

To our customers,

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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5 A MOLD THYRISTOR

The 5P[]J, 5P[]J-Z, and 5P[]J-ZK are a P gate all diffused mold type Thyristor granted 5 A On-state Average Current ($T_c = 95^\circ\text{C}$) with rated voltages up to 400 V or 600 V.

<R> FEATURES

- Suitable for capacitor discharge applications with high pulse current rating.
- $I_{GT} \leq 200 \mu\text{A}$
- Employs flame-retardant epoxy resin for casing (UL94V-0).
- Surface mounting (Z and ZK)

<R> APPLICATIONS

- Contact-less switch for electronic devices, ignition devices, electronic household appliances and other light industry equipment

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MAXIMUM RATINGS

CHARACTERISTICS	SYMBOL	5P4J, 5P4J-Z, 5P4J-ZK	5P6J, 5P6J-Z, 5P6J-ZK	UNIT	REMARK
Non-repetitive Peak Reverse Voltage	V_{RSM}	500	700	V	$R_{GK} = 1\text{ k}\Omega$
Non-repetitive Peak Off-state Voltage	V_{DSM}	500	700	V	$R_{GK} = 1\text{ k}\Omega$
Repetitive Peak Reverse Voltage	V_{RRM}	400	600	V	$R_{GK} = 1\text{ k}\Omega$
Repetitive Peak Off-state Voltage	V_{DRM}	400	600	V	$R_{GK} = 1\text{ k}\Omega$
Average On-state Current	$I_{T(AV)}$	5 ($T_C = 95^\circ\text{C}$, $\theta = 180^\circ$, Single phase half wave)		A	See Fig. 11
Effective On-state Current	$I_{T(RMS)}$	8		A	
Surge On-state Current	I_{TSM}	65 ($f = 50\text{ Hz}$, sine half wave, 1 cycle)		A	See Fig. 2
Fusing Current	$\int i^2 dt$	20 ($1\text{ ms} \leq t \leq 10\text{ ms}$)		A^2s	-
Critical Rate Rise of On-state Current	dI_T/dt	50		$\text{A}/\mu\text{s}$	-
Peak Gate Power Dissipation	P_{GM}	2 ($f \geq 50\text{ Hz}$, Duty $\leq 10\%$)		W	See Fig. 3
Average Gate Power Dissipation	$P_{G(AV)}$	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		$^\circ\text{C}$	-

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

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Repetitive Peak Reverse Current	I_{RRM}	$V_{RM} = V_{RRM}$	$T_j = 25^\circ\text{C}$	-	-	100	μA
			$T_j = 125^\circ\text{C}$	-	-	2	mA
Repetitive Peak Off-state Current	I_{DRM}	$V_{DM} = V_{DRM}$	$T_j = 25^\circ\text{C}$	-	-	100	μA
			$T_j = 125^\circ\text{C}$	-	-	2	mA
Critical Rate Rise of Off-state Voltage	dV_D/dt	$V_{DM} = 2/3 V_{DRM}$, $T_j = 125^\circ\text{C}$	-	3	-	$\text{V}/\mu\text{s}$	
On-state Voltage	V_{TM}	$I_{TM} = 10\text{ A}$	-	-	1.6	V	
Gate-trigger Current	I_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	-	-	200	μA	
Gate-trigger Voltage	V_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	-	-	0.8	V	
Gate Non-trigger Voltage	V_{GD}	$V_{DM} = 1/2 V_{DRM}$, $T_j = 125^\circ\text{C}$	0.2	-	-	V	
Holding Current	I_H	$V_{DM} = 24\text{ V}$, $I_{TM} = 10\text{ A}$	-	1	-	mA	
Circuit Commuted Turn-off Time	t_q	$I_{TM} = 3\text{ A}$, $V_R \geq 25\text{ V}$ $V_{DM} = 2/3 V_{DRM}$, $dI_R/dt = 15\text{ A}/\mu\text{s}$ $dV_D/dt = 3\text{ V}/\mu\text{s}$, $T_j = 125^\circ\text{C}$	-	80	-	μs	
Thermal Resistance	$R_{th(j-c)}$	Junction to case DC	-	-	3	$^\circ\text{C}/\text{W}$	
	$R_{th(j-a)}$	Junction to ambient DC ^{Note}	-	-	62.5		

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

TYPICAL CHARACTERISTICS

Fig. 1 $i_T - V_T$ CHARACTERISTICS

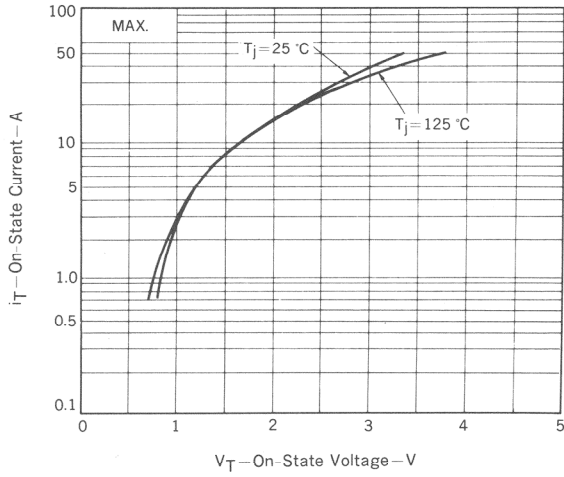


Fig. 2 I_{TSM} RATING

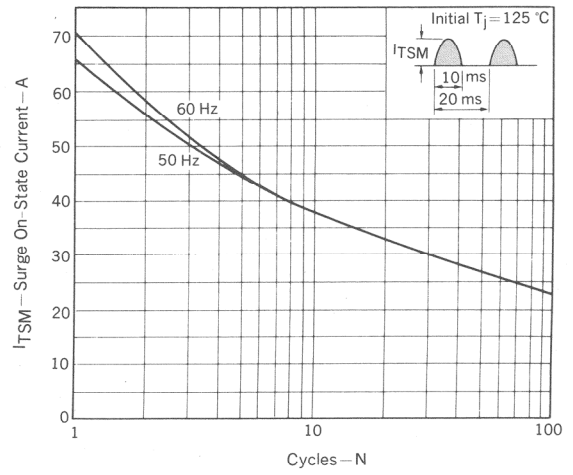
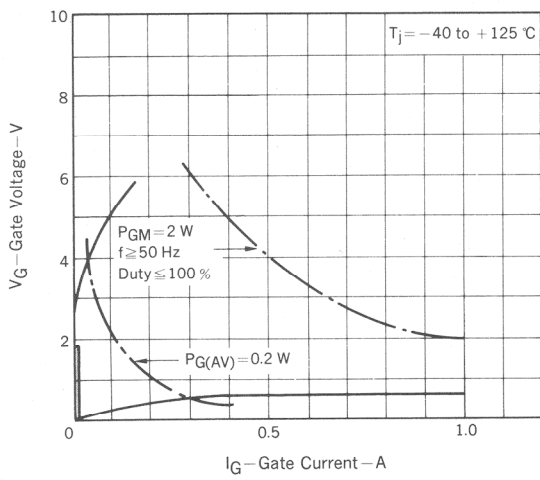


Fig. 3 $V_G - I_G$ RATING



<R>

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

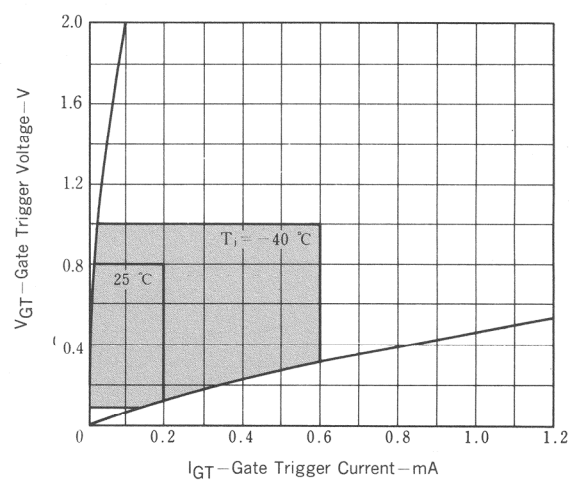


Fig. 5 $I_{GT} - T_a$ TYPICAL DISTRIBUTION

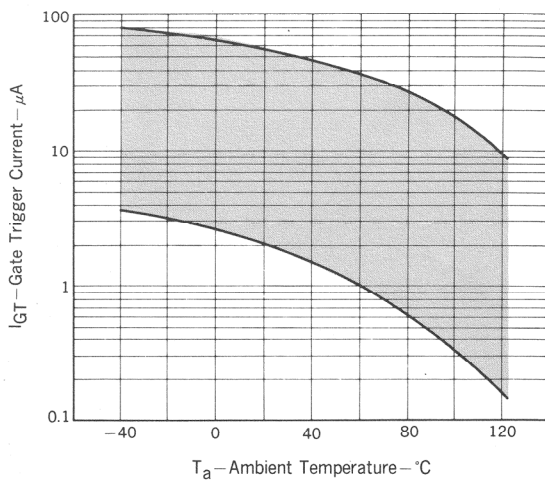


Fig. 6 $V_{GT} - T_a$ TYPICAL DISTRIBUTION

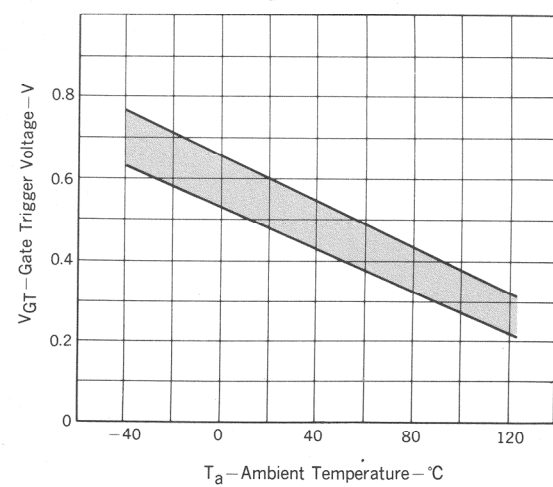


Fig. 7 $I_{GT} - \tau$ TYPICAL DISTRIBUTION

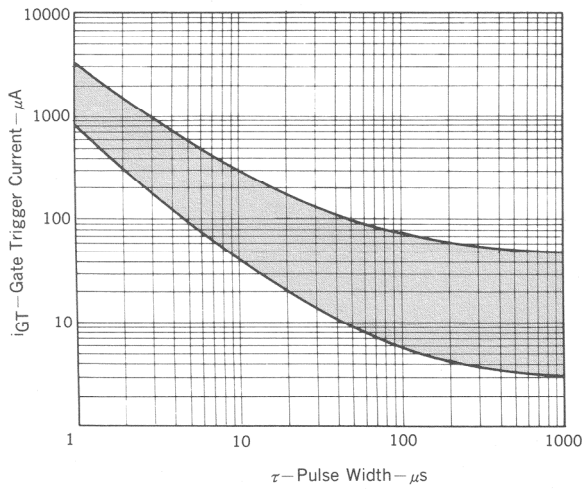


Fig. 8 $V_{GT} - \tau$ TYPICAL DISTRIBUTION

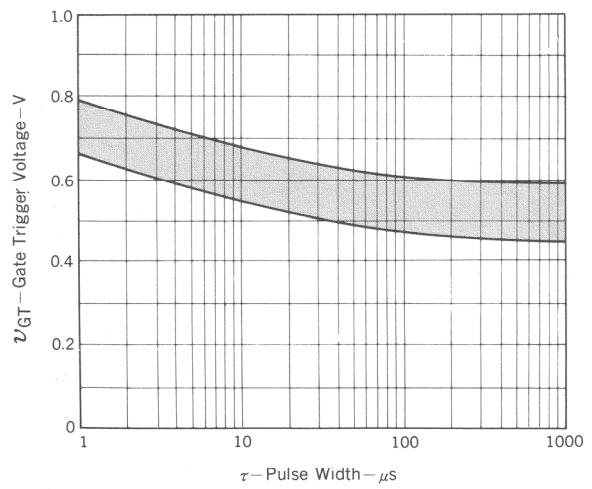


Fig. 9 $I_H - T_a$ TYPICAL DISTRIBUTION

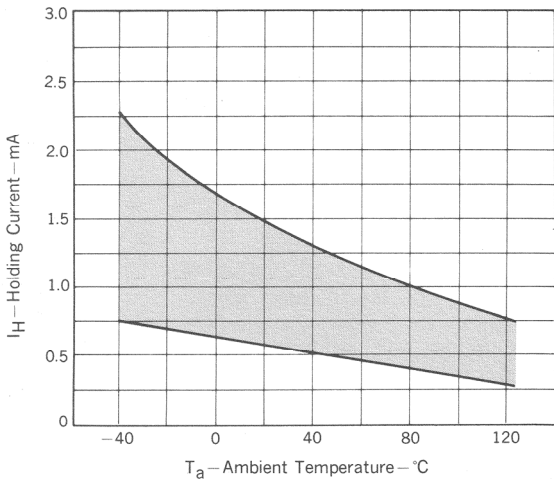


Fig. 10 $P_{T(AV)} - I_{T(AV)}$ CHARACTERISTIC

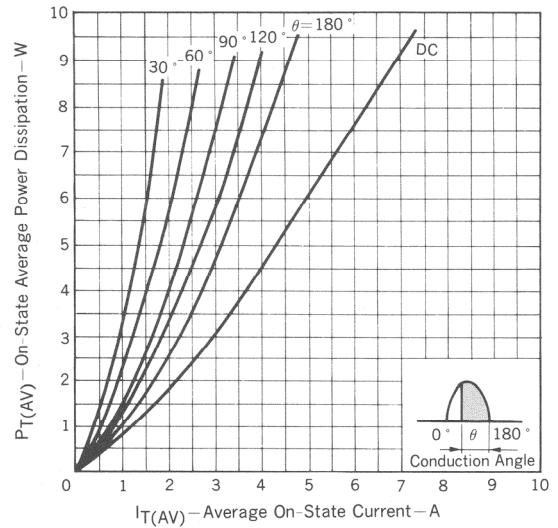


Fig. 11 $T_c - I_{T(AV)}$ RATING

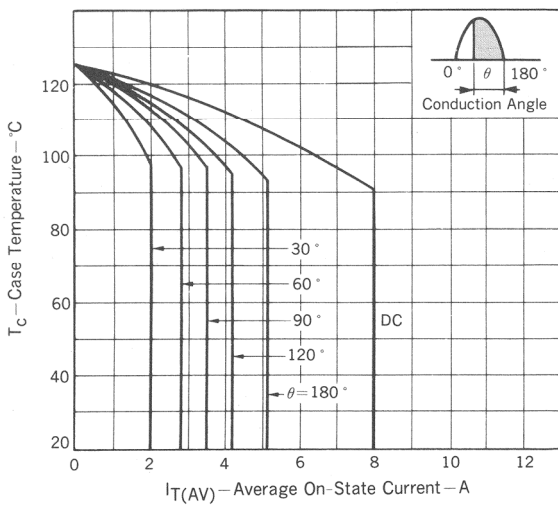
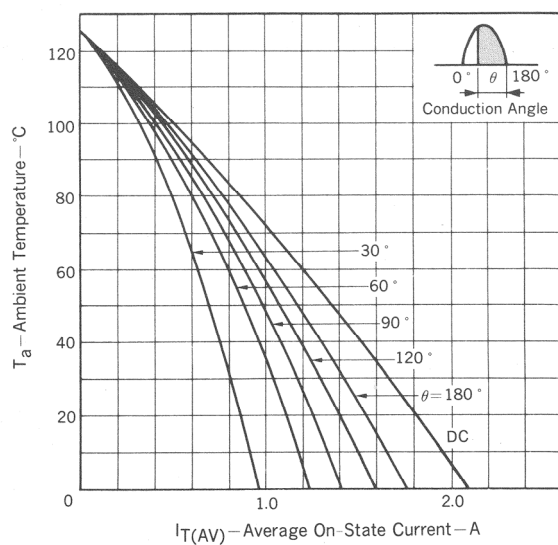
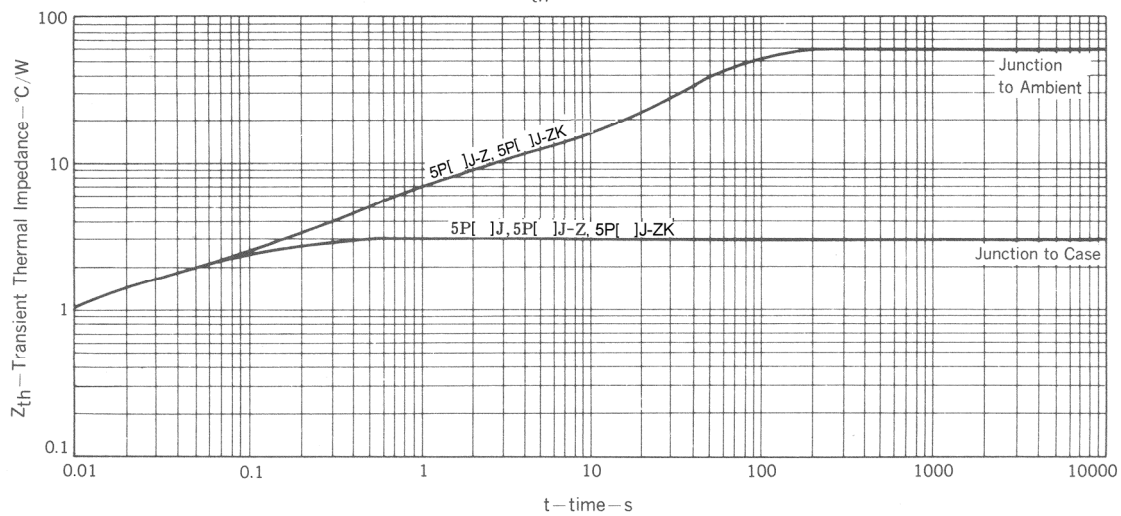


Fig. 12 $T_a - I_{T(AV)}$ RATING



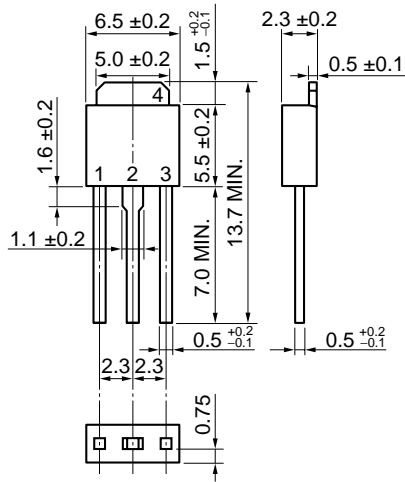
<R>

Fig. 13 Z_{th} CHARACTERISTIC

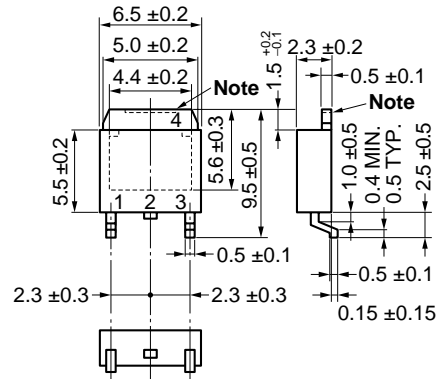


<R> PACKAGE DRAWING (Unit: mm)

• 5P[]J



• 5P[]J-Z



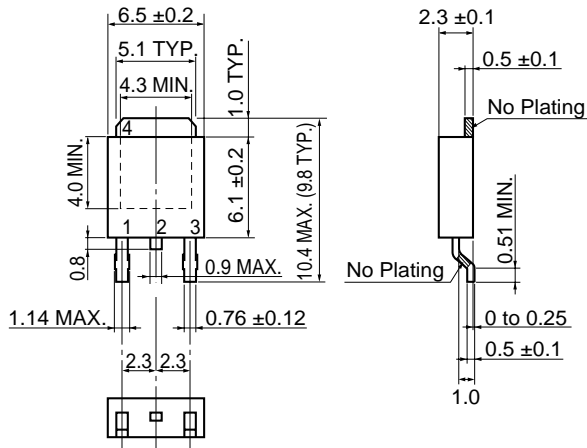
Pin Connection

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

Standard weight: 0.3 g

Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

• 5P[]J-ZK



Pin Connection

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

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