

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM12GZ47, SM12JZ47, SM12GZ47A, SM12JZ47A

AC POWER CONTROL APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage and Repetitive Peak Reverse Voltage	SM12GZ47 SM12GZ47A	400	V
	SM12JZ47 SM12JZ47A	600	
R. M. S. On-state Current (Full Sine Waveform $T_C = 72^\circ C$)	$I_T (RMS)$	12	A
Peak One Cycle 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	$A / \mu s$
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	$^\circ C$
Storage Temperature Range	T_{stg}	-40~125	$^\circ C$
Isolation Voltage (AC, $t = 1min.$)	V_{Isol}	1500	V

Note 1: di / dt test condition

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

$$I_{TM} \leq 17A$$

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

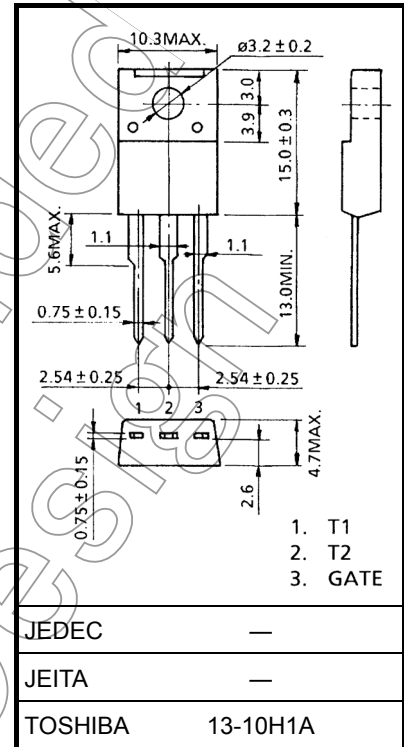
$$t_{gr} \leq 250ns$$

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

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).

Unit: mm

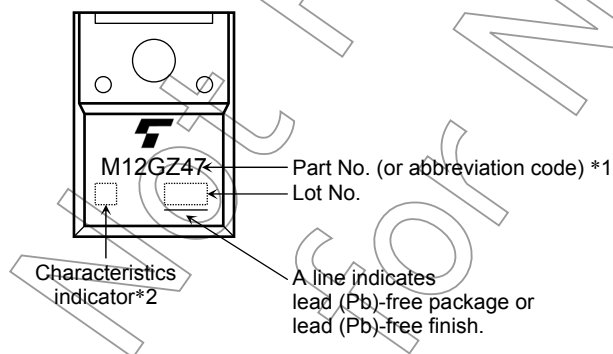


Weight: 1.7 g (typ.)

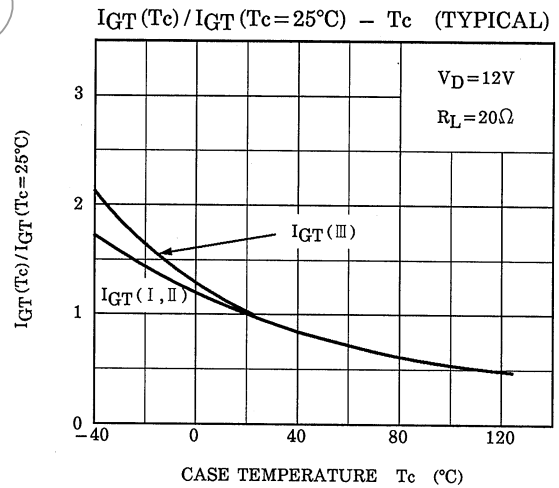
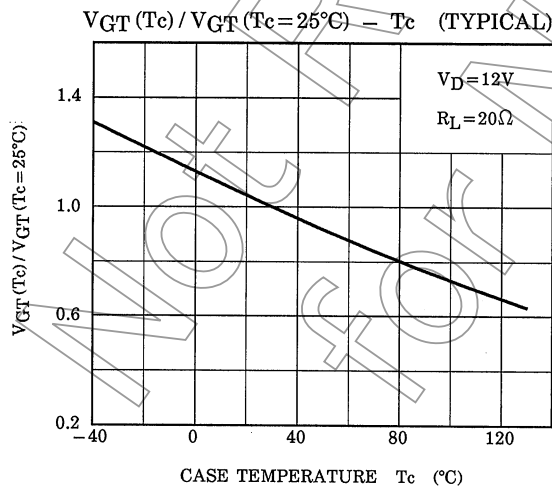
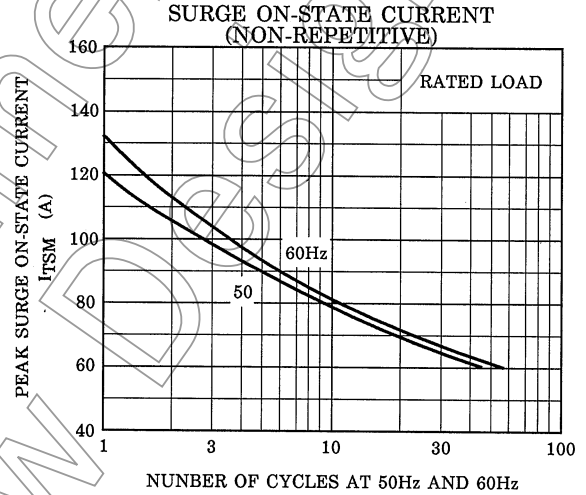
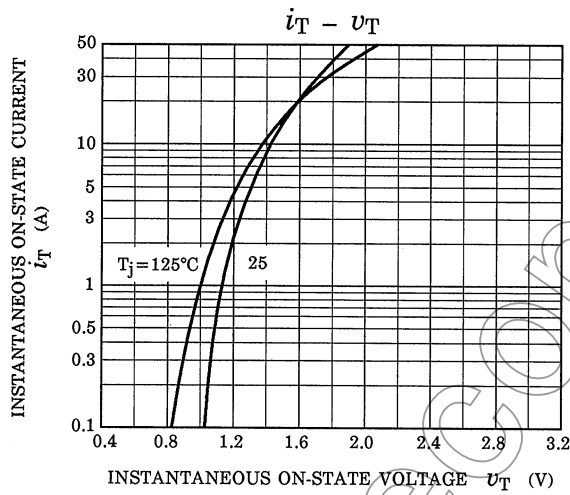
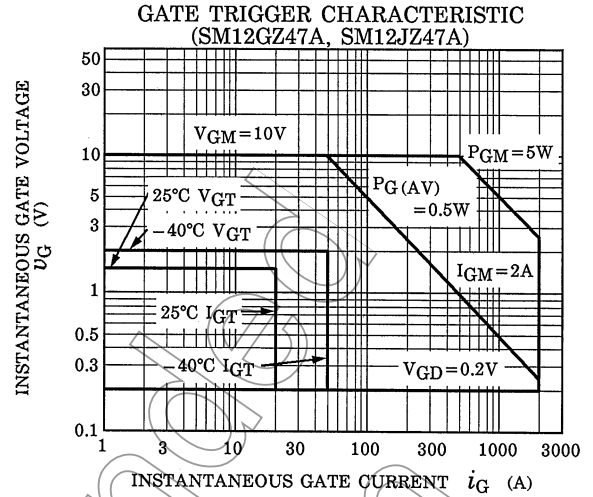
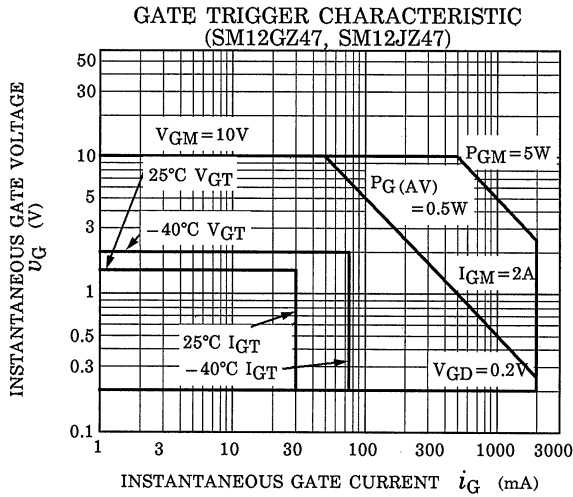
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

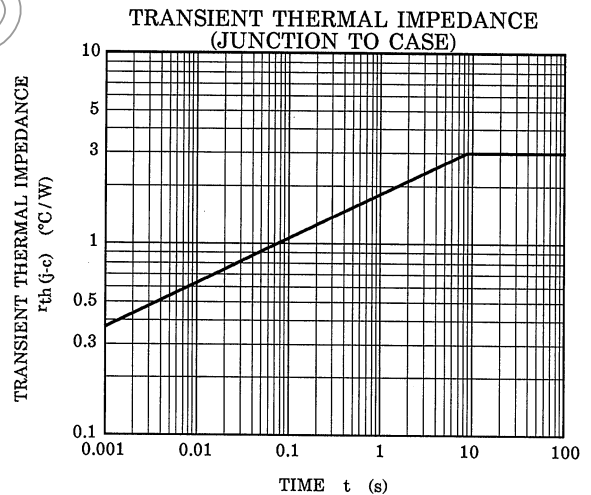
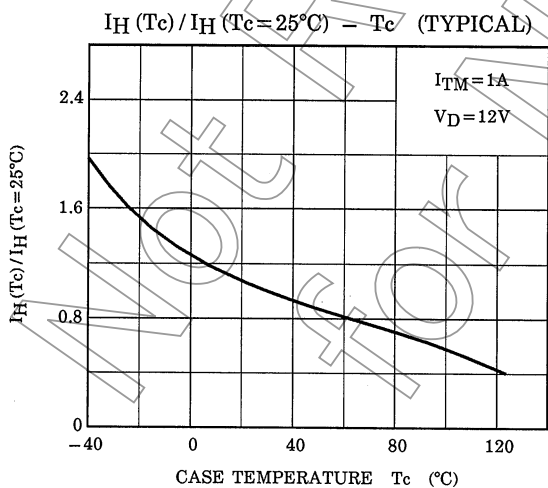
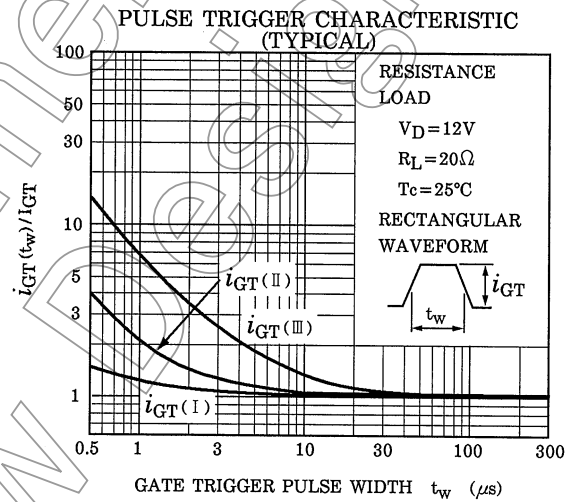
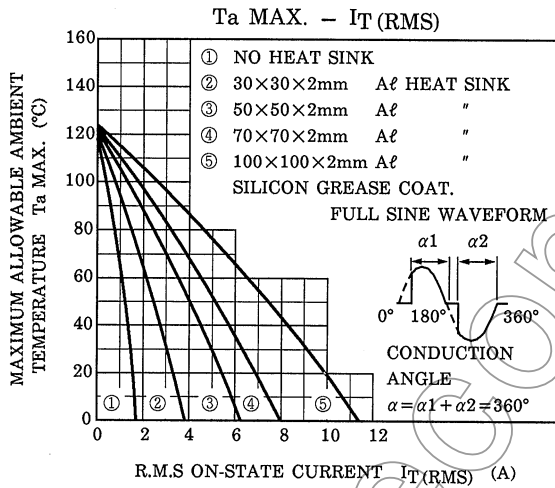
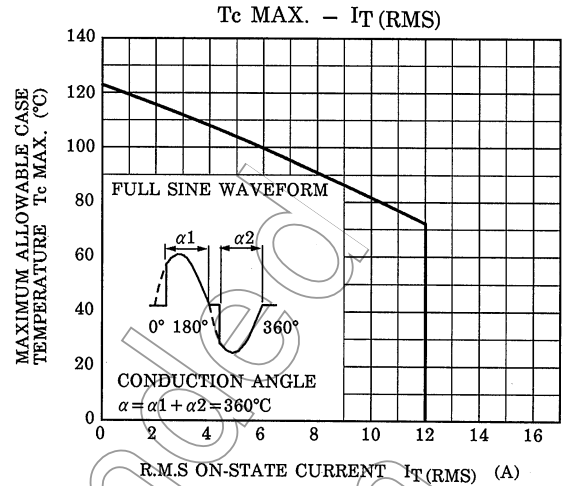
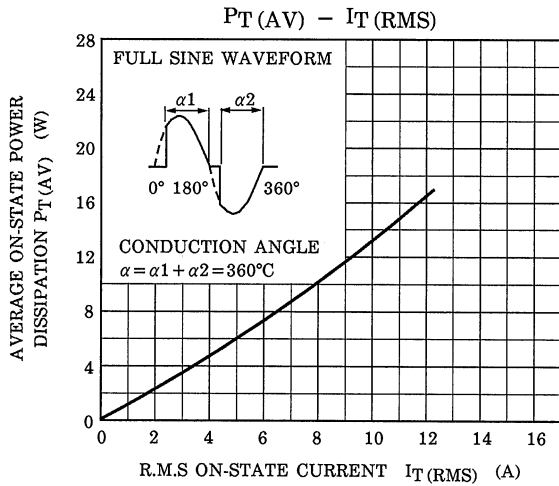
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current		I_{DRM}	$V_{DRM} = \text{Rated}$	—	—	20	μA	
Gate Trigger Voltage	I	V_{GT}	$V_D = 12\text{V}, R_L = 20\Omega$	T2 (+), Gate (+)	—	—	1.5	V
	II			T2 (+), Gate (-)	—	—	1.5	
	III			T2 (-), Gate (-)	—	—	1.5	
	IV			T2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

MARKING



	Part No. (or abbreviation code)	Part No.
*1	M12GZ47	SM12GZ47, SM12GZ47A
	M12JZ47	SM12JZ47, SM12JZ47A
*2	Nothing	SM12GZ47, SM12JZ47
	A	SM12GZ47A, SM12JZ47A





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