

Snubberless™ high temperature 25 A Triacs

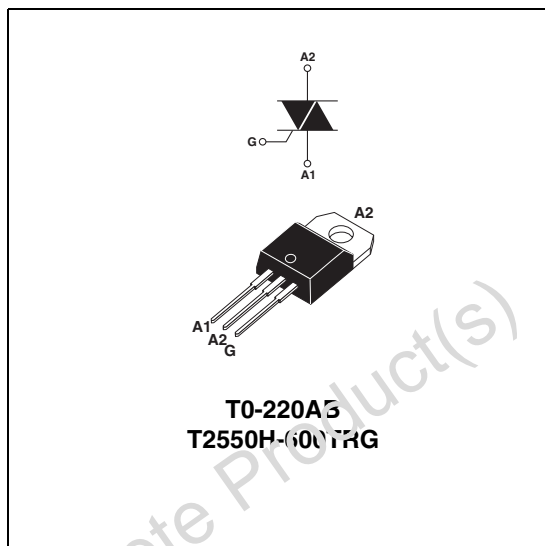
Main features

| Symbol | Value | Unit |
|-------------------|-------|------|
| $I_{T(RMS)}$ | 25 | A |
| V_{DRM}/V_{RRM} | 600 | V |
| $I_{GT} (Q_1)$ | 50 | mA |

Description

Specifically designed for use in high temperature environment (found in hot appliances such as cookers, ovens, hobs, electric heaters, coffee machines...), the new 25 A **T2550H** triacs provide an enhanced performance in terms of power loss and thermal dissipation. This allows for optimization of the heatsinking dimensioning, leading to space and cost effectiveness when compared to electro-mechanical solutions.

Based on ST snubberless technology, they offer high commutation switching capabilities and high noise immunity levels. And, thanks to their clip assembly technique, they provide a superior performance in surge current handling.



Order code

| Part Number | Marking |
|---------------|------------|
| T2550H-600TRG | T2550H600T |

Table 1. Absolute maximum ratings

| Symbol | Parameter | | Value | Unit | | |
|--------------------|--|---------------------------|---------------------------|------|--------------------------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | | $T_c = 125^\circ\text{C}$ | 25 | A | |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle, T_j initial = 25°C) | F = 50 Hz | t = 20 ms | 250 | A | |
| | | F = 60 Hz | t = 16.7 ms | 260 | | |
| I^2t | I^2t Value for fusing | $t_p = 10$ ms | | 340 | A^2s | |
| di/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100$ ns | F = 120 Hz | $T_j = 150^\circ\text{C}$ | 50 | A/ μs | |
| V_{DSM}/V_{RSM} | Non repetitive surge peak off-state voltage | $t_p = 10$ ms | $T_j = 25^\circ\text{C}$ | 700 | V | |
| I_{GM} | Peak gate current | $t_p = 20$ μs | $T_j = 150^\circ\text{C}$ | 4 | A | |
| $P_{G(AV)}$ | Average gate power dissipation | $T_j = 150^\circ\text{C}$ | | 1 | W | |
| T_{stg} T_j | Storage junction temperature range Operating junction temperature range | | | | - 40 to + 150 - 40 to + 150 | $^\circ\text{C}$ |

1 Characteristics

Table 2. Electrical Characteristics ($T_j = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Test Conditions | Quadrant | | Value | Unit |
|-------------------|---|--------------|------|-------|------------------|
| $I_{GT}^{(1)}$ | $V_D = 12\text{ V}$ $R_L = 33\ \Omega$ | I - II - III | MAX. | 50 | mA |
| V_{GT} | | | | 1.3 | V |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3\ \text{k}\Omega$ $T_j = 150^\circ\text{C}$ | I - II - III | MIN. | 0.15 | V |
| $I_H^{(2)}$ | $I_T = 500\ \text{mA}$ | | MAX. | 75 | mA |
| I_L | $I_G = 1.2 I_{GT}$ | I - II - III | MAX. | 90 | mA |
| $dV/dt^{(2)}$ | $V_D = 67\% V_{DRM}$ gate open $T_j = 150^\circ\text{C}$ | | MIN. | 500 | V/ μs |
| $(di/dt)_c^{(2)}$ | Without snubber $T_j = 150^\circ\text{C}$ | | MIN. | 11.1 | A/ms |

1. minimum I_{GT} is guaranteed at 10% of I_{GT} max.

2. for both polarities of A2 referenced to A1.

Table 3. Static Characteristics

| Symbol | Test Conditions | | | Value | Unit |
|------------------------|--|---------------------------|------|-------|---------------|
| $V_T^{(1)}$ | $I_{TM} = 35\ \text{A}$ $t_p = 380\ \mu\text{s}$ | $T_j = 25^\circ\text{C}$ | MAX. | 1.5 | V |
| $V_{to}^{(1)}$ | Threshold voltage | $T_j = 150^\circ\text{C}$ | MAX. | 0.80 | V |
| $R_d^{(1)}$ | Dynamic resistance | $T_j = 150^\circ\text{C}$ | MAX. | 19 | m Ω |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | $T_j = 25^\circ\text{C}$ | MAX. | 5 | μA |
| | | $T_j = 150^\circ\text{C}$ | | 8.5 | mA |
| | $V_{DRM}/V_{RRM} = 400\ \text{V}$ (at mains peak voltage) | $T_j = 150^\circ\text{C}$ | | 5.5 | |

1. for both polarities of A2 referenced to A1.

Table 4. Thermal resistance

| Symbol | Parameter | Value | Unit |
|---------------|-----------------------|-------|---------------------------|
| $R_{th(j-c)}$ | Junction to case (AC) | 0.8 | $^\circ\text{C}/\text{W}$ |

Figure 1. Maximum power dissipation versus RMS on-state current (full cycle)

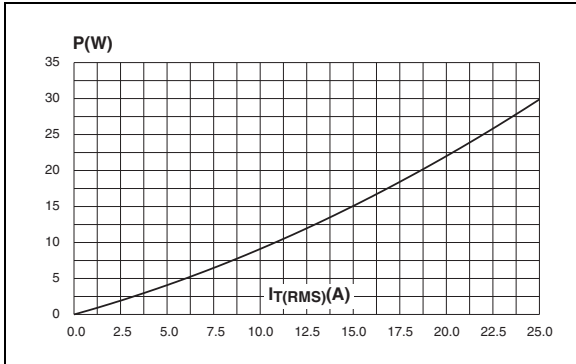


Figure 2. RMS on-state current versus case temperature (full cycle)

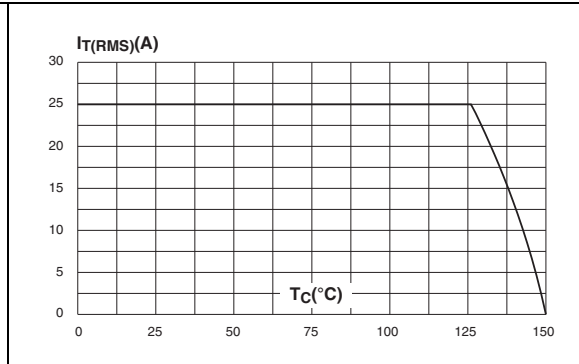


Figure 3. Relative variation of thermal impedance versus pulse duration

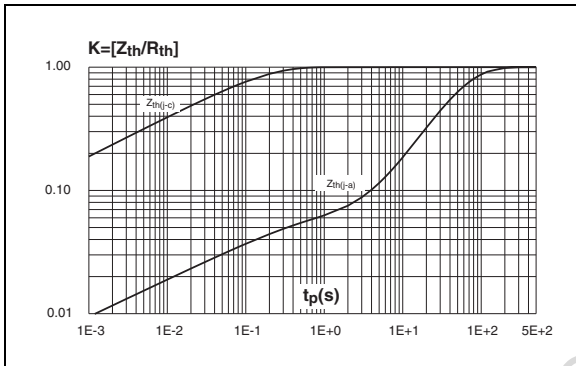


Figure 4. On-state characteristics (maximum values)

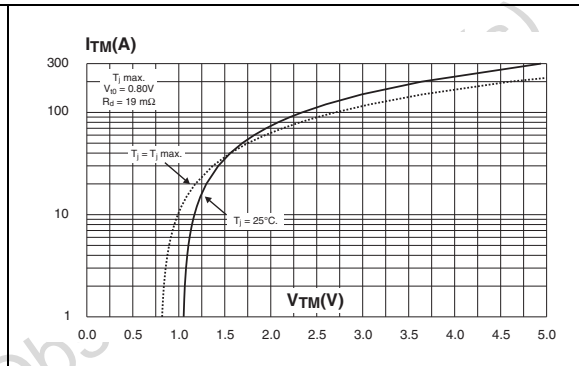


Figure 5. Surge peak on-state current versus number of cycles

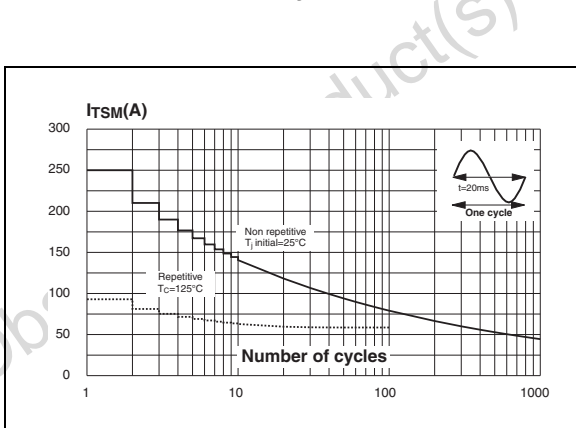


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10$ ms and corresponding value of I^2t

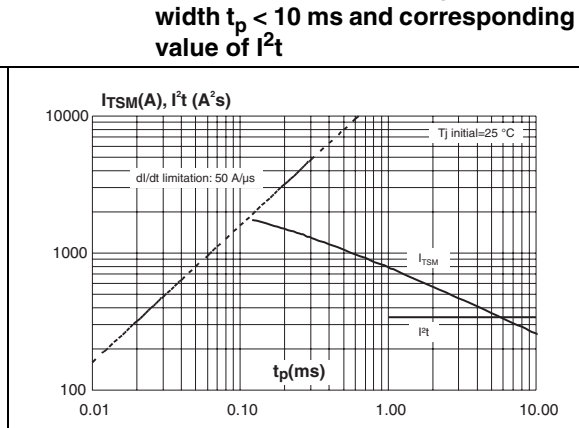


Figure 7. Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

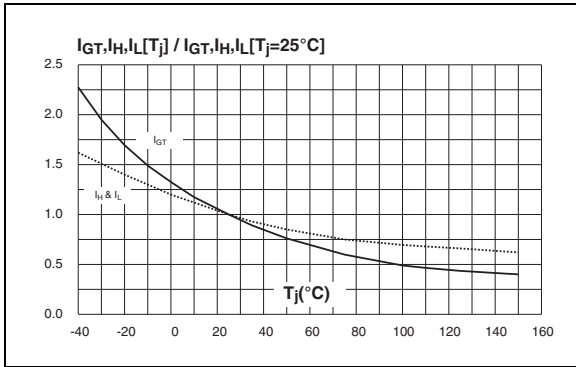


Figure 8. Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values)

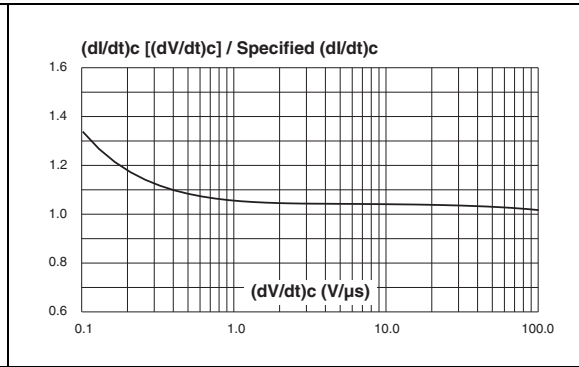


Figure 9. Relative variation of critical rate of decrease of main current versus junction temperature

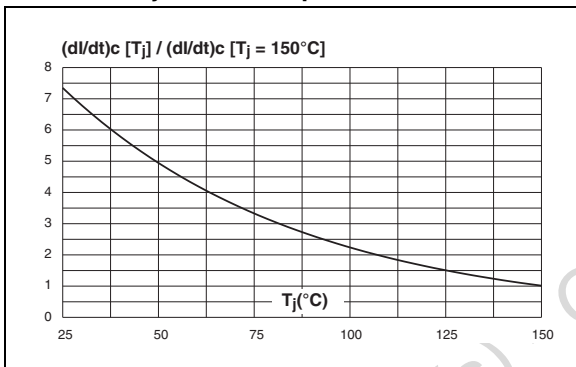


Figure 10. Leakage current versus junction temperature for different values of blocking voltage (typical values)

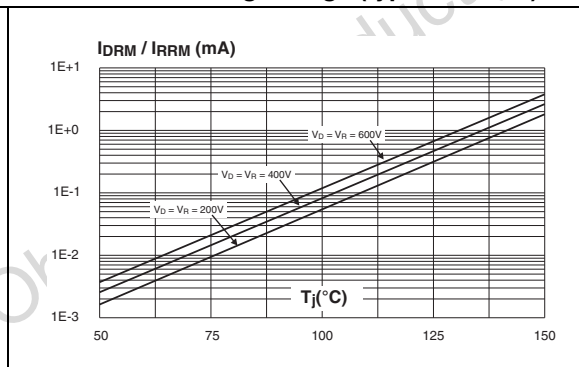
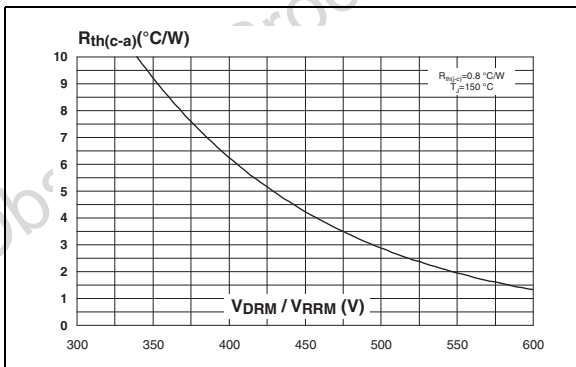
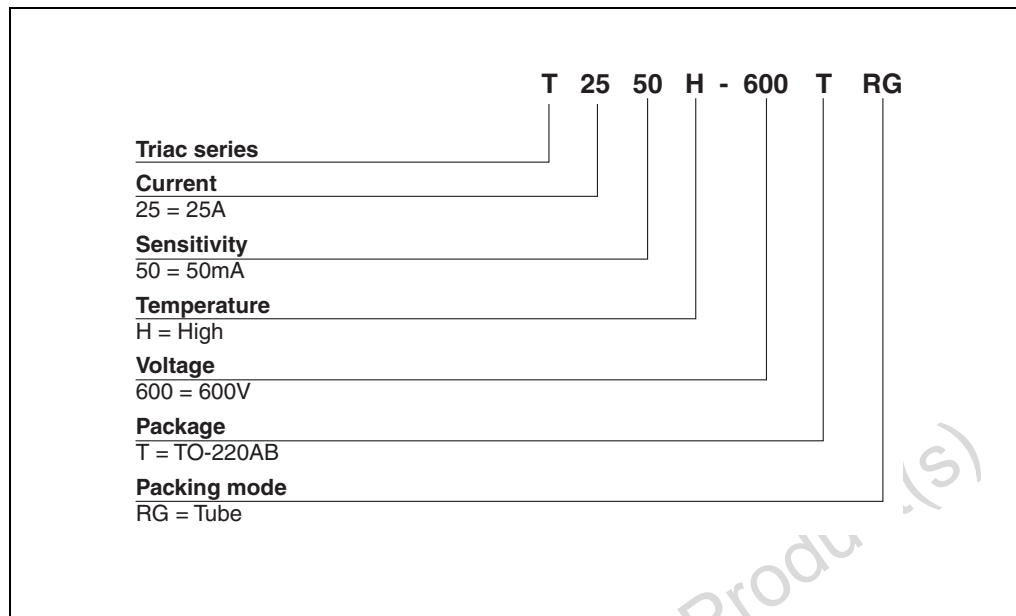


Figure 11. Acceptable repetitive peak off-state voltage versus case-ambient thermal resistance

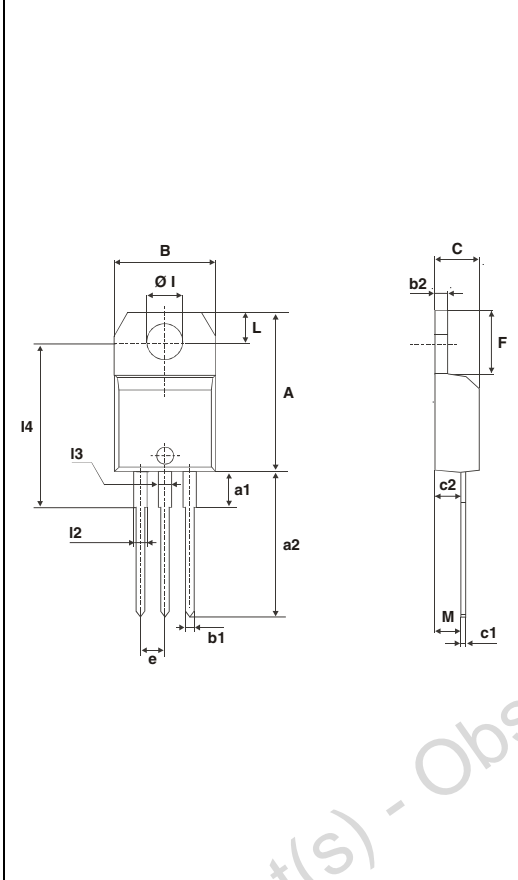


2 Ordering information scheme



3 Package information

Table 5. TO-220AB Dimensions



| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 15.20 | | 15.90 | 0.598 | | 0.625 |
| a1 | | 3.75 | | | 0.147 | |
| a2 | 13.00 | | 14.00 | 0.511 | | 0.551 |
| B | 10.00 | | 10.40 | 0.393 | | 0.409 |
| b1 | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b2 | 1.23 | | 1.32 | 0.048 | | 0.051 |
| C | 4.40 | | 4.60 | 0.173 | | 0.181 |
| c1 | 0.49 | | 0.70 | 0.019 | | 0.027 |
| c2 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| F | 6.20 | | 6.60 | 0.244 | | 0.259 |
| Ø1 | 3.75 | | 3.85 | 0.147 | | 0.151 |
| l4 | 15.80 | 16.40 | 16.80 | 0.622 | 0.646 | 0.661 |
| L | 2.65 | | 2.95 | 0.104 | | 0.116 |
| l2 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| l3 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| M | | 2.60 | | | 0.102 | |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

4 Ordering information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|------------|----------|--------|----------|---------------|
| T2550H-600TRG | T2550H600T | TO-220AB | 2.3 g | 50 | Tube |

5 Revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Apr-2002 | 5A | Last update. |
| 13-Feb-2006 | 6 | TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added. |
| 20-Jun-2006 | 7 | Reformatted to current standards. Figures 6 and 11 replaced. |

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2006 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com