

TOSHIBA GATE TURN-OFF THYRISTOR

**SG3000EX24**

INVERTER APPLICATION

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 2500\text{ V}$
- R.M.S On-State Current :  $I_T(RMS) = 1600\text{ A}$
- 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 (Note 1)	$V_{DRM}$	2500	V
Repetitive Peak Reverse Voltage	$V_{RRM}$	16	V
Peak Turn-Off Current (Note 2)	$I_{TGQM}$	3000	A
R.M.S On-State Current (Note 3)	$I_T(RMS)$	1600	A
Peak One Cycle Surge On-State Current (Non Repetitive, 10 ms-Width Half Sine Waveform)	$I_{TSM}$	22000	A
Critical Rate of Rise of On-State Current (Note 4)	$di/dt$	400	A / $\mu\text{s}$
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)	$V_{RGM}$	16	V
Operating Junction Temperature Range	$T_j$	-40~125	°C
Storage Temperature Range	$T_{stg}$	-40~150	°C
Mounting Force	—	$33.3 \pm 4.9$	kN

(Note 1) :  $V_{GK} = -2\text{ V}$

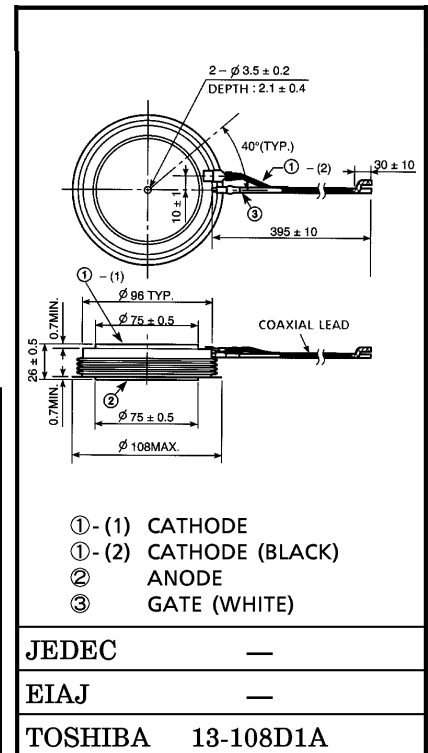
(Note 2) :  $V_{DM} = 2500\text{ V}$ ,  $C_S = 6\ \mu\text{F}$ ,  $R_S = 5\ \Omega$ ,  $di_{GQ}/dt = 30\text{ A}/\mu\text{s}$ ,  $V_{DSP} \leq 750\text{ V}$ ,  
 $L_S \leq 0.2\ \mu\text{H}$

(Note 3) : 50 Hz Half Sine Waveform at  $T_f = 75^\circ\text{C}$

(Note 4) :  $V_D = 1/2 V_{DRM}$ ,  $I_{GM} = 30\text{ A}$

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

Unit in mm



JEDEC	—
EIAJ	—
TOSHIBA	13-108D1A

Weight : 1290 g

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## ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current	$I_{DRM}$	$V_{DRM} = \text{Rated}, V_{GK} = -2 \text{ V}, T_j = 125^\circ\text{C}$	—	—	100	mA	
Repetitive Peak Reverse Current	$I_{RRM}$	$V_{RRM} = \text{Rated}, T_j = 125^\circ\text{C}$	—	—	10	mA	
Repetitive Peak Reverse Gate Current	$I_{RGM}$	$V_{RGM} = 16 \text{ V}, T_j = 125^\circ\text{C}$	—	—	10	mA	
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3000 \text{ A}, T_j = 125^\circ\text{C}$	—	—	3.0	V	
Gate Trigger Voltage	$V_{GT}$	$V_D = 24 \text{ V}, R_L = 0.1 \Omega$	$T_j = -40^\circ\text{C}$	—	—	1.5	V
			$T_j = 25^\circ\text{C}$	—	—	1.2	
Gate Trigger Current	$I_{GT}$	$V_D = 24 \text{ V}, R_L = 0.1 \Omega$	$T_j = -40^\circ\text{C}$	—	—	10	A
			$T_j = 25^\circ\text{C}$	—	—	4.0	
Turn-On Delay Time	$t_d$	$V_D = 1/2 V_{DRM}, I_{TM} = 3000 \text{ A}, di/dt = 400 \text{ A}/\mu\text{s}, I_{GM} = 30 \text{ A}, T_j = 25^\circ\text{C}$	—	—	3.0	$\mu\text{s}$	
Turn-On Time	$t_{gt}$		—	—	10	$\mu\text{s}$	
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = 2/3 \text{ RATED}, \text{Exponential Rise}, T_j = 125^\circ\text{C}, V_{GK} = -2 \text{ V}$	1000	—	—	$\text{V}/\mu\text{s}$	
Storage Time	$t_s$	$I_{TGQ} = 3000 \text{ A}, V_{DM} = 2500 \text{ V}, V_D = 1/2 V_{DRM}, di_{GQ}/dt = 30 \text{ A}/\mu\text{s}, C_S = 6 \mu\text{F}, R_S = 5 \Omega, T_j = 125^\circ\text{C}, L_S \leq 0.2 \mu\text{H}$	—	—	28	$\mu\text{s}$	
Gate Turn-Off Time	$t_{gq}$		—	—	30	$\mu\text{s}$	
Tail Time	$t_{tail}$		—	—	90	$\mu\text{s}$	
Gate Turn-Off Current	$I_{GQ}$		—	650	—	A	
Thermal Resistance (Junction to Fin)	$R_{th(j-f)}$	DC	—	—	0.016	$^\circ\text{C}/\text{W}$	

