

TENTATIVE

TOSHIBA GATE TURN-OFF THYRISTOR

# SG4500GXH25

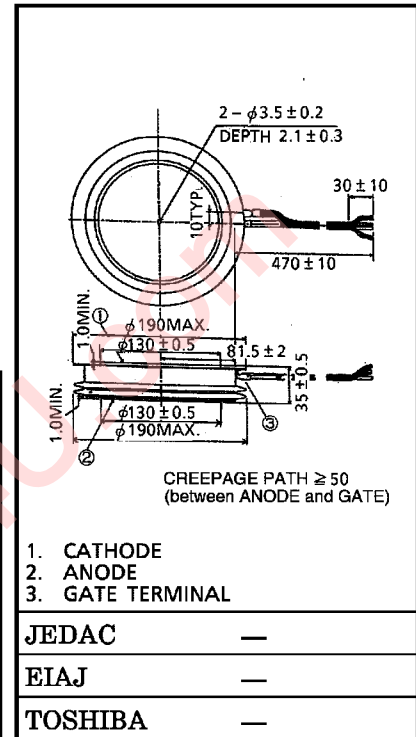
INVERTER APPLICATION

Unit in mm

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 4500V$   
(Note 1)
- Repetitive Peak Reverse Voltage :  $V_{RRM} = 4000V$
- R.M.S On-State Current :  $I_T (RMS) = 3000A$
- Peak Turn-Off Current :  $I_{TGQM} = 4500A$
- Critical Rate of Rise of On-State Current :  $di / dt = 300A / \mu s$
- Critical Rate of Rise of Off-State Voltage :  $dv / dt = 1000V / \mu s$

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage (Note 1)	$V_{DRM}$	4500	V
Repetitive Peak Reverse Voltage	$V_{RRM}$	4000	V
Peak Turn-Off Current (Note 2)	$I_{TGQM}$	4500	A
R.M.S On-State Current (Note 3)	$I_T (RMS)$	3000	A
Peak One Cycle Surge On-State Current (Non Repetitive, 10ms-Width Half Sine Waveform)	$I_{TSM}$	46000	A
Critical Rate of Rise of On-State Current (Note 4)	$di / dt$	300	A / $\mu s$
Peak Forward Gate Current	$I_{FGM}$	200	A
Average Forward Gate Power Dissipation	$P_{FG} (AV)$	190	W
Average Reverse Gate Reverse Dissipation	$P_{RG} (AV)$	550	W
R.M.S Gate Current (Note 5)	$I_G (RMS)$	84	A
Peak Reverse Gate Voltage (At Static)	$V_{RGM}$	17	V
Operation Junction Temperature Range	$T_j$	-40~115	°C
Storage Temperature Range	$T_{stg}$	-40~115	°C
Mounting Force	—	98~120	kN



Weight : 6000g

(Note 1)  $V_{GK} = -10V$

(Note 2)  $V_D = 2250V, V_{DM} \leq 3600V, C_S \geq 6\mu F, di_{GQ} / dt \geq 60A / \mu s, V_{DSP} \leq 1200V, L_S \leq 80nH$   
(non-snubber)

(Note 3) 50Hz Half Sine Waveform,  $T_j = 80^\circ C$

(Note 4)  $V_D \leq 2250V, I_{TM} \leq 4500A, I_G \geq 100A (t_r \leq 1\mu s), f \leq 50Hz, C_S \leq 6\mu F, R_S \geq 5\Omega,$   
 $25^\circ C \leq T_j \leq 115^\circ C$

(Note 5) Ambient Temperature of coaxial gate-cathode lead =  $90^\circ C$

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## ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current	$I_{DRM}$	$V_{DRM} = 4500V$ , $V_{GK} = -10V$ $T_j = 115^\circ C$	—	—	300	mA
Repetitive Peak Reverse Current	$I_{RRM}$	$V_{RRM} = 4000V$ $T_j = 115^\circ C$	—	—	300	mA
Repetitive Peak Reverse Gate Current	$I_{RGM}$	$V_{RGM} = 17V$ $T_j = 125^\circ C$	—	—	10	mA
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 4500A$ , $T_j = 115^\circ C$	—	—	4.0	V
Gate Trigger Voltage	$V_{GT}$	$V_D = 24V$	$T_j = -40^\circ C$	—	—	V
			$T_j = 25^\circ C$	—	—	2.0
Gate Trigger Current	$I_{GT}$	$R_L = 0.1\Omega$	$T_j = -40^\circ C$	—	—	A
			$T_j = 25^\circ C$	—	—	10
Turn-On Delay Time	$t_d$	$V_D = 2250V$ , $I_{TM} = 4500A$ $di_F / dt = 300A / \mu s$	—	—	4.0	$\mu s$
Turn-On Time	$t_{gt}$	$I_{GM} = 100A$ ( $t_r = 1\mu s$ ) $T_j = 25^\circ C$ , non-snubber	—	—	12	$\mu s$
Critical Rate of Rise of Off-State Voltage	$dv / dt$	$V_{DRM} = 2250V$ $T_j = 115^\circ C$ , $V_{GK} = -10V$ Exponential Rise	1000	—	—	$V / \mu s$
Storage Time	$t_s$	$I_{TGQ} = 4500A$	—	—	45	$\mu s$
Gate Turn-Off Time	$t_{gq}$	$V_{DM} = 3600V$ , $T_j = 115^\circ C$	—	—	48	$\mu s$
Tail Time	$t_{tail}$	$V_D = 2000V$ , $C_S = 6\mu F$ $di_{GQ} / dt = 60A / \mu s$	—	—	800	$\mu s$
Gate Turn-Off Current	$I_{GQ}$	Off squeeze current $\geq 600mA$	—	—	1500	A
Thermal Resistance	$R_{th(j-f)}$	Junction to fin	—	—	0.0043	$^\circ C / W$
Reverse Recovery Charge	$Q_{rr}$	$I_T = 2000A$ , $V_R = 1500V$ $di_T / dt = -300A / \mu s$ , $C_S = 6\mu F$ $R_S = 5\Omega$ , $T_j = 115^\circ C$	$V_{TM} \leq 2.6V$	—	15000	$\mu C$
			$V_{TM} = 4.0V$	—	8000	

