

(SGR3000GXH26)

**INVERTER APPLICATION**

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 4500V$  (Note 1)
- R.M.S On-State Current :  $I_T (RMS) = 1200A$  ( $T_f = 77^\circ C$ )
- R.M.S Reverse Current :  $I_R (RMS) = 900A$  ( $T_f = 77^\circ C$ )
- Peak Turn-Off Current :  $I_{TGQM} = 3000A$
- Critical Rate of Rise of On-State Current :  $di / dt = 600A / \mu s$
- Critical Rate of Rise of Off-State Current :  $dv / dt = 1000V / \mu s$

**MAXIMUM RATINGS**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage (Note 1)	$V_{DRM}$	4500	V
Peak Turn-Off Current (Note 2)	$I_{TGQM}$	3000	A
R.M.S On-State Current (Note 3)	$I_T (RMS)$	1200	A
R.M.S Reverse Current (Note 3)	$I_R (RMS)$	900	A
Peak One Cycle Surge On-State Current (non repetitive, 10ms-width half sine waveform)	$I_{TSM}$	16000	A
Peak One Cycle Surge Reverse Current (non repetitive, 10ms-width half sine waveform)	$I_{RSM}$	14000	A
Critical Rate of Rise of On-State Current (Note 4)	$di / dt$	600	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	$P_{RG} (AV)$	230	W
Peak Reverse Gate Power Dissipation	$P_{RGM}$	30	kW
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	$^\circ C$
Storage Temperature Range	$T_{stg}$	-40~150	$^\circ C$
Mounting Force	—	$39.2 \pm 4.9$	kN

Note 1 :  $V_{GK} \leq -2V$

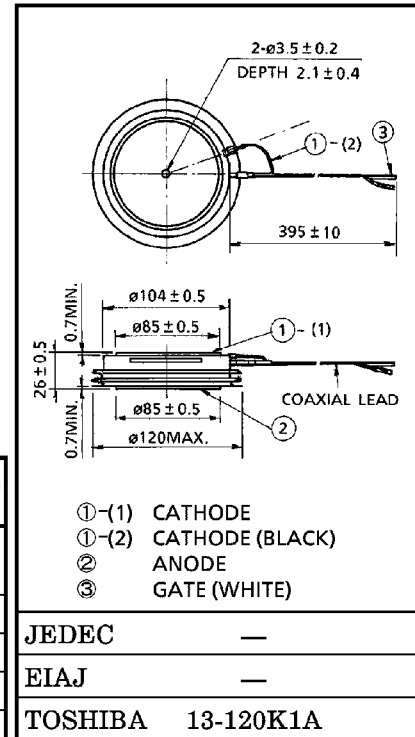
Note 2 :  $V_{DM} = 4000V$ ,  $C_S = 3.5 \mu F$ ,  $R_S = 5 \Omega$ ,  $di_{GQ} / dt = 50A / \mu s$ ,  $L_S \leq 0.2 \mu H$ ,  $V_{DSP} \leq 1030V$

Note 3 : 50Hz Half Sine Waveform at  $T_f = 77^\circ C$

Note 4 :  $V_D = 1 / 2 V_{DRM}$ ,  $I_{TM} = 4000A$ ,  $I_{GM} \geq 25A$

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

Unit in mm



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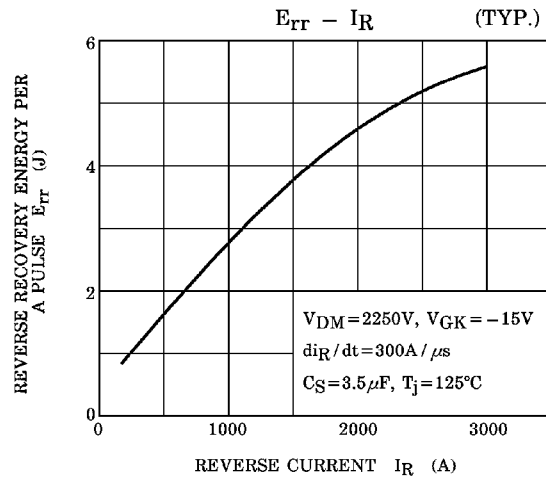
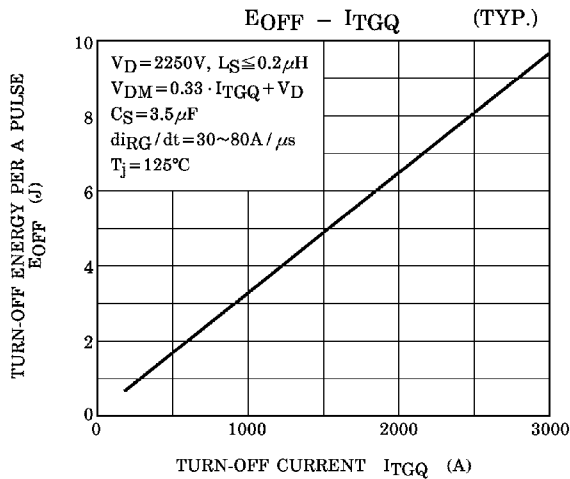
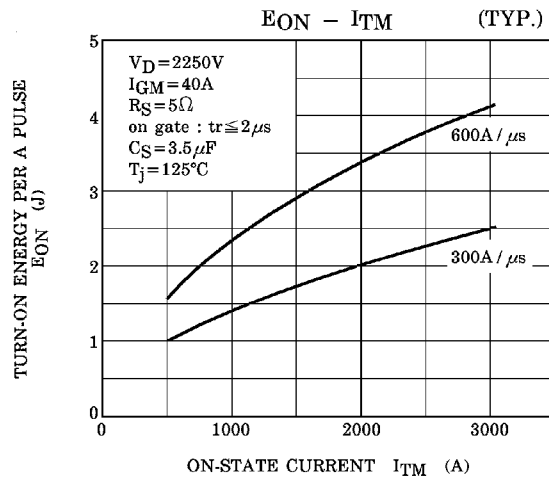
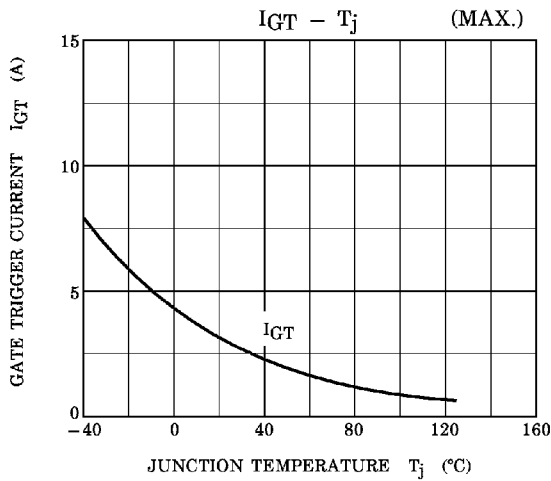
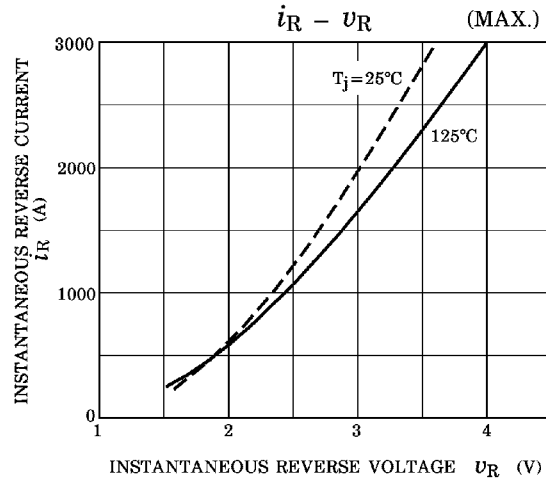
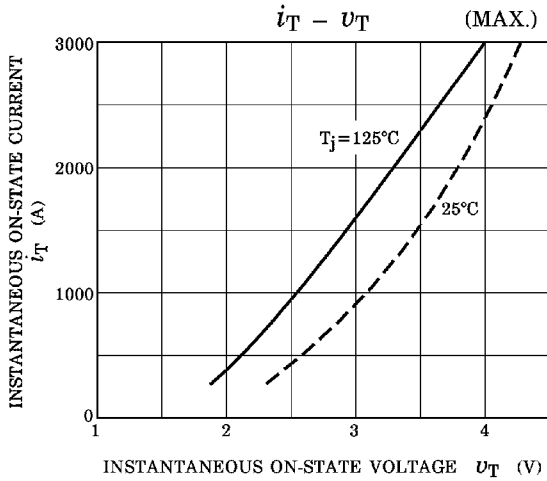
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

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ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Repetitive Peak Off-State Current	$I_{DRM}$	$V_{DRM} = \text{RATED}$ , $V_{GK} = -2V$ , $T_j = 125^\circ\text{C}$	—	—	150	mA	
Repetitive Peak Reverse Gate Current	$I_{RGM}$	$V_{RGM} = 18V$ , $T_j = 25^\circ\text{C}$	—	—	250	mA	
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3000A$ , $T_j = 125^\circ\text{C}$	—	—	4.0	V	
Peak Reverse Voltage	$V_{RM}$	$I_{RM} = 3000A$ , $T_j = 125^\circ\text{C}$	—	—	4.0	V	
Gate Trigger Voltage	$V_{GT}$	$V_D = 24V$ , $R_L = 0.1\Omega$	$T_j = -40^\circ\text{C}$	—	—	1.5	V
	$T_j = 25^\circ\text{C}$		—	—	1.20		
Gate Trigger Current	$I_{GT}$		$T_j = -40^\circ\text{C}$	—	—	8.0	A
	$T_j = 25^\circ\text{C}$		—	—	3.0		
Turn-On Delay Time	$t_d$	$V_D = 1/2 V_{DRM}$ , $I_{TM} = 4000A$ , $di/dt = 600A/\mu s$ , $I_{GM} = 25A$ , $di_G/dt = 10A/\mu s$ , $T_j = 25^\circ\text{C}$	—	—	3	$\mu s$	
Turn-On Time	$t_{gt}$		—	—	10		
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = 2/3 \text{ RATED}$ , $T_j = 125^\circ\text{C}$ , $V_{GK} = -15V$	1000	—	—	V / $\mu s$	
Storage Time	$t_s$	$V_{DM} = 4000V$ , $I_{TGQ} = 3000A$ , $V_D = 1/2 V_{DRM}$ , $di_{GQ}/dt = 50A/\mu s$ , $C_S = 3.5\mu F$ , $R_S = 5\Omega$ , $T_j = 125^\circ\text{C}$ , $L_S \leq 0.2\mu H$	—	—	27.0	$\mu s$	
Gate Turn-Off Time	$t_{gq}$		—	—	30.0		
Gate Turn-Off Current	$I_{GQ}$		—	—	800	A	
Tail Time	$t_{tail}$		(V <sub>D</sub> = 1000V)		115	$\mu s$	
Commutating Critical Rate of Rise of Off-State Voltage	$dv/dt(c)$	$I_{RM} = 3500A$ , $di_R/dt = 300A/\mu s$ , $V_D = 1500V$ , $V_{DM} = 3000V$ , $C_S = 3.5\mu F$ , $V_{GK} = -2V$ , $T_j = 125^\circ\text{C}$	350	—	—	V / $\mu s$	
Reverse Recovery Charge	$Q_{rr}$	$I_{RM} = 2000A$ , $V_D = 500V$ , $di_R/dt = 100A/\mu s$ , $T_j = 125^\circ\text{C}$ (no snubber circuit)	—	—	2200	$\mu C$	
Peak Reverse Recovery Current	$I_{rr}$		—	—	500	A	
Thermal Resistance (Junction to Fin)	$R_{th(j-f)}$	DC	GTO Side	—	—	0.016	$^\circ\text{C/W}$
			Diode Side	—	—	0.025	

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