

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

# SM16GZ51, SM16JZ51

## AC POWER CONTROL APPLICATIONS

- Repetitive Peak off-State Voltage :  $V_{DRM} = 400, 600 \text{ V}$
- R.M.S On-State Current :  $I_T (\text{RMS}) = 16 \text{ A}$
- High Commutating ( $dv / dt$ ) :  $(dv / dt) c = 10 \text{ V} / \mu\text{s}$
- Isolation Voltage :  $V_{ISOL} = 1500 \text{ V AC}$

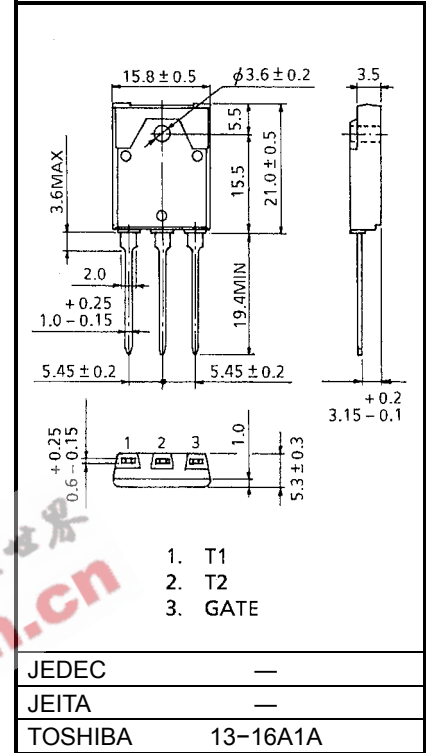
## MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM16GZ51	400	V
	SM16JZ51	600	
R. M. S. On-state Current (Full Sine Waveform $T_a = 82^\circ\text{C}$ )	$I_T (\text{RMS})$	16	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	$I_{TSM}$	150 (50 Hz)	A
		165 (60 Hz)	
$I^2 t$ Limit Value	$I^2 t$	112.5	$\text{A}^2 \text{s}$
Critical Rate of Rise of On-State Current (Note 1)	$di / dt$	50	$\text{A} / \mu\text{s}$
Peak Gate Power Dissipation	$P_{GM}$	5	W
Average Gate Power Dissipation	$P_G (\text{AV})$	0.5	W
Peak Gate Voltage	$V_{GM}$	10	V
Peak Gate Current	$I_{GM}$	2	A
Junction Temperature	$T_j$	-40~125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40~125	$^\circ\text{C}$
Isolation Voltage (AC, $t = 1 \text{ min.}$ )	$V_{ISOL}$	1500	V

Note 1:  $di / dt$  test condition

$$V_{DRM} = 0.5 \times \text{Rated}, I_{TM} \leq 25 \text{ A}, t_{gw} \geq 10 \mu\text{s}, t_{gr} \leq 250 \text{ ns}, i_{gp} = I_{GT} \times 2.0$$

Unit: mm

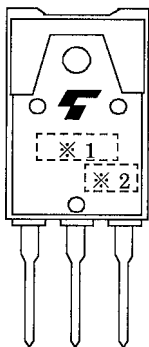


Weight: 2.0g

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

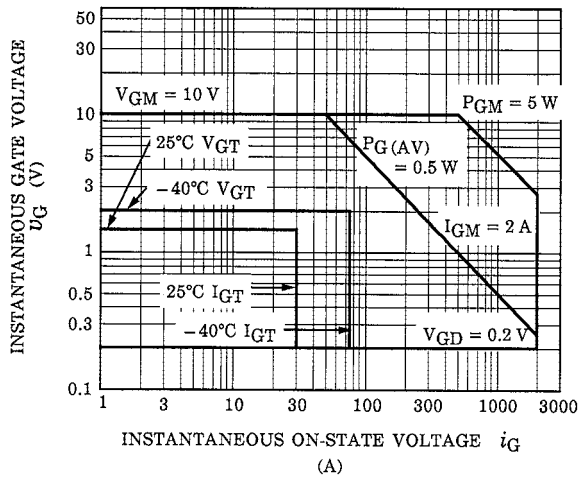
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current	$I_{DRM}$	$V_{DRM} = \text{Rated}$	—	—	20	$\mu\text{A}$	
Gate Trigger Voltage	I	$V_D = 12\text{ V}, R_L = 20\ \Omega$	T2 (+), Gate (+)		—	1.5	V
	II		T2 (+), Gate (-)		—	1.5	
	III		T2 (-), Gate (-)		—	1.5	
	IV		T2 (-), Gate (+)		—	—	
Gate Trigger Current	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 (+)		—	—	
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	$I_H$	$V_D = 12\text{ V}, I_{TM} = 1\text{ A}$	—	—	50	mA	
Thermal Resistance	$R_{th(j-c)}$	Junction to Case, AC	—	—	1.8	$^\circ\text{C}/\text{W}$	
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = \text{Rated}, T_j = 125^\circ\text{C}$ Exponential Rise	—	300	—	$\text{V}/\mu\text{s}$	
Critical Rate of Rise of Off-State Voltage at Commutation	$(dv/dt)_c$	$V_{DRM} = 400\text{ V}, T_j = 125^\circ\text{C}$ $(di/dt)_c = -8.7\text{ A/ms}$	10	—	—	$\text{V}/\mu\text{s}$	

## MARKING

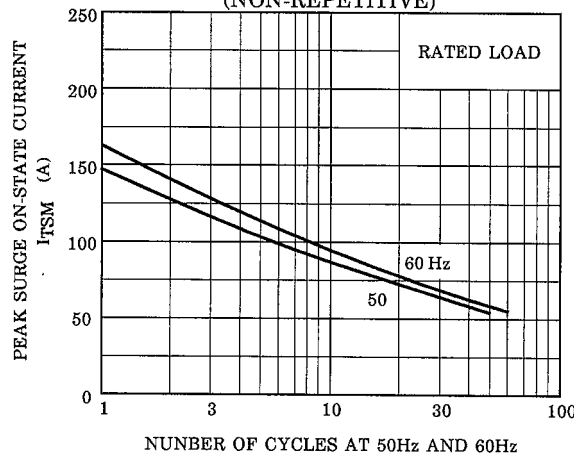


*NUMBER	SYMBOL	MARK
*1	TYPE	M16GZ51
		M16JZ51
*2	Lot Number Month (Starting from Alphabet A) Year (Last Decimal Digit of the Current Year)	Example 8A : January 1998 8B : February 1998 8L : December 1998

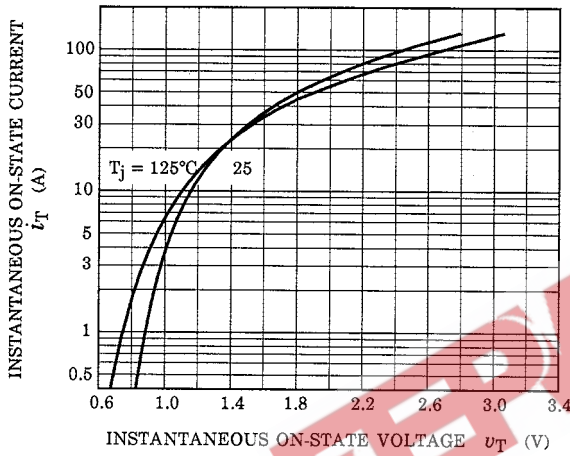
GATE TRIGGER CHARACTERISTIC



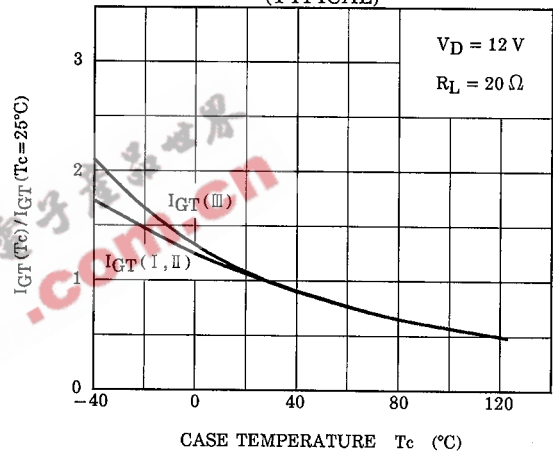
SURGE ON-STATE CURRENT (NON-REPETITIVE)



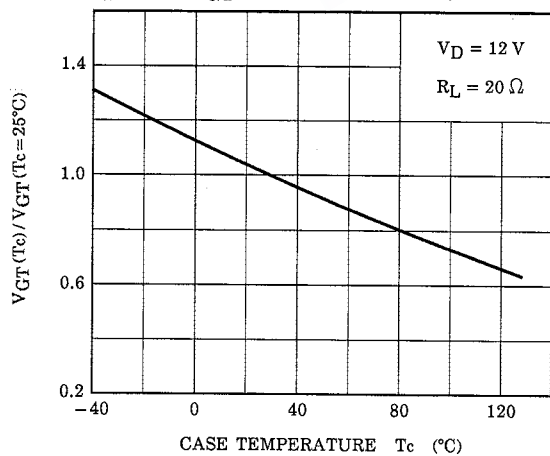
$i_T - v_T$



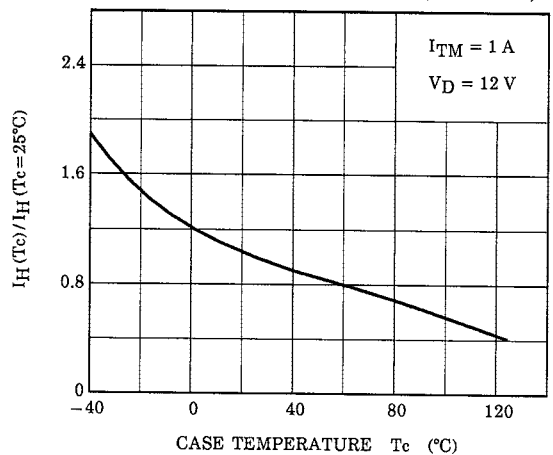
$I_{GT}(T_c) / I_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL)

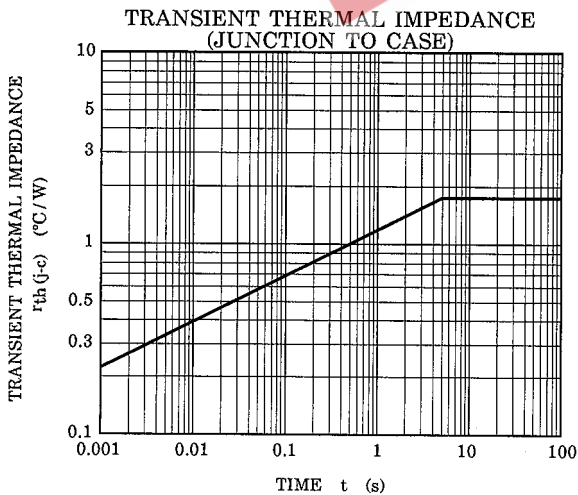
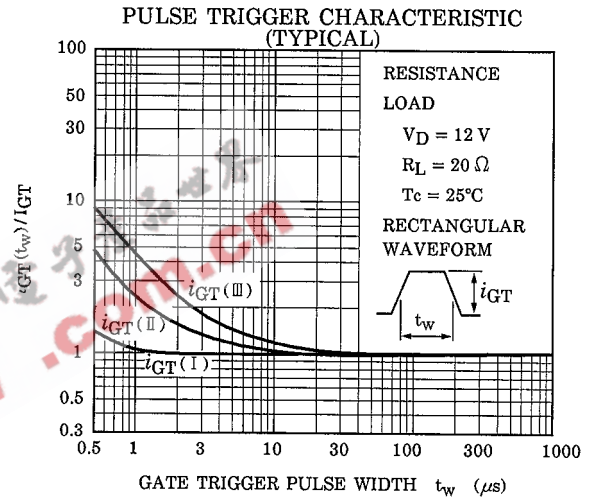
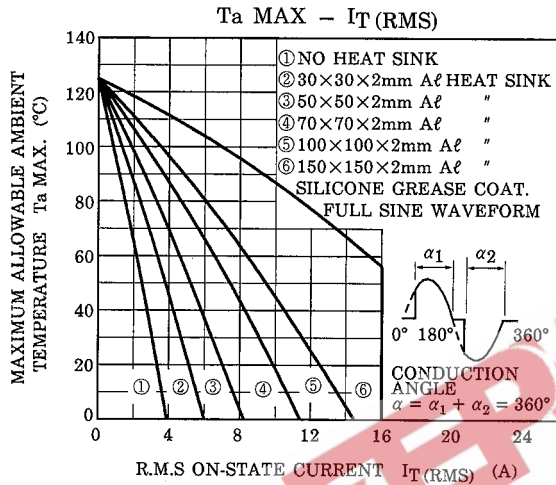
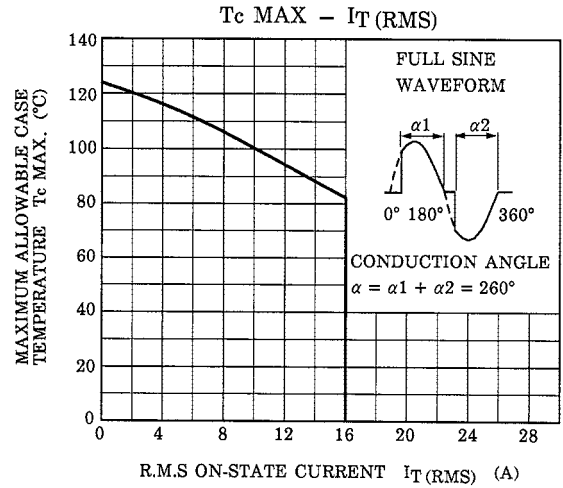
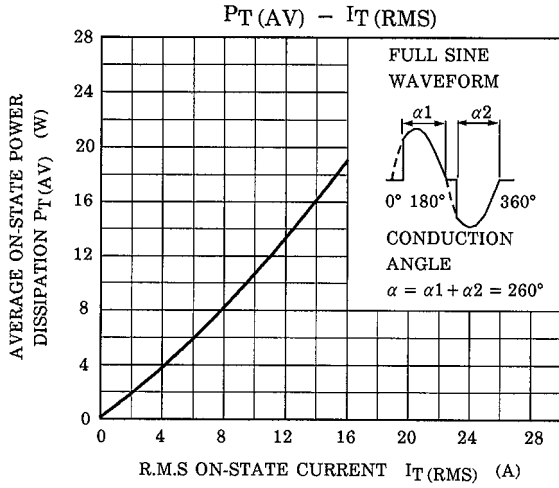


$V_{GT}(T_c) / V_{GT}(T_c = 25^\circ C) - T_c$  (TYPICAL)



$I_H(T_c) / I_H(T_c = 25^\circ C) - T_c$  (TYPICAL)





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