

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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300 mA HIGH-WITHSTANDING-VOLTAGE MOLD SCR

DESCRIPTION

The 03P4MG and 03P6MG are P-gate fully diffused mold SCRs with an average on-state current of 300 mA. The repeat peak off-state voltages (and reverse voltages) are 400 and 600 V.

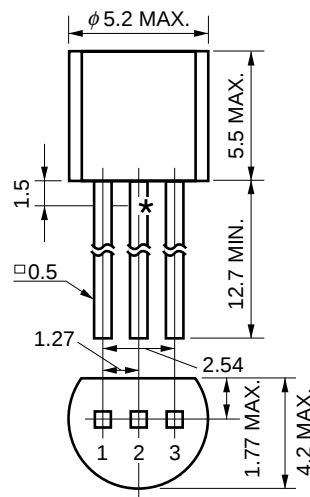
FEATURES

- 400 and 600 V high-withstanding-voltage series of products
- The non-repetitive withstanding voltage is a high 700 V, making it easy to harmonize the rise voltage of the surge absorber.
- High-sensitivity thyristor ($I_{GT} = 3$ to $50 \mu A$)
- Employs flame-retardant epoxy resin (UL94V-0)

APPLICATIONS

Leakage breakers, SSRs, various type of alarms, consumer electronic equipments and automobile electronic components

PACKAGE DRAWING (Unit: mm)



Electrode connection

- 1: Gate
- 2: Anode
- 3: Cathode

*T_c test bench-mark
Standard weight: 0.3 g

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings		Unit	Remarks
		03P4MG	03P6MG		
Non-repetitive Peak Reverse Voltage	V _{RSM}	700	700	V	R _{GK} = 1 kΩ
Non-repetitive Peak Off-state Voltage	V _{DSM}	700	700	V	R _{GK} = 1 kΩ
Repetitive Peak Reverse Voltage	V _{RRM}	400	600	V	R _{GK} = 1 kΩ
Repetitive Peak Off-state Voltage	V _{DRM}	400	600	V	R _{GK} = 1 kΩ
Average On-state Current	I _{T(AV)}	300 (T _A = 30°C, Single half-wave, θ = 180°)		mA	Refer to Figure 10.
Effective On-state Current	I _{T(RMS)}	470		mA	—
★ Surge On-state Current	I _{TSM}	8 (f = 50 Hz, Sine half-wave, 1 cycle)		A	Refer to Figure 2.
Fusing Current	$\int i^2 dt$	0.15 (1 ms ≤ t ≤ 10 ms)		A ² s	—
Critical Rate of On-state Current of Rise	di _T /dt	20		A/μs	—
Peak Gate Power Dissipation	P _{GM}	100 (f ≥ 50 Hz, Duty ≤ 10%)		mW	Refer to Figure 3.
Average Gate Power Dissipation	P _{G(AV)}	10		mW	Refer to Figure 3.
Peak Gate Forward Current	I _{FGM}	100 (f ≥ 50 Hz, Duty ≤ 10%)		mA	—
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 ($T_j = 25^\circ\text{C}$, $R_{\theta K} = 1\text{ k}\Omega$)

Parameter	Symbol	Conditions	Specifications			Unit	Remarks
			MIN.	TYP.	MAX.		
Non-repetitive Peak Reverse Current	I_{RRM}	$V_{RM} = V_{RRM}$	$T_j = 25^\circ\text{C}$	—	10	μA	—
			$T_j = 125^\circ\text{C}$	—	100	μA	—
Non-repetitive Peak Off-state Current	I_{DRM}	$V_{DM} = V_{DRM}$	$T_j = 25^\circ\text{C}$	—	10	μA	—
			$T_j = 125^\circ\text{C}$	—	100	μA	—
Critical Rate-of-rise of Off-state Voltage	dV_D/dt	$T_j = 125^\circ\text{C}$, $V_{DM} = \frac{2}{3} V_{DRM}$	10	—	—	$\text{V}/\mu\text{s}$	—
On-state Voltage	V_T	$I_T = 4\text{ A}$	—	—	2.2	V	Refer to Figure 1.
Gate Trigger Current	I_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	3	—	50	μA	—
Gate Trigger Voltage	V_{GT}	$V_{DM} = 6\text{ V}$, $R_L = 100\ \Omega$	—	—	0.8	V	—
Gate Non-trigger Voltage	V_{GD}	$T_j = 125^\circ\text{C}$, $V_{DM} = \frac{V_{DRM}}{2}$	0.2	—	—	V	—
Holding Current	I_H	$V_{DM} = 24\text{ V}$, $I_{TM} = 4\text{ A}$	—	—	5	mA	—
Turn-off Time	t_q	$T_j = 125^\circ\text{C}$, $I_T = 200\text{ mA}$, $dI_R/dt = 15\text{ A}/\mu\text{s}$, $V_R \geq 25\text{ V}$, $V_{DM} = \frac{2}{3} V_{DRM}$, $dV_D/dt = 10\text{ V}/\mu\text{s}$	—	60	—	μs	—
Thermal Resistance	$R_{th(j-c)}$	Junction-to-case DC	—	—	50	$^\circ\text{C}/\text{W}$	Refer to Figure 14.
	$R_{th(j-a)}$	Junction-to-ambient DC	—	—	230	$^\circ\text{C}/\text{W}$	Refer to Figure 14.

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Figure 1. i_r vs. v_T Characteristics

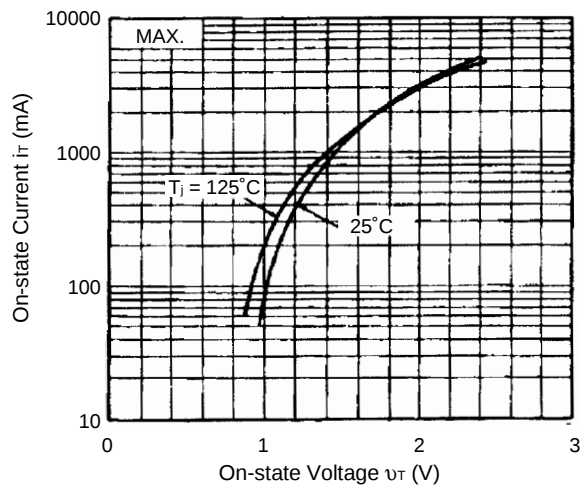


Figure 2. I_{TSM} Rating

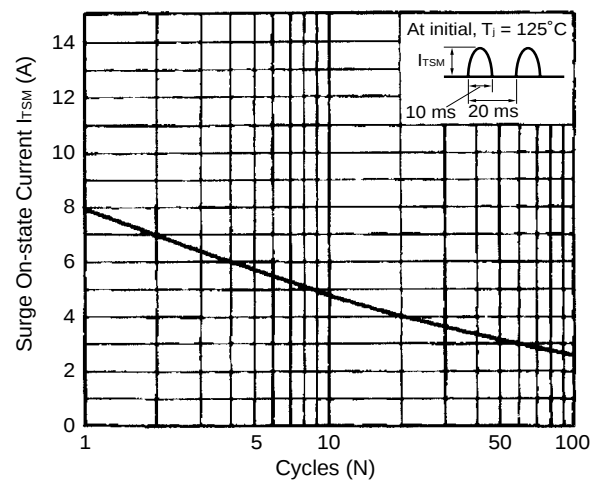


Figure 3. Gate Rating

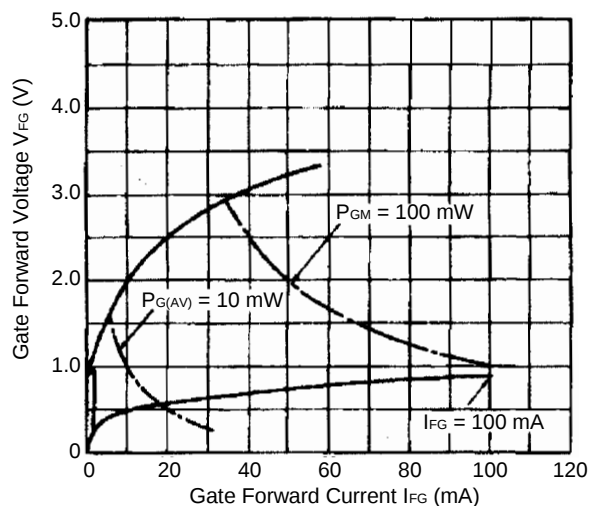


Figure 4. Example of Gate Characteristics

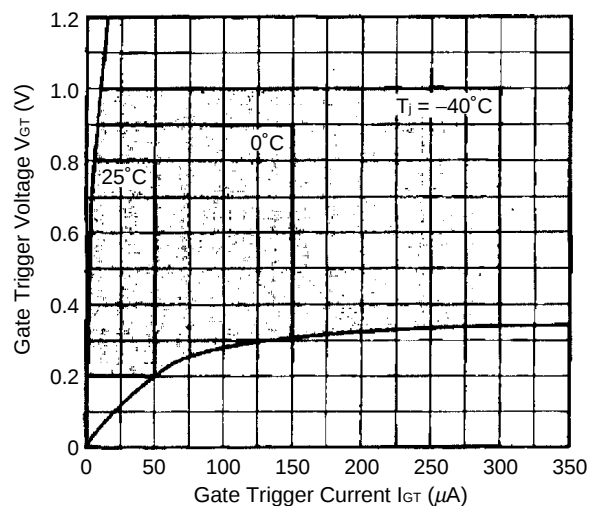


Figure 5. I_{GT} vs. T_A Example of Characteristics

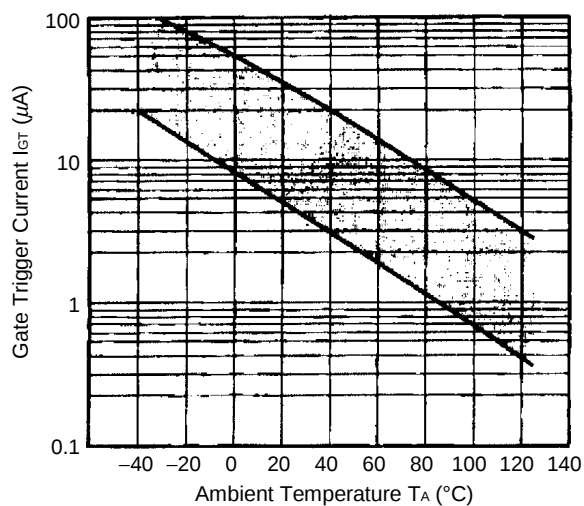


Figure 6. V_{GT} vs. T_A Example of Characteristics

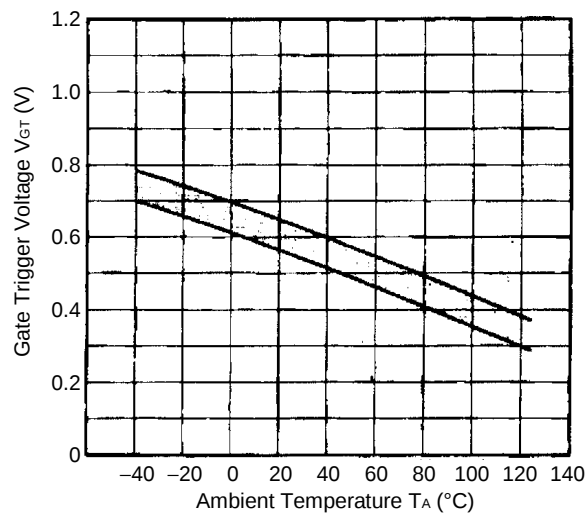


Figure 7. i_{GS} vs. τ Example of Characteristics

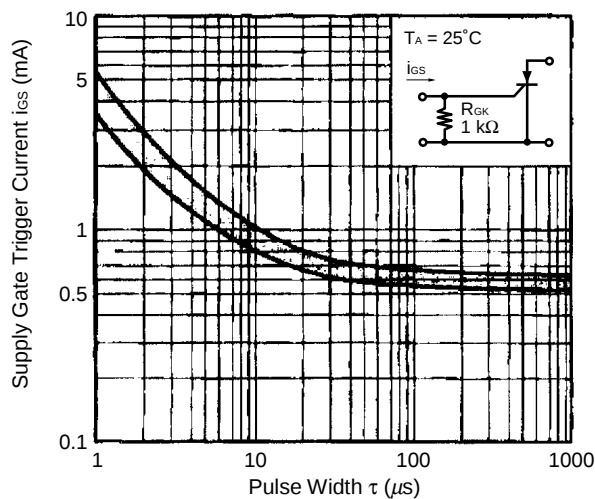


Figure 8. v_{GT} vs. τ Example of Characteristics

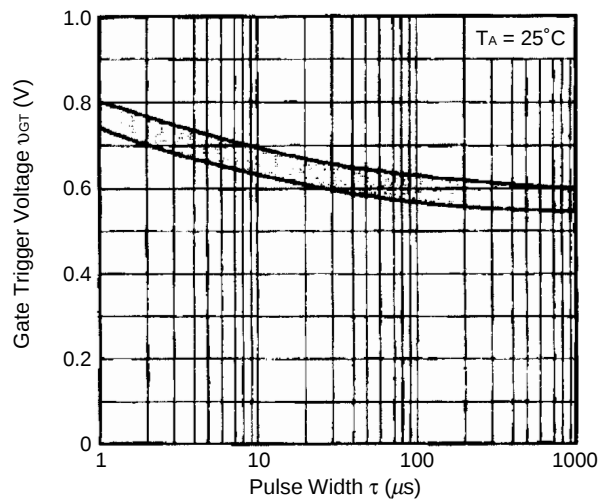


Figure 9. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

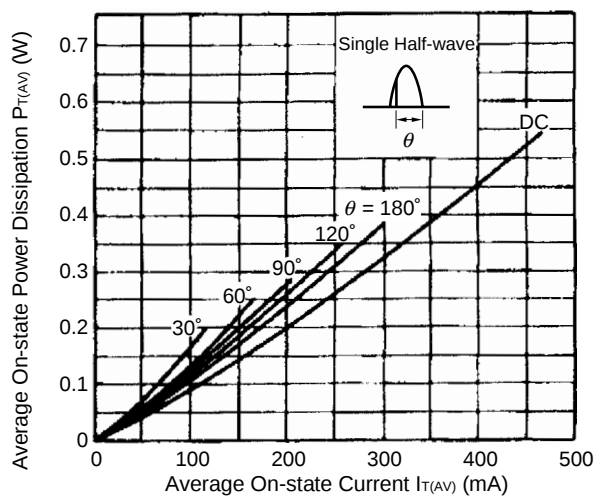


Figure 10. T_A vs. $I_{T(AV)}$ Characteristics

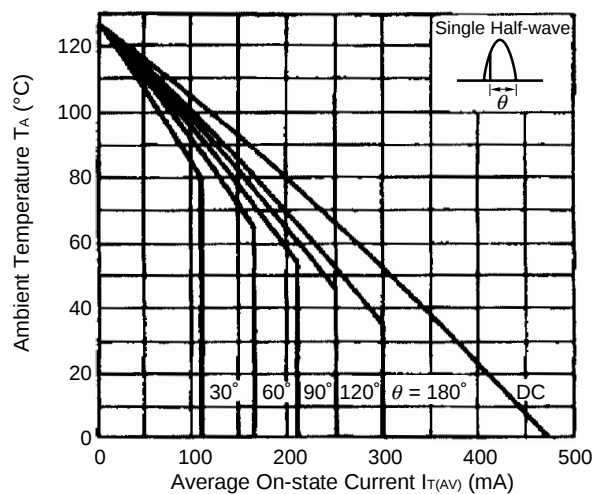


Figure 11. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

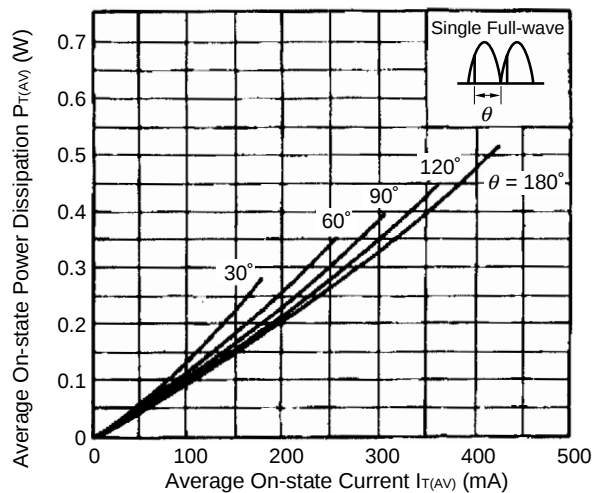


Figure 12. T_A vs. $I_{T(AV)}$ Characteristics

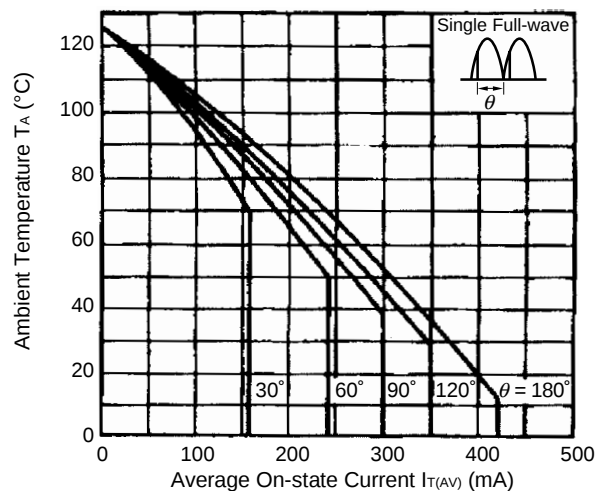


Figure 13. I_H vs. T_A Example of Characteristics

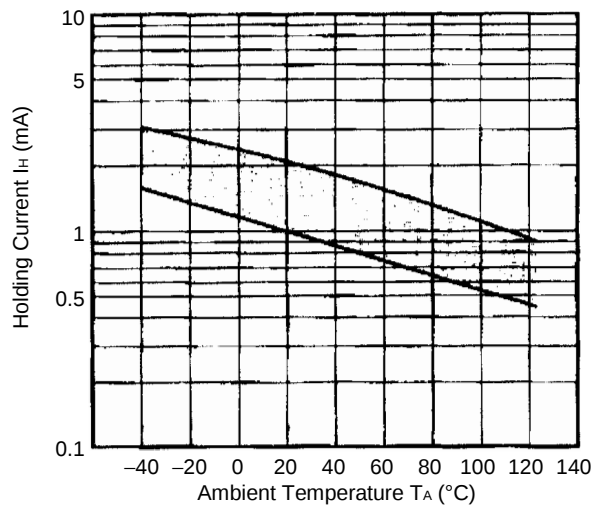
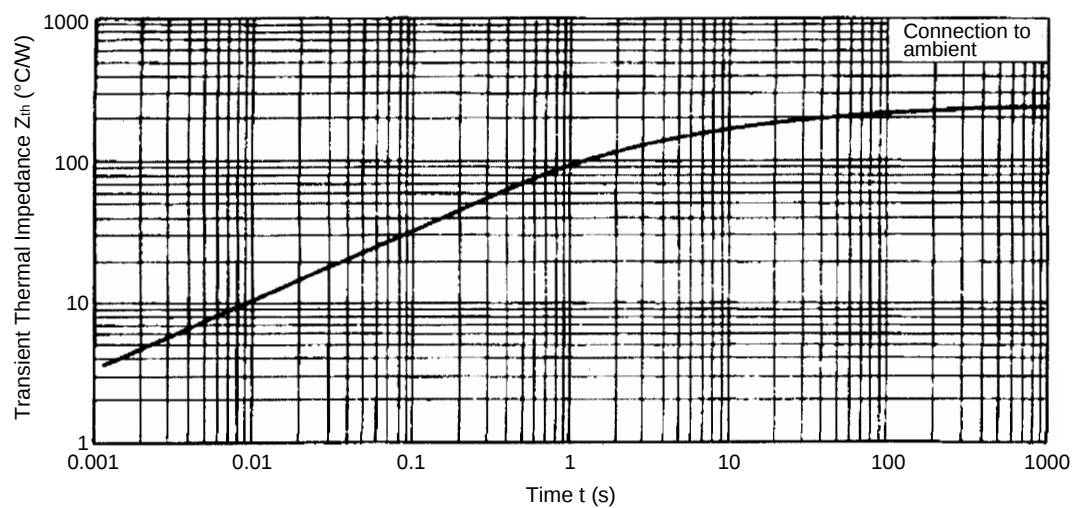


Figure 14. Z_{th} Characteristics



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