

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

## SM16G45, SM16J45, SM16G45A, SM16J45A

### AC POWER CONTROL APPLICATIONS

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 400V, 600V$
- R.M.S On-State Current :  $I_T (RMS) = 16A$
- High Commutating (dv / dt)

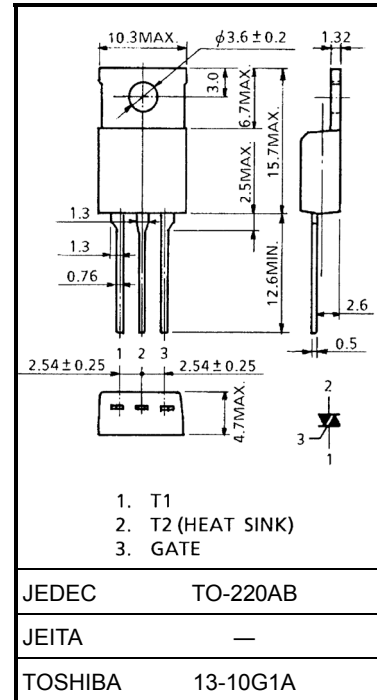
### ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM16G45 SM16G45A	400	V
	SM16J45 SM16J45A	600	
R.M.S On-State Current (Full Sine Waveform $T_c = 100^\circ C$ )	$I_T (RMS)$	16	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	$I_{TSM}$	150 (50Hz)	A
		165 (60Hz)	
$I^2_t$ Limit Value	$I^2_t$	112.5	$A^2s$
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

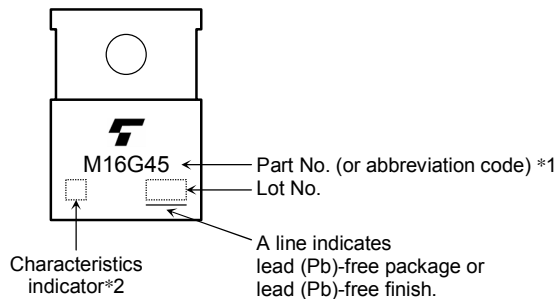


Weight: 2.0 g (typ.)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

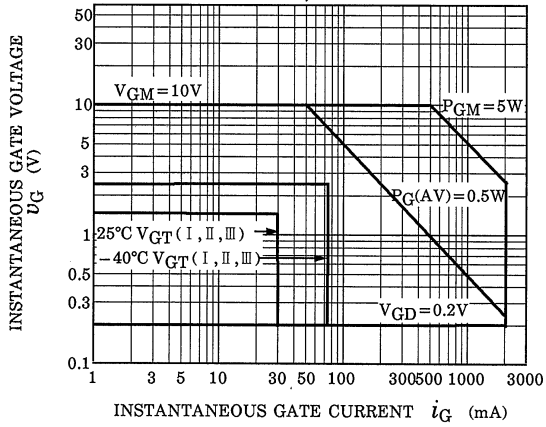
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current		$I_{DRM}$	$V_{DRM} = \text{Rated}$	—	—	20	$\mu\text{A}$	
Gate Trigger Voltage	I	$V_{GT}$	$V_D = 12\text{V}, R_L = 20\Omega$	T2 (+), Gate (+)	—	—	1.5	V
	II			T2 (+), Gate (-)	—	—	1.5	
	III			T2 (-), Gate (-)	—	—	1.5	
	IV			T2 (-), Gate (-)	—	—	—	
Gate Trigger Current	SM16G45 SM16J45	$I_{GT}$	$V_D = 12\text{V}, R_L = 20\Omega$	T2 (+), Gate (+)	—	—	30	mA
				T2 (+), Gate (-)	—	—	30	
				T2 (-), Gate (-)	—	—	30	
				T2 (-), Gate (+)	—	—	—	
	SM16G45A SM16J45A			T2 (+), Gate (+)	—	—	20	
				T2 (+), Gate (-)	—	—	20	
				T2 (-), Gate (-)	—	—	20	
				T2 (-), Gate (+)	—	—	—	
Peak On-State Voltage		$V_{TM}$	$I_{TM} = 25\text{A}$	—	—	1.5	V	
Gate Non-Trigger Voltage		$V_{GD}$	$V_D = \text{Rated}, T_c = 125^\circ\text{C}$	0.2	—	—	V	
Holding Current		$I_H$	$V_D = 12\text{V}, I_{TM} = 2\text{A}$	—	—	50	mA	
Critical Rate of Rise of Off-State Voltage at Commutation	SM16G45 SM16J45	$(dv/dt)_c$	$V_D = 400\text{V}, (di/dt)_c = -8.7\text{A/ms}, T_j = 125^\circ\text{C}$	10	—	—	V / $\mu\text{s}$	
	SM16G45A SM16J45A			4	—	—		
Thermal Resistance		$R_{th(j-c)}$	Junction to Case, AC	—	—	1.4	$^\circ\text{C} / \text{W}$	

## MARKING

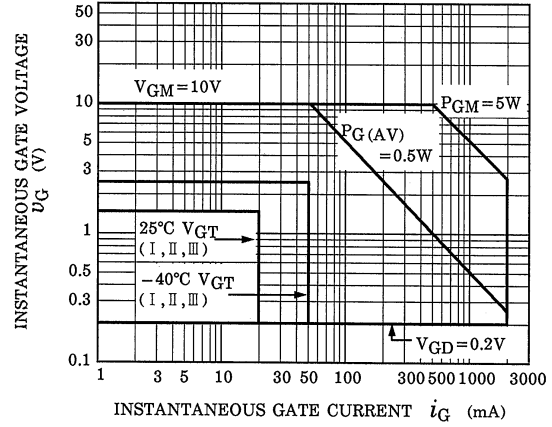


	Part No. (or abbreviation code)	Part No.
*1	M16G45	SM16G45, SM16G45A
	M16J45	SM16J45, SM16J45A
*2	Nothing	SM16G45, SM16J45
	M16J45A	SM16G45A, SM16J45A

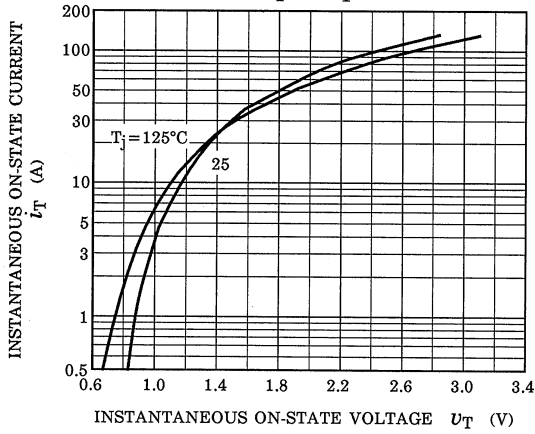
GATE TRIGGER CHARACTERISTIC  
SM16G45, SM16J45



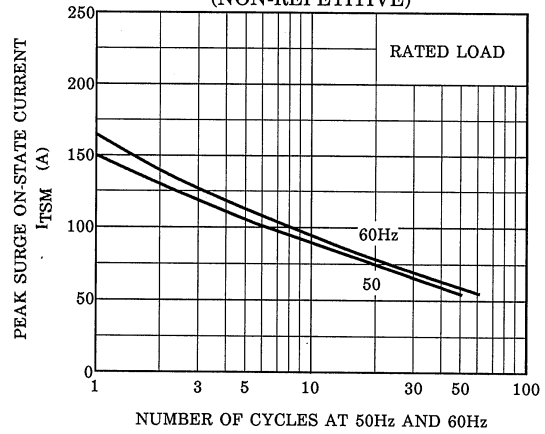
GATE TRIGGER CHARACTERISTIC  
SM16G45A, SM16J45A



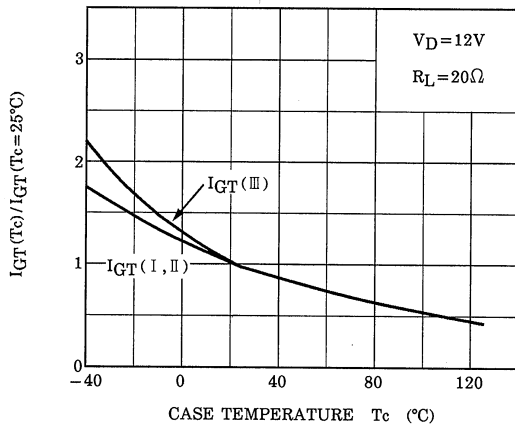
$i_T - u_T$



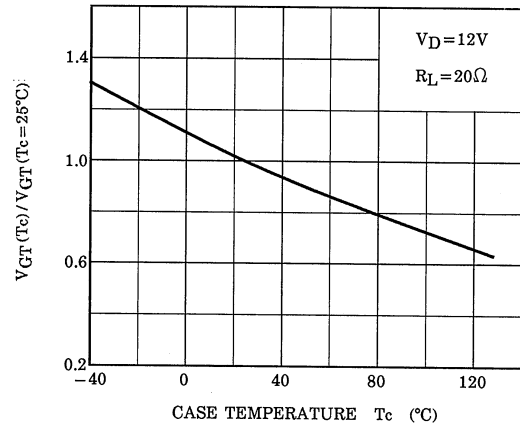
SURGE ON-STATE CURRENT  
(NON-REPETITIVE)

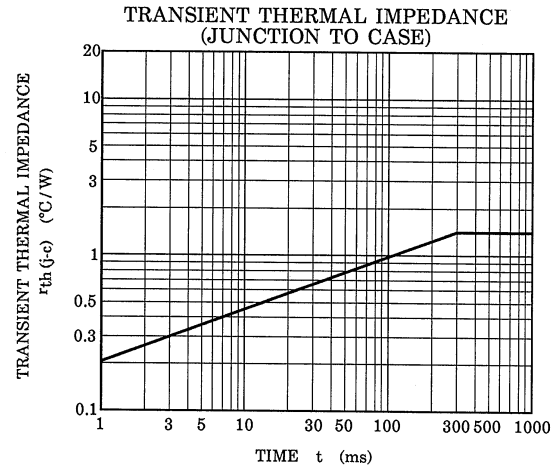
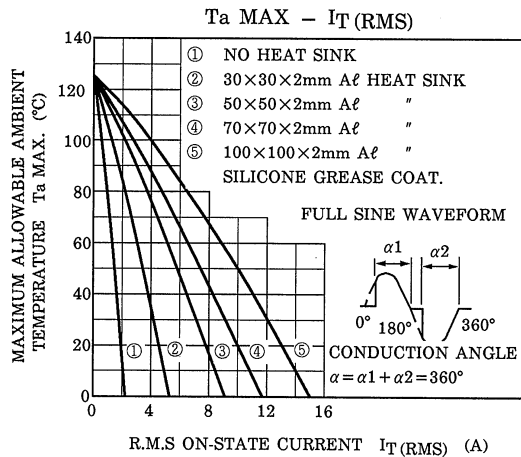
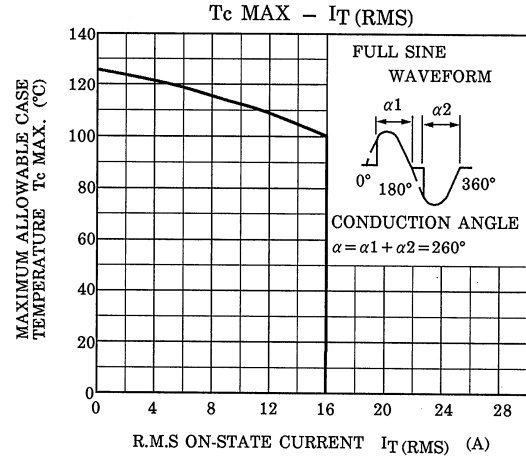
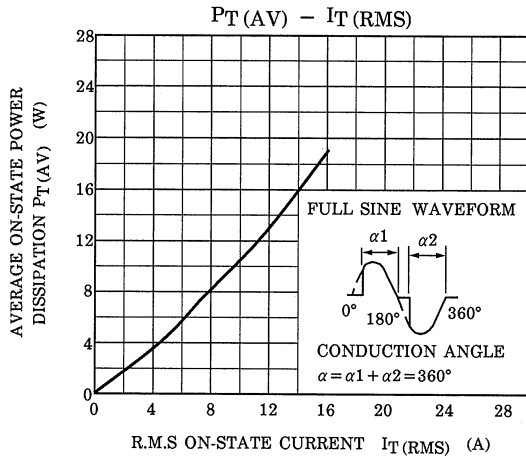
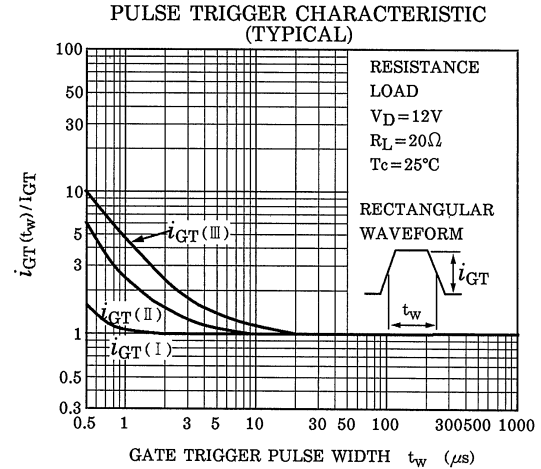
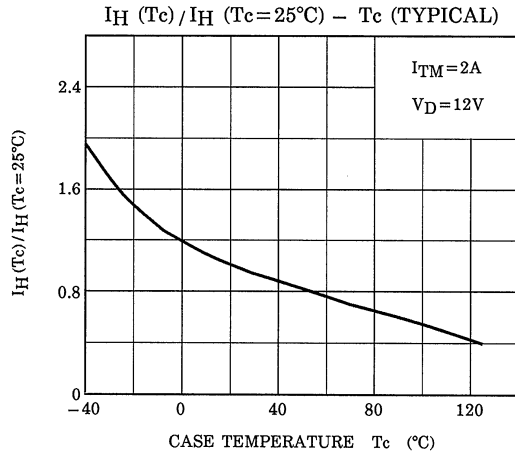


$I_{GT}(T_c) / I_{GT}(T_c = 25^\circ\text{C}) - T_c$  (TYPICAL)



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





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