

# 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, $T_C = 91^{\circ}C$ <sup>Note2</sup>
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 <sup>2</sup> s	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	°C	
Storage temperature	$T_{stg}$	– 40 to +125	°C	
Mass	—	2.0	g	Typical value

## Electrical Characteristics

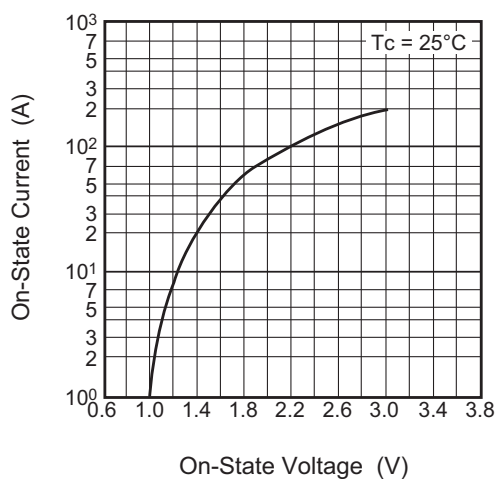
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak reverse current	$I_{RRM}$	—	—	2.0	mA	$T_J = 125^{\circ}C$ , $V_{RRM}$ applied
Repetitive peak off-state current	$I_{DRM}$	—	—	2.0	mA	$T_J = 125^{\circ}C$ , $V_{DRM}$ applied
On-state voltage	$V_{TM}$	—	—	1.6	V	$T_C = 25^{\circ}C$ ,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

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

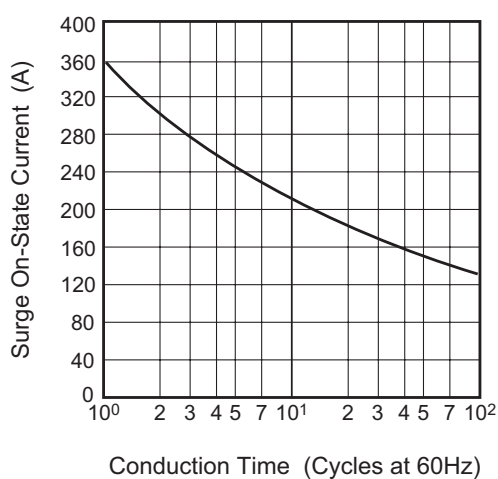
2. Case temperature is measured at anode tab 1.5 mm away from the molded case.

## Performance Curves

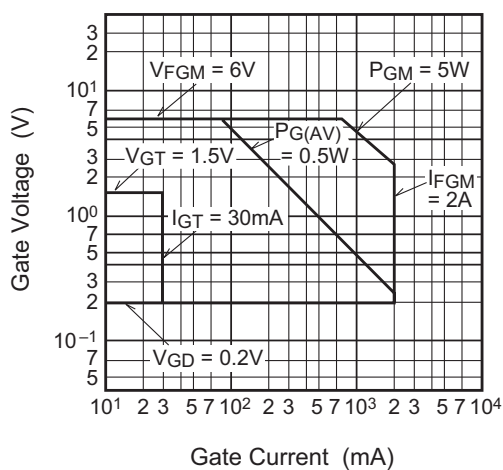
Maximum On-State Characteristics



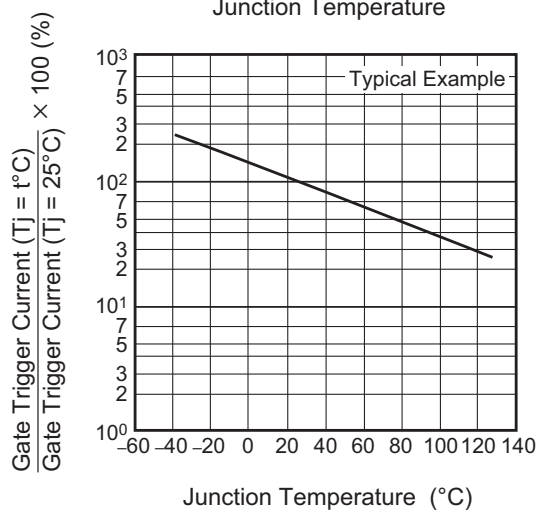
Rated Surge On-State Current



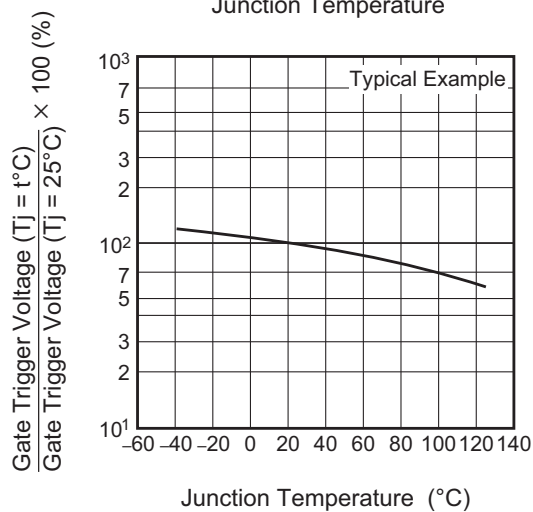
Gate Characteristics



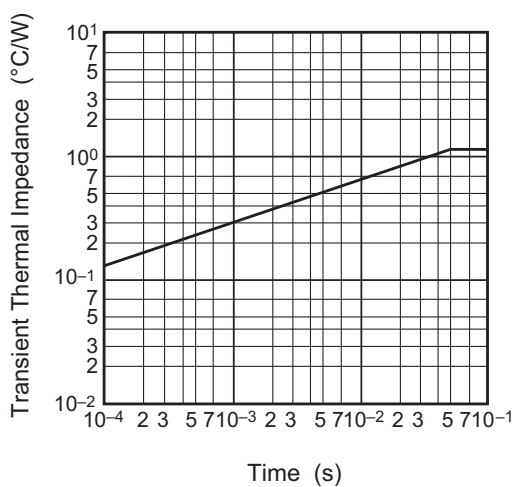
Gate Trigger Current vs. Junction Temperature



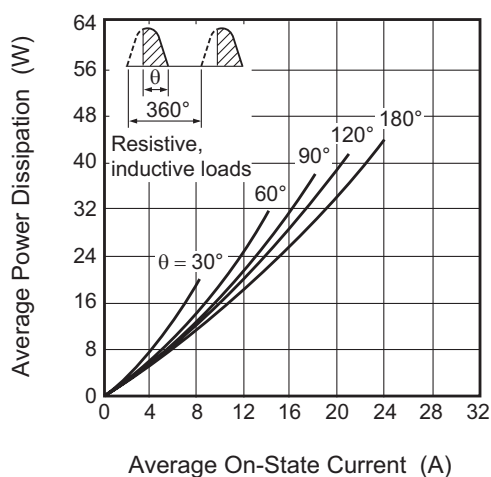
Gate Trigger Voltage vs. Junction Temperature



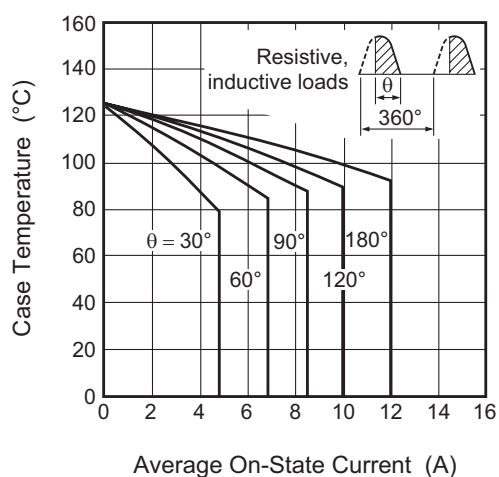
Maximum Transient Thermal Impedance Characteristics (Junction to case)



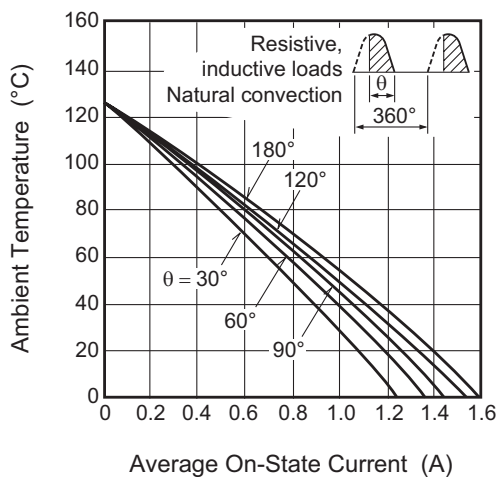
Maximum Average Power Dissipation  
(Single-Phase Half Wave)



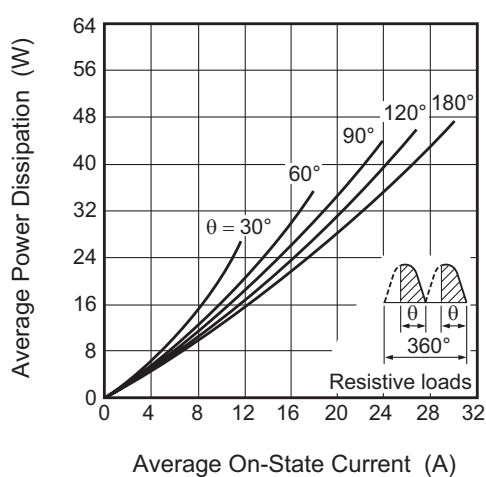
Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



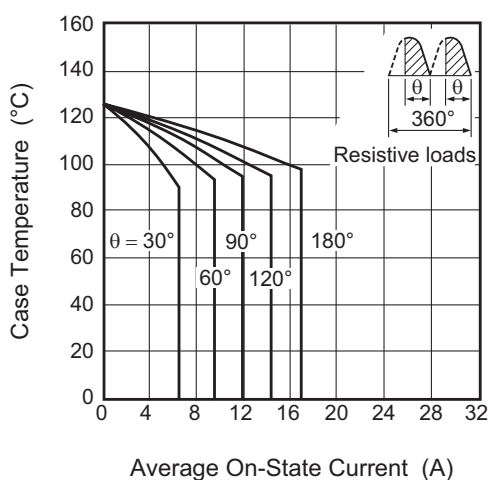
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Half Wave)



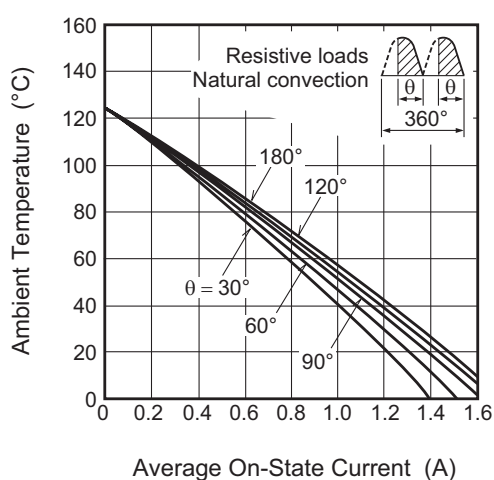
Maximum Average Power Dissipation  
(Single-Phase Full Wave)



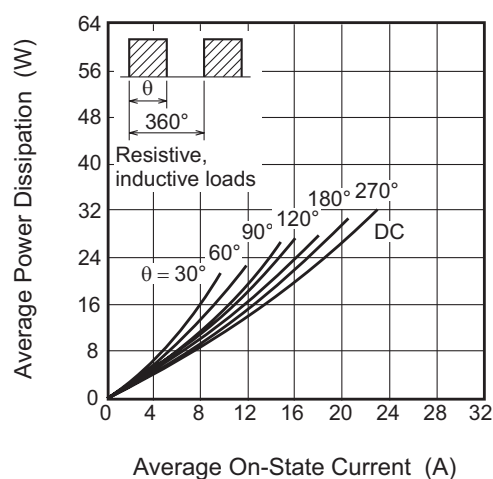
Allowable Case Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



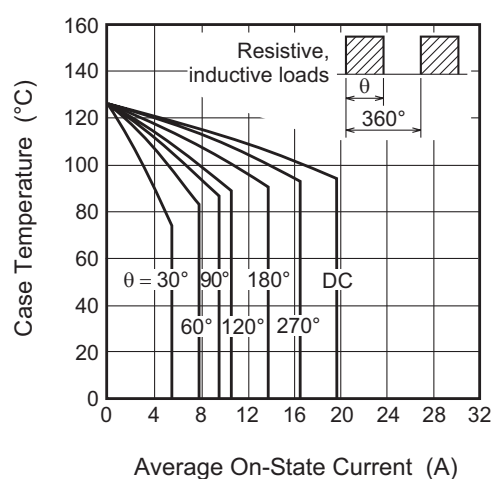
Allowable Ambient Temperature vs.  
Average On-State Current  
(Single-Phase Full Wave)



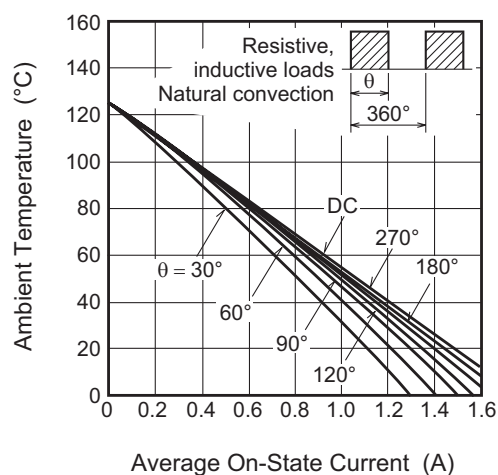
Maximum Average Power Dissipation  
(Rectangular Wave)



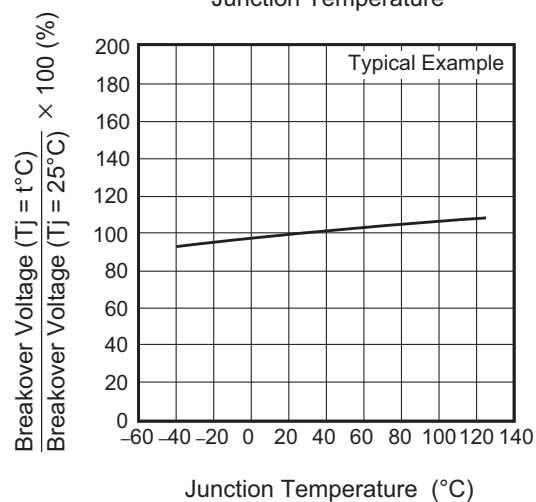
Allowable Case Temperature vs.  
Average On-State Current  
(Rectangular Wave)



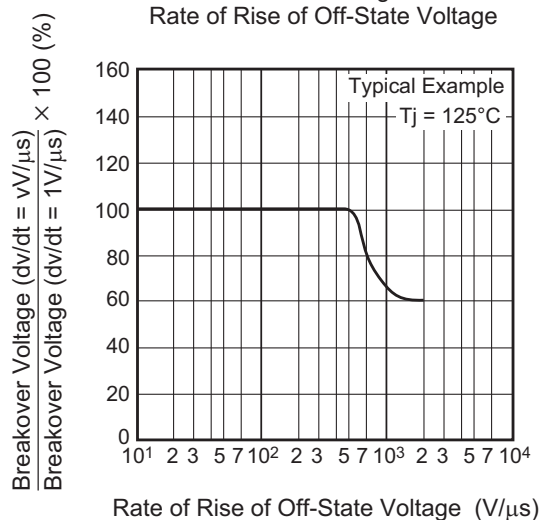
Allowable Ambient Temperature vs.  
Average On-State Current  
(Rectangular Wave)



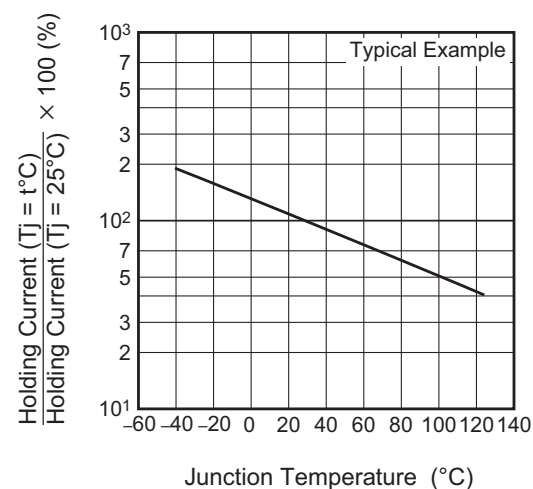
Breakover Voltage vs.  
Junction Temperature

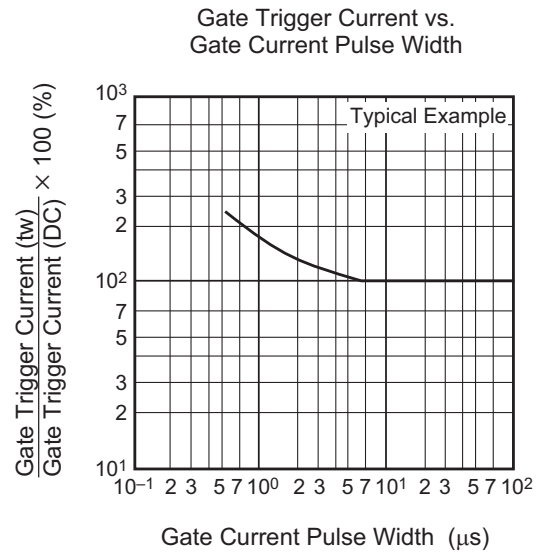
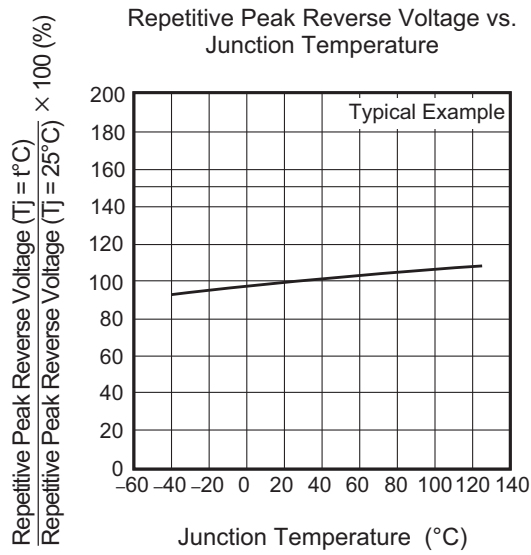


Breakover Voltage vs.  
Rate of Rise of Off-State Voltage



Holding Current vs.  
Junction Temperature

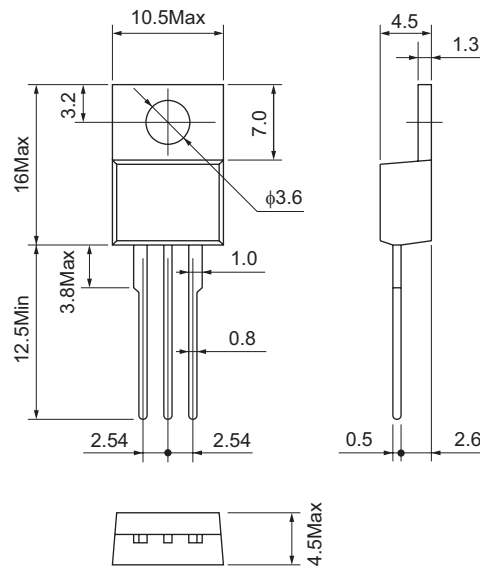




## Package Dimensions

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

Unit: 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.

Notes:

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