

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

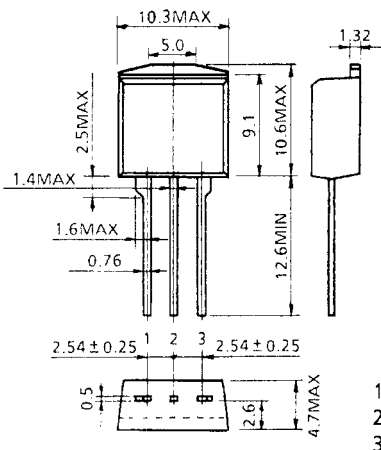
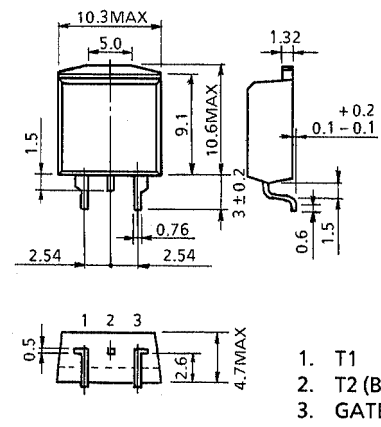
TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

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

AC POWER CONTROL APPLICATIONS

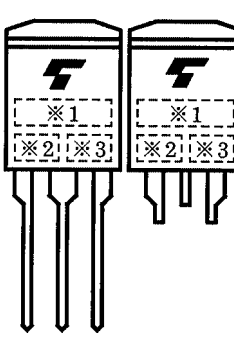
- Repetitive Peak Off-State Voltage :  $V_{DRM}=400, 600V$
- R.M.S. On-State Current :  $I_T (RMS) =12A$
- Gate Trigger Current :  $I_{GT}=30mA$  Max.  
:  $I_{GT}=20mA$  Max. ("A"Type)

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
			SM12J48, SM12J48A, USM12J48, USM12J48A
	*2		SM12G48A, SM12J48A, USM12G48A, USM12J48A
	*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

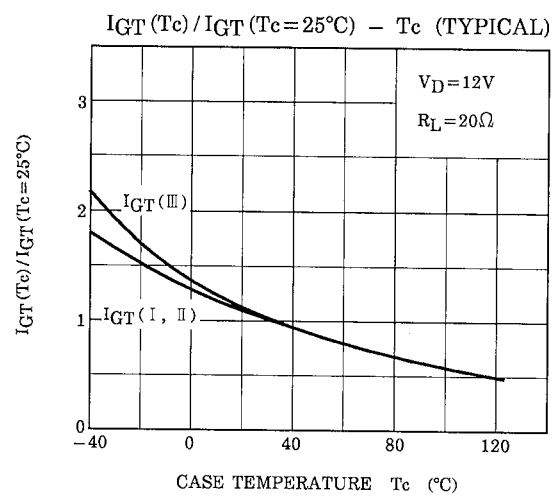
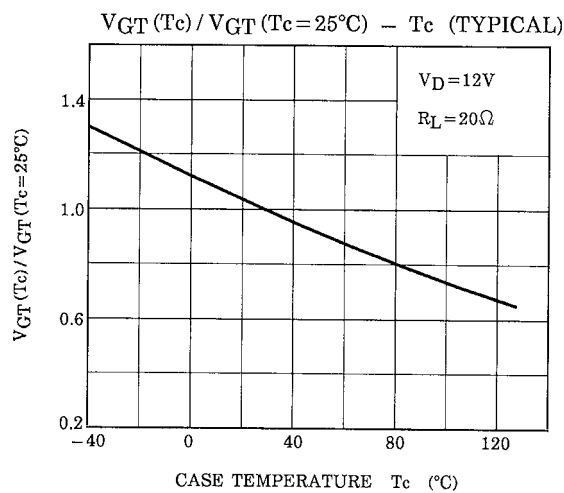
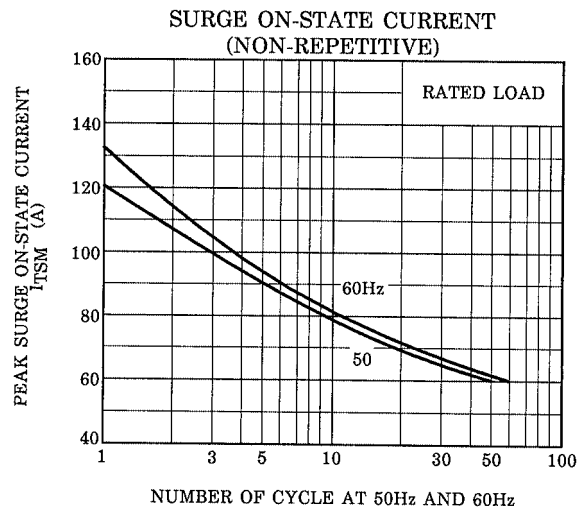
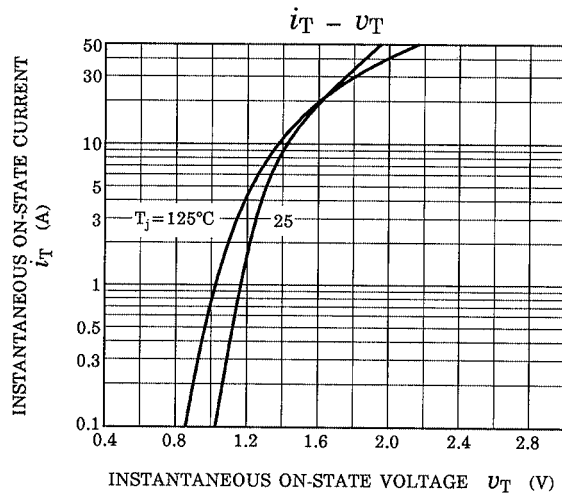
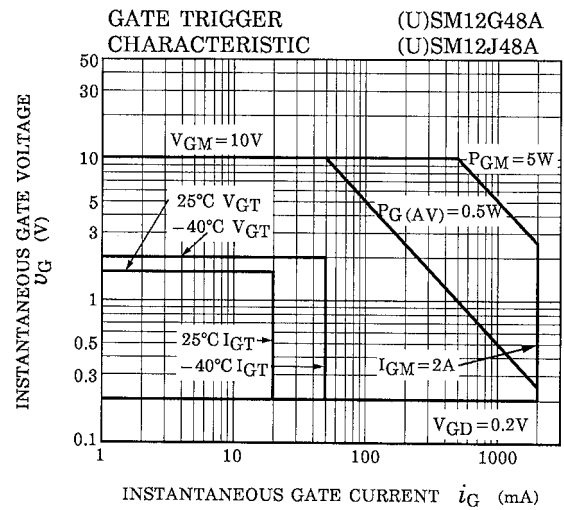
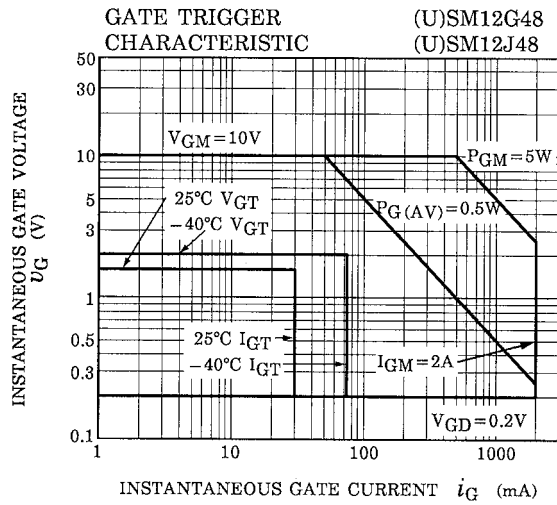
## MAXIMUM RATINGS

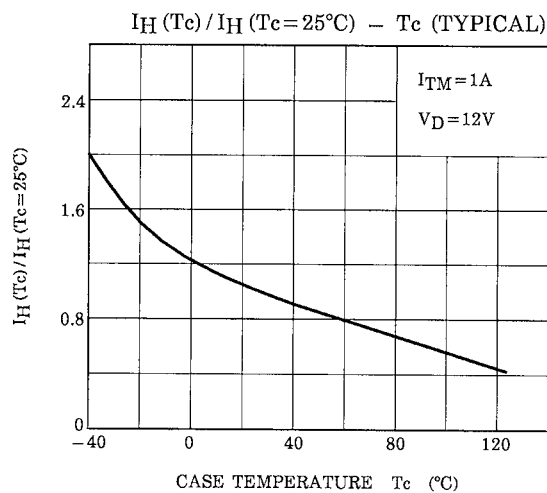
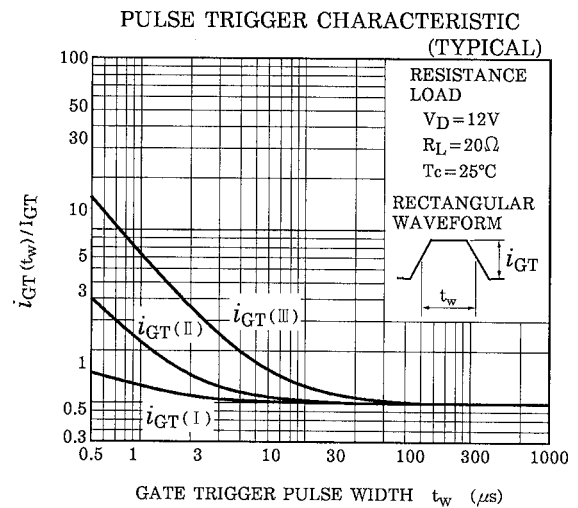
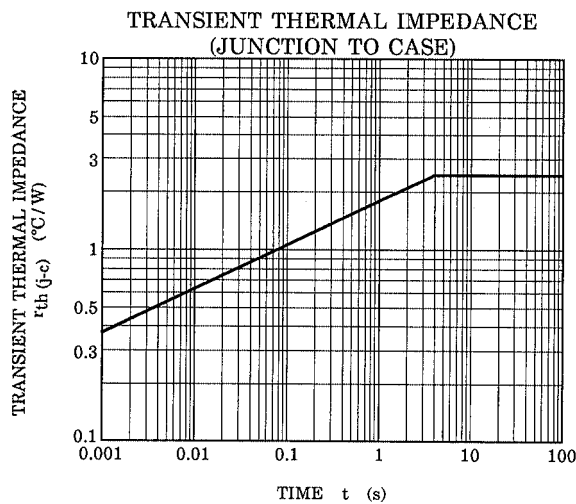
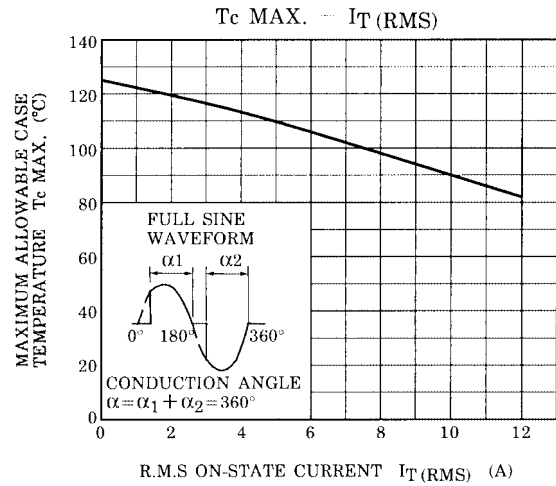
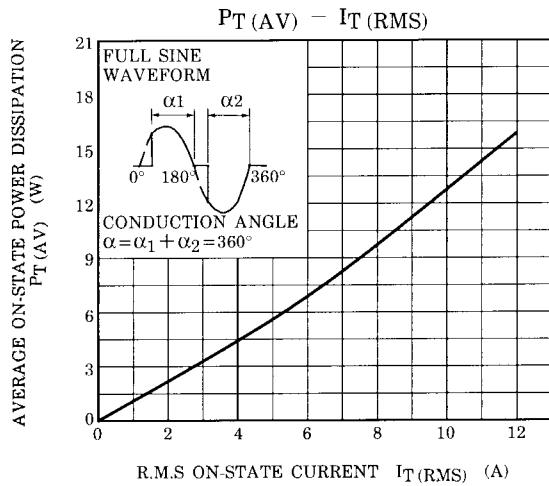
CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	(U)SM12G48 (U)SM12G48A	$V_{\text{DRM}}$	400	V
	(U)SM12J48 (U)SM12J48A		600	
R.M.S On-State Current		$I_{\text{T}} (\text{RMS})$	12	A
Peak One Cycle Surge On-State Current (Non-Repetitive)		$I_{\text{TSM}}$	120 (50Hz)	A
			132 (60Hz)	
$I^2t$ Limit Value		$I^2t$	72	$\text{A}^2\text{s}$
Critical Rate of Rise of On-State Current (Note 1)		$di/dt$	50	$\text{A} / \mu\text{s}$
Peak Gate Power Dissipation		$P_{\text{GM}}$	5	W
Average Gate Power Dissipation		$P_{\text{G}} (\text{AV})$	0.5	W
Peak Forward Gate Voltage		$V_{\text{GM}}$	10	V
Peak Forward Gate Current		$I_{\text{GM}}$	2	A
Junction Temperature		$T_{\text{j}}$	-40~125	$^{\circ}\text{C}$
Storage Temperature Range		$T_{\text{stg}}$	-40~125	$^{\circ}\text{C}$

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

## ELECTRICAL CHARACTERISTICS ( $T_{\text{a}}=25^{\circ}\text{C}$ )

CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT	
Repetitive Peak Off-State Current		I <sub>DRM</sub>	V <sub>DRM</sub> =Rated		—	—	20	μA	
Gate Trigger Voltage		I	V <sub>GT</sub>	V <sub>D</sub> =12V R <sub>L</sub> =20Ω	T2 (+) , Gate (+)	—	—	1.5	V
		II			T2 (+) , Gate (—)	—	—	1.5	
		III			T2 (—) , Gate (—)	—	—	1.5	
		IV			T2 (—) , Gate (+)	—	—	—	
Gate Trigger Current	SM12G48 SM12J48	I	I <sub>GT</sub>	V <sub>D</sub> =12V R <sub>L</sub> =20Ω	T2 (+) , Gate (+)	—	—	30	mA
		II			T2 (+) , Gate (—)	—	—	30	
		III			T2 (—) , Gate (—)	—	—	30	
		IV			T2 (—) , Gate (+)	—	—	—	
	SM12G48A SM12J48A	I			T2 (+) , Gate (+)	—	—	20	
		II			T2 (+) , Gate (—)	—	—	20	
		III			T2 (—) , Gate (—)	—	—	20	
		IV			T2 (—) , Gate (+)	—	—	—	
Peak On-State Voltage		V <sub>TM</sub>	I <sub>TM</sub> =17A		—	—	1.5	V	
Gate Non-Trigger Voltage		V <sub>GD</sub>	V <sub>D</sub> =Rated, T <sub>c</sub> =125°C		0.2	—	—	V	
Holding Current		I <sub>H</sub>	V <sub>D</sub> =12V, I <sub>TM</sub> =1A		—	—	50	mA	
Thermal Resistance		R <sub>th</sub> (j-c)	Junction to Case, AC		—	—	2.4	°C / W	
Critical Rate of Rise of Off-State Voltage	(U)SM12G48 (U)SM12J48	dv / dt	V <sub>DRM</sub> =Rated, T <sub>j</sub> =125°C Exponential Rise	—	300	—	V / μs		
	(U)SM12G48A (U)SM12J48A			—	200	—			
Critical Rate of Rise of Off-State Voltage at Commutation	(U)SM12G48 (U)SM12J48	(dv / dt) c	V <sub>DRM</sub> =400V, T <sub>j</sub> =125°C (di / dt) c=–6.5A / ms	10	—	—	V / μs		
	(U)SM12G48A (U)SM12J48A			4	—	—			





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