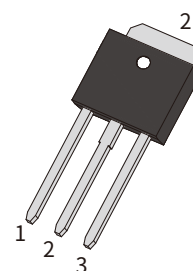


## FEATURES

- | Direct interfacing to logic level ICs
- | Direct interfacing to low power gate drive circuits
- | High blocking voltage capability
- | Planar passivated for voltage ruggedness and reliability
- | Triggering in all four quadrant



TO-251

## APPLICATIONS

- | General purpose motor control circuits
- | Phase control operations in light dimmers and motor speed controllers
- | Home appliances



Schematic Symbol

## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                 |              | Symbol              | Value           | Unit                   |
|---------------------------------------------------------------------------|--------------|---------------------|-----------------|------------------------|
| Repetitive peak off-state voltage ( $T_j=25^\circ\text{C}$ )              |              | $V_{\text{DRM}}$    | 600             | V                      |
| Repetitive peak reverse voltage ( $T_j=25^\circ\text{C}$ )                |              | $V_{\text{RRM}}$    | 600             | V                      |
| RMS on-state current ( $T_c=105^\circ\text{C}$ )                          |              | $I_{\text{T(RMS)}}$ | 4               | A                      |
| Non repetitive surge peak on-state current (full cycle, $F=50\text{Hz}$ ) |              | $I_{\text{TSM}}$    | 35              |                        |
| $I^2t$ value for fusing ( $t_p=10\text{ms}$ )                             |              | $I^2t$              | 6.1             | $\text{A}^2\text{S}$   |
| Critical rate of rise of on-state current ( $I_G=2 \cdot I_{\text{GT}}$ ) | I - II - III | $di/dt$             | 50              | $\text{A}/\mu\text{s}$ |
|                                                                           | IV           |                     | 10              |                        |
| Peak gate current                                                         |              | $I_{\text{GM}}$     | 2               | A                      |
| Average gate power dissipation                                            |              | $P_{\text{G(AV)}}$  | 0.5             | W                      |
| Peak gate power                                                           |              | $P_{\text{GM}}$     | 5               | W                      |
| Operating junction temperature range                                      |              | $T_j$               | $-40 \sim +125$ | $^\circ\text{C}$       |
| Storage junction temperature range                                        |              | $T_{\text{STG}}$    | $-40 \sim +150$ |                        |

## ELECTRICAL CHARACTERISTICS (T<sub>j</sub>=25°C unless otherwise specified)

| Symbol              | Test Condition                                                                  | Quadrant              | Value |     |      |      | Unit |
|---------------------|---------------------------------------------------------------------------------|-----------------------|-------|-----|------|------|------|
|                     |                                                                                 |                       | T     | D   | E    | F    |      |
| I <sub>GT</sub>     | V <sub>D</sub> =12V                                                             | I - II - III          | ≤5    | ≤5  | ≤10  | ≤25  | mA   |
|                     |                                                                                 | IV                    | ≤5    | ≤10 | ≤25  | ≤70  |      |
| V <sub>GT</sub>     |                                                                                 | ALL                   | ≤1.3  |     |      |      | V    |
| V <sub>GD</sub>     | V <sub>D</sub> =V <sub>DRM</sub> , R <sub>L</sub> =3.3KΩ, T <sub>j</sub> =125°C |                       | ≥0.2  |     |      |      | V    |
| I <sub>H</sub>      | I <sub>T</sub> =100mA                                                           |                       | ≤5    | ≤15 | ≤25  | ≤30  | mA   |
| I <sub>L</sub>      | I <sub>G</sub> =1.2I <sub>GT</sub>                                              | I - III               | ≤10   | ≤20 | ≤30  | ≤40  |      |
|                     |                                                                                 | II - IV               | ≤15   | ≤35 | ≤45  | ≤60  |      |
| dV <sub>D</sub> /dt | V <sub>D</sub> =67%V <sub>DRM</sub> , T <sub>j</sub> =125°C                     |                       | ≥20   | ≥50 | ≥100 | ≥150 | V/μs |
| V <sub>TM</sub>     | I <sub>TM</sub> =5.5A, tp=380μs                                                 |                       | ≤1.6  |     |      |      | V    |
| I <sub>DRM</sub>    | V <sub>D</sub> =V <sub>DRM</sub> , V <sub>R</sub> =V <sub>RRM</sub>             | T <sub>j</sub> =25°C  | ≤5    |     |      |      | uA   |
| I <sub>RRM</sub>    |                                                                                 | T <sub>j</sub> =125°C | ≤0.5  |     |      |      | mA   |

## THERMAL RESISTANCES

| Symbol               | Parameter            | Value | Unit |
|----------------------|----------------------|-------|------|
| R <sub>th(j-c)</sub> | Junction to case(AC) | 2.8   | °C/W |

# PARAMETER CHARACTERISTIC CURVE

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

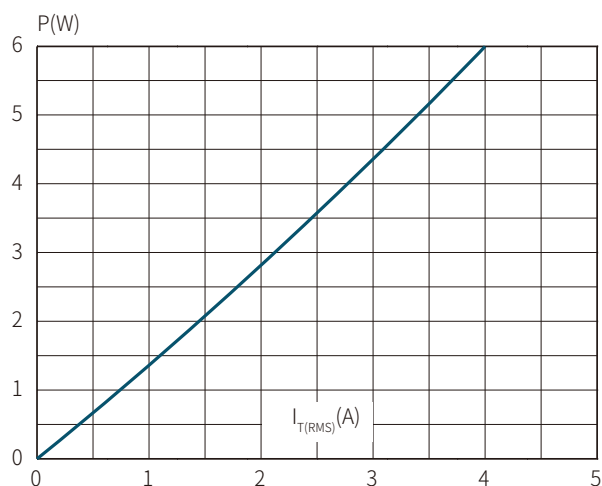


FIG.2: RMS on-state current versus case temperature

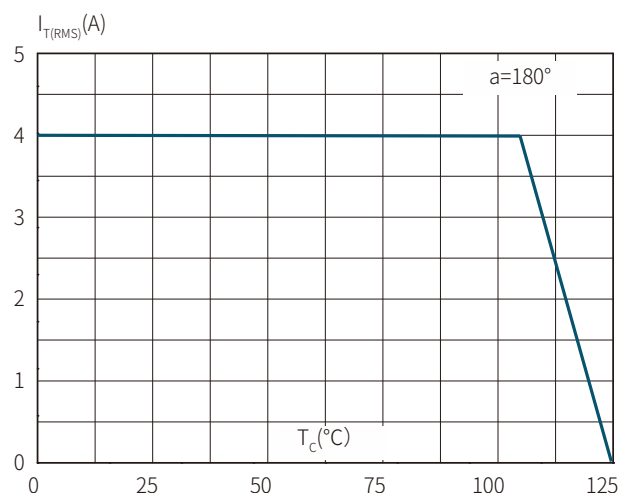


FIG.3: Surge peak on-state current versus number of cycles

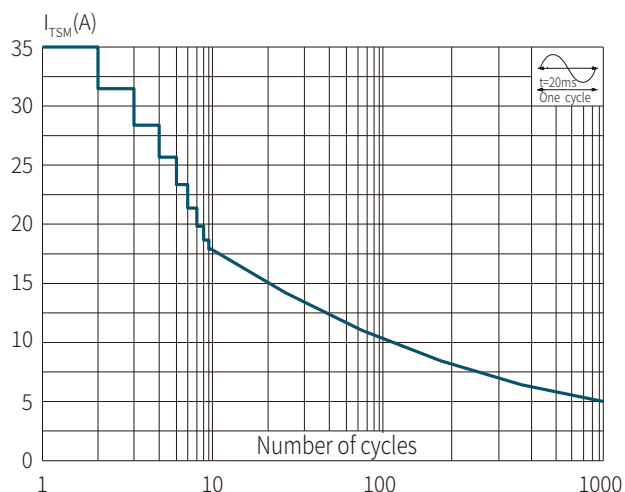
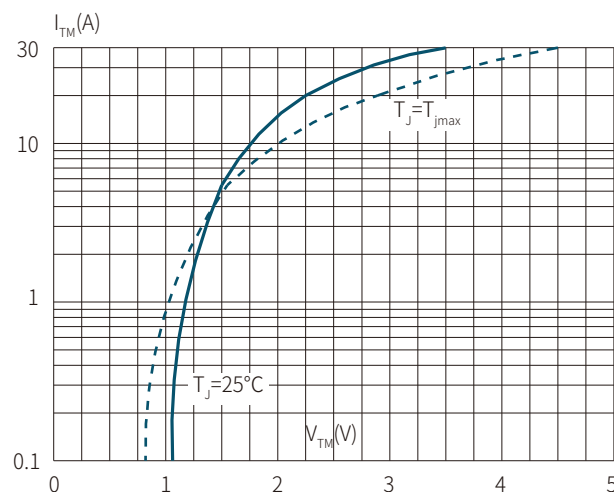
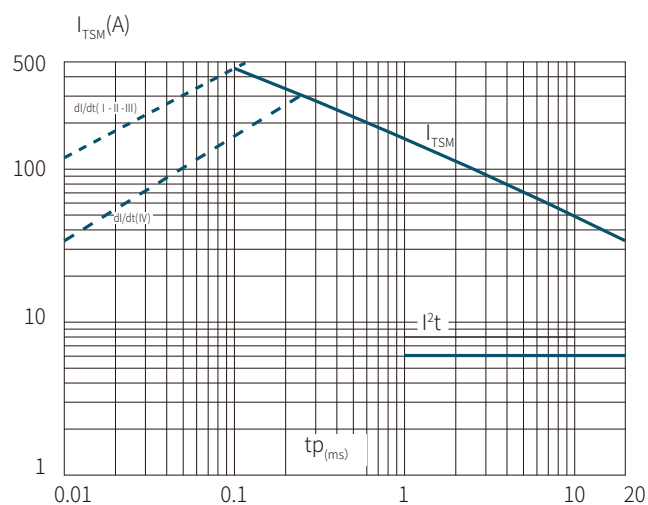


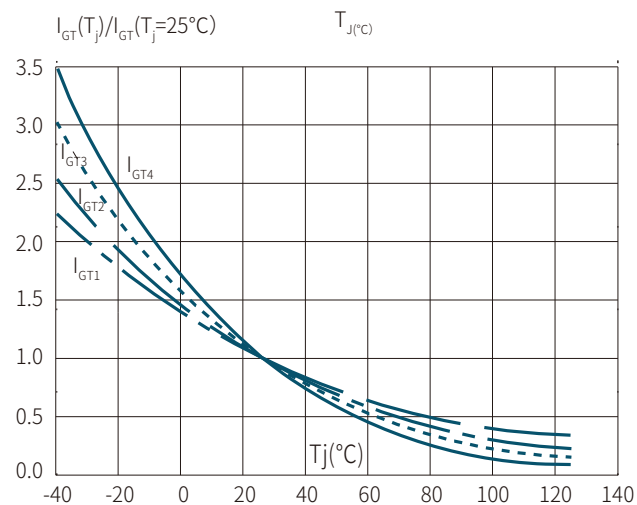
FIG.4 On-state characteristics (maximum values)



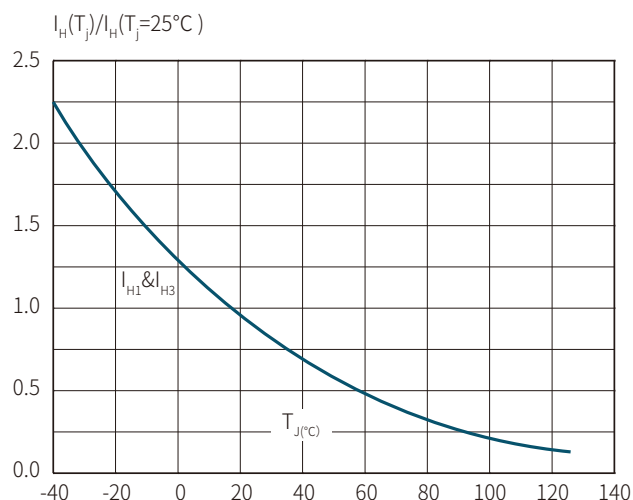
**FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$  and corresponding value of  $I^2t$  ( $dI/dt < 50\text{A}/\mu\text{s}$ )**



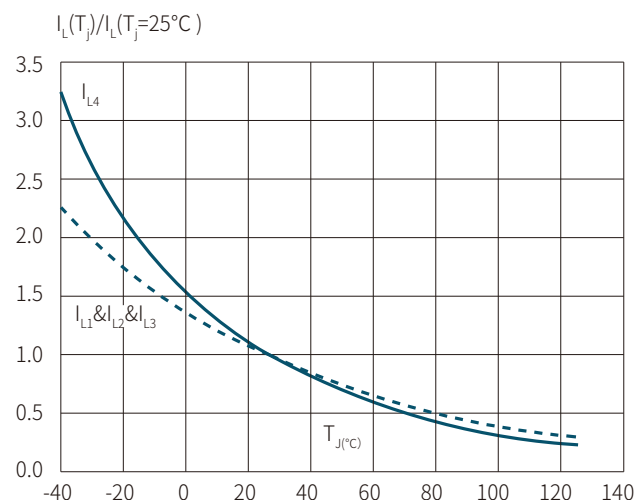
**FIG.6 Relative variations of gate trigger current versus junction temperature**



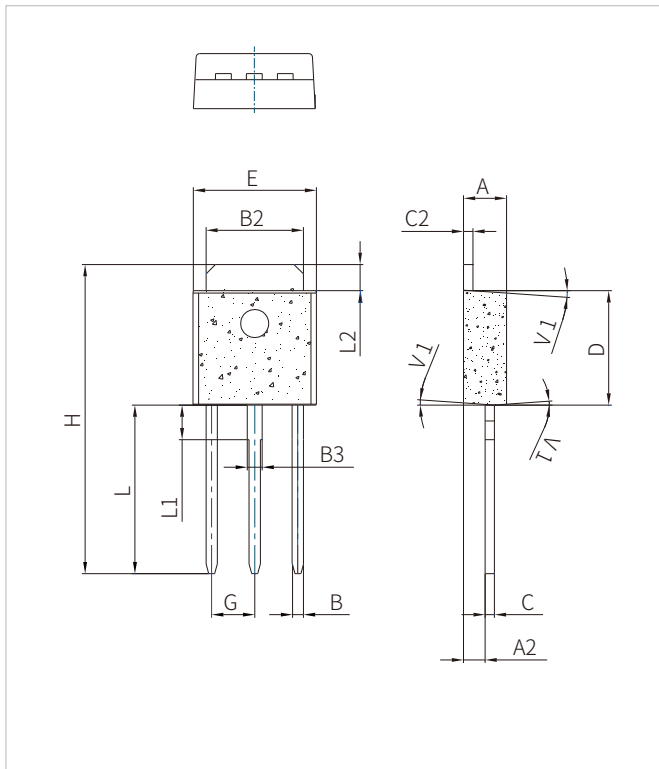
**FIG.7 Relative variations of holding current versus junction temperature**



**FIG.8 Relative variations of latching current versus junction temperature**



## TO-251 PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.10        |      | 2.50 | 0.083  |       | 0.098 |
| A2   | 0.90        |      | 1.20 | 0.035  |       | 0.047 |
| B    | 0.55        |      | 0.65 | 0.022  |       | 0.026 |
| B2   | 5.10        |      | 5.40 | 0.200  |       | 0.213 |
| B3   | 0.76        |      | 0.85 | 0.030  |       | 0.033 |
| C    | 0.45        |      | 0.62 | 0.018  |       | 0.024 |
| C2   | 0.48        |      | 0.62 | 0.019  |       | 0.024 |
| D    | 5.90        |      | 6.30 | 0.232  |       | 0.248 |
| E    | 6.30        |      | 6.80 | 0.248  |       | 0.268 |
| G    |             | 2.30 |      |        | 0.091 |       |
| H    | 16.0        |      | 17.0 | 0.630  |       | 0.669 |
| L    | 8.90        |      | 9.40 | 0.350  |       | 0.370 |
| L1   | 1.80        |      | 2.20 | 0.071  |       | 0.087 |
| L2   | 1.37        |      | 1.50 | 0.054  |       | 0.059 |
| V1   |             | 4°   |      |        | 4°    |       |

## ORDERING INFORMATION

| Part Number | Package | Qty/pcs |           |        |
|-------------|---------|---------|-----------|--------|
|             |         | Tube    | Inner Box | Carton |
| Z0402MF     | TO-251  | 80      | 4000      | 20000  |

To find your local partner within Semiwell' s website : [www.semiwell.com](http://www.semiwell.com)  
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