

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

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(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

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

BCR16CS

MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

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

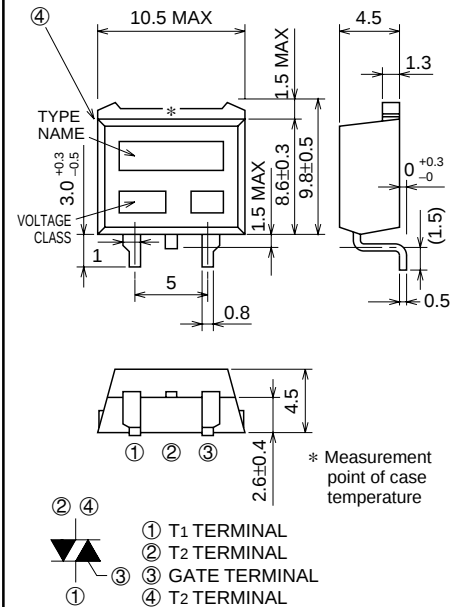
BCR16CS



- I_T (RMS) **16A**
- V_{DRM} **600V**
- I_{FGT} I , I_{RGT} I , I_{RGT} III **20mA**

OUTLINE DRAWING

Dimensions
in mm



TO-220S

APPLICATION

Contactless AC switches , light dimmer, electric flasher unit, hair drier, control of household equipment such as TV sets · stereo · refrigerator · washing machine · infrared kotatsu · carpet · electric fan, solenoid drivers, small motor control, copying machine, electric tool, other general purpose control applications

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	Unit
		12	
V_{DRM}	Repetitive peak off-state voltage *1	600	V
V_{DSM}	Non-repetitive peak off-state voltage *1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
I_T (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, $T_c=100^\circ\text{C}$ *3	16	A
I_{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	170	A
I^2_t	I^2_t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	121	A ² s
PGM	Peak gate power dissipation		5	W
PG (AV)	Average gate power dissipation		0.5	W
VGM	Peak gate voltage		10	V
IGM	Peak gate current		2	A
T_j	Junction temperature		-40 ~ +125	°C
T_{stg}	Storage temperature		-40 ~ +125	°C
—	Weight	Typical value	1.2	g

*1. Gate open.

Mar. 2002

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

MEDIUM POWER USE
NON-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} =25A, 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	—	—	1.5	V
V _{RGT} I			—	—	1.5	V
V _{RGT} III			—	—	1.5	V
I _{FGT} I	Gate trigger current *2	T _j =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	—	—	20	mA
I _{RGT} I			—	—	20	mA
I _{RGT} III			—	—	20	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	—	—	1.4	°C/W
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *5	T _j =125°C	10	—	—	V/μs

*2. Measurement using the gate trigger characteristics measurement circuit.

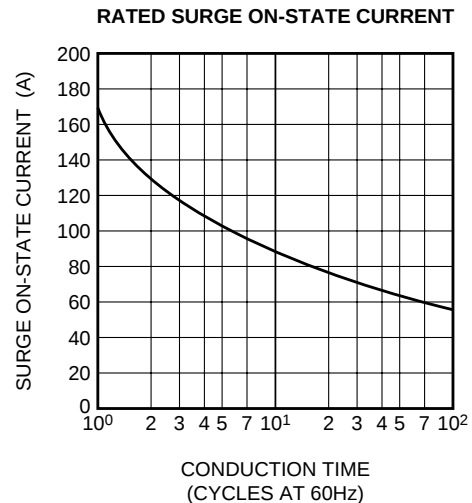
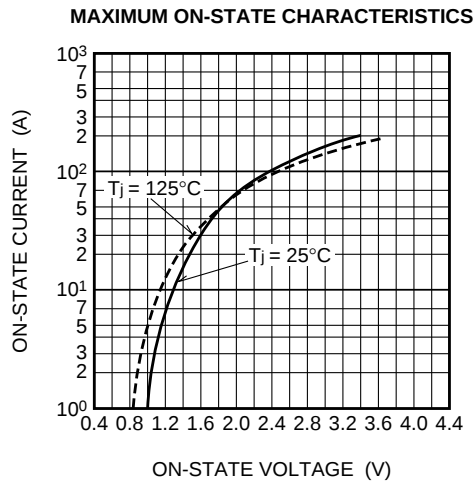
*3. Case temperature is measured on the T2 terminal.

*4. The contact thermal resistance R_{th} (c-j) in case of greasing is 1.0°C/W.

*5. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

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 =-8.0A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES

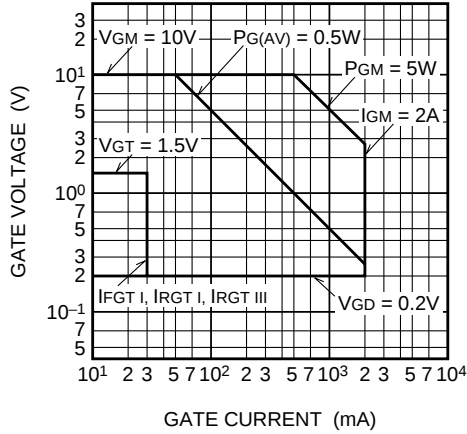


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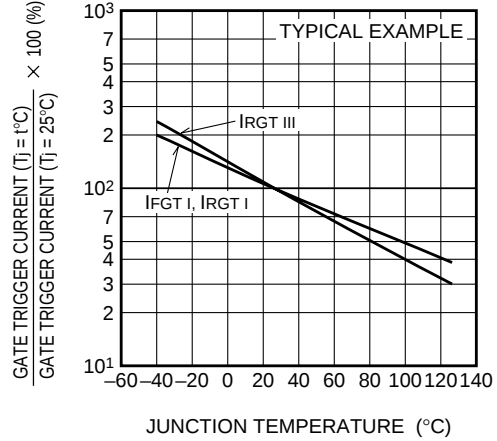
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

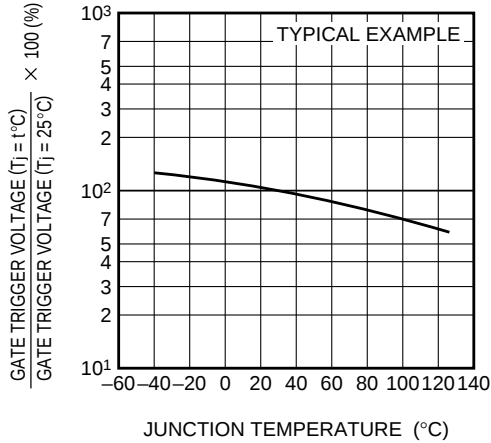
**GATE CHARACTERISTICS
(I, II AND III)**



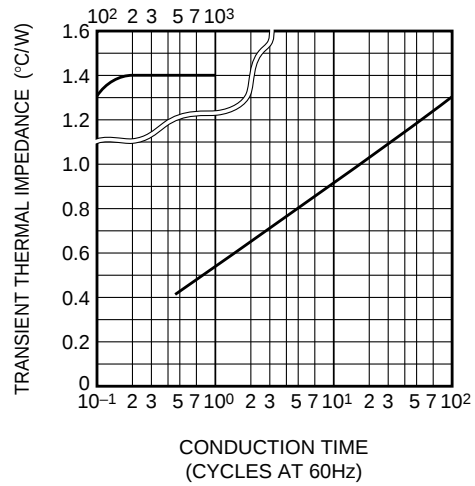
**GATE TRIGGER CURRENT VS.
JUNCTION TEMPERATURE**



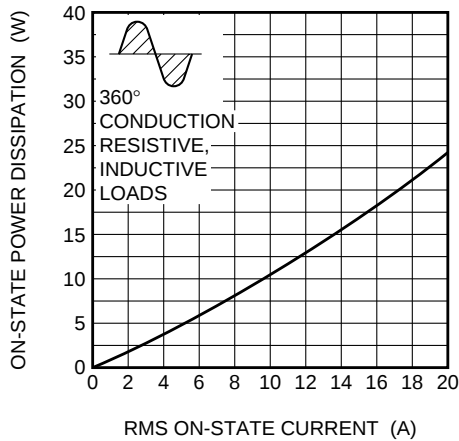
**GATE TRIGGER VOLTAGE VS.
JUNCTION TEMPERATURE**



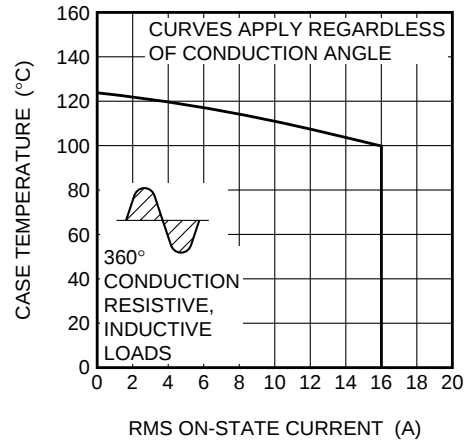
**MAXIMUM TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(JUNCTION TO CASE)**



**MAXIMUM ON-STATE POWER
DISSIPATION**



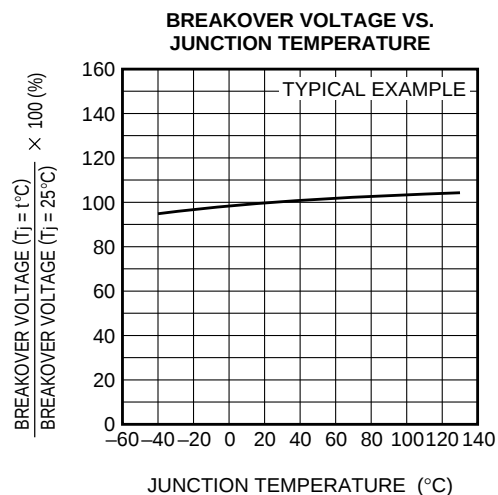
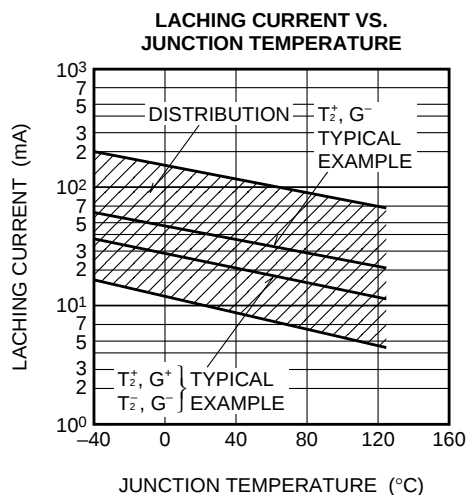
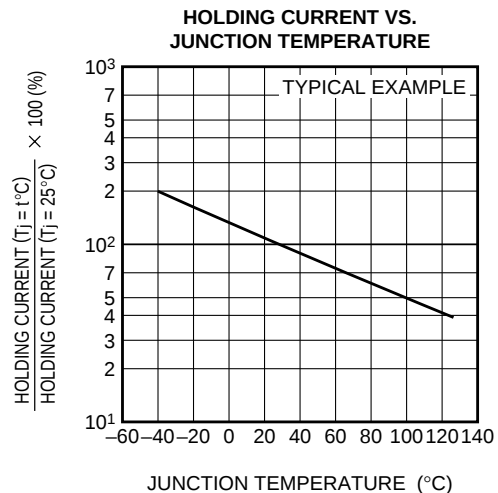
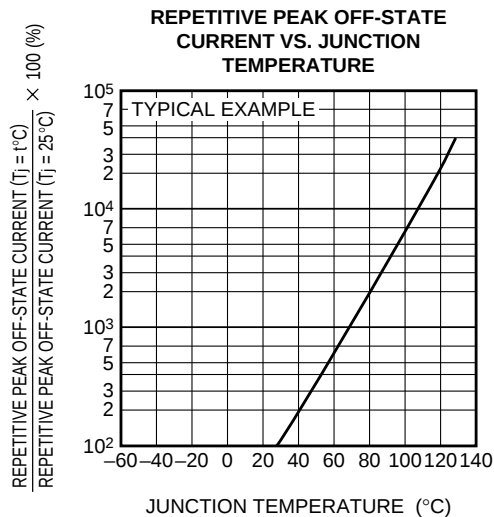
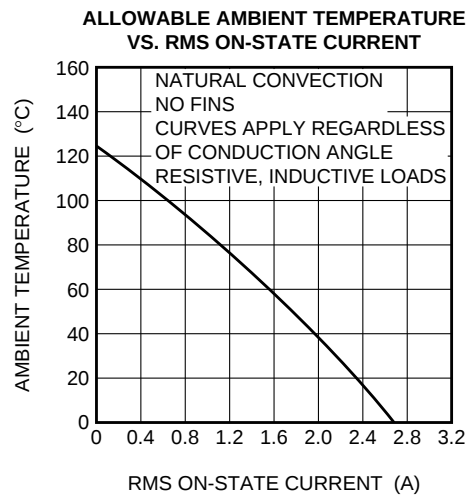
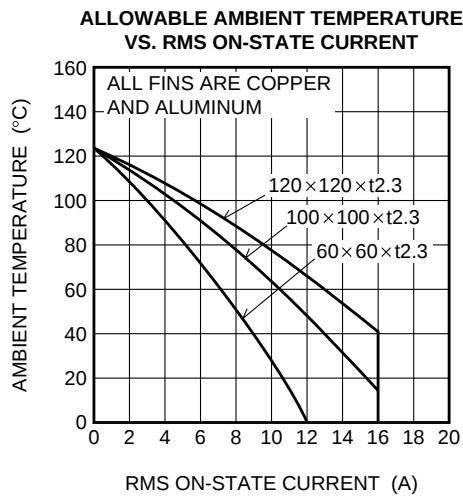
**ALLOWABLE CASE TEMPERATURE
VS. RMS ON-STATE CURRENT**



BCR16CS

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

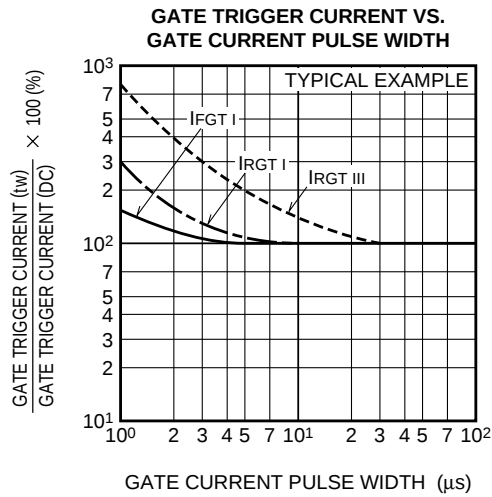
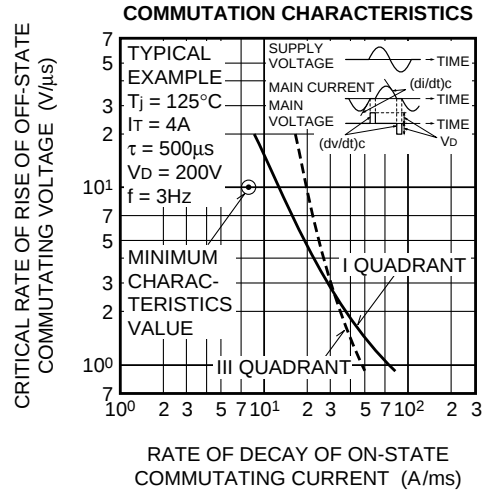
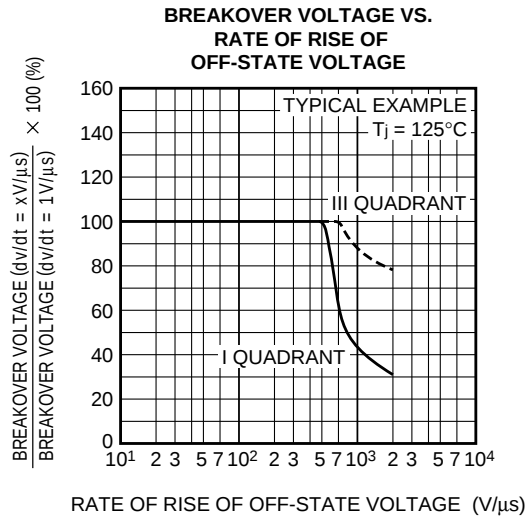
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE



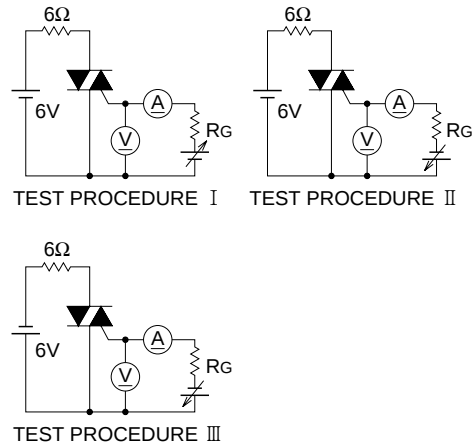
BCR16CS

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

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



BCR16CS

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

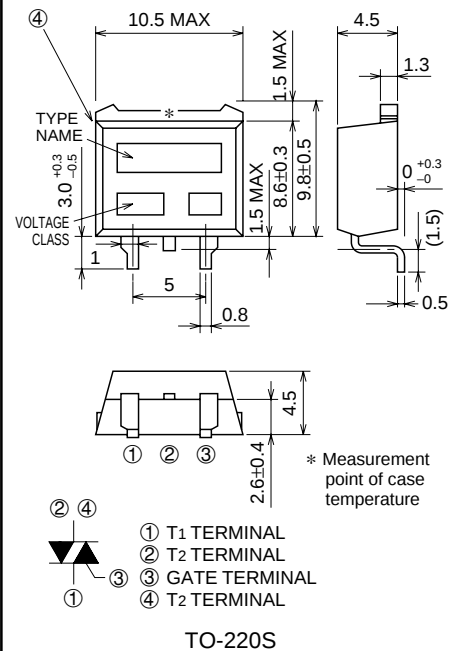
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

BCR16CS

- **IT (RMS)** **16A**
- **VDRM** **600V**
- **IFGT I , IRGT I , IRGT III** **20mA**

OUTLINE DRAWING

Dimensions
in mm

**APPLICATION**

Contactless AC switches , light dimmer, electric flasher unit, hair drier, control of household equipment such as TV sets · stereo · refrigerator · washing machine · infrared kotatsu · carpet · electric fan, solenoid drivers, small motor control, copying machine, electric tool, 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	Unit
		12	
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, T _c =125°C *3	16	A
ITSM	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	170	A
I ² _t	I ² _t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	121	A ² s
PGM	Peak gate power dissipation		5	W
PG (AV)	Average gate power dissipation		0.5	W
VGM	Peak gate voltage		10	V
IGM	Peak gate current		2	A
T _j	Junction temperature		-40 ~ +150	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Weight	Typical value	1.2	g

*1. Gate open.

Mar. 2002

BCR16CS

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

MEDIUM POWER USE
NON-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} =25A, 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	—	—	1.5	V
V _{RGT} I			—	—	1.5	V
V _{RGT} III			—	—	1.5	V
I _{FGT} I	Gate trigger current *2	T _J =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	—	—	20	mA
I _{RGT} I			—	—	20	mA
I _{RGT} III			—	—	20	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	—	—	1.4	°C/W
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *5	T _J =125°C/150°C	10/1	—	—	V/μs

*2. Measurement using the gate trigger characteristics measurement circuit.

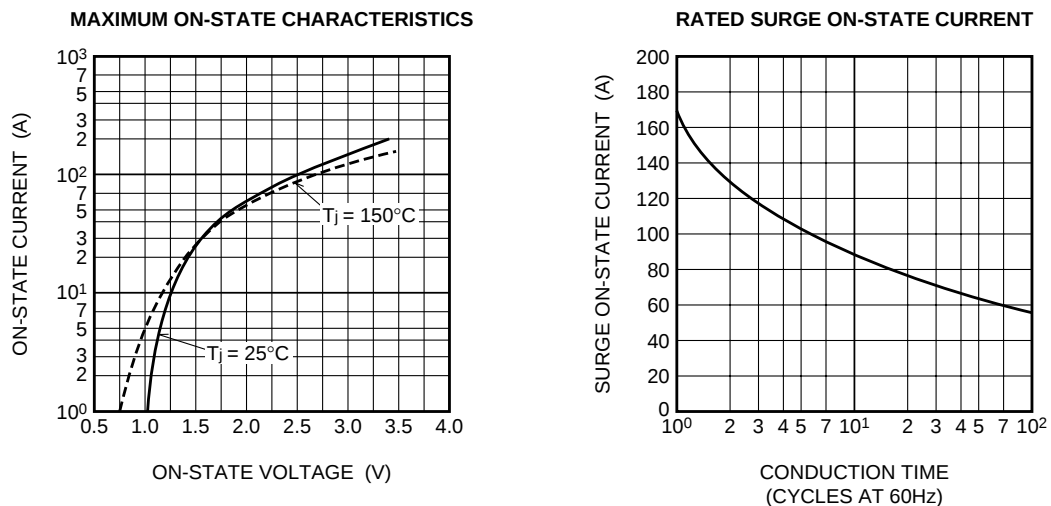
*3. Case temperature is measured on the T2 terminal.

*4. The contact thermal resistance R_{th} (c-j) in case of greasing is 1.0°C/W.

*5. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

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 =-8.0A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES

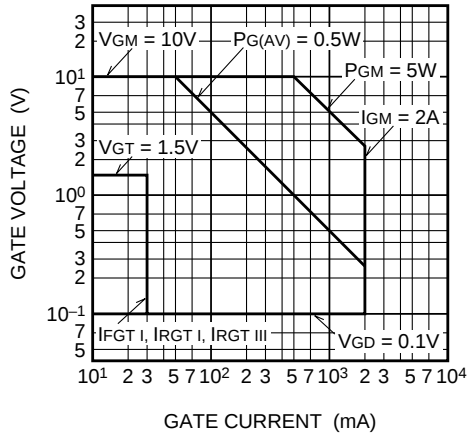


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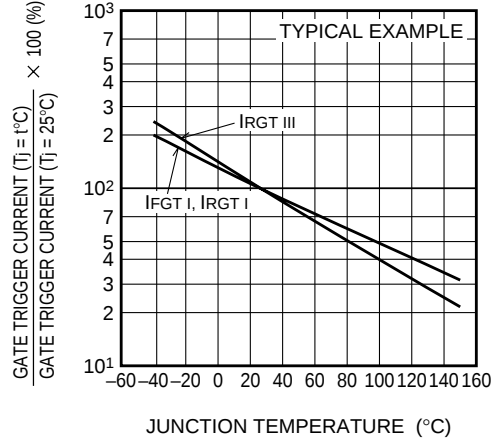
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

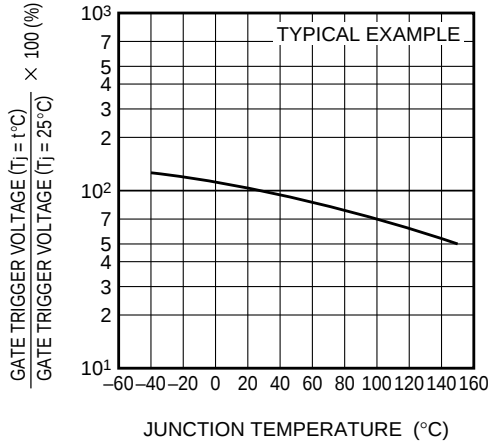
**GATE CHARACTERISTICS
(I, II AND III)**



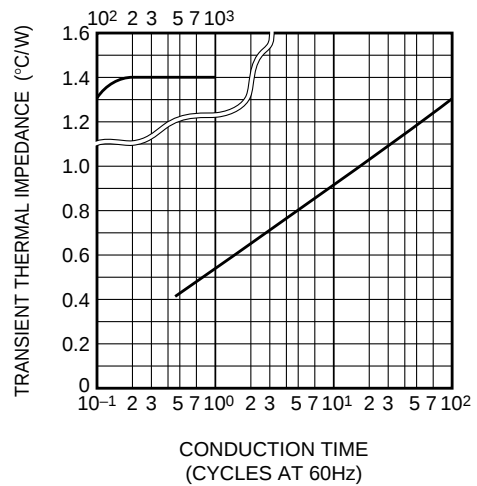
**GATE TRIGGER CURRENT VS.
JUNCTION TEMPERATURE**



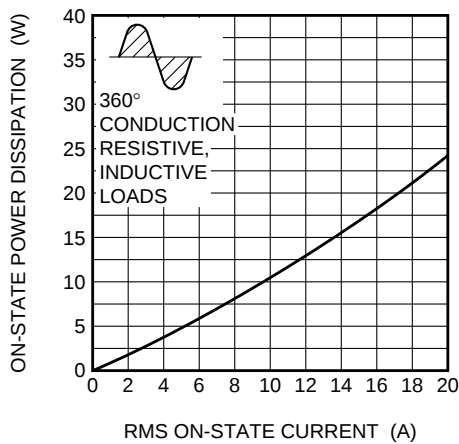
**GATE TRIGGER VOLTAGE VS.
JUNCTION TEMPERATURE**



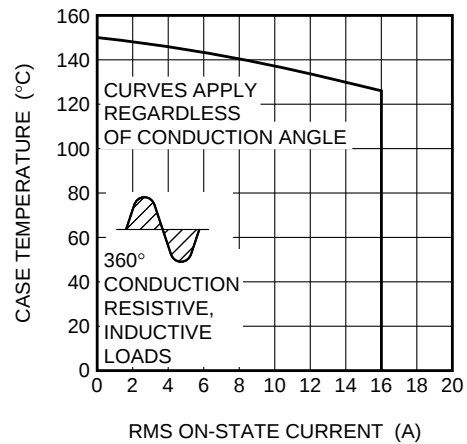
**MAXIMUM TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(JUNCTION TO CASE)**



**MAXIMUM ON-STATE POWER
DISSIPATION**



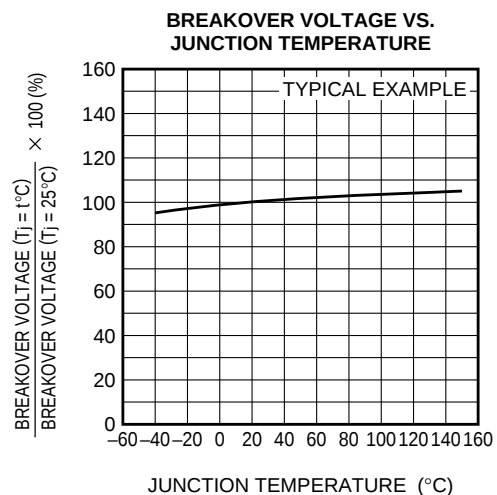
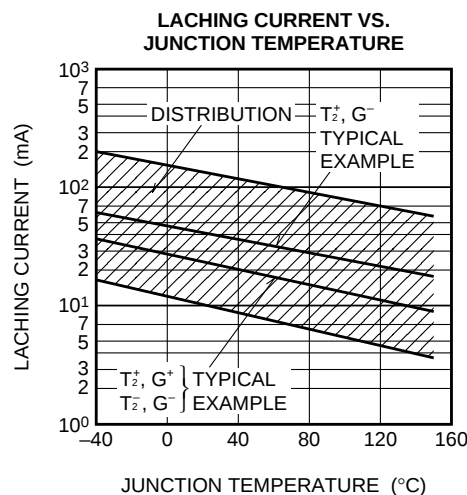
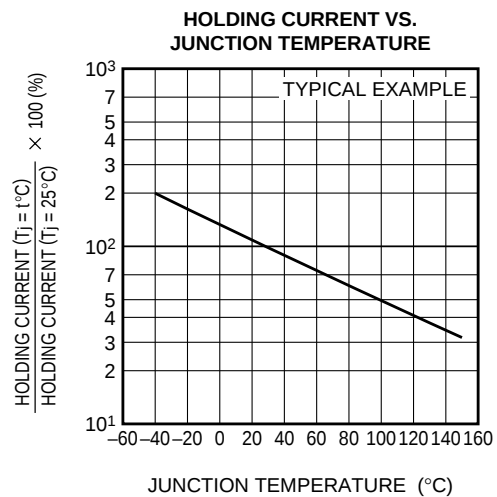
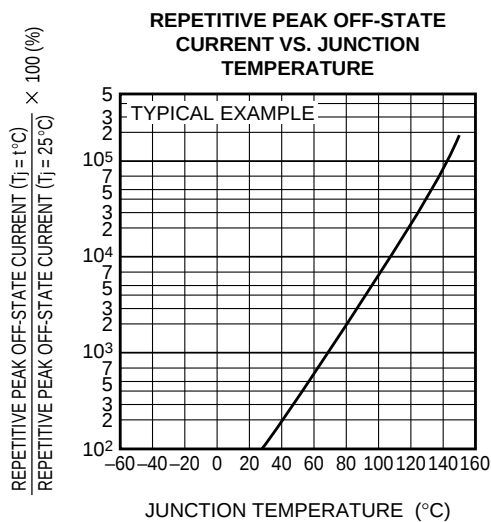
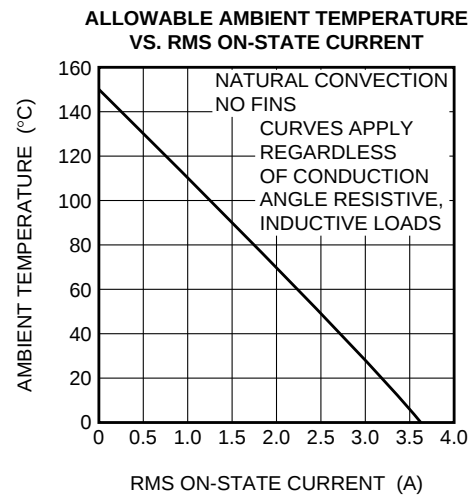
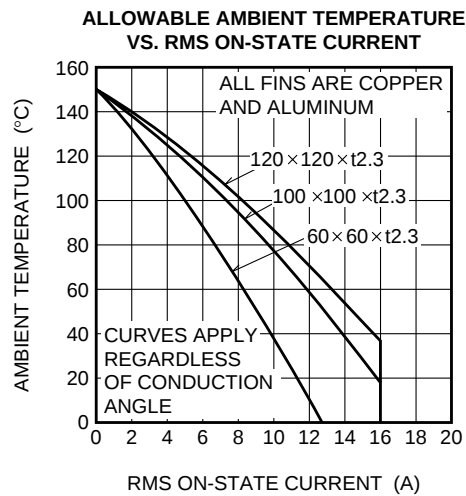
**ALLOWABLE CASE TEMPERATURE
VS. RMS ON-STATE CURRENT**



BCR16CS

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

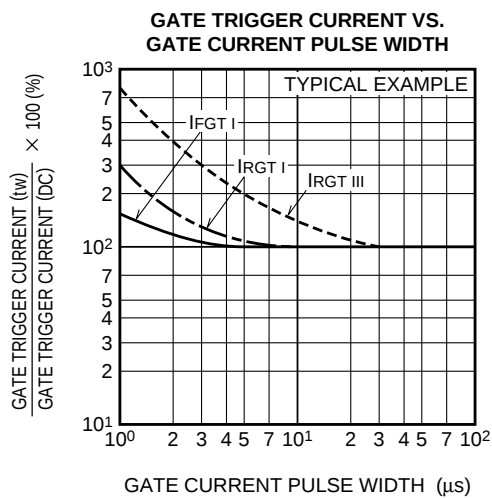
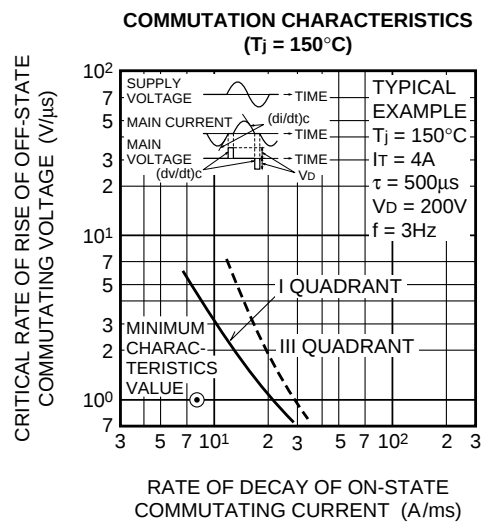
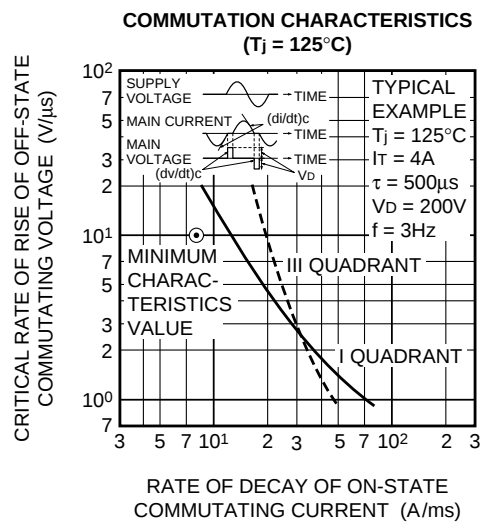
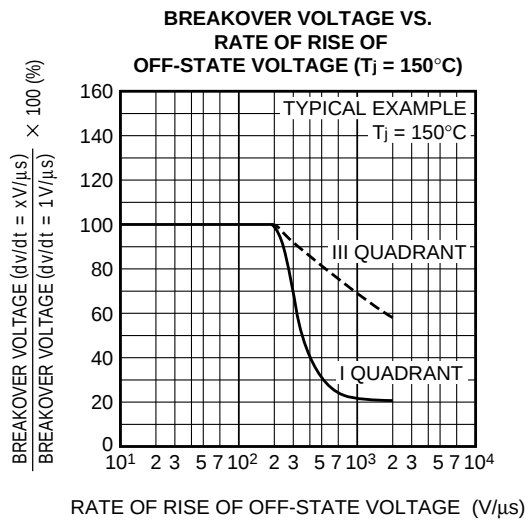
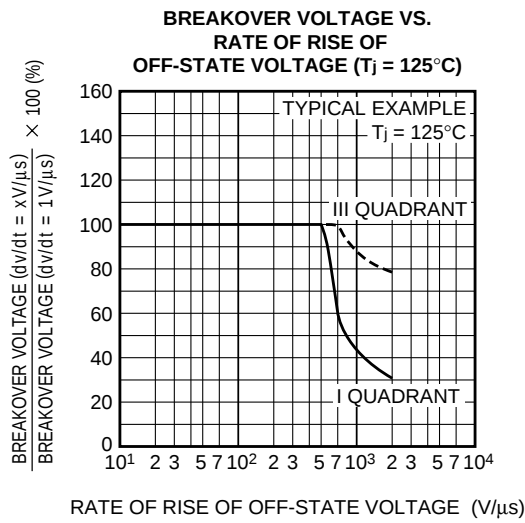
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE



BCR16CS

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

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

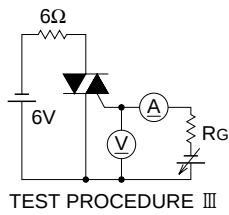
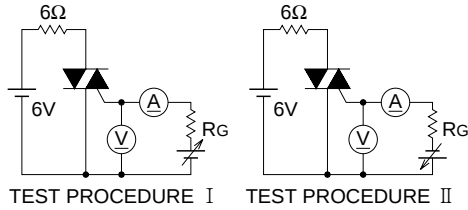


BCR16CS

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

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC

