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°C), repetitive peak off-state voltage 400 V and 600 V.

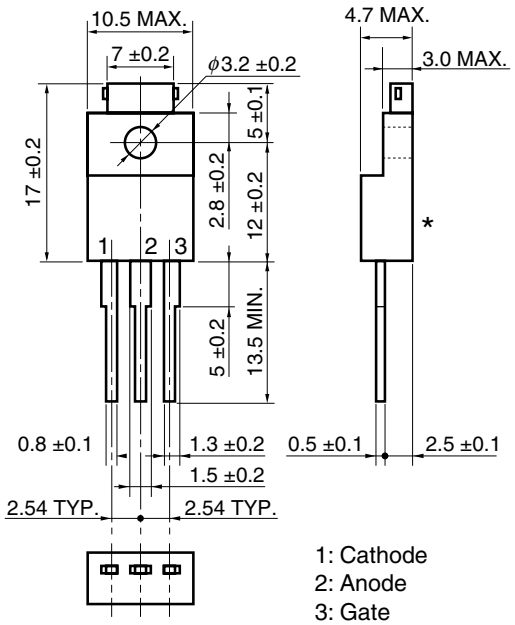
<R> FEATURES

- 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)



1: Cathode
2: Anode
3: Gate

*: T_C test bench-mark

Standard weight: 2 g

Document No. D17163EJ4V0DS00 (4th edition)
Date Published October 2008 NS
Printed in Japan

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

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°C, single phase half wave, θ = 180°)		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	$\int i_T^2 dt$	28 (1 ms ≤ t ≤ 10 ms)		A^2s	–
Critical Rate Rise of On-state Current	dI_T/dt	50		A/μs	–
Peak Gate Power Dissipation	P_{GM}	5 (f ≥ 50 Hz, Duty ≤ 10%)		W	Refer to **Figure 3**.
Average Gate Power Dissipation	$P_{G(AV)}$	0.5		W	
Peak Gate Forward Current	I_{FGM}	2 (f ≥ 50 Hz, Duty ≤ 10%)		A	–
Peak Gate Reverse Voltage	V_{RGM}	10		V	–
Junction Temperature	T_j	–40 to +125		°C	–
Storage Temperature	T_{stg}	–55 to +150		°C	–

ELECTRICAL CHARACTERISTICS (T_j = 25°C)

Parameter	Symbol	Conditions		MIN.	TYP.	MAX.	Unit	Remarks
Repetitive Peak Reverse Current	I_{RRM}	$V_{RM} = V_{RRM}$	T_j = 25°C	–	–	100	μA	–
			T_j = 125°C	–	–	2	mA	–
Repetitive Peak Off-state Current	I_{DRM}	$V_{DM} = V_{DRM}$	T_j = 25°C	–	–	100	μA	–
			T_j = 125°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 Ω		–	–	10	mA	Refer to **Figure 4**.
Gate Trigger Voltage	V_{GT}	V_{DM} = 6 V, R_L = 100 Ω		–	–	1.5	V	
Gate Non-trigger Voltage	V_{GD}	T_j = 125°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°C, $V_{DM} = \frac{2}{3} V_{DRM}$		–	40	–	V/μs	–
Circuit Commuted Turn-off Time	t_q	T_j = 125°C, I_{TM} = 5 A, di_R/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	°C/W	Refer to **Figure 13**.
	$R_{th(j-a)}$	Junction to ambient DC		–	–	60	°C/W	

TYPICAL CHARACTERISTICS

Figure 1. i_T vs. v_T CHARACTERISTIC

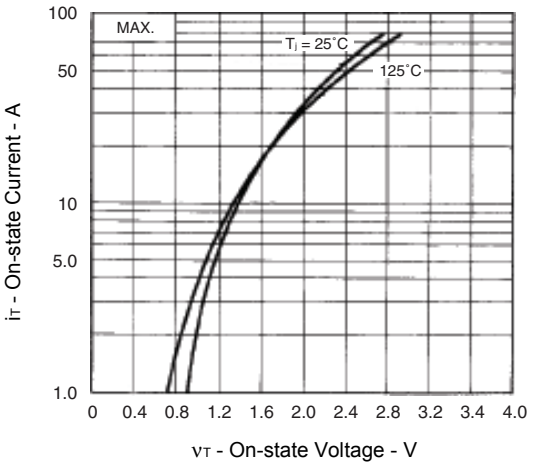


Figure 2. I_{TSM} RATING

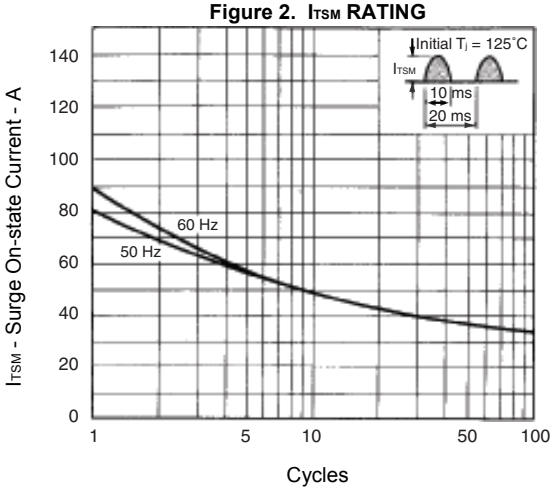


Figure 3. V_{FG} vs. I_{FG} RATING

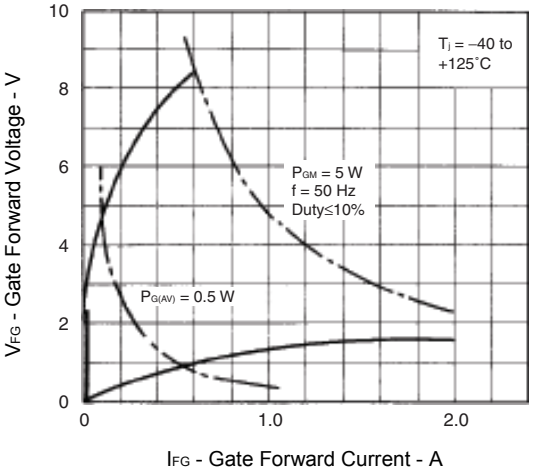


Figure 4. V_{GT} vs. I_{GT} CHARACTERISTIC

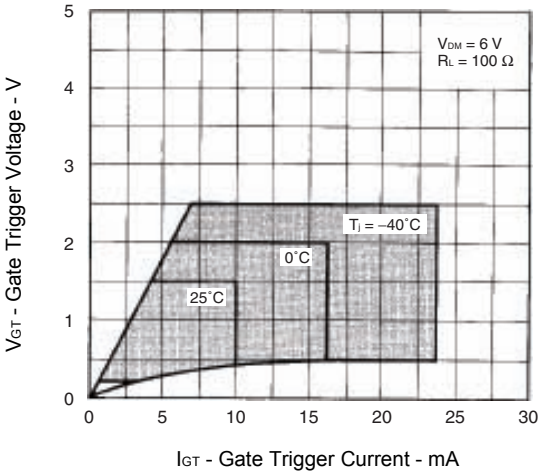


Figure 5. I_{GT} vs. T_A CHARACTERISTIC

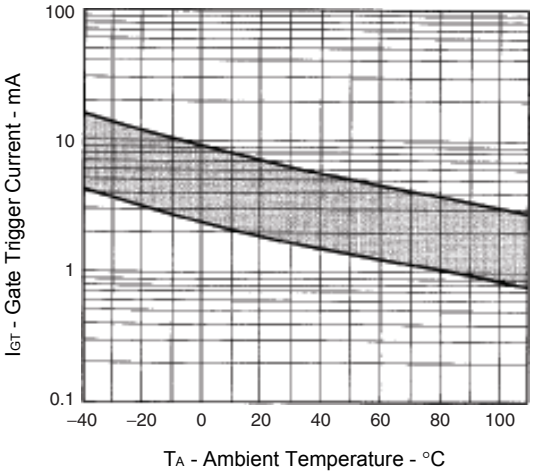


Figure 6. V_{GT} vs. T_A CHARACTERISTIC

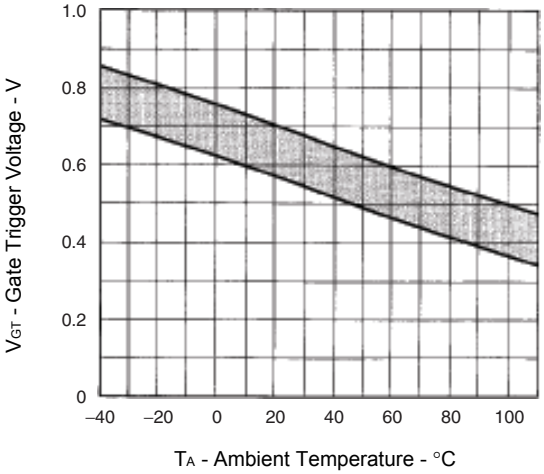


Figure 7. i_{GT} vs. τ CHARACTERISTIC

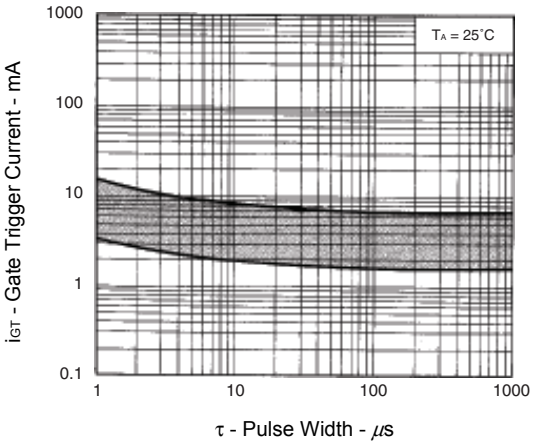


Figure 8. v_{GT} vs.- τ CHARACTERISTIC

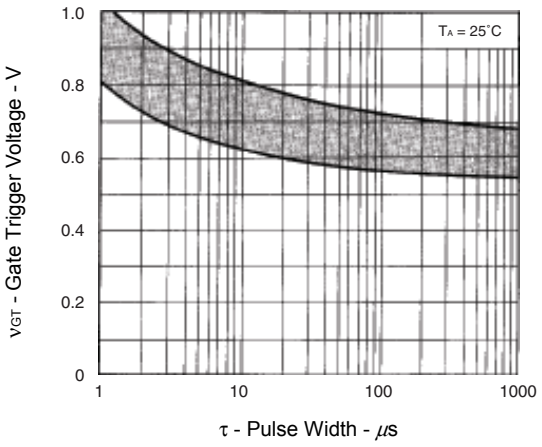


Figure 9. I_H vs. T_A CHARACTERISTIC

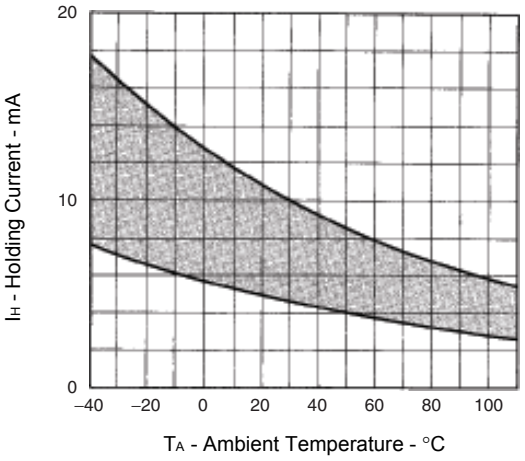


Figure 10. $P_{T(AV)}$ vs. $I_{T(AV)}$ CHARACTERISTIC

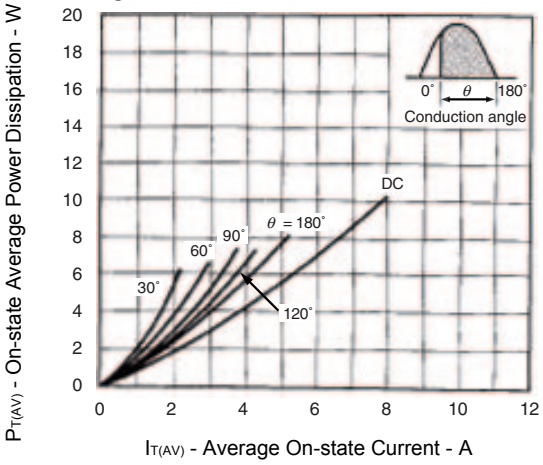


Figure 11. T_C vs. $I_{T(AV)}$ RATING

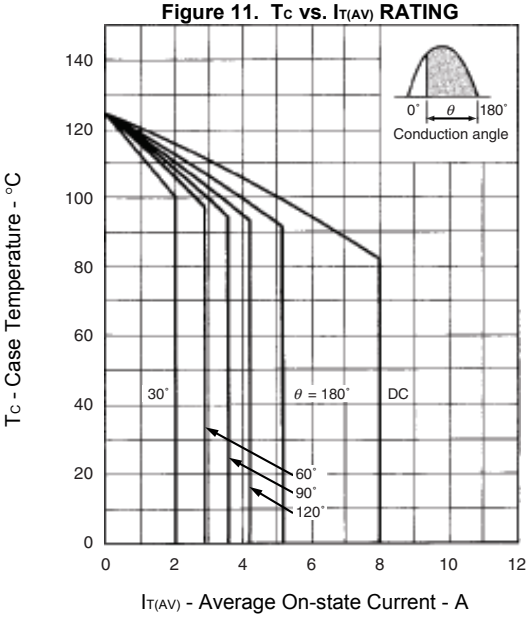


Figure 12. T_A vs. $I_{T(AV)}$ RATING

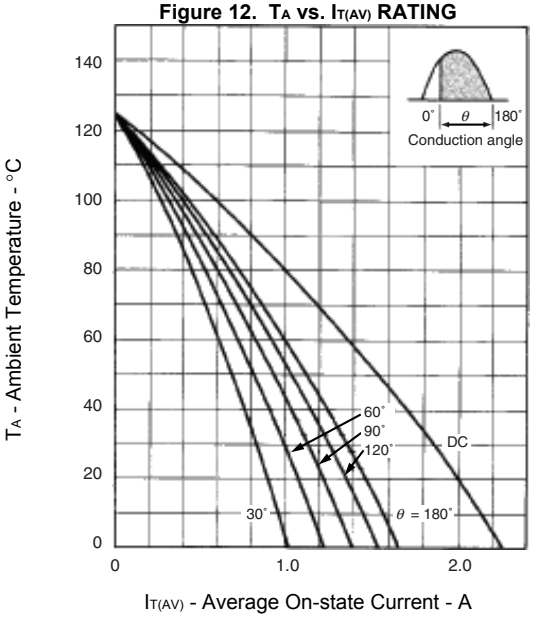
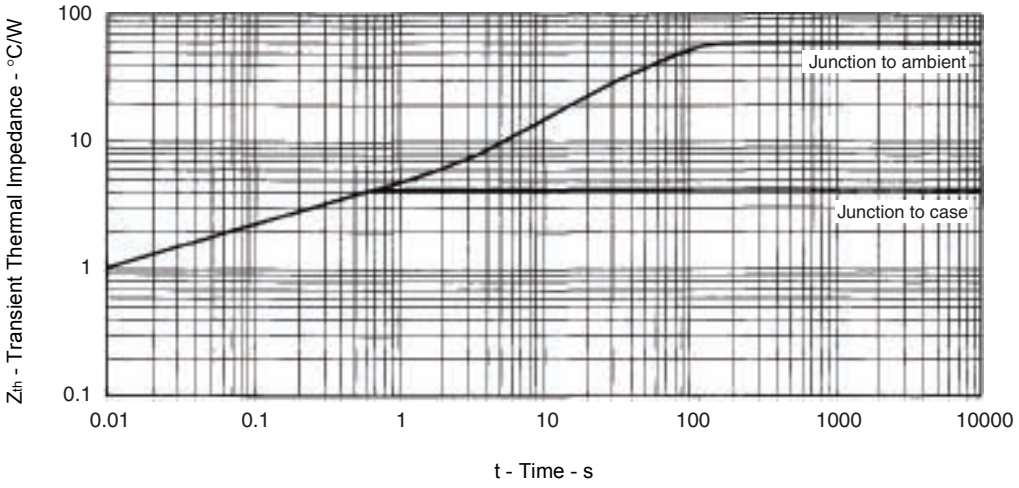


Figure 13. Z_{th} CHARACTERISTIC



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