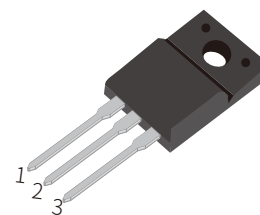


## FEATURES

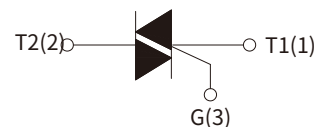
- | Direct interfacing to logic level ICs
- | Direct interfacing to low power gate drive circuits
- | High blocking voltage capability
- | Planar passivated for voltage ruggedness and reliability
- | Triggering in all four quadrant



TO-220F

## 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 ( $T_c=100^\circ\text{C}$ )                          |              | $I_{\text{T(RMS)}}$ | 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 ( $I_G=2 \times I_{GT}$ )       | 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~+125 | $^\circ\text{C}$       |
| Storage junction temperature range                                        |              | $T_{\text{STG}}$    | -40~+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    |     |      |      | μA   |
| 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) | 3.3   | °C/W |

## PARAMETER CHARACTERISTIC CURVE

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

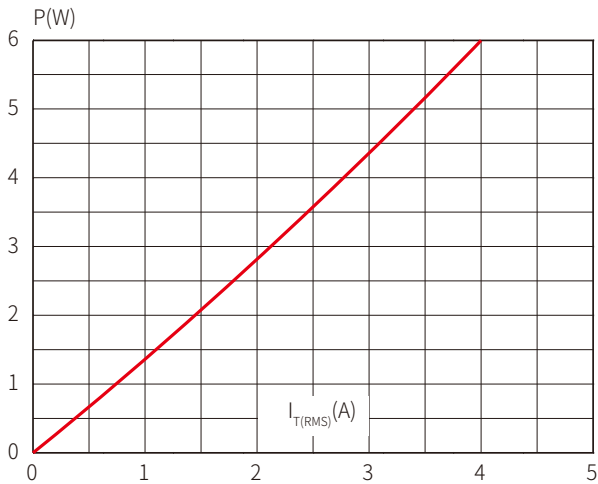


FIG.2: RMS on-state current versus case temperature

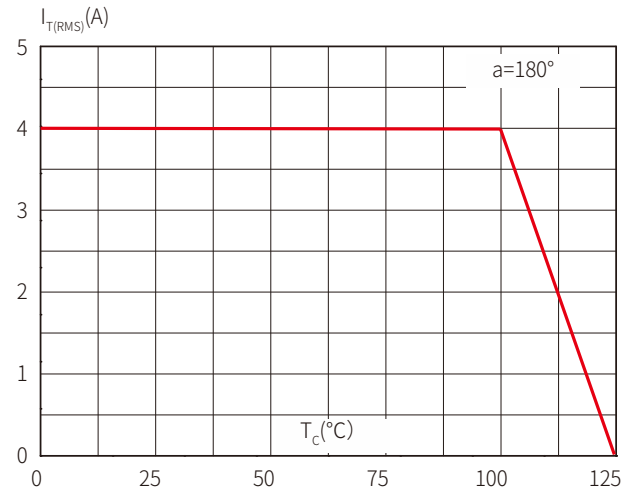


FIG.3: Surge peak on-state current versus number of cycles

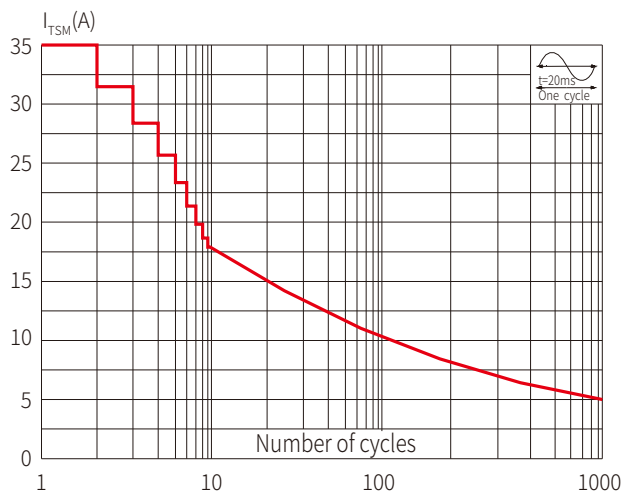
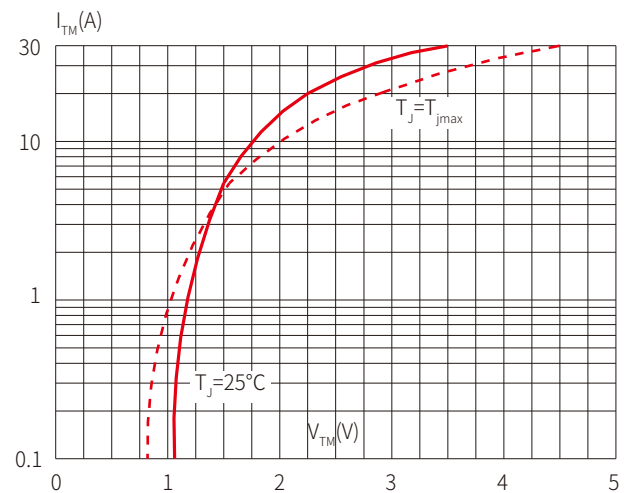
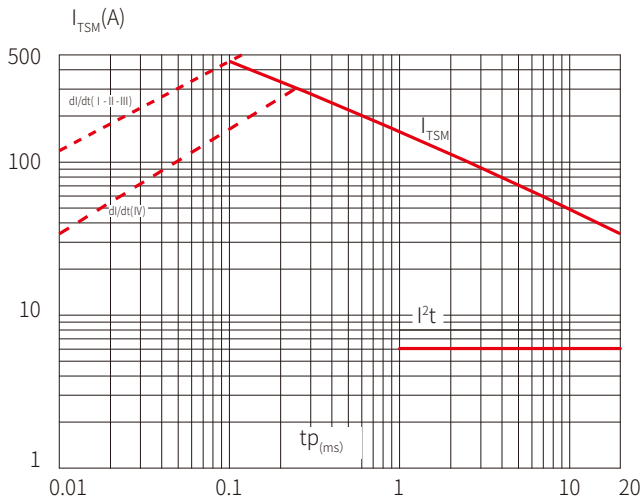


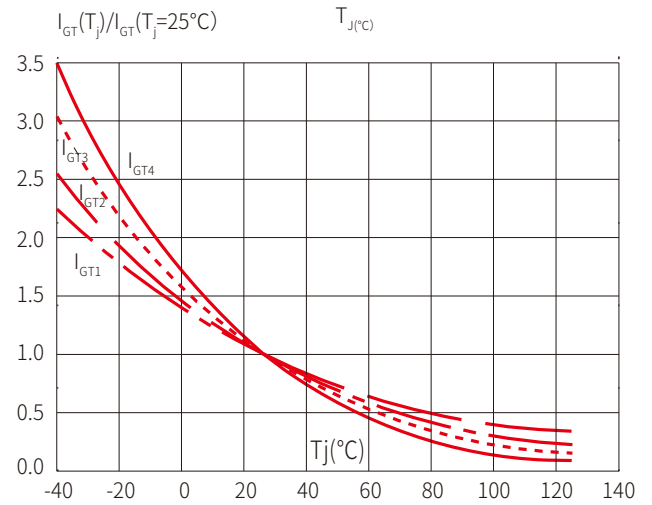
FIG.4 On-state characteristics (maximum values)



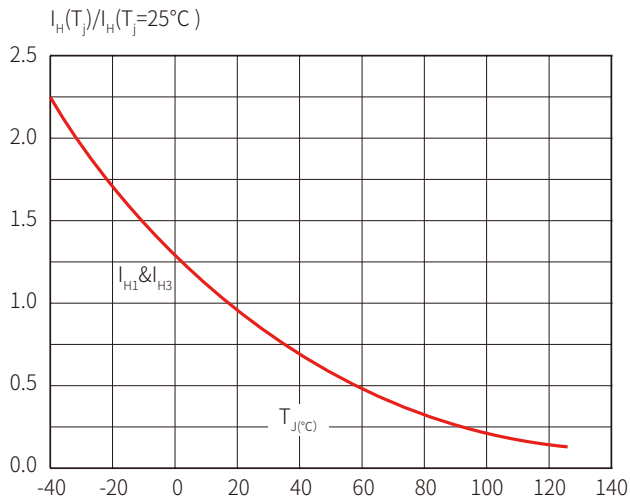
**FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$  and corresponding value of  $I^2t$  ( $dI/dt < 50\text{A}/\mu\text{s}$ )**



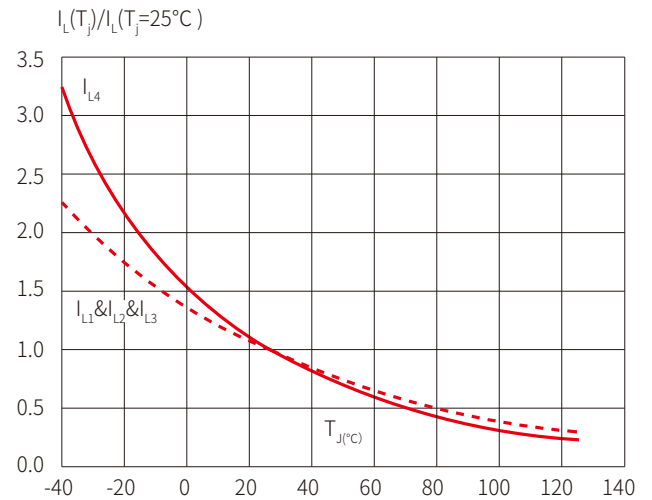
**FIG.6 Relative variations of gate trigger current versus junction temperature**



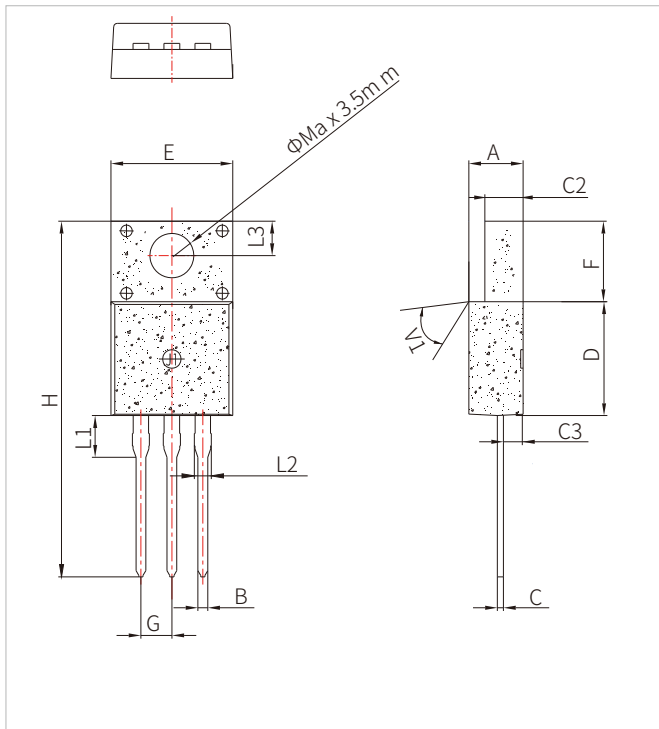
**FIG.7 Relative variations of holding current versus junction temperature**



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



## TO-220F PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40        |      | 4.90 | 0.173  |       | 0.193 |
| B    | 0.74        | 0.80 | 0.83 | 0.029  |       | 0.033 |
| C    | 0.45        |      | 0.75 | 0.018  |       | 0.030 |
| C2   | 2.40        |      | 2.70 | 0.094  |       | 0.106 |
| C3   | 2.60        |      | 3.00 | 0.102  |       | 0.118 |
| D    | 8.80        |      | 9.30 | 0.346  |       | 0.366 |
| E    | 9.70        |      | 10.4 | 0.382  |       | 0.409 |
| F    | 6.40        |      | 7.00 | 0.252  |       | 0.276 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 30.0 | 1.102  |       | 1.181 |
| L1   |             | 3.55 |      |        | 0.140 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   |             | 3.30 |      |        | 0.130 |       |
| V1   |             | 45°  |      |        | 45°   |       |

## ORDERING INFORMATION

| Part Number     | Package | Qty/pcs |           |        |
|-----------------|---------|---------|-----------|--------|
|                 |         | Tube    | Inner Box | Carton |
| STF4Q60T(D/E/F) | TO-220F | 50      | 1000      | 5000   |

**Headquarters**

No.3387 Shendu Road  
Pujiang I&E Park  
Minhang Shanghai China  
201000

**Hotline**

400-021-5756

**Web**

<https://www.semiware.com>

**Sales Center**

Tel: 86-21-3463-7458  
Email: [sales18@semiware.com](mailto:sales18@semiware.com)

**Customer Service**

Tel: 86-21-5484-1001  
Email: [sales17@semiware.com](mailto:sales17@semiware.com)

**Technical Support**

Tel: 86-21-3463-7654  
Email: [fae01@semiware.com](mailto:fae01@semiware.com)

**Complaint & Suggestions**

Tel: 86-21-3463-7172  
Ext: 8868  
Email: [cs03@semiware.com](mailto:cs03@semiware.com)

**By QR Code**

Website



Wechat

To find your local partner within Semiware's global website: [www.semiware.com](http://www.semiware.com)

© 2022 Semiware Semiconductor Inc.

The content of this document has been carefully checked and understood. However, neither Semiware nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Semiware does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Chinese law and resulting disputes shall be settled by the courts at the place of business of Semiware. Latest publications and a complete disclaimer can be downloaded from the Semiware website. All trademarks recognized.