

THYRISTORS
3P4J, 3P4J-Z

3 A MOLD THYRISTOR

DESCRIPTION

The 3P4J and 3P4J-Z are P-gate all diffused mold type THYRISTOR granted average on-state current 3 Amps ($T_C = 103^\circ\text{C}$), with rated voltages up to 400 Volts.

FEATURES

- Small and Surface Mount package.
- High junction temperature provides free application design.
- Less holding current distribution provides free application design.
- 40 A surge current.

APPLICATIONS

Various temperature control, Electronic jar.

Electric sewing machine, Automotive application such as regulator, Speed control of motor.

Various solid state relay etc.

MAXIMUM RATINGS

ITEM	SYMBOL	MAXIMUM RATINGS	UNIT	NOTE
Non-Repetitive Peak Reverse Voltage *	V_{RSM}	500	V	
Non-Repetitive Peak-off Voltage *	V_{DSM}	500	V	
Repetitive Reverse Voltage *	V_{RRM}	400	V	
Repetitive Peak-off Voltage *	V_{DRM}	400	V	
On-state Current	$I_T(AV)$	3 ($T_C = 103^\circ\text{C}$, $\theta = 180^\circ$ Single Phase half wave)	A	Fig. 11
	$I_T(RSM)$	4.0		
Surge On-state Current	I_{TSM}	40	A	Fig. 2
Critical Rate-Rise of On-State Current	di/dt	50	A/ μs	
Gate Power Dissipation	P_{GM}	1 (f $\geq$ 50 Hz, Duty $\leq$ 10 %)	W	
Gate Power Dissipation	$P_{G(AV)}$	0.2	W	
Gate Forward Current	I_{FGM}	0.5 (f $\geq$ 50 Hz, Duty $\leq$ 10 %)	A	
Gate Reverse Voltage	V_{RGM}	6	V	
Junction Temperature	T_j	-40 to +125	$^\circ\text{C}$	
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$	

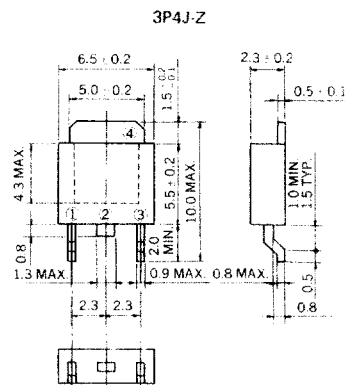
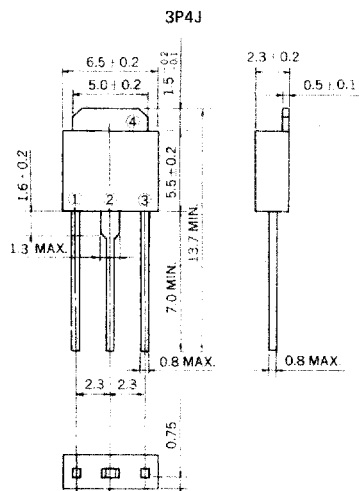
*Note: Insert a resistance below 1 k Ω between gate and cathode, because the items are guaranteed by connecting short resistance between gate and cathode ($R_{GK} = 1\text{ k}\Omega$).

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

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Repetitive Peak Reverse Current	I_{RRM}	$V_{RM} = 400\text{ V}$, $T_j = 125^\circ\text{C}$ $R_{GK} = 1\text{ k}\Omega$	—	—	1	mA	
Repetitive Peak Off-state Current	I_{DRM}	$V_{DM} = 400\text{ V}$, $T_j = 125^\circ\text{C}$ $R_{GK} = 1\text{ k}\Omega$	—	—	1	mA	
On-state Voltage	V_{TM}	$I_{TM} = 4\text{ A}$	—	—	1.4	V	See Fig. 1
Gate-Trigger Current	I_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$ $R_{GK} = 1\text{ k}\Omega$	—	—	100	μA	See Fig. 5 Fig. 7
Gate-Trigger Voltage	V_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$ $R_{GK} = 1\text{ k}\Omega$	—	—	0.8	V	See Fig. 6 Fig. 8
Gate Non-Trigger Voltage	V_{GD}	$V_{DM} = 200\text{ V}$, $T_j = 125^\circ\text{C}$ $R_{GK} = 1\text{ k}\Omega$	0.2	—	—	V	
Critical Rate-of-Rise of Off-state Voltage	dv/dt	$V_{DM} = 270\text{ V}$, $T_j = 125^\circ\text{C}$ $R_{GK} = 1\text{ k}\Omega$	—	10	—	V/ μs	
Holding Current*	I_H	$V_D = 24\text{ V}$, $R_{GK} = 1\text{ k}\Omega$ $I_{TM} = 5\text{ A}$	—	—	5	mA	See Fig. 9
Thermal Resistance	$R_{th(j-c)}$	Junction to Case	—	—	4	$^\circ\text{C/W}$	See Fig. 13
	$R_{th(j-a)}$	Junction to Ambient*	—	—	62.5	$^\circ\text{C/W}$	

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

PACKAGE DIMENSIONS (in millimeters)



Pin Connection

1. Cathode
2. Anode
3. Gate
4. Fin (Anode)

CHARACTERISTIC

Fig. 1 $I_T - V_T$ CHARACTERISTIC

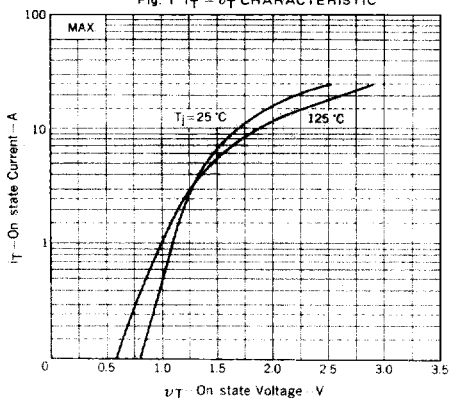


Fig. 2 I_{TSM} RATING

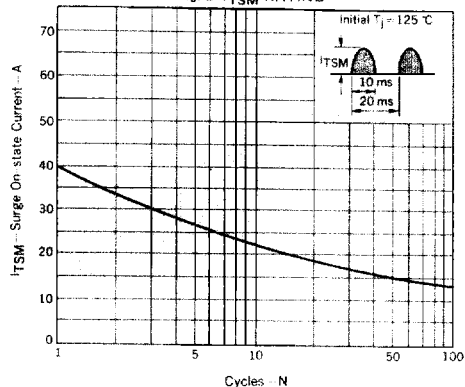


Fig. 3 GATE POWER RATINGS

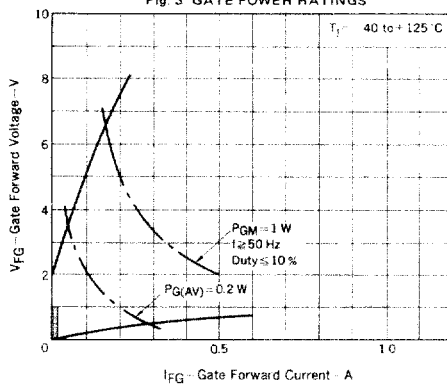


Fig. 4 GATE CHARACTERISTIC

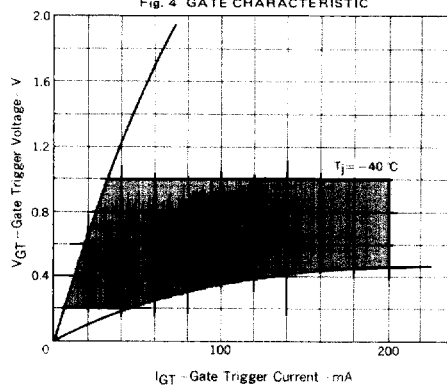


Fig. 5 $I_{GT} - T_a$ TYPICAL DISTRIBUTION

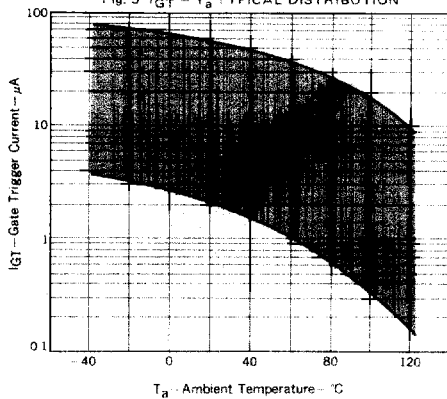


Fig. 6 $V_{GT} - T_a$ TYPICAL DISTRIBUTION

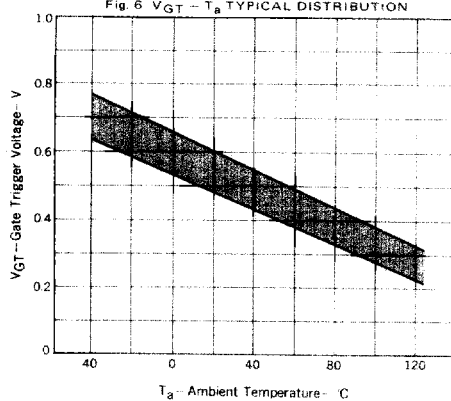


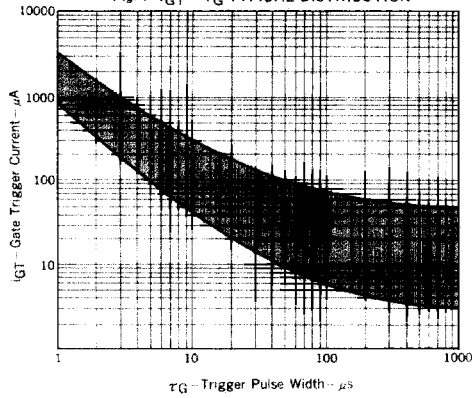
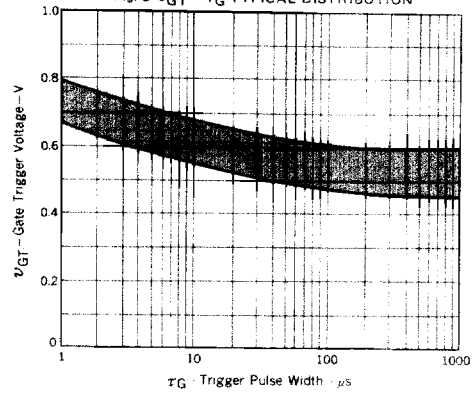
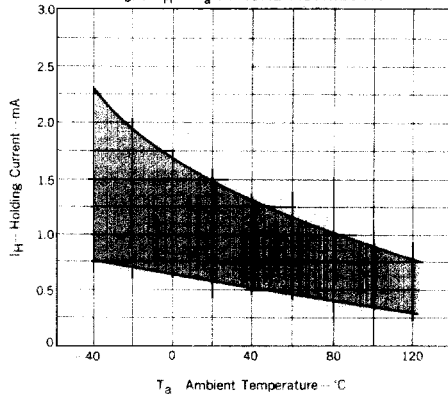
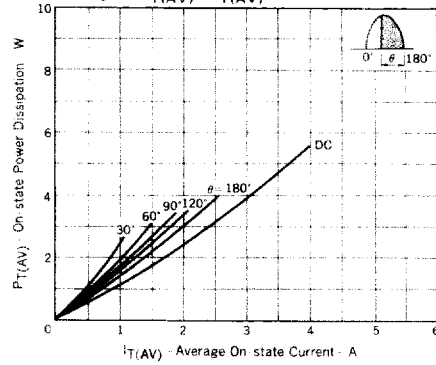
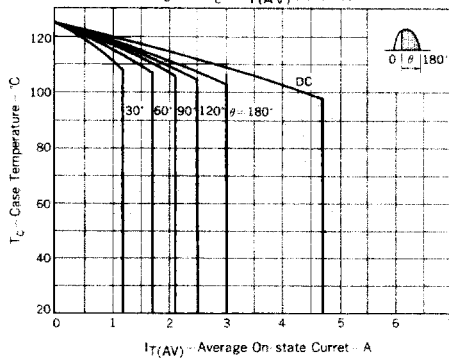
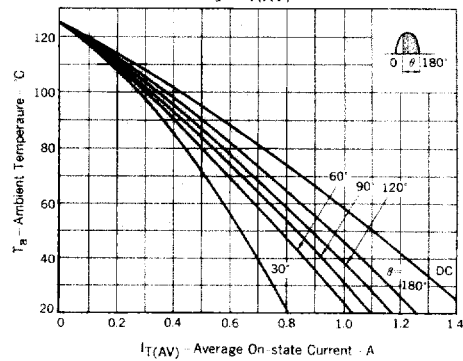
Fig. 7 $I_{GT} - \tau_G$ TYPICAL DISTRIBUTIONFig. 8 $V_{GT} - \tau_G$ TYPICAL DISTRIBUTIONFig. 9 $I_H - T_a$ TYPICAL DISTRIBUTIONFig. 10 $P_T(AV) - I_T(AV)$ CHARACTERISTICFig. 11 $T_c - I_T(AV)$ RATINGFig. 12 $T_a - I_T(AV)$ RATING

Fig. 13 Z_{th} CHARACTERISTIC

