

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM6G45, SM6J45, SM6G45A, SM6J45A

AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off-State Voltage: $V_{DRM} = 400V, 600V$
- R.M.S On-State Current: $I_T (RMS) = 6A$
- High Commutating (dv / dt)

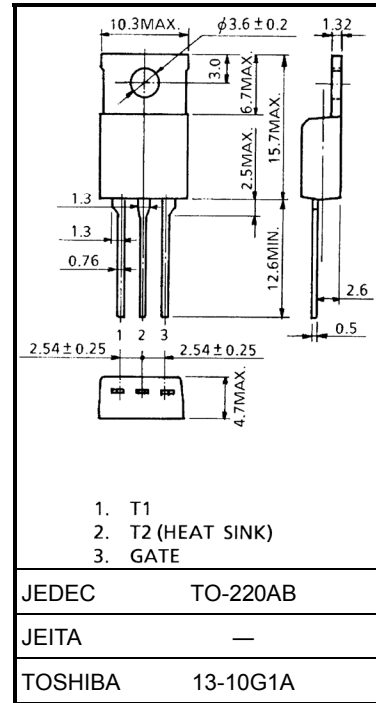
ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM6G45 SM6G45A	400	V
	SM6J45 SM6J45A	600	
R.M.S On-State Current (Full Sine Waveform $T_c = 104^\circ C$)	$I_T (RMS)$	6	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	I_{TSM}	60 (50Hz)	A
		66 (60Hz)	
I^2_t Limit Value	I^2_t	18	A^2s
Critical Rate of Rise of On-State Current	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	-40~125	$^\circ C$
Storage Temperature Range	T_{stg}	-40~125	$^\circ C$

Note: 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

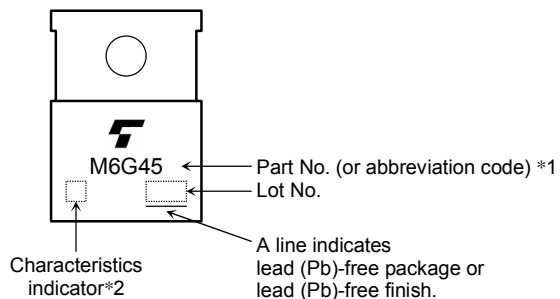


Weight: 2.0 g (typ.)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

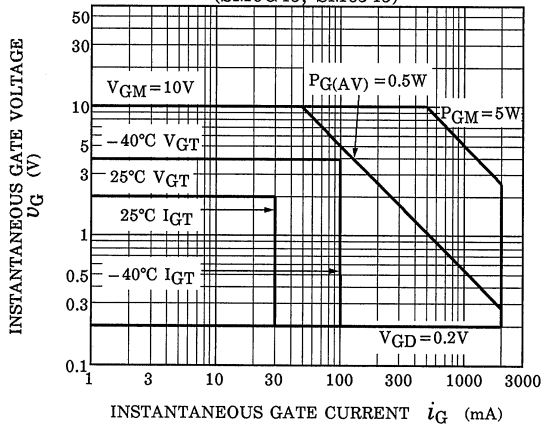
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current		I_{DRM}	$V_{DRM} = \text{Rated}, T_j = 125^\circ\text{C}$	—	—	2	mA	
Gate Trigger Voltage	SM6G45 SM6J45	I	$V_D = 12\text{V}$ $R_L = 20\Omega$	T2 (+), Gate (+)	—	—	2	V
		II		T2 (+), Gate (-)	—	—	2	
		III		T2 (-), Gate (-)	—	—	2	
		IV		T2 (-), Gate (+)	—	—	—	
	SM6G45A SM6J45A	I		T2 (+), Gate (+)	—	—	1.5	
		II		T2 (+), Gate (-)	—	—	1.5	
		III		T2 (-), Gate (-)	—	—	1.5	
		IV		T2 (-), Gate (+)	—	—	—	
Gate Trigger Current	SM6G45 SM6J45	I	$V_D = 12\text{V}$ $R_L = 20\Omega$	T2 (+), Gate (+)	—	—	30	mA
		II		T2 (+), Gate (-)	—	—	30	
		III		T2 (-), Gate (-)	—	—	30	
		IV		T2 (-), Gate (+)	—	—	—	
	SM6G45A SM6J45A	I		T2 (+), Gate (+)	—	—	20	
		II		T2 (+), Gate (-)	—	—	20	
		III		T2 (-), Gate (-)	—	—	20	
		IV		T2 (-), Gate (+)	—	—	—	
Peak On-State Voltage		V_{TM}	$I_{TM} = 9\text{A}$	—	—	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	—	—	2.5	$^\circ\text{C} / \text{W}$	
Critical Rate of Rise of Off-State Voltage at Commutation	SM6G45 SM6J45	$(dv / dt)_c$	$V_{DRM} = 400\text{V},$ $(di / dt)_c = -3.3\text{A} / \text{ms}$ $T_j = 125^\circ\text{C}$	10	—	—	V / μs	
	SM6G45A SM6J45A			4	—	—		

MARKING

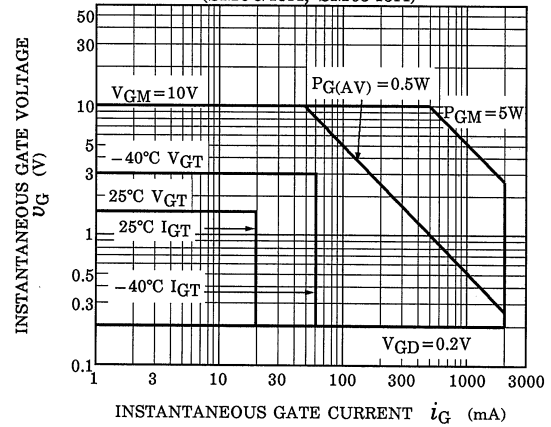


	Part No. (or abbreviation code)	Part No.
*1	M6G45	SM6G45, SM6G45A
	M6J45	SM6J45, SM6J45A
*2	Nothing	SM6G45, SM6J45
	A	SM6G45A, SM6J45A

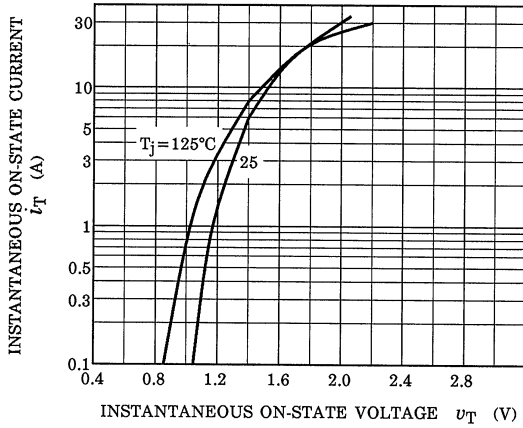
GATE TRIGGER CHARACTERISTIC
(SM6G45, SM6J45)



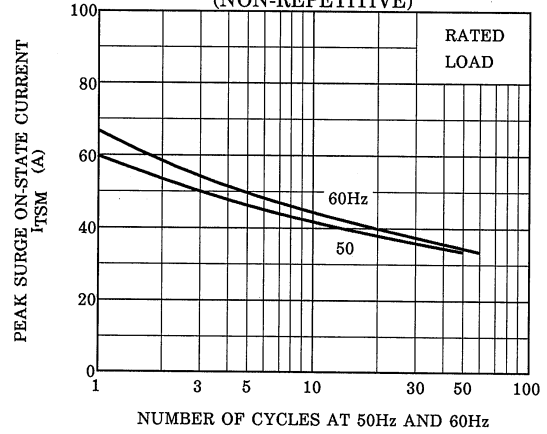
GATE TRIGGER CHARACTERISTIC
(SM6G45A, SM6J45A)



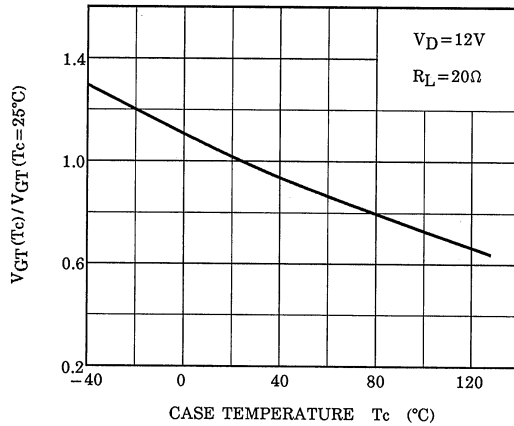
$i_T - v_T$



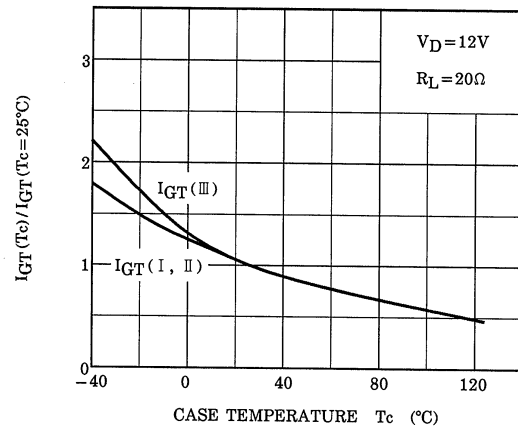
SURGE ON-STATE CURRENT
(NON-REPETITIVE)

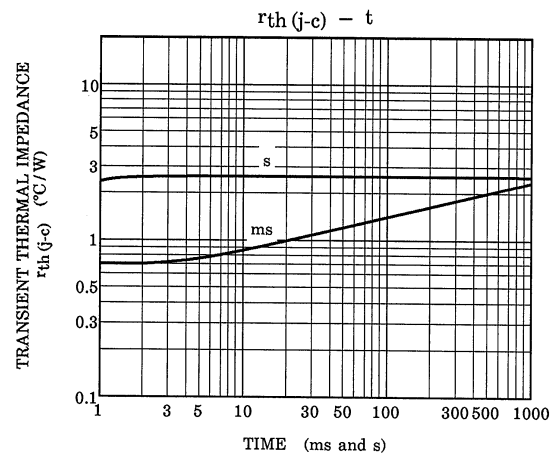
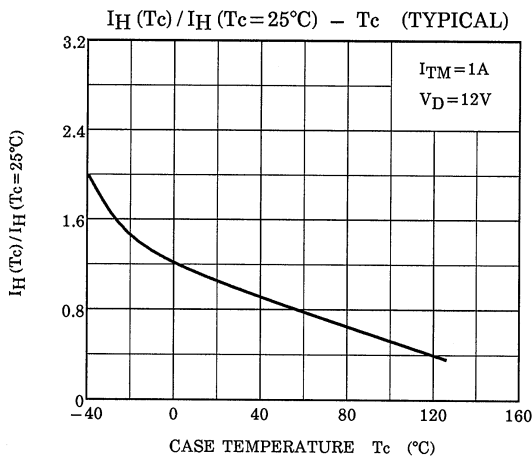
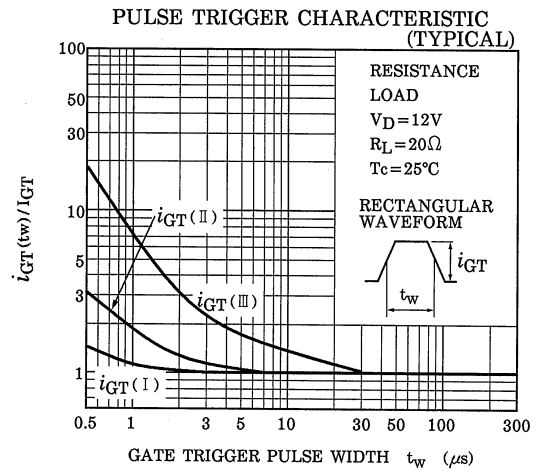
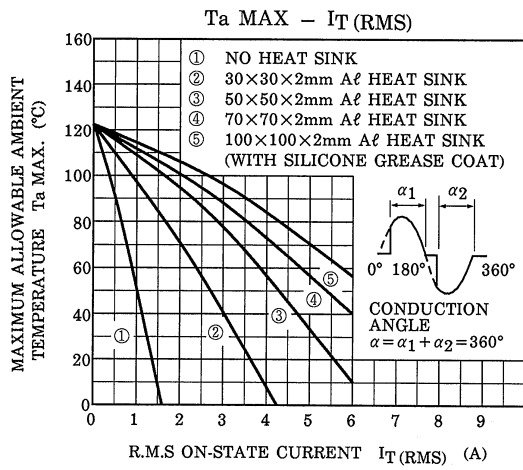
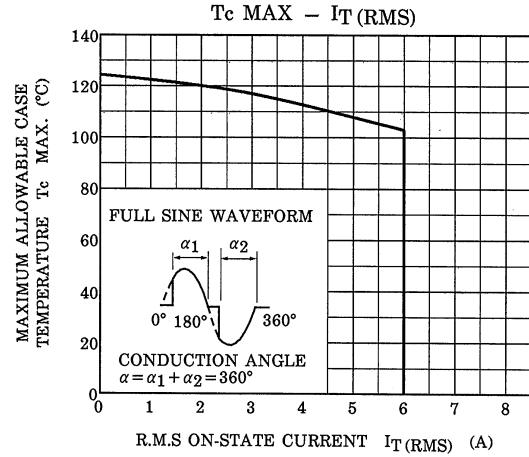
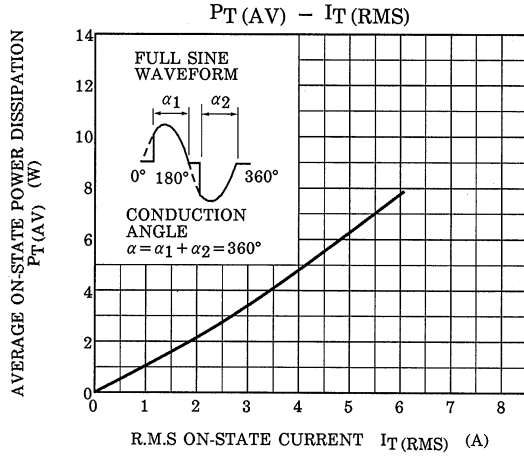


$V_{GT}(T_c) / V_{GT}(T_c = 25^\circ\text{C}) - T_c$ (TYPICAL)



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





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