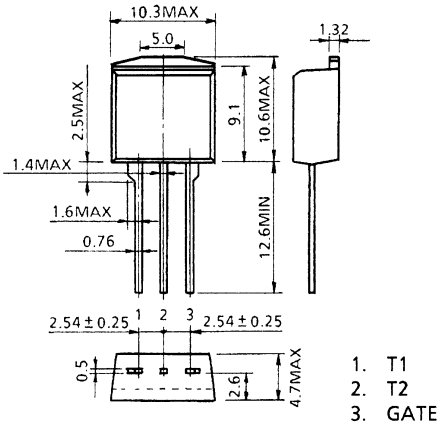
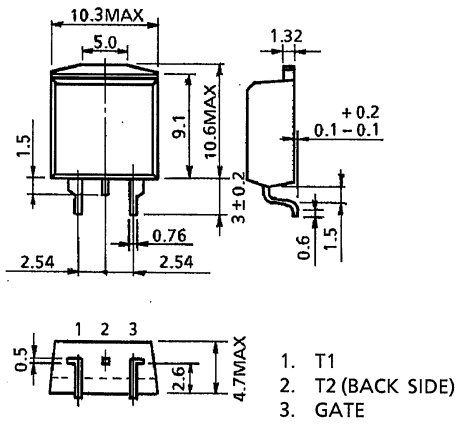
TOSHIBA BI-DIRECTIONAL TRIODE THYRISTOR SILICON PLANAR TYPE

SM16G48, USM16G48, SM16J48, USM16J48
SM16G48A, USM16G48A, SM16J48A, USM16J48A

AC POWER CONTROL APPLICATIONS

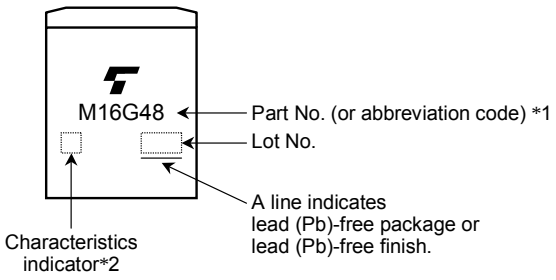
- Repetitive Peak Off-State Voltage :V_{DRM}=400V, 600V
- R.M.S On-State Current :$I_{T\ (RMS)}$=16A
- Gate Trigger Current :I_{GT}=30mA Max.
  :I_{GT}=20mA Max. ("A"Type)

Unit in mm

SM16G48, SM16J48, SM16G48A, SM16J48A	USM16G48, USM16J48, USM16G48A, USM16J48A
	
JEDEC —	JEDEC —
JEITA —	JEITA —
TOSHIBA 13-10J1A	TOSHIBA 13-10J2A

Weight : 1.7g

MARKING



	Part No. (or abbreviation code)	Part No.
*1	M16G48	SM16G48, SM16G48A
		USM16G48, USM16G48A
	M16J48	SM16J48, SM16J48A
		USM16J48, USM16J48A
*2	Nothing	SM16G48, SM16J48
		USM16G48, USM16J48
	A	SM16G48A, SM16J48A
		USM16J48, USM16J48A

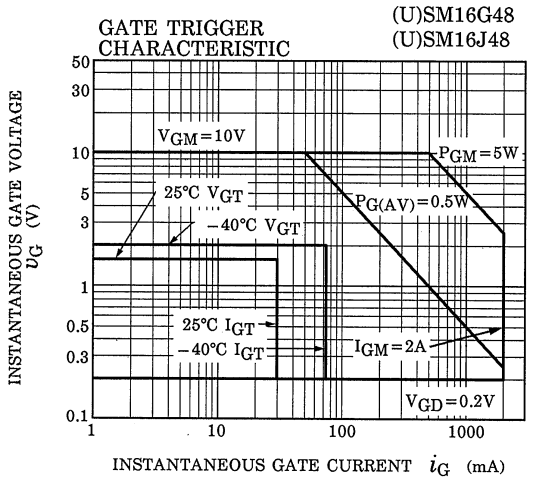
MAXIMUM RATINGS (Ta=25°C)

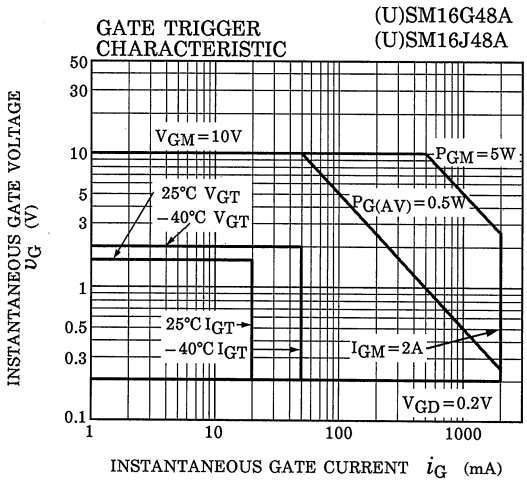
CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	(U)SM12G48 (U)SM12G48A	V_{DRM}	400	V
	(U)SM12J48 (U)SM12J48A		600	
R.M.S On-State Current		$I_{T\ (RMS)}$	16	A
Peak One Cycle Surge On-State Current (Non-Repetitive)		I_{TSM}	150 (50Hz)	A
			165 (60Hz)	
I^2t Limit Value		I^2t	112.5	A^2s
Critical Rate of Rise of On-State Current (Note 1)		di /dt	50	A / μs
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	°C
Storage Temperature Range		T_{stg}	−40~125	°C

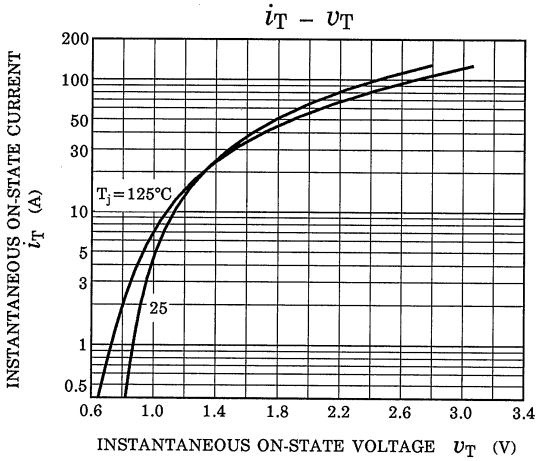
Note 1 : V_{DRM}=0.5×Rated
I_{TM}≤25A
t_{gw}≥10μs
t_{gr}≤250ns
i_{gp}=I_{GT}×2.0

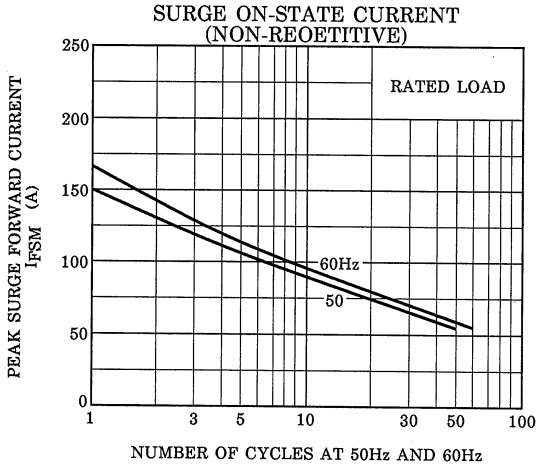
ELECTRICAL CHARACTERISTICS (Ta=25°C)

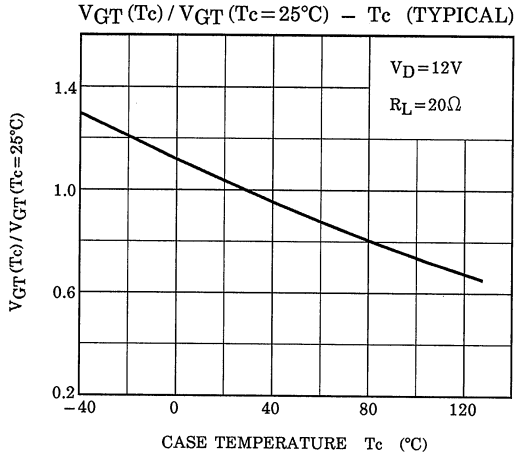
CHARACTERISTIC			SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current			I_{DRM}	V_{DRM}=Rated		—	—	20	μA
Gate Trigger Voltage		I	V_{GT}	V_D=12V R_L=20Ω	T2 (+) , Gate (+)	—	—	1.5	V
		II			T2 (+) , Gate (−)	—	—	1.5	
		III			T2 (−) , Gate (−)	—	—	1.5	
		IV			T2 (−) , Gate (+)	—	—	—	
Gate Trigger Current	(U)SM16G48 (U)SM16J48	I	I_{GT}	V_D=12V R_L=20Ω	T2 (+) , Gate (+)	—	—	30	mA
		II			T2 (+) , Gate (−)	—	—	30	
		III			T2 (−) , Gate (−)	—	—	30	
		IV			T2 (−) , Gate (+)	—	50	—	
	(U)SM16G48A (U)SM16J48A	I			T2 (+) , Gate (+)	—	—	20	
		II			T2 (+) , Gate (−)	—	—	20	
		III			T2 (−) , Gate (−)	—	—	20	
		IV			T2 (−) , Gate (+)	—	—	—	
Peak On-State Voltage			V_{TM}	I_{TM}=17A		—	—	1.5	—
Gate Non-Trigger Voltage			V_{GD}	V_D=Rated, Tc=125°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		—	—	2.0	°C / W
Critical Rate of Rise of Off-State Voltage	(U)SM16G48 (U)SM16J48		dv / dt	V_{DRM}=Rated, T_j=125°C Exponential Rise		—	300	—	V / μs
	(U)SM16G48A (U)SM16J48A					—	200	—	
Critical Rate of Rise of Off-State Voltage at Commutation	(U)SM16G48 (U)SM16J48		(dv / dt) c	V_{DRM}=400V, T_j=125°C (di / dt) c=−8.7A / ms		10	—	—	V / μs
	(U)SM16G48A (U)SM16J48A					4	—	—	

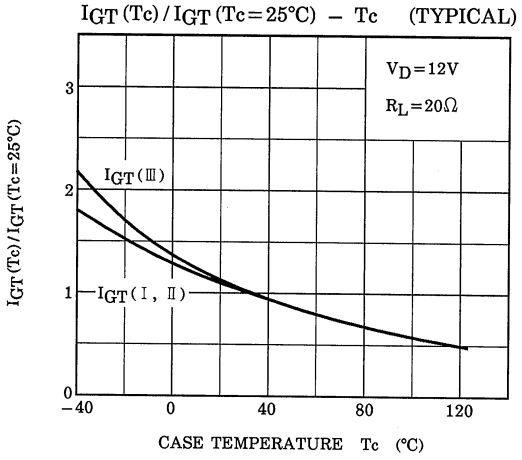

GATE TRIGGER CHARACTERISTIC
(U)SM16G48
(U)SM16J48
INSTANTANEOUS GATE VOLTAGE v_G (V)
V_{GM}=10V
P_{GM}=5W
25°C V_{GT}
−40°C V_{GT}
$P_{G(AV)}$=0.5W
25°C I_{GT}
−40°C I_{GT}
I_{GM}=2A
V_{GD}=0.2V
INSTANTANEOUS GATE CURRENT i_G (mA)


GATE TRIGGER CHARACTERISTIC
(U)SM16G48A
(U)SM16J48A
INSTANTANEOUS GATE VOLTAGE v_G (V)
V_{GM}=10V
P_{GM}=5W
25°C V_{GT}
−40°C V_{GT}
$P_{G(AV)}$=0.5W
25°C I_{GT}
−40°C I_{GT}
I_{GM}=2A
V_{GD}=0.2V
INSTANTANEOUS GATE CURRENT i_G (mA)

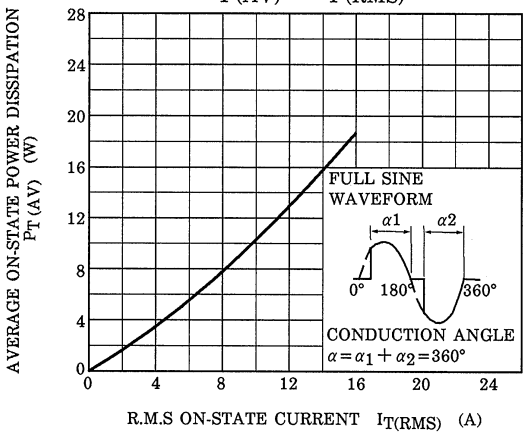

$i_T - v_T$
INSTANTANEOUS ON-STATE CURRENT i_T (A)
T_j=125°C
25
INSTANTANEOUS ON-STATE VOLTAGE v_T (V)


SURGE ON-STATE CURRENT (NON-REOETITIVE)
RATED LOAD
PEAK SURGE FORWARD CURRENT I_{FSM} (A)
60Hz
50
NUMBER OF CYCLES AT 50Hz AND 60Hz

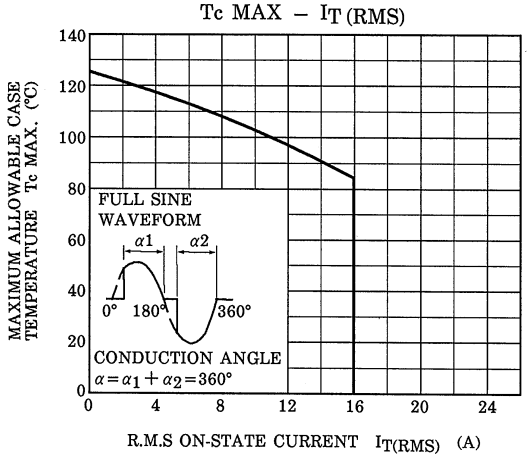

V_{GT} (Tc) / V_{GT} (Tc=25°C) − Tc (TYPICAL)
V_D=12V
R_L=20Ω
V_{GT} (Tc) / V_{GT} (Tc=25°C)
CASE TEMPERATURE Tc (°C)


I_{GT} (Tc) / I_{GT} (Tc=25°C) − Tc (TYPICAL)
V_D=12V
R_L=20Ω
I_{GT}(Ⅲ)
I_{GT}(Ⅰ, Ⅱ)
I_{GT} (Tc) / I_{GT} (Tc=25°C)
CASE TEMPERATURE Tc (°C)

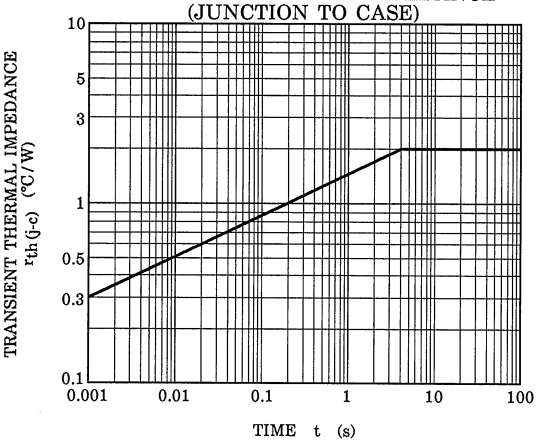
$P_{T\,(AV)}$ – $I_{T\,(RMS)}$



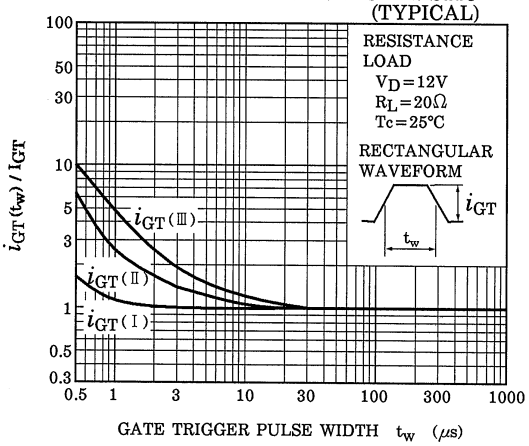
Tc MAX – $I_{T\,(RMS)}$



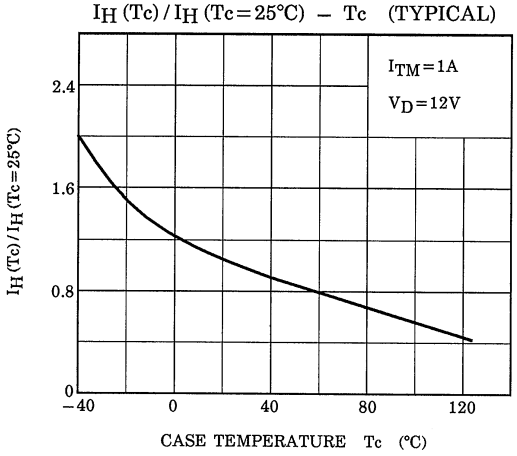
TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)



PULSE TRIGGER CHARACTERISTIC (TYPICAL)



I_H (Tc) / I_H (Tc = 25°C) – Tc (TYPICAL)



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