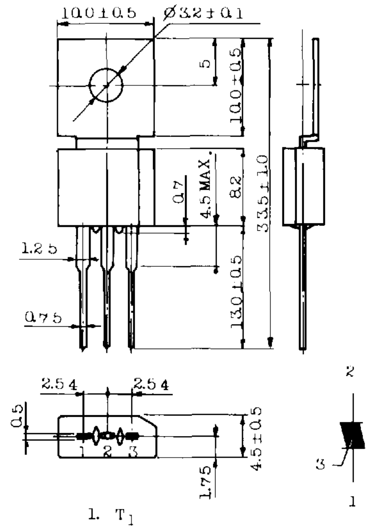
BI-DIRECTIONAL TRIODE THYRISTOR
SILICON PLANAR TYPE

SM2(B, D, G)41

AC POWER CONTROL APPLICATIONS.

Unit in mm



1. T_1
2. T_2 (HEAT SINK)
3. GATE

JEDEC	—
EIAJ	—
TOSHIBA	13-10A1B

Weight : 1.5g

- Repetitive Peak Off-State Voltage : V_{DRM}=100 ~ 400V
- R.M.S On-State Current : $I_{T(RMS)}$=2A
- Suitable for Heating Control, Motor Control, Dimmer and Switching Systems.

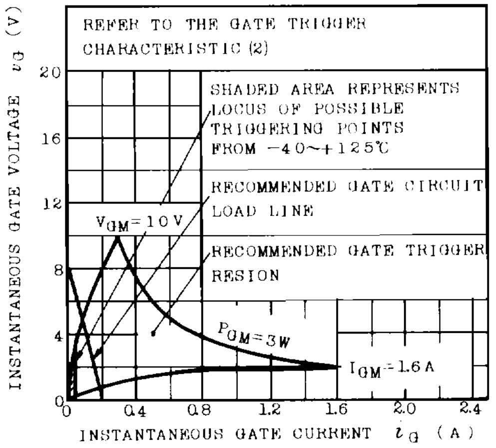
MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM2B41	V_{DRM}	100	V
	SM2D41		200	
	SM2G41		400	
R.M.S On-State Current (Full Sine Waveform Tc=85°C)		$I_{T(RMS)}$	2	A
Peak One Cycle Surge On-State Current (Non-Repetitive)		I_{TSM}	12(50Hz)	A
			13(60Hz)	
I^2t Limit Value (t=1 ~ 10ms)		I^2t	0.72	A^2s
Peak Gate Power Dissipation		P_{GM}	3	W
Average Gate Power Dissipation		$P_{G(AV)}$	0.3	W
Peak Gate Voltage		V_{GM}	10	V
Peak Gate Current		I_{GM}	1.6	A
Junction Temperature		T_j	-40 ~ 125	°C
Storage Temperature Range		T_{stg}	-40 ~ 125	°C

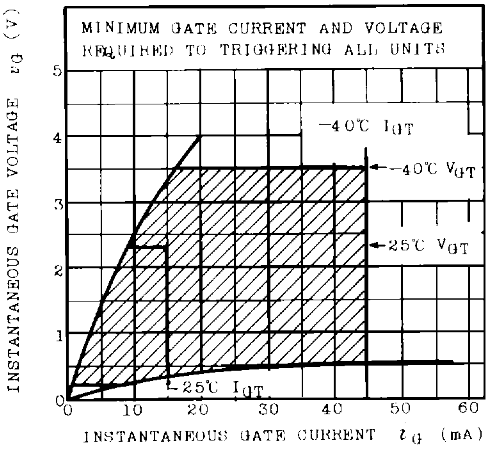
ELECTRICAL CHARACTERISTICS (Ta=25°C)

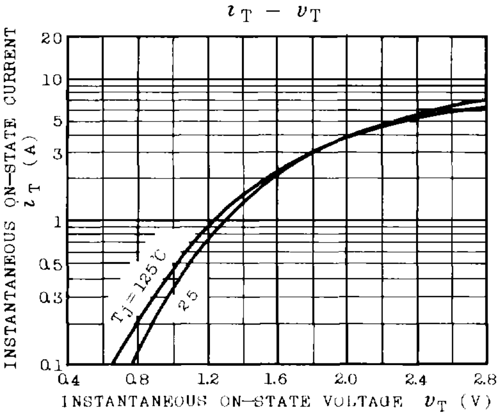
CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current		I_{DRM}	V_{DRM}=Rated, Tj=125°C		-	-	100	μA
Gate Trigger Voltage	I	V_{GT}	V_D=12V R_L=20Ω	T2(+), Gate(+)	-	-	2.3	V
	II			T2(+), Gate(-)	-	-	2.3	
	III			T2(-), Gate(-)	-	-	2.3	
	IV			T2(-), Gate(+)	-	1.8	-	
Gate Trigger Current	I	I_{GT}		T2(+), Gate(+)	-	-	15	mA
	II			T2(+), Gate(-)	-	-	15	
	III			T2(-), Gate(-)	-	-	15	
	IV			T2(-), Gate(+)	-	15	-	
Peak On-State Voltage		V_{TM}	I_{TM}=6A		-	-	2.6	V
Gate Non-Trigger Voltage		V_{GD}	V_D=Rated, Tc=125°C		0.2	-	-	V
Holding Current		I_H	R_L=100Ω		-	-	25	mA
Thermal Resistance		Rth(j-c)	Junction to Case, AC		-	-	12	°C/W

GATE TRIGGER CHARACTERISTIC (1)

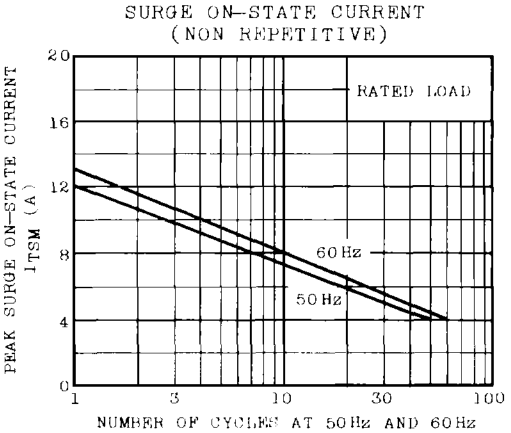


GATE TRIGGER CHARACTERISTIC (2)

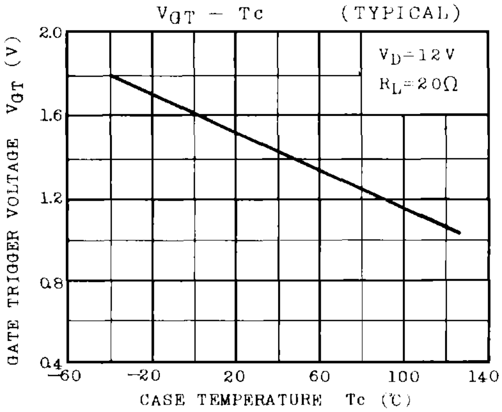




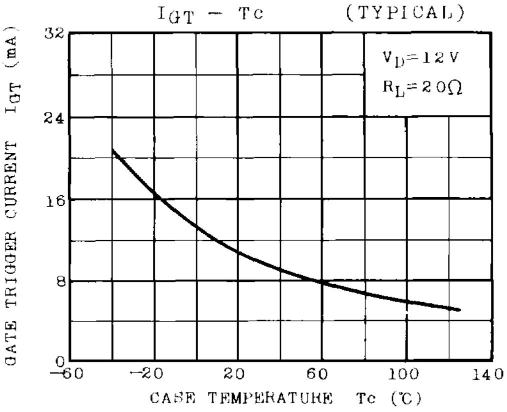
$i_T - v_T$
INSTANTANEOUS ON-STATE CURRENT i_T (A)
20
10
5
3
1
0.5
0.3
0.1
0.4
0.8
1.2
1.6
2.0
2.4
2.8
$T_J = 125°C$
25
INSTANTANEOUS ON-STATE VOLTAGE v_T (V)



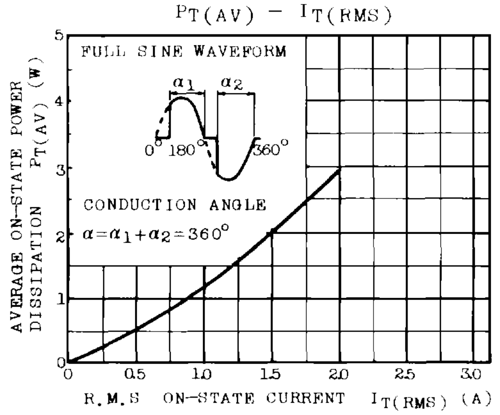
SURGE ON-STATE CURRENT
(NON REPETITIVE)
PEAK SURGE ON-STATE CURRENT I_{TSM} (A)
20
16
12
8
4
0
RATED LOAD
60 Hz
50 Hz
1
3
10
30
100
NUMBER OF CYCLES AT 50 Hz AND 60 Hz



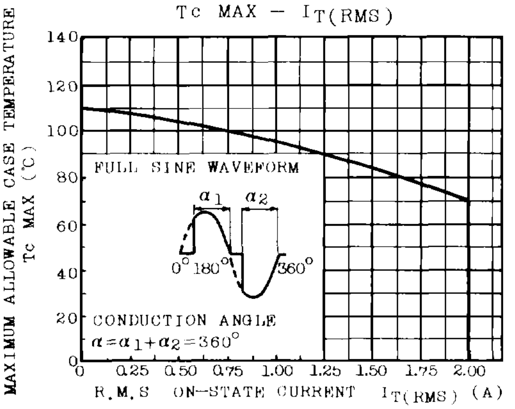
$V_{GT} - Tc$
(TYPICAL)
GATE TRIGGER VOLTAGE V_{GT} (V)
2.0
1.6
1.2
0.8
0.4
$V_D = 12 V$
$R_L = 20 \Omega$
−60
−20
20
60
100
140
CASE TEMPERATURE Tc (°C)



$I_{GT} - Tc$
(TYPICAL)
GATE TRIGGER CURRENT I_{GT} (mA)
32
24
16
8
0
$V_D = 12 V$
$R_L = 20 \Omega$
−60
−20
20
60
100
140
CASE TEMPERATURE Tc (°C)

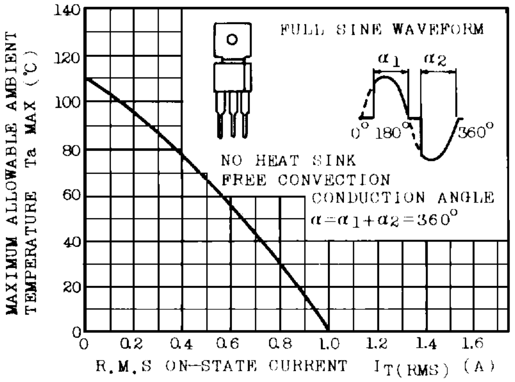


$P_{T(AV)} - I_{T(RMS)}$
AVERAGE ON-STATE POWER DISSIPATION $P_{T(AV)}$ (W)
5
4
3
2
1
0
FULL SINE WAVEFORM
α_1
α_2
0°
180°
360°
CONDUCTION ANGLE
$\alpha = \alpha_1 + \alpha_2 = 360°$
0
0.5
1.0
1.5
2.0
2.5
3.0
R.M.S ON-STATE CURRENT $I_{T(RMS)}$ (A)

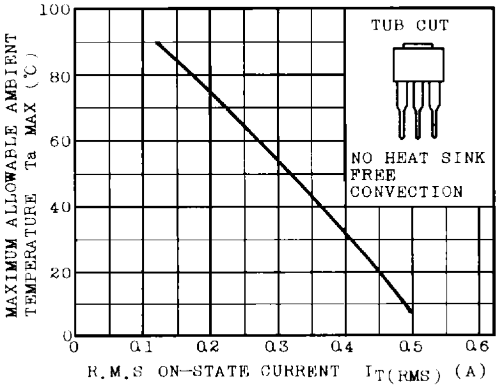


Tc MAX − $I_{T(RMS)}$
MAXIMUM ALLOWABLE CASE TEMPERATURE Tc MAX (°C)
140
120
100
80
60
40
20
0
FULL SINE WAVEFORM
α_1
α_2
0°
180°
360°
CONDUCTION ANGLE
$\alpha = \alpha_1 + \alpha_2 = 360°$
0
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
R.M.S ON-STATE CURRENT $I_{T(RMS)}$ (A)

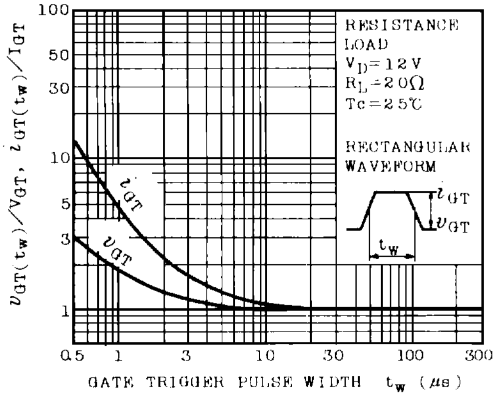
Ta MAX — $I_{T(RMS)}$



Ta MAX — $I_{T(RMS)}$



PULSE TRIGGER CHARACTERISTIC
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE
(JUNCTION TO CASE)