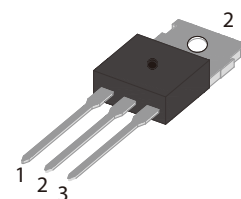


## FEATURES

- High current 12 A RMS current Triac
- Low thermal resistance
- High commutation or very high commutation capability
- RoHS (2002/95/EC) compliant packages
- UL-94, V0 flammability package resin compliance



TO-220C

## 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 ( $T_j=25^{\circ}\text{C}$ )             |              | $V_{\text{DRM}}$    | 600/800         | V                      |
| Repetitive peak reverse voltage ( $T_j=25^{\circ}\text{C}$ )               |              | $V_{\text{RRM}}$    | 600/800         | V                      |
| RMS on-state current ( $T_c=105^{\circ}\text{C}$ )                         |              | $I_{\text{T(RMS)}}$ | 12              | A                      |
| Non repetitive surge peak on-state current (full cycle, $F=50\text{Hz}$ )  |              | $I_{\text{TSM}}$    | 95              |                        |
| $I^2t$ value for fusing ( $t_p=10\text{ms}$ )                              |              | $I^2t$              | 45              | $\text{A}^2\text{S}$   |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{\text{GT}}$ ) | 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 ( $T_j=25^{\circ}\text{C}$ unless otherwise specified)

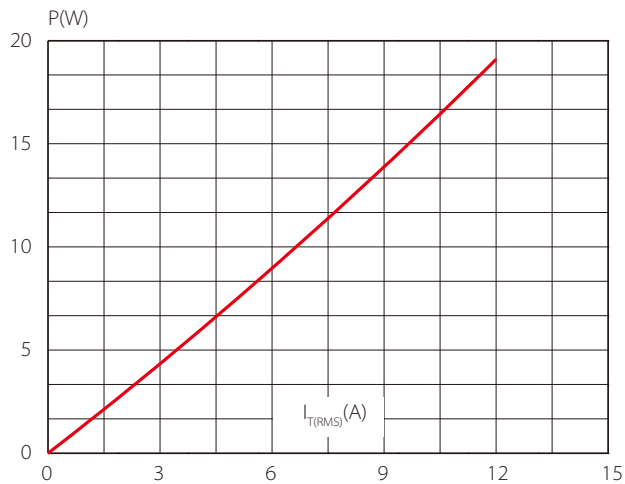
| Symbol    | Test Condition                                                | Quadrant                  | Value      |           |           | Unit             |
|-----------|---------------------------------------------------------------|---------------------------|------------|-----------|-----------|------------------|
|           |                                                               |                           | D          | E         | F         |                  |
| $I_{GT}$  | $V_D=12\text{V}, R_L=33\Omega$                                | I - II - III              | $\leq 5$   | $\leq 10$ | $\leq 25$ | mA               |
|           |                                                               | IV                        | $\leq 10$  | $\leq 25$ | $\leq 70$ |                  |
| $V_{GT}$  |                                                               | ALL                       | $\leq 1.5$ |           |           | V                |
| $V_{GD}$  | $V_D=V_{DRM}, R_L=3.3\text{K}\Omega, T_j=125^{\circ}\text{C}$ | ALL                       | $\geq 0.2$ |           |           | V                |
| $I_H$     | $I_T=100\text{mA}$                                            |                           | $\leq 10$  | $\leq 25$ | $\leq 30$ | mA               |
| $I_L$     | $I_G=1.2I_{GT}$                                               | I - III - IV              | $\leq 15$  | $\leq 30$ | $\leq 40$ |                  |
|           |                                                               | II                        | $\leq 20$  | $\leq 40$ | $\leq 80$ |                  |
| $dV_D/dt$ | $V_D=67\%V_{DRM}, T_j=125^{\circ}\text{C}$                    |                           | $\geq 20$  | $\geq 50$ | $\geq 50$ | V/ $\mu\text{s}$ |
| $V_{TM}$  | $I_{TM}=15\text{A}, t_p=380\mu\text{s}$                       |                           | $\leq 1.6$ |           |           | V                |
| $I_{DRM}$ | $V_D=V_{DRM}, V_R=V_{RRM}$                                    | $T_j=25^{\circ}\text{C}$  | $\leq 5$   |           |           | $\mu\text{A}$    |
| $I_{RRM}$ |                                                               | $T_j=125^{\circ}\text{C}$ | $\leq 1$   |           |           | mA               |

## THERMAL RESISTANCES

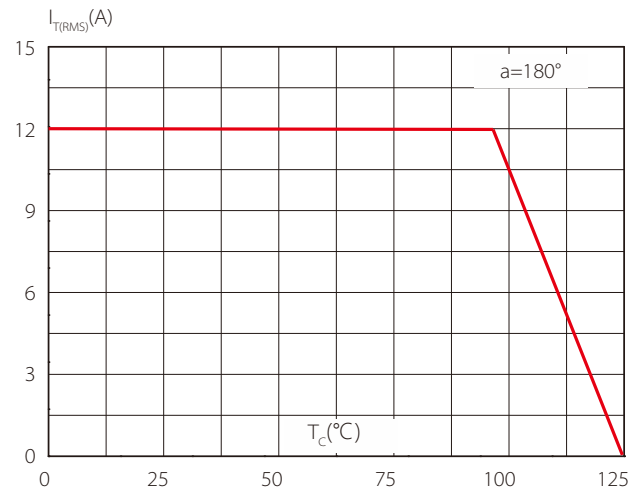
| Symbol        | Parameter            | Value | Unit                        |
|---------------|----------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | Junction to case(AC) | 1.4   | $^{\circ}\text{C}/\text{W}$ |

## PARAMETER CHARACTERISTIC CURVE

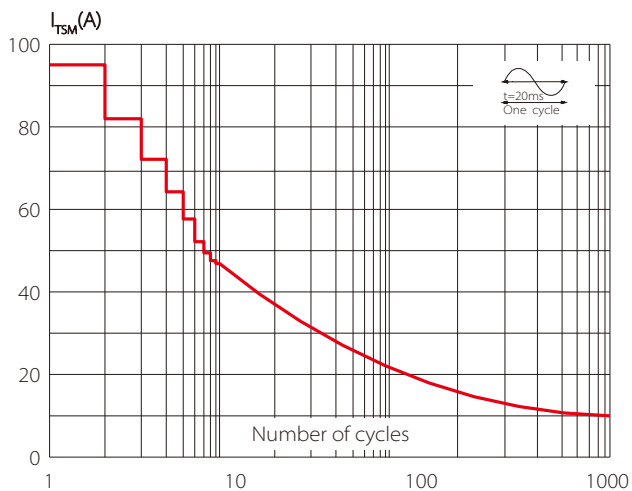
**FIG.1 Maximum power dissipation versus RMS on-state current**



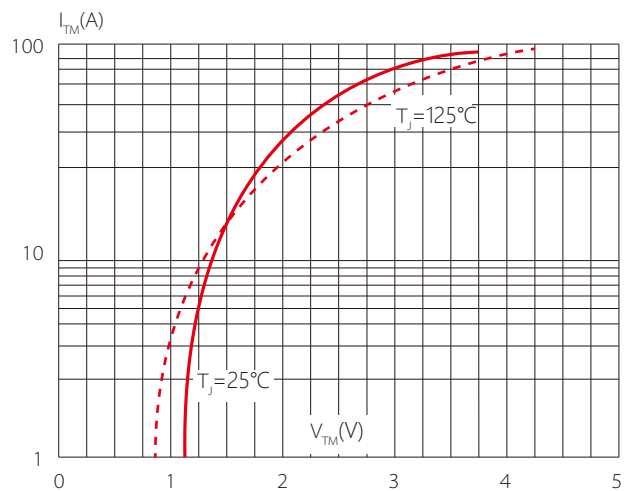
**FIG.2: RMS on-state current versus case temperature**



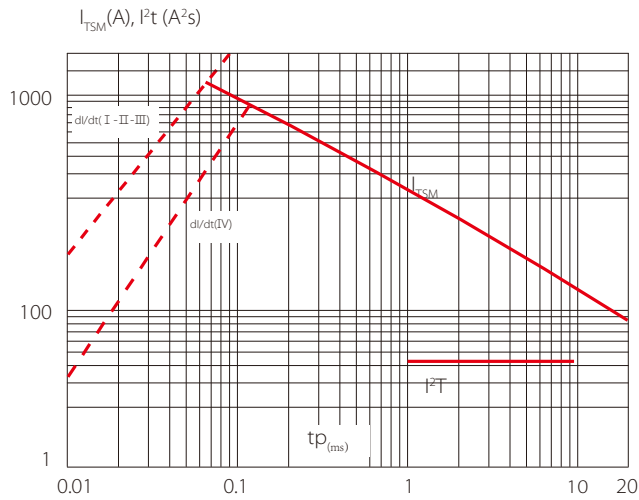
**FIG.3: Surge peak on-state current versus number of cycles**



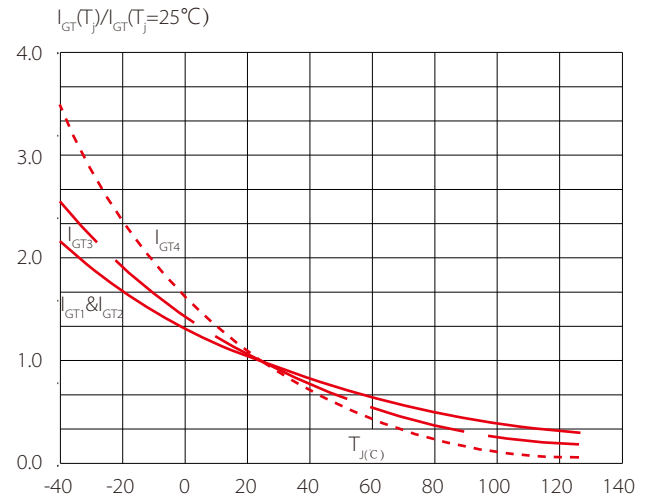
**FIG.4 On-state characteristics (maximum values)**



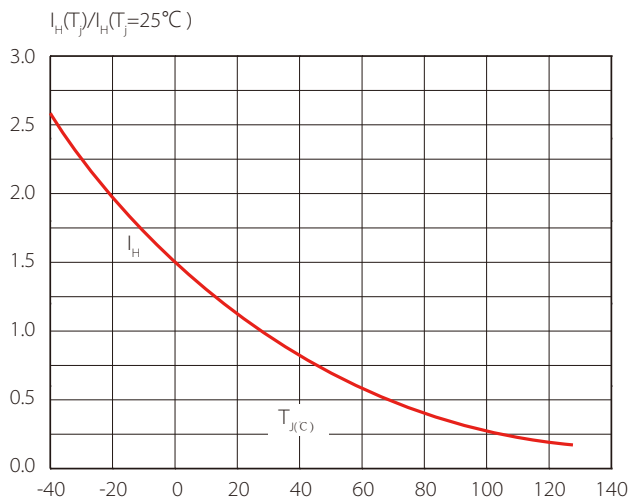
**FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$  and corresponding value of  $I^2t$  ( I - II - III:  $di/dt < 50\text{A}/\mu\text{s}$ ; IV:  $di/dt < 10\text{A}/\mu\text{s}$ )**



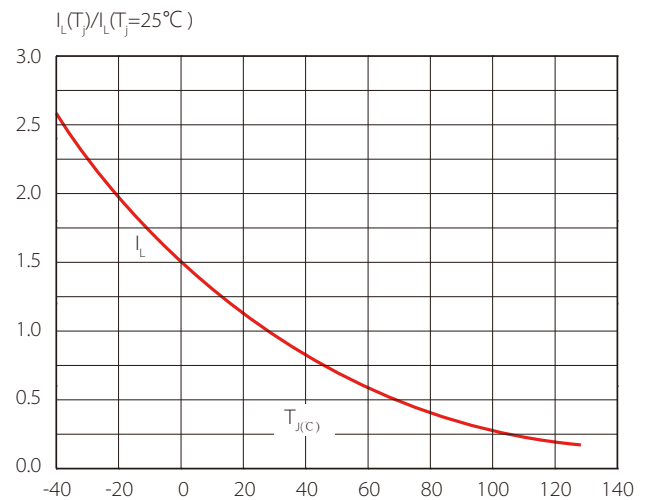
**FIG.6 Relative variations of gate trigger current versus junction temperature**



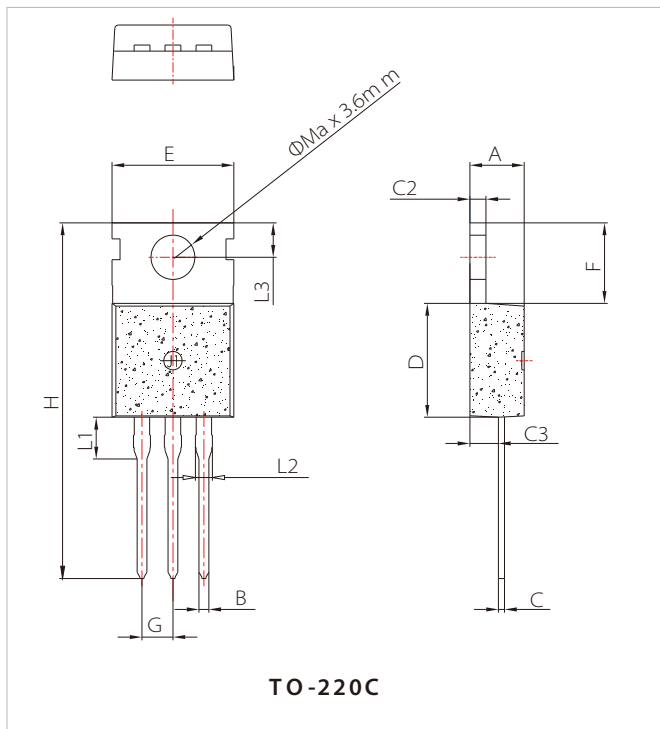
**FIG.7 Relative variations of holding current versus junction temperature**



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



## PACKAGE MECHANICAL DATA



| Ref. | Dimensions              |      |      |        |       |       |
|------|-------------------------|------|------|--------|-------|-------|
|      | Ref. Millimeters Inches |      |      | Inches |       |       |
|      | Min.                    | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40                    |      | 4.60 | 0.173  |       | 0.181 |
| B    | 0.70                    |      | 0.90 | 0.028  |       | 0.035 |
| C    | 0.45                    |      | 0.60 | 0.018  |       | 0.024 |
| C2   | 1.23                    |      | 1.32 | 0.048  |       | 0.052 |
| C3   | 2.20                    |      | 2.60 | 0.087  |       | 0.102 |
| D    | 8.90                    |      | 9.90 | 0.350  |       | 0.390 |
| E    | 9.90                    |      | 10.3 | 0.390  |       | 0.406 |
| F    | 6.30                    |      | 6.90 | 0.248  |       | 0.272 |
| G    |                         | 2.54 |      |        | 0.1   |       |
| H    | 28.0                    |      | 29.8 | 1.102  |       | 1.173 |
| L1   |                         | 3.39 |      |        | 0.133 |       |
| L2   | 1.14                    |      | 1.70 | 0.045  |       | 0.067 |
| L3   | 2.65                    |      | 2.95 | 0.104  |       | 0.116 |
| Φ    |                         | 3.6  |      |        | 0.142 |       |

## ORDERING INFORMATION

| Part Number         | Package | Qty/pcs |           |        |
|---------------------|---------|---------|-----------|--------|
|                     |         | Tube    | Inner Box | Carton |
| BT138-600/800D(E/F) | TO-220C | 50      | 1000      | 5000   |

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