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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DATA SHEET

Phase-out/Discontinued

THYRISTORS

AC05DSMA, AC05FSMA

5 A RESIN MOLD TYPE TRIAC

<R> DESCRIPTION

The AC05DSMA and AC05FSMA are resin mold type TRIACs with an effective on-state current 5 A (T_C = 99°C), repetitive peak off-state voltage 400 V and 600 V.

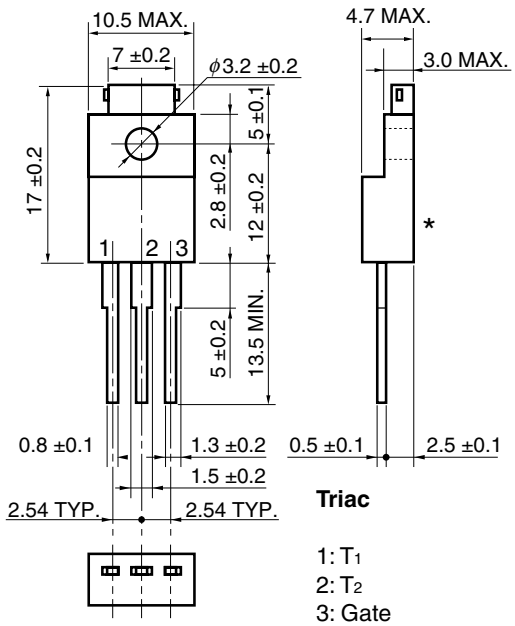
FEATURES

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

APPLICATIONS

- Motor speed control
- Heater temperature control
- Lamp light control
- Various solid state switches

<R> PACKAGE DRAWING (Unit: mm)



Triac

1: T_1
2: T_2
3: Gate

*: T_C test bench-mark

Standard weight: 2 g

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MAXIMUM RATINGS

Parameter	Symbol	AC05DSMA	AC05FSMA	Unit	Remarks
Non-repetitive Peak Off-state Voltage	V_{DSM}	500	700	V	–
Repetitive Peak Off-state Voltage	V_{DRM}	400	600	V	–
Effective On-state Current	$I_{T(RMS)}$	5 (T_C = 99°C)		A	Refer to **Figure 11** and **12**.
Surge On-state Current	I_{TSM}	50 (50 Hz 1 cycle) 55 (60 Hz 1 cycle)		A	Refer to **Figure 2**.
Fusing Current	$\int i_T^2 dt$	10 (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}	3 (f ≥ 50 Hz, Duty ≤ 10%)		W	–
Average Gate Power Dissipation	$P_{G(AV)}$	0.3		W	–
Peak Gate Current	I_{GM}	±1.5 (f ≥ 50 Hz, Duty ≤ 10%)		A	–
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 Off-state Current		I_{DRM}	$V_{DM} = V_{DRM}$	T_j = 25°C	–	–	100	μA	–
				T_j = 125°C	–	–	1	mA	–
On-state Voltage		V_{TM}	I_{TM} = 5 A		–	–	1.8	V	Refer to **Figure 1**.
Gate Trigger Current	Mode I	I_{GT}	V_{DM} = 12 V,	T_2+, G+	–	–	10	mA	Refer to **Figure 4**.
	II		R_L = 30 Ω	T_2–, G+	–	–	–		
	III			T_2–, G–	–	–	10		
	IV			T_2+, G–	–	–	10		
Gate Trigger Voltage	Mode I	V_{GT}	V_{DM} = 12 V,	T_2+, G+	–	–	1.5	V	Refer to **Figure 4**.
	II		R_L = 30 Ω	T_2–, G+	–	–	–		
	III			T_2–, G–	–	–	1.5		
	IV			T_2+, G–	–	–	1.5		
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		–	10	–	mA	–
Critical Rate Rise of Off-state Voltage		dv/dt	T_j = 125°C, $V_{DM} = \frac{2}{3} V_{DRM}$		–	100	–	V/μs	–
Commutating Critical Rate Rise of Off-state Voltage		(dv/dt)c	T_j = 125°C, $(di_T/dt)c$ = –2.7 A/ms, V_D = 400 V		5	–	–	V/μs	–
Thermal Resistance **Note**		$R_{th(j-c)}$	Junction-to-case AC		–	–	4.2	°C/W	Refer to **Figure 13**.

Note The thermal resistance with a 50 Hz or 60 Hz sine wave current, as shown in the following expression:

$$R_{th(j-c)} = \frac{T_{j(max)} - T_C}{P_{T(AV)}}$$

$T_{j(max)}$: Maximum junction temperature

T_C: Case temperature

$P_{T(AV)}$: Average on-dissipation

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TYPICAL CHARACTERISTICS

Figure 1. i_T vs. v_T CHARACTERISTIC

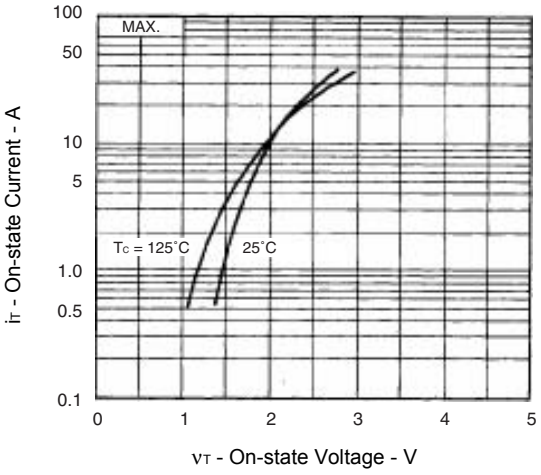


Figure 2. I_{TSM} RATING

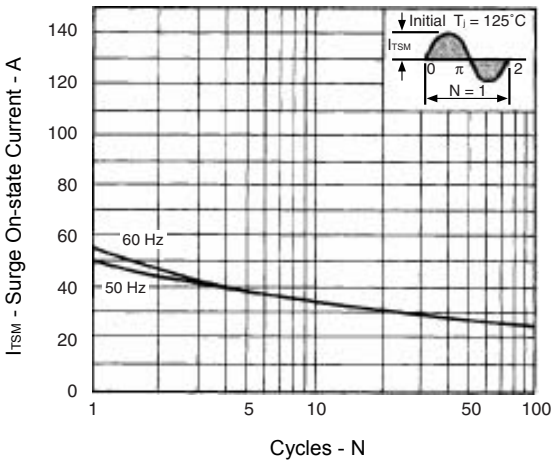


Figure 3. GATE RATING

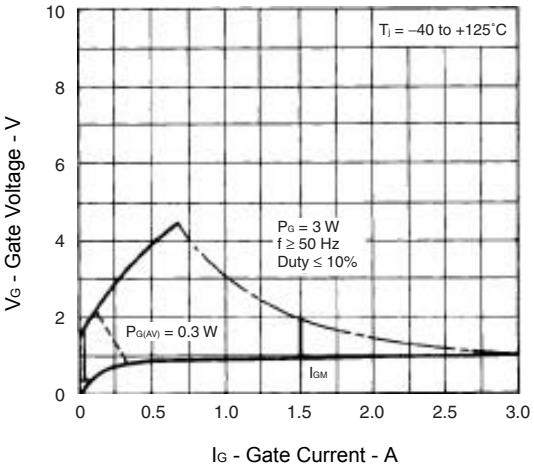


Figure 4. GATE CHARACTERISTIC

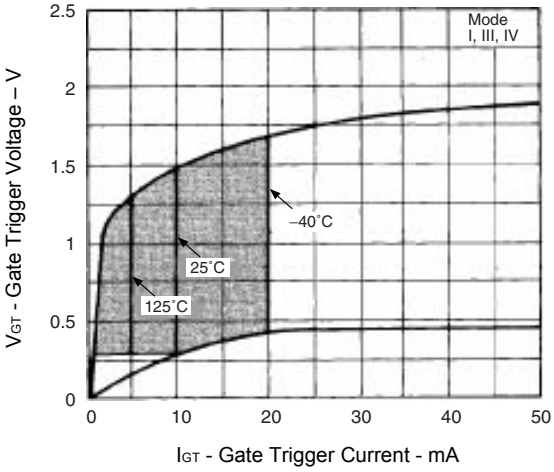


Figure 5. I_{GT} vs. T_A CHARACTERISTIC

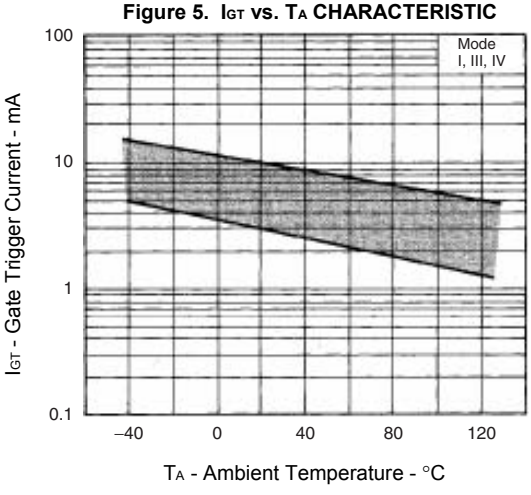
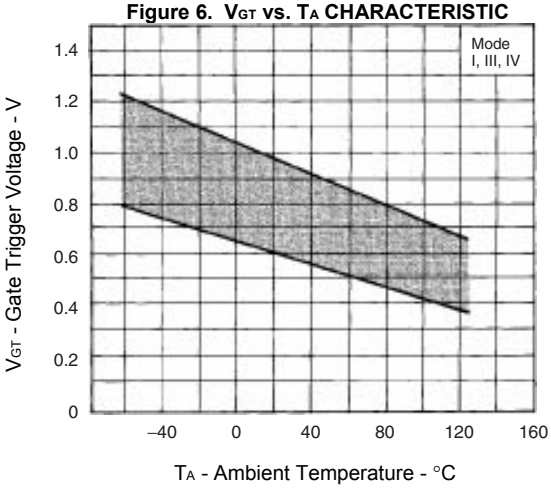


Figure 6. V_{GT} vs. T_A CHARACTERISTIC



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Figure 7. i_{GT} vs. τ CHARACTERISTIC

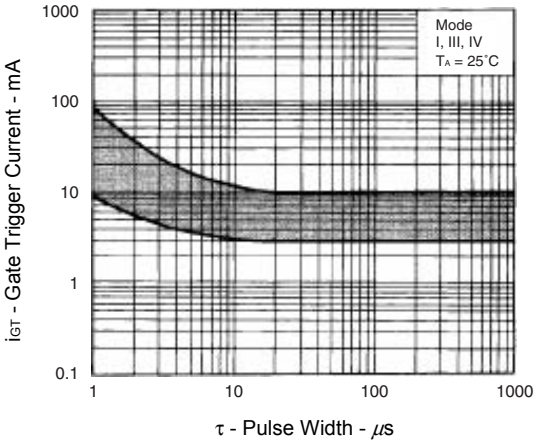


Figure 8. v_{GT} vs. τ CHARACTERISTIC

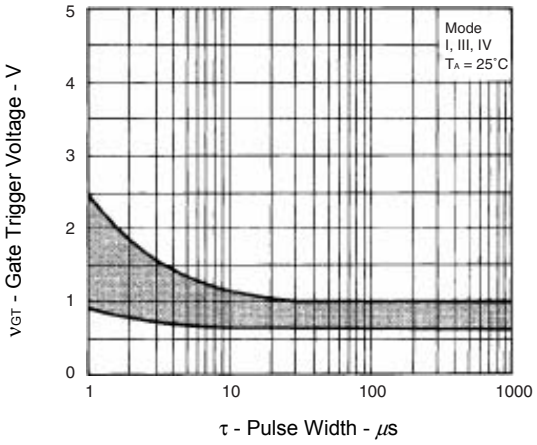


Figure 9. I_H vs. T_A CHARACTERISTIC

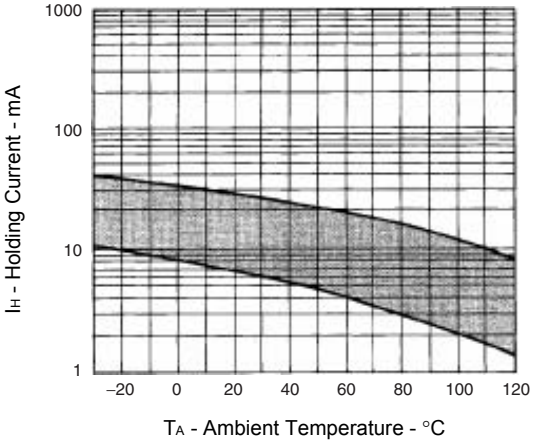


Figure 10. $P_{T(AV)}$ vs. $I_{T(RMS)}$ CHARACTERISTIC

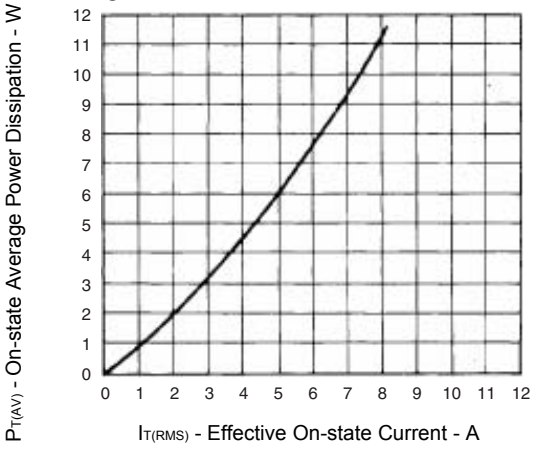


Figure 11. T_C vs. $I_{T(RMS)}$ RATING

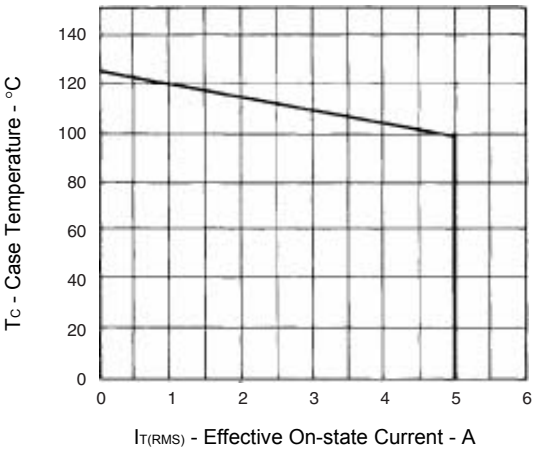
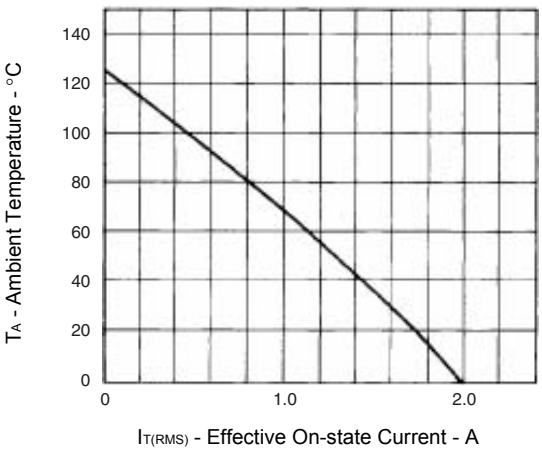


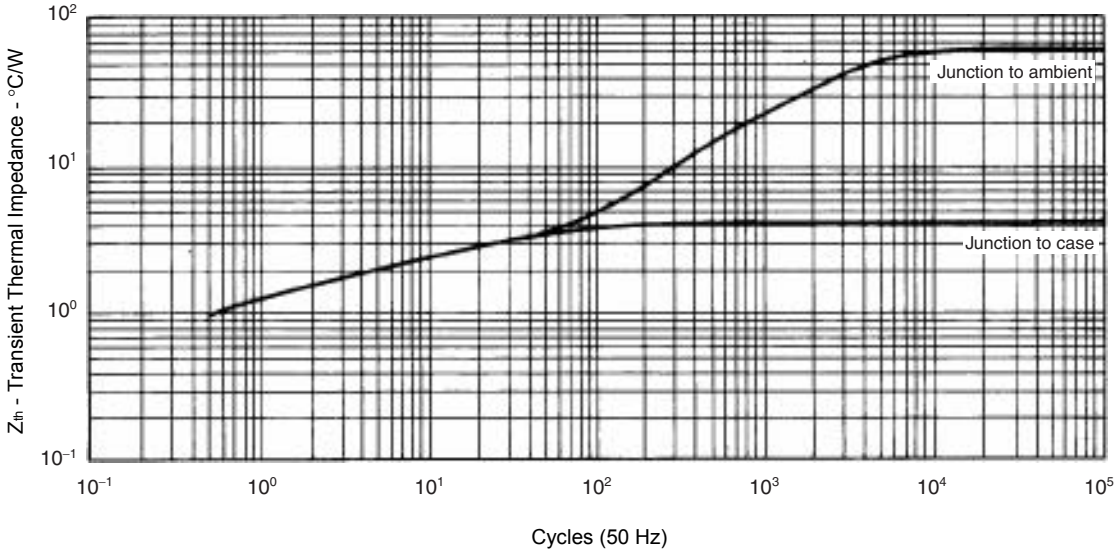
Figure 12. T_A vs. $I_{T(RMS)}$ RATING



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Figure 13. Z_{th} CHARACTERISTIC



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