

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

**SM8G48, USM8G48, SM8J48, USM8J48**  
**SM8G48A, USM8G48A, SM8J48A, USM8J48A**

AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off-State Voltage :  $V_{DRM}=400, 600V$
- R.M.S On-State Current :  $I_T$  (RMS) = 8A
- Gate Trigger Current
  - :  $I_{GT}=30mA$  MAX.
  - :  $I_{GT}=20mA$  MAX. ("A"Type)

Unit : mm

| SM8G48, SM8J48, SM8G48A, SM8J48A |          |
|----------------------------------|----------|
|                                  |          |
| JEDEC                            | —        |
| EIAJ                             | —        |
| TOSHIBA                          | 13-10J1A |

| USM8G48, USM8J48, USM8G48A, USM8J48A |          |
|--------------------------------------|----------|
|                                      |          |
| JEDEC                                | —        |
| EIAJ                                 | —        |
| TOSHIBA                              | 13-10J2A |

## MAXIMUM RATINGS

Weight : 1.7g

| CHARACTERISTIC                                            |            | SYMBOL               | RATING    | UNIT             |
|-----------------------------------------------------------|------------|----------------------|-----------|------------------|
| Repetitive Peak<br>Off-State Voltage                      | (U)SM8G48  | V <sub>DRM</sub>     | 400       | V                |
|                                                           | (U)SM8G48A |                      |           |                  |
|                                                           | (U)SM8J48  |                      |           |                  |
|                                                           | (U)SM8J48A |                      |           |                  |
| R.M.S On-State Current                                    |            | I <sub>T</sub> (RMS) | 8         | A                |
| Peak One Cycle Surge On-State<br>Current (Non-Repetitive) |            | I <sub>TSM</sub>     | 80 (50Hz) | A                |
|                                                           |            |                      | 88 (60Hz) |                  |
| I <sup>2</sup> t Limit Value                              |            | I <sup>2</sup> t     | 32        | A <sup>2</sup> s |
| Critical Rate of Rise of On-State<br>Current (Note 1)     |            | di / dt              | 50        | A / μs           |
| Peak Gate Power Dissipation                               |            | P <sub>GM</sub>      | 5         | W                |
| Average Gate Power Dissipation                            |            | P <sub>G</sub> (AV)  | 0.5       | W                |
| Peak Forward Gate Voltage                                 |            | V <sub>GM</sub>      | 10        | V                |
| Peak Forward Gate Current                                 |            | I <sub>GM</sub>      | 2         | A                |
| Junction Temperature                                      |            | T <sub>j</sub>       | −40~125   | °C               |
| Storage Temperature Range                                 |            | T <sub>stg</sub>     | −40~125   | °C               |

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

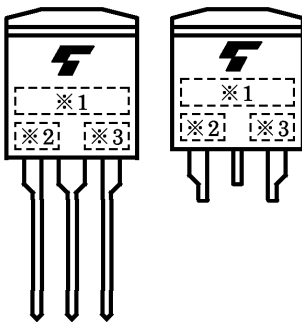
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## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                            |                          | SYMBOL                 | TEST CONDITION                                                                         |                                              | MIN.            | TYP. | MAX. | UNIT   |     |    |
|-----------------------------------------------------------|--------------------------|------------------------|----------------------------------------------------------------------------------------|----------------------------------------------|-----------------|------|------|--------|-----|----|
| Repetitive Peak Off-State Current                         |                          | I <sub>DRM</sub>       | V <sub>DRM</sub> = Rated                                                               |                                              | —               | —    | 20   | μA     |     |    |
| Gate Trigger Voltage                                      |                          | I                      | V <sub>GT</sub>                                                                        | V <sub>D</sub> = 12V<br>R <sub>L</sub> = 20Ω | T2(+), GATE (+) |      | —    | —      | 1.5 | V  |
|                                                           |                          |                        |                                                                                        |                                              | T2(+), GATE (—) |      | —    | —      | 1.5 |    |
|                                                           |                          |                        |                                                                                        |                                              | T2(—), GATE (—) |      | —    | —      | 1.5 |    |
|                                                           |                          |                        |                                                                                        |                                              | T2(—), GATE (+) |      | —    | —      | —   |    |
| Gate Trigger Current                                      | (U)SM8G48<br>(U)SM8J48   | I                      | I <sub>GT</sub>                                                                        | V <sub>D</sub> = 12V                         | T2(+), GATE (+) |      | —    | —      | 30  | mA |
|                                                           |                          | II                     |                                                                                        |                                              | T2(+), GATE (—) |      | —    | —      | 30  |    |
|                                                           |                          | III                    |                                                                                        |                                              | T2(—), GATE (—) |      | —    | —      | 30  |    |
|                                                           |                          | IV                     |                                                                                        |                                              | T2(—), GATE (+) |      | —    | —      | —   |    |
|                                                           | (U)SM8G48A<br>(U)SM8J48A | I                      |                                                                                        | R <sub>L</sub> = 20Ω                         | T2(+), GATE (+) |      | —    | —      | 20  |    |
|                                                           |                          | II                     |                                                                                        |                                              | T2(+), GATE (—) |      | —    | —      | 20  |    |
|                                                           |                          | III                    |                                                                                        |                                              | T2(—), GATE (—) |      | —    | —      | 20  |    |
|                                                           |                          | IV                     |                                                                                        |                                              | T2(—), GATE (+) |      | —    | —      | —   |    |
| Peak On-State Voltage                                     |                          | V <sub>TM</sub>        | I <sub>TM</sub> = 12A                                                                  |                                              | —               | —    | 1.5  | V      |     |    |
| Gate Non-Trigger Voltage                                  |                          | V <sub>GD</sub>        | V <sub>D</sub> = Rated, T <sub>c</sub> = 125°C                                         |                                              | 0.2             | —    | —    | V      |     |    |
| Holding Current                                           |                          | I <sub>H</sub>         | V <sub>D</sub> = 12V, I <sub>TM</sub> = 1A                                             |                                              | —               | —    | 50   | mA     |     |    |
| Thermal Resistance                                        |                          | R <sub>th(j-c)</sub>   | Junction to Case, AC                                                                   |                                              | —               | —    | 2.8  | °C / W |     |    |
| Critical Rate of Rise of Off-State Voltage                | (U)SM8G48<br>(U)SM8J48   | dv / dt                | V <sub>DRM</sub> = Rated, T <sub>j</sub> = 125°C<br>Exponential Rise                   |                                              | —               | 300  | —    | V / μs |     |    |
|                                                           | (U)SM8G48A<br>(U)SM8J48A |                        |                                                                                        |                                              | —               | 200  | —    |        |     |    |
| Critical Rate of Rise of Off-State Voltage at Commutation | (U)SM8G48<br>(U)SM8J48   | (dv / dt) <sub>c</sub> | V <sub>DRM</sub> = 400V, T <sub>j</sub> = 125°C<br>(di / dt) <sub>c</sub> = −4.5A / ms |                                              | 10              | —    | —    | V / μs |     |    |
|                                                           | (U)SM8G48A<br>(U)SM8J48A |                        |                                                                                        |                                              | 4               | —    | —    |        |     |    |

## MARKING



| NUMBER | SYMBOL                                                                                                                                                                              |                                      | MARK                                                                  |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------|
| ※ 1    | TYPE                                                                                                                                                                                | SM8G48, SM8G48A, USM8G48, USM8G48A   | M8G48                                                                 |
|        |                                                                                                                                                                                     | SM8J48, SM8J48A, USM8J48, USM8J48A   | M8J48                                                                 |
| ※ 2    |                                                                                                                                                                                     | SM8G48A, SM8J48A, USM8G48A, USM8J48A | A                                                                     |
| ※ 3    | Lot Number<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 |

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