To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

CR05AS

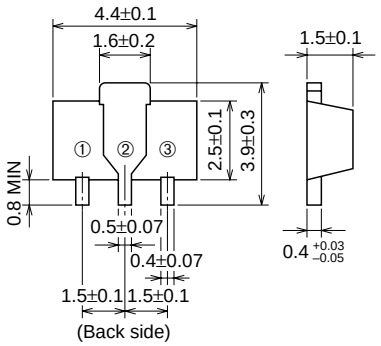
LOW POWER USE

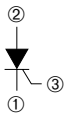
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

CR05AS

- $I_{T\ (AV)}$ 0.5A
- V_{DRM} 200V/400V
- I_{GT} 100μA

OUTLINE DRAWING Dimensions in mm





① CATHODE
② ANODE
③ GATE

SOT-89

APPLICATION

Solid state relay, strobe flasher, ignitor, hybrid IC

MAXIMUM RATINGS

Symbol	Parameter	Voltage class		Unit
		4 (marked "CB")	8 (marked "CD")	
V_{RRM}	Repetitive peak reverse voltage	200	400	V
V_{RSM}	Non-repetitive peak reverse voltage	300	500	V
$V_{R\ (DC)}$	DC reverse voltage	160	320	V
V_{DRM}	Repetitive peak off-state voltage *1	200	400	V
$V_{D\ (DC)}$	DC off-state voltage *1	160	320	V

Symbol	Parameter	Conditions	Ratings	Unit
$I_{T\ (RMS)}$	RMS on-state current		0.79	A
$I_{T\ (AV)}$	Average on-state current	Commercial frequency, sine half wave, 180° conduction, T_a=57°C *2	0.5	A
I_{TSM}	Surge on-state current	60Hz sine half wave 1 full cycle, peak value, non-repetitive	10	A
I^2t	I^2t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	0.4	A^2s
P_{GM}	Peak gate power dissipation		0.1	W
$P_{G\ (AV)}$	Average gate power dissipation		0.01	W
V_{FGM}	Peak gate forward voltage		6	V
V_{RGM}	Peak gate reverse voltage		6	V
I_{FGM}	Peak gate forward current		0.1	A
T_j	Junction temperature		–40 ~ +125	°C
T_{stg}	Storage temperature		–40 ~ +125	°C
—	Weight	Typical value	48	mg

*1. With Gate-to-cathode resistance R_{GK}=1kΩ

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LOW POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

ELECTRICAL CHARACTERISTICS

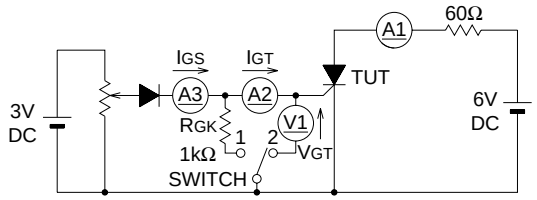
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{RRM}	Repetitive peak reverse current	T_j=125°C, V_{RRM} applied	—	—	0.1	mA
I_{DRM}	Repetitive peak off-state current	T_j=125°C, V_{DRM} applied, R_{GK}=1kΩ	—	—	0.1	mA
V_{TM}	On-state voltage	T_a=25°C, I_{TM}=1.5A, instantaneous value	—	—	1.9	V
V_{GT}	Gate trigger voltage	T_a=25°C, V_D=6V, I_T=0.1A *4	—	—	0.8	V
V_{GD}	Gate non-trigger voltage	T_j=125°C, V_D=1/2V_{DRM}, R_{GK}=1kΩ	0.2	—	—	V
I_{GT}	Gate trigger current	T_j=25°C, V_D=6V, I_T=0.1A *4	1	—	100*3	μA
I_H	Holding current	T_j=25°C, V_D=12V, R_{GK}=1kΩ	—	—	3	mA
$R_{th\ (j-a)}$	Thermal resistance	Junction to ambient *2	—	—	70	°C/W

*2. Soldering with ceramic plate (25mm × 25mm × t0.7).
*3. If special values of I_{GT} are required, choose at least two items from those listed in the table below. (Example: AB, BC)

Item	A	B	C
I_{GT} (μA)	1 ~ 30	20 ~ 50	40 ~ 100

The above values do not include the current flowing through the 1kΩ resistance between the gate and cathode.

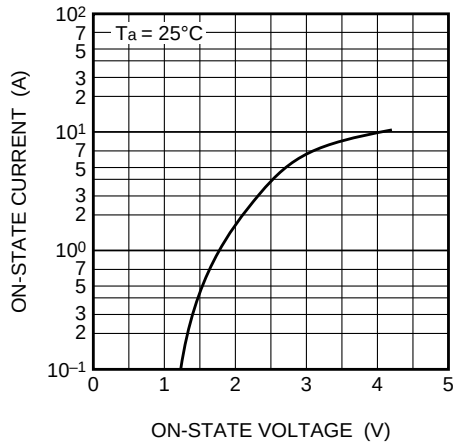
*4. I_{GT}, V_{GT} measurement circuit.



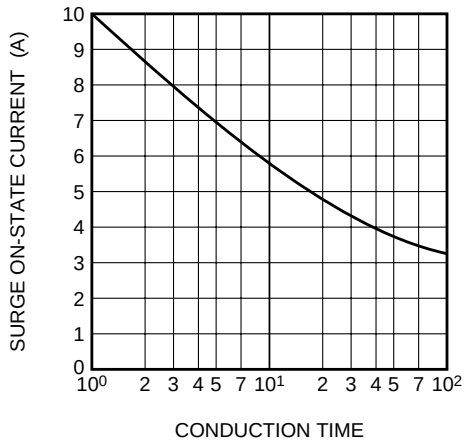
SWITCH 1 : I_{GT} measurement
SWITCH 2 : V_{GT} measurement
(Inner resistance of voltage meter is about 1kΩ)

PERFORMANCE CURVES

MAXIMUM ON-STATE CHARACTERISTICS



RATED SURGE ON-STATE CURRENT



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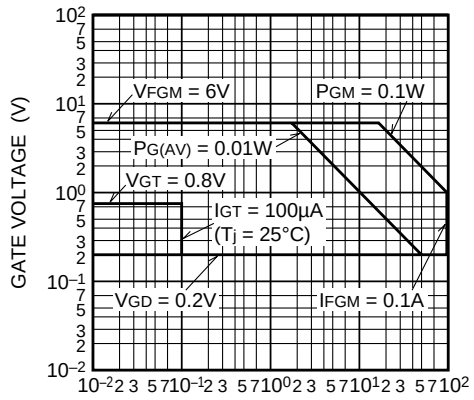
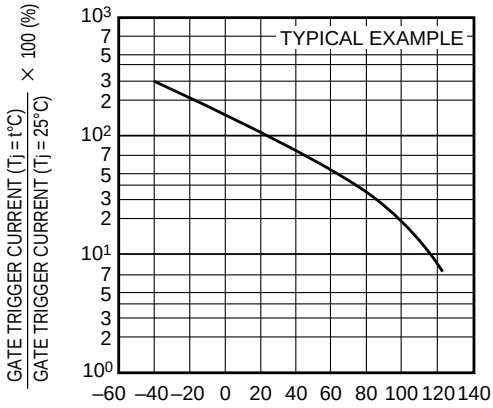
LOW POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

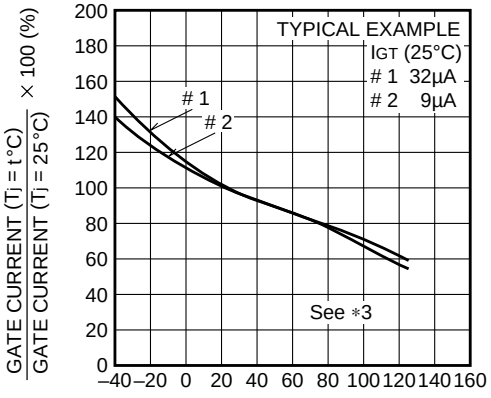
GATE CHARACTERISTICS



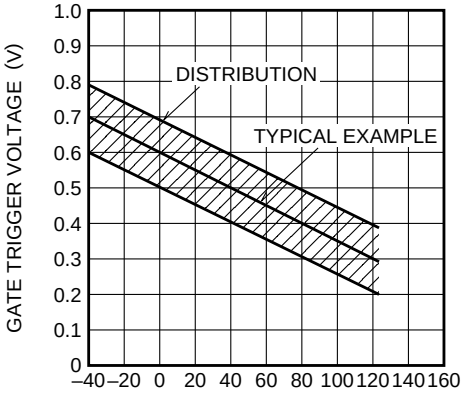
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



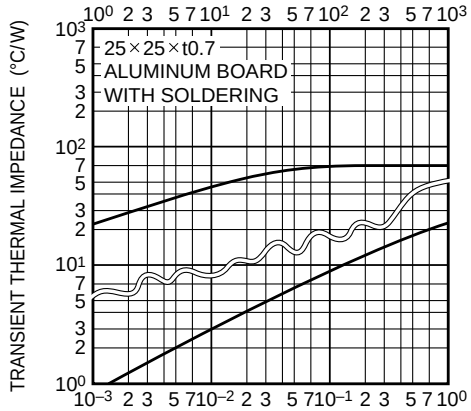
GATE CURRENT VS. JUNCTION TEMPERATURE



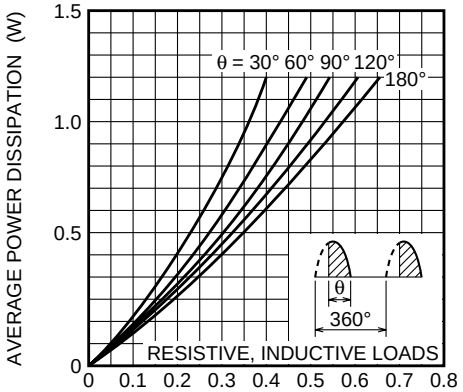
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO AMBIENT)



MAXIMUM AVERAGE POWER DISSIPATION (SINGLE-PHASE HALF WAVE)



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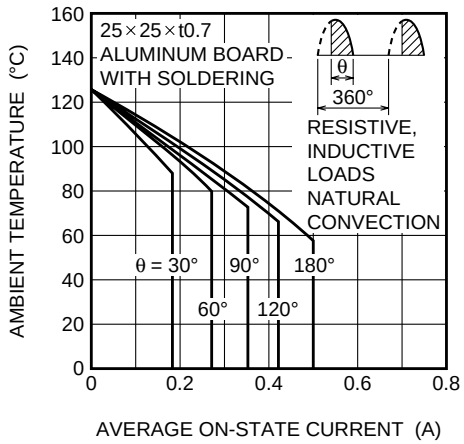
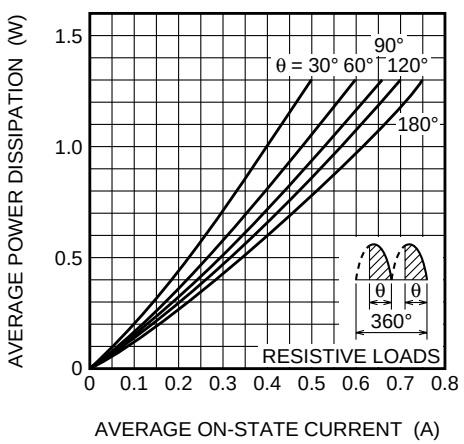
LOW POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

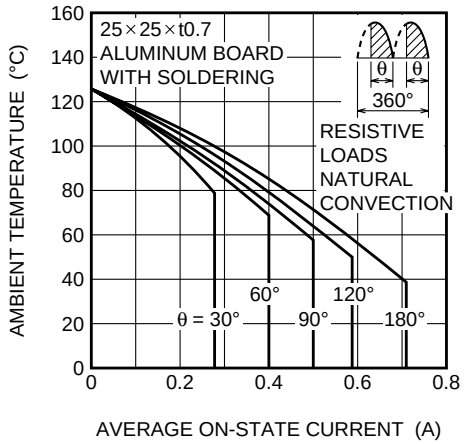
ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)



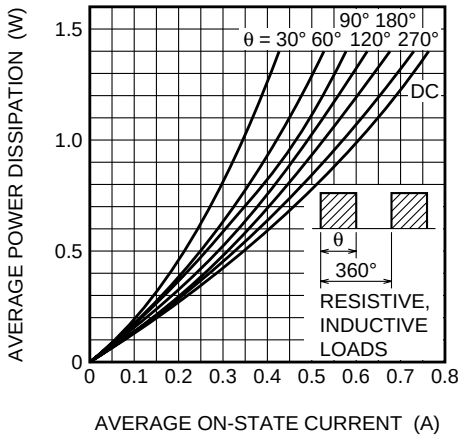
MAXIMUM AVERAGE POWER DISSIPATION (SINGLE-PHASE FULL WAVE)



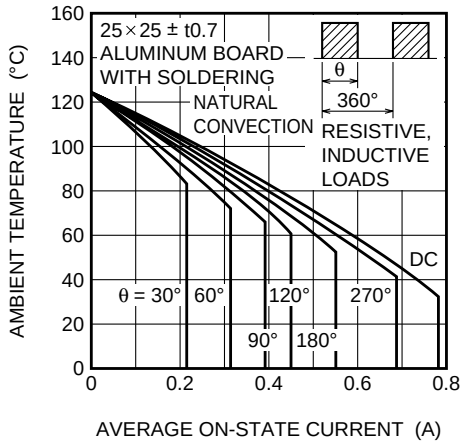
ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE FULL WAVE)



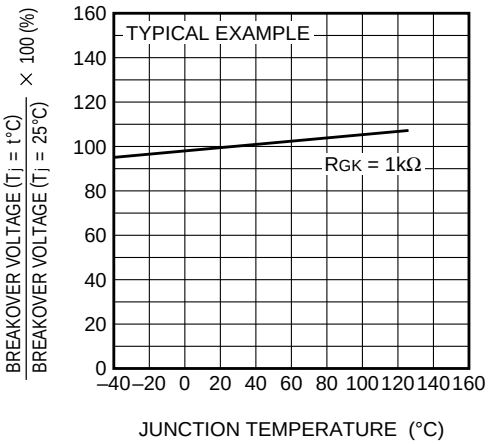
MAXIMUM AVERAGE POWER DISSIPATION (RECTANGULAR WAVE)



ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)



BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE



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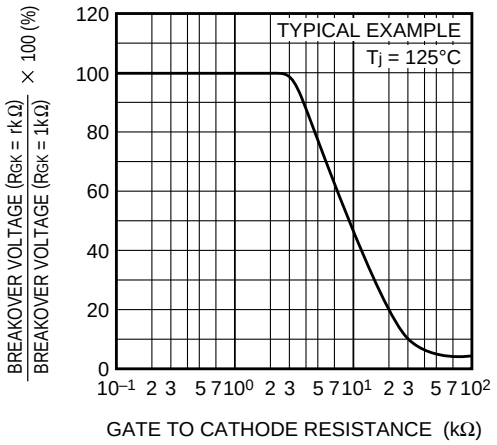
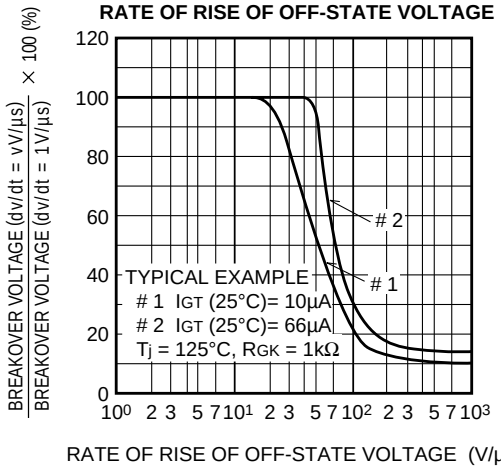
LOW POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

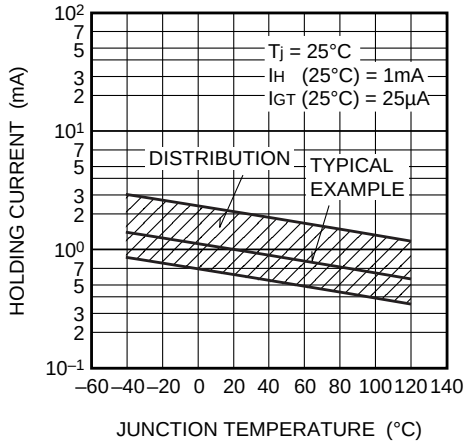
BREAKOVER VOLTAGE VS. GATE TO CATHODE RESISTANCE



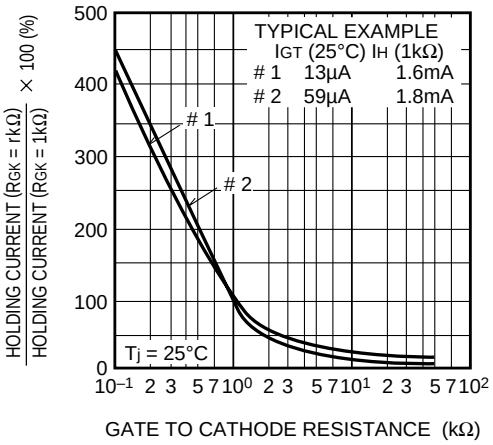
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE



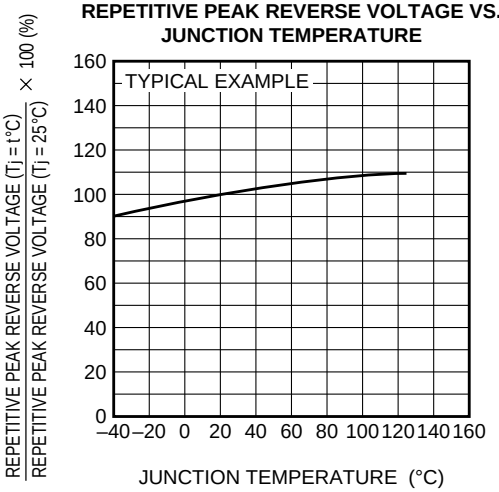
HOLDING CURRENT VS. JUNCTION TEMPERATURE



HOLDING CURRENT VS. GATE TO CATHODE RESISTANCE



REPETITIVE PEAK REVERSE VOLTAGE VS. JUNCTION TEMPERATURE



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH