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April 1st, 2010
Renesas Electronics Corporation

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CR12CM-12A

Thyristor

Medium Power Use

REJ03G0350-0200

Rev.2.00

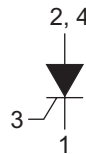
Nov 30, 2007

Features

- $I_{T(AV)}$: 12 A
- V_{DRM} : 600 V
- I_{GT} : 30 mA
- Non-Insulated Type
- Planar Passivation Type

Outline

RENESAS Package code: PRSS0004AA-A
(Package name: TO-220)



1. Cathode
2. Anode
3. Gate
4. Anode

Applications

Switching mode power supply, regulator for autcycle, motor control, heater control, and other general purpose control applications

Maximum Ratings

Parameter	Symbol	Voltage class	Unit
		12	
Repetitive peak reverse voltage	V_{RRM}	600	V
Non-repetitive peak reverse voltage	V_{RSM}	720	V
DC reverse voltage	$V_{R(DC)}$	480	V
Repetitive peak off-state voltage	V_{DRM}	600	V
DC off-state voltage	$V_{D(DC)}$	480	V

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	I_T (RMS)	18.8	A	
Average on-state current	I_T (AV)	12	A	Commercial frequency, sine half wave 180° conduction, $T_c = 91^\circ\text{C}$ ^{Note2}
Surge on-state current	I_{TSM}	360	A	60Hz sine half wave 1 full cycle, peak value, non-repetitive
I^2t for fusing	I^2t	544	A^2s	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current
Peak gate power dissipation	P_{GM}	5	W	
Average gate power dissipation	P_G (AV)	0.5	W	
Peak gate forward voltage	V_{FGM}	6	V	
Peak gate reverse voltage	V_{RGM}	10	V	
Peak gate forward current	I_{FGM}	2	A	
Junction temperature	T_j	– 40 to +125	$^\circ\text{C}$	
Storage temperature	T_{stg}	– 40 to +125	$^\circ\text{C}$	
Mass	—	2.0	g	Typical value

Electrical Characteristics

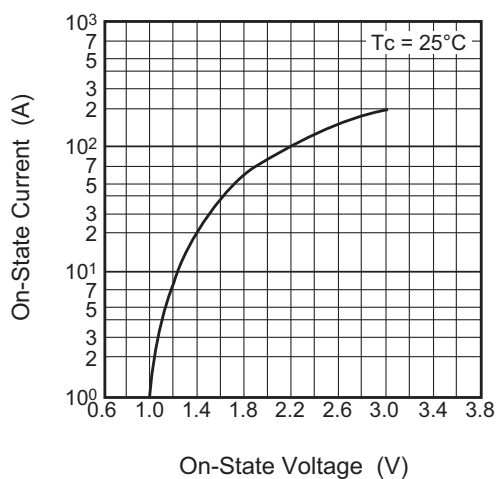
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak reverse current	I_{RRM}	—	—	2.0	mA	$T_j = 125^\circ\text{C}$, V_{RRM} applied
Repetitive peak off-state current	I_{DRM}	—	—	2.0	mA	$T_j = 125^\circ\text{C}$, V_{DRM} applied
On-state voltage	V_{TM}	—	—	1.6	V	$T_c = 25^\circ\text{C}$, $I_{TM} = 40\text{ A}$, instantaneous value
Gate trigger voltage	V_{GT}	—	—	1.5	V	$T_j = 25^\circ\text{C}$, $V_D = 6\text{ V}$, $I_T = 1\text{ A}$
Gate non-trigger voltage	V_{GD}	0.2	—	—	V	$T_j = 125^\circ\text{C}$, $V_D = 1/2 V_{DRM}$
Gate trigger current	I_{GT}	—	—	30	mA	$T_j = 25^\circ\text{C}$, $V_D = 6\text{ V}$, $I_T = 1\text{ A}$
Holding current	I_H	—	15	—	mA	$T_j = 25^\circ\text{C}$, $V_D = 12\text{ V}$
Thermal resistance	$R_{th(j-c)}$	—	—	1.2	$^\circ\text{C/W}$	Junction to case ^{Note1 Note2}

Notes: 1. The contact thermal resistance $R_{th(c-f)}$ in case of greasing is 1.0°C/W .

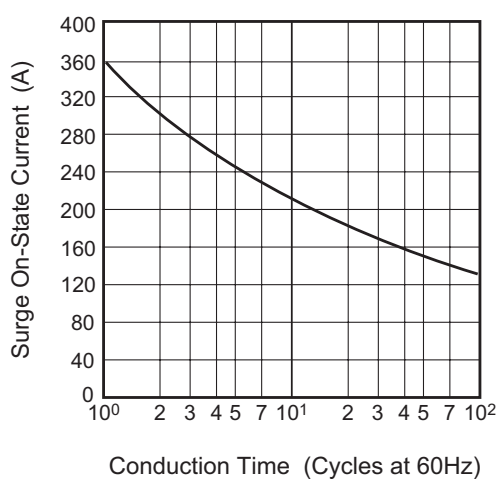
2. Case temperature is measured at anode tab 1.5 mm away from the molded case.

Performance Curves

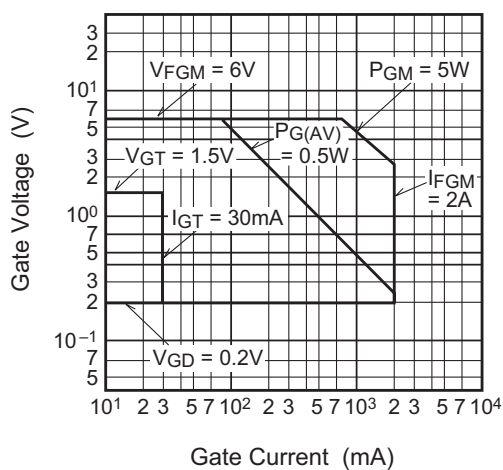
Maximum On-State Characteristics



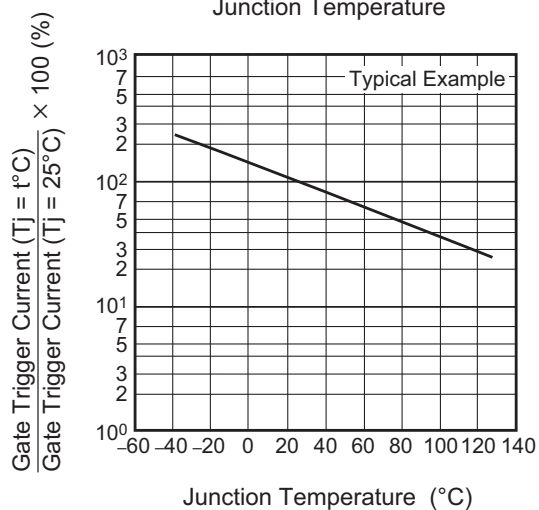
Rated Surge On-State Current



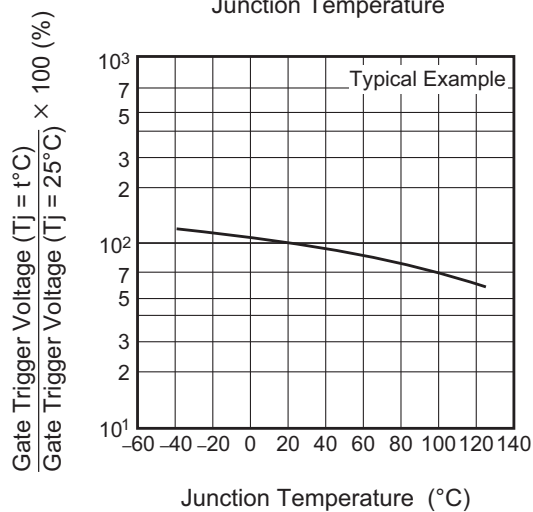
Gate Characteristics



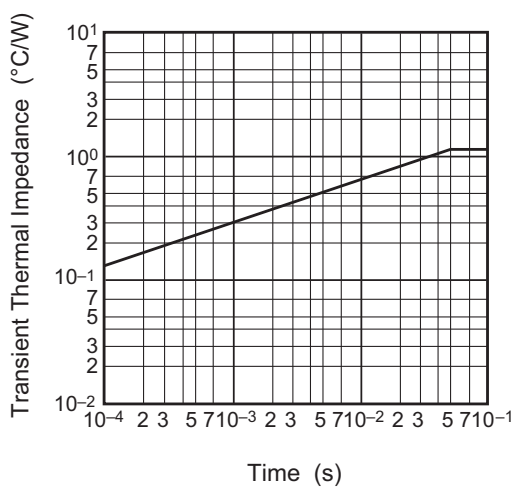
Gate Trigger Current vs. Junction Temperature



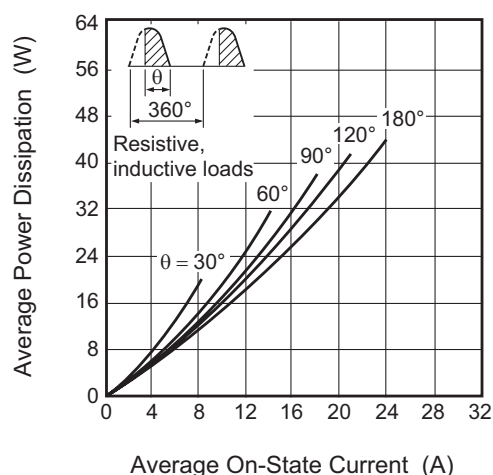
Gate Trigger Voltage vs. Junction Temperature



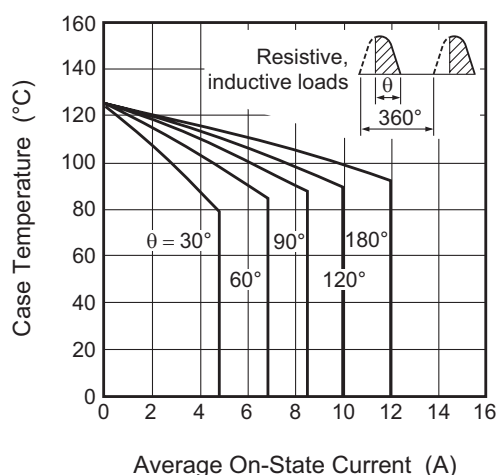
Maximum Transient Thermal Impedance Characteristics (Junction to case)



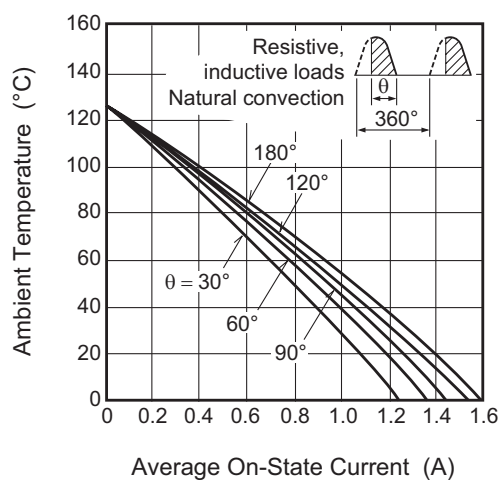
Maximum Average Power Dissipation
(Single-Phase Half Wave)



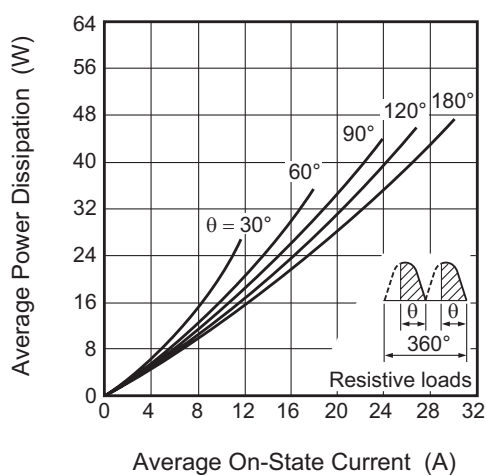
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Half Wave)



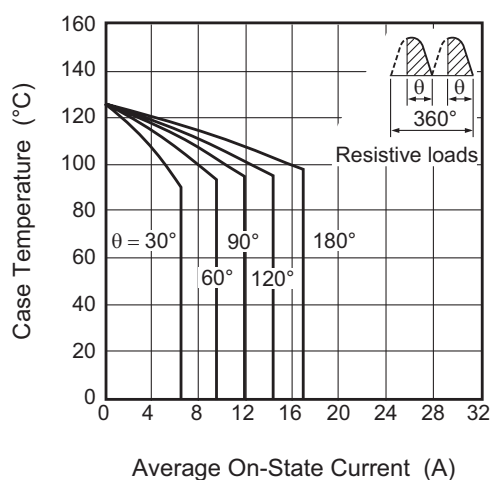
Allowable Ambient Temperature vs.
Average On-State Current
(Single-Phase Half Wave)



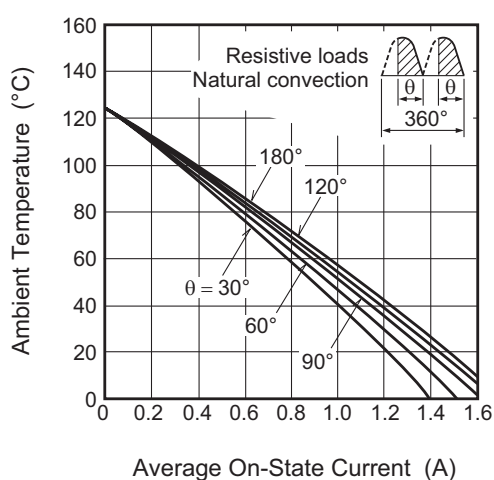
Maximum Average Power Dissipation
(Single-Phase Full Wave)

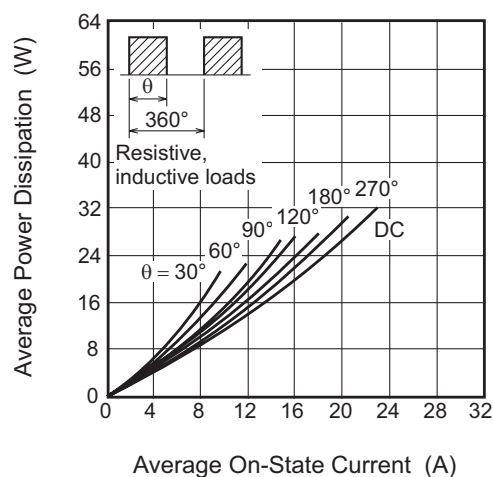
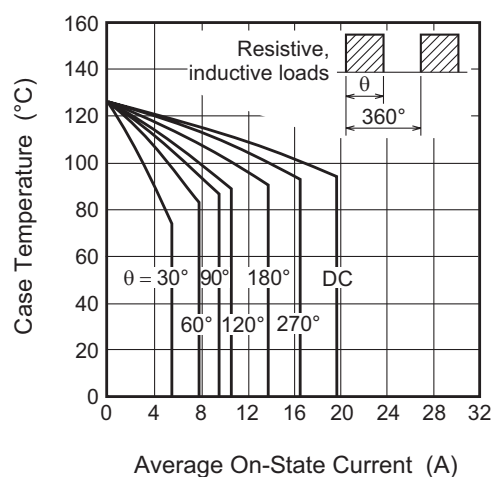
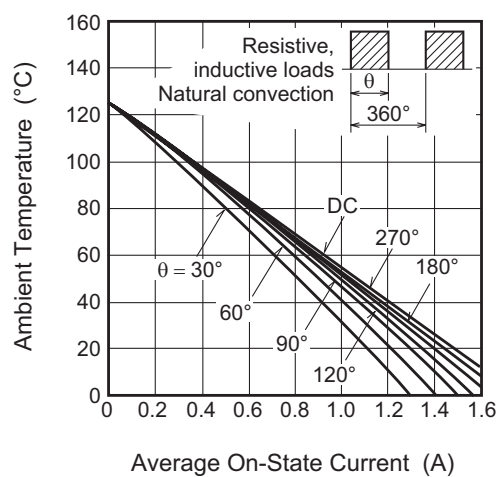
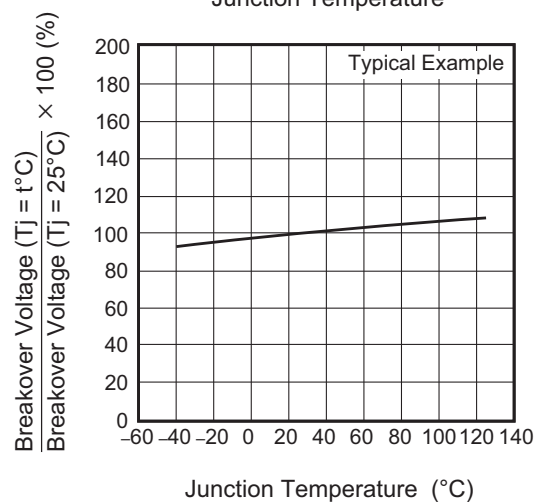
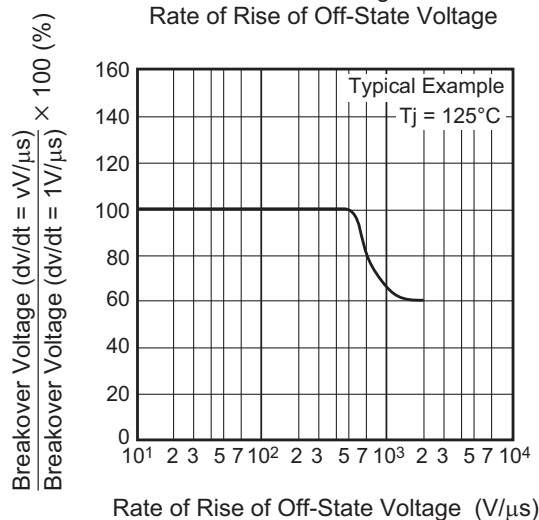
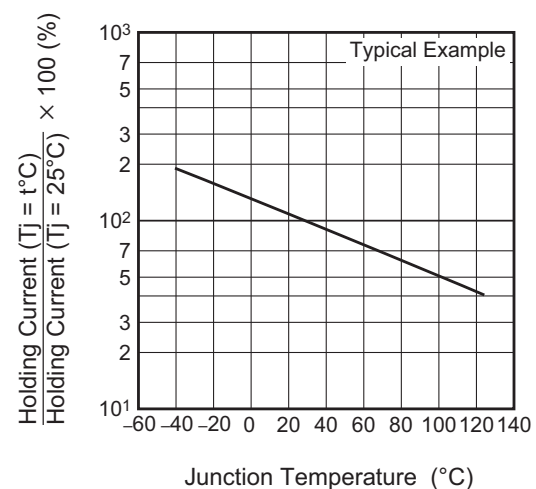


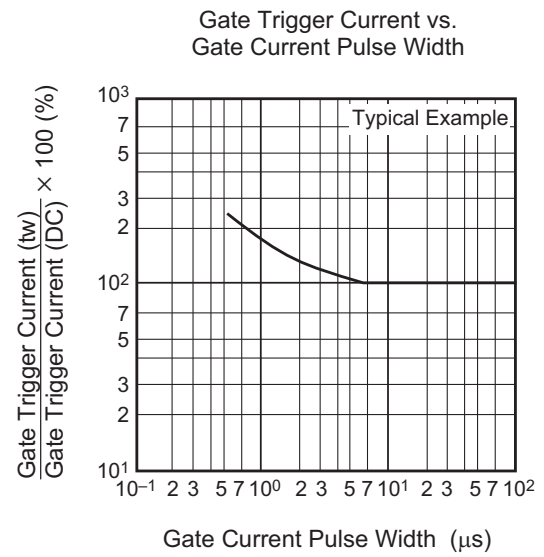
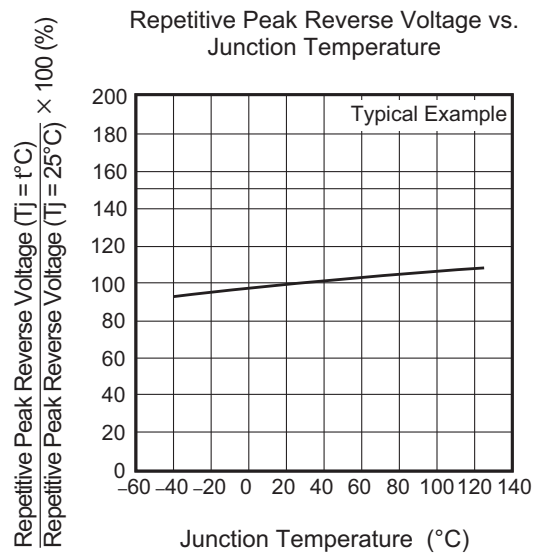
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Full Wave)



Allowable Ambient Temperature vs.
Average On-State Current
(Single-Phase Full Wave)



Maximum Average Power Dissipation
(Rectangular Wave)Allowable Case Temperature vs.
Average On-State Current
(Rectangular Wave)Allowable Ambient Temperature vs.
Average On-State Current
(Rectangular Wave)Breakover Voltage vs.
Junction TemperatureBreakover Voltage vs.
Rate of Rise of Off-State VoltageHolding Current vs.
Junction Temperature



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-220	SC-46	PRSS0004AA-A	—	2.0g	

The technical drawing illustrates the CR12CM-12A package in three views: top, side, and a detail of the lead. The top view shows a square body with a width of 10.5Max mm and a height of 16Max mm. A central circular feature has a diameter of $\phi 3.6$ mm. The distance from the top edge to the center of this feature is 3.2 mm, and the distance from the center to the bottom edge of the body is 7.0 mm. The body is mounted on a base with a width of 12.5Min mm. The base has a thickness of 3.8Max mm. The distance between the two leads is 1.0 mm, and the width of each lead is 0.8 mm. The distance from the center of the base to the center of each lead is 2.54 mm. The side view shows a total height of 4.5 mm, with a lead height of 1.3 mm. The base has a width of 0.5 mm and a total width of 2.6 mm. The detail view shows the lead profile with a maximum height of 4.5Max mm.

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Vinyl sack	100	Type name	CR12CM-12A
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	CR12CM-12A-A8

Note : Please confirm the specification about the shipping in detail.

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