

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR ILLICON PLANAR TYPE

SM25GZ51, SM25JZ51

AC POWER CONTROL APPLICATIONS

Unit: mm

- Repetitive Peak Off-State Voltage: $V_{DRM} = 400V, 600V$
- R.M.S On-State Current: $I_T (RMS) = 25A$
- High Commutating (dv/dt): (dv/dt) $c = 10V/\mu s$
- Isolation Voltage: $V_{Isol} = 1500V AC$

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM25GZ51	400	V
	SM25JZ51	600	
R.M.S On-State Current (Full Sine Waveform $T_c = 73^\circ C$)	$I_T (RMS)$	25	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	I_{TSM}	230 (50Hz)	A
		253 (60Hz)	
$I^2 t$ Limit Value	$I^2 t$	260	$A^2 s$
Critical Rate of Rise of On-State Current (Note 1)	di/dt	50	$A/\mu s$
Peak Gate Power Dissipation	P_{GM}	5	W
Average Gate Power Dissipation	$P_{G(AV)}$	0.5	W
Peak Gate Voltage	V_{GM}	10	V
Peak Gate Current	I_{GM}	2	A
Junction Temperature	T_j	$-40 \sim 125$	$^\circ C$
Storage Temperature Range	T_{stg}	$-40 \sim 125$	$^\circ C$
Isolation Voltage (AC, $t = 1 min.$)	V_{Isol}	1500	V

Note 1: di/dt Test Condition

$$V_{DRM} = 0.5 \times \text{Rated}$$

$$I_{TM} \leq 40A$$

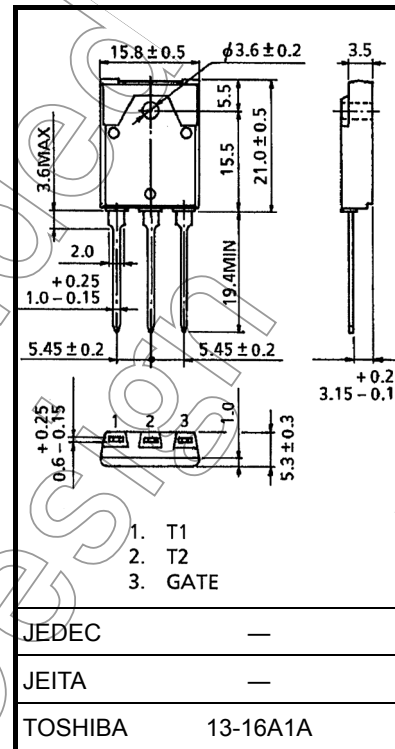
$$t_{gw} \geq 10\mu s$$

$$t_{gr} \leq 250ns$$

$$i_{gp} = I_{GT} \times 2.0$$

Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

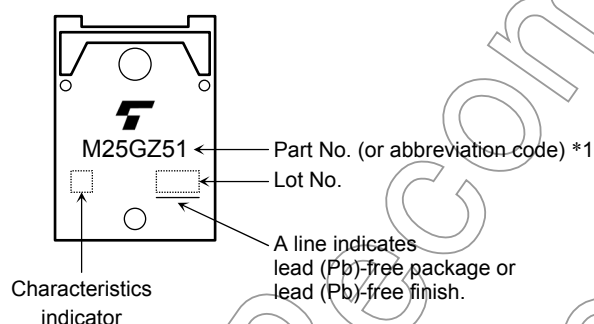


Weight: 5.9 g (typ.)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

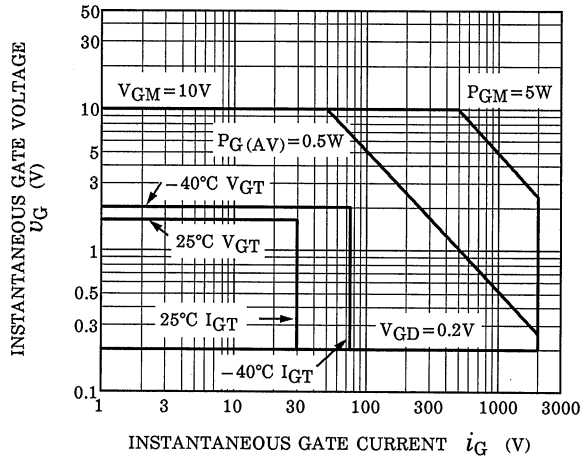
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Repetitive Peak Off-State Current	I_{DRM}	$V_{DRM} = \text{Rated}$	—	—	20	μA
Gate Trigger Voltage	I	$V_D = 12\text{V}$ $R_L = 20\Omega$	—	—	1.5	V
	II				1.5	
	III				1.5	
Gate Trigger Current	I	$V_D = 12\text{V}$ $R_L = 20\Omega$	—	—	30	mA
	II				30	
	III				30	
Peak On-State Voltage	V_{TM}	$I_{TM} = 40\text{A}$	—	—	1.5	V
Gate Non-Trigger Voltage	V_{GD}	$V_D = \text{Rated}$, $T_c = 125^\circ\text{C}$	0.2	—	—	V
Holding Current	I_H	$V_D = 12\text{V}$, $I_{TM} = 1\text{A}$	—	—	60	mA
Thermal Resistance	$R_{th(j-c)}$	Junction to Case, AC	—	—	1.3	$^\circ\text{C} / \text{W}$
Critical Rate of Rise of Off-State Voltage	dv / dt	$V_{DRM} = \text{Rated}$, $T_j = 125^\circ\text{C}$ Exponential Rise	—	300	—	V / μs
Critical Rate of Rise of Off-State Voltage at Commutation	$(dv / dt)_c$	$V_{DRM} = 400\text{V}$, $T_j = 125^\circ\text{C}$ $(di / dt)_c = -15\text{A} / \text{ms}$	10	—	—	V / μs

MARKING

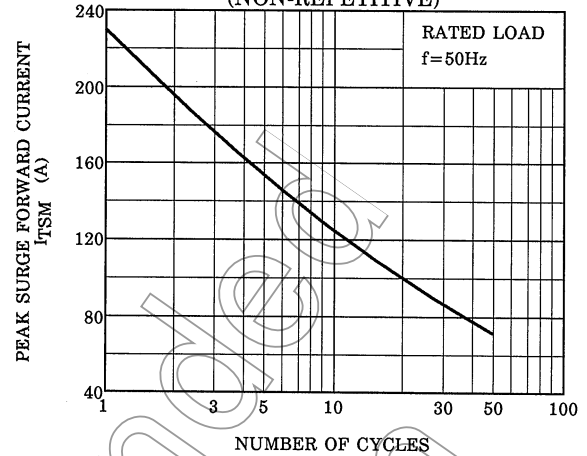


*1	Part No. (or abbreviation code)	Part No.
	M25GZ51	SM25GZ51
	M25JZ51	SM25JZ51

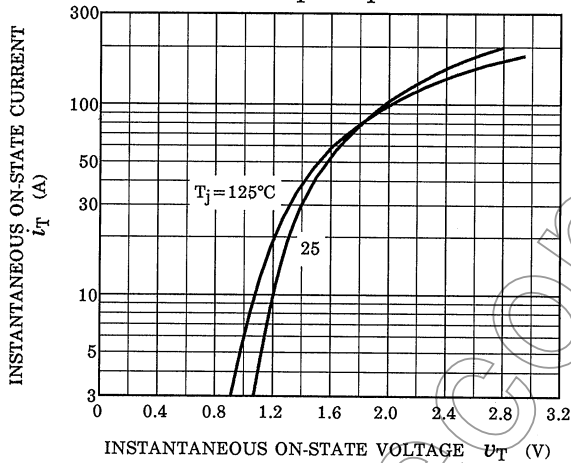
GATE TRIGGER CHARACTERISTIC



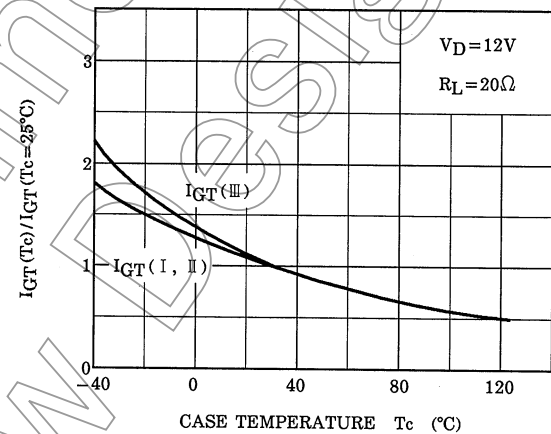
SURGE ON-STATE CURRENT (NON-REPETITIVE)



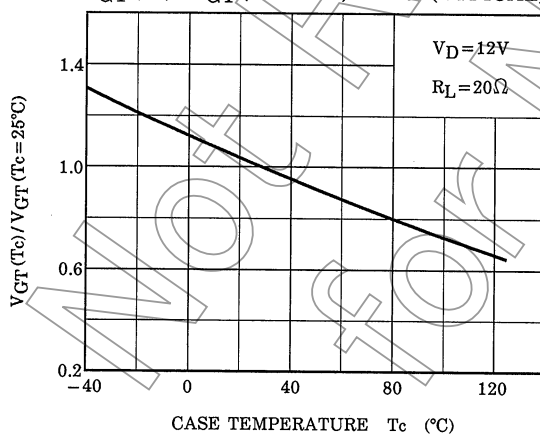
$i_T - v_T$



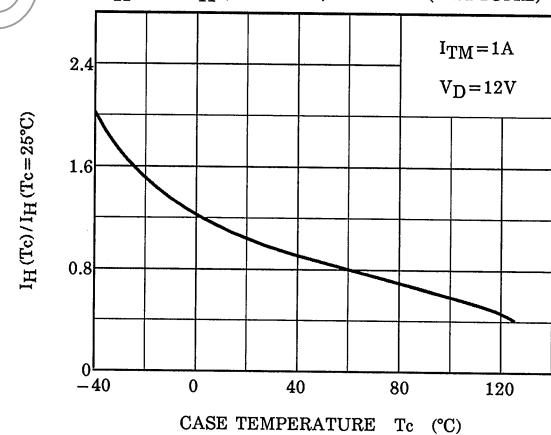
$I_{GT}(T_c) / I_{GT}(T_c=25^\circ C) - T_c$ (TYPICAL)

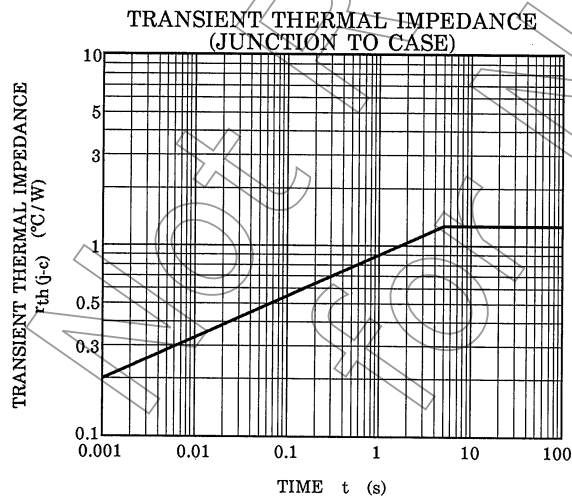
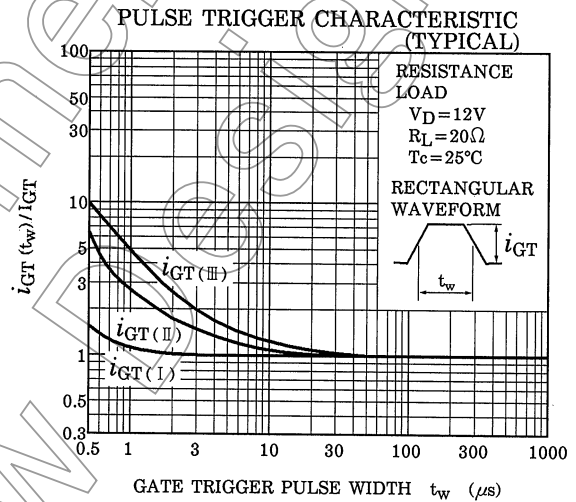
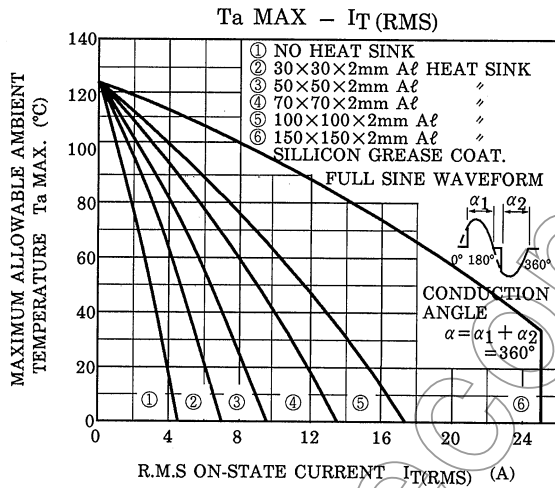
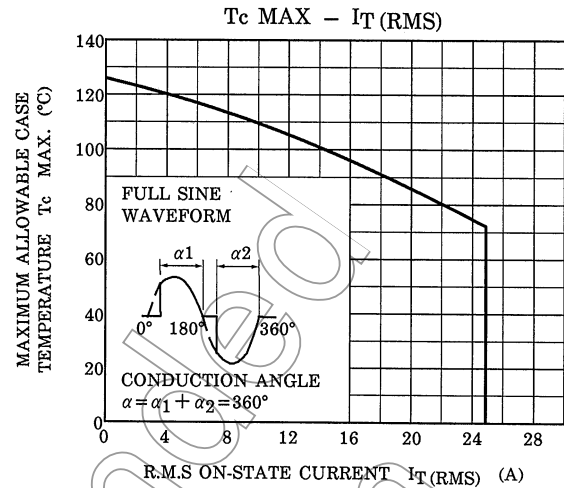
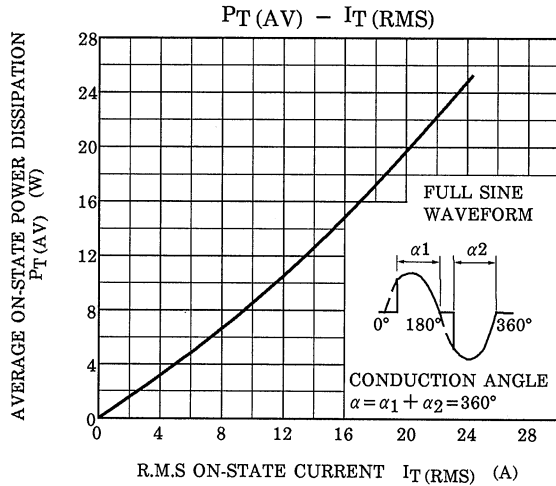


$V_{GT}(T_c) / V_{GT}(T_c=25^\circ C) - T_c$ (TYPICAL)



$I_H(T_c) / I_H(T_c=25^\circ C) - T_c$ (TYPICAL)





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