

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

# SM3GZ47, SM3JZ47

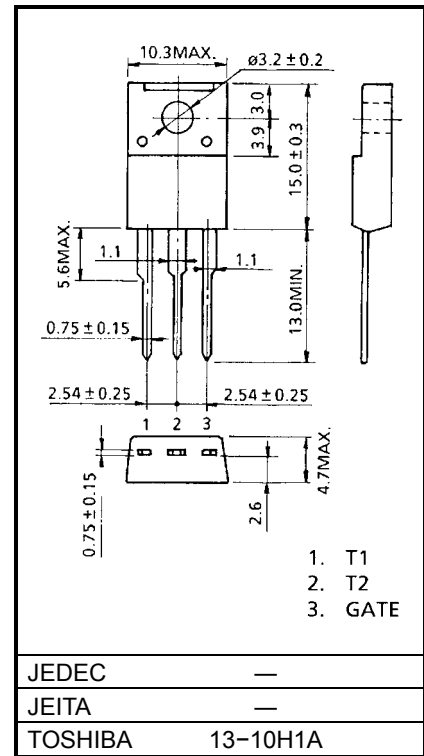
## AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 400, 600V$
- R.M.S ON-State Current :  $I_T (RMS) = 3A$
- High Commutating (dv / dt)
- Isolation Voltage :  $V_{ISOL} = 1500V AC$

## MAXIMUM RATINGS

| CHARACTERISTIC   | SYMBOL      | RATING    | UNIT        |
|--|-------------|-----------|-------------|
| Repetitive Peak Off-State Voltage                                | SM3GZ47     | 400       | V           |
|  | SM3JZ47     | 600       |             |
| R.M.S On-State Current (Full Sine Waveform $T_c = 110^\circ C$ ) | $I_T (RMS)$ | 3         | A           |
| Peak One Cycle Surge On-State Current (Non-Repetitive)           | $I_{TSM}$   | 30 (50Hz) | A           |
|  |             | 33 (60Hz) |             |
| $I^2 t$ Limit Value ( $t = 1\sim 10ms$ )                         | $I^2 t$     | 4.5       | $A^2 s$     |
| Critical Rate of Rise of On-State Current (Note 1)               | di / dt     | 50        | A / $\mu s$ |
| Peak Gate Power Dissipation                                      | $P_{GM}$    | 5         | W           |
| Average Gate Power Dissipation                                   | $P_G (AV)$  | 0.5       | W           |
| Peak Gate Voltage  | $V_{GM}$    | 10        | V           |
| Peak Gate Current  | $I_{GM}$    | 2         | A           |
| Junction Temperature   | $T_j$       | -40~125   | $^\circ C$  |
| Storage Temperature Range  | $T_{stg}$   | -40~125   | $^\circ C$  |
| Isolation Voltage (AC, $t = 1min.$ )                             | $V_{ISOL}$  | 1500      | V           |

Unit: mm



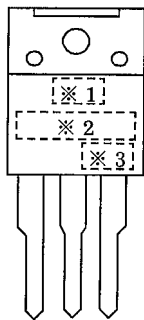
Weight: 1.7g

Note 1: di / dt test condition  
 $V_{DRM} = 0.5 \times \text{Rated}$   
 $I_{TM} \leq 4.5A$   
 $t_{gw} \geq 10\mu s$   
 $t_{gr} \leq 250ns$   
 $i_{gp} = I_{GT} \times 2.0$

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

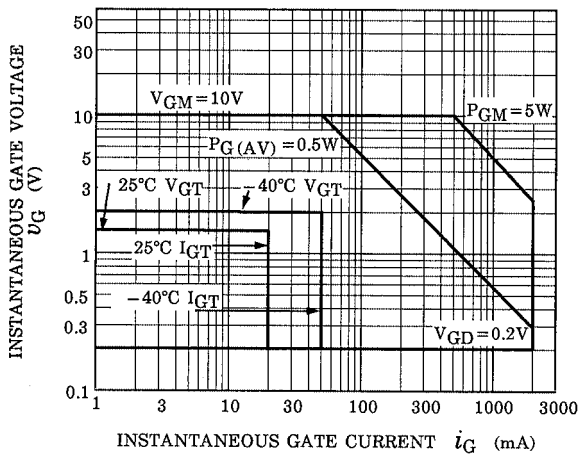
| CHARACTERISTIC  |     | SYMBOL        | TEST CONDITION   | MIN              | TYP. | MAX | UNIT                        |    |
|---|-----|---------------|--|------------------|------|-----|-----------------------------|----|
| Repetitive Peak Off-State Current                         |     | $I_{DRM}$     | $V_{DRM} = \text{Rated}$   | —                | —    | 20  | $\mu\text{A}$               |    |
| Gate Trigger Voltage                                      | I   | $V_{GT}$      | $V_D = 12\text{V}$<br>$R_L = 20\Omega$   | T2 (+), Gate (+) | —    | —   | 1.5                         | V  |
|   | II  |               |  | T2 (+), Gate (-) | —    | —   | 1.5                         |    |
|   | III |               |  | T2 (-), Gate (-) | —    | —   | 1.5                         |    |
|   | IV  |               |  | T2 (-), Gate (+) | —    | —   | —                           |    |
| Gate Trigger Current                                      | I   | $I_{GT}$      | $V_D = 12\text{V}$<br>$R_L = 20\Omega$   | T2 (+), Gate (+) | —    | —   | 20                          | mA |
|   | II  |               |  | T2 (+), Gate (-) | —    | —   | 20                          |    |
|   | III |               |  | T2 (-), Gate (-) | —    | —   | 20                          |    |
|   | IV  |               |  | T2 (-), Gate (+) | —    | —   | —                           |    |
| Peak On-State Voltage                                     |     | $V_{TM}$      | $I_{TM} = 4.5\text{A}$   | —                | —    | 1.5 | V                           |    |
| Gate Non-Trigger Voltage                                  |     | $V_{GD}$      | $V_D = \text{Rated}, T_c = 125^\circ\text{C}$  | 0.2              | —    | —   | V                           |    |
| Holding Current   |     | $I_H$         | $V_D = 12\text{V}, I_{TM} = 1\text{A}$   | —                | —    | 30  | mA                          |    |
| Thermal Resistance  |     | $R_{th(j-c)}$ | Junction to Case, AC   | —                | —    | 4.2 | $^\circ\text{C} / \text{W}$ |    |
| Critical Rate of Rise of Off-State Voltage                |     | $dv / dt$     | $V_{DRM} = \text{Rated}, T_j = 125^\circ\text{C}$<br>Exponential Rise                        | —                | 300  | —   | $\text{V} / \mu\text{s}$    |    |
| Critical Rate of Rise of Off-State Voltage at Commutation |     | $(dv / dt)_c$ | $V_{DRM} = 400\text{V}, T_j = 125^\circ\text{C}$<br>$(di / dt)_c = -2.0\text{A} / \text{ms}$ | 10               | —    | —   | $\text{V} / \mu\text{s}$    |    |

## MARKING

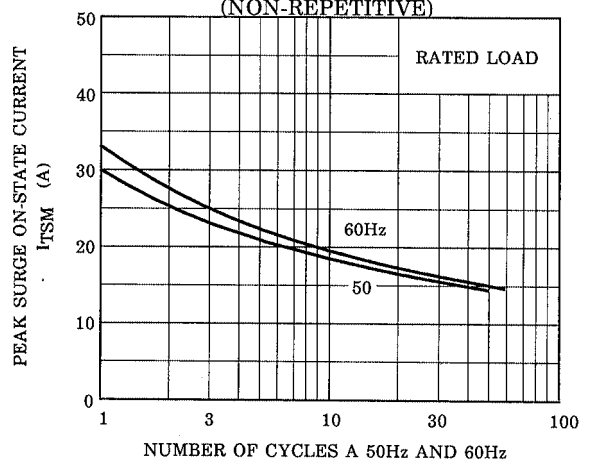


| NUMBER | SYMBOL  | MARK   |
|--------|---|--|
| * 1    | TOSHIBA PRODUCT MARK  |  |
| * 2    | TYPE  | SM3GZ47  |
|        |   | SM3JZ47  |
| * 3    | Lot Number<br><br>Month (Starting from Alphabet A)<br>Year (Last Decimal Digit of the Current Year) | Example<br>8A : January 1998<br>8B : February 1998<br>8L : December 1998 |

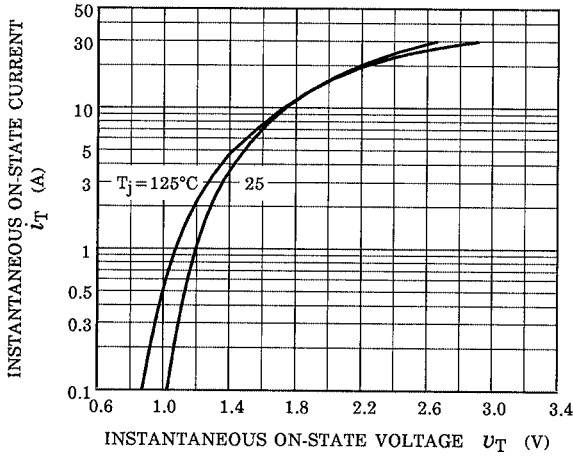
GATE TRIGGER CHARACTERISTIC



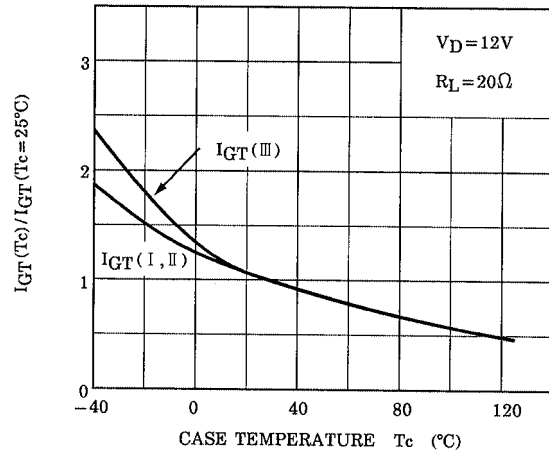
SURGE ON-STATE CURRENT (NON-REPETITIVE)



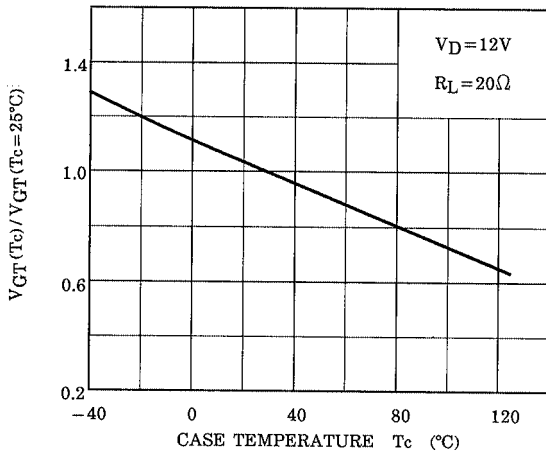
$i_T - v_T$



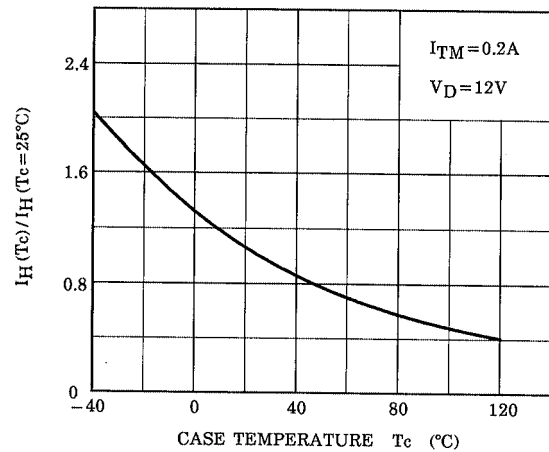
$I_{GT}(T_c) / I_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL)

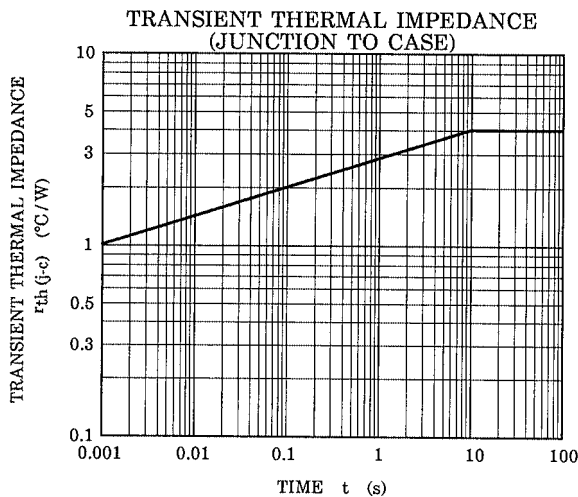
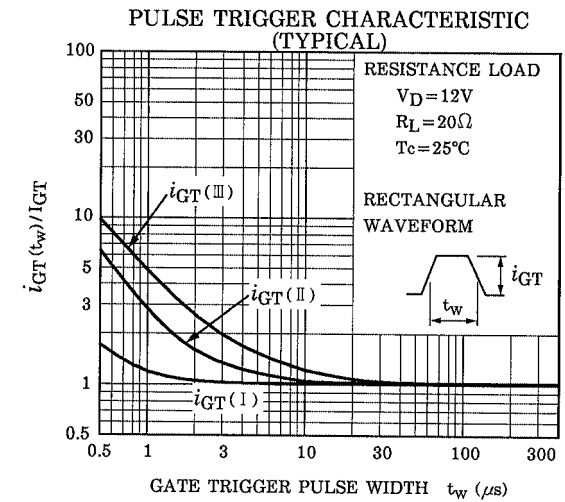
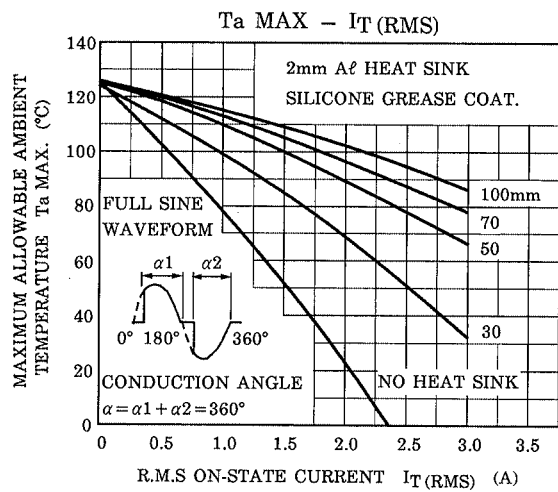
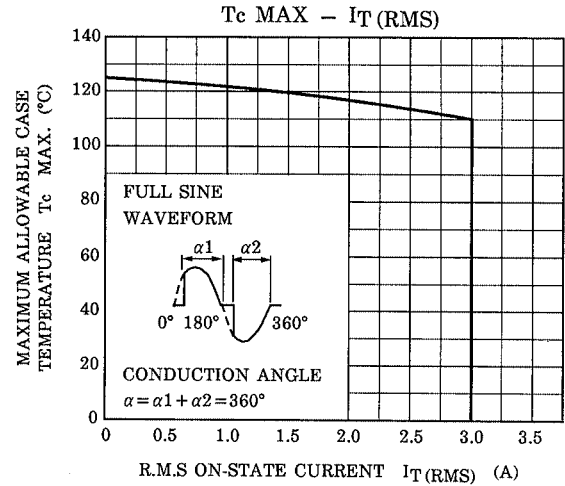
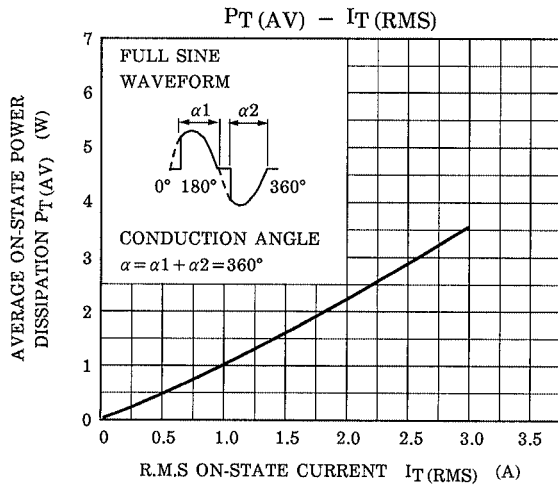


$V_{GT}(T_c) / V_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL)



$I_H(T_c) / I_H(T_c = 25^\circ C) - T_c$  (TYPICAL)





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