

THYRISTORS 5P4J, 5P6J

5 A SMALL MOLD THYRISTOR

DESCRIPTION

The 5P4J and 5P6J are P gate all diffused mold type Thyristor granted 5 Amps On-state Average Current ($T_c = 95^\circ\text{C}$), with rated voltages up to 600 volts.

FEATURES

- Small and Surface mount package.
- 65 A surge current.
- High Voltage. : $V_{\text{DRM}}, V_{\text{RRM}} = 400 \text{ V}$ (5P4J)
 $V_{\text{DRM}}, V_{\text{RRM}} = 600 \text{ V}$ (5P6J)

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

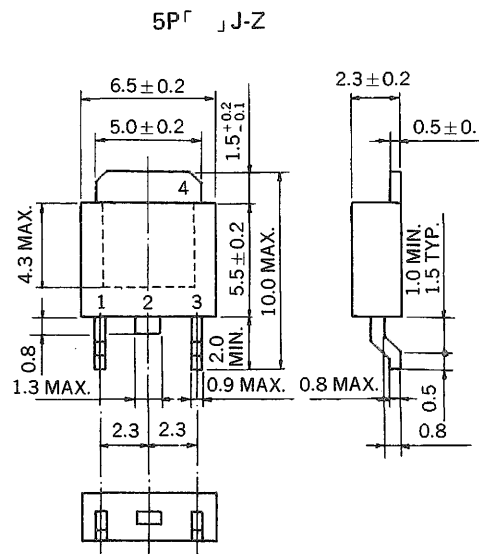
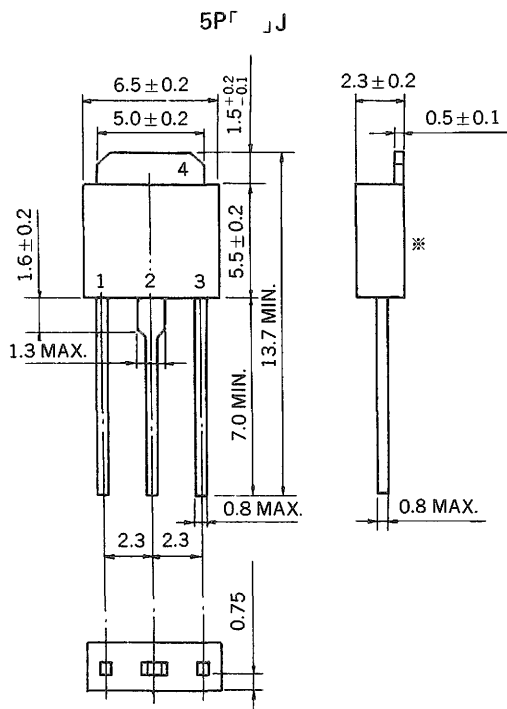
CHARACTERISTIC	SYMBOL	5P4J	5P6J	UNIT	NOTE
Non-Repetitive Peak Reverse Voltage	V_{RSM}	500	700	V	$R_{\text{GK}} = 1 \text{ k}\Omega$
Non-Repetitive Peak Off-State Voltage	V_{DSM}	500	700	V	$R_{\text{GK}} = 1 \text{ k}\Omega$
Repetitive Peak Reverse Voltage	V_{RRM}	400	600	V	$R_{\text{GK}} = 1 \text{ k}\Omega$
Repetitive Peak Off-State Voltage	V_{DRM}	400	600	V	$R_{\text{GK}} = 1 \text{ k}\Omega$
Average On-State Current	$I_{\text{T(AV)}}$	5 ($T_c = 95^\circ\text{C}, \theta = 180^\circ$ Single phase half wave)		A	See Fig. 11
Surge On-State Current	I_{TSM}	65 ($f = 50 \text{ Hz, ONE cycle}$)		A	See Fig. 2
Fusing Current	$\int i_{\text{T}}^2 dt$	20 ($1 \text{ ms} \leq t \leq 10 \text{ ms}$)		A^2s	
Peak Gate Power Dissipation	P_{GM}	2 ($f \geq 50 \text{ Hz, Duty} \leq 10 \%$)		W	See Fig. 3
Average Gate Power Dissipation	$P_{\text{G(AV)}}$	0.2		W	
Peak Gate Forward Current	I_{FGM}	1 ($f \geq 50 \text{ Hz, Duty} \leq 10 \%$)		A	
Peak Gate Reverse Voltage	V_{RGM}	6		V	
Junction Temperature	T_j	-40 to +125		$^\circ\text{C}$	
Storage Temperature	T_{stg}	-55 to +150		$^\circ\text{C}$	

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$, $R_{GK} = 1\text{ k}\Omega$)

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}	$I_{TM} = 10\text{ A}$	—	—	1.6	V	See Fig. 1
Gate-Trigger Current	I_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	—	—	200	μA	See Fig. 4
Gate-Trigger Voltage	V_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	—	—	0.8	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	$V_{DM} = \frac{2}{3} V_{DRM}$, $T_j = 125^\circ\text{C}$	—	3	—	V/ μs	
Holding Current	I_H	$V_D = 24\text{ V}$	—	1	—	mA	
Circuit Commuted Turn-Off Time	t_q	$I_{TM} = 3\text{ A}$, $V_R \geq 25\text{ V}$ $V_{DM} = \frac{2}{3} V_{DRM}$, $di_R/dt = 15\text{ A}/\mu\text{s}$ $dv/dt = 3\text{ V}/\mu\text{s}$, $T_j = 125^\circ\text{C}$	—	80	—	μs	
Thermal Resistance	$R_{th(j-c)}$	Junction to case	—	—	3	$^\circ\text{C}/\text{W}$	See Fig. 13
	$R_{th(j-a)}^*$	Junction to Ambient	—	—	60	$^\circ\text{C}/\text{W}$	

* Mounted on ceramic substrate of $7.5\text{ cm}^2 \times 0.7\text{ mm}$

PACKAGE DIMENSIONS (Unit : mm)



Pin Connection

1. Cathode
2. Anode
3. Gate

※ Measure point of Case Temperature.

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

Fig. 1 $i_T - V_T$ CHARACTERISTICS

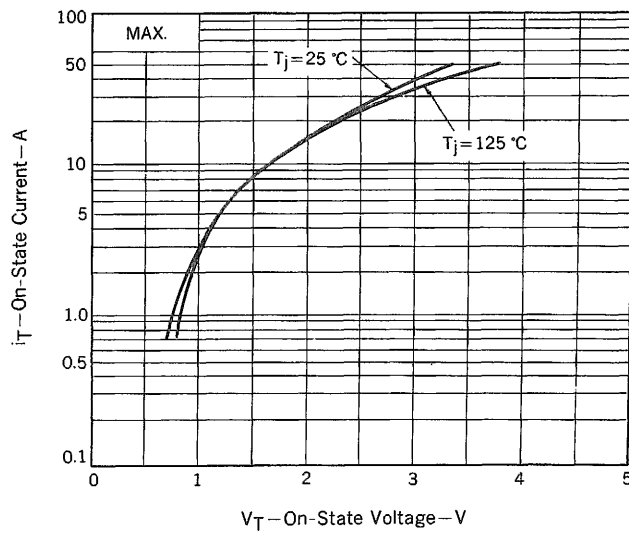


Fig. 2 I_{TSM} RATING

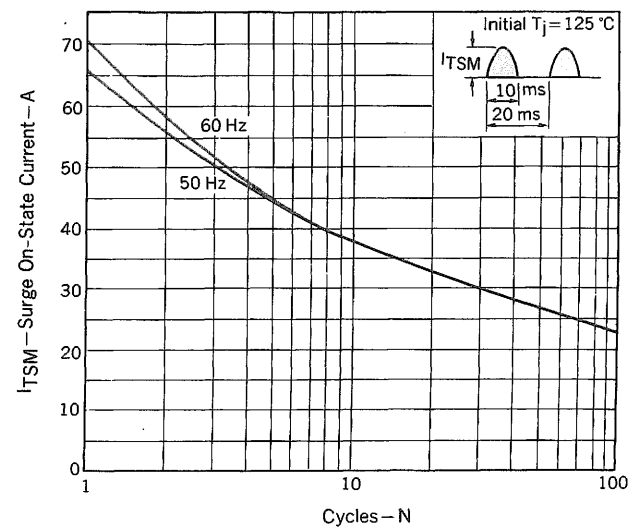


Fig. 3 $V_G - I_G$ RATING

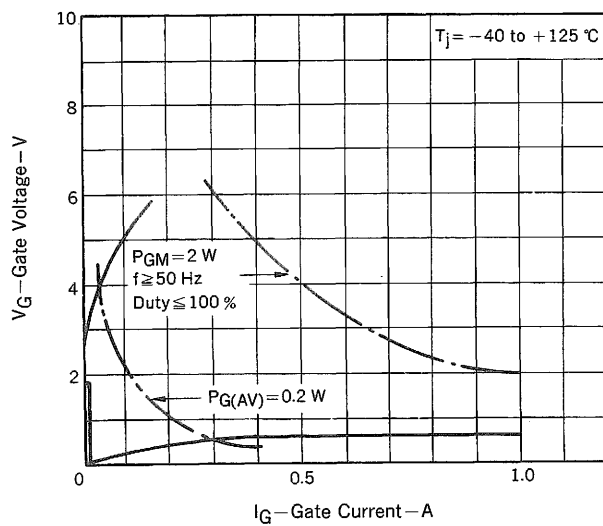


Fig. 4 $V_{GT} - I_{GT}$ CHARACTERISTIC

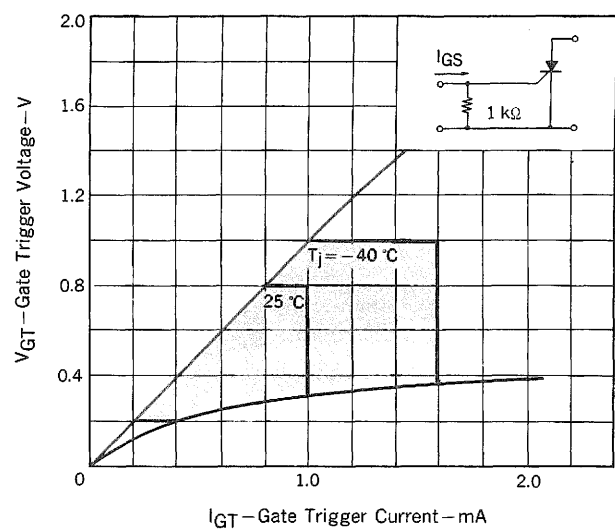


Fig. 5 $I_{GT} - T_a$ TYPICAL DISTRIBUTION

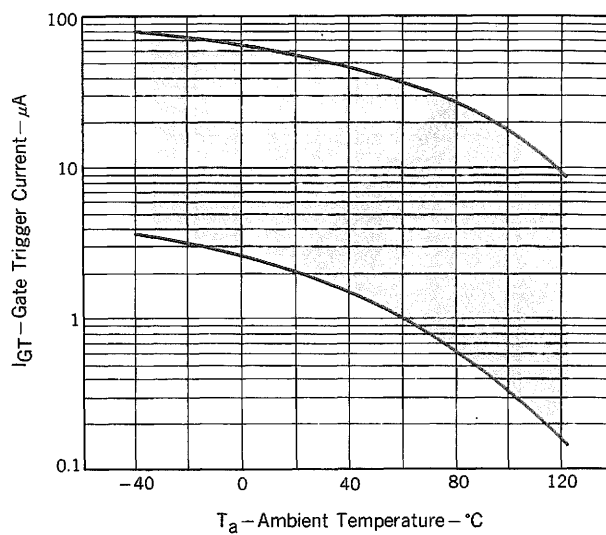


Fig. 6 $V_{GT} - T_a$ TYPICAL DISTRIBUTION

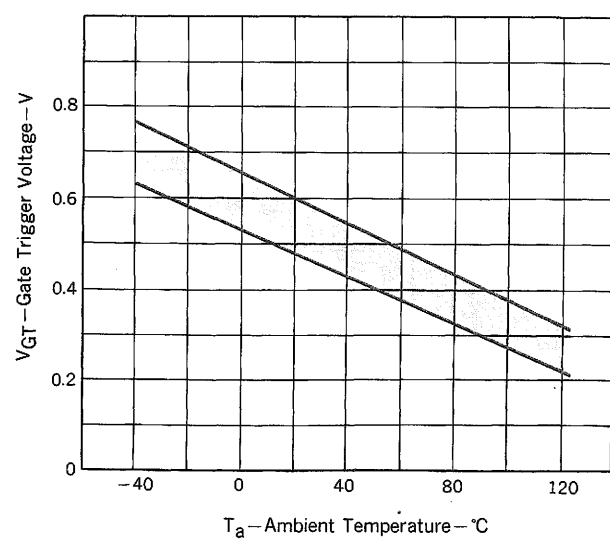


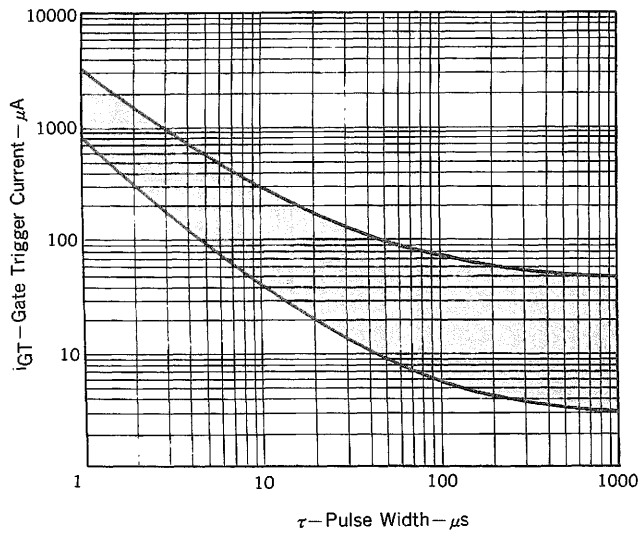
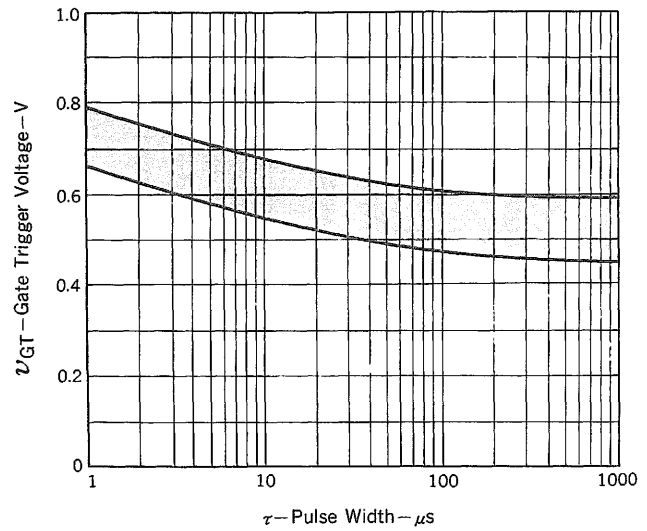
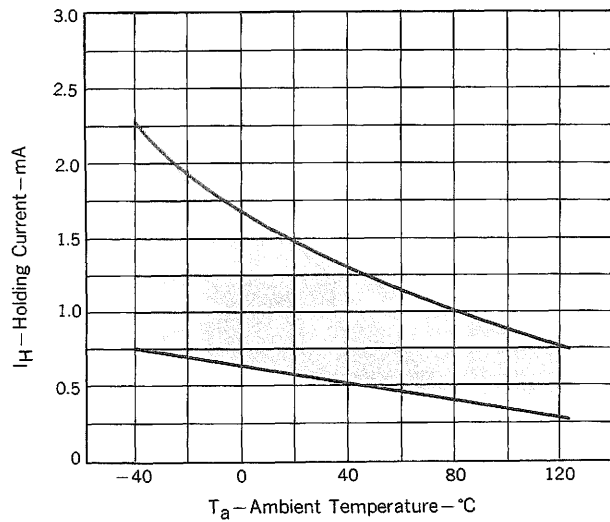
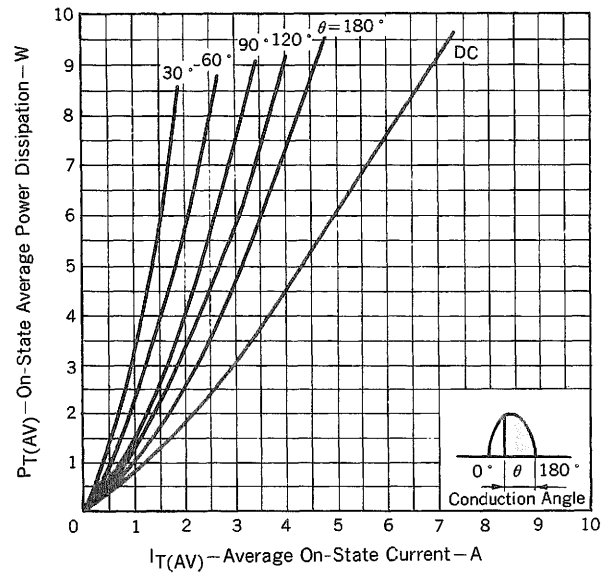
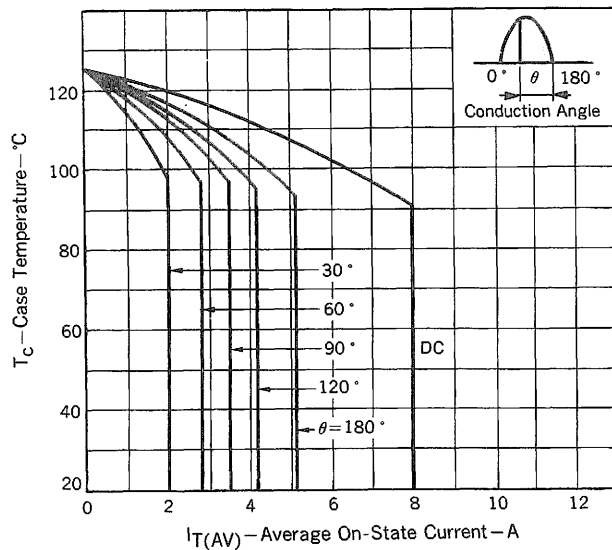
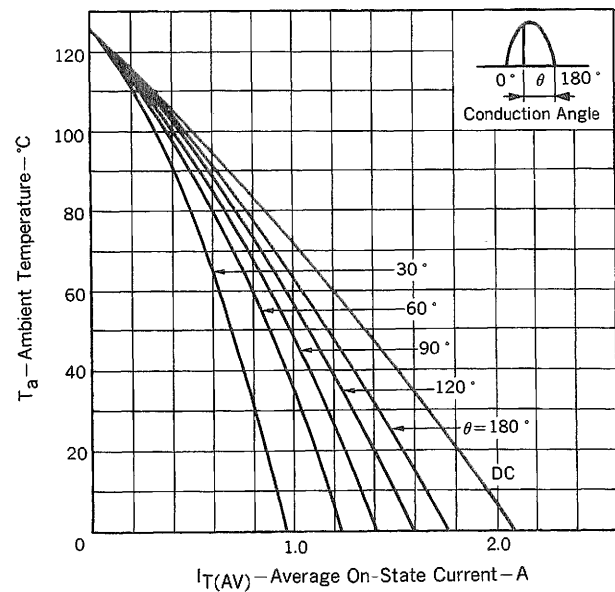
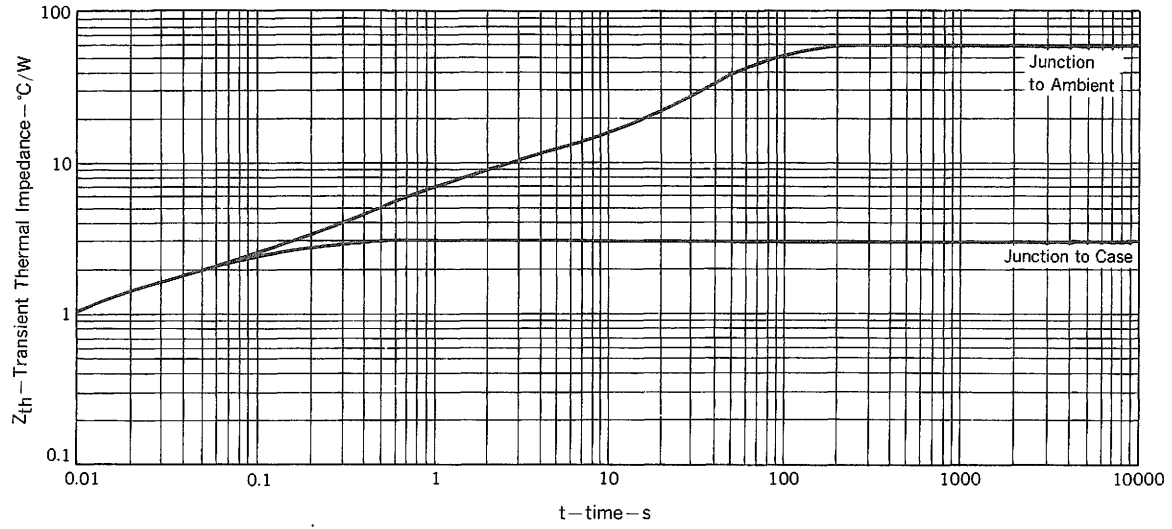
Fig. 7 $I_{GT} - \tau$ TYPICAL DISTRIBUTIONFig. 8 $V_{GT} - \tau$ TYPICAL DISTRIBUTIONFig. 9 $I_H - T_a$ TYPICAL DISTRIBUTIONFig. 10 $P_{T(AV)} - I_{T(AV)}$ CHARACTERISTICFig. 11 $T_c - I_{T(AV)}$ RATINGFig. 12 $T_a - I_{T(AV)}$ RATING

Fig. 13 Z_{th} CHARACTERISTIC



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NEC ELECTRON DEVICE