BI-DIRECTIONAL TRIODE THYRISTOR
SILICON PLANAR TYPE

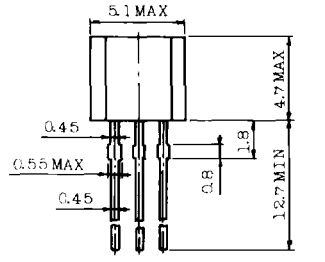
SM1(D, G)43

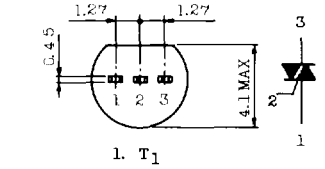
AC POWER CONTROL APPLICATIONS.

FEATURES:

. Repetitive Peak Off-State Voltage : V_{DRM}=200, 400V
. R.M.S On-State Current : $I_{T(RMS)}$=1A
. High Sensitivity Type
. High Commutating (dv/dt)

Unit in mm





1. T_1
2. GATE
3. T_2

JEDEC	TO-92
EIAJ	SC-43
TOSHIBA	13-5A1E

Weight : 0.2g

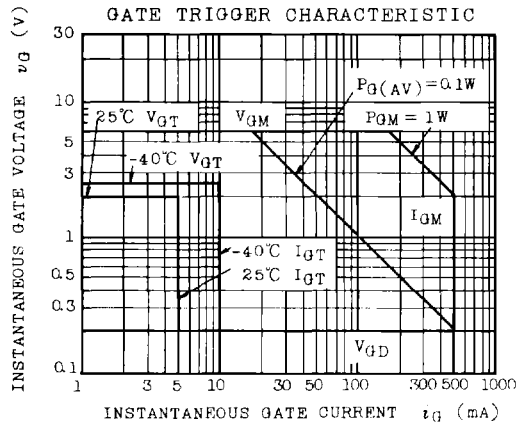
MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage	SM1D43	V_{DRM}	200	V
	SM1G43		400	
R.M.S On-State Current (Full Sine Waveform Tc=74°C)		$I_{T(RMS)}$	1.0	A
Peak One Cycle Surge On-State Current (Non-Repetitive)		I_{TSM}	8(50Hz)	A
			8.8(60Hz)	
I^2t Limit Value (t=1~10ms)		I^2t	0.32	A^2s
Peak Gate Power Dissipation		P_{GM}	1	W
Average Gate Power Dissipation		$P_{G(AV)}$	0.1	W
Peak Gate Voltage		V_{GM}	6	V
Peak Gate Current		I_{GM}	0.5	A
Junction Temperature		T_j	-40~125	°C
Storage Temperature Range		T_{stg}	-40~125	°C

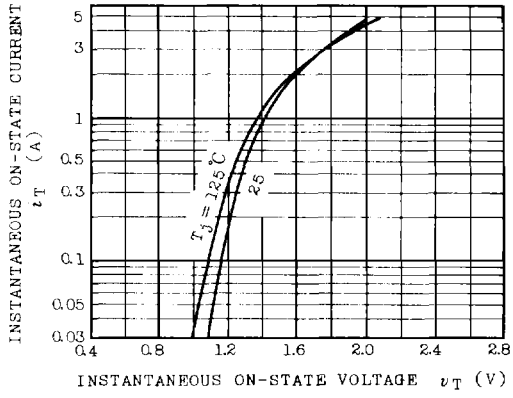
ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Repetitive Peak Off-State Current		I_{DRM}	V_{DRM}=Rated V_{DRM}		-	-	10	μA
Gate Trigger Votlage	I	V_{GT}	V_D=12V R_L=20Ω	T2(+), Gate(+)	-	-	2	V
	II			T2(+), Gate(-)	-	-	2	
	III			T2(-), Gate(-)	-	-	2	
	IV			T2(-), Gate(+)	-	2	-	
Gate Trigger Current	I	I_{GT}		T2(+), Gate(+)	-	-	5	mA
	II			T2(+), Gate(-)	-	-	5	
	III			T2(-), Gate(-)	-	-	5	
	IV			Ta(-), Gate(+)	-	10	-	
Peak On-State Voltage		V_{TM}	I_{TM}=1.5A		-	-	1.5	V
Gate Non-Trigger Voltage		V_{GD}	V_D=Rated V_{DRM}, Tc=125°C		0.2	-	-	V
Holding Current		I_H	V_D=12V, Gate open		-	-	10	mA
Critical Rate of Rise of Off-State Voltage		dv/dt	V_D=Rated V_{DRM}, Tj=125°C Exponential Rise		10	-	-	V/μs
Critical Rate of Rise of Off-State Voltage at Commutation		(dv/dt)c	V_D=Rated V_{DRM}, Tj=125°C (di/dt)c=-0.5A/ms		3	-	-	V/μs
Thermal Resistance		$R_{th(j-c)}$	Junction to Case		-	-	40	°C/W
Thermal Resistance		$R_{th(j-a)}$	Junction to Ambient		-	-	180	°C/W

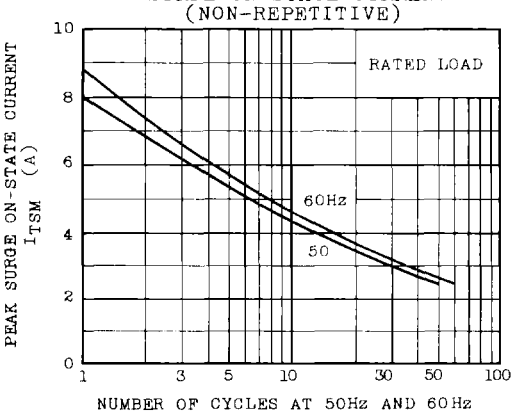
GATE TRIGGER CHARACTERISTIC



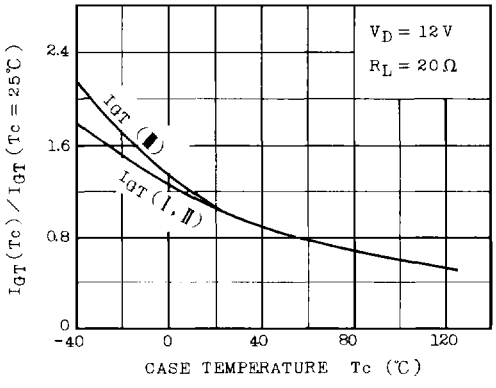
$i_T - v_T$



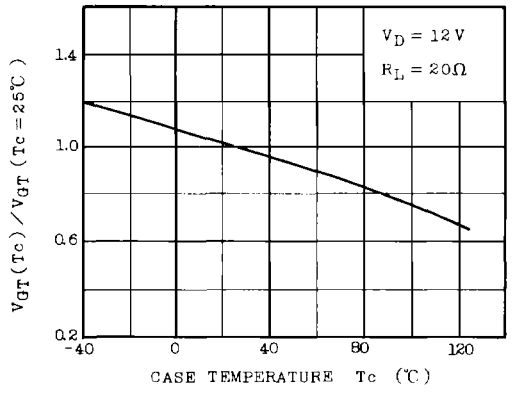
SURGE ON-STATE CURRENT (NON-REPETITIVE)



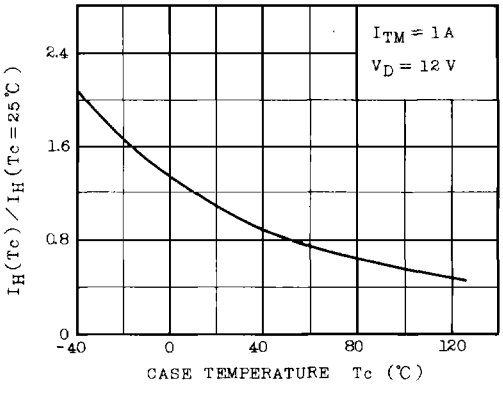
$I_{GT}(Tc)/I_{GT}(Tc=25℃) - Tc$ (TYPICAL)

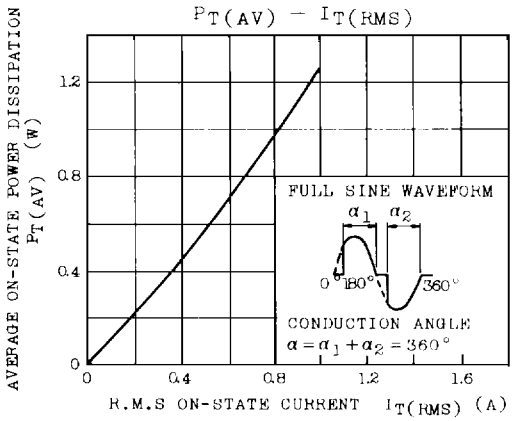


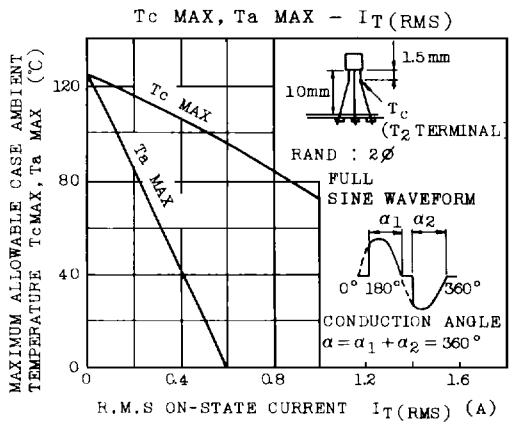
$V_{GT}(Tc)/V_{GT}(Tc=25℃) - Tc$ (TYPICAL)

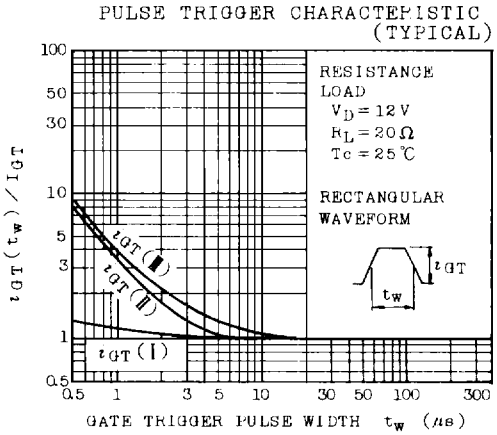


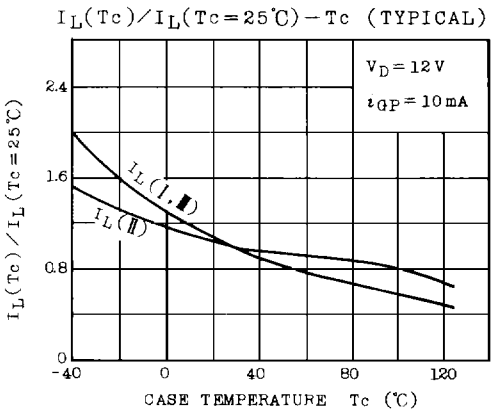
$I_H(Tc)/I_H(Tc=25℃) - Tc$ (TYPICAL)

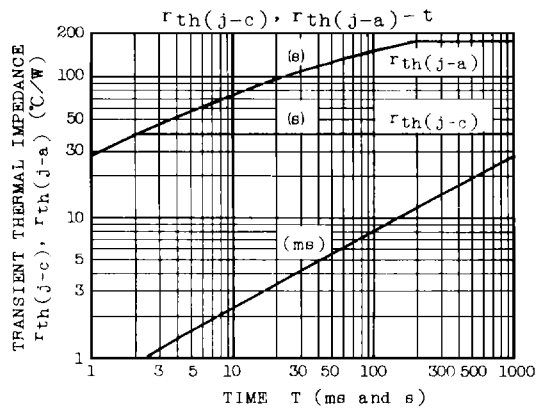



$P_{T(AV)} - I_{T(RMS)}$
AVERAGE ON-STATE POWER DISSIPATION $P_{T(AV)}$ (W)
FULL SINE WAVEFORM
α_1 α_2
0° 180° 360°
CONDUCTION ANGLE
$\alpha = \alpha_1 + \alpha_2 = 360°$
R.M.S ON-STATE CURRENT $I_{T(RMS)}$ (A)


Tc MAX, Ta MAX - $I_{T(RMS)}$
MAXIMUM ALLOWABLE CASE AMBIENT TEMPERATURE TcMAX, Ta MAX (℃)
Tc MAX
Ta MAX
1.5mm
10mm
T_c
(T_2 TERMINAL)
RAND : 2Ø
FULL SINE WAVEFORM
α_1 α_2
0° 180° 360°
CONDUCTION ANGLE
$\alpha = \alpha_1 + \alpha_2 = 360°$
R.M.S ON-STATE CURRENT $I_{T(RMS)}$ (A)


PULSE TRIGGER CHARACTERISTIC (TYPICAL)
$t_{GT}(t_w) / I_{GT}$
RESISTANCE LOAD
$V_D = 12V$
$R_L = 20\Omega$
Tc = 25℃
RECTANGULAR WAVEFORM
t_{GT}
t_w
t_{GT} (Ⅰ)
t_{GT} (Ⅱ)
t_{GT} (Ⅲ)
GATE TRIGGER PULSE WIDTH t_w (μs)


$I_L(Tc) / I_L(Tc=25℃)$ - Tc (TYPICAL)
$I_L(Tc) / I_L(Tc=25℃)$
$V_D = 12V$
$I_{GP} = 10mA$
I_L (Ⅰ, Ⅲ)
I_L (Ⅱ)
CASE TEMPERATURE Tc (℃)


$r_{th(j-c)}$, $r_{th(j-a)}$ - t
TRANSIENT THERMAL IMPEDANCE $r_{th(j-c)}$, $r_{th(j-a)}$ (℃/W)
(s)
(s)
(ms)
$r_{th(j-a)}$
$r_{th(j-c)}$
TIME T (ms and s)