To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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RENESAS

Phase-out/Discontinued

THYRISTORS

03P4MG,03P6MG

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.

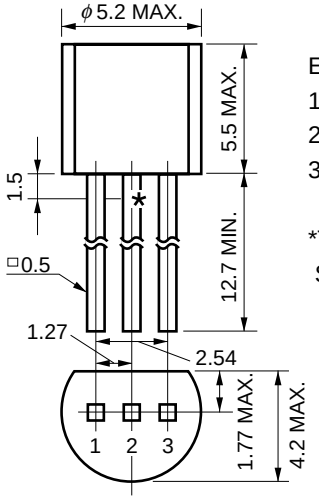
FEATURES

- 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 μA)
- 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	$\int i_T^2 dt$	0.15 (1 ms ≤ t ≤ 10 ms)		A^2s	–
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	–

Document No. D15290EJ4V0DS00 (4th edition)
Date Published February 2003 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

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

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

TYPICAL CHARACTERISTICS (T_A = 25°C)

Figure 1. i_T vs. v_T Characteristics

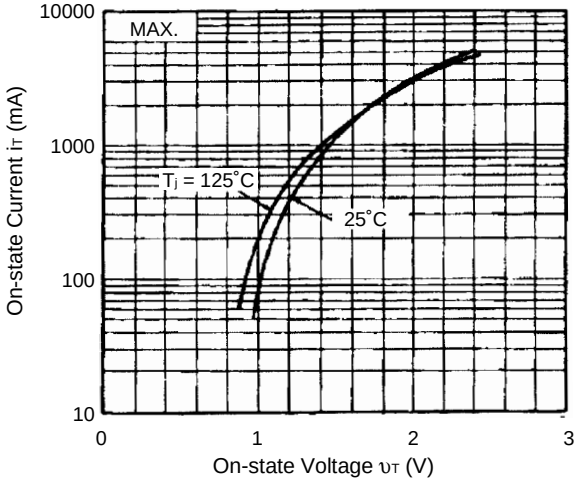


Figure 2. I_{TSM} Rating

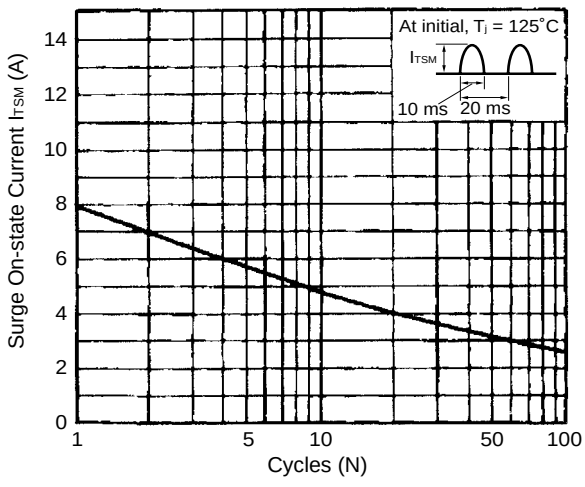


Figure 3. Gate Rating

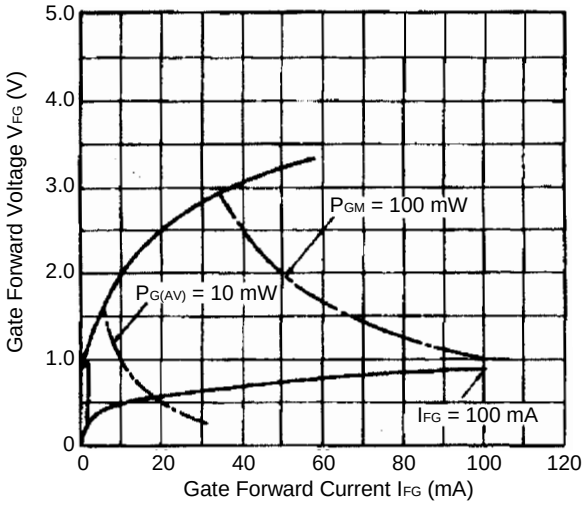


Figure 4. Example of Gate Characteristics

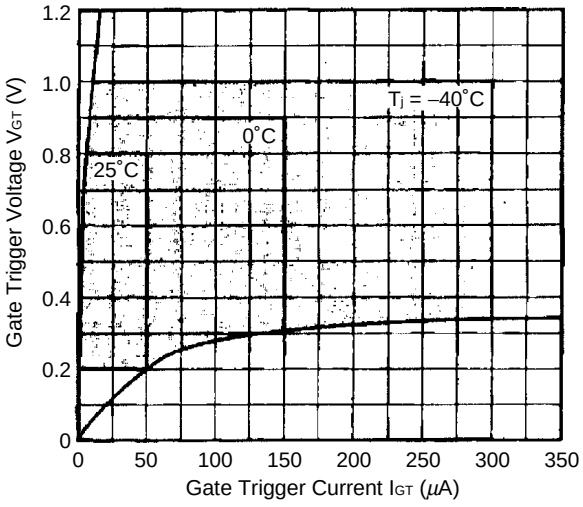


Figure 5. I_{GT} vs. T_A Example of Characteristics

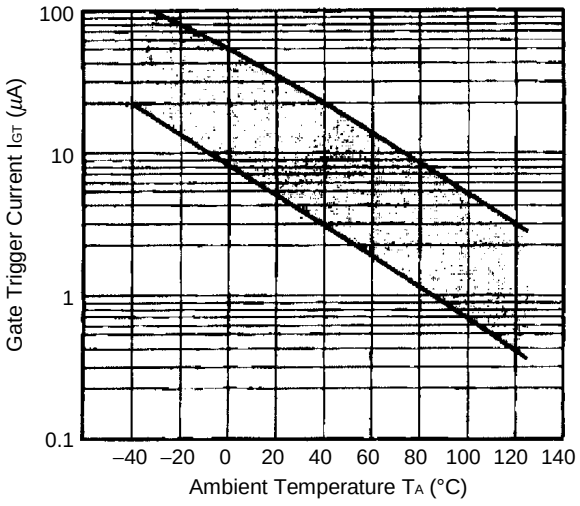


Figure 6. V_{GT} vs. T_A Example of Characteristics

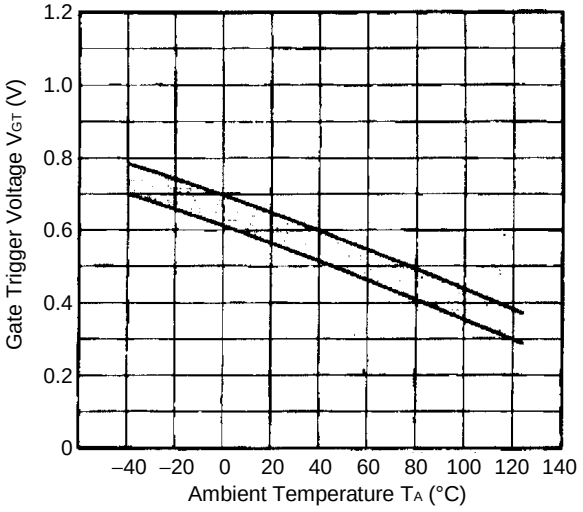


Figure 7. i_{GS} vs. τ Example of Characteristics

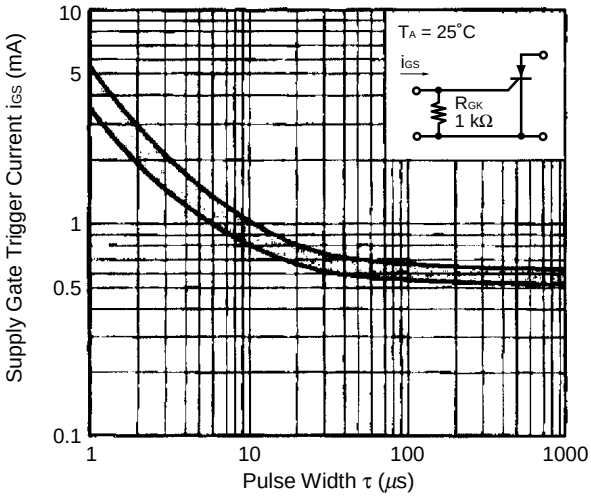


Figure 8. υ_{GT} vs. τ Example of Characteristics

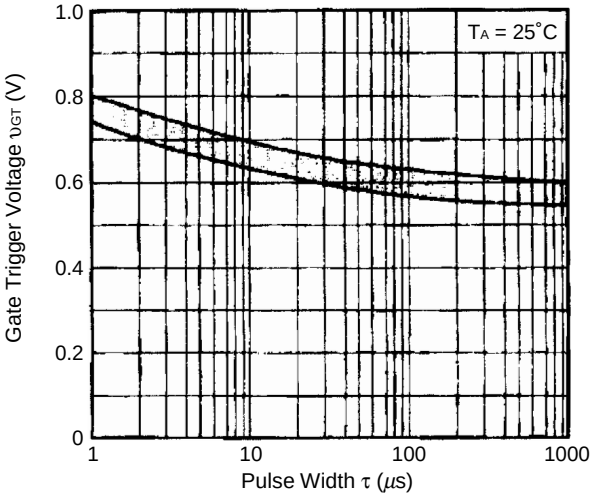


Figure 9. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

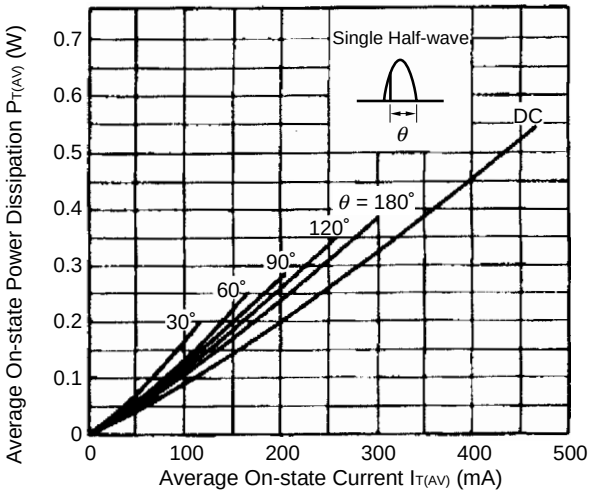


Figure 10. T_A vs. $I_{T(AV)}$ Characteristics

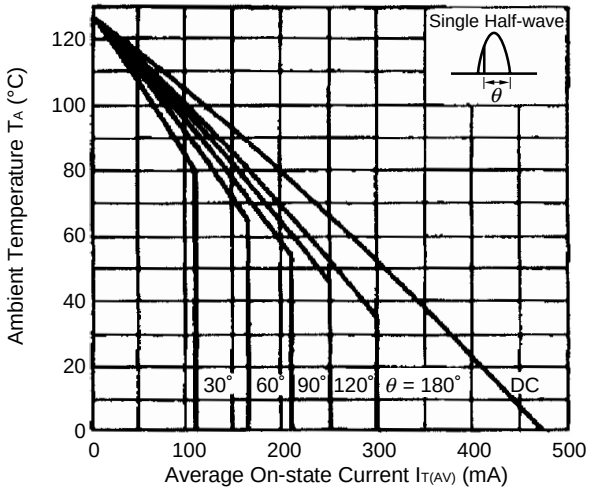


Figure 11. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

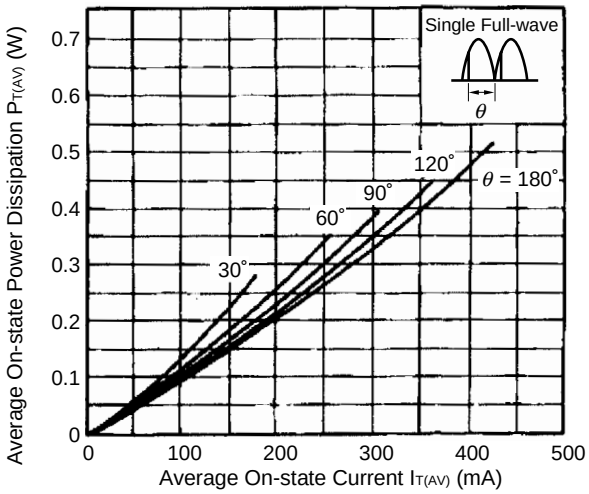


Figure 12. T_A vs. $I_{T(AV)}$ Characteristics

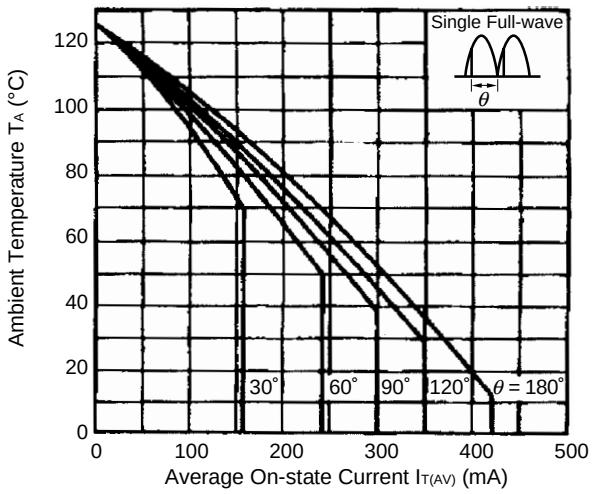


Figure 13. I_H vs. T_A Example of Characteristics

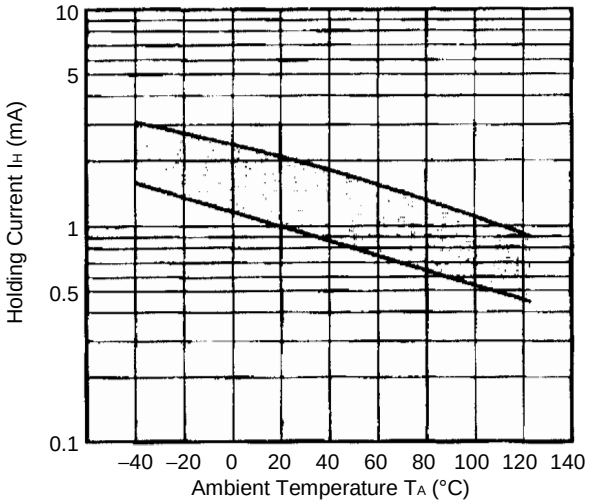
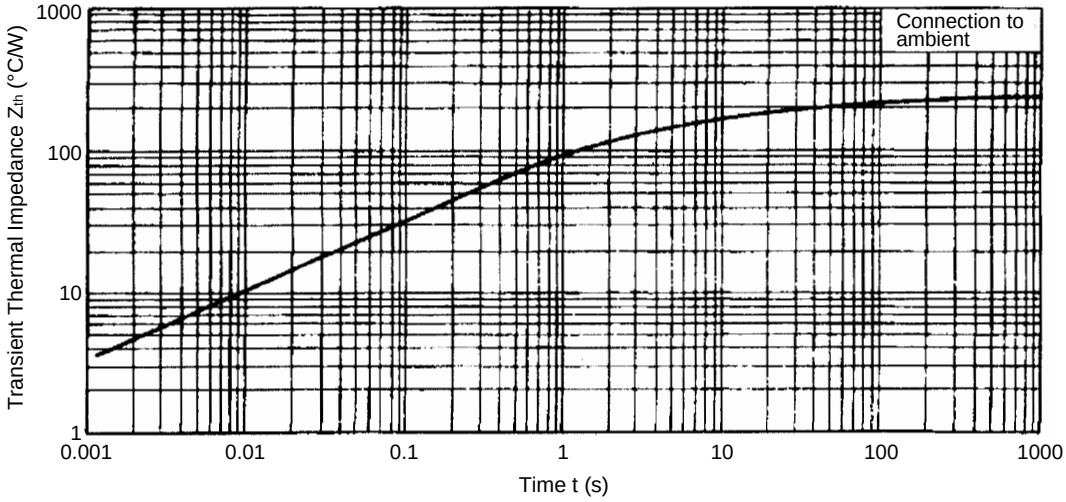


Figure 14. Z_{th} Characteristics



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