

# TOSHIBA SM12(G,J)48, USM12(G,J)48, SM12(G,J)48A, USM12(G,J)48A

TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

## SM12G48, USM12G48, SM12J48, USM12J48 SM12G48A, USM12G48A, SM12J48A, USM12J48A

### AC POWER CONTROL APPLICATIONS

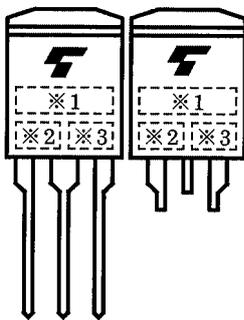
- Repetitive Peak Off-State Voltage :  $V_{DRM}=400, 600V$
- R.M.S. On-State Current :  $I_T (RMS) =12A$
- Gate Trigger Current :  $I_{GT}=30mA \text{ Max.}$   
:  $I_{GT}=20mA \text{ Max. ("A"Type)}$

Unit in mm

SM12G48, SM12J48, SM12G48A, SM12J48A	USM12G48, USM12J48, USM12G48A, USM12J48A
JEDEC —	JEDEC —
JEITA —	JEITA —
TOSHIBA 13-10J1A	TOSHIBA 13-10J2A

Weight : 1.7g

### MARKING



NUMBER	SYMBOL		MARK
*1	TYPE	SM12G48, SM12G48A, USM12G48, USM12G48A	SM12G48
		SM12J48, SM12J48A, USM12J48, USM12J48A	SM12J48
*2		SM12G48A, SM12J48A, USM12G48A, USM12J48A	A
*3	Lot Number ← Month (Starting from Alphabet A) ← Year (Last Decimal Digit of the Year of Manufacture)		Example 8A : January 1998 8B : February 1998 8L : December 1998

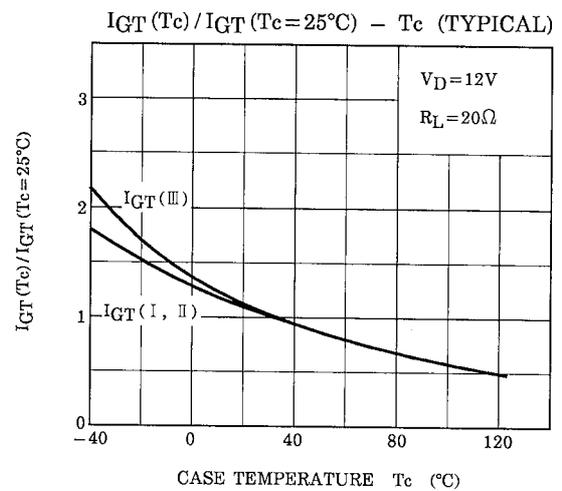
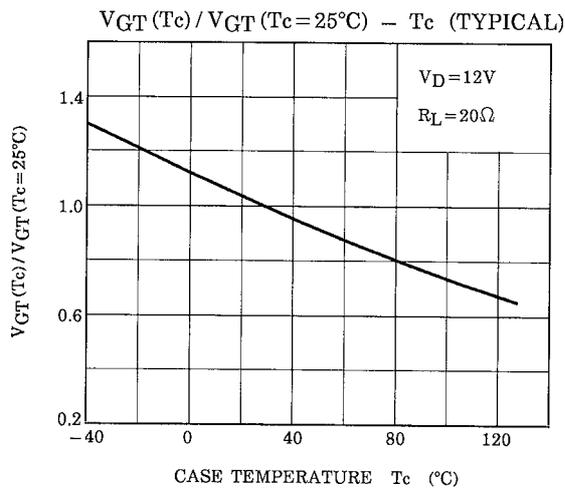
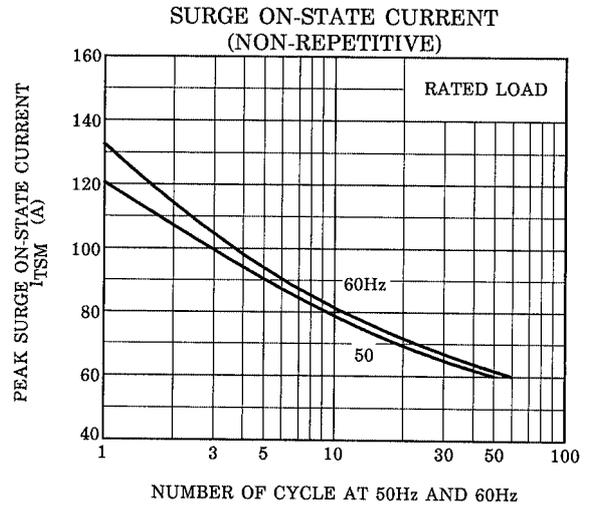
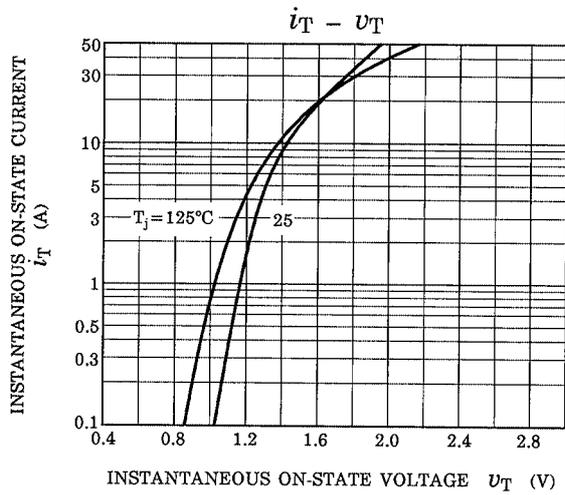
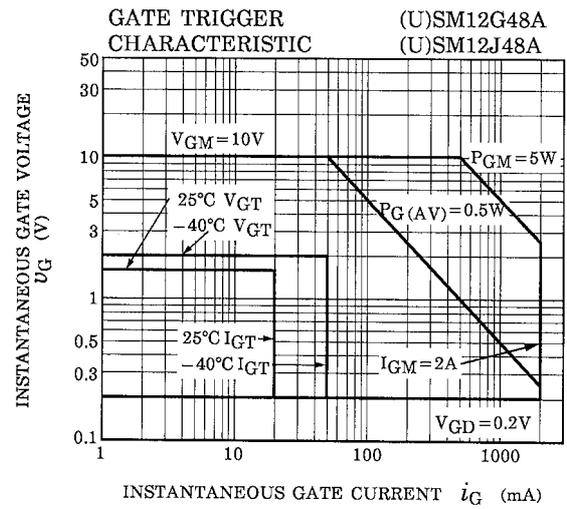
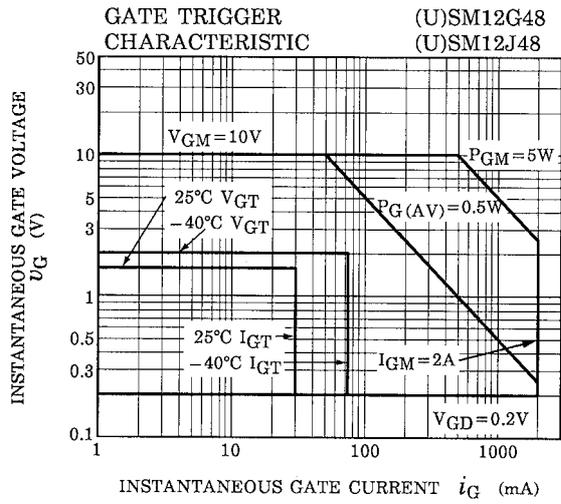
## MAXIMUM RATINGS

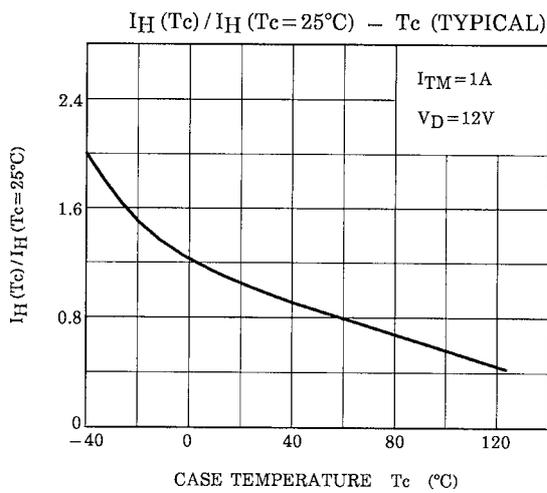
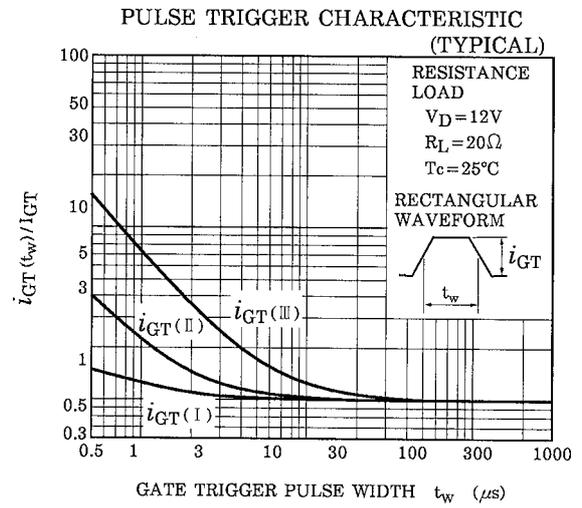
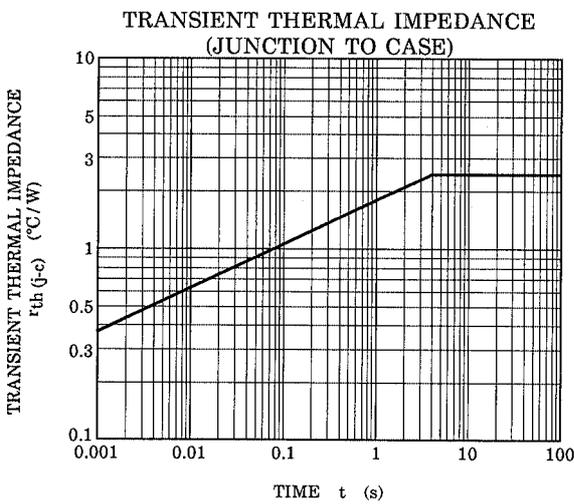
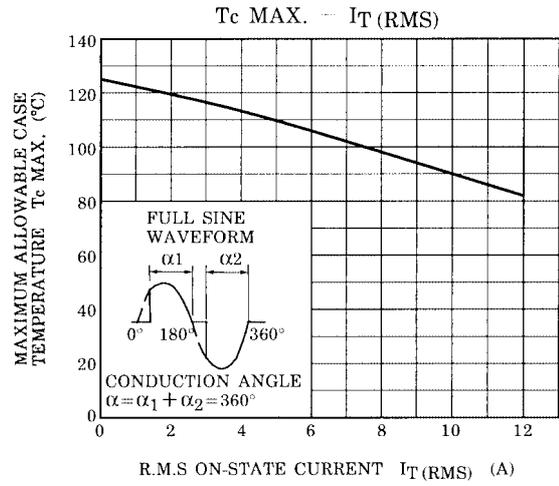
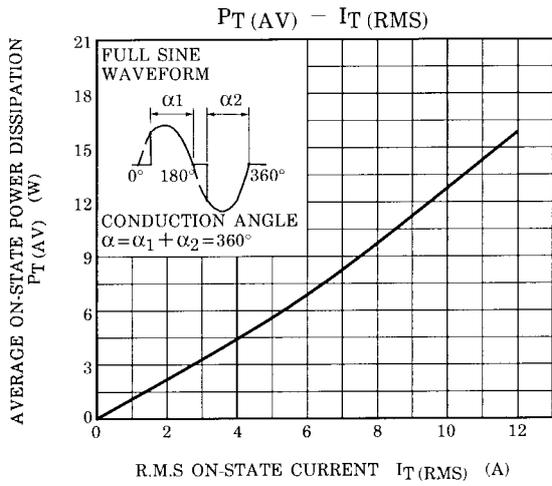
CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	(U)SM12G48 (U)SM12G48A	$V_{DRM}$	400	V
	(U)SM12J48 (U)SM12J48A		600	
R.M.S On-State Current		$I_T$ (RMS)	12	A
Peak One Cycle Surge On-State Current (Non-Repetitive)		$I_{TSM}$	120 (50Hz)	A
			132 (60Hz)	
$I^2t$ Limit Value		$I^2t$	72	$A^2s$
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 Forward Gate Voltage		$V_{GM}$	10	V
Peak Forward Gate Current		$I_{GM}$	2	A
Junction Temperature		$T_j$	-40~125	$^{\circ}C$
Storage Temperature Range		$T_{stg}$	-40~125	$^{\circ}C$

Note 1 :  $V_{DRM}=0.5 \times \text{Rated}$   
 $I_{TM} \leq 15A$   
 $t_{gw} \geq 10\mu s$   
 $t_{gr} \leq 250ns$   
 $i_{gp} = I_{GT} \times 2.0$

## 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	$\mu A$	
Gate Trigger Voltage		I II III IV	$V_{GT}$ $V_D=12V$ $R_L=20\Omega$	T2 (+), Gate (+)	—	—	1.5	V
				T2 (+), Gate (-)	—	—	1.5	
				T2 (-), Gate (-)	—	—	1.5	
				T2 (-), Gate (+)	—	—	—	
Gate Trigger Current	SM12G48 SM12J48	I II III IV	$I_{GT}$ $V_D=12V$ $R_L=20\Omega$	T2 (+), Gate (+)	—	—	30	mA
				T2 (+), Gate (-)	—	—	30	
				T2 (-), Gate (-)	—	—	30	
				T2 (-), Gate (+)	—	—	—	
	SM12G48A SM12J48A	I II III IV	$I_{GT}$ $V_D=12V$ $R_L=20\Omega$	T2 (+), Gate (+)	—	—	20	
				T2 (+), Gate (-)	—	—	20	
				T2 (-), Gate (-)	—	—	20	
				T2 (-), Gate (+)	—	—	—	
Peak On-State Voltage		$V_{TM}$	$I_{TM}=17A$	—	—	1.5	V	
Gate Non-Trigger Voltage		$V_{GD}$	$V_D = \text{Rated}, T_c = 125^{\circ}C$	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	—	—	2.4	$^{\circ}C/W$	
Critical Rate of Rise of Off-State Voltage	(U)SM12G48 (U)SM12J48	$dv/dt$	$V_{DRM} = \text{Rated}, T_j = 125^{\circ}C$ Exponential Rise	—	300	—	V / $\mu s$	
	(U)SM12G48A (U)SM12J48A			—	200	—		
Critical Rate of Rise of Off-State Voltage at Commutation	(U)SM12G48 (U)SM12J48	$(dv/dt)_c$	$V_{DRM}=400V, T_j=125^{\circ}C$ $(di/dt)_c = -6.5A/ms$	10	—	—	V / $\mu s$	
	(U)SM12G48A (U)SM12J48A			4	—	—		





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