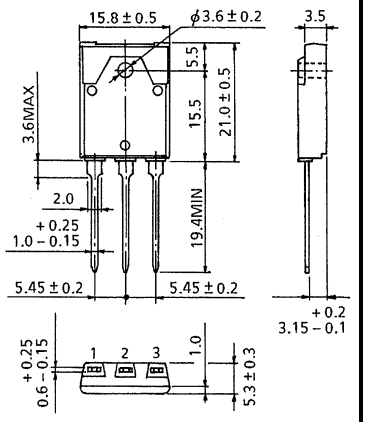
TOSHIBA BI−DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM16GZ51, SM16JZ51

AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off−State Voltage: V_{DRM} = 400V, 600 V
- R.M.S On−State Current: $I_{T\ (RMS)}$ = 16 A
- High Commutating (dv / dt): (dv / dt) c = 10 V / μs
- Isolation Voltage: V_{ISOL} = 1500 V AC

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	13-16A1A

Weight: 2.0 g (typ.)

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off−State Voltage	SM16GZ51	V_{DRM}	400	V
	SM16JZ51		600	
R. M. S. On−state Current (Full Sine Waveform Ta = 82°C)		$I_{T\ (RMS)}$	16	A
Peak One Cylce Surge On−State Current (Non−Repetitive)		I_{TSM}	150 (50 Hz)	A
			165 (60 Hz)	
I^2t Limit Value		I^2t	112.5	A^2s
Critical Rate of Rise of On−State Current (Note 1)		di / dt	50	A / μs
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	−40~125	°C
Storage Temperature Range		T_{stg}	−40~125	°C
Isolation Voltage (AC, t = 1 min.)		V_{ISOL}	1500	V

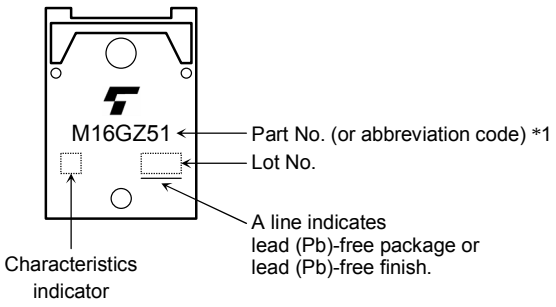
Note 1: di / dt test condition
V_{DRM} = 0.5 × Rated, $I_{TM} \leq 25$ A, $t_{gw} \geq 10$ μs, $t_{gr} \leq 250$ ns, $i_{gp} = I_{GT} \times 2.0$

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).

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

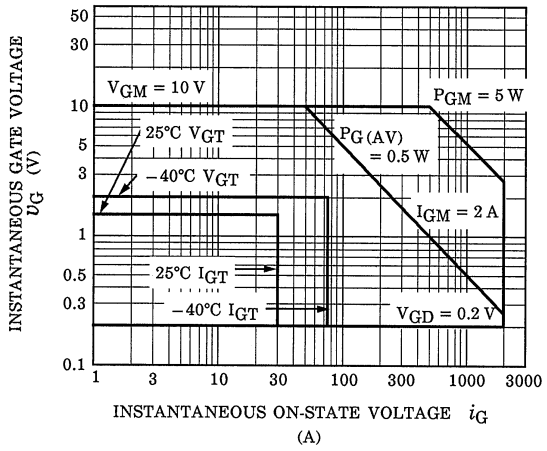
CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN	TYP.	MAX	UNIT
Repetitive Peak Off−State Current		I_{DRM}	V_{DRM} = Rated		—	—	20	μA
Gate Trigger Voltage	I	V_{GT}	V_D = 12 V, R_L = 20 Ω	T2 (+) , Gate (+)	—	—	1.5	V
	II			T2 (+) , Gate (−)	—	—	1.5	
	III			T2 (−) , Gate (−)	—	—	1.5	
	IV			T2 (−) , Gate (+)	—	—	—	
Gate Trigger Current	I	I_{GT}	V_D = 12 V, R_L = 20 Ω	T2 (+) , Gate (+)	—	—	30	mA
	II			T2 (+) , Gate (−)	—	—	30	
	III			T2 (−) , Gate (−)	—	—	30	
	IV			T2 (−) , Gate (+)	—	—	—	
Peak On−State Voltage		V_{TM}	I_{TM} = 25 A		—	—	1.5	V
Gate Non−Trigger Voltage		V_{GD}	V_D = Rated, Tc = 125°C		0.2	—	—	V
Holding Current		I_H	V_D = 12 V, I_{TM} = 1 A		—	—	50	mA
Thermal Resistance		$R_{th\ (j-c)}$	Junction to Case, AC		—	—	1.8	°C / W
Critical Rate of Rise of Off−State Voltage		dv / dt	V_{DRM} = Rated, T_j = 125°C Exponential Rise		—	300	—	V / μs
Critical Rate of Rise of Off−State Voltage at Commutation		(dv / dt) c	V_{DRM} = 400 V, T_j = 125°C (di / dt) c = −8.7 A / ms		10	—	—	V / μs

MARKING

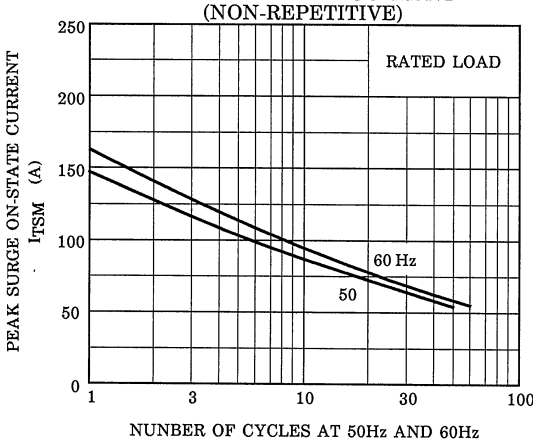


	Part No. (or abbreviation code)	Part No.
*1	M16GZ51	SM16GZ51
	M16JZ51	SM16JZ51

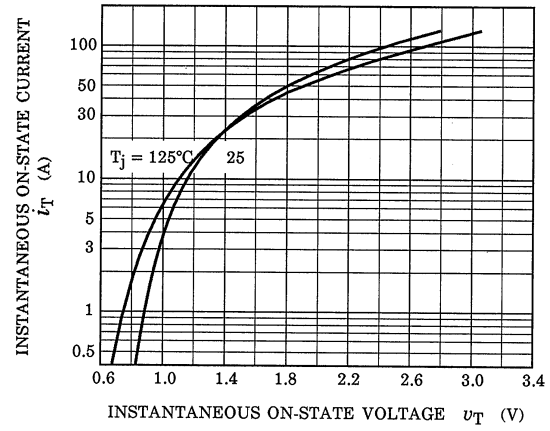
GATE TRIGGER CHARACTERISTIC



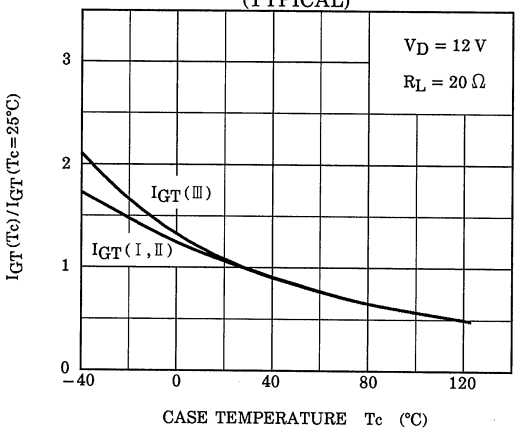
SURGE ON-STATE CURRENT (NON-REPETITIVE)



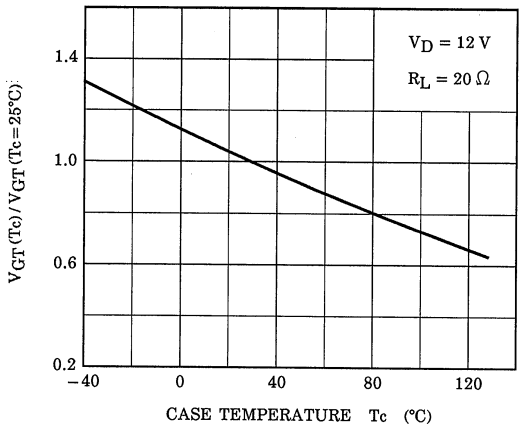
$i_T - v_T$



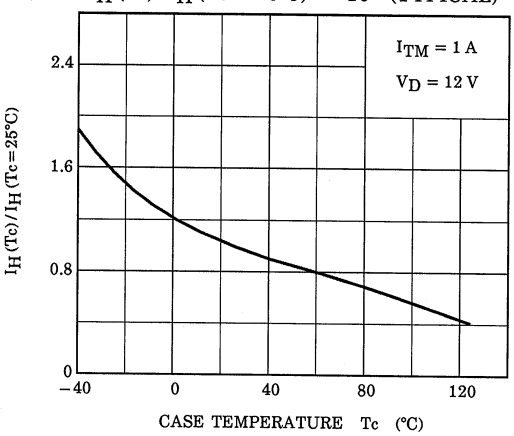
I_{GT} (Tc) / I_{GT} (Tc = 25°C) − Tc (TYPICAL)



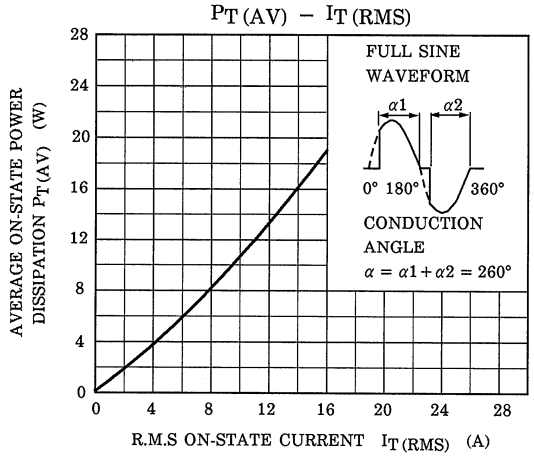
V_{GT} (Tc) / V_{GT} (Tc = 25°C) − Tc (TYPICAL)



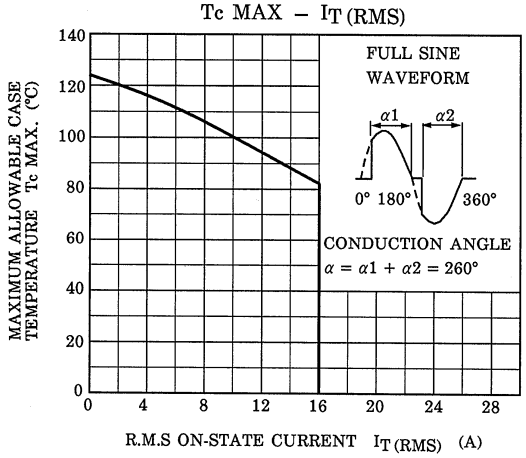
I_H (Tc) / I_H (Tc = 25°C) − Tc (TYPICAL)



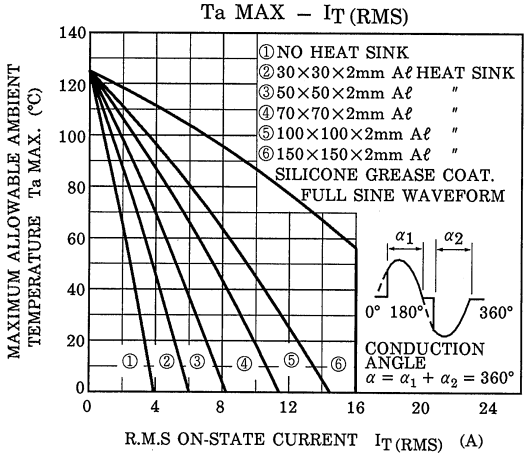
$P_{T(AV)}$ – $I_{T(RMS)}$



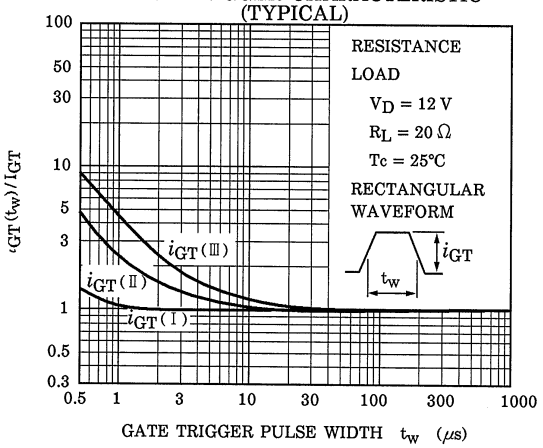
Tc MAX – $I_{T(RMS)}$



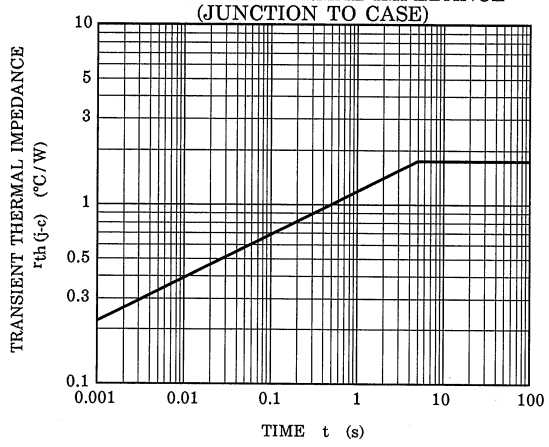
Ta MAX – $I_{T(RMS)}$



PULSE TRIGGER CHARACTERISTIC (TYPICAL)



TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)



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