

TENTATIVE

TOSHIBA GATE TURN-OFF THYRISTOR

# SG3000JX26

## INVERTER APPLICATION

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 6000 \text{ V}$  (Note 1)
- Repetitive Peak Reverse Voltage :  $V_{RRM} = 17 \text{ V}$
- R.M.S On-State Current :  $I_T(\text{RMS}) = 1200 \text{ A}$
- Peak Turn-Off Current :  $I_{TGQM} = 3000 \text{ A}$
- Critical Rate of Rise of On-State Current :  $di/dt = 400 \text{ A}/\mu\text{s}$
- Critical Rate of Rise of Off-State Voltage :  $dv/dt = 1000 \text{ V}/\mu\text{s}$

## MAXIMUM RATINGS

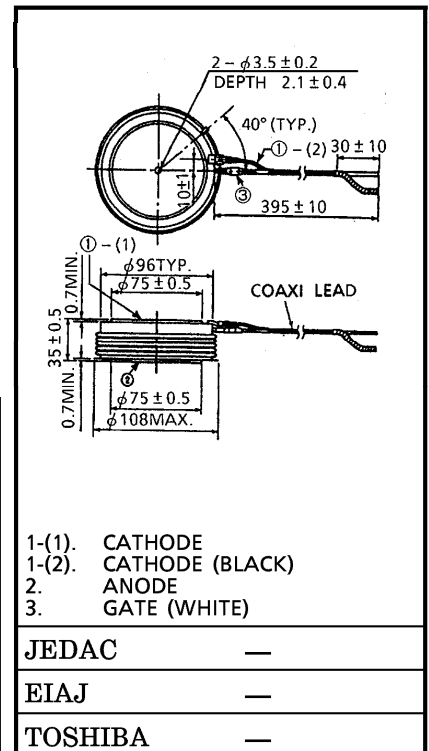
| CHARACTERISTIC                                                                                | SYMBOL            | RATING         | UNIT              |
|-----------------------------------------------------------------------------------------------|-------------------|----------------|-------------------|
| Repetitive Peak Off-State Voltage<br>(Note 1)                                                 | $V_{DRM}$         | 6000           | V                 |
| Repetitive Peak Reverse Voltage                                                               | $V_{RRM}$         | 17             | V                 |
| Peak Turn-Off Current (Note 2)                                                                | $I_{TGQM}$        | 3000           | A                 |
| R.M.S On-State Current (Note 3)                                                               | $I_T(\text{RMS})$ | 1200           | A                 |
| Peak One Cycle Surge On-State<br>Current (Non Repetitive, 10 ms-<br>Width Half Sine Waveform) | $I_{TSM}$         | 16000          | A                 |
| Critical Rate of Rise of On-State<br>Current (Note 4)                                         | $di/dt$           | 400            | A / $\mu\text{s}$ |
| Peak Forward Gate Current                                                                     | $I_{FGM}$         | 100            | A                 |
| Average Gate Power Dissipation                                                                | $P_G(\text{AV})$  | 150            | W                 |
| R.M.S Gate Current (Note 5)                                                                   | $I_G(\text{RMS})$ | 42             | A                 |
| Peak Reverse Gate Voltage<br>(At Static)                                                      | $V_{RGM}$         | 17             | V                 |
| Operation Junction Temperature<br>Range                                                       | $T_j$             | -40~125        | °C                |
| Storage Temperature Range                                                                     | $T_{stg}$         | -40~150        | °C                |
| Mounting Force                                                                                | —                 | $33.3 \pm 4.9$ | kN                |

(Note 1) :  $V_{GK} = -2 \text{ V}$ (Note 2) :  $V_D = 3000 \text{ V}$ ,  $V_{DM} \leq 5000 \text{ V}$ ,  $C_S \geq 3 \mu\text{F}$ ,  $di_{GQ}/dt \geq 40 \text{ A}/\mu\text{s}$ ,  $V_{DSP} \leq 1000 \text{ V}$ ,  
 $L_S \leq 0.2 \mu\text{H}$ 

(Note 3) : 50 Hz Half Sine Waveform

(Note 4) :  $V_D \leq 4000 \text{ V}$ ,  $I_{TM} \leq 3000 \text{ A}$ ,  $I_G \geq 35 \text{ A}$  ( $t_r \leq 1 \mu\text{s}$ ),  $f \leq 50 \text{ Hz}$ ,  $C_S \leq 6 \mu\text{F}$ ,  
 $R_S \leq 5 \Omega$ ,  $25^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ (Note 5) : Ambient Temperature of coaxial gate-cathode lead =  $90^\circ\text{C}$ 

Unit in mm



Weight : 1700 g

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## ELECTRICAL CHARACTERISTICS

| CHARACTERISTICS                            | SYMBOL                | TEST CONDITION                                                                                  |                        | MIN  | TYP. | MAX   | UNIT   |
|--------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------|------------------------|------|------|-------|--------|
| Repetitive Peak Off-State Current          | I <sub>DRM</sub>      | V <sub>DRM</sub> = 6000 V, V <sub>GK</sub> = −2 V<br>T <sub>j</sub> = 125°C                     |                        | —    | —    | 200   | mA     |
| Repetitive Peak Reverse Current            | I <sub>RRM</sub>      | V <sub>RRM</sub> = 17 V<br>T <sub>j</sub> = 125°C                                               |                        | —    | —    | 10    | mA     |
| Repetitive Peak Reverse Gate Current       | I <sub>RGM</sub>      | V <sub>RGM</sub> = 17 V<br>T <sub>j</sub> = 125°C                                               |                        | —    | —    | 10    | mA     |
| Peak On-State Voltage                      | V <sub>TM</sub>       | I <sub>TM</sub> = 3000 A, T <sub>j</sub> = 125°C                                                |                        | —    | —    | 4.3   | V      |
| Gate Trigger Voltage                       | V <sub>GT</sub>       | V <sub>D</sub> = 24 V<br>R <sub>L</sub> = 0.1 Ω                                                 | T <sub>j</sub> = −40°C | —    | —    | 2.5   | V      |
|                                            |                       |                                                                                                 | T <sub>j</sub> = 25°C  | —    | —    | 1.5   | V      |
| Gate Trigger Current                       | I <sub>GT</sub>       |                                                                                                 | T <sub>j</sub> = −40°C | —    | —    | —     | A      |
|                                            |                       |                                                                                                 | T <sub>j</sub> = 25°C  | —    | —    | 3.5   | A      |
| Turn-On Delay Time                         | t <sub>d</sub>        | V <sub>D</sub> = 3000 V, I <sub>TM</sub> = 3000 A<br>di / dt = 400 A / μs                       |                        | —    | —    | 3.0   | μs     |
| Turn-On Time                               | t <sub>gt</sub>       | I <sub>GM</sub> = 35 A (t <sub>r</sub> = 1 μs)<br>T <sub>j</sub> = 25°C, non-snubber            |                        | —    | —    | 10    | μs     |
| Critical Rate of Rise of Off-State Voltage | dv / dt               | V <sub>DRM</sub> = 3000 V<br>T <sub>j</sub> = 125°C, V <sub>GK</sub> = −5 V<br>Exponential Rise |                        | 1350 | —    | —     | V / μs |
| Storage Time                               | t <sub>s</sub>        | I <sub>TGQ</sub> = 3000 A                                                                       |                        | —    | —    | 30    | μs     |
| Gate Turn-Off Time                         | t <sub>gq</sub>       | V <sub>DM</sub> = 5000 V, T <sub>j</sub> = 125°C                                                |                        | —    | —    | 33    | μs     |
| Tail Time                                  | t <sub>tail</sub>     | V <sub>D</sub> = 3000 V, C <sub>S</sub> = 3 μF<br>di <sub>GQ</sub> / dt = 50 A / μs             |                        | —    | —    | 120   | μs     |
| Gate Turn-Off Current                      | I <sub>GQ</sub>       | Off squeeze current ≥ 300 mA                                                                    |                        | —    | —    | 850   | A      |
| Thermal Resistance                         | R <sub>th (j-f)</sub> | Junction to fin                                                                                 |                        | —    | —    | 0.017 | °C / W |

