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April 1st, 2010
Renesas Electronics Corporation

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

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The Renesas logo, featuring the word "RENESAS" in a bold, sans-serif font with a stylized square symbol to the left of the letter "R".

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2 A HIGH-SPEED SWITCHING SCR

The 2S2M and 2S4M are P-gate fully diffused mold SCRs with an average on-current of 2 A. The repeat peak off-voltages (and reverse voltages) are 200 V and 400 V.

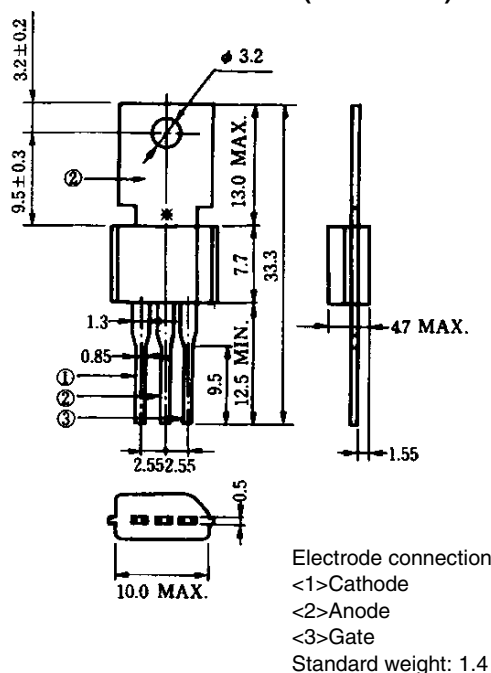
FEATURES

- This transistor is designed for high-speed switching and is ideal for use in commercial frequencies, high-frequency pulse applications, and inverter applications.
- 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.
- Employs flame-retardant epoxy resin (UL94V-0).

APPLICATIONS

Consumer electronic equipments, ignitors of devices for light industry, inverter, and solenoid valve drives

PACKAGE DRAWING (UNIT: mm)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	2S2M	2S4M	Ratings	Unit
Non-repetitive peak reverse voltage	V _{RSM}	300	500	V	R _{GK} = 1 kΩ
Non-repetitive peak off-state voltage	V _{DSM}	300	500	V	R _{GK} = 1 kΩ
Repetitive peak reverse voltage	V _{RRM}	200	400	V	R _{GK} = 1 kΩ
Repetitive peak off-voltage	V _{DRM}	200	400	V	R _{GK} = 1 kΩ
Average on-state current	I _{T(AV)}	2 (Tc = 77°C, Single half-wave, θ = 180°)		A	Refer to Figure 6 and 7.
Surge on-state current	I _{TSM}	20 (f = 50 Hz, Sine half-wave, 1 cycle)		A	Refer to Figure 2.
High-frequency peak on-state current	I _{TRM}	15 (Tc = 65°C, f = 10 kp.p.s, t _p = 10 μs)		A	—
Fusing current	∫ i _T dt	1.6 (1 ms ≤ t ≤ 10 ms)		A ² s	—
Critical rate of rise of on-state current	di _T /dt	50		A/μs	—
Peak gate power dissipation	P _{GM}	0.5 (f ≥ 50 Hz, Duty ≤ 10%)		W	—
Average gate power dissipation	P _{G(AV)}	0.1		W	—
Peak gate forward current	I _{FGM}	0.2 (f ≥ 50 Hz, Duty ≤ 10%)		A	—
Peak gate reverse voltage	V _{RGM}	6		V	—
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	Specifications			Unit	Remarks
			MIN.	TYP.	MAX.		
Repeat peak off-state current	I _{DRM}	V _{DM} = V _{DRM}	T _j = 25°C		10	μA	–
			T _j = 125°C		200		–
Repetitive peak reverse current	I _{RRM}	V _{RM} = V _{RRM}	T _j = 25°C		10	μA	–
			T _j = 125°C		200	V	Refer to Figure 1.
On voltage	V _{TM}	T _j = 25°C, I _{TM} = 4 A	–	–	2.2	V	Refer to Figure 9.
Gate trigger voltage	V _{GT}	V _{DM} = 6 V, R _L = 100 Ω	–	–	0.8	μA	Refer to Figure 8.
Gate trigger current	I _{GT}	V _{DM} = 6 V, R _L = 100 Ω	–	–	300	V	–
Gate non-trigger voltage	V _{GD}	T _j = 125°C, V _{DM} = 1/2 V _{DRM}	0.2	–	–	V	–
Critical rate of-rise of off-state voltage	dv/dt	T _j = 125°C, V _{DM} = 2/3 V _{DRM}	10	–	–	V/μs	–
Holding current	I _H	T _j = 25°C, V _D = 24 V	–	–	10	mA	–
Commutating turn-off time	T _q	T _j = 125°C, I _T = 2 A V _{DM} = 2/3 V _{DRM} , V _R = 50 V dv/dt = 10 V/μs	–	–	15	μs	–
Turn-on time	T _{gt}	T _j = 125°C, V _{DM} = 2/3 V _{DRM} I _{TM} = 30 A I _G = 5 mA, t _{IG} = 5 μs	–	–	2	μs	–
Thermal resistance	R _{th(j-c)}	Junction-to-case DC	–	–	10	°C/W	Refer to Figure 13.
	R _{th(j-a)}	Junction-to-ambient DC	–	–	75		

TYPICAL CHARACTERISTICS (T_a = 25°C)

Figure 1. i_T vs. v_T Characteristics

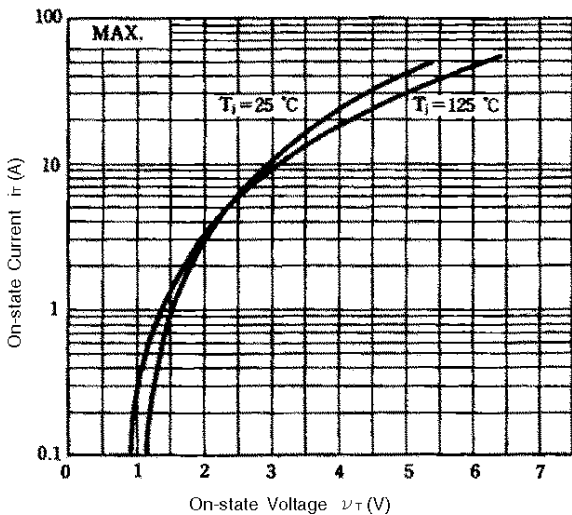


Figure 2. I_{TSM} Rating

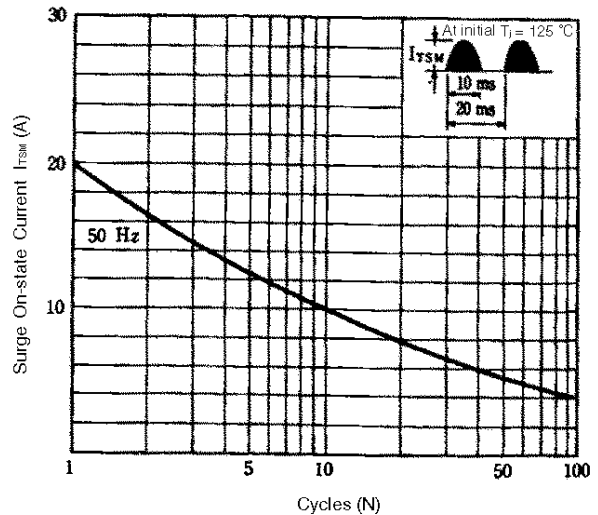


Figure 3. I_{TRM} vs. t_p Rating

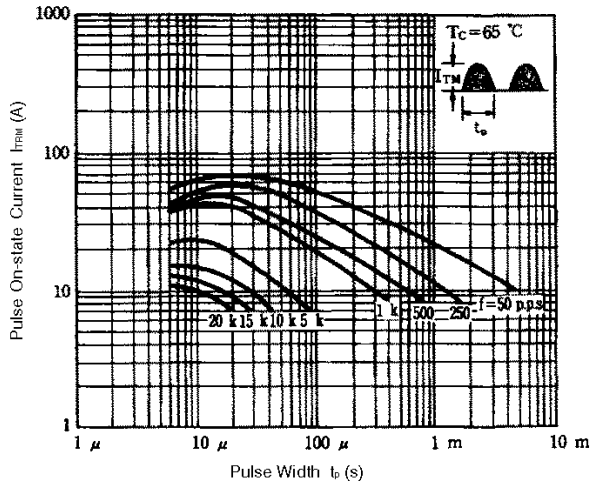


Figure 4. I_{TRM} vs. t_p Rating

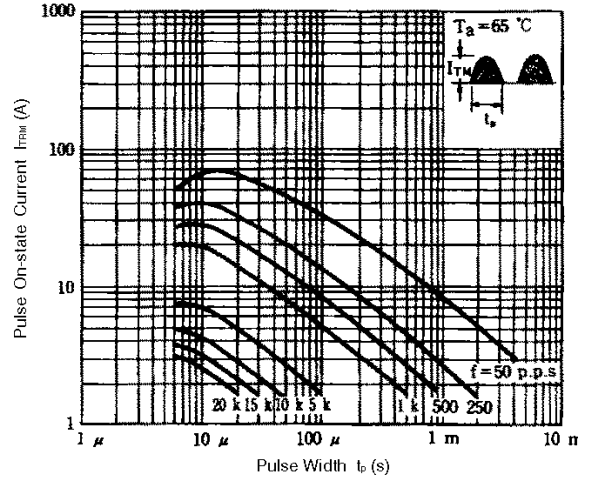


Figure 5. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

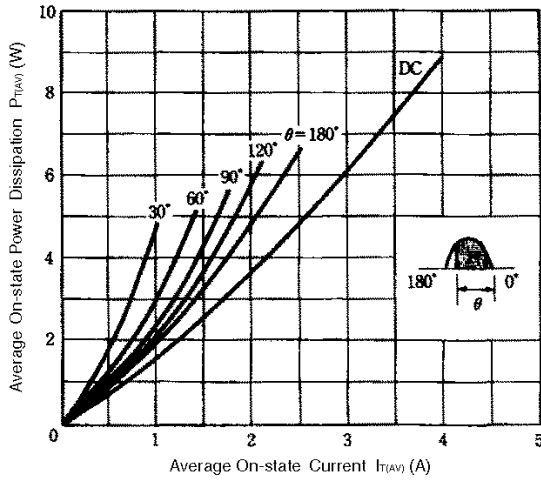


Figure 6. T_c vs. $I_{T(AV)}$ Rating

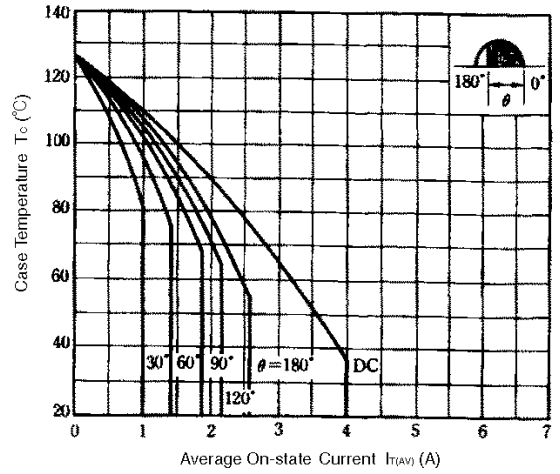


Figure 7. T_A vs. $I_{T(AV)}$ Rating

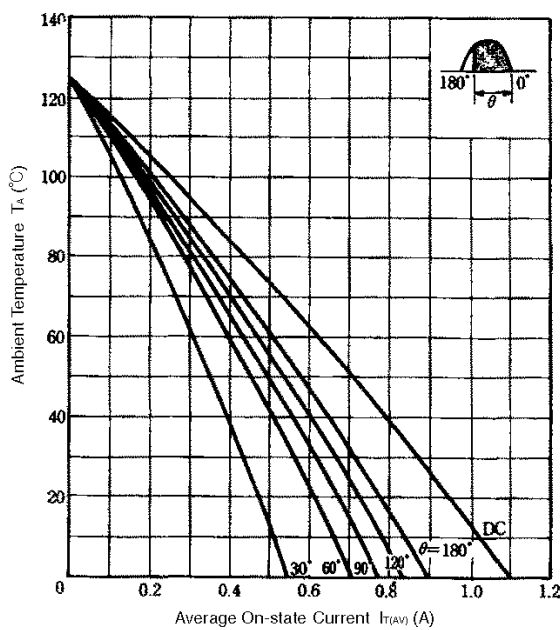


Figure 8. I_{GT} vs. T_A Example of Characteristics

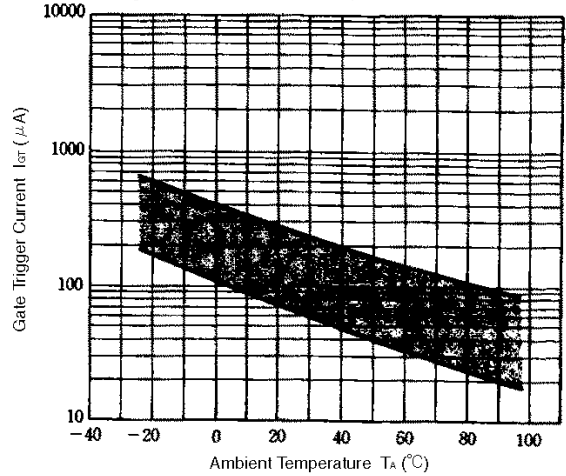


Figure 9. V_{GT} vs. T_A Example of Characteristics

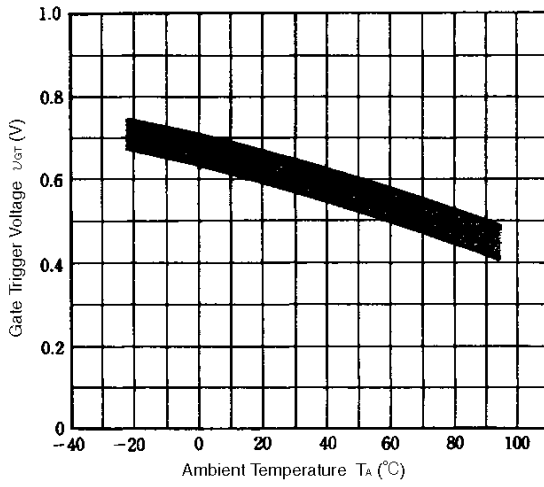


Figure 10. i_{GS} vs. τ Example of Characteristics

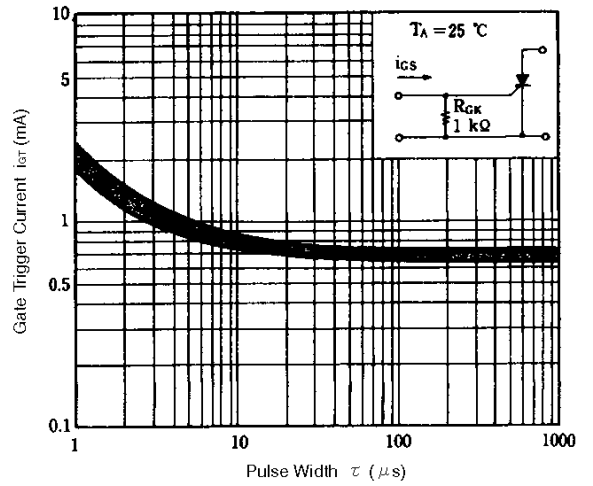


Figure 11. V_{GT} vs. τ Example of Characteristics

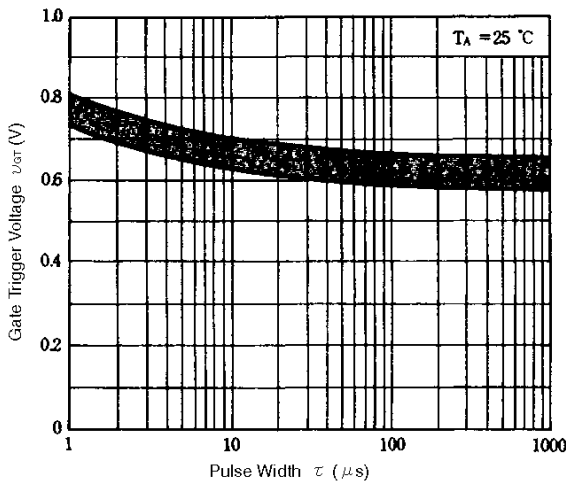


Figure 12. I_H vs. T_A Example of Characteristics

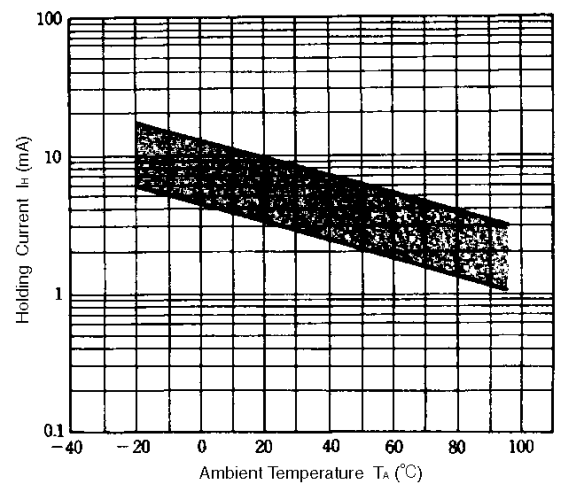
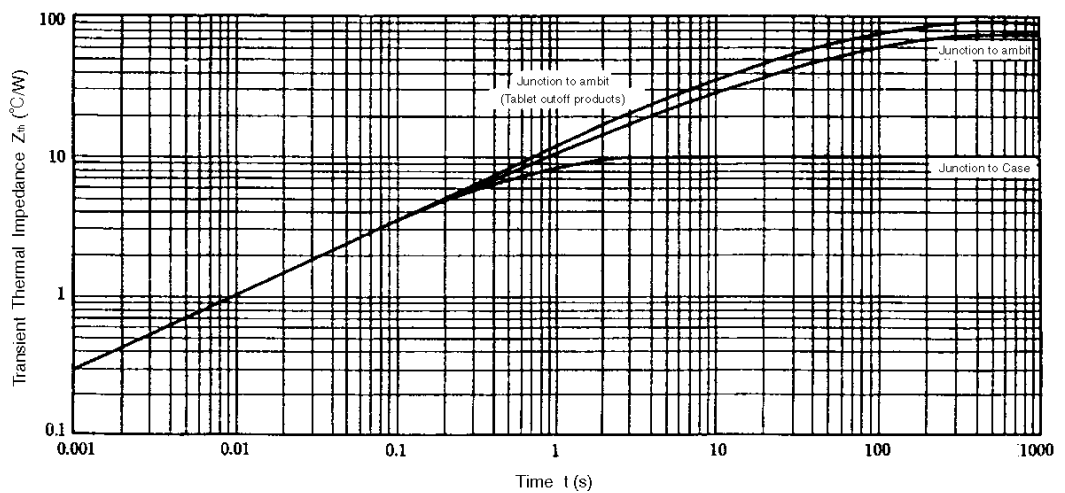


Figure 13. Z_{th} Characteristics



[MEMO]

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