

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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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 ( $T_c = 99^\circ\text{C}$ ), repetitive peak off-state voltage 400 V and 600 V.

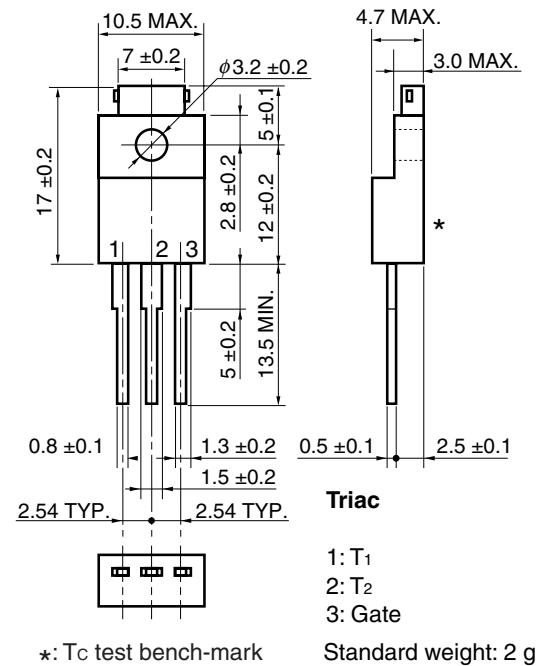
FEATURES

- 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)



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**MAXIMUM RATINGS**

Parameter	Symbol	AC05DSMA	AC05FSMA	Unit	Remarks
Non-repetitive Peak Off-state Voltage	V <sub>DSM</sub>	500	700	V	–
Repetitive Peak Off-state Voltage	V <sub>DRM</sub>	400	600	V	–
Effective On-state Current	I <sub>T(RMS)</sub>	5 (T <sub>c</sub> = 99°C)		A	Refer to <b>Figure 11</b> and <b>12</b> .
Surge On-state Current	I <sub>TSM</sub>	50 (50 Hz 1 cycle) 55 (60 Hz 1 cycle)		A	Refer to <b>Figure 2</b> .
Fusing Current	$\int I_t^2 dt$	10 (1 ms ≤ t ≤ 10 ms)		A <sup>2</sup> s	–
Critical Rate Rise of On-state Current	dI <sub>t</sub> /dt	50		A/μs	–
Peak Gate Power Dissipation	P <sub>GM</sub>	3 (f ≥ 50 Hz, Duty ≤ 10%)		W	–
Average Gate Power Dissipation	P <sub>G(AV)</sub>	0.3		W	–
Peak Gate Current	I <sub>GM</sub>	±1.5 (f ≥ 50 Hz, Duty ≤ 10%)		A	–
Junction Temperature	T <sub>j</sub>	–40 to +125		°C	–
Storage Temperature	T <sub>stg</sub>	–55 to +150		°C	–

**ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remarks	
Repetitive Peak Off-state Current		I <sub>DRM</sub>	V <sub>DM</sub> = V <sub>DRM</sub>	T <sub>j</sub> = 25°C	–	–	100	μA	–
				T <sub>j</sub> = 125°C	–	–	1	mA	–
On-state Voltage		V <sub>TM</sub>	I <sub>TM</sub> = 5 A	–	–	1.8	V	Refer to <b>Figure 1</b> .	
Gate Trigger Current	Mode I	I <sub>GT</sub>	V <sub>DM</sub> = 12 V, R <sub>L</sub> = 30 Ω	T <sub>2+</sub> , G+	–	–	10	mA	Refer to <b>Figure 4</b> .
	II			T <sub>2–</sub> , G+	–	–	–		
	III			T <sub>2–</sub> , G–	–	–	10		
	IV			T <sub>2+</sub> , G–	–	–	10		
Gate Trigger Voltage	Mode I	V <sub>GT</sub>	V <sub>DM</sub> = 12 V, R <sub>L</sub> = 30 Ω	T <sub>2+</sub> , G+	–	–	1.5	V	Refer to <b>Figure 4</b> .
	II			T <sub>2–</sub> , G+	–	–	–		
	III			T <sub>2–</sub> , G–	–	–	1.5		
	IV			T <sub>2+</sub> , G–	–	–	1.5		
Gate Non-trigger Voltage		V <sub>GD</sub>	T <sub>j</sub> = 125°C, V <sub>DM</sub> = $\frac{1}{2}$ V <sub>DRM</sub>	0.2	–	–	V	–	
Holding Current		I <sub>H</sub>	V <sub>DM</sub> = 24 V	–	10	–	mA	–	
Critical Rate Rise of Off-state Voltage		dv/dt	T <sub>j</sub> = 125°C, V <sub>DM</sub> = $\frac{2}{3}$ V <sub>DRM</sub>	–	100	–	V/μs	–	
Commutating Critical Rate Rise of Off-state Voltage		(dv/dt) <sub>c</sub>	T <sub>j</sub> = 125°C, (di <sub>T</sub> /dt) <sub>c</sub> = –2.7 A/ms, V <sub>D</sub> = 400 V	5	–	–	V/μs	–	
Thermal Resistance <sup>Note</sup>		R <sub>th(j-c)</sub>	Junction-to-case AC	–	–	4.2	°C/W	Refer to <b>Figure 13</b> .	

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

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

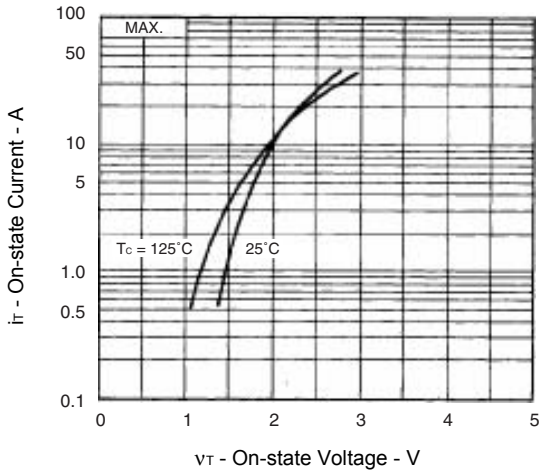
T<sub>j(max)</sub>: Maximum junction temperature

T<sub>c</sub>: Case temperature

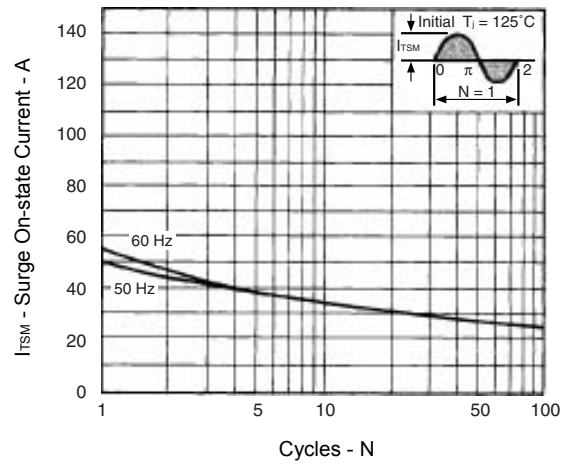
P<sub>T(AV)</sub>: Average on-dissipation

**TYPICAL CHARACTERISTICS**

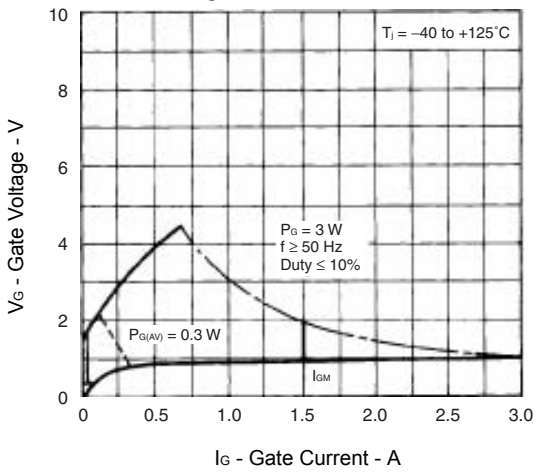
**Figure 1.  $i_r$  vs.  $v_T$  CHARACTERISTIC**



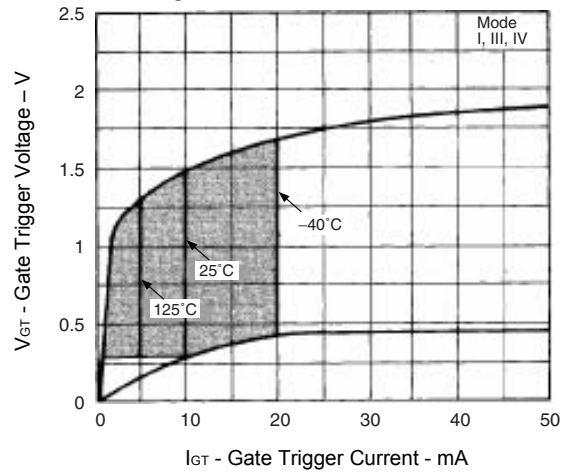
**Figure 2.  $I_{TSM}$  RATING**



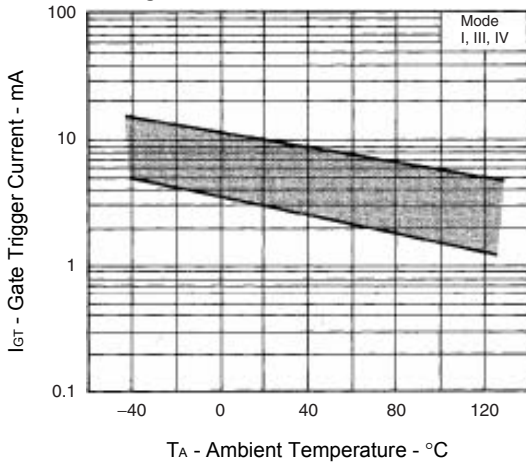
**Figure 3. GATE RATING**



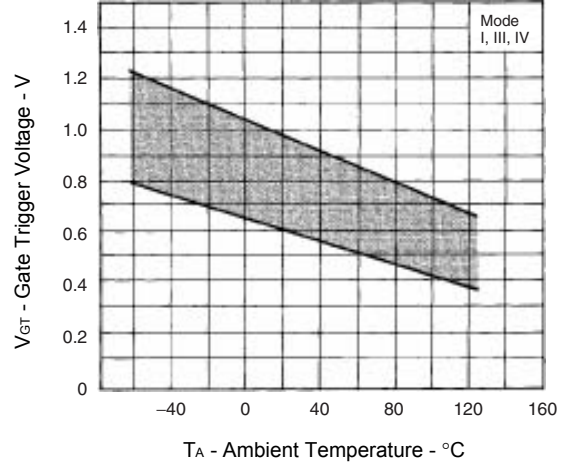
**Figure 4. GATE CHARACTERISTIC**

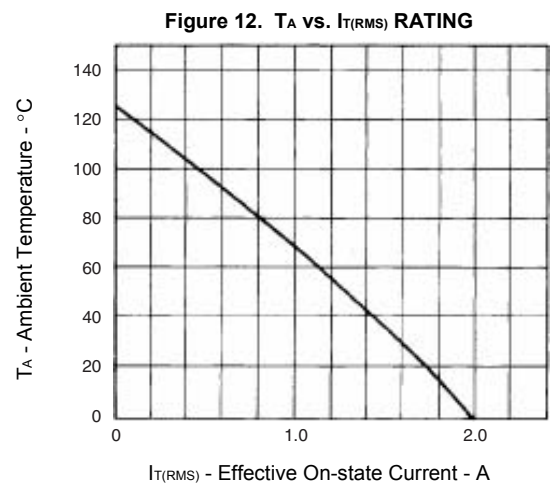
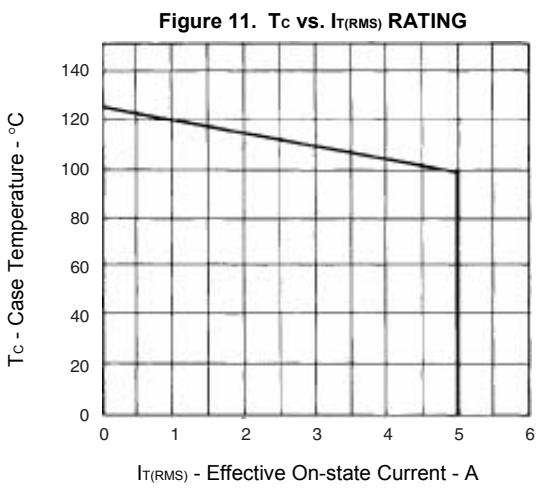
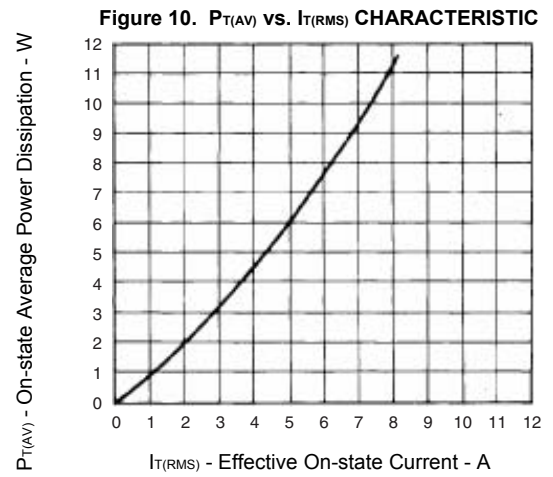
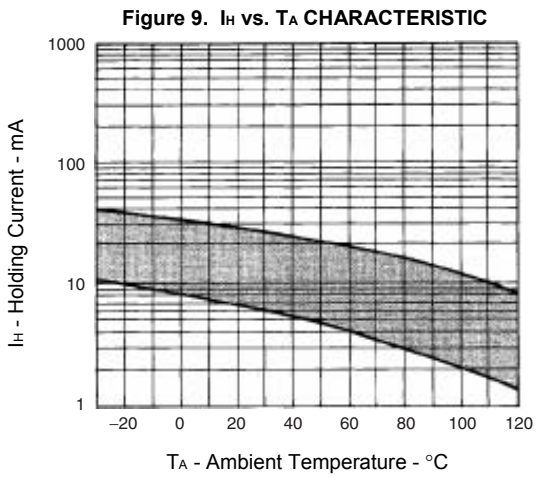
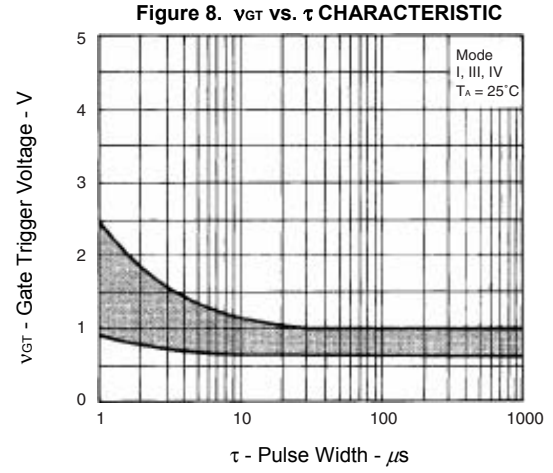
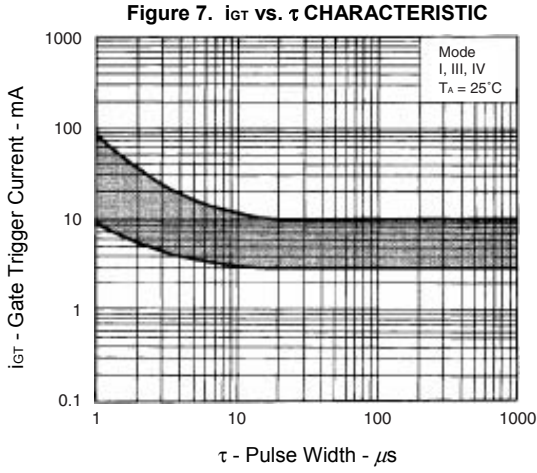


**Figure 5.  $I_{GT}$  vs.  $T_A$  CHARACTERISTIC**

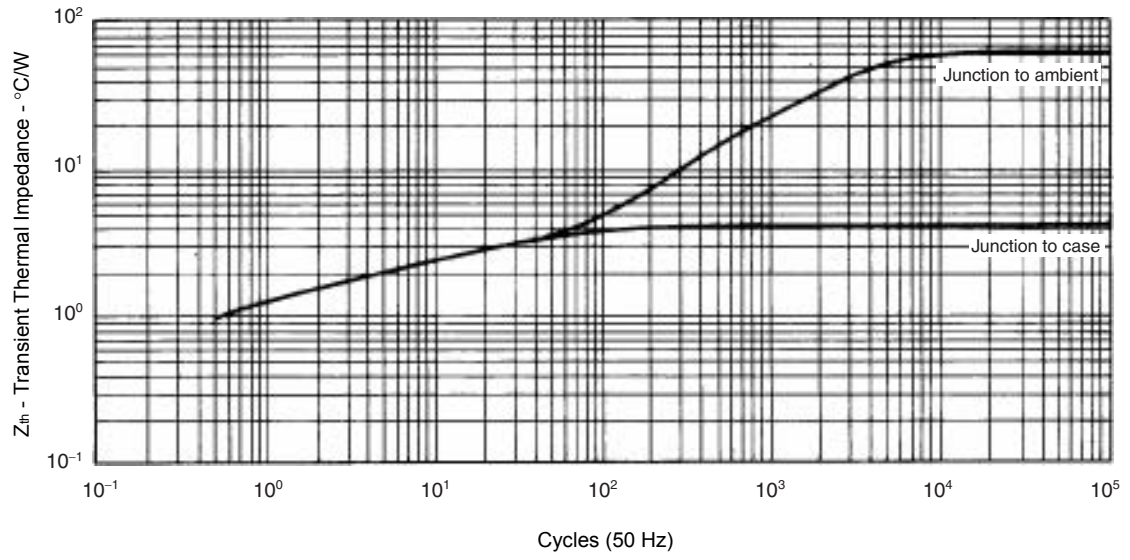


**Figure 6.  $V_{GT}$  vs.  $T_A$  CHARACTERISTIC**





**Figure 13.  $Z_{th}$  CHARACTERISTIC**



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