

## SNUBBERLESS TRIAC

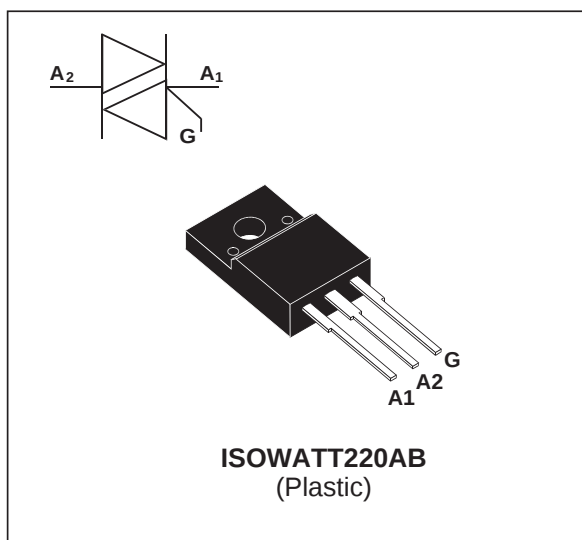
### FEATURES

- $I_{T(RMS)} = 8\text{ A}$
- $V_{DRM} = V_{RRM} = 600\text{V to } 800\text{V}$
- EXCELLENT SWITCHING PERFORMANCES
- INSULATING VOLTAGE =  $1500V_{(RMS)}$
- U.L. RECOGNIZED : E81734

### DESCRIPTION

The T820/830W triacs use high performance glass passivated chip technology, housed in a fully molded plastic ISOWATT220AB package.

The SNUBBERLESS<sup>TM</sup> concept offers suppression of R-C network, and is suitable for applications such as phase control and static switch on inductive and resistive loads.



### ABSOLUTE RATINGS (limiting values)

| Symbol             | Parameter                                                                                                             |                                            | Value                          | Unit                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------|------------------------|
| $I_{T(RMS)}$       | RMS on-state current<br>(360° conduction angle)                                                                       | $T_c = 95^\circ\text{C}$                   | 8                              | A                      |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $T_j$ initial = $25^\circ\text{C}$ )                                  | $t_p = 16.7\text{ ms}$<br>(1 cycle, 60 Hz) | 88                             | A                      |
|                    |                                                                                                                       | $t_p = 10\text{ ms}$<br>(1/2 cycle, 50 Hz) | 100                            |                        |
| $I^2t$             | $I^2t$ Value (half-cycle, 50 Hz)                                                                                      | $t_p = 10\text{ ms}$                       | 50                             | $\text{A}^2\text{s}$   |
| $di/dt$            | Critical rate of rise of on-state current<br>Gate supply : $I_G = 500\text{ mA}$ $di_G/dt = 1\text{ A}/\mu\text{s}$ . | Repetitive<br>$F = 50\text{ Hz}$           | 20                             | $\text{A}/\mu\text{s}$ |
|                    |                                                                                                                       | Non Repetitive                             | 100                            |                        |
| $T_{stg}$<br>$T_j$ | Storage temperature range<br>Operating junction temperature range                                                     |                                            | - 40 to + 150<br>- 40 to + 125 | $^\circ\text{C}$       |
| TI                 | Maximum lead temperature for soldering during 10s at 4.5 mm from case                                                 |                                            | 260                            | $^\circ\text{C}$       |

| Symbol                 | Parameter                                                      | T820 / T830-xxxW |     |     | Unit |
|------------------------|----------------------------------------------------------------|------------------|-----|-----|------|
|                        |                                                                | 600              | 700 | 800 |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_j = 125^\circ\text{C}$ | 600              | 700 | 800 | V    |

**T820-xxxW / T830-xxxW****THERMAL RESISTANCES**

| Symbol   | Parameter                                        | Value | Unit |
|----------|--------------------------------------------------|-------|------|
| Rth(j-a) | Junction to ambient                              | 50    | °C/W |
| Rth(j-c) | Junction to case for A.C (360° conduction angle) | 3.1   | °C/W |

**GATE CHARACTERISTICS** (maximum values)

$P_{G(AV)} = 1 \text{ W}$   $P_{GM} = 10 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )  $I_{GM} = 4 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )

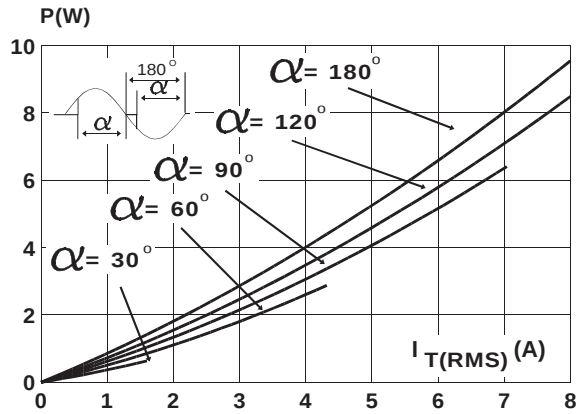
**ELECTRICAL CHARACTERISTICS**

| Symbol                 | Test Conditions                                                           |                           | Quadrant |     | T820 | T830 | Unit                   |
|------------------------|---------------------------------------------------------------------------|---------------------------|----------|-----|------|------|------------------------|
| $I_{GT}$               | $V_D = 12\text{V}$ (DC) $R_L = 33\Omega$                                  | $T_j = 25^\circ\text{C}$  | I-II-III | MAX | 20   | 30   | mA                     |
| $V_{GT}$               | $V_D = 12\text{V}$ (DC) $R_L = 33\Omega$                                  | $T_j = 25^\circ\text{C}$  | I-II-III | MAX | 1.5  |      | V                      |
| $V_{GD}$               | $V_D = V_{DRM}$ $R_L = 3.3\text{k}\Omega$                                 | $T_j = 125^\circ\text{C}$ | I-II-III | MIN | 0.2  |      | V                      |
| tgt                    | $V_D = V_{DRM}$ $I_G = 500\text{mA}$<br>$di_G/dt = 3\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$  | I-II-III | TYP | 2    |      | $\mu\text{s}$          |
| $I_H^*$                | $I_T = 100\text{mA}$ Gate open                                            | $T_j = 25^\circ\text{C}$  |          | MAX | 35   | 50   |                        |
| $V_{TM}^*$             | $I_{TM} = 11\text{A}$ $t_p = 380\mu\text{s}$                              | $T_j = 25^\circ\text{C}$  |          | MAX | 1.5  |      | V                      |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM}$ rated<br>$V_{RRM}$ rated                                        | $T_j = 25^\circ\text{C}$  |          | MAX | 10   |      | $\mu\text{A}$          |
|                        |                                                                           | $T_j = 125^\circ\text{C}$ |          | MAX | 2    |      | mA                     |
| $dV/dt^*$              | Linear slope up to<br>$V_D = 67\%V_{DRM}$ Gate open                       | $T_j = 125^\circ\text{C}$ |          | MIN | 200  | 300  | $\text{V}/\mu\text{s}$ |
| $(dV/dt)_c^*$          | $(di/dt)_c = 4.5 \text{ A/ms}$ (see note)                                 | $T_j = 125^\circ\text{C}$ |          | MIN | 10   | 20   | $\text{V}/\mu\text{s}$ |

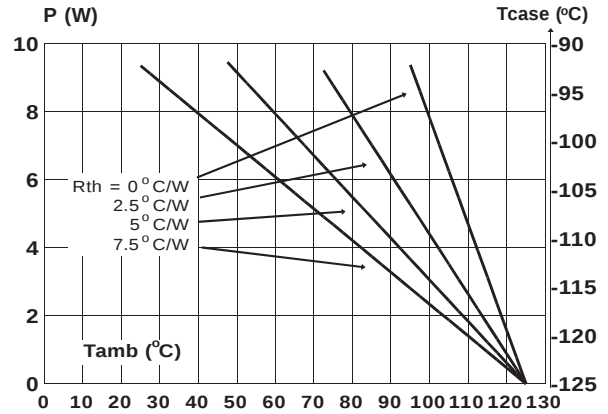
\* For either polarity of electrode A2 voltage with reference to electrode A1.

**Note :** In usual applications where  $(di/dt)_c$  is below  $4.5 \text{ A/ms}$ , the  $(dV/dt)_c$  is always lower than  $10\text{V}/\mu\text{s}$ , and, therefore, it is **unnecessary** to use a snubber R-C network accross T820W / T830W triacs.

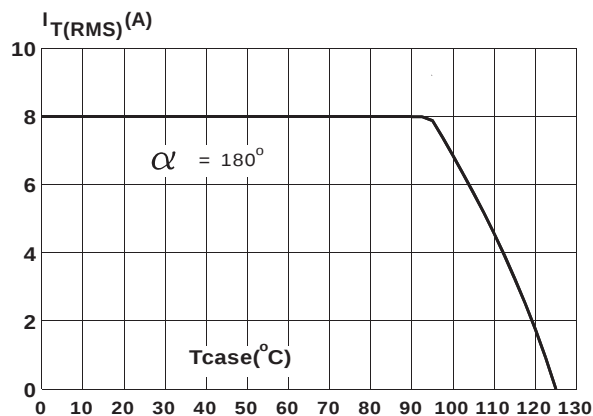
**Fig. 1:** Maximum power dissipation versus RMS on-state current.



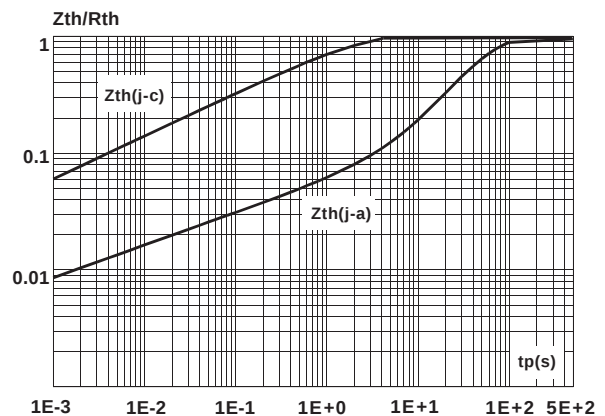
**Fig. 2:** Correlation between maximum power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact.



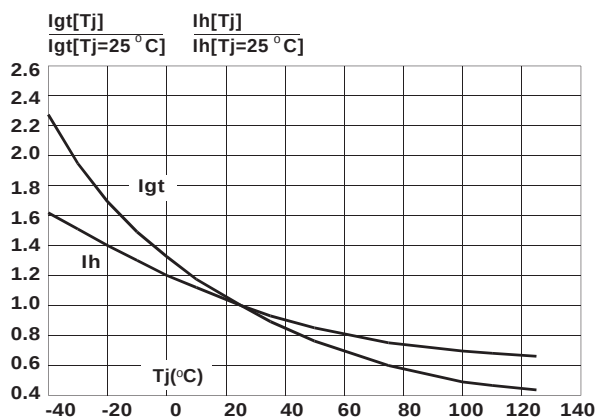
**Fig. 3:** RMS on-state current versus case temperature.



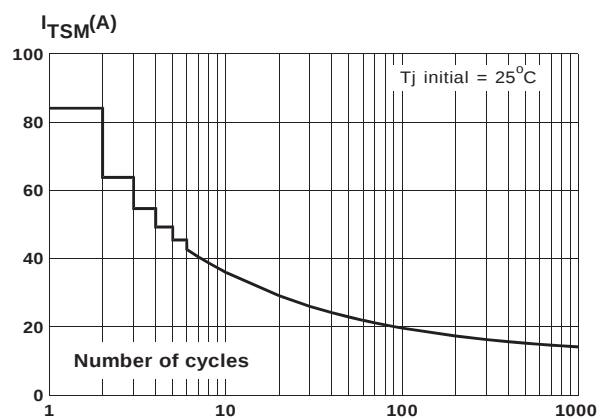
**Fig. 4:** Thermal transient impedance junction to case and junction to ambient versus pulse duration.



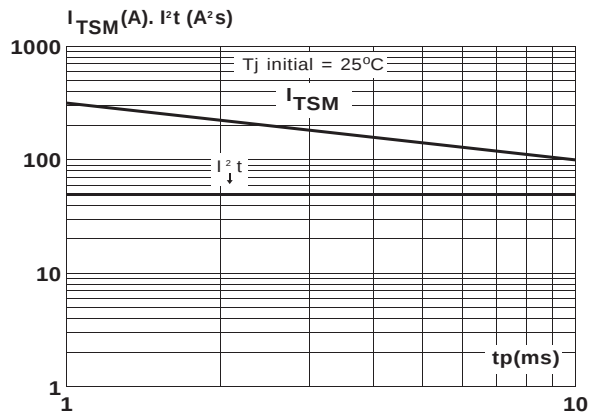
**Fig. 5:** Relative variation of gate trigger current and holding current versus junction temperature.



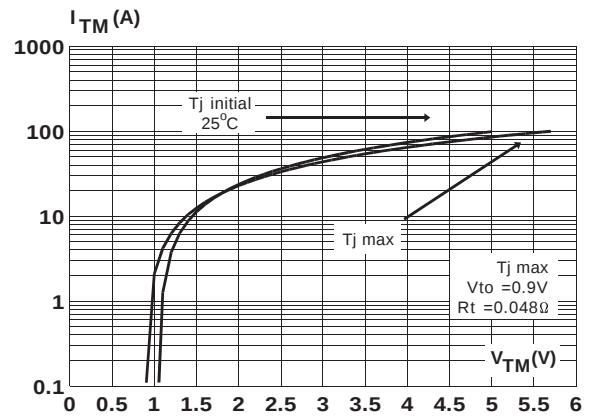
**Fig. 6:** Non repetitive surge peak on-state current versus number of cycles.



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



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



**PACKAGE MECHANICAL DATA**  
**ISOWATT220AB**

| REF. | DIMENSIONS  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| A    | 4.40        | 4.60  | 0.173      | 0.181 |
| B    | 2.50        | 2.70  | 0.098      | 0.106 |
| D    | 2.50        | 2.75  | 0.098      | 0.108 |
| E    | 0.40        | 0.70  | 0.016      | 0.028 |
| F    | 0.75        | 1.00  | 0.030      | 0.039 |
| F1   | 1.15        | 1.70  | 0.045      | 0.067 |
| F2   | 1.15        | 1.70  | 0.045      | 0.067 |
| G    | 4.95        | 5.20  | 0.195      | 0.205 |
| G1   | 2.40        | 2.70  | 0.094      | 0.106 |
| H    | 10.00       | 10.40 | 0.394      | 0.409 |
| L2   | 16.00 typ.  |       | 0.630 typ. |       |
| L3   | 28.60       | 30.60 | 1.125      | 1.205 |
| L4   | 9.80        | 10.60 | 0.386      | 0.417 |
| L6   | 15.90       | 16.40 | 0.626      | 0.646 |
| L7   | 9.00        | 9.30  | 0.354      | 0.366 |
| Diam | 3.00        | 3.20  | 0.118      | 0.126 |

- Cooling method : C
- Marking : Type number
- Weight : 2.1g
- Recommended torque value : 0.55 m.N.
- Maximum torque value : 0.70 m.N.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2001 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia  
 Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>

