

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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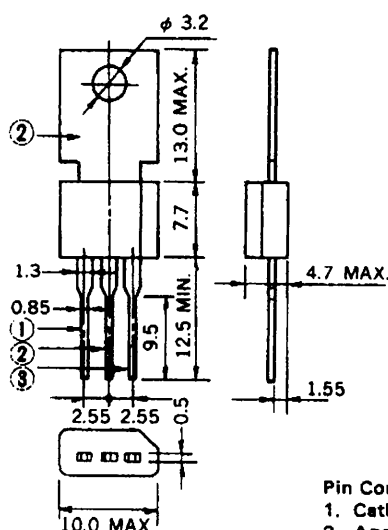
THYRISTOR

3S4M

HIGH SPEED SWITCHING 3 A (av.) MOLD THYRISTOR

PACKAGE DIMENSIONS

in millimeters



Pin Connection
1. Cathode
2. Anode
3. Gate

The 3S4M is P-gate all diffused mold type SCR granted Average on-state current 3 Amps ($T_C = 70^\circ C$), with rated voltages up to 400 Volts.

FEATURES

- Designed for Inverter, Pulse modulator, and other high frequency applications.
- Insured turn-off time of less than 5 μ s.
- 65 A surge current.

APPLICATIONS

- Automatic gas lighter
- Speed control of miniature type motor
- Electric sewing machine
- Battery charger
- TV
- Solenoid operation
- Inverter

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	MAXIMUM RATINGS	UNIT	NOTE
Non-Repetitive Peak Reverse Voltage	V_{RSM}	500	V	
Non-Repetitive Peak Off-State Voltage	V_{DSM}	500	V	
Repetitive Peak Reverse Voltage	V_{RRM}	400	V	
Repetitive Peak Off-state Voltage	V_{DRM}	400	V	
On-State Current	$I_T(AV)$	3 ($T_c = 70^\circ C, \theta = 180^\circ$ Single phase half wave)	A	See Fig. 4
Surge Non-Repetitive On-State Current	I_{TSM}	65	A	See Fig. 2
Peak Gate Power Dissipation	P_{GM}	3 ($f \geq 50$ Hz, Duty $\leq 10\%$)	W	
Average Gate Power Dissipation	$P_{G(AV)}$	0.5	W	
Peak Gate Forward Current	I_{FGM}	0.5 ($f \geq 50$ Hz, Duty $\leq 10\%$)	A	
Peak Gate Reverse Voltage	V_{RGM}	10	V	
Junction Temperature	T_j	-40 to +125	$^\circ C$	
Storage Temperature	T_{stg}	-55 to +150	$^\circ C$	
Weight	-	1.4	g	

T_c : Case Temperature is measured at 1.5 mm from the neck of Tablet.

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

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Repetitive Peak Off-State Current	I_{DRM}	$V_{\text{DM}} = V_{\text{DRM}}, T_j = 125^\circ\text{C}$ $R_{\text{GK}} = 1\text{ k}\Omega$	—	—	2.5	mA	
Repetitive Peak Reverse Current	I_{RRM}	$V_{\text{RM}} = V_{\text{RRM}}, T_j = 125^\circ\text{C}$ $R_{\text{GK}} = 1\text{ k}\Omega$	—	—	2.5	mA	
On-State Voltage	V_{TM}	$I_{\text{TM}} = 3\text{ A}$	—	—	2.0	V	See Fig. 1
Gate Trigger Current	I_{GT}	$V_{\text{DM}} = 6\text{ V}, R_L = 100\ \Omega$	—	—	30	mA	See Fig. 6
Gate Trigger Voltage	V_{GT}	$V_{\text{DM}} = 6\text{ V}, R_L = 100\ \Omega$	—	—	2.0	V	See Fig. 6
Gate Non-Trigger Voltage	V_{GD}	$V_{\text{DM}} = \frac{1}{2} V_{\text{DRM}}, T_j = 125^\circ\text{C}$	0.2	—	—	V	
Critical Rate-of-Rise of Off-State Voltage	dv/dt	$V_{\text{DM}} = \frac{2}{3} V_{\text{DRM}}, T_j = 125^\circ\text{C}$	50	100	—	V/ μs	
Holding Current	I_{H}	$V_{\text{D}} = 24\text{ V}$	—	30	—	mA	
Circuit Commutated Turn-Off Time	t_{q}	$V_{\text{DM}} = \frac{2}{3} V_{\text{DRM}}, T_j = 125^\circ\text{C}$ $dv/dt = 50\text{ V}/\mu\text{s}, V_{\text{R}} \geq 25\text{ V}$ $I_{\text{T}} = 20\text{ A}, dI_{\text{R}}/dt = 10\text{ A}/\mu\text{s}$	—	—	5.0	μs	
Turn-On Time	t_{gt}	$V_{\text{DM}} = \frac{2}{3} V_{\text{DRM}}, I_{\text{TM}} = 3\text{ A}$ $I_{\text{G}} = 0.1\text{ A}, t_{\text{IG}} = 5\ \mu\text{s}$	—	—	3.0	μs	
Thermal Resistance	$R_{\text{th(j-c)}}$	Junction to Case	—	—	8	$^\circ\text{C}/\text{W}$	See Fig. 9
	$R_{\text{th(j-a)}}$	Junction to Ambient	—	—	75		

Fig. 1 $I_{\text{TM}} - V_{\text{TM}}$ CHARACTERISTICS

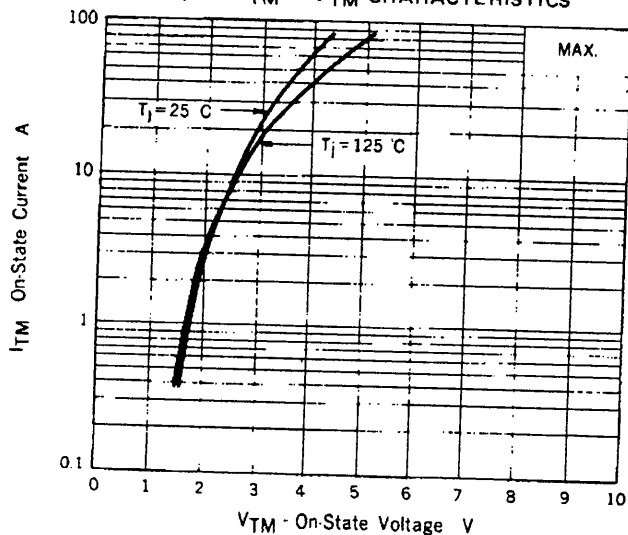


Fig. 2 I_{TSM} RATING

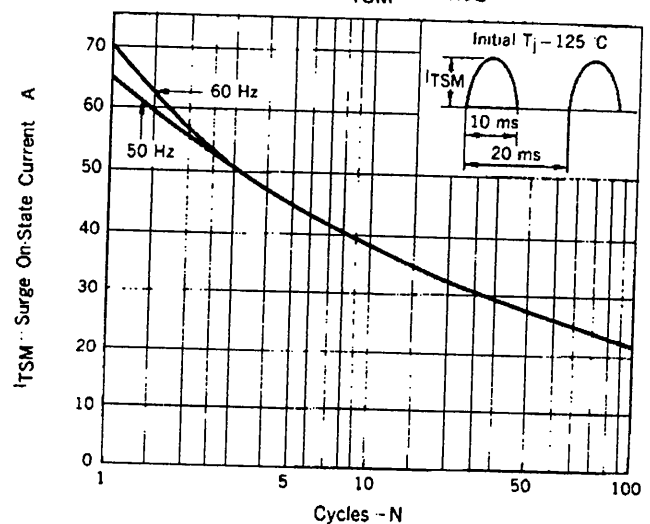




Fig. 3 $P_{T(AV)} - I_{T(AV)}$ CHARACTERISTICS

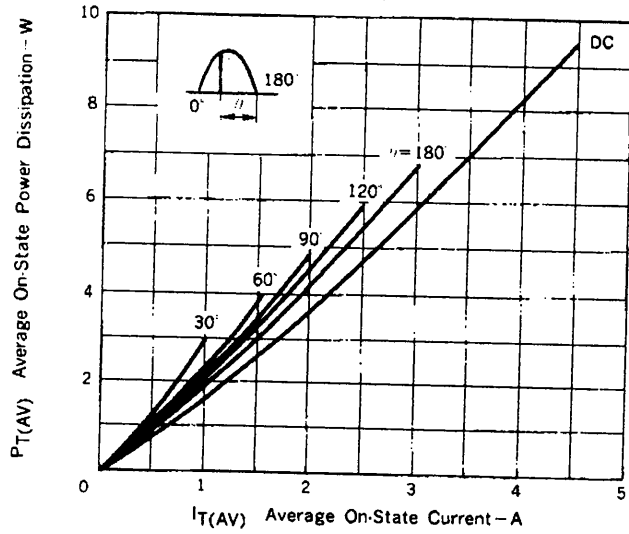


Fig. 4 $T_c - I_{T(AV)}$ RATINGS

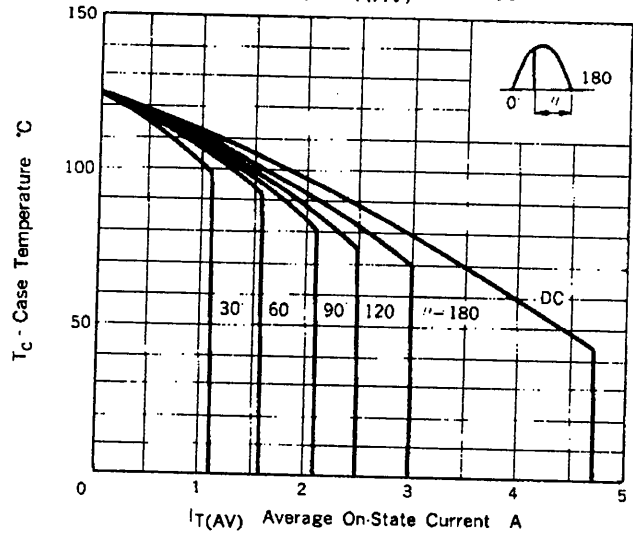


Fig. 5 $T_a - I_{T(AV)}$ RATINGS

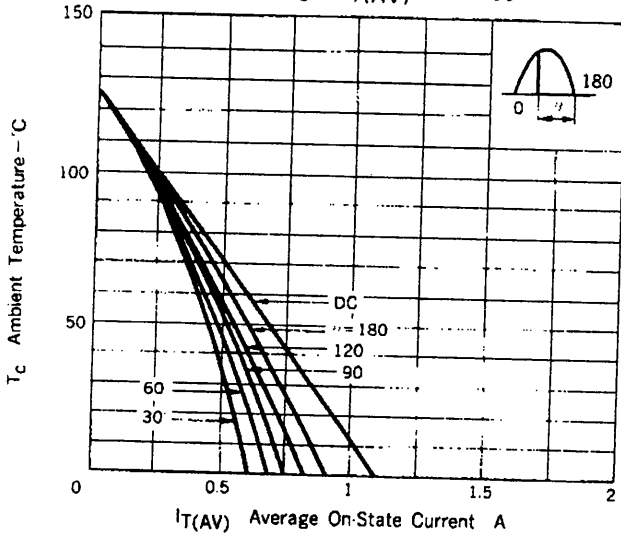


Fig. 6 GATE POWER RATINGS-CHARACTERISTICS

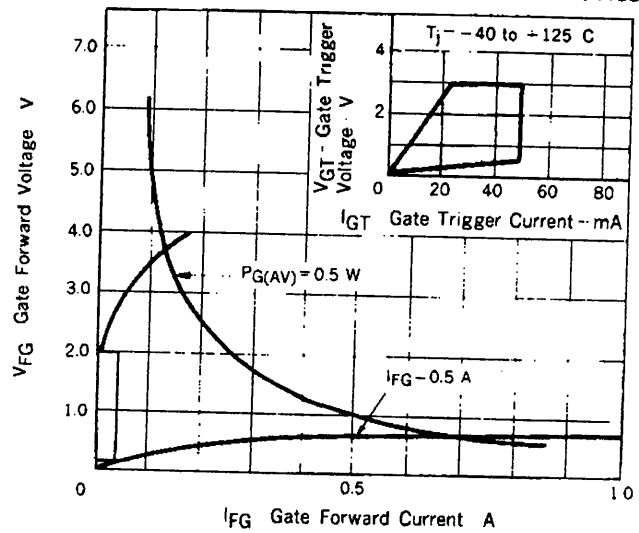


Fig. 7 $i_{GT} - \tau$ TYPICAL DISTRIBUTION

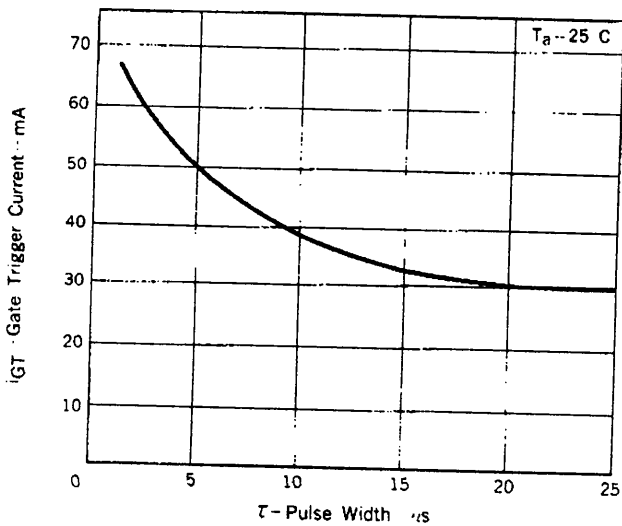


Fig. 8 $v_{GT} - \tau$ TYPICAL DISTRIBUTION

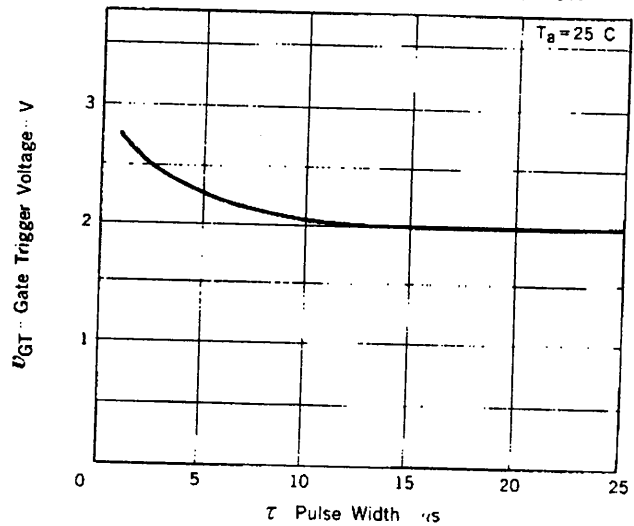
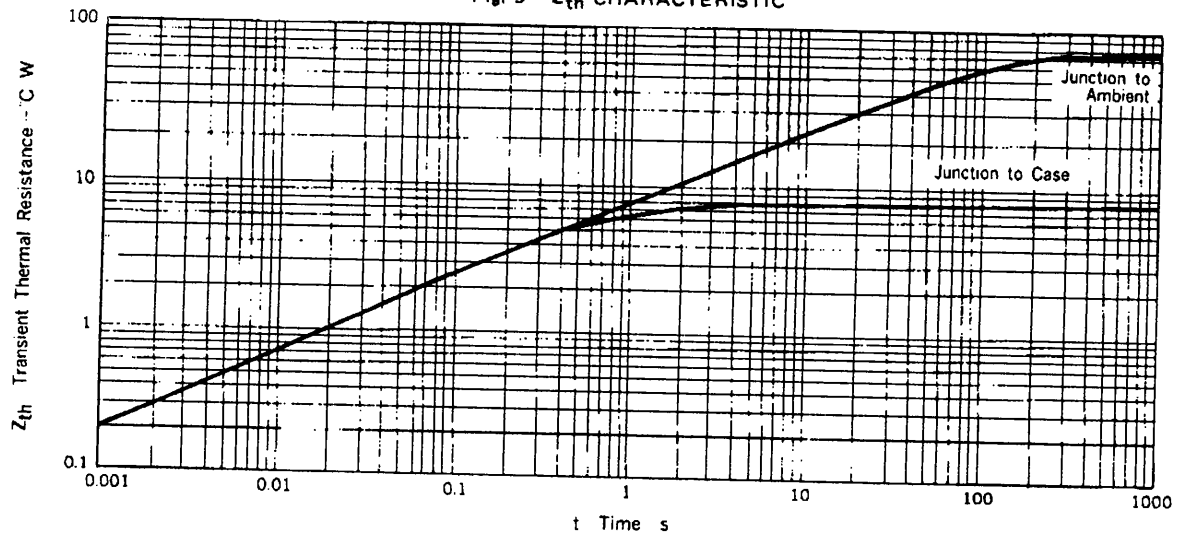
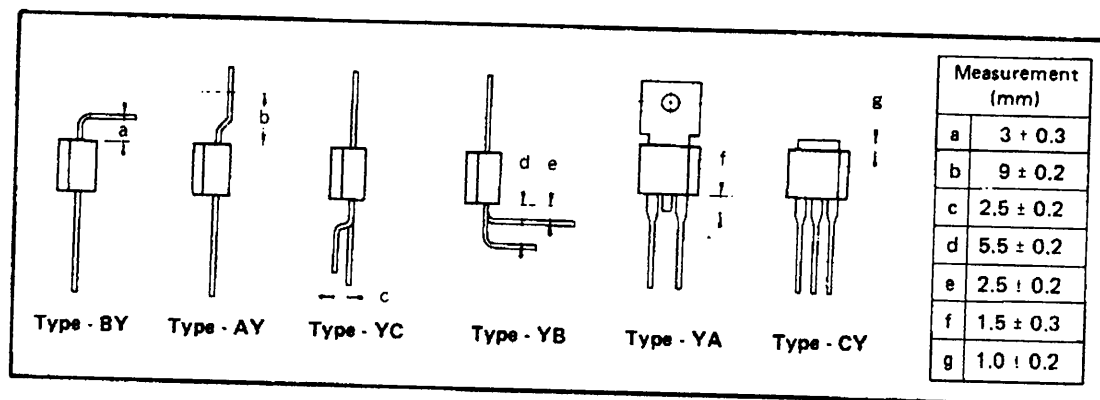


Fig. 9 Z_{th} CHARACTERISTIC



NOTICE FOR INSTALLATION

1. Electrode leads (especially heat sink tablet) are not granted to be bent because of wet-proof. However in case it is required inevitably, a mechanical stress should not be put on mold. Fix tightly between the mold case and the area to be formed or bent.
2. Special lead and heat tab formings as indicated below are available at an additional cost.



3. The surface of heat sink for thermal radiator is to be smooth without any foreign matter.
4. Suitable torque value is 4 to 5 kg·cm.
5. Soldering
 - Recommended solder: PbSn (4 : 6)
Melting point 180 °C
 - Dimension from the neck of lead to dipping points 4 to 6 mm
 - Soldering temperature and period
 - 250 °C less than 5 s.
 - 230 °C less than 10 s.

