

## SNUBBERLESS TRIAC

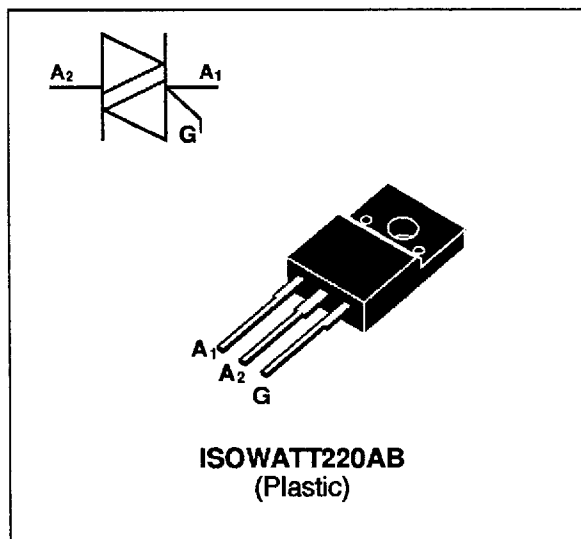
### FEATURES

- $I_{T(RMS)} = 12\text{ A}$
- $V_{DRM} = V_{RRM} = 400\text{V to } 700\text{V}$
- EXCELLENT SWITCHING PERFORMANCES
- INSULATING VOLTAGE =  $1500V_{(RMS)}$
- U.L. RECOGNIZED : E81734

### DESCRIPTION

The T1220/1230W triacs use high performance glass passivated chip technology, housed in a fully molded plastic ISOWATT220AB package.

The SNUBBERLESS™ 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)                                                                 | $T_c = 85\text{ °C}$                       | 12                             | A                  |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $T_j$ initial = $25\text{ °C}$ )                                | $t_p = 16.7\text{ ms}$<br>(1 cycle, 60 Hz) | 132                            | A                  |
|                    |                                                                                                                 | $t_p = 10\text{ ms}$<br>(1/2 cycle, 50 Hz) | 155                            |                    |
| $I^2t$             | $I^2t$ Value (half-cycle, 50 Hz)                                                                                | $t_p = 10\text{ ms}$                       | 120                            | $A^2s$             |
| $di/dt$            | Critical rate of rise of on-state current<br>Gate supply : $I_G = 500\text{ mA}$ $dI_G/dt = 1\text{ A}/\mu s$ . | Repetitive<br>$F = 50\text{ Hz}$           | 20                             | $A/\mu s$          |
|                    |                                                                                                                 | Non Repetitive                             | 100                            |                    |
| $T_{stg}$<br>$T_j$ | Storage temperature range<br>Operating junction temperature range                                               |                                            | - 40 to + 150<br>- 40 to + 125 | $^{\circ}\text{C}$ |
| $Tl$               | Maximum lead temperature for soldering during 10s at 4.5 mm from case                                           |                                            | 260                            | $^{\circ}\text{C}$ |

| Symbol                 | Parameter                                                  | T1220 / 1230-xxxW |     |     | Unit |
|------------------------|------------------------------------------------------------|-------------------|-----|-----|------|
|                        |                                                            | 400               | 600 | 700 |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_j = 125\text{ °C}$ | 400               | 600 | 700 | V    |

**T1220W / 1230W****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) | 2.8   | °C/W |

**GATE CHARACTERISTICS** (maximum values)

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

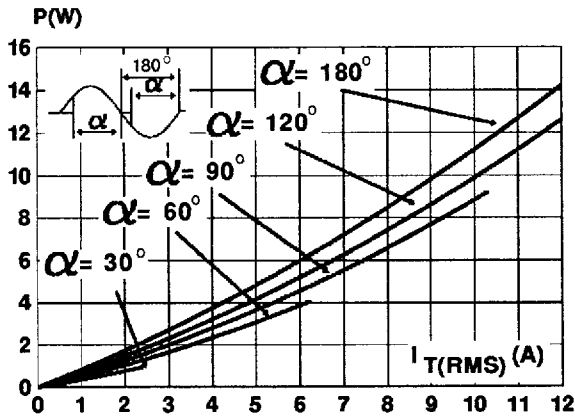
**ELECTRICAL CHARACTERISTICS**

| Symbol                 | Test Conditions                                                                                      | Quadrant                  |     | T1220 | T1230 | 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                |
| $t_{gt}$               | $V_D = V_{DRM}$ $I_G = 500\text{ mA}$<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    |                  |
| $V_{TM}^*$             | $I_{TM} = 17\text{ A}$ $t_p = 380\mu\text{s}$ $T_j = 25^\circ\text{C}$                               |                           | 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 $V_D = 67\% V_{DRM}$ Gate open $T_j = 125^\circ\text{C}$                          |                           | MIN | 200   | 300   | V/ $\mu\text{s}$ |
| $(dV/dt)_c^*$          | $(di/dt)_c = 6.5\text{ A/ms}$ (see note) $T_j = 125^\circ\text{C}$                                   |                           | MIN | 10    | 20    | V/ $\mu\text{s}$ |

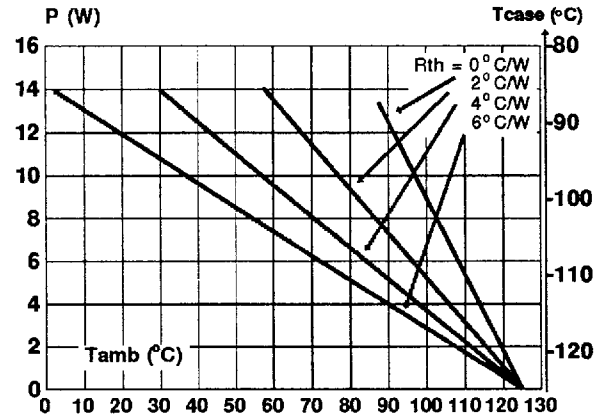
\* For either polarity of electrode A2 voltage with reference to electrode A1.

**Note :** In usual applications where  $(di/dt)_c$  is below 6.5 A/ms, the  $(dV/dt)_c$  is always lower than 10V/ $\mu\text{s}$ , and, therefore, it is **unnecessary** to use a snubber R-C network across T1220W / T1230W triacs.

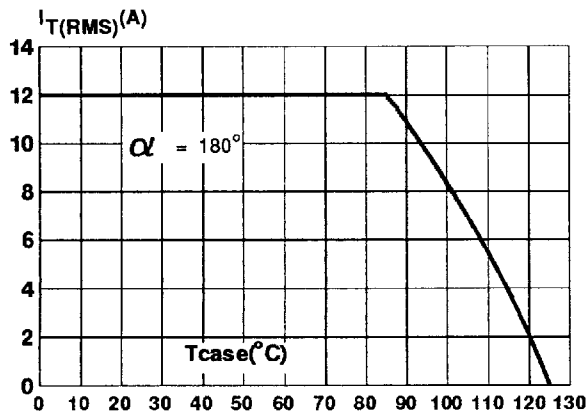
**Fig.1 :** Maximum power dissipation versus RMS on-state current.



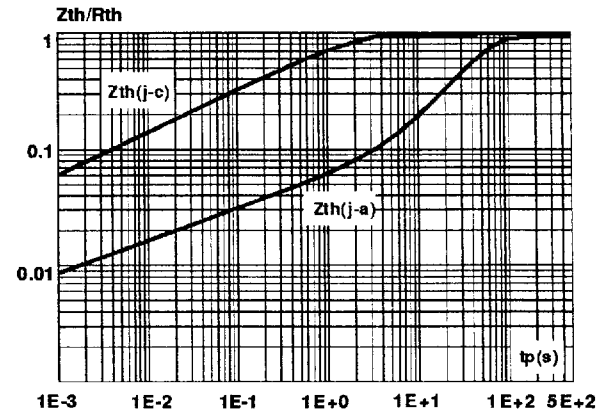
**Fig.2 :** Correlation between maximum power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact.



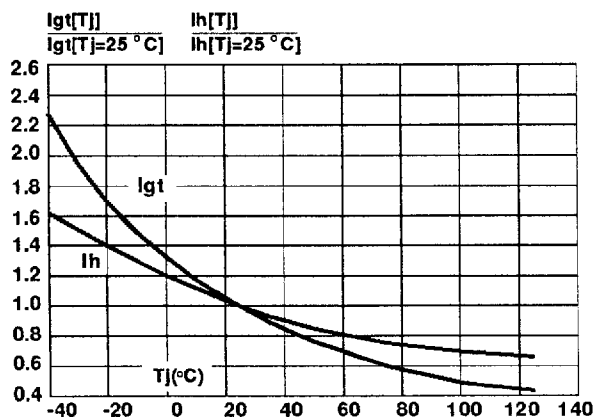
**Fig.3 :** RMS on-state current versus case temperature.



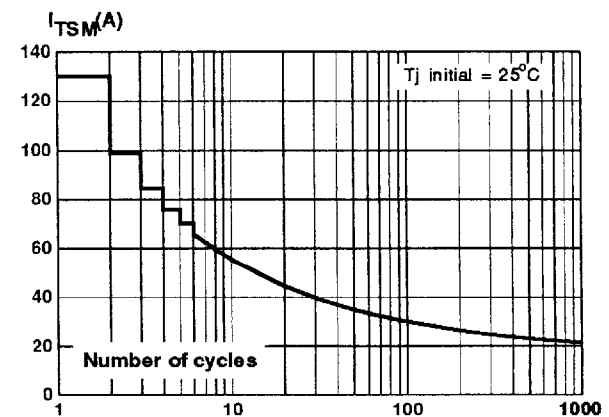
**Fig.4 :** Thermal transient impedance junction to case and junction to ambient versus pulse duration.



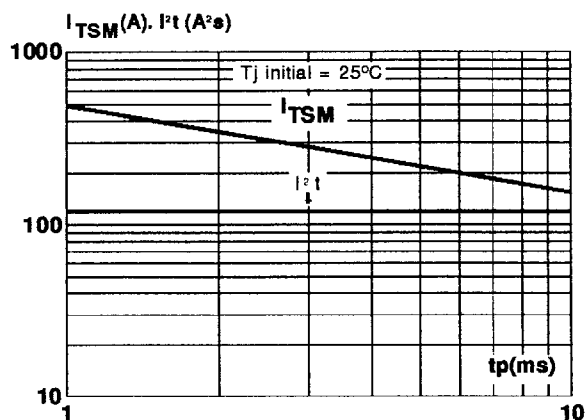
**Fig.5 :** Relative variation of gate trigger current and holding current versus junction temperature.



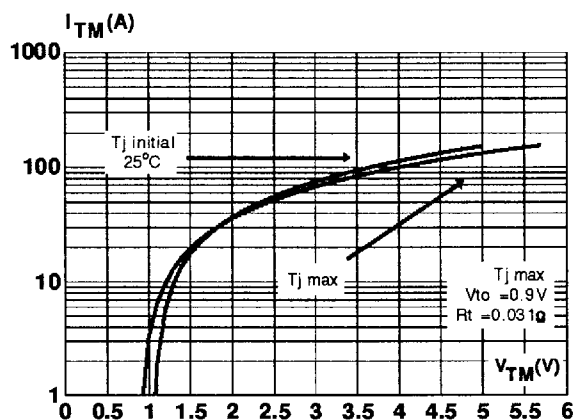
**Fig.6 :** Non repetitive surge peak on-state current versus number of cycles.

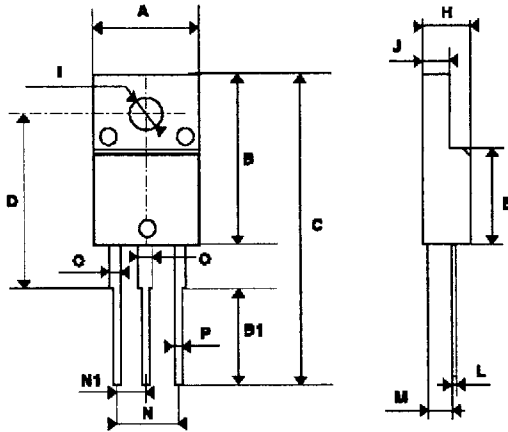


**Fig.7 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t_p \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



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



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


| REF. | DIMENSIONS  |      |           |       |
|------|-------------|------|-----------|-------|
|      | Millimeters |      | Inches    |       |
|      | Min.        | Max. | Min.      | Max.  |
| A    | 10          | 10.4 | 0.393     | 0.409 |
| B    | 15.9        | 16.4 | 0.626     | 0.645 |
| B1   | 9.8         | 10.6 | 0.385     | 0.417 |
| C    | 28.6        | 30.6 | 1.126     | 1.204 |
| D    | 16 typ      |      | 0.630 typ |       |
| E    | 9           | 9.3  | 0.354     | 0.366 |
| H    | 4.4         | 4.6  | 0.173     | 0.181 |
| I    | 3           | 3.2  | 0.118     | 0.126 |
| J    | 2.5         | 2.7  | 0.098     | 0.106 |
| L    | 0.4         | 0.7  | 0.015     | 0.027 |
| M    | 2.5         | 2.75 | 0.098     | 0.108 |
| N    | 4.95        | 5.2  | 0.195     | 0.204 |
| N1   | 2.4         | 2.7  | 0.094     | 0.106 |
| O    | 1.15        | 1.7  | 0.045     | 0.067 |
| P    | 0.75        | 1    | 0.030     | 0.039 |

Cooling method : C

Marking : Type number

Weight : 2.1g

Recommended torque value : 0.55 m.N.

Maximum torque value : 0.70 m.N.

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