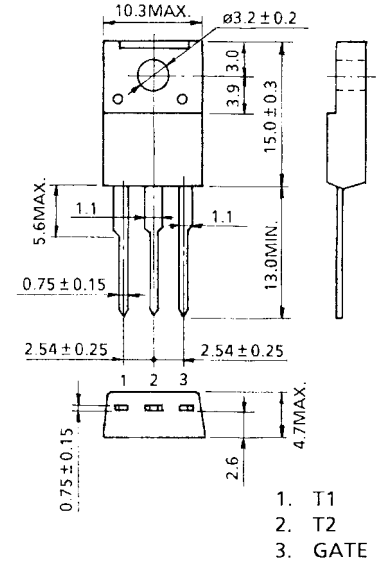
TOSHIBA BI−DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM12GZ47,SM12JZ47,SM12GZ47A,SM12JZ47A

AC POWER CONTROL APPLICATIONS

- Repetitive Peak off−State Voltage : V_{DRM} = 400, 600V
- R.M.S On−State Current : $I_{T\ (RMS)}$ = 12A
- High Commutating (dv / dt)
- Isolation Voltage : V_{Isol} = 1500V AC

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	13−10H1A

Weight: 1.7g

MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off−State Voltage and Repetitive Peak Reverse Voltage	SM12GZ47 SM12GZ47A	V_{DRM}	400	V
	SM12JZ47 SM12JZ47A		600	
R. M. S. On−tate Current (Full Sine Waveform TC = 72°C)		$I_{T\ (RMS)}$	12	A
Peak One Cylce Surge On−State Current (Non−Repetitive)		I_{TSM}	120 (50Hz)	A
			132 (60Hz)	
I^2t Limit Value		I^2t	72	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_{FGM}	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 = 1min.)		V_{Isol}	1500	V

Note 1: di / dt test condition

V_{DRM} = 0.5 × Rated

$I_{TM} \leq 17A$

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

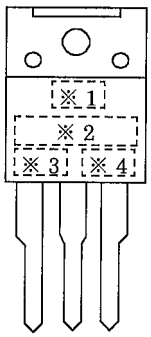
$t_{gr} \leq 250ns$

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

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

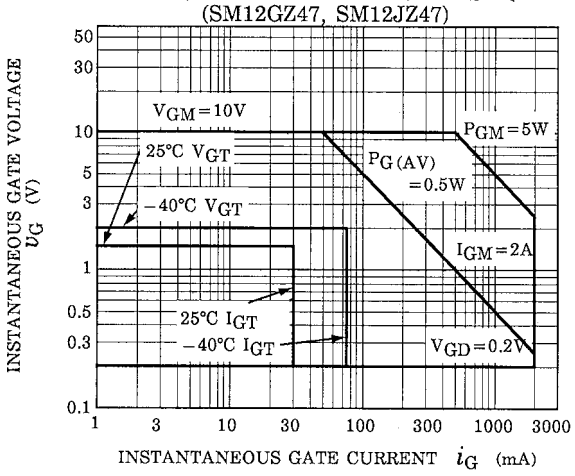
CHARACTERISTIC			SYMBOL	TEST CONDITION		MIN	TYP.	MAX	UNIT
Repetitive Peak Off−State Current			I_{DRM}	V_{DRM} = Rated		—	—	20	μA
Gate Trigger Voltage		I	V_{GT}	V_D = 12V, R_L = 20Ω	T2 (+) , Gate (+)	—	—	1.5	V
		II			T2 (+) , Gate (−)	—	—	1.5	
		III			T2 (−) , Gate (−)	—	—	1.5	
		IV			T2 (−) , Gate (+)	—	—	—	
Gate Trigger Current	SM12GZ47 SM12JZ47	I	I_{GT}	V_D = 12V, R_L = 20Ω	T2 (+) , Gate (+)	—	—	30	mA
		II			T2 (+) , Gate (−)	—	—	30	
		III			T2 (−) , Gate (−)	—	—	30	
		IV			T2 (−) , Gate (+)	—	—	—	
	SM12GZ47A SM12JZ47A	I			T2 (+) , Gate (+)	—	—	20	
		II			T2 (+) , Gate (−)	—	—	20	
		III			T2 (−) , Gate (−)	—	—	20	
		IV			T2 (−) , Gate (+)	—	—	—	
Peak On−State Voltage			V_{TM}	I_{TM} = 17A		—	—	1.5	V
Gate Non−Trigger Voltage			V_{GD}	V_D = Rated, Tc = 125°C		0.2	—	—	V
Holding Current			I_H	V_D = 12V, I_{TM} = 1A		—	—	50	mA
Thermal Resistance			$R_{th\ (j-c)}$	Junction to Case, AC		—	—	3.0	°C / W
Critical Rate of Rise of Off−State Voltage	SM12GZ47 SM12JZ47		dv / dt	V_{DRM} = Rated, T_j = 125°C Exponential Rise		—	300	—	V / μs
	SM12GZ47A SM12JZ47A					—	200	—	
Critical Rate of Rise of Off−State Voltage at Commutation	SM12GZ47 SM12JZ47		(dv / dt) c	V_{DRM} = 400V, T_j = 125°C (di / dt) c = − 6.5A / ms		10	—	—	V / μs
	SM12GZ47A SM12JZ47A					4	—	—	

MARKING

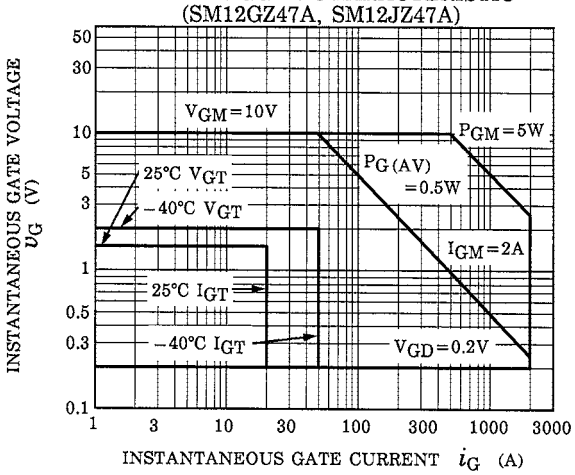


*NUMBER	SYMBOL		MARK
*1	TOSHIBA PRODUCT MARK		
*2	TYPE	SM12GZ47, SM12GZ47A	M12GZ47
		SM12JZ47, SM12JZ47A	M12JZ47
*3		SM12GZ47A, SM12JZ47A	A
*4	Lot Number □ □ Month (Starting from Alphabet A) Year (Last Decimal Digit of the Current Year)		Example 8A: January 1998 8B: February 1998 8L: December 1998

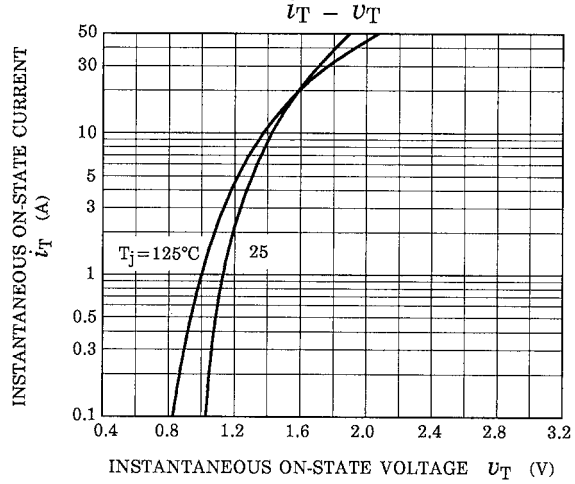
GATE TRIGGER CHARACTERISTIC
(SM12GZ47, SM12JZ47)



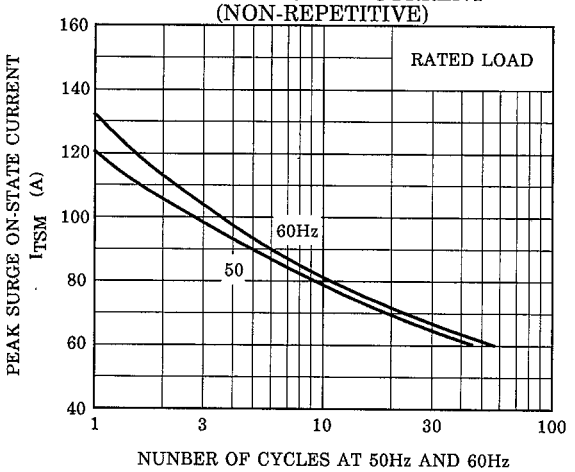
GATE TRIGGER CHARACTERISTIC
(SM12GZ47A, SM12JZ47A)



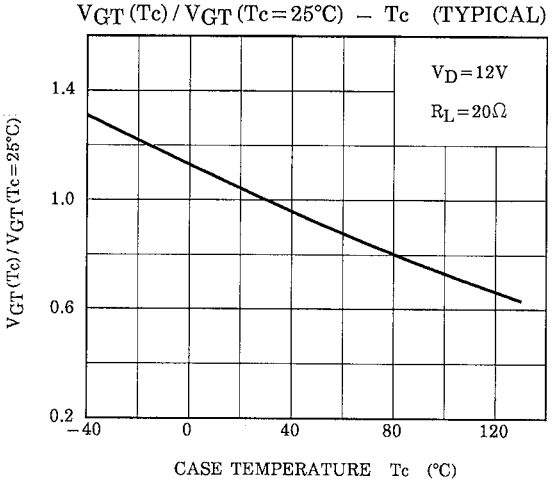
$i_T - v_T$



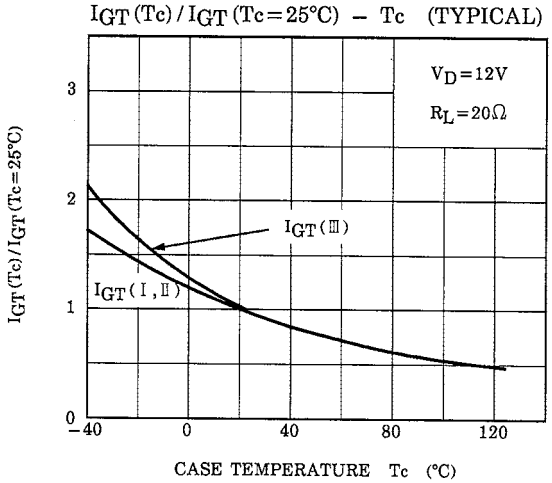
SURGE ON-STATE CURRENT
(NON-REPETITIVE)



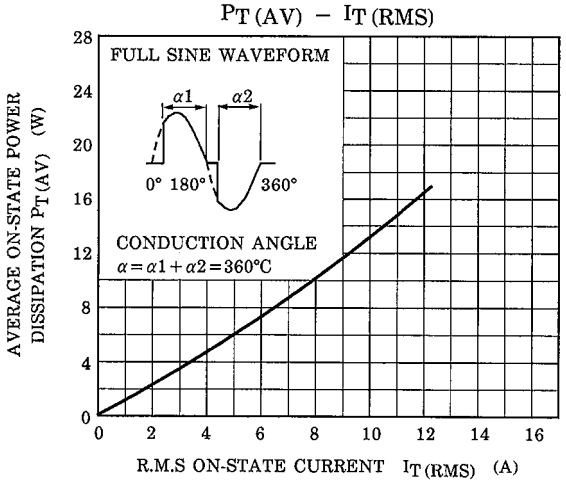
V_{GT} (Tc) / V_{GT} (Tc=25°C) − Tc (TYPICAL)



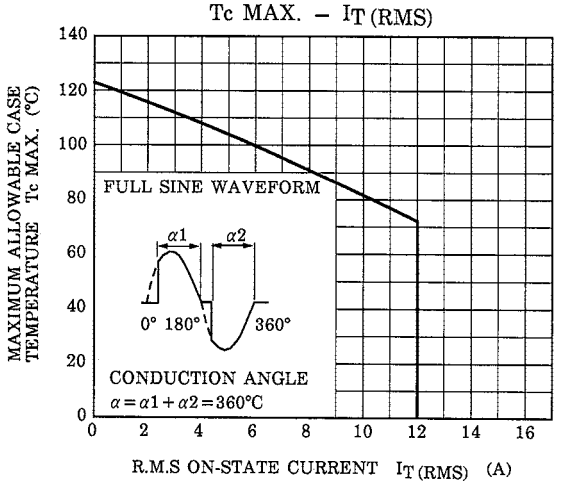
I_{GT} (Tc) / I_{GT} (Tc=25°C) − Tc (TYPICAL)



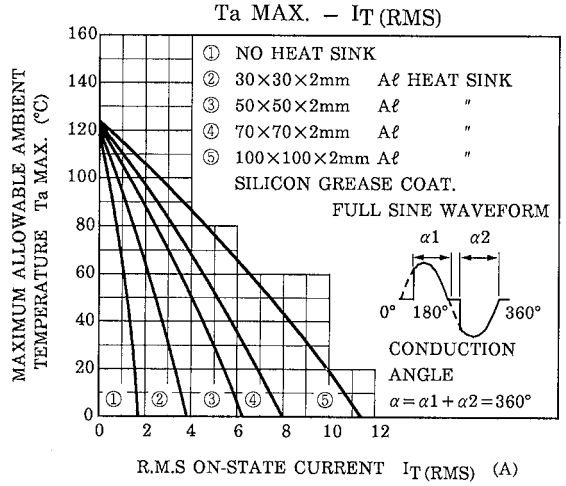
$P_{T(AV)}$ – $I_{T(RMS)}$



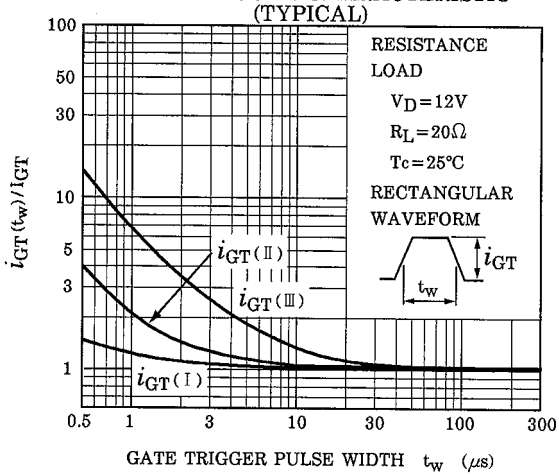
Tc MAX. – $I_{T(RMS)}$



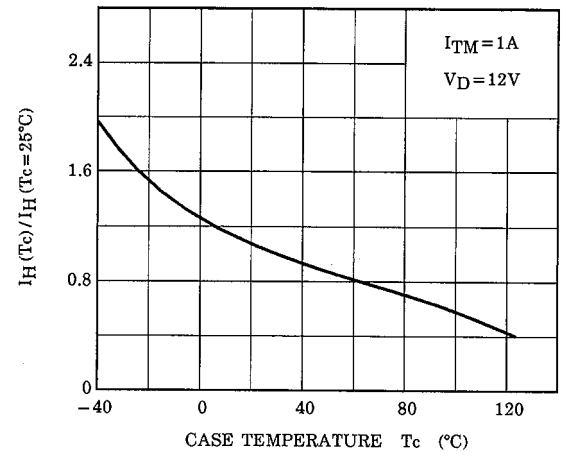
Ta MAX. – $I_{T(RMS)}$



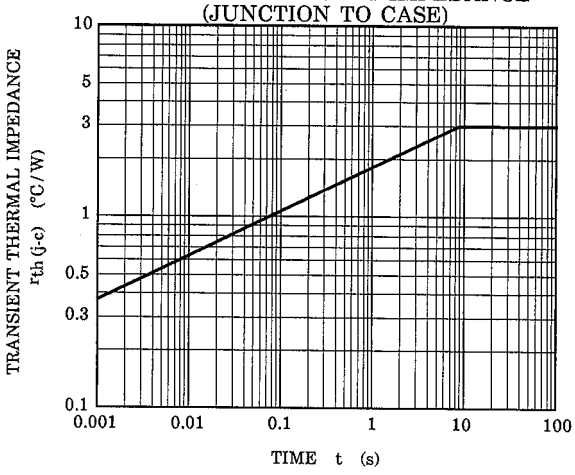
PULSE TRIGGER CHARACTERISTIC (TYPICAL)



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



TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)



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