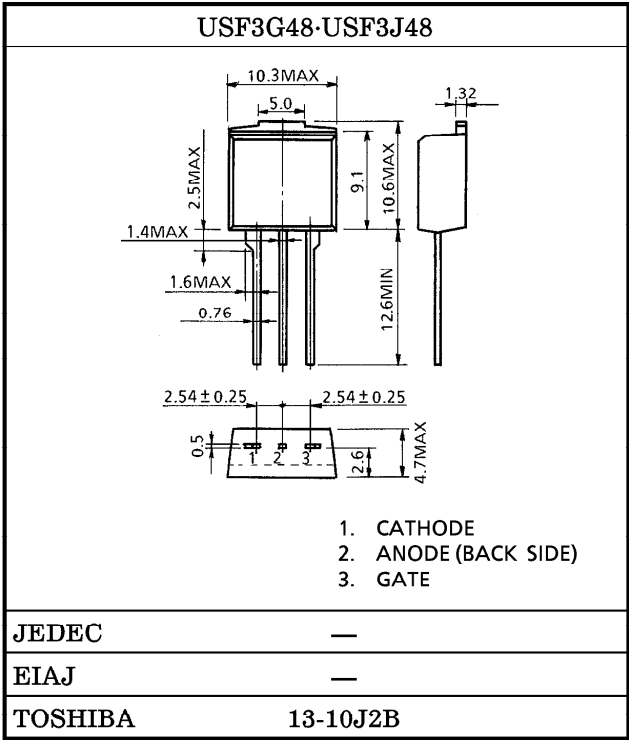
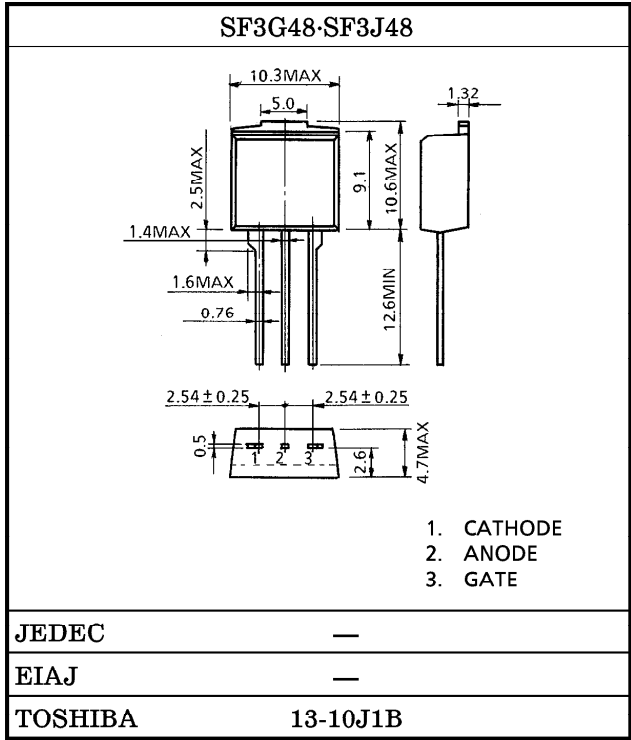


TOSHIBA THYRISTOR SILICON PLANAR TYPE

# SF3G48, SF3J48, USF3G48, USF3J48

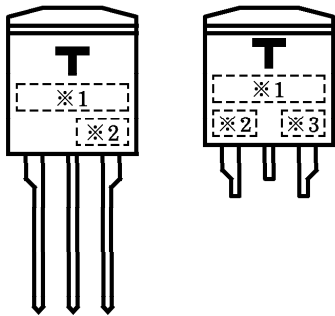
MEDIUM POWER CONTROL APPLICATIONS.

- Repetitive Peak Off-State Voltage :  $V_{DRM}$   
Repetitive Peak Reverse Voltage :  $V_{RRM}$  } =400, 600V
- Average On-State Current :  $I_{T(AV)}=3A$
- Gate Trigger Current :  $I_{GT}=10mA$  MAX.



Weight : 1.7 g

MARK



|     |                                                                                                                                                         |       |              |                 |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|-----------------|
| ※ 1 | MARK                                                                                                                                                    | F3G48 | TYPE<br>NAME | SF3G48, USF3G48 |
|     |                                                                                                                                                         | F3J48 |              | SF3J48, USF3J48 |
| ※ 2 | Lot Number                                                                                                                                              |       |              |                 |
|     | <div><div><div></div><div></div></div><div>←Month (Starting from Alphabet A)</div><div>↑</div><div>←Year (Last Number of the Christian Era)</div></div> |       |              |                 |

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

## MAXIMUM RATINGS

| CHARACTERISTICS                                                                                     |         | SYMBOL                 | RATING    | UNIT              |
|-----------------------------------------------------------------------------------------------------|---------|------------------------|-----------|-------------------|
| Repetitive Peak Off-State Voltage and Repetitive Peak Reverse Voltage                               | SF3G48  | $V_{DRM}$<br>$V_{RRM}$ | 400       | V                 |
|                                                                                                     | USF3G48 |                        |           |                   |
|                                                                                                     | SF3J48  |                        | 600       |                   |
|                                                                                                     | USF3J48 |                        |           |                   |
| Non-Repetitive Peak Reverse Voltage<br>(Non-Repetitive < 5ms,<br>$T_j = 0 \sim 125^\circ\text{C}$ ) | SF3G48  | $V_{RSM}$              | 500       | V                 |
|                                                                                                     | USF3G48 |                        |           |                   |
|                                                                                                     | SF3J48  |                        | 720       |                   |
|                                                                                                     | USF3J48 |                        |           |                   |
| Average On-State Current                                                                            |         | $I_{T(AV)}$            | 3         | A                 |
| R. M. S On-State Current                                                                            |         | $I_{T(RMS)}$           | 4.7       | A                 |
| Peak One Cycle Surge On-State Current (Non-Repetitive)                                              |         | $I_{TSM}$              | 50 (50Hz) | A                 |
|                                                                                                     |         |                        | 55 (60Hz) |                   |
| $I^2t$ Limit Value (t = 1~10ms)                                                                     |         | $I^2t$                 | 18        | A <sup>2</sup> s  |
| Critical Rate of Rise of On-State Current (Note 1)                                                  |         | di / dt                | 100       | A / $\mu\text{s}$ |
| Peak Gate Power Dissipation                                                                         |         | $P_{GM}$               | 5         | W                 |
| Average Gate Power Dissipation                                                                      |         | $P_{G(AV)}$            | 0.5       | W                 |
| Peak Forward Gate Voltage                                                                           |         | $V_{FGM}$              | 10        | V                 |
| Peak Reverse Gate Voltage                                                                           |         | $V_{RGM}$              | -5        | V                 |
| Peak Forward Gate Current                                                                           |         | $I_{GM}$               | 2         | A                 |
| Junction Temperature                                                                                |         | $T_j$                  | -40~125   | °C                |
| Storage Temperature Range                                                                           |         | $T_{stg}$              | -40~125   | °C                |

Note 1:  $V_{DRM} = 0.5 \times \text{Rated}$   
 $I_{TM} \leq 12\text{A}$   
 $t_{gw} \leq 10\mu\text{s}$   
 $t_{gr} \leq 250\text{ns}$   
 $i_{gp} = I_{GT} \times 2.0$

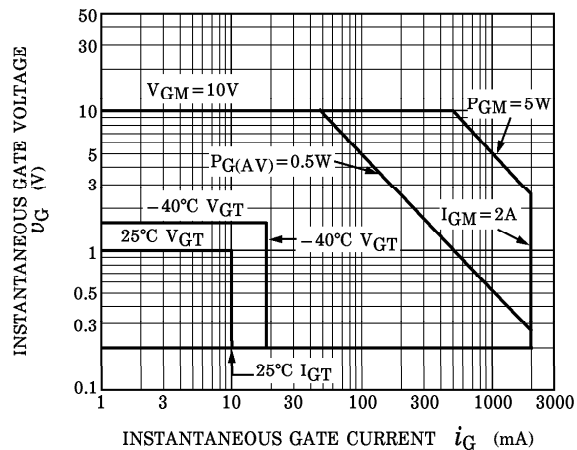
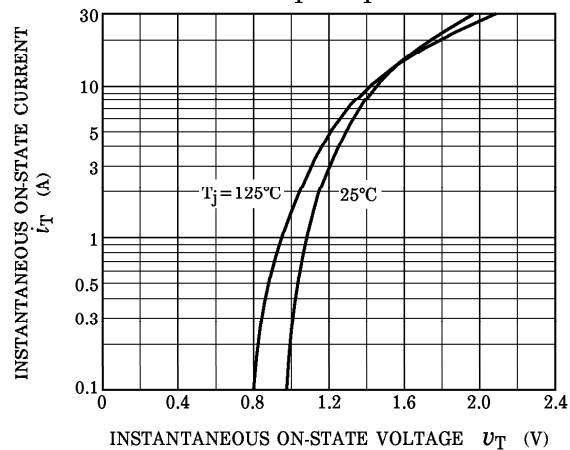
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTICS                                                       | SYMBOL                 | TEST CONDITION                                                                    | MIN. | TYP. | MAX. | UNIT              |
|-----------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------|------|------|------|-------------------|
| Repetitive Peak Off-State Current and Repetitive Peak Reverse Current | $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM} = V_{RRM} = \text{Rated}$                                                | —    | —    | 10   | $\mu\text{A}$     |
| Peak On-State Voltage                                                 | $V_{TM}$               | $I_{TM} = 12\text{A}$                                                             | —    | —    | 1.5  | V                 |
| Gate Trigger Voltage                                                  | $V_{GT}$               | $V_D = 6\text{V}, R_L = 10\Omega$                                                 | —    | —    | 1.0  | V                 |
| Gate Trigger Current                                                  | $I_{GT}$               |                                                                                   | —    | —    | 10   | mA                |
| Gate Non-Trigger Voltage                                              | $V_{GD}$               | $V_D = \text{Rated} \times 2/3, T_c = 125^\circ\text{C}$                          | 0.2  | —    | —    | V                 |
| Critical Rate of Rise of Off-State Voltage                            | dv / dt                | $V_{DRM} = \text{Rated}, T_c = 125^\circ\text{C}$<br>Exponential Rise             | —    | 50   | —    | V / $\mu\text{s}$ |
| Holding Current                                                       | $I_H$                  | $V_D = 6\text{V}, I_{TM} = 1\text{A}$                                             | —    | —    | 40   | mA                |
| Latching Current                                                      | $I_L$                  | $V_D = 6\text{V}, f = 50\text{Hz}$<br>$t_{gw} = 50\mu\text{s}, i_G = 30\text{mA}$ | —    | —    | 50   | mA                |
| Thermal Resistance                                                    | $R_{th(j-c)}$          | Junction to Case, DC                                                              | —    | —    | 3.6  | °C / W            |

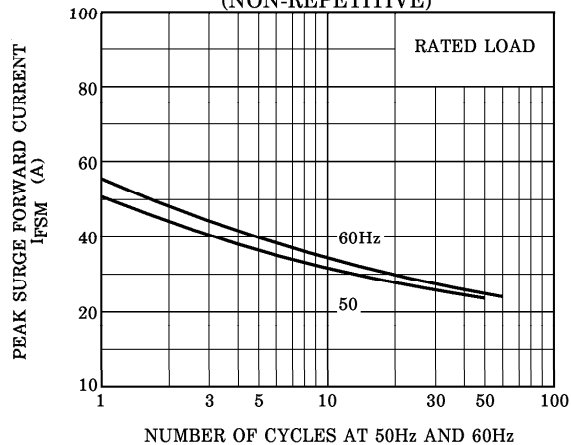
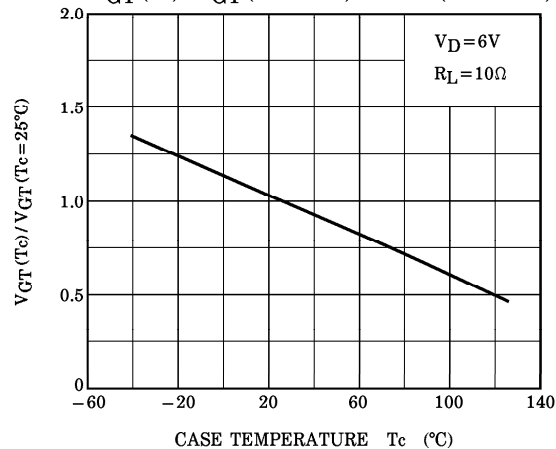
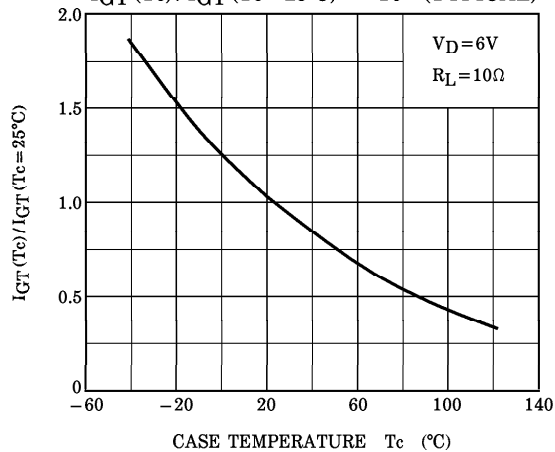
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GATE TRIGGER CHARACTERISTIC

 $i_T - v_T$ 

SURGE ON-STATE CURRENT (NON-REPETITIVE)

 $V_{GT}(T_c) / V_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL) $I_{GT}(T_c) / I_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL) $I_H(T_c) / I_H(T_c = 25^\circ C) - T_c$  (TYPICAL)