

5P4SM, 5P6SM, 5P4SMA, 5P6SMA

5 A MOLD ISOLATED THYRISTOR

DESCRIPTION

The 5P Γ SM and 5P Γ SMA are P gate all diffused mold type Thyristor granted 5 Amps On-state Average Current ($T_c = 94^\circ\text{C}$), with rated voltages up to 600 volts.

FEATURES

- Mold Isolated package.
- 80 A surge current.
- High Voltage. : $V_{DRM}, V_{RRM} = 400\text{ V}$ (5P4SM, 5P4SMA)
 $V_{DRM}, V_{RRM} = 600\text{ V}$ (5P6SM, 5P6SMA)

APPLICATIONS

- Motor speed control for household appliance.
- Temperature control for heater and constant temperature box.
- Constant voltage power source and battery charger.
- Automotive application such as regulator.
- Various solid state relay, etc.

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	5P4SM, 5P4SMA	5P6SM, 5P6SMA	UNIT	NOTE
Non-Repetitive Peak Reverse Voltage	V_{RSM}	500	700	V	
Non-Repetitive Peak Off-State Voltage	V_{DSM}	500	700	V	
Repetitive Peak Reverse Voltage	V_{RRM}	400	600	V	
Repetitive Peak Off-State Voltage	V_{DRM}	400	600	V	
Average On-State Current	$I_T(AV)$	5 ($T_c = 94^\circ\text{C}, \theta = 180^\circ$ Single phase half wave)		A	See Fig. 11
Surge On-State Current	I_{TSM}	80		A	See Fig. 2
Fusing Current	$\int i^2 dt$	28 ($1\text{ ms} \leq t \leq 10\text{ ms}$)		A ² s	
Peak Gate Power Dissipation	P_{GM}	5 ($f \geq 50\text{ Hz}, \text{Duty} \leq 10\%$)		W	See Fig. 3
Average Gate Power Dissipation	$P_{G(AV)}$	0.5		W	
Peak Gate Forward Current	I_{FGM}	2 ($f \geq 50\text{ Hz}, \text{Duty} \leq 10\%$)		A	
Peak Gate Reverse Voltage	V_{RGM}	10		V	
Junction Temperature	T_j	-40 to +125		$^\circ\text{C}$	
Storage Temperature	T_{stg}	-55 to +150		$^\circ\text{C}$	
Isolation Voltage	—	1500 (AC 1 min)		V_{RMS}	Only 5P Γ SM

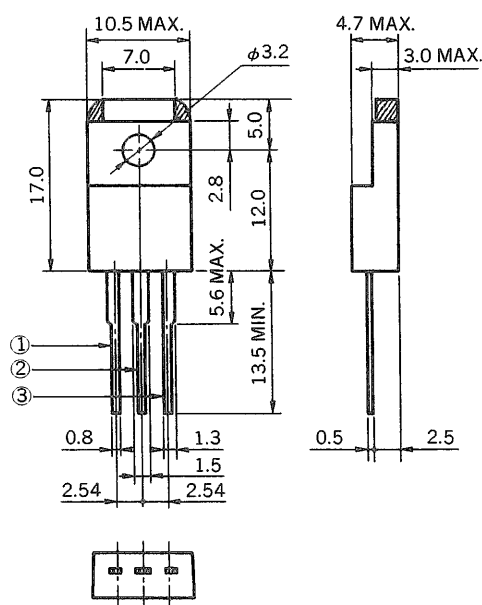
ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Repetitive Peak Reverse Current	I_{RRM}	$V_{RM} = V_{RRM}, T_j = 125^\circ\text{C}$	—	—	2	mA	
Repetitive Peak Off-State Current	I_{DRM}	$V_{DM} = V_{DRM}, T_j = 125^\circ\text{C}$	—	—	2	mA	
On-State Voltage	V_{TM}	$I_{TM} = 10\text{ A}$	—	—	1.4	V	See Fig. 1
Gate-Trigger Current	I_{GT}	$V_{DM} = 6\text{ V}, R_L = 100\ \Omega$	—	—	10	mA	See Fig. 4
Gate-Trigger Voltage	V_{GT}	$V_{DM} = 6\text{ V}, R_L = 100\ \Omega$	—	—	1.5	V	
Gate Non-Trigger Voltage	V_{GD}	$V_{DM} = \frac{1}{2} V_{DRM}, T_j = 125^\circ\text{C}$	0.2	—	—	V	
Critical Rate of Rise of Off-State Voltage	dv/dt	$V_{DM} = V_{DRM}, T_j = 125^\circ\text{C}$	—	40	—	V/ μs	
Holding Current	I_H	$V_D = 24\text{ V}$	—	6	—	mA	
Circuit Commuted Turn-Off Time	t_q	$I_{TM} = 5\text{ A}, V_R \geq 25\text{ V}$ $V_{DM} = \frac{2}{3} V_{DRM}, diR/dt = 15\text{ A}/\mu\text{s}$ $dv/dt = 10\text{ V}/\mu\text{s}, T_j = 125^\circ\text{C}$	—	50	—	μs	
Thermal Resistance	R_{th}	Junction to case	—	—	4.2	$^\circ\text{C}/\text{W}$	See Fig. 13

PACKAGE DIMENSIONS

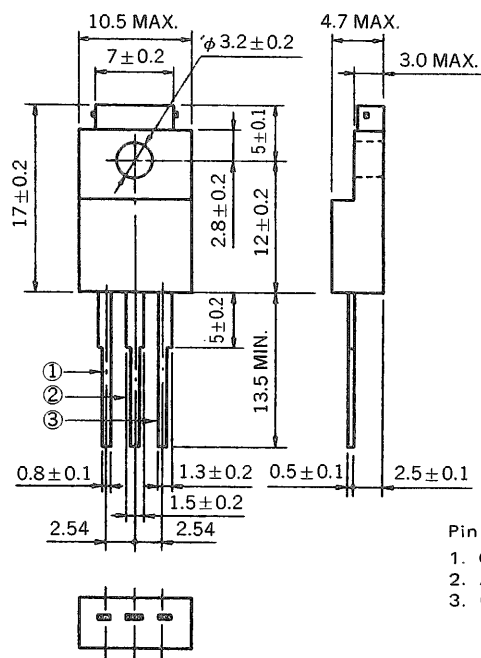
(Unit : mm)

5P4SM, 5P4SMA



Mold Coating

5P6SM, 5P6SMA



Pin Connection
 1. Cathode
 2. Anode
 3. Gate

CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

Fig. 1 $i_T - V_T$ CHARACTERISTICS

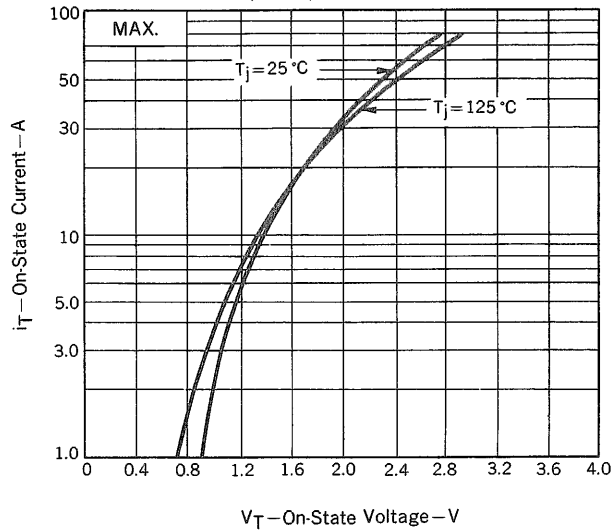


Fig. 2 I_{TSM} RATING

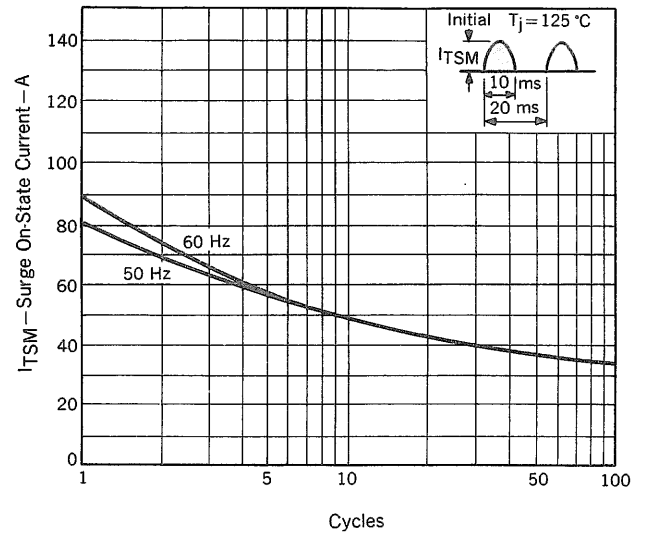


Fig. 3 $V_G - I_G$ RATING

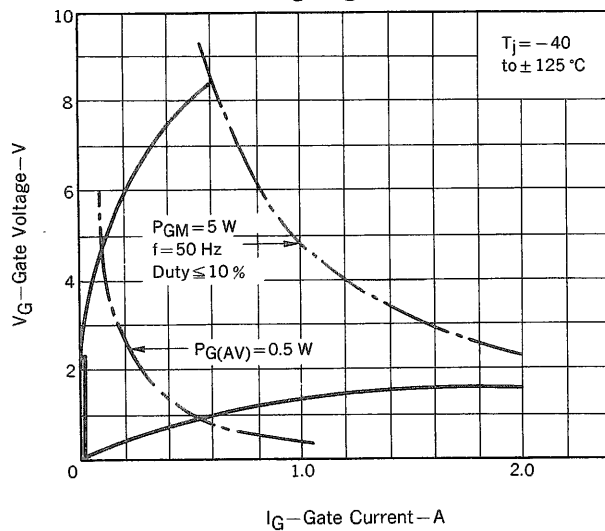


Fig. 4 $V_{GT} - I_{GT}$ CHARACTERISTIC

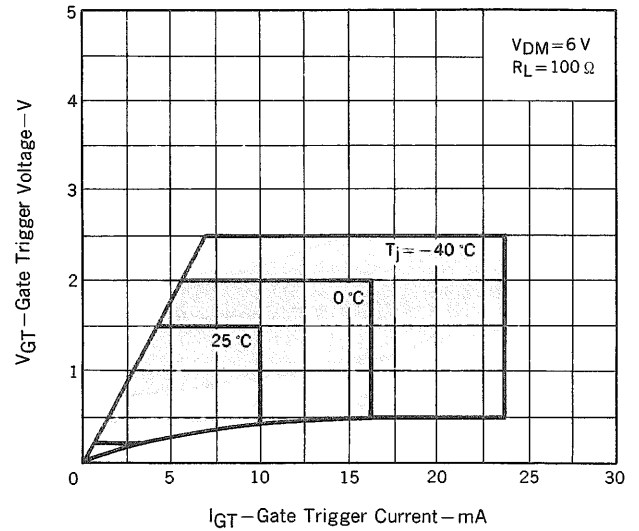


Fig. 5 $I_{GT} - T_a$ TYPICAL DISTRIBUTION

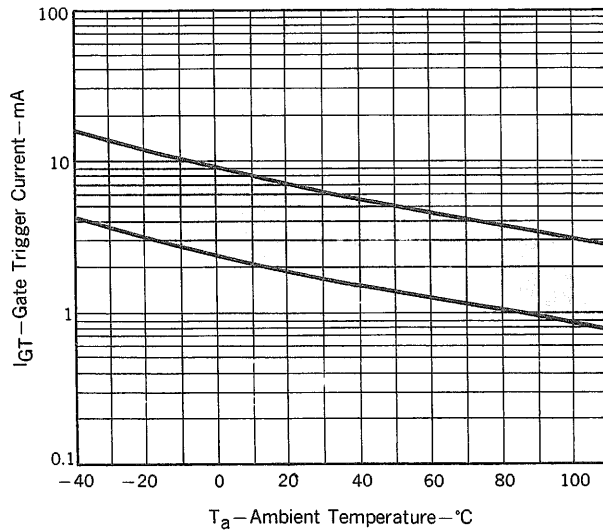


Fig. 6 $V_{GT} - T_a$ TYPICAL DISTRIBUTION

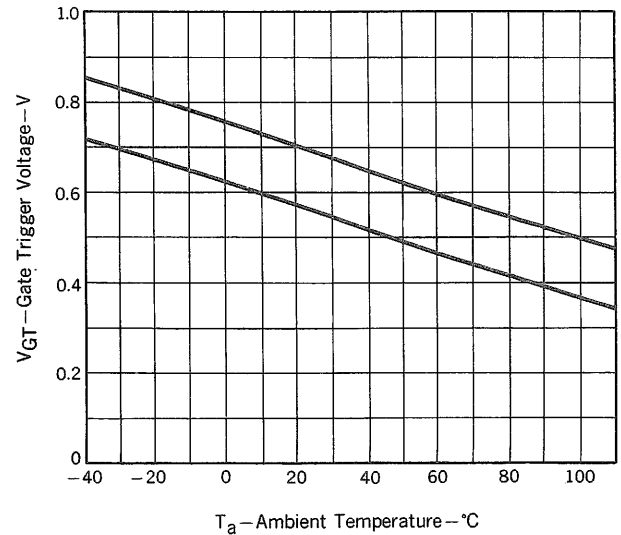


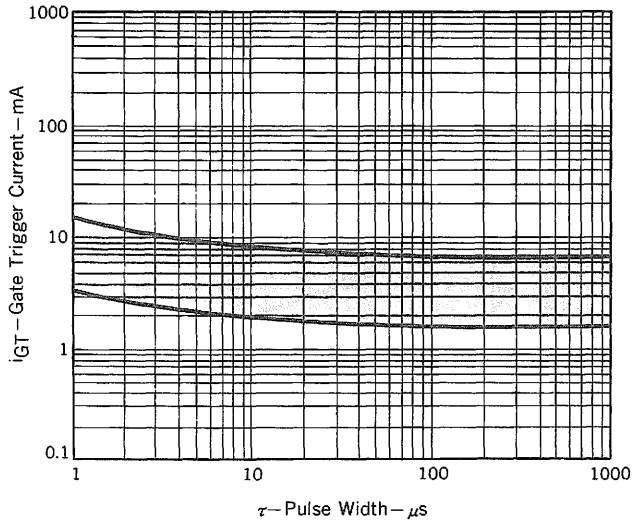
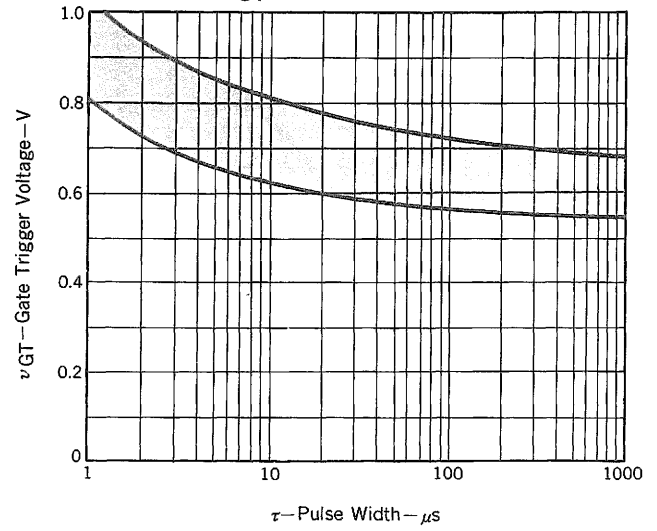
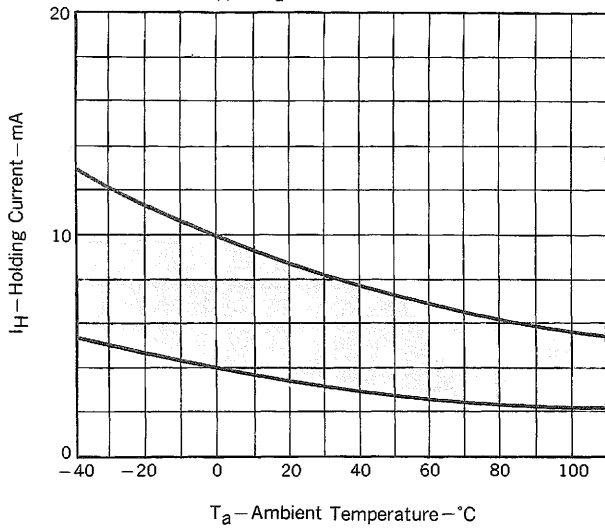
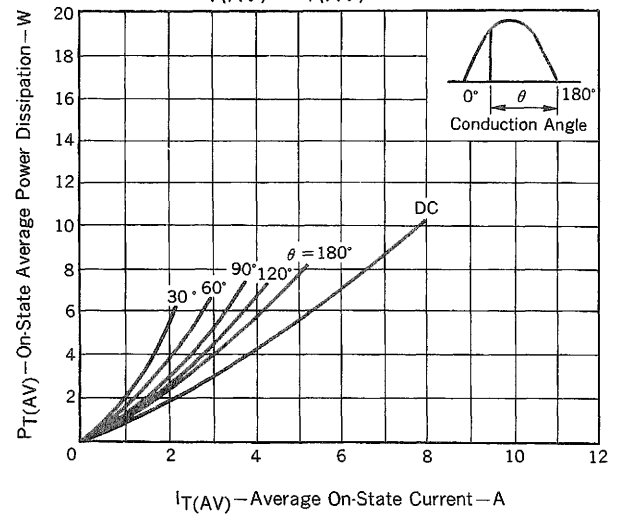
Fig. 7 $I_{GT} - \tau$ TYPICAL DISTRIBUTIONFig. 8 $V_{GT} - \tau$ TYPICAL DISTRIBUTIONFig. 9 $I_H - T_a$ TYPICAL DISTRIBUTIONFig. 10 $P_T(AV) - I_T(AV)$ CHARACTERISTIC

Fig. 11 $T_c - I_T(AV)$ RATING

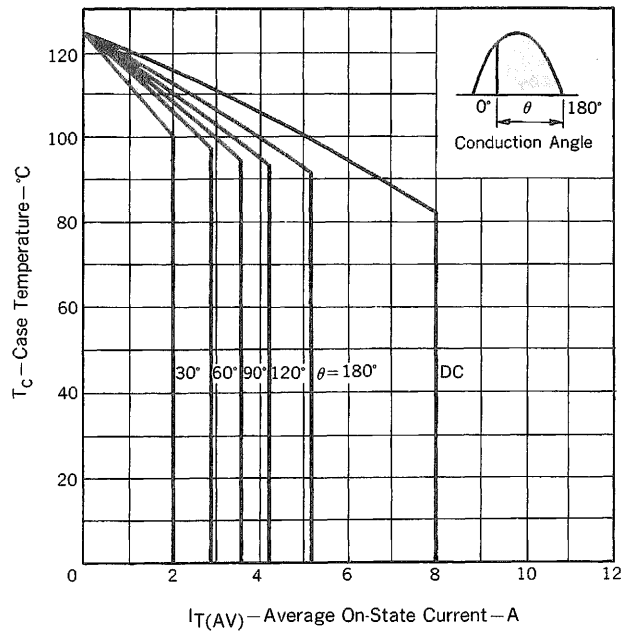


Fig. 12 $T_a - I_T(AV)$ RATING

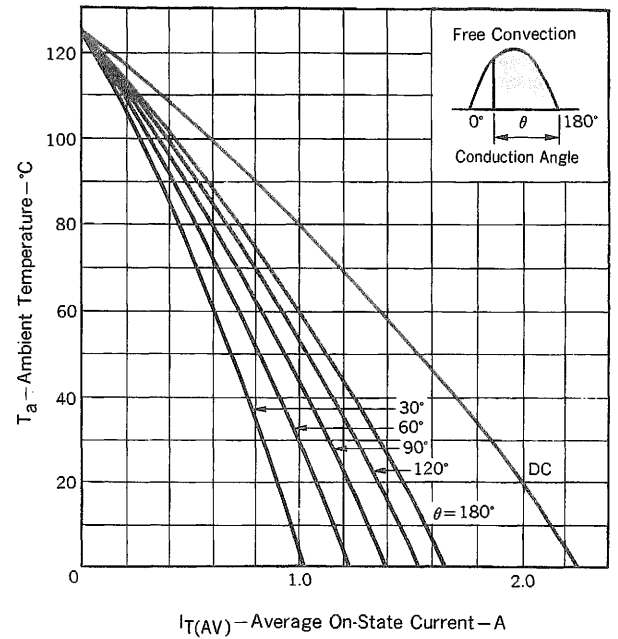
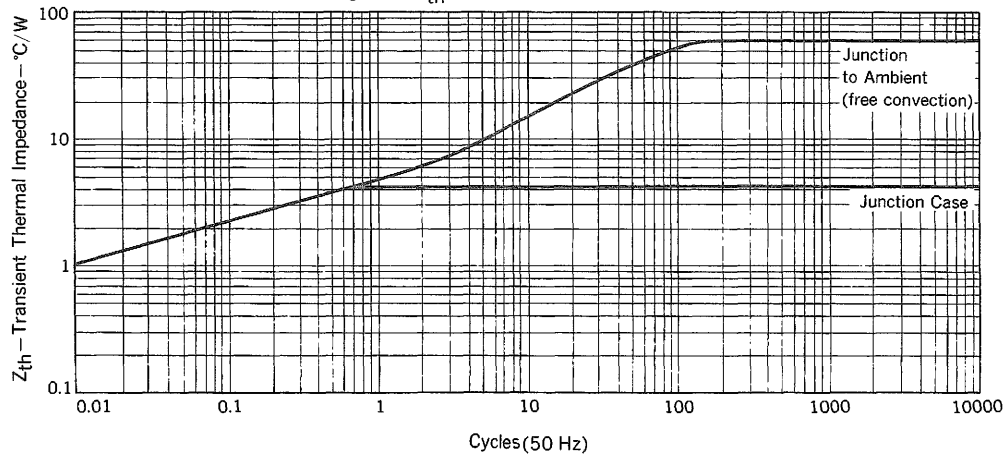


Fig. 13 Z_{th} CHARACTERISTIC



NOTICE FOR INSTALLATION

1. Electrode leads are not granted to be bent because of wet-proof. However it is required inevitably that a mechanical stress should not be put on mold case. Fix tightly between the mold case and the area to be formed or dent.
2. Electrode leads are not granted to be bent more than twice over 90° and avoid the bending within 1.5 mm from the neck of the mold case.
3. The surface of heat sink for thermal radiator is to be smooth without any foreign matter.
4. Suitable torque value is around 3kg-cm.