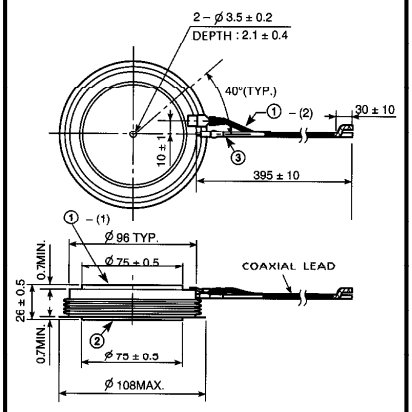
TOSHIBA GATE TURN-OFF THYRISTOR

# SG3000GXH29

INVERTER APPLICATION

- Repetitive Peak Off-State Voltage : $V_{DRM}$ = 4500V
- R.M.S On-State Current : $I_{T(RMS)}$ = 1200A
- Peak Turn-Off Current : $I_{TGQM}$ = 3000A
- Critical Rate of Rise of On-State Current : di / dt = 400A / $\mu$s
- Critical Rate of Rise of Off-State Voltage : dv / dt = 1000V / $\mu$s
- Suitable for 3000V DC Off-State Voltage Application

Unit in mm




①- (1) CATHODE
①- (2) CATHODE (BLACK)
② ANODE
③ GATE (WHITE)

| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 13-108D1A |

Weight : 1290g

MAXIMUM RATINGS

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Repetitive Peak Off-State Voltage (Note 1) | $V_{DRM}$ | 4500 | 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) | $I_{T(RMS)}$ | 1200 | A |
| Peak One Cycle Surge On-State Current (Non Repetitive, 10ms-Width Half Sine Waveform) | $I_{TSM}$ | 16000 | A |
| Critical Rate of Rise of On-State Current (Note 4) | di / dt | 400 | A / $\mu$s |
| Peak Forward Gate Current | $I_{FGM}$ | 100 | A |
| Average Forward Gate Power Dissipation | $P_{FG(AV)}$ | 50 | W |
| Average Reverse Gate Power Dissipation | $P_{RG(AV)}$ | 150 | W |
| R.M.S Gate Current (Note 5) | $I_{G(RMS)}$ | 42 | A |
| Peak Reverse Gate Voltage (at Static) | $V_{RGM}$ | 17 | V |
| Operating Junction Temperature Range | $T_j$ | −40~125 | °C |
| Storage Temperature Range | $T_{stg}$ | −40~150 | °C |
| Mounting Force | — | 28.5~44.0 | kN |

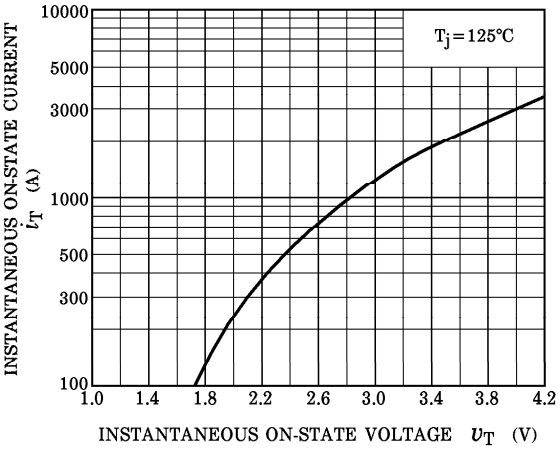
Note 1 : $V_{GK}$ = −2V
Note 2 : $V_{DM}$ = 4500V, $C_S$ = 6$\mu$F, $R_S$ = 5$\Omega$, $di_{GQ}$ / dt = 50A / $\mu$s, $V_{DSP} \leqq$ 850V, $L_S$ = 200nH (Stray inductance of snubber [GTO-$C_S$-$D_S$] loop)
Note 3 : 50Hz Half Sine Waveform at $T_f$ = 76°C
Note 4 : $V_D$ = 3000V, $I_{GM} \geqq$ 25A
Note 5 : Ambient Temperature of coaxial gate-cathode lead = 90°C

961001EAA2

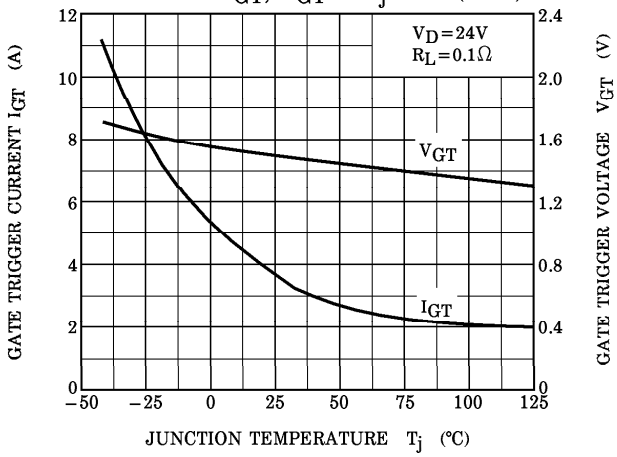
ELECTRICAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | TEST CONDITION | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Repetitive Peak Off-State Current | $I_{DRM}$ | $V_{DRM}=4500V$, $V_{GK}=-2V$, $T_j=125°C$ | | — | — | 100 | mA |
| Repetitive Peak Reverse Current | $I_{RRM}$ | $V_{RRM}=17V$, $T_j=125°C$ | | — | — | 10 | mA |
| Repetitive Peak Reverse Gate Current | $I_{RGM}$ | $V_{RGM}=17V$, $T_j=125°C$ | | — | — | 10 | mA |
| Peak On-State Voltage | $V_{TM}$ | $I_{TM}=3000A$, $T_j=125°C$ | | — | — | 4.0 | V |
| Gate Trigger Voltage | $V_{GT}$ | $V_D=24V$, $R_L=0.1\Omega$ | $T_j=-40°C$ | — | — | — | V |
| | | | $T_j=25°C$ | — | — | 1.5 | |
| Gate Trigger Current | $I_{GT}$ | | $T_j=-40°C$ | — | — | — | A |
| | | | $T_j=25°C$ | — | — | 3.5 | |
| Turn-On Delay Time | $t_d$ | $V_D=2800V$, $di/dt=400A/\mu s$, $I_{TM}=3000A$, $I_{GM}=25A$, $T_j=25°C$ | | — | — | 3 | $\mu s$ |
| Turn-On Time | $t_{gt}$ | | | — | — | 10 | $\mu s$ |
| Critical Rate of Rise of Off-State Voltage | $dv/dt$ | $V_D=3000V$, $V_{GK}=-2V$, Exponential Rise, $T_j=125°C$ | | 1000 | — | — | $V/\mu s$ |
| Storage Time | $t_s$ | $I_{TGQ}=3000A$, $V_{DM}=4500V$, $C_S=6\mu F$, $V_D=3000V$, $R_S=5\Omega$, $di_{GQ}/dt=50A/\mu s$, $T_j=125°C$, $V_{DSP}\leqq 850V$ | | — | — | 30 | $\mu s$ |
| Gate Turn-Off Time | $t_{gq}$ | | | — | — | 33 | $\mu s$ |
| Tail Time | $t_{tail}$ | | | — | — | 115 | $\mu s$ |
| Gate Turn-Off Current | $I_{GQ}$ | | | — | 770 | — | A |
| Thermal Resistance (Junction to Fin) | $R_{th\,(j\text{-}f)}$ | DC | | — | — | 0.014 | °C / W |

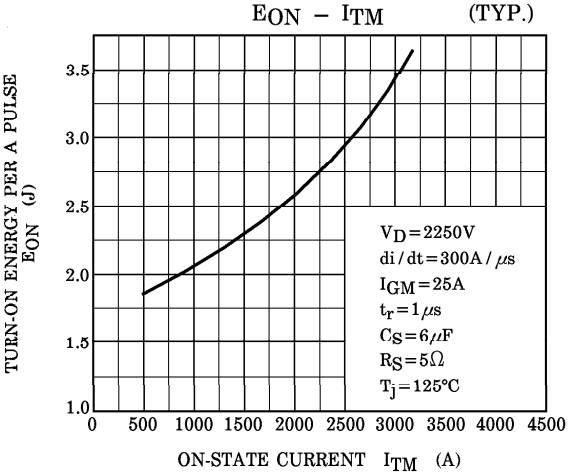
$i_T - v_T$ (MAX.)



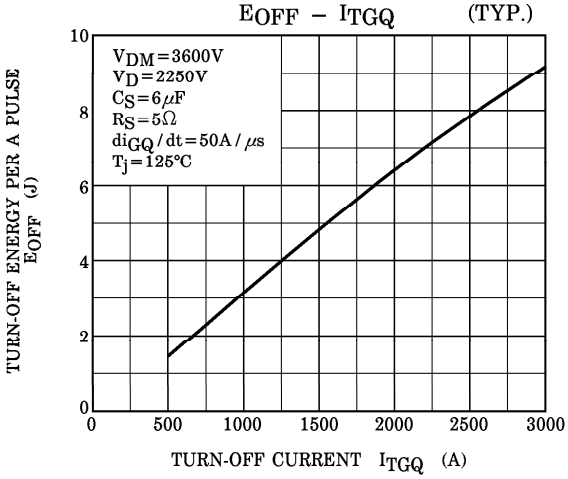

$I_{GT}$, $V_{GT}$ – $T_j$ (TYP.)



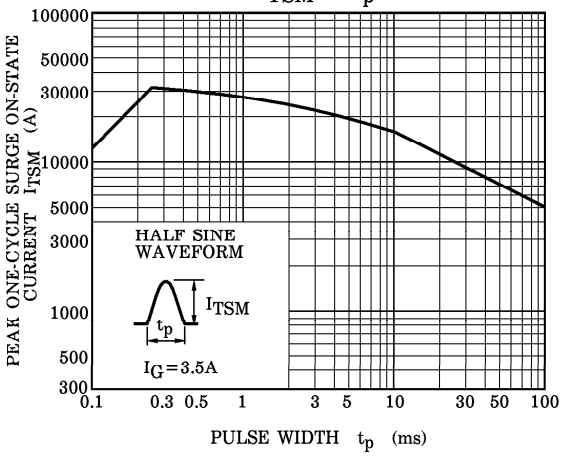

$E_{ON}$ – $I_{TM}$ (TYP.)




$E_{OFF}$ – $I_{TGQ}$ (TYP.)




$I_{TSM}$ – $t_p$




$r_{th\,(j\text{-}f)}$ – t (MAX.)