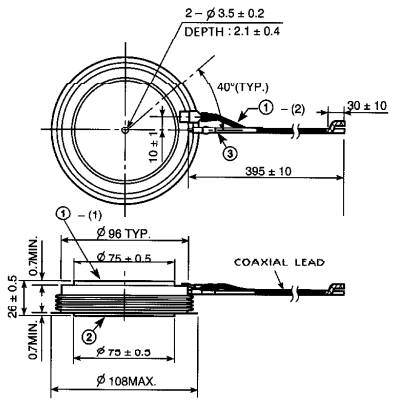
TOSHIBA GATE TURN-OFF THYRISTOR

SG2500GXH24

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} = 2500A
- Critical Rate of Rise of On-State Current : di / dt = 400A / μs
- Critical Rate of Rise of Off-State Voltage : dv / dt = 1000V / μs

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}	16	V
Peak Turn-Off Current (Note 2)	I_{TGQM}	2500	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
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}	16	V
Operating Junction Temperature Range	T_j	−40~125	°C
Storage Temperature Range	T_{stg}	−40~150	°C
Mounting Force	—	33.3±4.9	kN

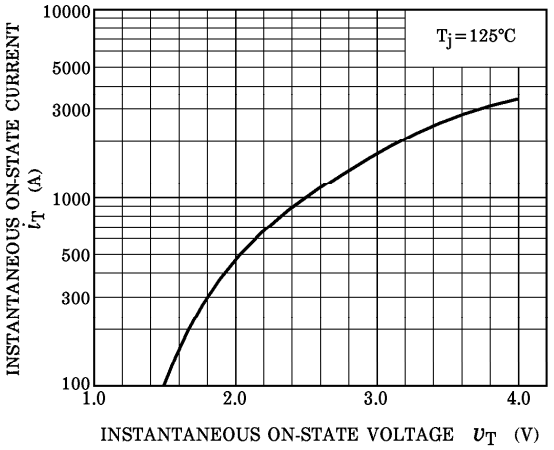
Note 1 V_{GK} = −2V
Note 2 V_{DM} = 4500V, C_S = 6μF, R_S = 5Ω, di_{GQ} / dt = 50A / μs, $V_{DSP} \leqq$ 850V, $L_S \leqq$ 0.3μH
Note 3 50Hz Half Sine Waveform at T_f = 77°C
Note 4 V_D = 1 / 2V_{DRM}, I_{GM} = 25A
Note 5 Ambient Temperature of coaxial gate-cathode lead = 90°C

961001EAA2

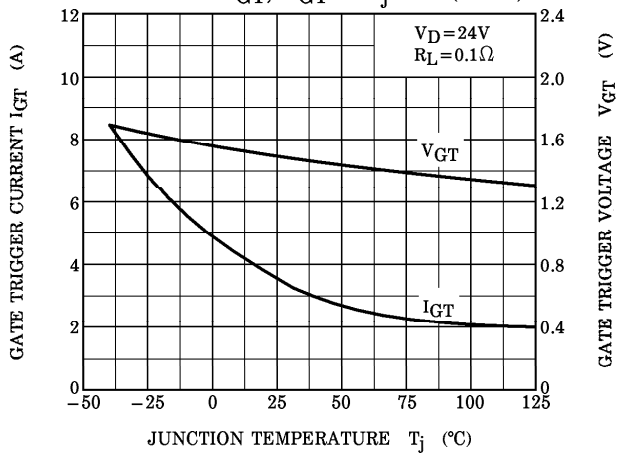
ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current	I_{DRM}	V_{DRM} = Rated, V_{GK} = −2V, T_j = 125°C		—	—	100	mA
Repetitive Peak Reverse Current	I_{RRM}	V_{RRM} = Rated, T_j = 125°C		—	—	10	mA
Repetitive Peak Reverse Gate Current	I_{RGM}	V_{RGM} = 16V, T_j = 125°C		—	—	10	mA
Peak On-State Voltage	V_{TM}	I_{TM} = 2500A, T_j = 125°C		—	—	3.4	V
Gate Trigger Voltage	V_{GT}	V_D = 24V, R_L = 0.1Ω	T_j = −40°C	—	—	1.7	V
			T_j = 25°C	—	—	1.5	
Gate Trigger Current	I_{GT}		T_j = −40°C	—	—	8.5	A
			T_j = 25°C	—	—	3.5	
Turn-On Delay Time	t_d	V_D = 1 / 2V_{DRM}, I_{TM} = 2500A, di / dt = 400A / μs, I_{GM} = 25A, T_j = 25°C		—	—	3	μs
Turn-On Time	t_{gt}			—	—	10	μs
Critical Rate of Rise of Off-State Voltage	dv / dt	V_{DRM} = 2 / 3 RATED, Exponential Rise, T_j = 125°C, V_{GK} = −2V		1000	—	—	V / μs
Storage Time	t_s	I_{TGQ} = 2500A, V_{DM} = 4500V, V_D = 1 / 2 V_{DRM}, di_{GQ} / dt = 50A / μs, C_S = 6μF, R_S = 5Ω, T_j = 125°C, L_S ≦ 0.3μH		—	—	23	μs
Gate Turn-Off Time	t_{gq}			—	—	25	μs
Tail Time	t_{tail}			—	—	70	μs
Gate Turn-Off Current	I_{GQ}			—	650	—	A
Thermal Resistance (Junction to Fin)	$R_{th\,(j\text{-}f)}$	DC		—	—	0.016	°C / W

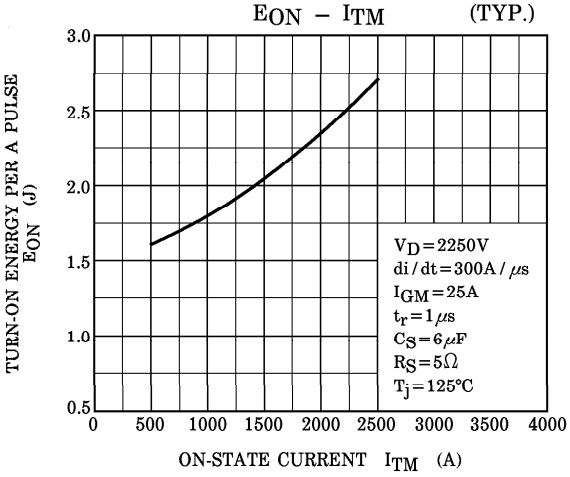
i_T – v_T (MAX.)



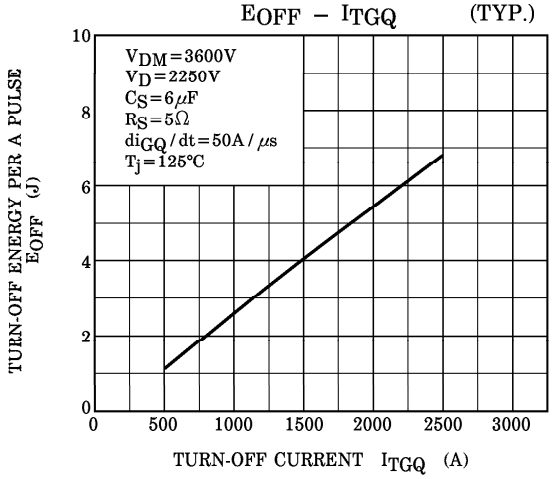
I_{GT}, V_{GT} – T_j (MAX.)



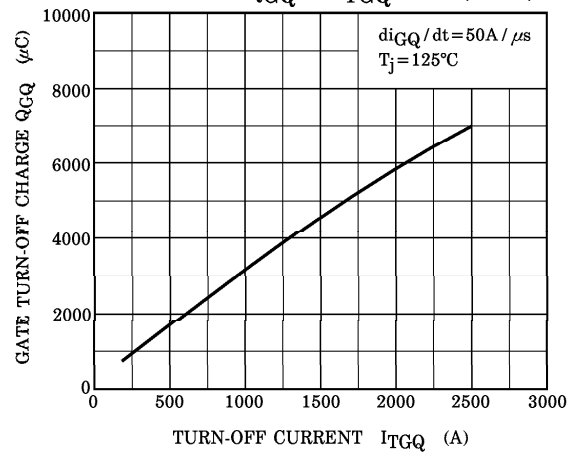
E_{ON} – I_{TM} (TYP.)



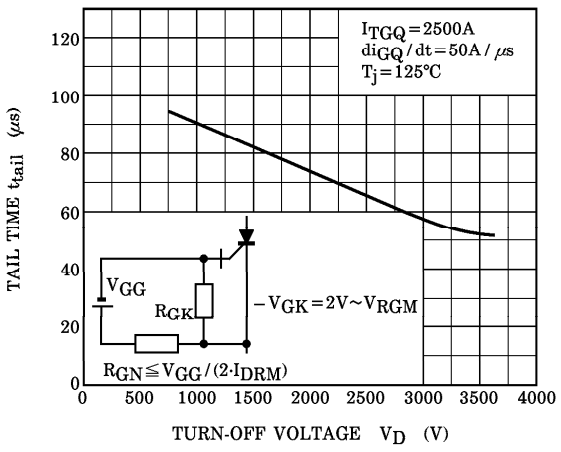
E_{OFF} – I_{TGQ} (TYP.)

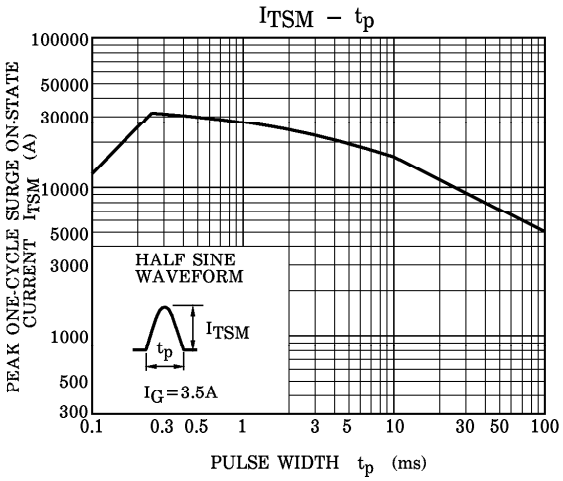


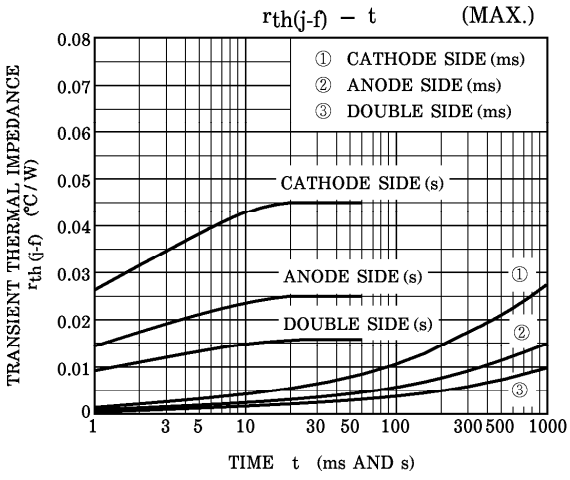
Q_{GQ} – I_{TGQ} (MAX.)



t_{tail} – V_D (MAX.)




I_{TSM} – t_p
PEAK ONE-CYCLE SURGE ON-STATE CURRENT I_{TSM} (A)
100000
50000
30000
10000
5000
3000
1000
500
300
HALF SINE WAVEFORM
I_{TSM}
t_p
I_G=3.5A
0.1
0.3
0.5
1
3
5
10
30
50
100
PULSE WIDTH t_p (ms)


$r_{th(j-f)}$ – t (MAX.)
TRANSIENT THERMAL IMPEDANCE $r_{th(j-f)}$ (°C/W)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
① CATHODE SIDE (ms)
② ANODE SIDE (ms)
③ DOUBLE SIDE (ms)
CATHODE SIDE (s)
ANODE SIDE (s)
DOUBLE SIDE (s)
①
②
③
1
3
5
10
30
50
100
300
500
1000
TIME t (ms AND s)