

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

## SM3GZ47, SM3JZ47

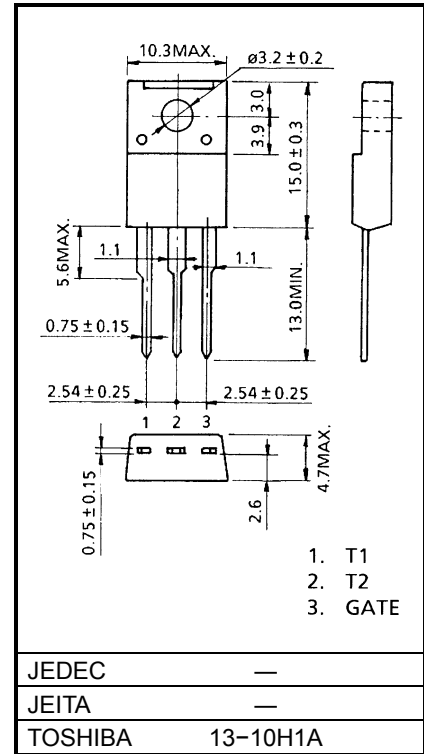
### AC POWER CONTROL APPLICATIONS

- 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<br>(Full Sine Waveform $T_c = 110^\circ C$ ) | $I_T (RMS)$ | 3              | A           |
| Peak One Cycle Surge On-State Current<br>(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<br>(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                                                | $T_j$       | $-40 \sim 125$ | $^\circ C$  |
| Storage Temperature Range                                           | $T_{stg}$   | $-40 \sim 125$ | $^\circ C$  |
| Isolation Voltage (AC, $t = 1min.$ )                                | $V_{ISOL}$  | 1500           | V           |

Unit: mm



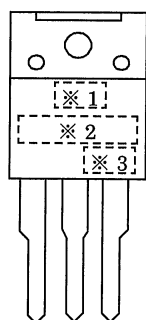
Weight: 1.7g

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)

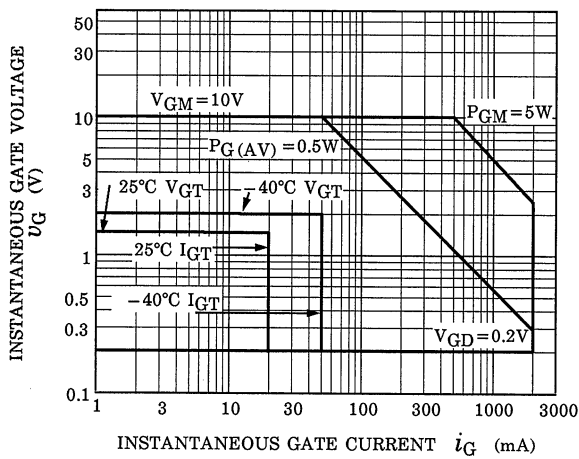
| CHARACTERISTIC                                            |     | SYMBOL        | TEST CONDITION                                                                                  |                  | MIN | TYP. | MAX | UNIT                        |
|-----------------------------------------------------------|-----|---------------|-------------------------------------------------------------------------------------------------|------------------|-----|------|-----|-----------------------------|
| 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

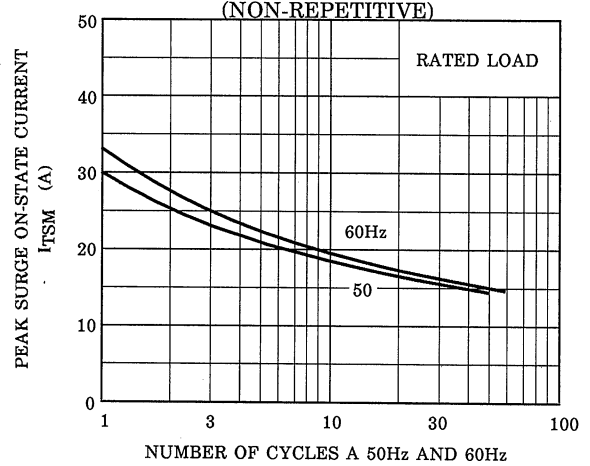


| NUMBER | SYMBOL                                                                                                                                                                                                                                                                                                                                                                                                                     |         | MARK                                                                     |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------------------------------|
| * 1    | TOSHIBA PRODUCT MARK                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                                          |
| * 2    | TYPE                                                                                                                                                                                                                                                                                                                                                                                                                       | SM3GZ47 | M3GZ47                                                                   |
|        |                                                                                                                                                                                                                                                                                                                                                                                                                            | SM3JZ47 | M3JZ47                                                                   |
| * 3    | Lot Number<br><div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="margin-left: 10px;">             Month (Starting from Alphabet A)<br/>             Year (Last Decimal Digit of the Current Year)           </div> </div> |         | Example<br>8A : January 1998<br>8B : February 1998<br>8L : December 1998 |

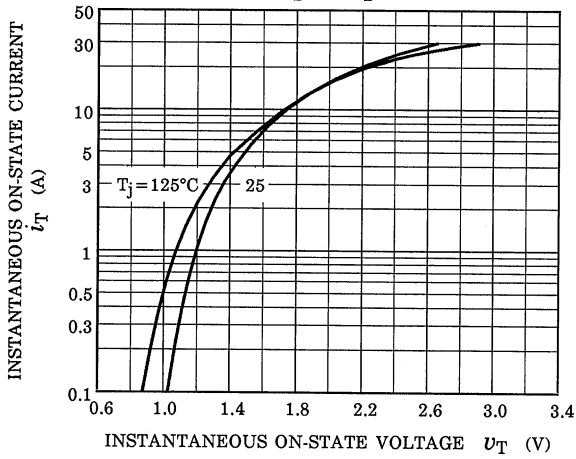
### GATE TRIGGER CHARACTERISTIC



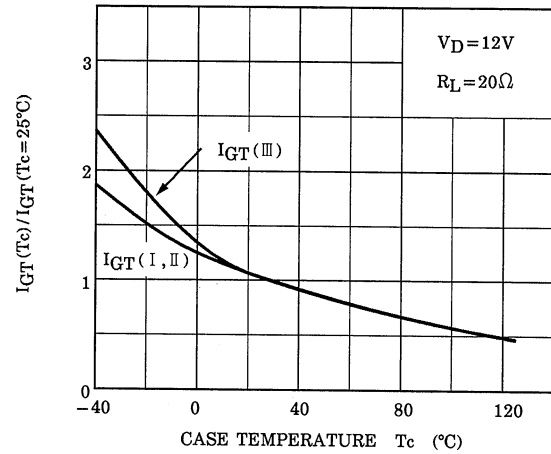
### SURGE ON-STATE CURRENT (NON-REPETITIVE)



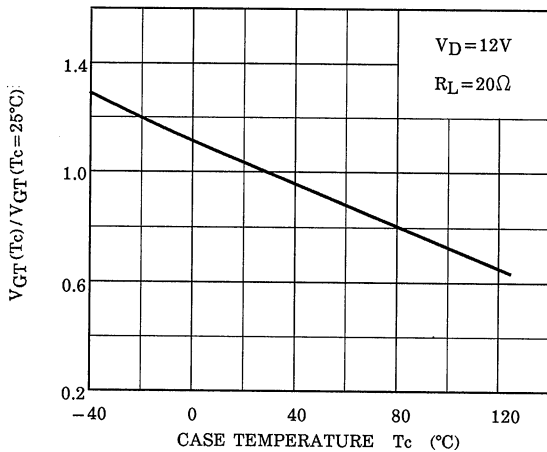
### $i_T - v_T$



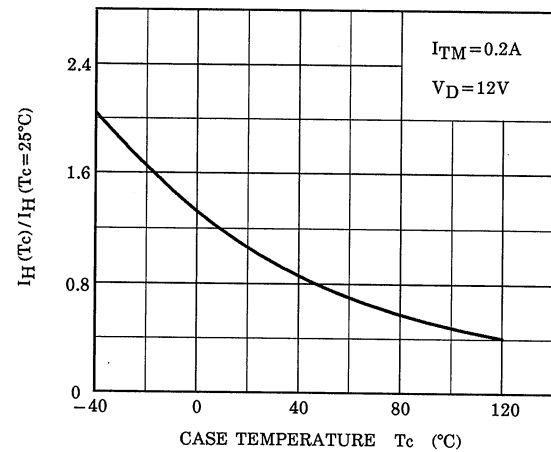
### $I_{GT}(T_c)/I_{GT}(T_c=25^\circ C) - T_c$ (TYPICAL)

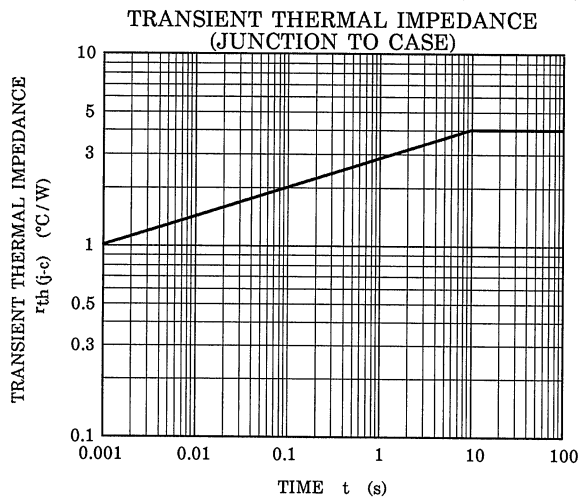
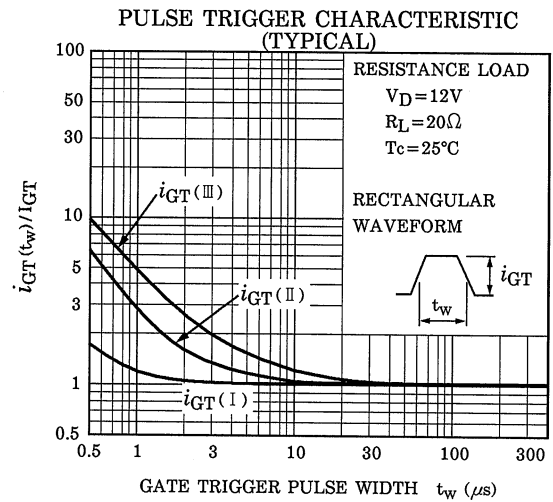
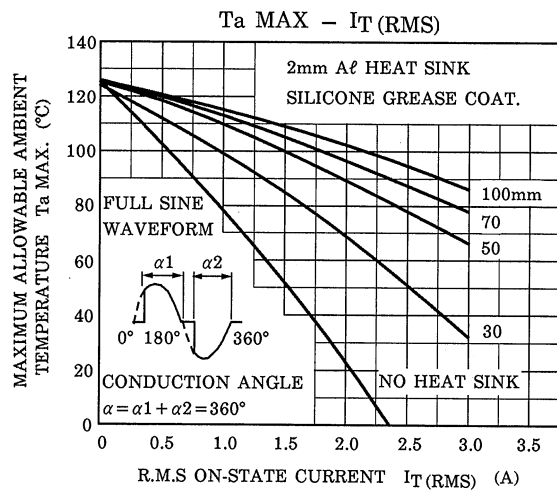
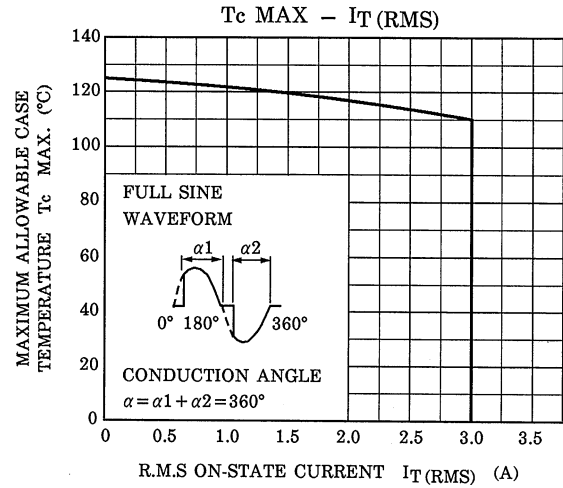
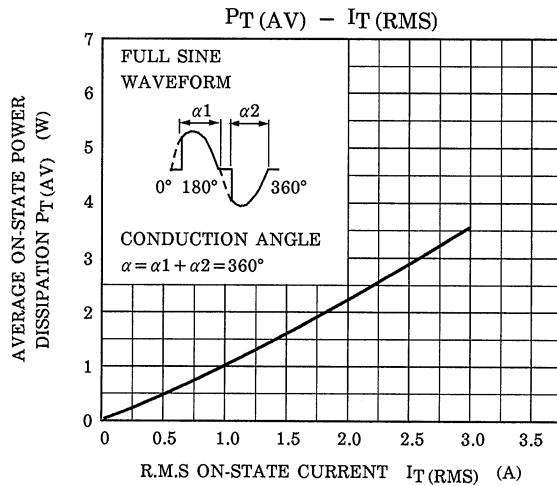


### $V_{GT}(T_c)/V_{GT}(T_c=25^\circ C) - T_c$ (TYPICAL)



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





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