

TOSHIBA GATE TURN-OFF THYRISTOR REVERSE CONDUCTING TYPE

SGR3000GXH28

INVERTER APPLICATION

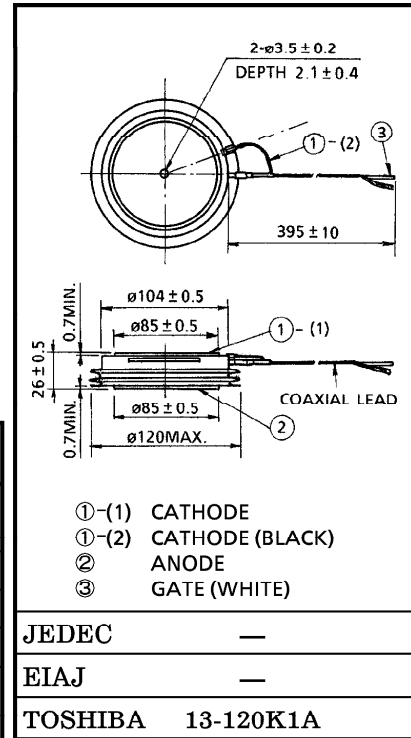
- Repetitive Peak Off-State Voltage : $V_{DRM}=4500V$ (Note 1)
- R.M.S On-State Current : $I_T(RMS)=1200A$ ($T_f=77^\circ C$)
- R.M.S Reverse Current : $I_R(RMS)=900A$ ($T_f=77^\circ C$)
- Peak Turn-off Current : $I_{TGQM}=3000A$
- Critical Rate of Rise of On-State Current : $di/dt=600A/\mu s$
- Critical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

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 / μs
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 ± 4.9	kN

Note 1 : $V_{GK} \leq -2V$ Note 2 : $V_{DM}=4000V$, $C_S=3.5\mu F$, $R_S=5\Omega$, $di_{RG}/dt=50A/\mu s$, $L_S \leq 0.2\mu H$, $V_{DSP} \leq 1030V$ Note 3 : 50Hz Half Sine Waveform at $T_f=77^\circ C$ Note 4 : $V_D=3000V$, $I_{TM}=4000A$, $I_{GM}=25A$ Note 5 : Ambient Temperature of coaxial gate-cathode lead= $90^\circ C$

Unit in mm



Weight : 1700g

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ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current	I_{DRM}	$V_{\text{DRM}} = 4500\text{V}$, $V_{\text{GK}} = -2\text{V}$, $T_j = 125^\circ\text{C}$		—	—	150	mA
Repetitive Peak Reverse Gate Current	I_{RGM}	$V_{\text{RGM}} = 18\text{V}$, $T_j = 25^\circ\text{C}$		—	—	250	mA
Peak On-State Voltage	V_{TM}	$I_{\text{TM}} = 3000\text{A}$, $T_j = 125^\circ\text{C}$		—	—	4.0	V
Peak Reverse Voltage	V_{RM}	$I_{\text{RM}} = 3000\text{A}$, $T_j = 125^\circ\text{C}$		—	—	4.0	V
Gate Trigger Voltage	V_{GT}	$V_{\text{D}} = 24\text{V}$, $R_{\text{L}} = 0.1\Omega$	$T_j = -40^\circ\text{C}$	—	—	—	V
			$T_j = 25^\circ\text{C}$	—	—	1.20	
Gate Trigger Current	I_{GT}		$T_j = -40^\circ\text{C}$	—	—	—	A
			$T_j = 25^\circ\text{C}$	—	—	3.0	
Turn-On Delay Time	t_{d}	$V_{\text{D}} = 2800\text{V}$, $I_{\text{TM}} = 3000\text{A}$, $di/dt = 600\text{A}/\mu\text{s}$, $I_{\text{GM}} = 25\text{A}$, $di_{\text{G}}/dt = 10\text{A}/\mu\text{s}$, $T_j = 25^\circ\text{C}$		—	—	3	μs
Turn-On Time	t_{gt}			—	—	10	
Critical Rate of Rise of Off-State Voltage	dv/dt	$V_{\text{D}} = 3000\text{V}$, Exponential Rise, $T_j = 125^\circ\text{C}$, $V_{\text{GK}} = -15\text{V}$		1000	—	—	$\text{V}/\mu\text{s}$
Storage Time	t_{s}	$I_{\text{TGQ}} = 3000\text{A}$, $V_{\text{DM}} = 4000\text{V}$, $V_{\text{D}} = 2800\text{V}$, $di_{\text{RG}}/dt = 50\text{A}/\mu\text{s}$, $C_{\text{S}} = 3.5\mu\text{F}$, $R_{\text{S}} = 5\Omega$, $T_j = 125^\circ\text{C}$, $L_{\text{S}} \leq 0.2\mu\text{H}$		—	—	29.7	μs
Gate Turn-Off Time	t_{gq}			—	—	33.0	
Tail Time	t_{tail}			—	—	115	
Gate Turn-Off Current	I_{GQ}			—	880	—	A
Commutating Critical Rate of Rise of Off-State Voltage	$dv/dt(c)$	$I_{\text{RM}} = 3500\text{A}$, $di_{\text{R}}/dt = 300\text{A}/\mu\text{s}$, $V_{\text{D}} = 1500\text{V}$, $V_{\text{DM}} = 3000\text{V}$, $C_{\text{S}} = 3.5\mu\text{F}$, $V_{\text{GK}} = -15\text{V}$, $T_j = 125^\circ\text{C}$		350	—	—	$\text{V}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	$I_{\text{R}} = 2000\text{A}$, $V_{\text{D}} = 500\text{V}$, $di_{\text{R}}/dt = 100\text{A}/\mu\text{s}$, $T_j = 125^\circ\text{C}$ (no snubber circuit)		—	—	3300	μC
Thermal Resistance (Junction to Fin)	$R_{\text{th(j-f)}}$	DC	GTO Side	—	—	0.016	$^\circ\text{C}/\text{W}$
			Diode Side	—	—	0.025	

