BCR16CS

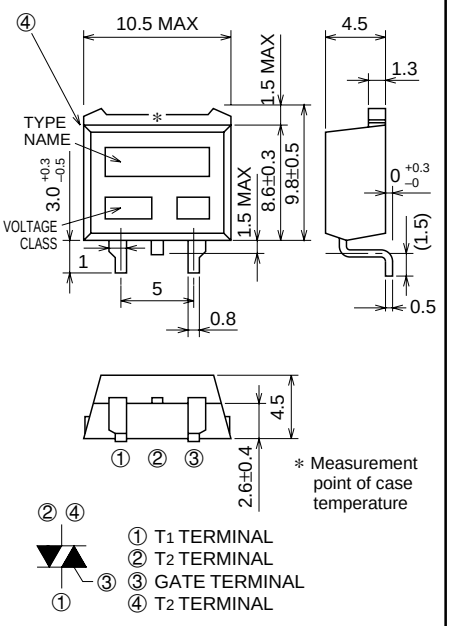
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

BCR16CS

- **$I_{T\ (RMS)}$ 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°C *3	16	A
I_{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	170	A
I^2t	I^2t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	121	A^2s
P_{GM}	Peak gate power dissipation		5	W
$P_{G\ (AV)}$	Average gate power dissipation		0.5	W
V_{GM}	Peak gate voltage		10	V
I_{GM}	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.

MITSUBISHI ELECTRIC

BCR16CS

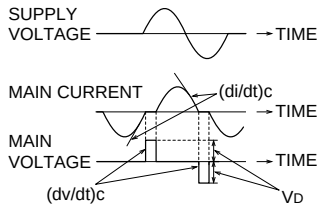
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

ELECTRICAL CHARACTERISTICS

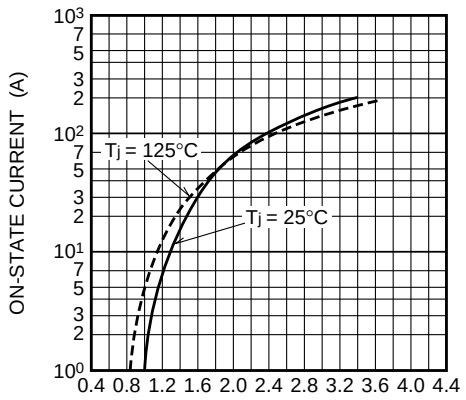
Symbol	Parameter		Test conditions	Limits			Unit
				Min.	Typ.	Max.	
I_{DRM}	Repetitive peak off-state current		T_j=125°C, V_{DRM} applied	—	—	2.0	mA
V_{TM}	On-state voltage		T_C=25°C, I_{TM}=25A, Instantaneous measurement	—	—	1.5	V
$V_{FGT\ I}$	Gate trigger voltage *2	Ⅰ	T_j=25°C, V_D=6V, R_L=6Ω, R_G=330Ω	—	—	1.5	V
$V_{RGT\ I}$		Ⅱ		—	—	1.5	V
$V_{RGT\ III}$		Ⅲ		—	—	1.5	V
$I_{FGT\ I}$	Gate trigger current *2	Ⅰ	T_j=25°C, V_D=6V, R_L=6Ω, R_G=330Ω	—	—	20	mA
$I_{RGT\ I}$		Ⅱ		—	—	20	mA
$I_{RGT\ III}$		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 $R_{th\ (c-f)}$ 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.

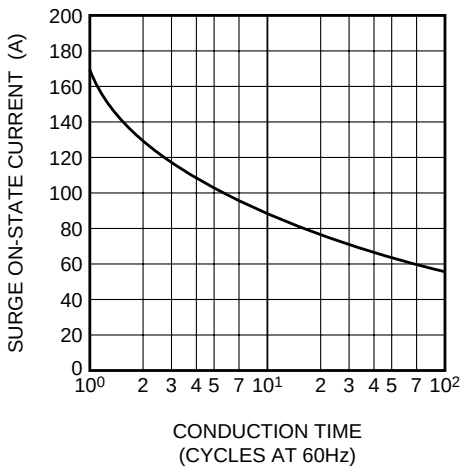
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T_j=125°C 2. Rate of decay of on-state commutating current $(di/dt)_c$=–8.0A/ms 3. Peak off-state voltage V_D=400V	

PERFORMANCE CURVES

MAXIMUM ON-STATE CHARACTERISTICS



RATED SURGE ON-STATE CURRENT



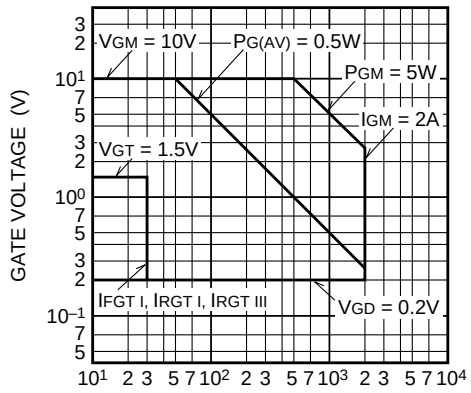
MITSUBISHI ELECTRIC

BCR16CS

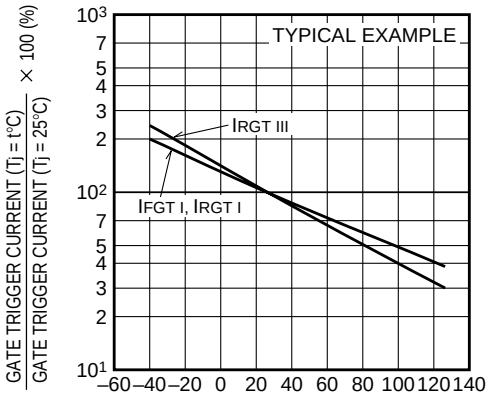
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

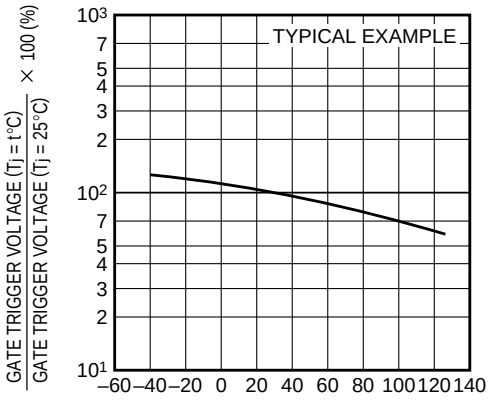
GATE CHARACTERISTICS (I, II AND III)



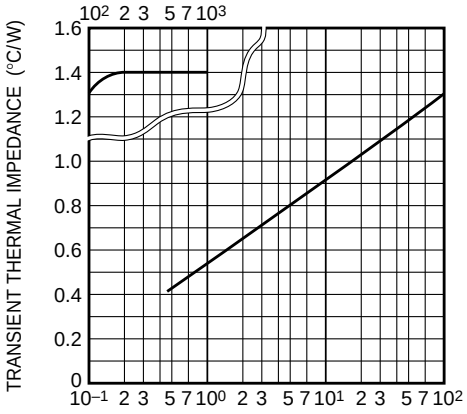
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



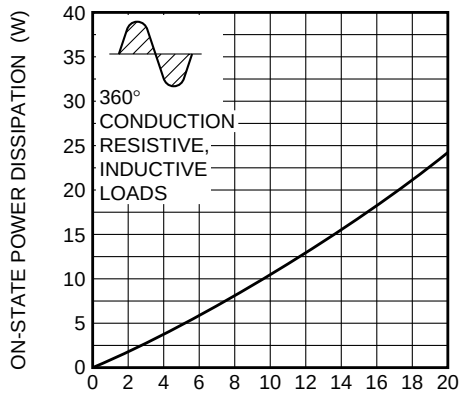
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



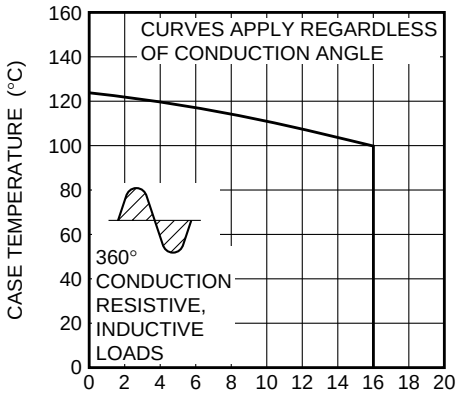
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



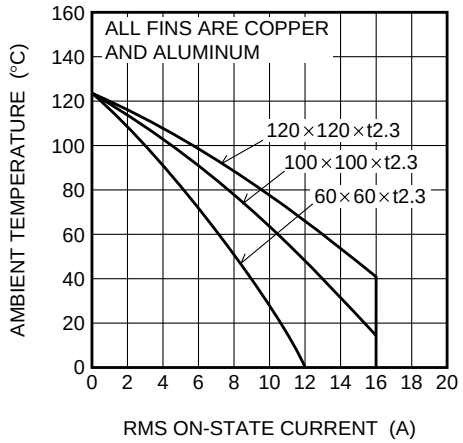
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



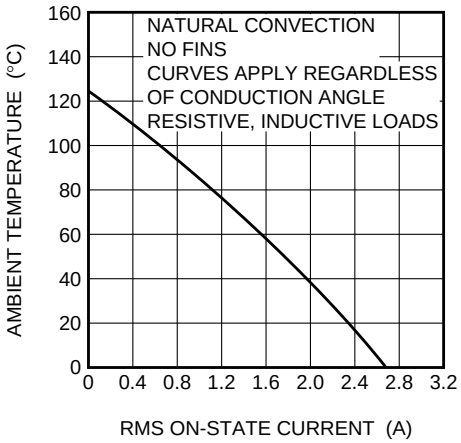
MITSUBISHI ELECTRIC

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

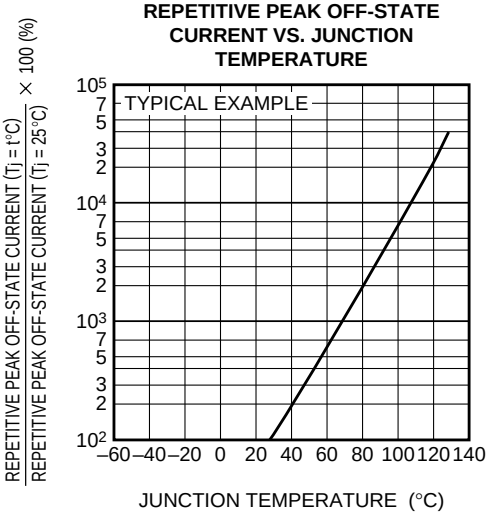
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



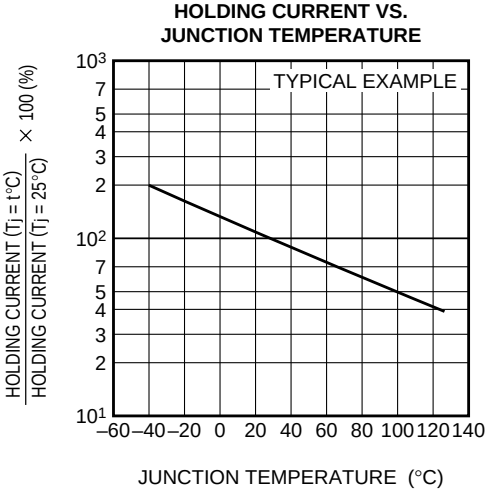
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



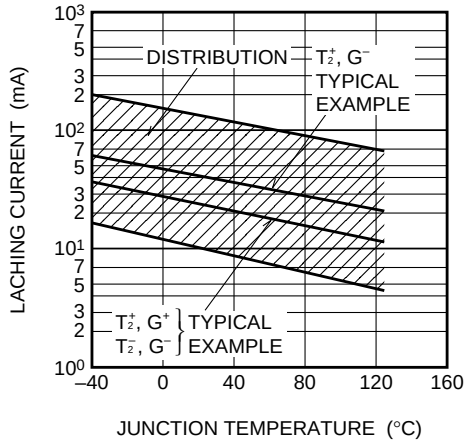
REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE



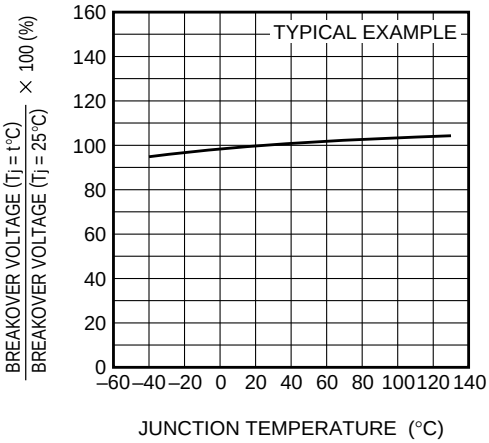
HOLDING CURRENT VS. JUNCTION TEMPERATURE



LACHING CURRENT VS. JUNCTION TEMPERATURE



BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE

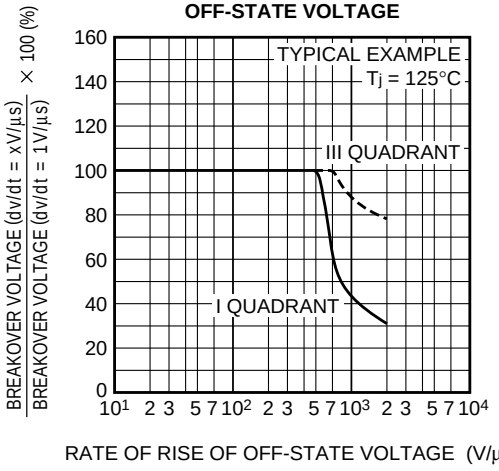


BCR16CS

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

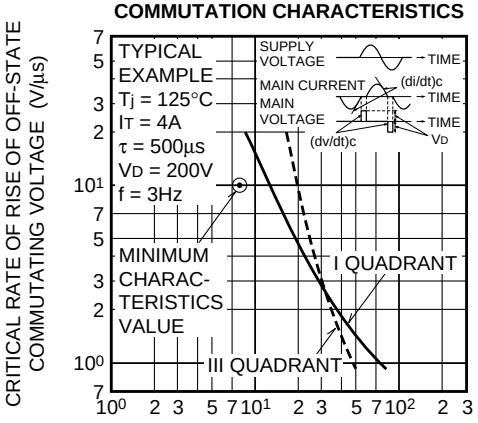
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

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



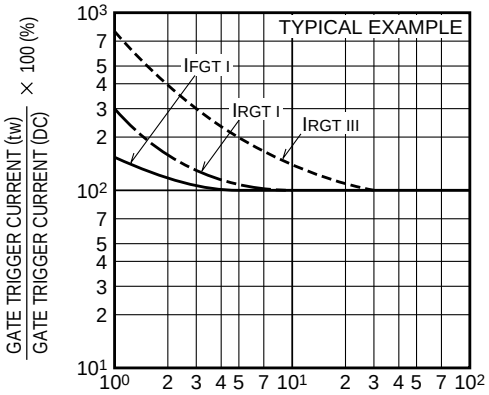
RATE OF RISE OF OFF-STATE VOLTAGE (V/μs)

COMMUTATION CHARACTERISTICS



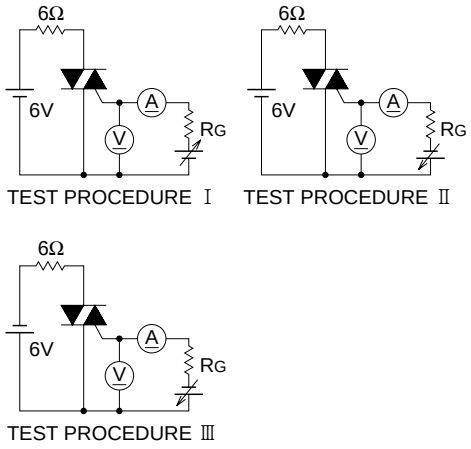
RATE OF DECAY OF ON-STATE COMMUTATING CURRENT (A/ms)

GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



GATE CURRENT PULSE WIDTH (μs)

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



MITSUBISHI ELECTRIC

BCR16CS

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

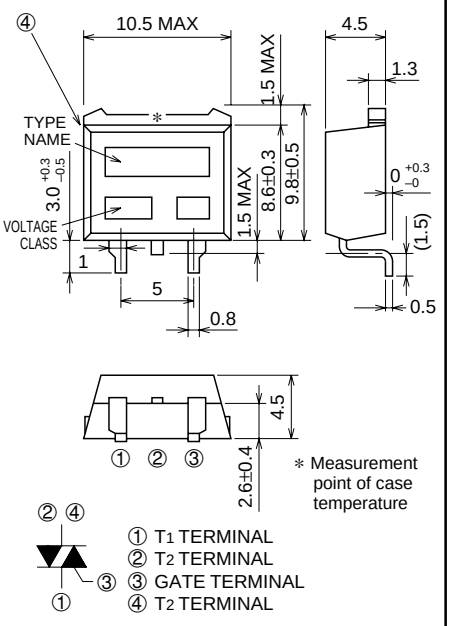
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

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

(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	
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=125°C ∗3	16	A
I_{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	170	A
I^2t	I^2t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	121	A^2s
P_{GM}	Peak gate power dissipation		5	W
$P_{G\ (AV)}$	Average gate power dissipation		0.5	W
V_{GM}	Peak gate voltage		10	V
I_{GM}	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.

MITSUBISHI ELECTRIC

BCR16CS

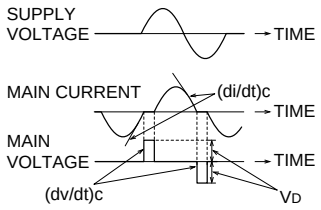
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

ELECTRICAL CHARACTERISTICS

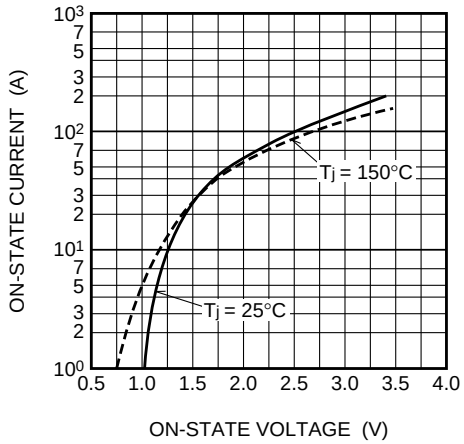
Symbol	Parameter		Test conditions	Limits			Unit
				Min.	Typ.	Max.	
I_{DRM}	Repetitive peak off-state current		T_j=150°C, V_{DRM} applied	—	—	2.0	mA
V_{TM}	On-state voltage		T_C=25°C, I_{TM}=25A, Instantaneous measurement	—	—	1.5	V
$V_{FGT\ I}$	Gate trigger voltage *2	Ⅰ	T_j=25°C, V_D=6V, R_L=6Ω, R_G=330Ω	—	—	1.5	V
$V_{RGT\ I}$		Ⅱ		—	—	1.5	V
$V_{RGT\ III}$		Ⅲ		—	—	1.5	V
$I_{FGT\ I}$	Gate trigger current *2	Ⅰ	T_j=25°C, V_D=6V, R_L=6Ω, R_G=330Ω	—	—	20	mA
$I_{RGT\ I}$		Ⅱ		—	—	20	mA
$I_{RGT\ III}$		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 $R_{th\ (c-f)}$ 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.

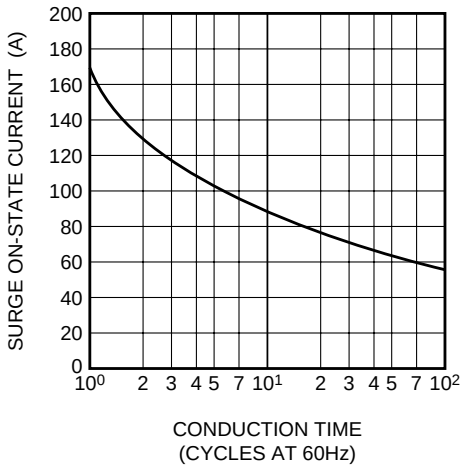
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T_j=125°C/150°C 2. Rate of decay of on-state commutating current $(di/dt)_c$=–8.0A/ms 3. Peak off-state voltage V_D=400V	

PERFORMANCE CURVES

MAXIMUM ON-STATE CHARACTERISTICS



RATED SURGE ON-STATE CURRENT



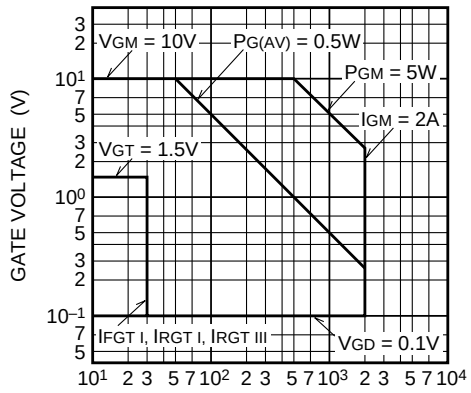
MITSUBISHI ELECTRIC

BCR16CS

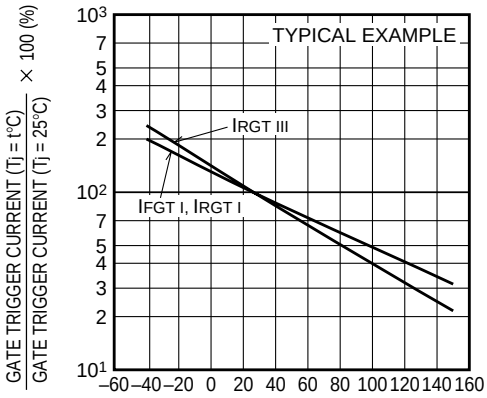
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

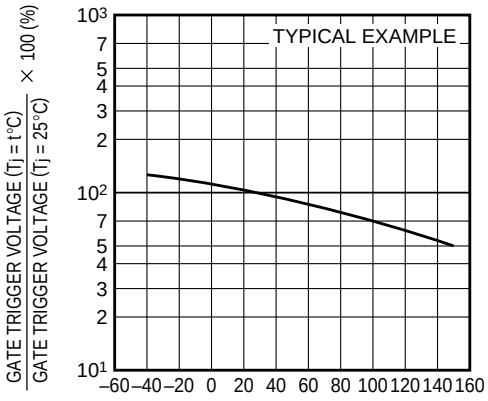
GATE CHARACTERISTICS (I, II AND III)



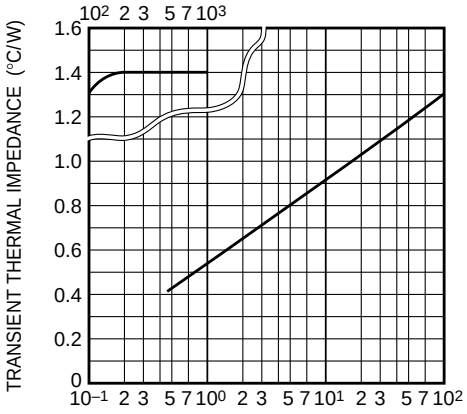
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



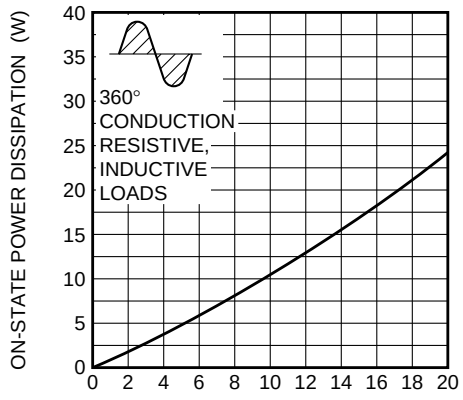
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



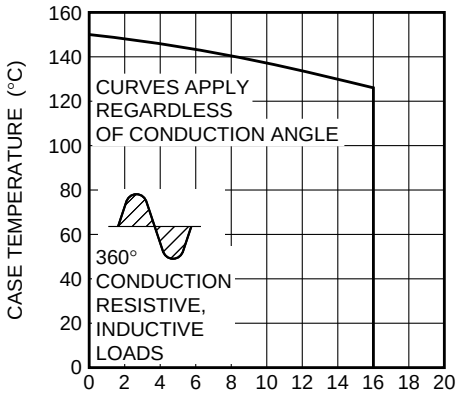
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



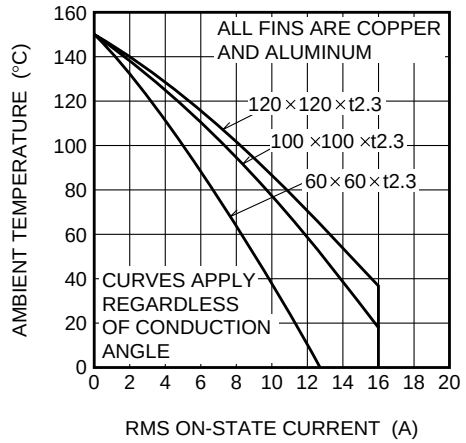
MITSUBISHI ELECTRIC

BCR16CS

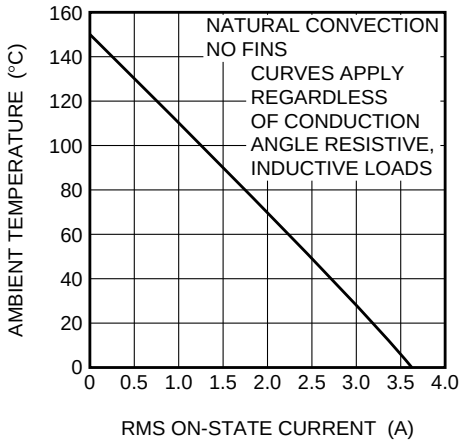
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

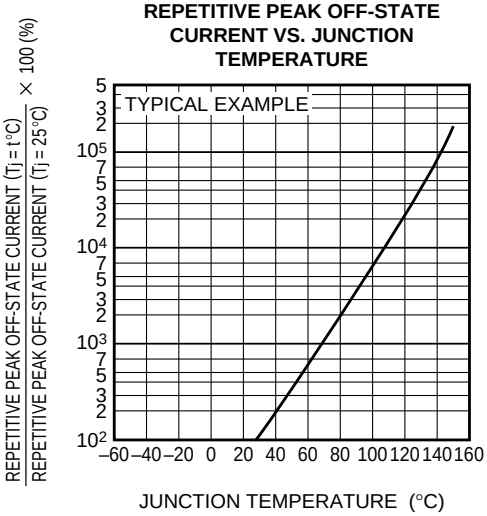
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



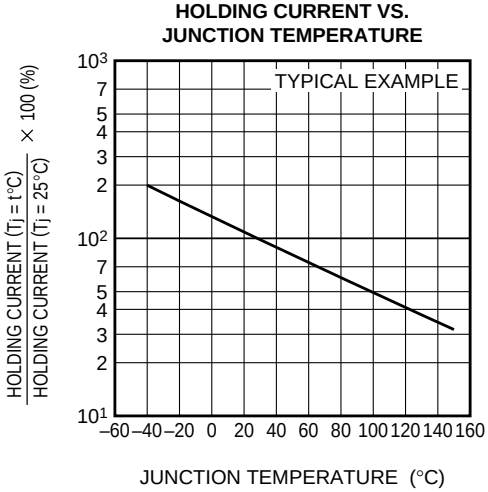
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



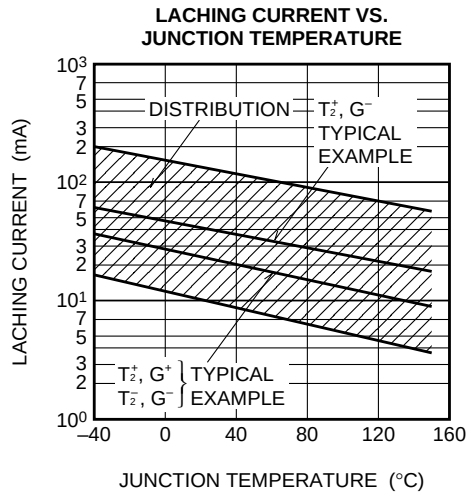
REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE



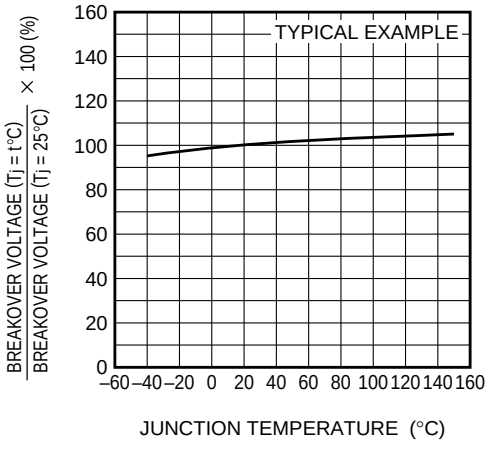
HOLDING CURRENT VS. JUNCTION TEMPERATURE



LACHING CURRENT VS. JUNCTION TEMPERATURE



BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE



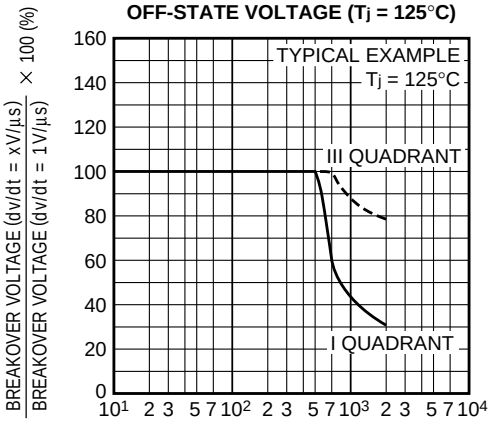
MITSUBISHI ELECTRIC

BCR16CS

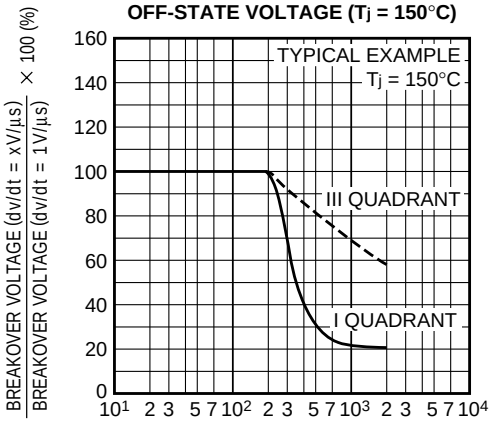
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

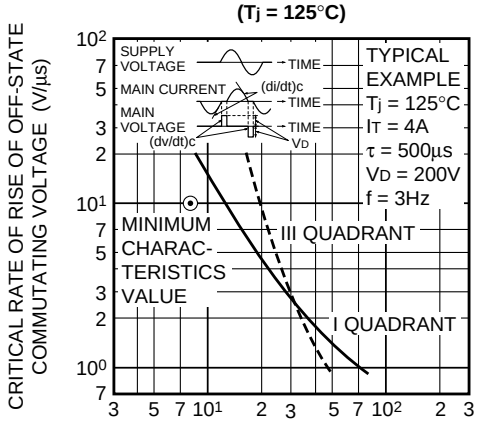
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE (T_j = 125°C)



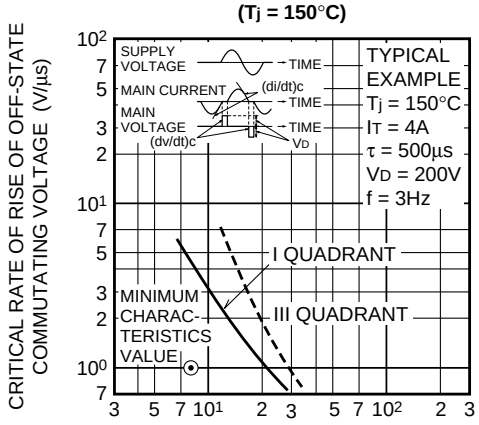
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE (T_j = 150°C)



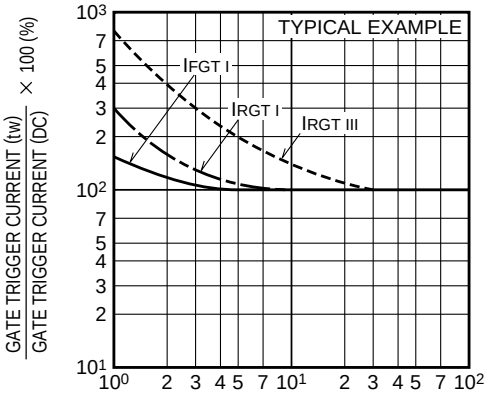
COMMUTATION CHARACTERISTICS (T_j = 125°C)



COMMUTATION CHARACTERISTICS (T_j = 150°C)



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



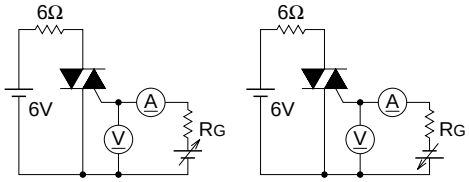
MITSUBISHI ELECTRIC

BCR16CS

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

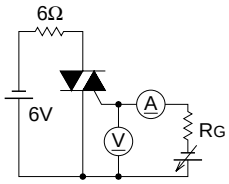
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



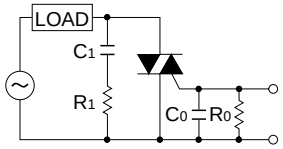
TEST PROCEDURE Ⅰ

TEST PROCEDURE Ⅱ



TEST PROCEDURE Ⅲ

RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



C_1 = 0.1~0.47μF C_0 = 0.1μF
R_1 = 47~100Ω R_0 = 100Ω

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