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April 1st, 2010
Renesas Electronics Corporation

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

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RENESAS

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THYRISTORS AC03DGM, AC03FGM

3 A MOLD TRIAC

The AC03EGM and AC03FGM are fully diffused mold TRIACs with an effective on-current of 3 A. The repeat peak off-voltages are 400 V and 600 V.

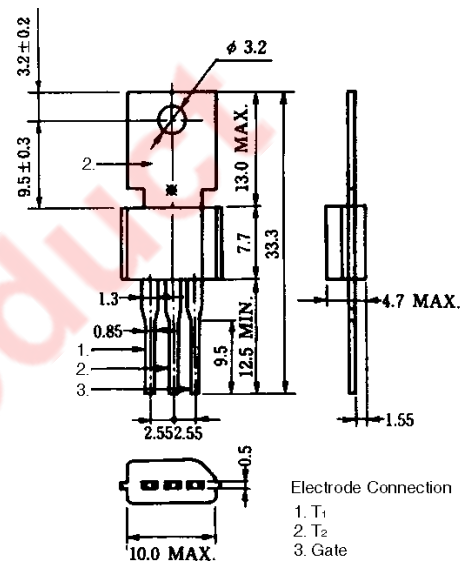
FEATURES

- Gate trigger current (mode I, III, and IV) at 12 mA or less is guaranteed.
- This transistor features a small and lightweight package and is easy to handle even on the mounting surface due to its TO-202AA dimensions. Processing of lead wires and heatsink (tablet) using jigs is also possible.
- High degrees-of-freedom applications design is available due to high gate trigger sensitivity and small hold current distribution.
- Employs flame-retardant epoxy resin (UL94V-0).

APPLICATIONS

Noncontact switches of motor speed control, heater temperature control, lamp light control

PACKAGE DRAWING (UNIT: mm)



*T_c test bench-mark

Standard weight: 1.4 g

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Parameter	Symbol	AC03DGM	AC03FGM	Unit	Remarks
Non-repetitive peak off-state voltage	V _{DSM}	500	700	V	—
Repetitive peak off-voltage	V _{DRM}	400	600	V	—
Effective on-state current	I _{T(RMS)}	3 (T _c = 92°C)		A	Refer to Figures 11 and 12.
Surge on-state current	I _{TSM}	30 (50 Hz 1 cycle) 33 (60 Hz 1 cycle)		A	Refer to Figure 2.
Fusing current	fI _T ² dt	4.0 (1 ms ≤ t ≤ 10 ms)		A ² s	—
Critical rate of rise of on-state current	dI _T /dt	40		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}	±0.5 (f ≥ 50 Hz, Duty ≤ 10 %)		A	—
Junction temperature	T _j	-40 to +125		°C	—
Storage temperature	T _{stg}	-55 to +150		°C	—

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ELECTRICAL CHARACTERISTICS (T_j = 25°C, R_{GK} = 1 kΩ)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remarks	
Repeat peak off-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 R _L = 30 Ω	T ₂ +, G+	–	–	12	mA	Refer to Figure 4.
	II			T ₂ –, G+	–	–	–		
	III			T ₂ –, G–	–	–	12		
	IV			T ₂ +, G–	–	–	12		
Gate trigger voltage	Mode I	V _{GT}	V _{DM} = 12 V R _L = 30 Ω	T ₂ +, G+	–	–	1.5	V	Refer to Figure 4.
	II			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} = 1/2 V _{DRM}	0.2	–	–	V	–	
Hold current		I _H	V _{DM} = 24 V, I _{TM} = 5 A	–	10	–	mA	–	
Critical rate of rise of off-state voltage		dv/dt	T _j = 125°C, V _{DM} = 2/3 V _{DRM}	–	100	–	V/μs	–	
Commutating critical rate of rise of off-state voltage		(dv/dt) _c	T _j = 125°C (di/dt) _c = –1.6 A/ms V _D = 400 V	5	–	–	V/μs	–	
Thermal resistance*		R _{th(j-c)}	Junction-to-case AC	–	–	10	°C/W	Refer to Figure 13.	
		R _{th(j-a)}	Junction-to-ambient AC	–	–	75	°C/W		

* The thermal resistance at 50 Hz and 60 Hz sine wave current, which is shown on 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

Figure 1. I_T vs. V_T Characteristics

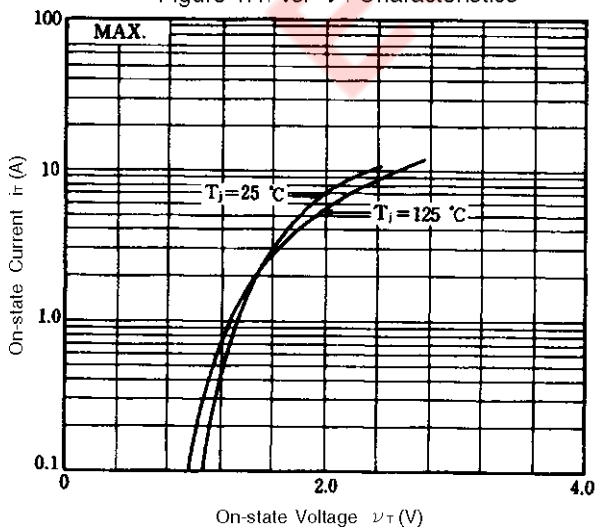


Figure 2. I_{TSM} Rating

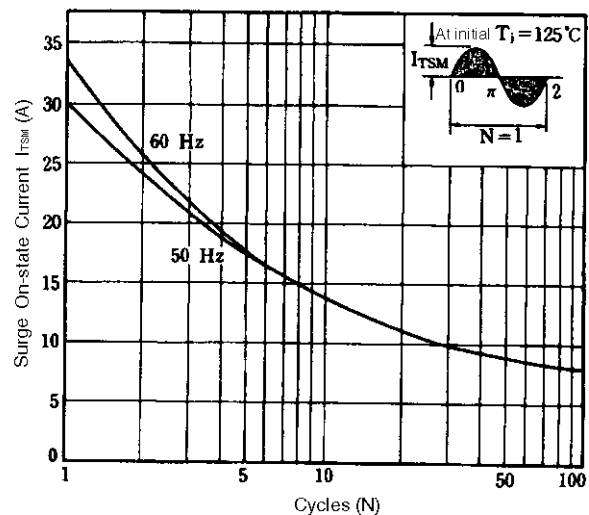


Figure 3. Gate Rating

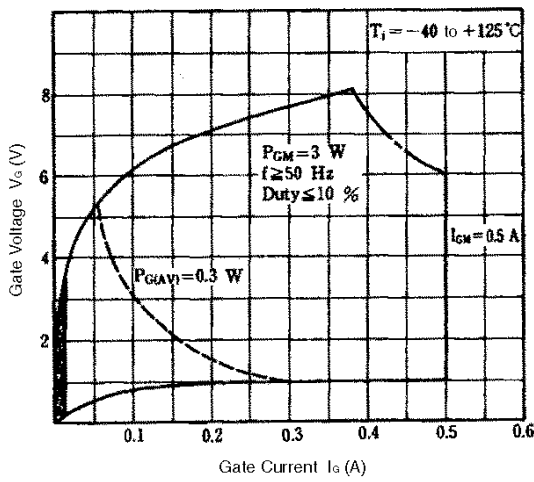


Figure 4. Example of Gate Characteristics

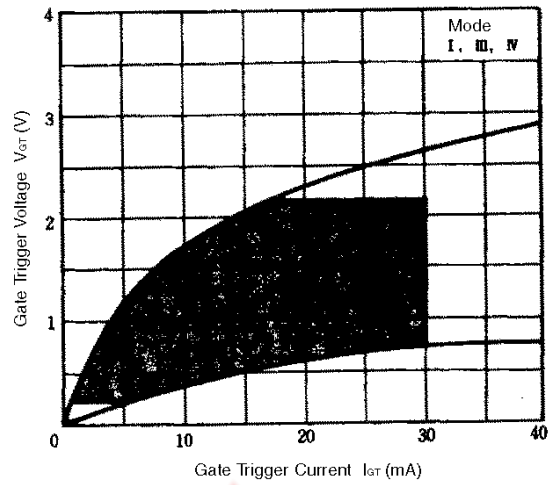


Figure 5. I_{GT} vs. T_A Example of Characteristics

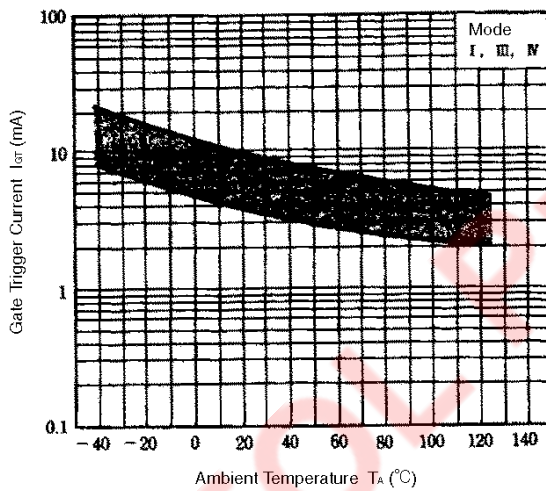


Figure 6. V_{GT} vs. T_A Example of Characteristics

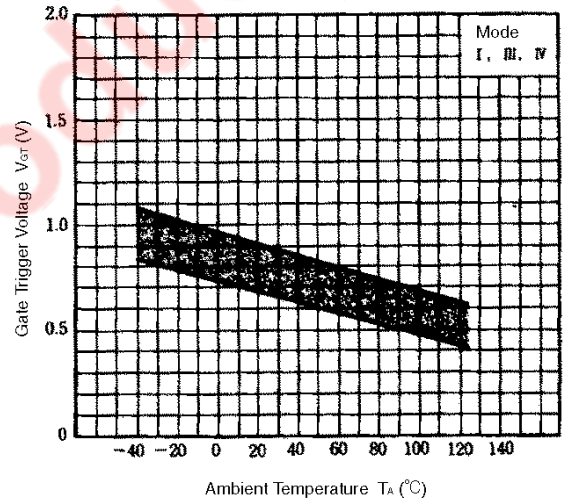


Figure 7. I_{GT} vs. τ Example of Characteristics

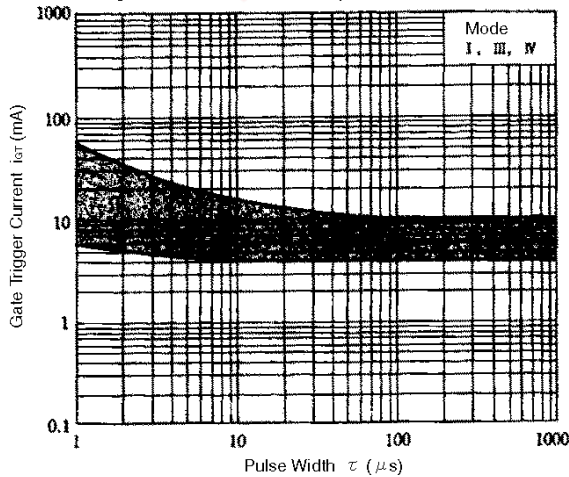


Figure 8. V_{GT} vs. τ Example of Characteristics

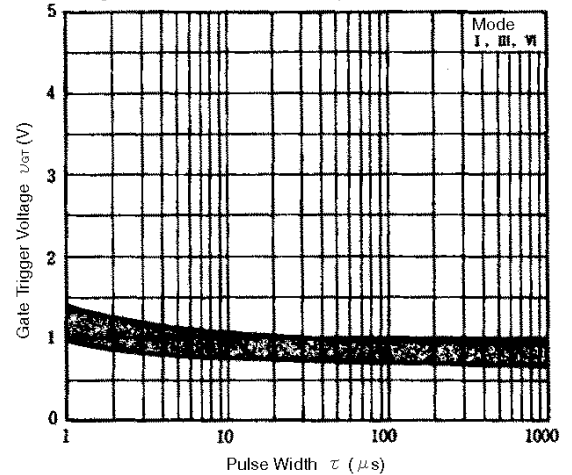


Figure 9. I_H vs. T_A Example of Characteristics

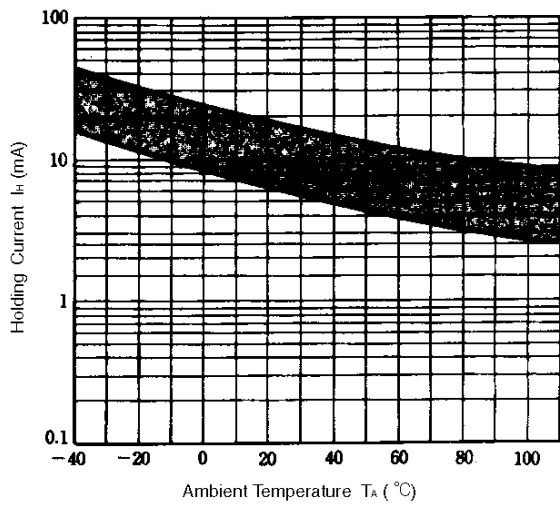


Figure 10. $P_{T(AV)}$ vs. $I_{T(RMS)}$ Characteristics

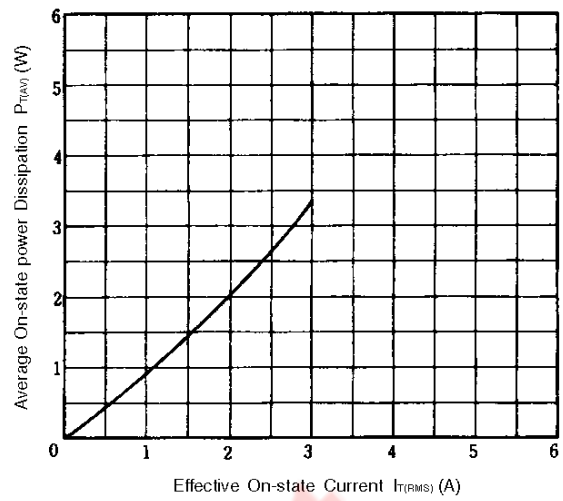


Figure 11. T_C vs. $I_{T(AV)}$ Rating

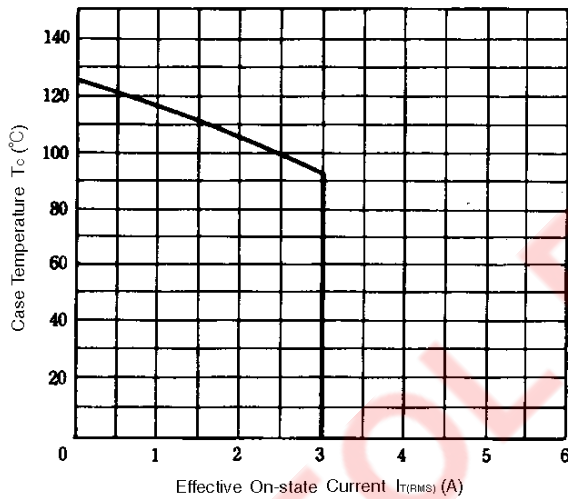


Figure 12. T_A vs. $I_{T(RMS)}$ Rating

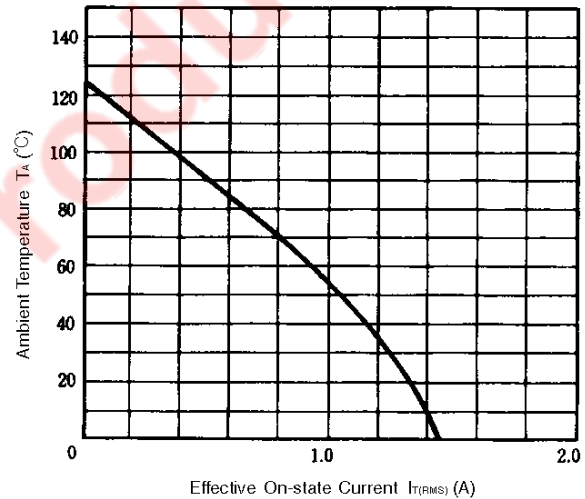
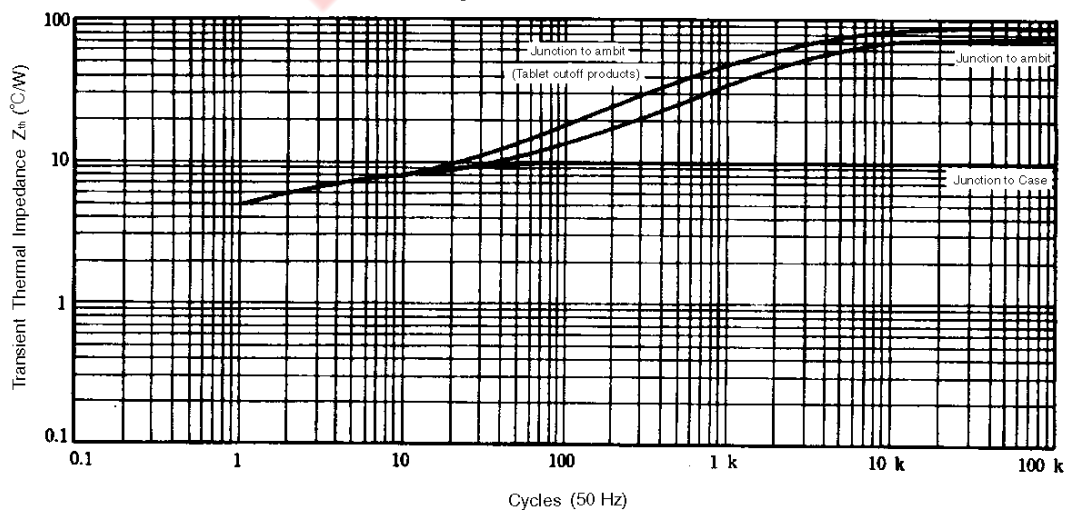


Figure 13. Z_{th} Characteristics



[MEMO]

EOL Product

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