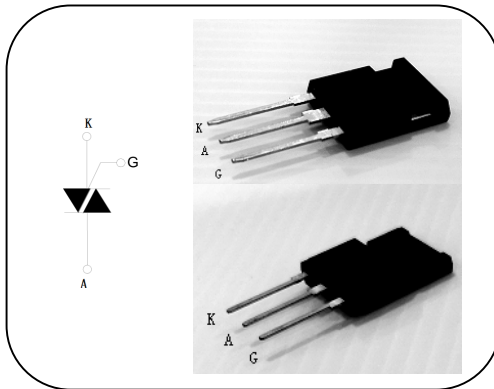


**Features:**

n-state rms current:41A  
 Blocking voltage:1600V  
 Gate current:50mA

**Typical Applications:**

Solid state relay  
 Battery charging system  
 Uninterruptible power supply  
 Variable speed motor drive  
 Industrial welding systems  
 By pass AC switch

| SYMBOL                              | CHARACTERISTIC                                                       | TEST CONDITIONS                     | T <sub>j</sub> ( C) | VALUE |      |      | UNIT             |
|-------------------------------------|----------------------------------------------------------------------|-------------------------------------|---------------------|-------|------|------|------------------|
|                                     |                                                                      |                                     |                     | Min   | Type | Max  |                  |
| I <sub>T(RMS)</sub>                 | RMS on-state current                                                 | T <sub>c</sub> =25°C                | 125                 |       |      | 41   | A                |
| V <sub>DRM</sub> / V <sub>RRM</sub> | Repetitive peak off-state voltage<br>Repetitive peak reverse voltage | tp=10ms                             | 25                  |       |      | 1600 | V                |
| I <sub>DRM</sub>                    | Repetitive peak off-state current                                    | at V <sub>DRM</sub>                 | 25                  |       | 10   |      | μA               |
| I <sub>RRM</sub>                    | Repetitive peak reverse current                                      | at V <sub>RRM</sub>                 |                     |       | 5    |      | mA               |
| I <sub>TSM</sub>                    | Surge on-state current                                               | 10ms half sine wave                 | 25                  |       |      | 410  | A                |
| I <sup>2</sup> t                    | I <sup>2</sup> t value for fusing                                    | V <sub>R</sub> =0.6V <sub>RRM</sub> |                     |       |      | 800  | A <sup>2</sup> s |
| V <sub>TM</sub>                     | Peak on-state voltage                                                | I <sub>TM</sub> =60A, tp=380μs      | 25                  |       | 1.55 |      | V                |
| di/dt                               | Critical rate of rise of on-state current                            | I <sub>G</sub> =2*I <sub>GT</sub>   | 25                  |       | 50   |      | A/μs             |
| I <sub>GM</sub>                     | Peak gate current                                                    |                                     |                     |       | 4    |      | A                |
| P <sub>G(AV)</sub>                  | Average gate power dissipation                                       |                                     |                     |       | 1    |      | W                |
| P <sub>GM</sub>                     | Peak gate power                                                      |                                     |                     |       | 10   |      | W                |
| R <sub>th(j-c)</sub>                | Thermal resistance<br>Junction to case                               | TO-247                              |                     |       | 0.8  |      | C /W             |
|                                     |                                                                      | TO-3PF                              |                     |       | 1.2  |      |                  |
| T <sub>stg</sub>                    | Storage junction temperature range                                   |                                     |                     | -40   |      | 150  | C                |
| T <sub>j</sub>                      | Operating Junction Temperature                                       |                                     |                     | -40   |      | 150  | C                |
| Outline                             | TO-247 / TO-3PF                                                      |                                     |                     |       |      |      |                  |

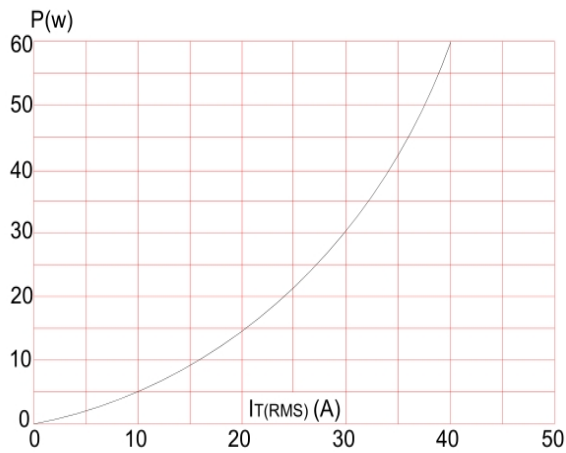
## b) Quadrants

| Symbol    | Test Conditions                                               | Quadrant     | Min  | Typ | Max | Unit       |
|-----------|---------------------------------------------------------------|--------------|------|-----|-----|------------|
| $I_{GT}$  | $V_D=12V \quad R_L=33 \Omega$                                 | I - II - III |      |     | 50  | mA         |
| $V_{GT}$  |                                                               | I - II - III |      |     | 1.3 | V          |
| $V_{GD}$  | $V_D=V_{DRM} \quad T_J=125^\circ C \quad R_L=3.3k \Omega$     | I - II - III | 0.2  |     |     | V          |
| $I_L$     | $I_G=1.2I_{GT}$                                               | I - III      |      |     | 80  | mA         |
|           |                                                               | II           |      |     | 100 |            |
| $I_H$     | $I_T=100mA$                                                   |              |      |     | 60  | mA         |
| dv/dt     | $V_D=2/3V_{DRM} \quad \text{Gate Open} \quad T_J=125^\circ C$ |              | 1000 |     |     | V/ $\mu s$ |
| (dv/dt)/c | Without snubber $T_J=125^\circ C$                             |              | 20   |     |     | V/ $\mu s$ |

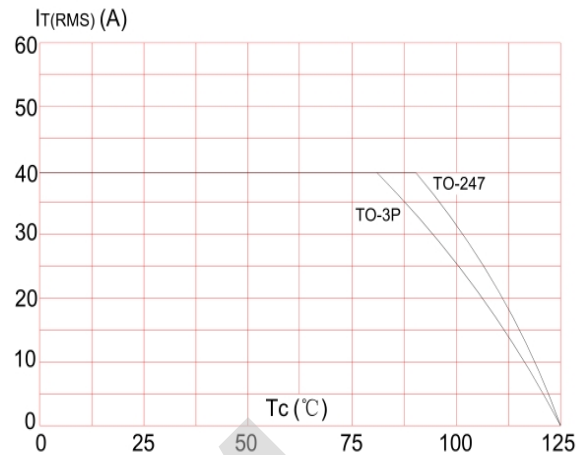
## c) Quadrants

| Symbol    | Test Conditions                                               | Quadrant     | Min | Typ | Max | Unit       |
|-----------|---------------------------------------------------------------|--------------|-----|-----|-----|------------|
| $I_{GT}$  | $V_D=12V \quad R_L=33 \Omega$                                 | I - II - III |     |     | 50  | mA         |
|           |                                                               | IV           |     |     | 70  |            |
| $V_{GT}$  |                                                               | ALL          |     |     | 1.5 | V          |
| $V_{GD}$  | $V_D=V_{DRM} \quad T_J=125^\circ C \quad R_L=3.3k \Omega$     | ALL          | 0.2 |     |     | V          |
| $I_L$     | $I_G=1.2I_{GT}$                                               | I - II - III |     |     | 90  | mA         |
|           |                                                               | II           |     |     | 100 |            |
| $I_H$     | $I_T=100mA$                                                   |              |     |     | 80  | mA         |
| dv/dt     | $V_D=2/3V_{DRM} \quad \text{Gate Open} \quad T_J=125^\circ C$ |              | 500 |     |     | V/ $\mu s$ |
| (dv/dt)/c | Without snubber $T_J=125^\circ C$                             |              | 20  |     |     | V/ $\mu s$ |

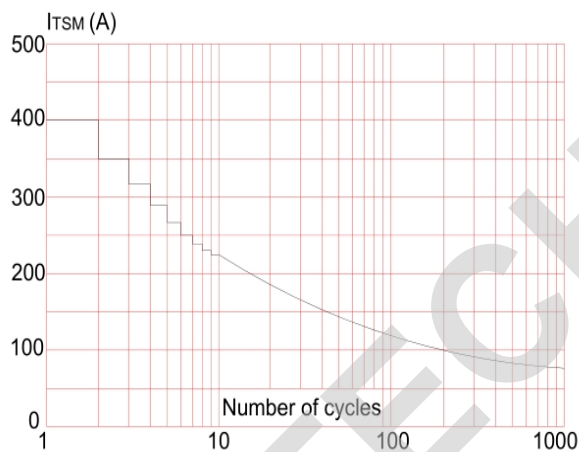
**FIG.1** Maximum power dissipation versus RMS on-state current



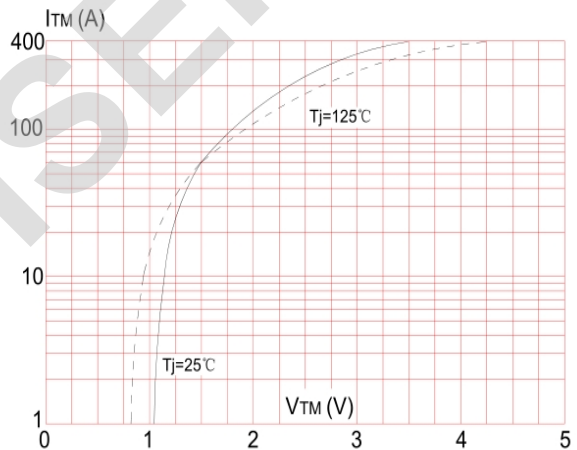
**FIG.2:** RMS on-state current versus case temperature



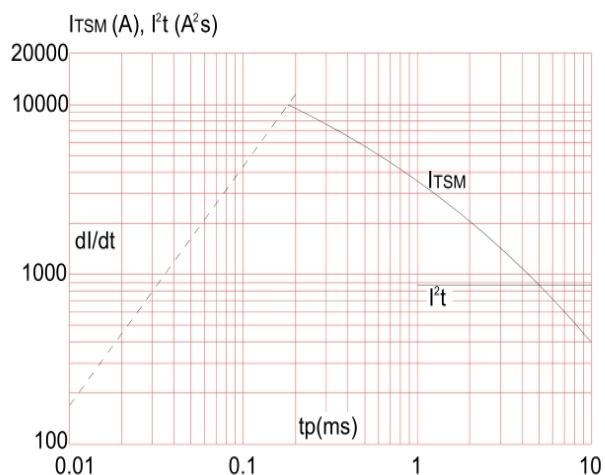
**FIG.3:** Surge peak on-state current versus number of cycles



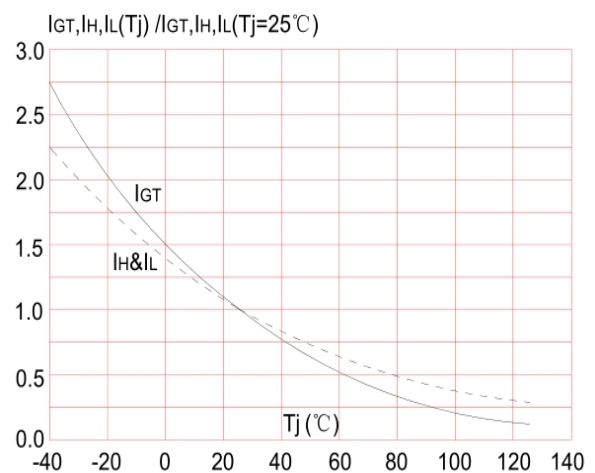
**FIG.4:** On-state characteristics (maximum values)



**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10ms$ , and corresponding value of  $I^2 t$  ( $di/dt < 50A/\mu s$ )

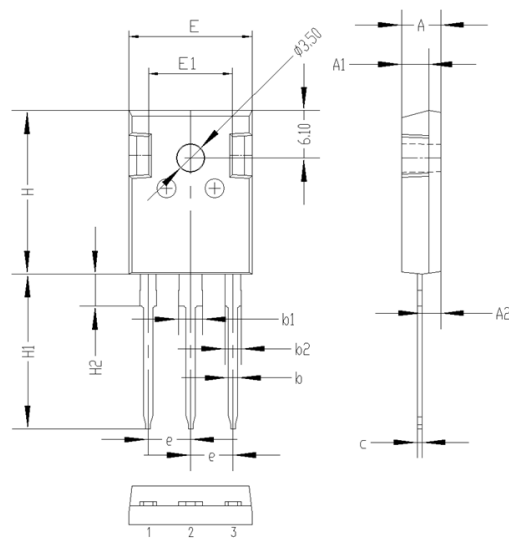


**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature



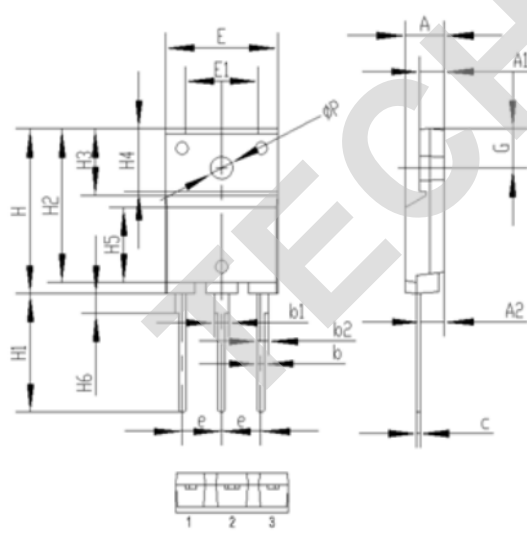
Outline:

TO-247 PACKAGE



| Symbol   | Dimensions(millimeters) |       |
|----------|-------------------------|-------|
|          | Min.                    | Max.  |
| A        | 4.80                    | 5.20  |
| A1       | 3.30                    | 3.70  |
| A2       | 2.10                    | 2.50  |
| b        | 1.00                    | 1.40  |
| b1       | 2.90                    | 3.30  |
| b2       | 1.90                    | 2.30  |
| c        | 0.40                    | 0.80  |
| e        | 5.25                    | 5.65  |
| E        | 15.6                    | 16.0  |
| E1       | 10.6                    | 11.00 |
| H        | 20.8                    | 21.2  |
| H1       | 19.4                    | 20.4  |
| H2       | 3.90                    | 4.30  |
| G        | 5.90                    | 6.30  |
| $\Phi P$ | 3.30                    | 3.70  |

TO-3PF PACKAGE



| Symbol   | Dimensions(millimeters) |       |
|----------|-------------------------|-------|
|          | Min.                    | Max.  |
| A        | 5.30                    | 5.70  |
| A1       | 3.25                    | 3.65  |
| A2       | 3.15                    | 3.55  |
| b        | 0.80                    | 1.20  |
| b1       | 1.85                    | 2.15  |
| b2       | 1.45                    | 1.75  |
| c        | 0.40                    | 0.80  |
| e        | 5.25                    | 5.65  |
| E        | 15.4                    | 15.8  |
| E1       | 10.0                    | 10.4  |
| H        | 22.5                    | 23.2  |
| H1       | 16.0                    | 17.0  |
| H2       | 21.2                    | 21.6  |
| H3       | 9.10                    | 9.50  |
| H4       | 8.55                    | 8.95  |
| H5       | 10.20                   | 10.60 |
| H6       | 2.55                    | 2.85  |
| G        | 5.30                    | 5.70  |
| $\Phi P$ | 3.00                    | 3.40  |