

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


BCR3PM

LOW POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

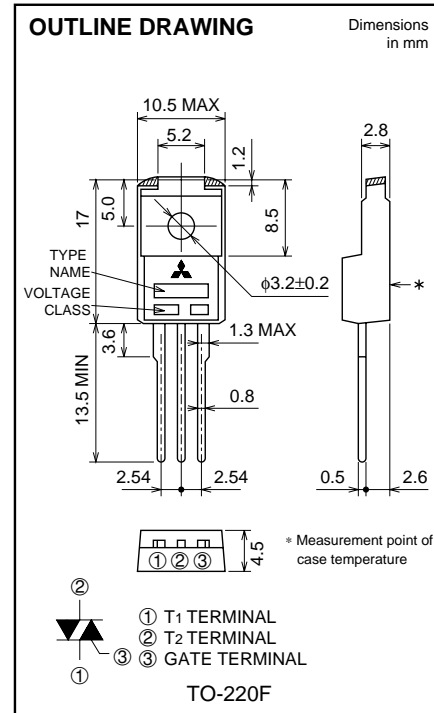
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

BCR3PM



- **IT (RMS)** **3A**
- **VDRM** **600V**
- **IFGT I , IRGT I , IRGT III** **20mA (10mA) *5**
- **Viso** **2000V**
- **UL Recognized: Yellow Card No.E80276(N)**

File No. E80271



APPLICATION

Contactless AC switches, light dimmer, electric blankets, control of household equipment such as electric fan, solenoid drivers, small motor control, other general purpose control applications

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	
		12	Unit
VDRM	Repetitive peak off-state voltage *1	600	V
VDSM	Non-repetitive peak off-state voltage *1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
IT (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, Tc=107°C	3.0	A
ITSM	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	30	A
I ² t	I ² t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	3.7	A ² s
P _{GM}	Peak gate power dissipation		3	W
P _{G (AV)}	Average gate power dissipation		0.3	W
V _{GM}	Peak gate voltage		6	V
I _{GM}	Peak gate current		0.5	A
T _J	Junction temperature		-40 ~ +125	°C
T _{stg}	Storage temperature		-40 ~ +125	°C
—	Weight	Typical value	2.0	g
Viso	Isolation voltage	Ta=25°C, AC 1 minute, T1 · T2 · G terminal to case	2000	V

*1. Gate open.

BCR3PM

Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

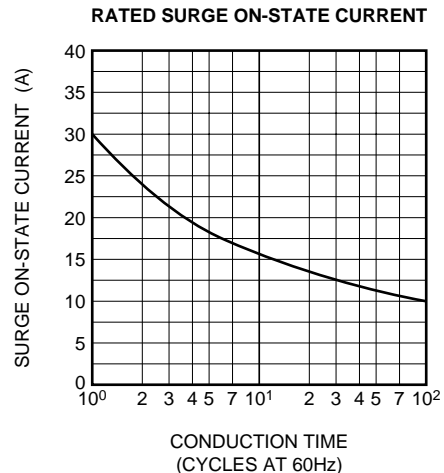
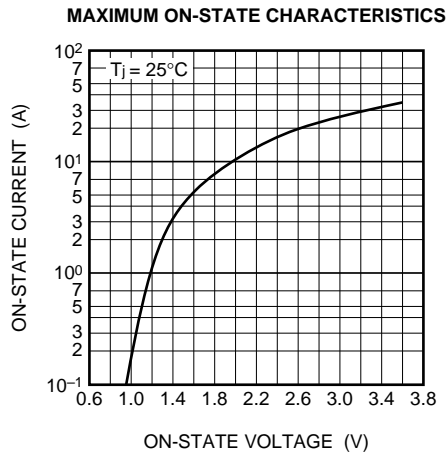
ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit	
			Min.	Typ.	Max.		
IDRM	Repetitive peak off-state current	T _J =125°C, V _{DRM} applied	—	—	2.0	mA	
V _{TM}	On-state voltage	T _c =25°C, I _{TM} =4.5A, Instantaneous measurement	—	—	1.5	V	
V _{FGT I}	Gate trigger voltage *2	T _J =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	1.5	V
V _{RGT I}			II	—	—	1.5	V
V _{RGT III}			III	—	—	1.5	V
I _{FGT I}	Gate trigger current *2	T _J =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	20*5	mA
I _{RGT I}			II	—	—	20*5	mA
I _{RGT III}			III	—	—	20*5	mA
V _{GD}	Gate non-trigger voltage	T _J =125°C, V _D =1/2V _{DRM}	0.2	—	—	V	
R _{th (j-c)}	Thermal resistance	Junction to case *3	—	—	4.5	°C/W	
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *4	T _J =125°C	5	—	—	V/μs	

*2. Measurement using the gate trigger characteristics measurement circuit.
 *3. The contact thermal resistance R_{th (c-f)} in case of greasing is 0.5°C/W.
 *4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.
 *5. High sensitivity (I_{GT}≤10mA) is also available. (IGT item①)

Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T _J =125°C 2. Rate of decay of on-state commutating current (di/dt) _c =-1.5A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES

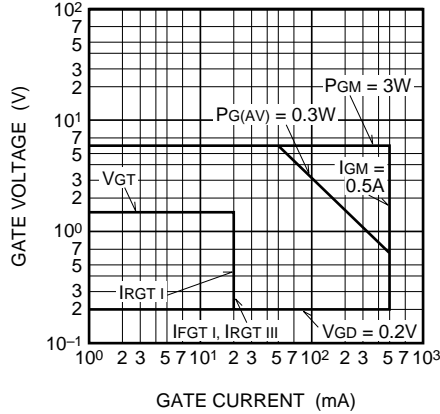


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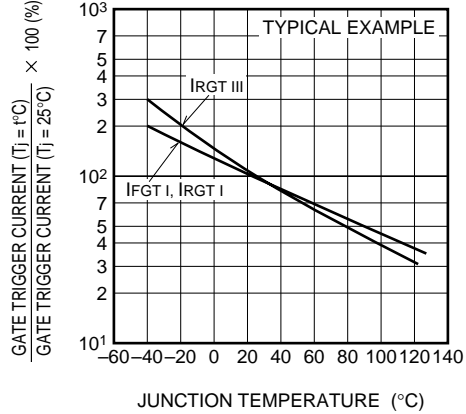
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

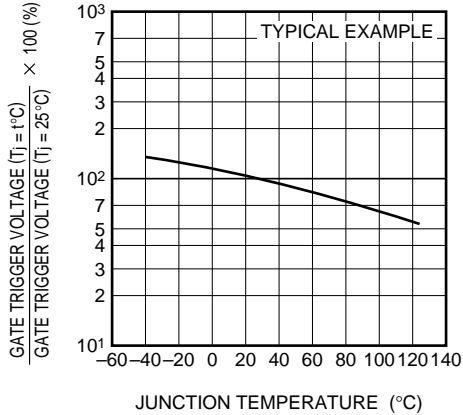
GATE CHARACTERISTICS (I, II AND III)



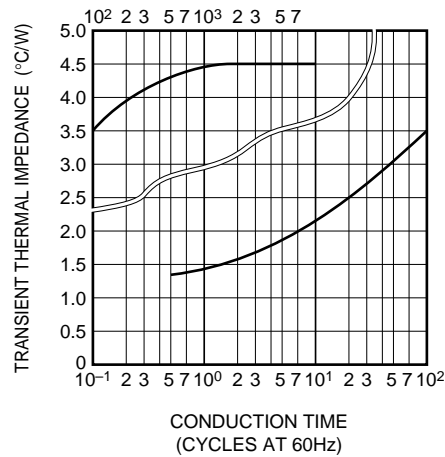
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



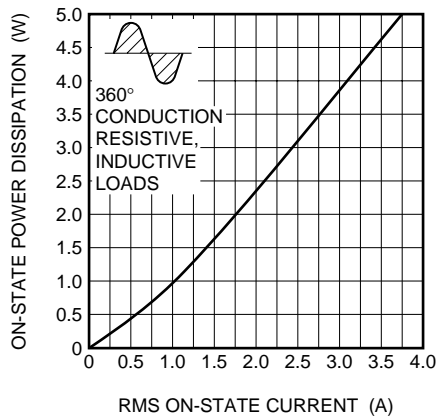
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



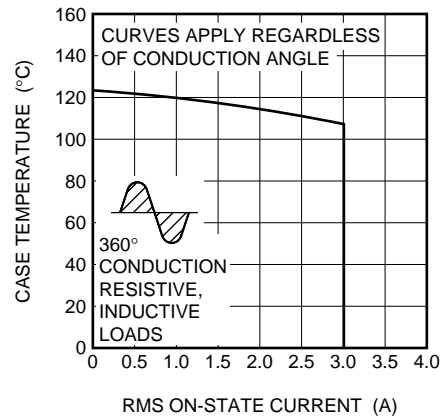
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



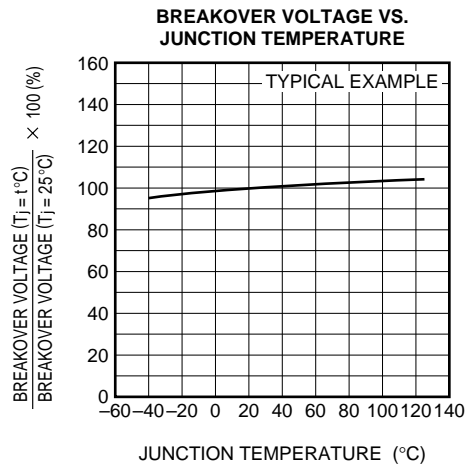
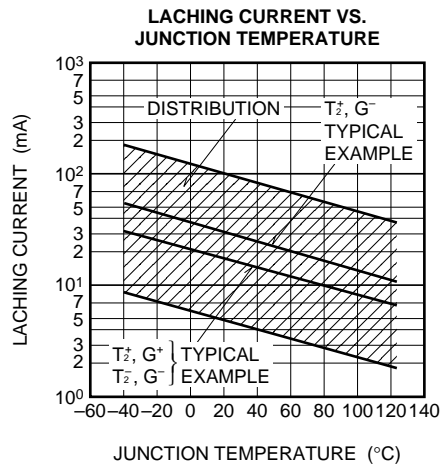
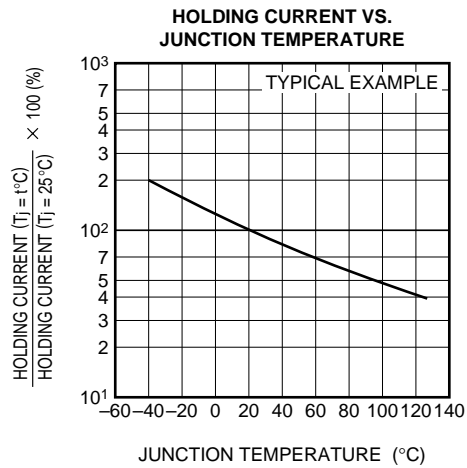
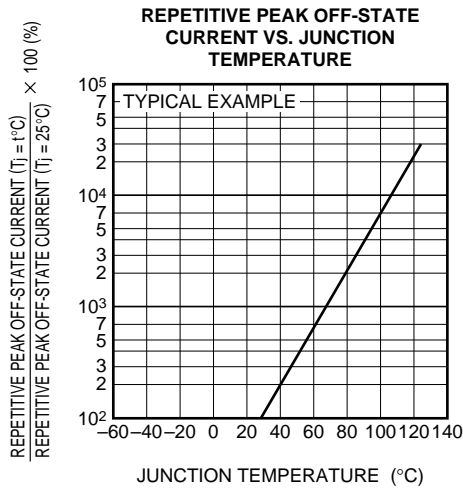
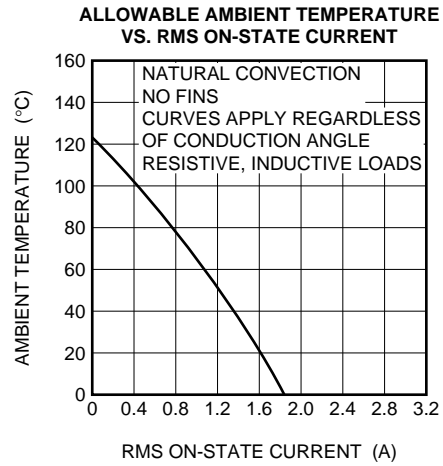
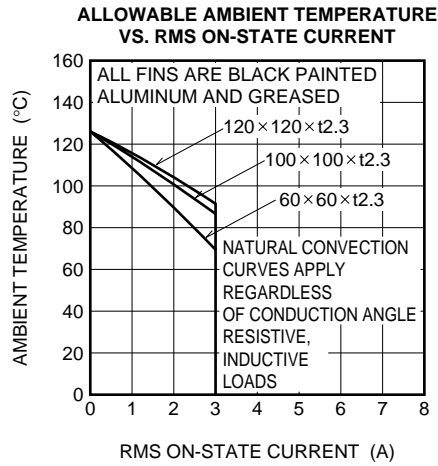
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



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Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

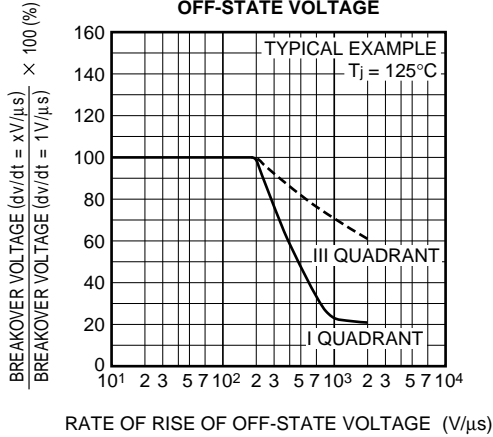


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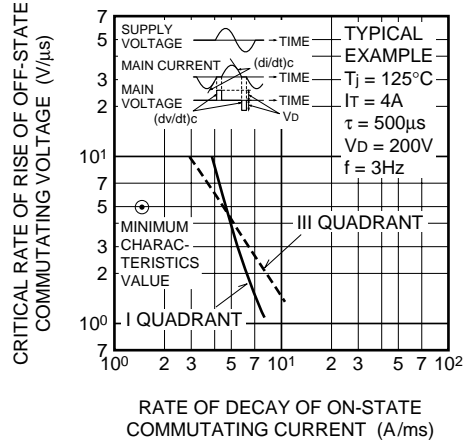
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

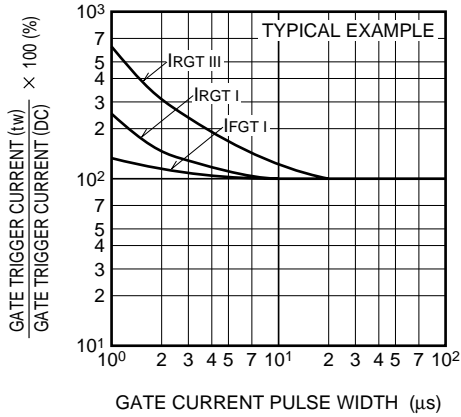
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE



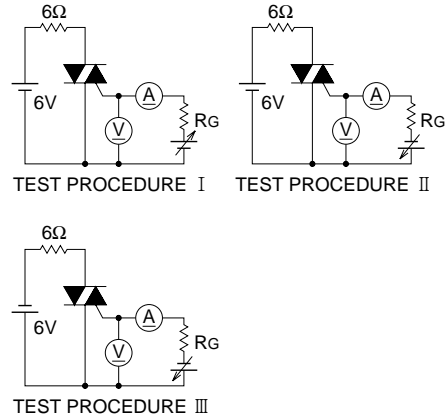
COMMUTATION CHARACTERISTICS



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS




BCR3PM

LOW POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

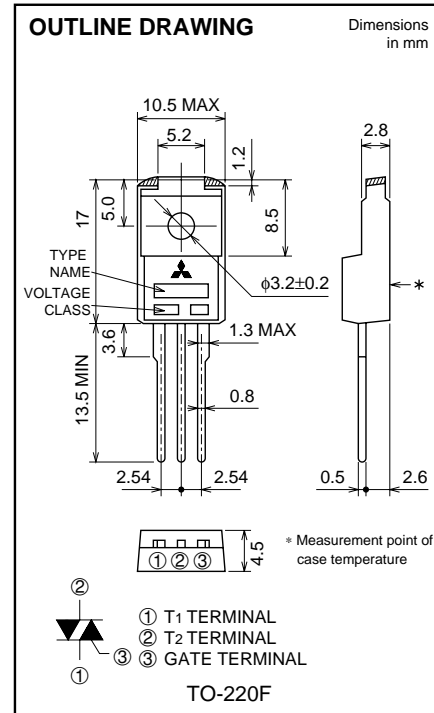
The product guaranteed maximum junction temperature 150°C (See warning.)

BCR3PM



- **IT (RMS)** **3A**
- **VDRM** **600V**
- **IFGT I , IRGT I , IRGT III** **20mA (10mA) *5**
- **Viso** **2000V**
- **UL Recognized: Yellow Card No.E80276(N)**

File No. E80271



APPLICATION

Contactless AC switches, light dimmer, electric blankets, control of household equipment such as electric fan, solenoid drivers, small motor control, other general purpose control applications

(Warning)

1. Refer to the recommended circuit values around the triac before using.
2. Be sure to exchange the specification before using. If not exchanged, general triacs will be supplied.

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	
		12	Unit
VDRM	Repetitive peak off-state voltage *1	600	V
VDSM	Non-repetitive peak off-state voltage *1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
IT (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, Tc=132°C	3.0	A
ITSM	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	30	A
I ² t	I ² t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	3.7	A ² s
P _{GM}	Peak gate power dissipation		3	W
P _{G (AV)}	Average gate power dissipation		0.3	W
V _{GM}	Peak gate voltage		6	V
I _{GM}	Peak gate current		0.5	A
T _J	Junction temperature		-40 ~ +150	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Weight	Typical value	2.0	g
Viso	Isolation voltage	Ta=25°C, AC 1 minute, T1 · T2 · G terminal to case	2000	V

*1. Gate open.

BCR3PM

The product guaranteed maximum junction temperature 150°C (See warning.)

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

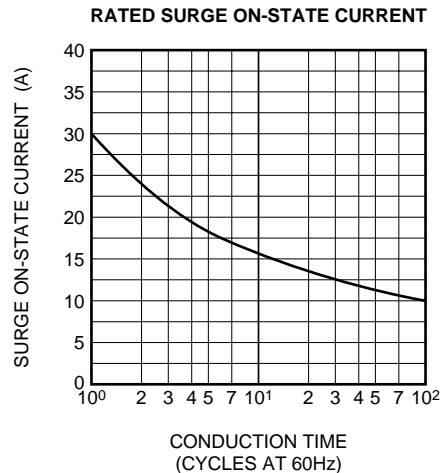
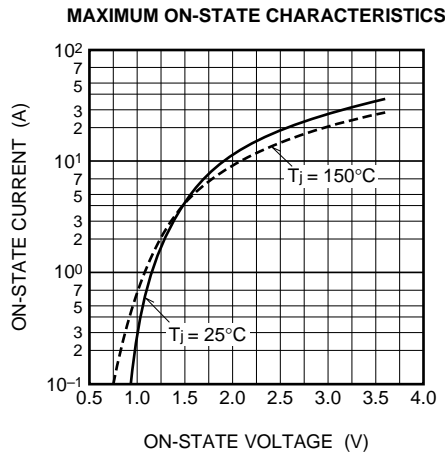
ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit	
			Min.	Typ.	Max.		
IDRM	Repetitive peak off-state current	T _J =150°C, V _{DRM} applied	—	—	2.0	mA	
V _{TM}	On-state voltage	T _c =25°C, I _{TM} =4.5A, Instantaneous measurement	—	—	1.5	V	
V _{FGT I}	Gate trigger voltage *2	T _J =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	1.5	V
V _{RGT I}			II	—	—	1.5	V
V _{RGT III}			III	—	—	1.5	V
I _{FGT I}	Gate trigger current *2	T _J =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	20*5	mA
I _{RGT I}			II	—	—	20*5	mA
I _{RGT III}			III	—	—	20*5	mA
V _{GD}	Gate non-trigger voltage	T _J =125°C/150°C, V _D =1/2V _{DRM}	0.2/0.1	—	—	V	
R _{th (j-c)}	Thermal resistance	Junction to case *3	—	—	4.5	°C/W	
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *4	T _J =125°C/150°C	5/1	—	—	V/μs	

*2. Measurement using the gate trigger characteristics measurement circuit.
 *3. The contact thermal resistance R_{th (c-f)} in case of greasing is 0.5°C/W.
 *4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.
 *5. High sensitivity (I_{GT}≤10mA) is also available. (IGT item①)

Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T _J =125°C/150°C 2. Rate of decay of on-state commutating current (di/dt) _c =-1.5A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES



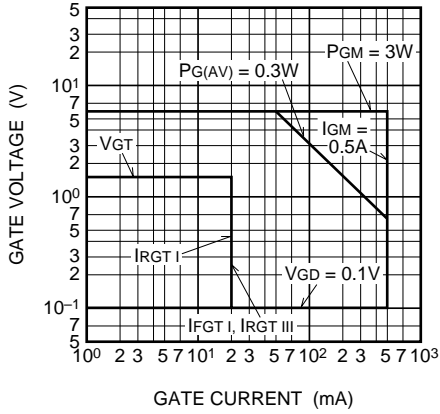
BCR3PM

LOW POWER USE

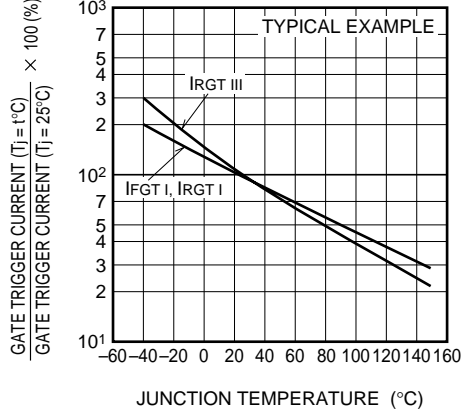
INSULATED TYPE, PLANAR PASSIVATION TYPE

The product guaranteed maximum junction temperature 150°C (See warning.)

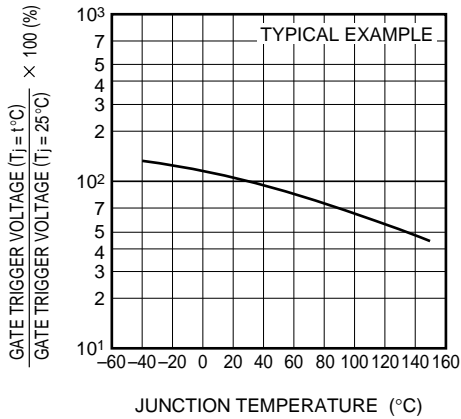
GATE CHARACTERISTICS (I, II AND III)



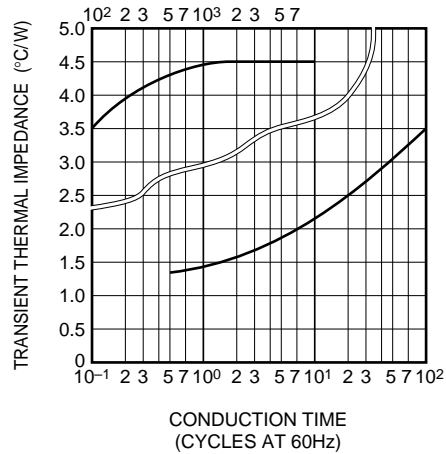
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



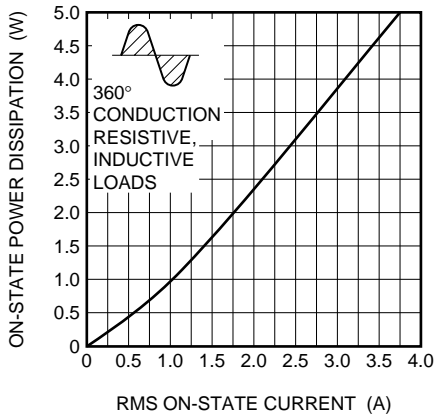
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



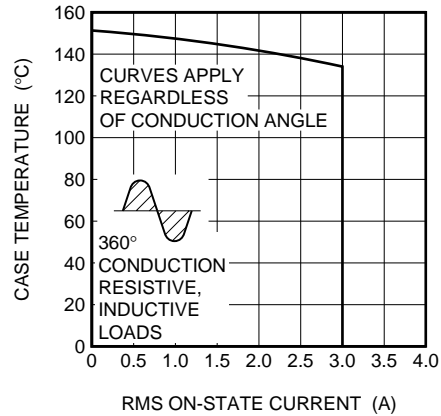
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



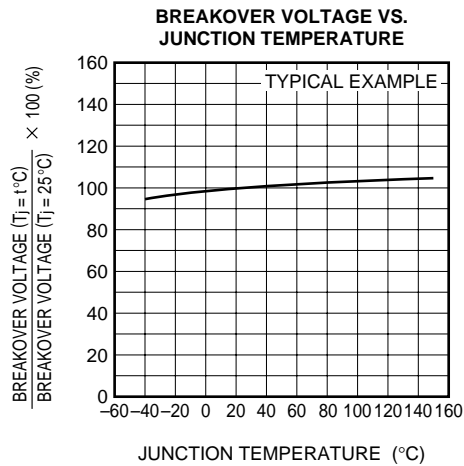
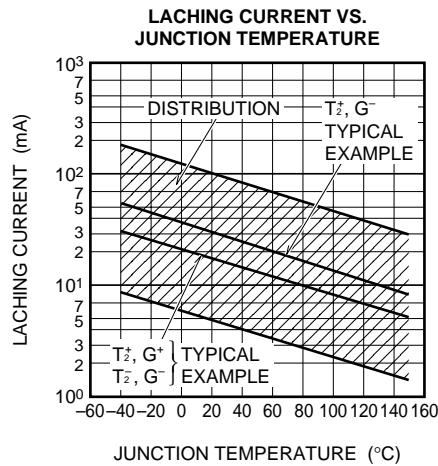
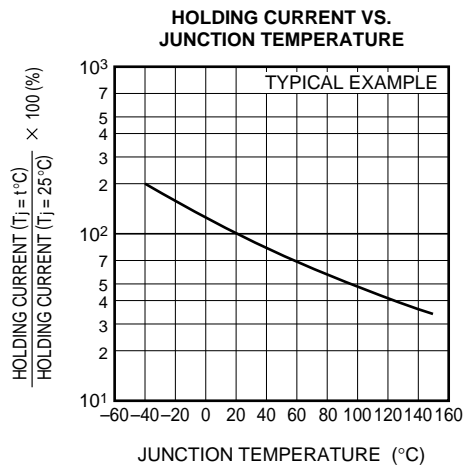
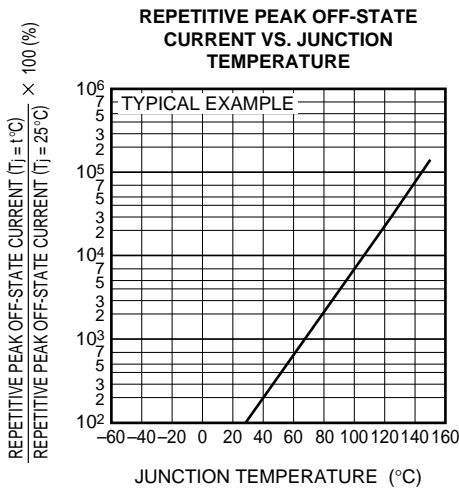
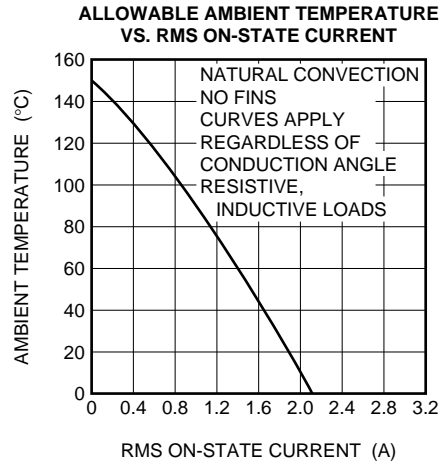
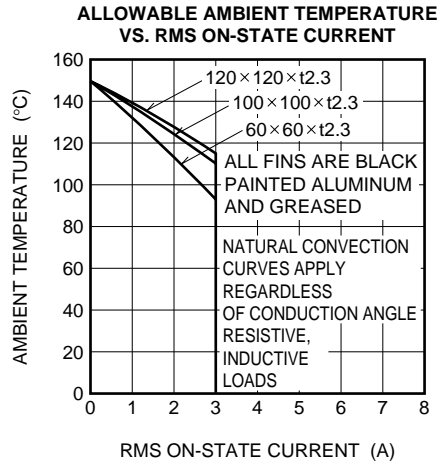
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



BCR3PM

The product guaranteed maximum junction temperature 150°C (See warning.)

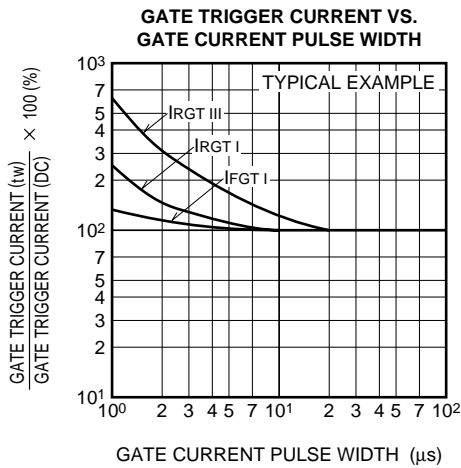
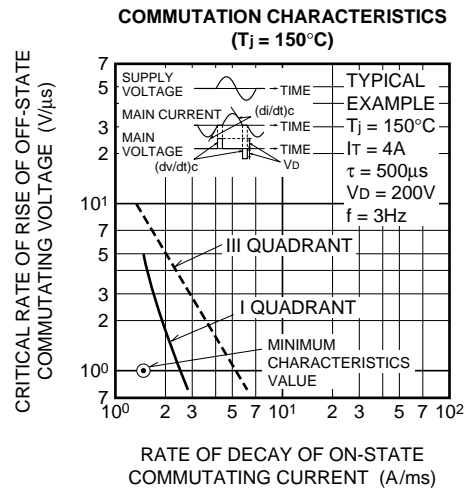
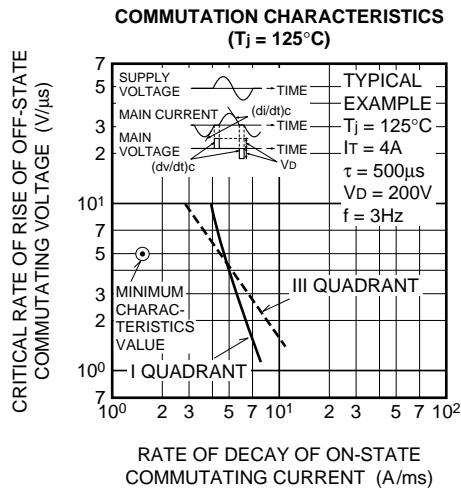
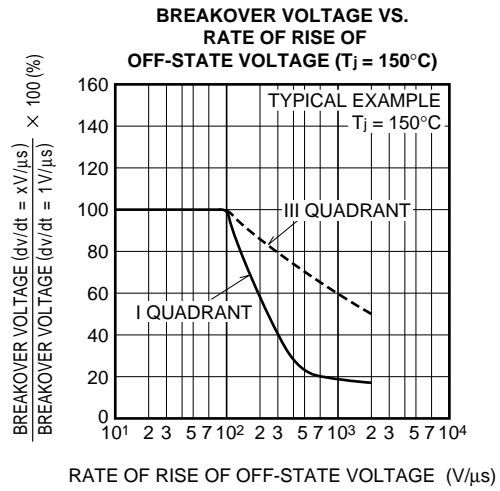
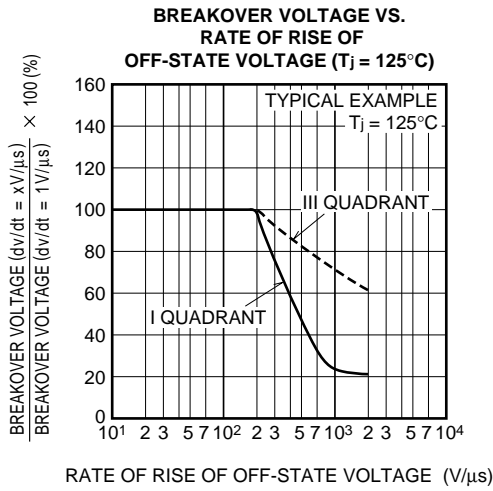
LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE



BCR3PM

The product guaranteed maximum junction temperature 150°C (See warning.)

**LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE**

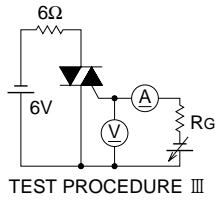
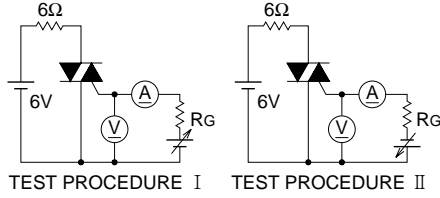


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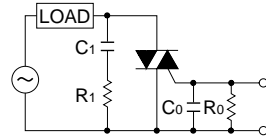
The product guaranteed maximum junction temperature 150°C (See warning.)

LOW POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



$C_1 = 0.1 \sim 0.47 \mu\text{F}$ $C_0 = 0.1 \mu\text{F}$
 $R_1 = 47 \sim 100 \Omega$ $R_0 = 100 \Omega$