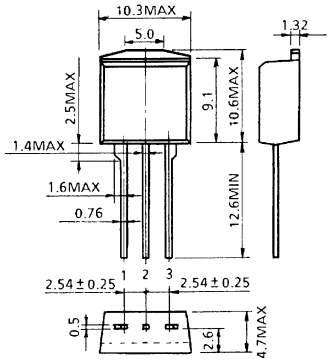
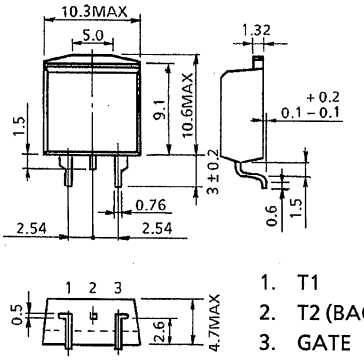
TOSHIBA BI−DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM8G48, USM8G48, SM8J48, USM8J48
SM8G48A, USM8G48A, SM8J48A, USM8J48A

AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off−State Voltage: V_{DRM} = 400V, 600V
- R.M.S On−State Current: $I_{T\ (RMS)}$ = 8A
- Gate Trigger Current: I_{GT} = 30mA Max.
  : I_{GT} = 20mA Max. (“A”Type)

Unit: mm

SM8G48, SM8J48, SM8G48A, SM8J48A		USM8G48, USM8J48, USM8G48A, USM8J48A	
 1. T1 2. T2 3. GATE		 1. T1 2. T2 (BACK SIDE) 3. GATE	
JEDEC	—	JEDEC	—
JEITA	—	JEITA	—
TOSHIBA	13-10J1A	TOSHIBA	13-10J2A

Weight: 1.7g

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	(U)SM8G48 (U)SM8G48A	V_{DRM}	400	V
	(U)SM8J48 (U)SM8J48A		600	
R.M.S On−State Current		$I_{T\ (RMS)}$	8	A
Peak One Cycle Surge On−State Current (Non-Repetitive)		I_{TSM}	80 (50Hz)	A
			88 (60Hz)	
I^2t Limit Value		I^2t	32	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 Forward Gate Voltage		V_{GM}	10	V
Peak Forward Gate Current		I_{GM}	2	A
Junction Temperature		T_j	−40~125	°C
Storage Temperature Range		T_{stg}	−40~125	°C

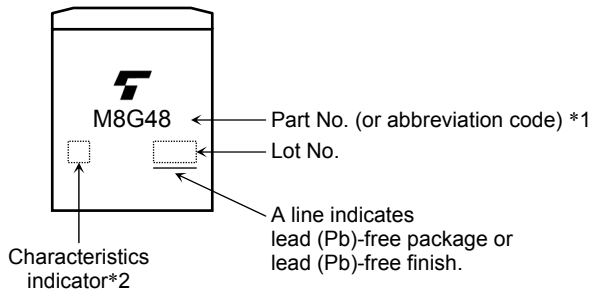
Note 1: V_{DRM} = 0.5×Rated
$I_{TM} \leq 12A$
$t_{gw} \geq 10\mu s$
$t_{gr} \leq 250ns$
$i_{gp} = I_{GT} \times 2.0$

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).

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

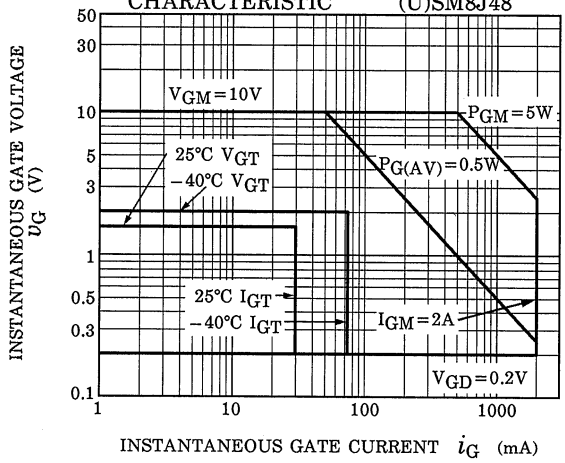
CHARACTERISTIC			SYMBOL	TEST CONDITION		MIN	TYP.	MAX	UNIT
Repetitive Peak Off−State Current			I_{DRM}	V_{DRM} = Rated		—	—	20	μA
Gate Trigger Voltage		I	V_{GT}	V_D = 12V, R_L = 20Ω	T2 (+), Gate (+)	—	—	1.5	V
		II			T2 (+), Gate (−)	—	—	1.5	
		III			T2 (−), Gate (−)	—	—	1.5	
		IV			T2 (−), Gate (+)	—	—	—	
Gate Trigger Current	(U)SM8G48 (U)SM8J48	I	I_{GT}	V_D = 12V, R_L = 20Ω	T2 (+), Gate (+)	—	—	30	mA
		II			T2 (+), Gate (−)	—	—	30	
		III			T2 (−), Gate (−)	—	—	30	
		IV			T2 (−), Gate (+)	—	—	—	
	(U)SM8G48A (U)SM8J48A	I			T2 (+), Gate (+)	—	—	20	
		II			T2 (+), Gate (−)	—	—	20	
		III			T2 (−), Gate (−)	—	—	20	
		IV			T2 (−), Gate (+)	—	—	—	
Peak On−State Voltage			V_{TM}	I_{TM} = 12A		—	—	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		—	—	2.8	°C / W
Critical Rate of Rise of Off−State Voltage	(U)SM8G48 (U)SM8J48		dv / dt	V_{DRM} = Rated, T_j = 125°C Exponential Rise		—	300	—	V / μs
	(U)SM8G48A (U)SM8J48A					—	200	—	
Critical Rate of Rise of Off−State Voltage at Commutation	(U)SM8G48 (U)SM8J48		(dv / dt) c	V_{DRM} = 400V, T_j = 125°C (di / dt) c = −4.5A / ms		10	—	—	V / μs
	(U)SM8G48A (U)SM8J48A					4	—	—	

MARKING

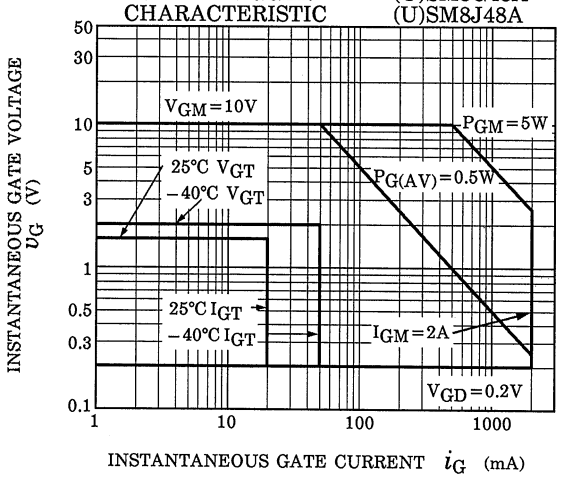


	Part No. (or abbreviation code)	Part No.
*1	M8G48	SM8G48, SM8G48A
		USM8G48, USM8G48A
	M8J48	SM8J48, SM8J48A
		USM8J48, USM8J48A
*2	Nothing	SM8G48, SM8J48
		USM8G48, USM8J48
	A	SM8G48A, SM8J48A
		USM8G48A, USM8J48A

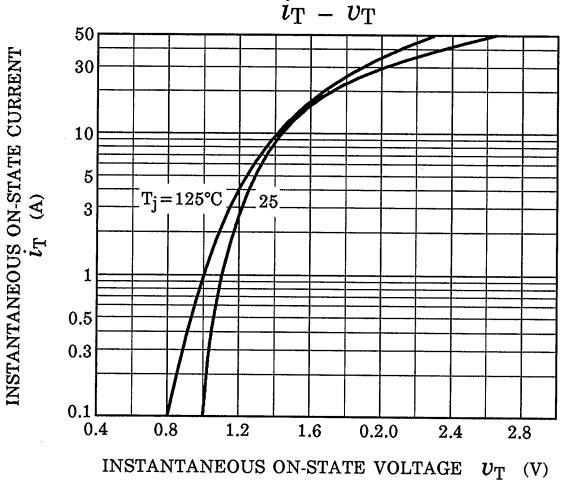
GATE TRIGGER CHARACTERISTIC (U)SM8G48 (U)SM8J48



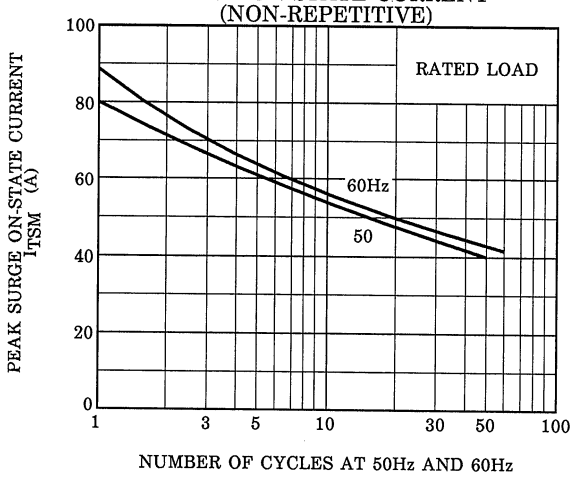
GATE TRIGGER CHARACTERISTIC (U)SM8G48A (U)SM8J48A



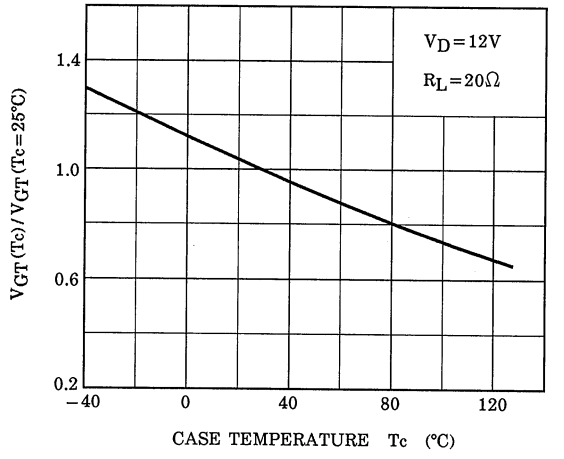
$i_T - v_T$



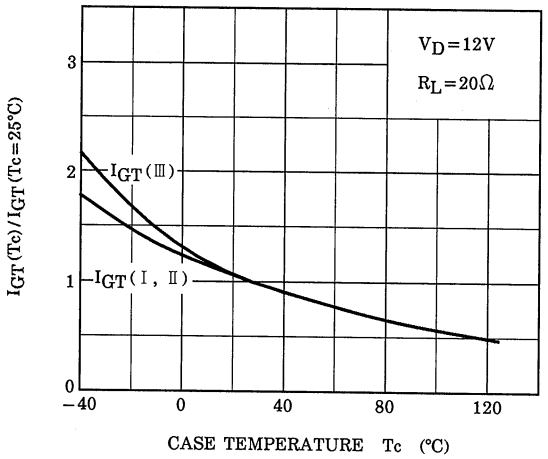
SURGE ON-STATE CURRENT (NON-REPETITIVE)



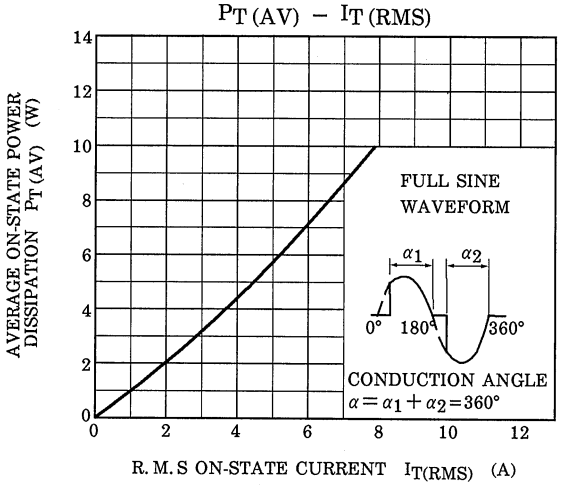
V_{GT} (Tc) / V_{GT} (Tc = 25°C) − Tc (TYPICAL)



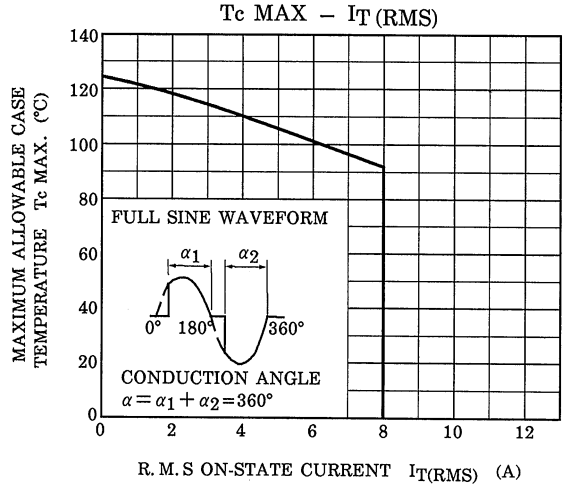
I_{GT} (Tc) / I_{GT} (Tc = 25°C) − Tc (TYPICAL)



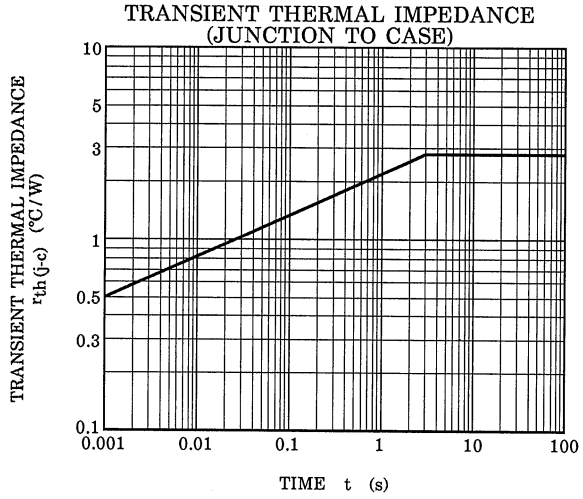
$P_{T\,(AV)}$ – $I_{T\,(RMS)}$



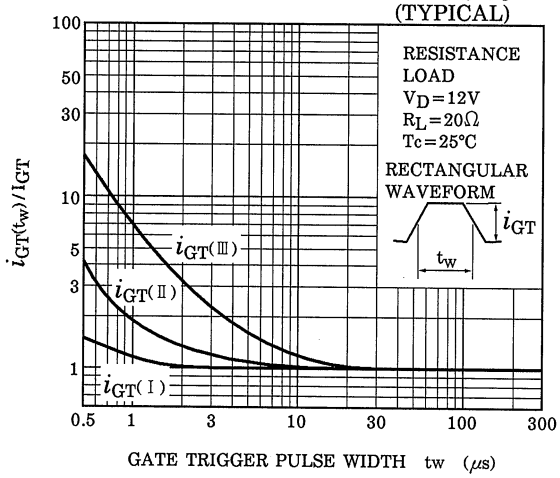
Tc MAX – $I_{T\,(RMS)}$



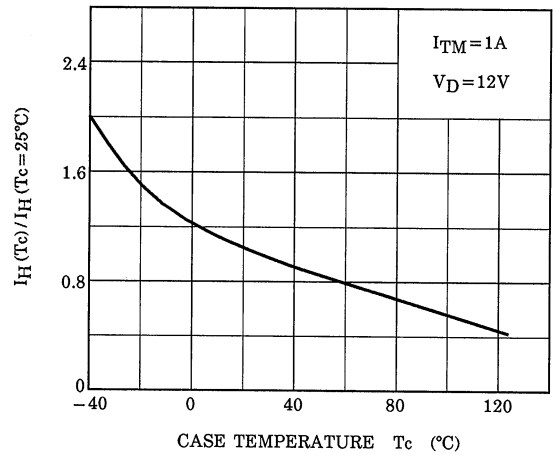
TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)



PULSE TRIGGER CHARACTERISTIC (TYPICAL)



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



RESTRICTIONS ON PRODUCT USE

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