

TOSHIBA THYRISTOR SILICON DIFFUSED TYPE

# SF1500GX23

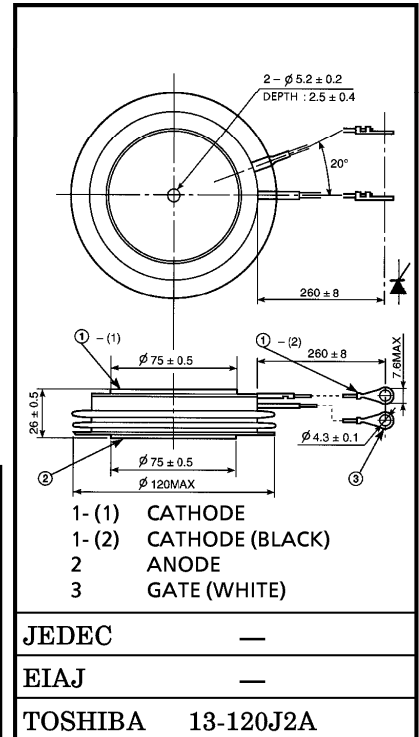
HIGH POWER CONTROL APPLICATIONS

Unit in mm

- Repetitive Peak Off-State Voltage :  $V_{DRM}$  } = 4000V
- Repetitive Peak Reverse Voltage :  $V_{RRM}$  }
- Average On-State Current :  $I_T(AV) = 1500A$
- Turn-Off Time :  $t_q = 400\mu s$  (Max.)
- Critical Rate of Rise of On-State Current :  $di/dt = 250A/\mu s$
- Critical Rate of Rise of Off-State Voltage :  $dv/dt = 1500V/\mu s$
- Flat Package

**MAXIMUM RATINGS**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage and Repetitive Peak Reverse Voltage	$V_{DRM}$ $V_{RRM}$	4000	V
Non-Repetitive Peak Reverse Voltage (Non-Repetitive < 5ms, $T_j = 0 \sim 125^\circ C$ )	$V_{RSM}$	4400	V
R.M.S On-State Current	$I_T(RMS)$	2355	A
Average On-State Current	$I_T(AV)$	1500	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	$I_{TSM}$	30000 (50Hz) 33000 (60Hz)	A
$I^2t$ Limit Value	$I^2t$	$4.5 \times 10^6$	$A^2s$
Critical Rate of Rise of On-State Current (Note)	$di/dt$	250	$A/\mu s$
Peak Gate Power Dissipation	$P_{GM}$	30	W
Average Gate Power Dissipation	$P_{G(AV)}$	4	W
Peak Forward Gate Current	$I_{GM}$	6	A
Peak Forward Gate Voltage	$V_{FGM}$	30	V
Peak Reverse Gate Voltage	$V_{RGM}$	5	V
Junction Temperature	$T_j$	-40~125	$^\circ C$
Storage Temperature Range	$T_{stg}$	-40~125	$^\circ C$
Mounting Force	—	30~45	kN



Weight : 1350g

Note :  $V_D = 2000V$ ,  $f = 50Hz$ ,  $T_j = 125^\circ C$ , Gate Supply ( $V_G = 15V$ ,  $R_G = 8\Omega$ ,  $t_r \leq 1\mu s$ )

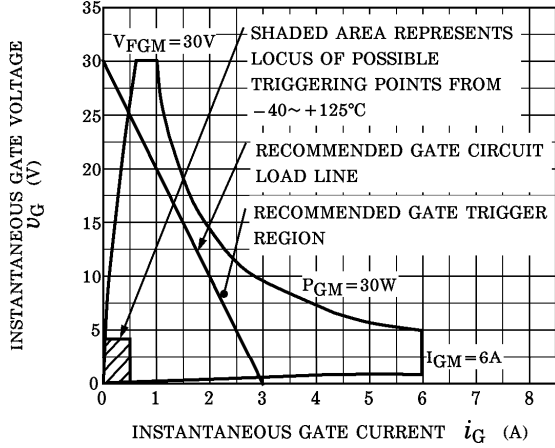
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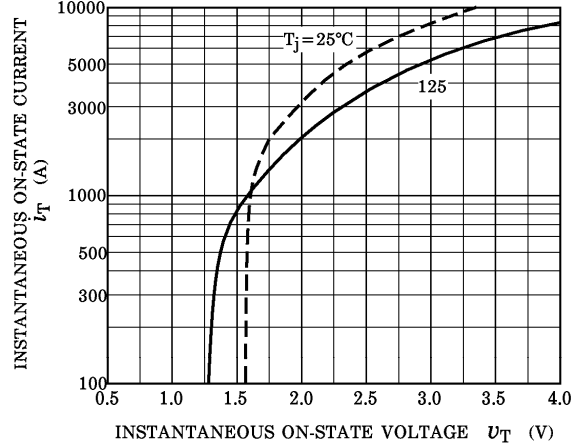
## ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	MAX.	UNIT	
Repetitive Peak Off-State Current and Repetitive Peak Reverse Current	$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM} = 4000V$ , $T_j = 125^\circ C$	—	120	mA	
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 5000A$ , $T_j = 25^\circ C$	—	2.4	V	
Gate Trigger Voltage	$V_{GT}$	$V_D = 12V$ , $R_L = 6\Omega$	$T_j = -40^\circ C$	—	4.5	V
			$T_j = 25^\circ C$	—	3.5	
Gate Trigger Current	$I_{GT}$	$V_D = 12V$ , $R_L = 6\Omega$	$T_j = -40^\circ C$	—	600	mA
			$T_j = 25^\circ C$	—	400	
Gate Non-Trigger Voltage	$V_{GD}$	$V_D = 2000V$ , $T_j = 125^\circ C$		0.2	—	V
Gate Non-Trigger Current	$I_{GD}$			5	—	mA
Delay Time	$t_d$	$V_D = 2000V$ , $T_j = 25^\circ C$ Gate Supply	—	5	$\mu s$	
Gate Turn-On Time	$t_{gt}$	( $V_G = 15V$ , $R_G = 8\Omega$ , $t_r \leq 1\mu s$ )	—	10	$\mu s$	
Turn-Off Time	$t_q$	$I_T = 1200A$ , $V_R \geq 200V$ , $dv/dt = 25V/\mu s$ , $T_j = 125^\circ C$ $V_{DRM} = 2000V$ , $di/dt = 2A/\mu s$	—	400	$\mu s$	
Holding Current	$I_H$	$T_j = 25^\circ C$ , $R_L = 6\Omega$	—	300	mA	
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = 2670V$ , $T_j = 125^\circ C$ Gate Open Exponential Rise	1500	—	$V/\mu s$	
Thermal Resistance	$R_{th(j-f)}$	Junction to Fin	—	0.0125	$^\circ C/W$	

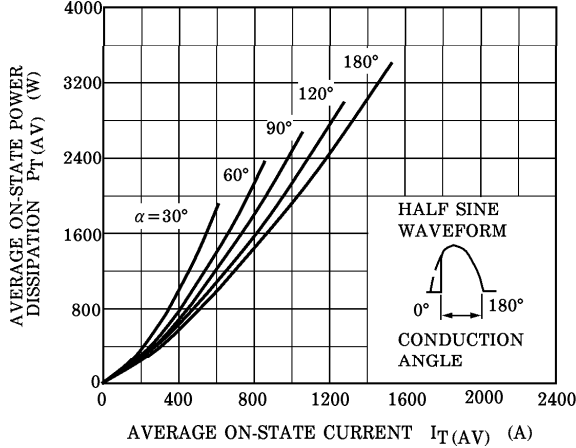
**GATE TRIGGER CHARACTERISTIC**



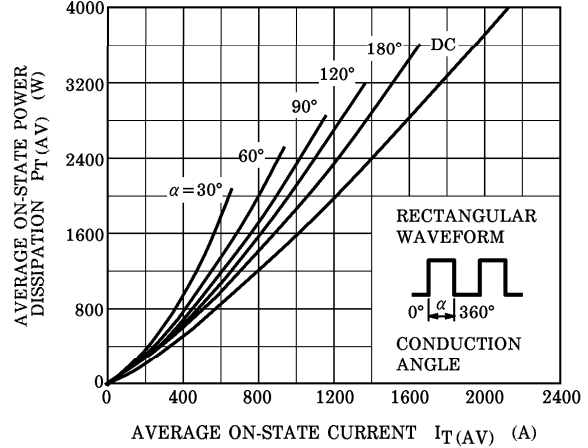
**$i_T - v_T$**



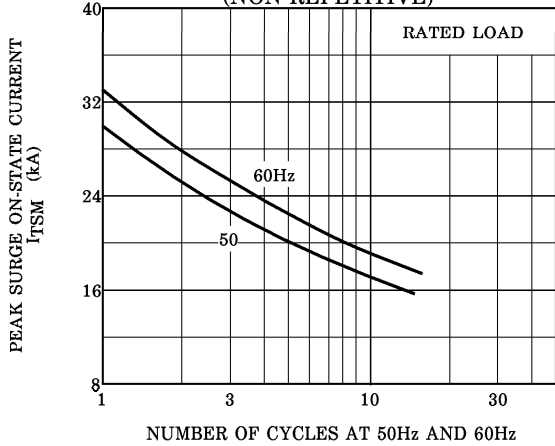
**$P_T(AV) - I_T(AV)$**



**$P_T(AV) - I_T(AV)$**



**SURGE ON-STATE CURRENT (NON-REPETITIVE)**



**TRANSIENT THERMAL IMPEDANCE (JUNCTION TO FIN)**

