base qty. | Delivery mode |
|------------|-----------|--------------------|--------|-----------|---------------|
| T1235T-8I  | T1235T-8I | TO-220AB insulated | 2.3 g  | 50        | Tube          |

### 4 Revision history

Table 8: Document revision history

| Date        | Revision | Changes   |
|-------------|----------|---|
| 17-Oct-2017 | 1        | Initial release.  |
| 18-Dec-2017 | 2        | Updated <a href="#">Table 4: "Static characteristics"</a> . |



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