

To our customers,

Old Company Name in Catalogs and Other Documents

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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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Phase-out/Discontinued

THYRISTORS

5P4SMA, 5P6SMA

5 A RESIN MOLD TYPE SCR

<R> DESCRIPTION

The 5P4SMA and 5P6SMA are resin mold type SCRs with an average on-state current 5 A ($T_c = 94^\circ\text{C}$), repetitive peak off-state voltage 400 V and 600 V.

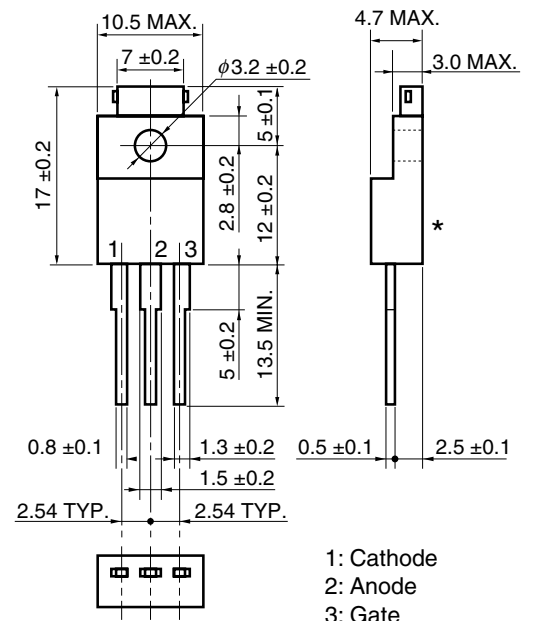
<R> FEATURES

- Can be replaced with TO-220AB package
- High allowable on-current when using a single unit

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.

<R> PACKAGE DRAWING (Unit: mm)



*: T_c test bench-mark

Standard weight: 2 g

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MAXIMUM RATINGS

Parameter	Symbol	5P4SMA	5P6SMA	Unit	Remarks
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 ($T_C = 94^\circ\text{C}$, single phase half wave, $\theta = 180^\circ$)		A	Refer to Figure 11 .
Effective On-state Current	$I_{T(RMS)}$	8		A	
Surge On-state Current	I_{TSM}	80 (50 Hz, sine half wave, 1 cycle) 88 (60 Hz, sine half wave, 1 cycle)		A	Refer to Figure 2 .
Fusing Current	$\int i^2 dt$	28 (1 ms $\leq t \leq 10$ ms)		A ² s	—
Critical Rate Rise of On-state Current	dI_T/dt	50		A/ μs	—
Peak Gate Power Dissipation	P_{GM}	5 ($f \geq 50$ Hz, Duty $\leq 10\%$)		W	Refer to Figure 3 .
Average Gate Power Dissipation	$P_{G(AV)}$	0.5		W	
Peak Gate Forward Current	I_{FGM}	2 ($f \geq 50$ Hz, 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		$^\circ\text{C}$	—

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remarks
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	—
On-state Voltage	V_{TM}	$I_{TM} = 10$ A	—	—	1.4	V	Refer to Figure 1 .
Gate Trigger Current	I_{GT}	$V_{DM} = 6$ V, $R_L = 100 \Omega$	—	—	10	mA	Refer to Figure 4 .
Gate Trigger Voltage	V_{GT}	$V_{DM} = 6$ V, $R_L = 100 \Omega$	—	—	1.5	V	
Gate Non-trigger Voltage	V_{GD}	$T_J = 125^\circ\text{C}$, $V_{DM} = \frac{1}{2} V_{DRM}$	0.2	—	—	V	—
Holding Current	I_H	$V_{DM} = 24$ V, $I_{TM} = 10$ A	—	6	—	mA	—
Critical Rate Rise of Off-state Voltage	dv/dt	$T_J = 125^\circ\text{C}$, $V_{DM} = \frac{2}{3} V_{DRM}$	—	40	—	V/ μs	—
Circuit Commuted Turn-off Time	t_q	$T_J = 125^\circ\text{C}$, $I_{TM} = 5$ A, $di_T/dt = 15$ A/ μs , $V_R \geq 25$ V, $V_{DM} = \frac{2}{3} V_{DRM}$, $dV_D/dt = 10$ V/ μs	—	50	—	μs	—
Thermal Resistance ^{Note}	$R_{th(j-c)}$	Junction to case DC	—	—	4.2	$^\circ\text{C/W}$	Refer to Figure 13 .
	$R_{th(j-a)}$	Junction to ambient DC	—	—	60	$^\circ\text{C/W}$	

TYPICAL CHARACTERISTICS

Figure 1. i_T vs. v_T CHARACTERISTIC

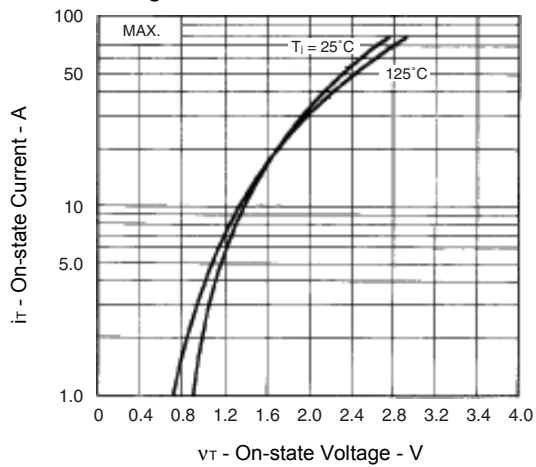


Figure 2. I_{TSM} RATING

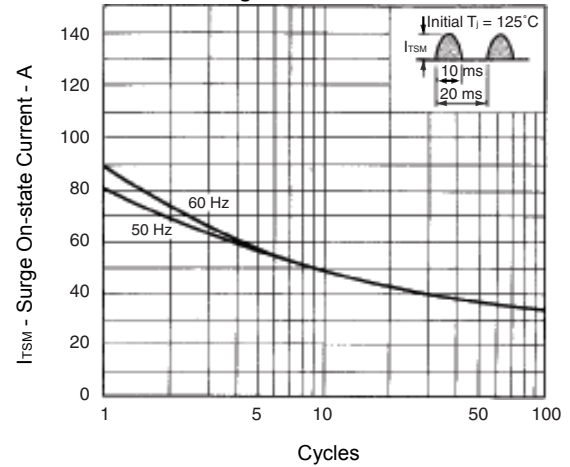


Figure 3. V_{FG} vs. I_{FG} RATING

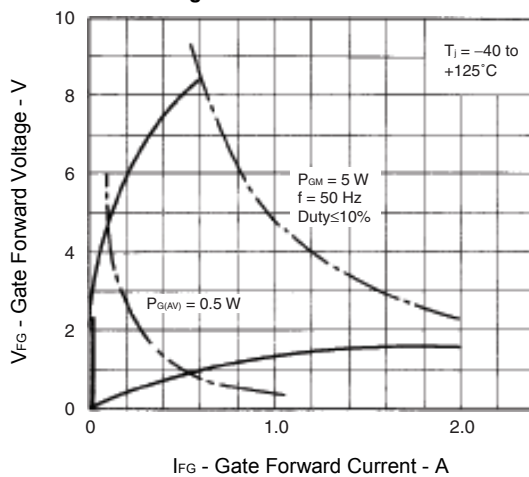


Figure 4. V_{GT} vs. I_{GT} CHARACTERISTIC

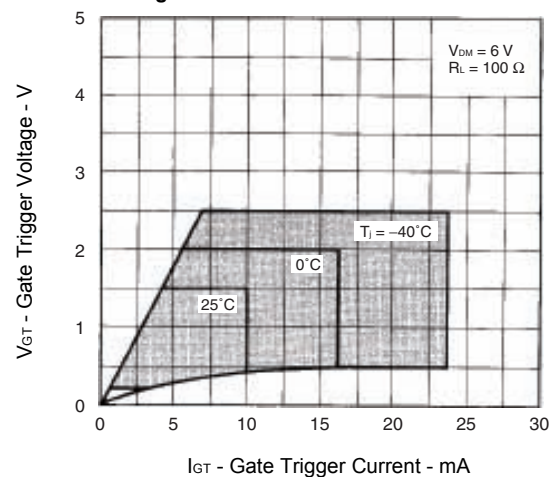


Figure 5. I_{GT} vs. T_A CHARACTERISTIC

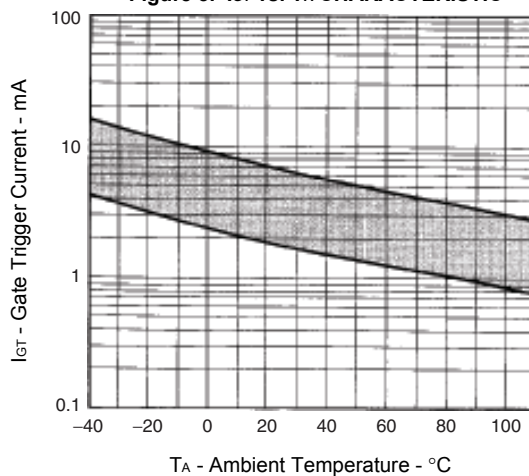


Figure 6. V_{GT} vs. T_A CHARACTERISTIC

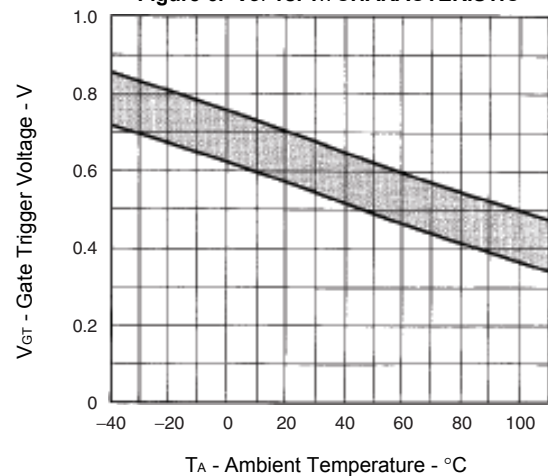


Figure 7. i_{GT} vs. τ CHARACTERISTIC

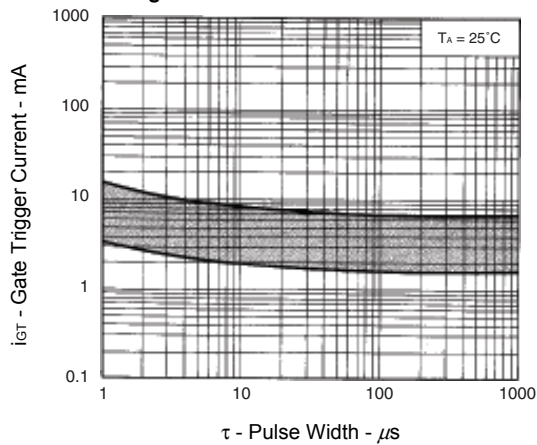


Figure 8. v_{GT} vs. τ CHARACTERISTIC

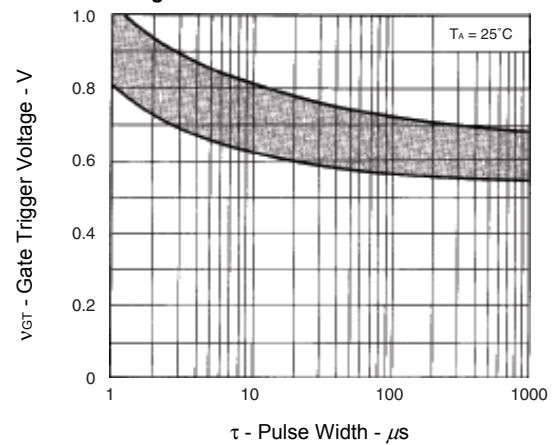


Figure 9. I_H vs. T_A CHARACTERISTIC

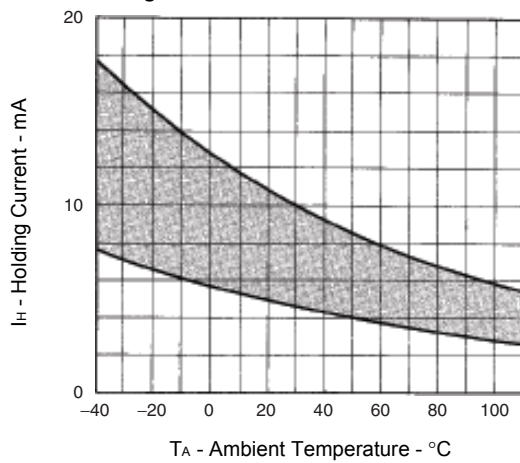


Figure 10. $P_{T(AV)}$ vs. $I_{T(AV)}$ CHARACTERISTIC

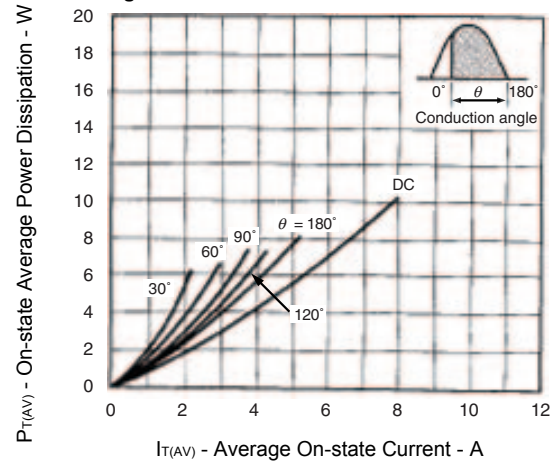


Figure 11. T_C vs. $I_{T(AV)}$ RATING

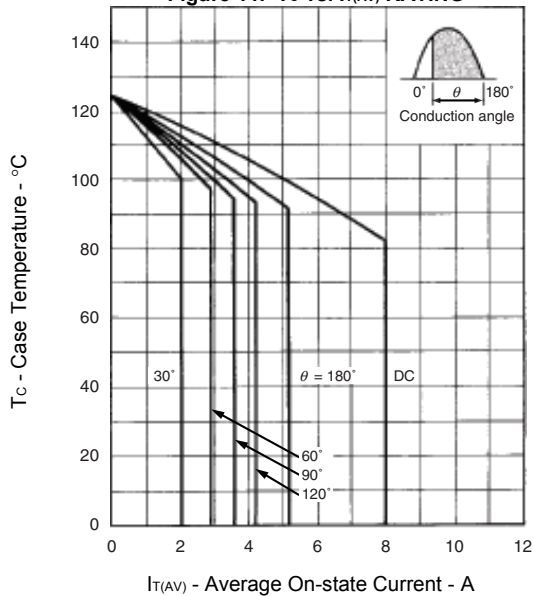


Figure 12. T_A vs. $I_{T(AV)}$ RATING

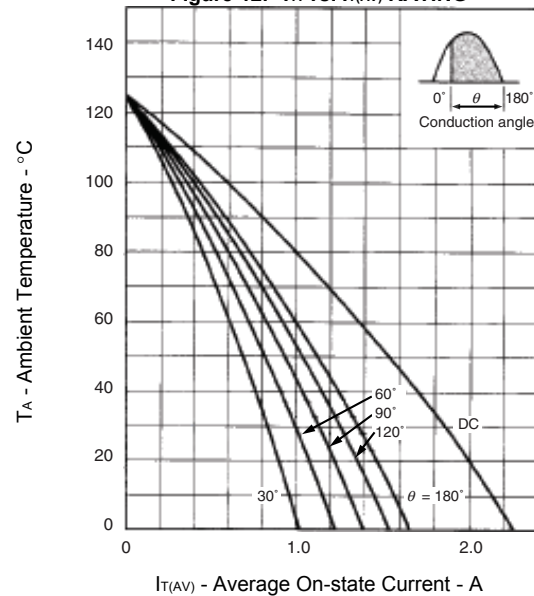
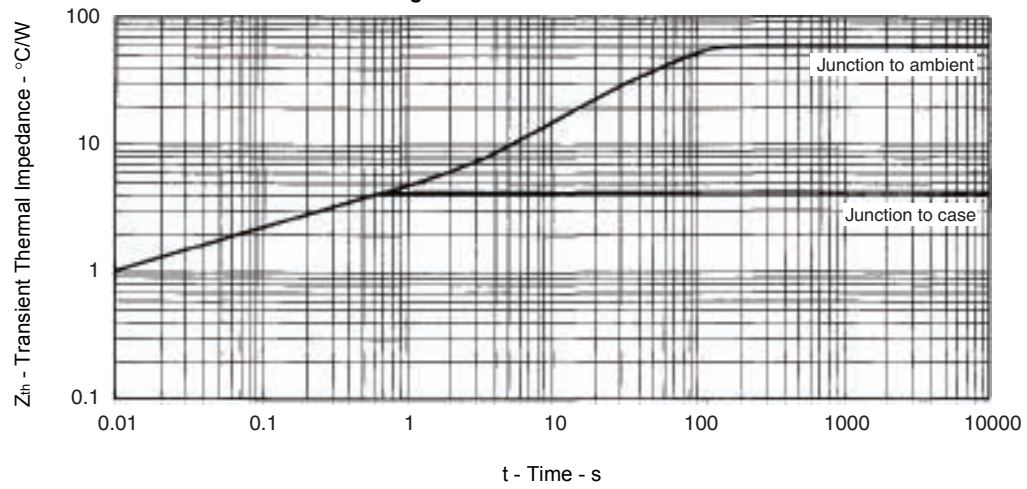


Figure 13. Z_{th} CHARACTERISTIC



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