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

BCR5KM

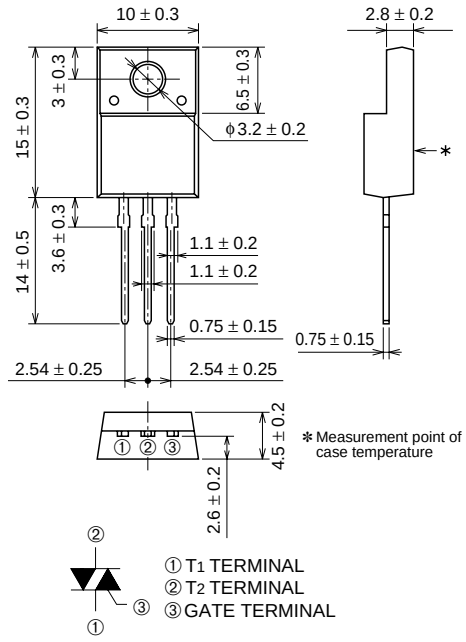
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

BCR5KM

- $I_{T\ (RMS)}$ 5A
- V_{DRM} 600V
- $I_{FGT\ I}$, $I_{RGT\ I}$, $I_{RGT\ III}$ ..... 15mA (10mA) ✻3
- UL Recognized: Yellow Card No.E80276(N)
  File No. E80271

OUTLINE DRAWING **Dimensions in mm**



TO-220FN

APPLICATION

Control of heater such as electric rice cooker, electric pot

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, Tc=103°C	5	A
I_{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	50	A
I^2t	I^2t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	10.4	A^2s
P_{GM}	Peak gate power dissipation		3	W
$P_{G\ (AV)}$	Average gate power dissipation		0.3	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		2.0	g
V_{iso}	Isolation voltage	T_a=25°C, AC 1 minute, $T_1 \cdot T_2 \cdot$ G terminal to case	2000	V

✻1. Gate open.

BCR5KM

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

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

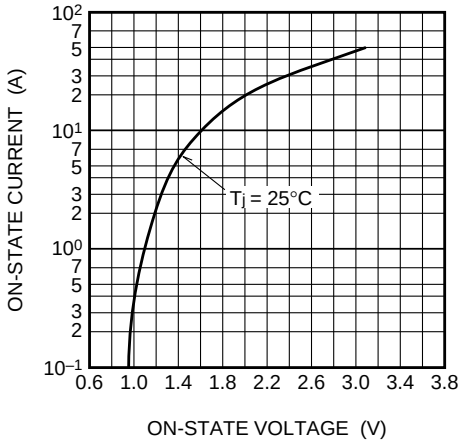
ELECTRICAL CHARACTERISTICS

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}=7A, 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	—	—	15*3	mA
$I_{RGT\ I}$		II		—	—	15*3	mA
$I_{RGT\ III}$		III		—	—	15*3	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 *4	—	—	3.8	°C/W
$R_{th\ (j-a)}$	Thermal resistance		Junction to ambient	—	—	50	°C/W

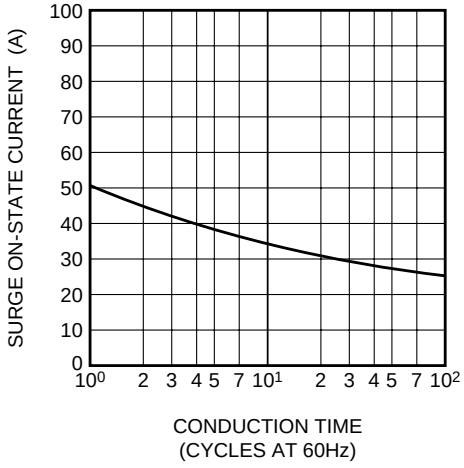
*2. Measurement using the gate trigger characteristics measurement circuit.
*3. High sensitivity (I_{GT}≤ 10mA) is also available. (I_{GT} item ①)
*4. The contact thermal resistance $R_{th\ (c-f)}$ in case of greasing is 0.5°C/W.

PERFORMANCE CURVES

MAXIMUM ON-STATE CHARACTERISTICS



RATED SURGE ON-STATE CURRENT

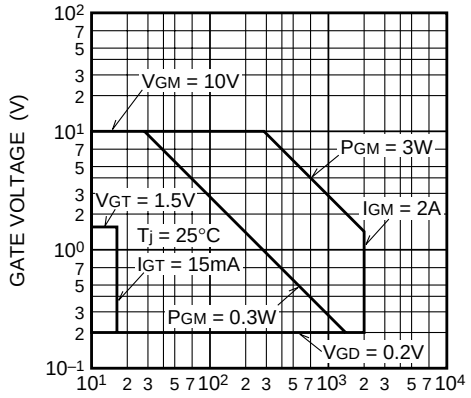


BCR5KM

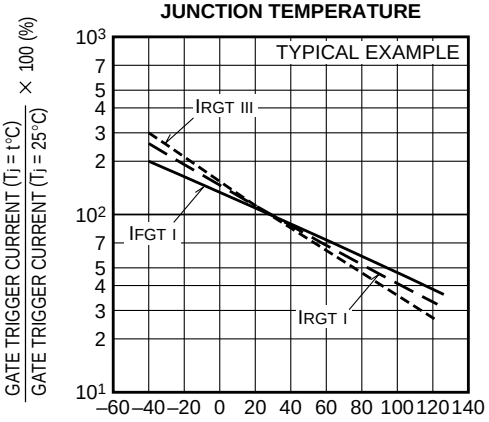
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

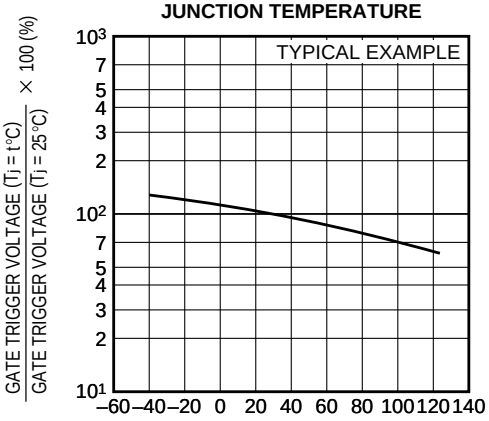
GATE CHARACTERISTICS (I, II AND III)



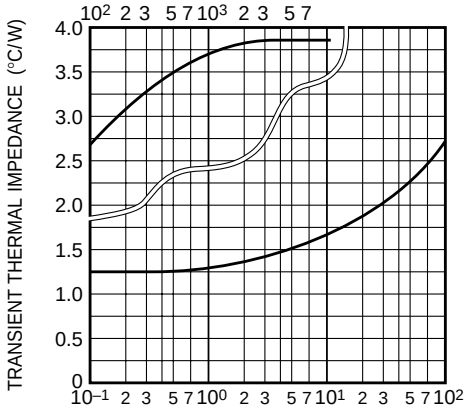
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



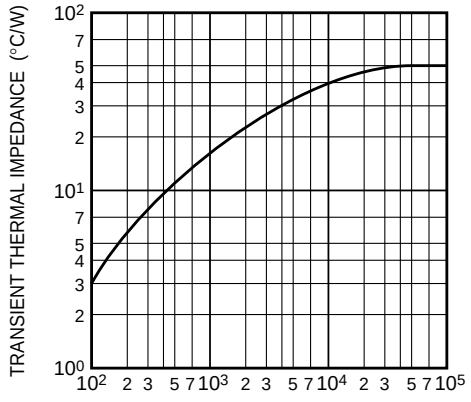
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



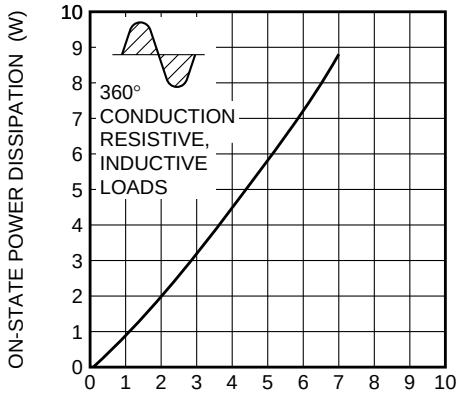
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO AMBIENT)



MAXIMUM ON-STATE POWER DISSIPATION

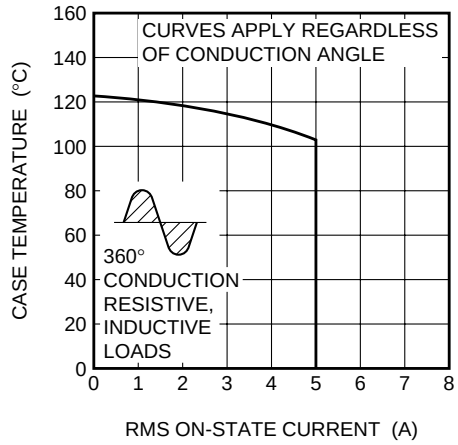


BCR5KM

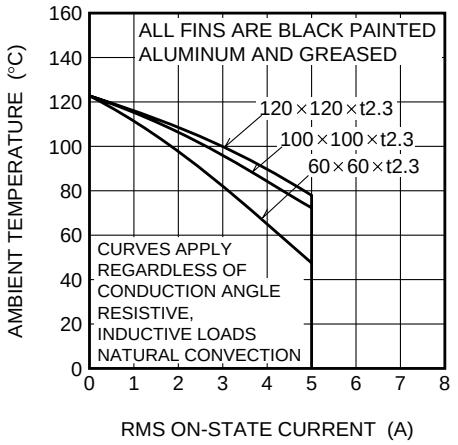
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

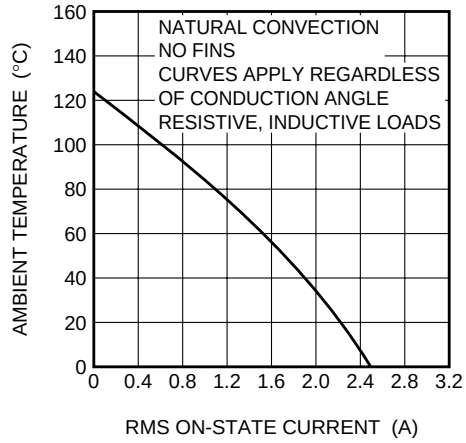
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



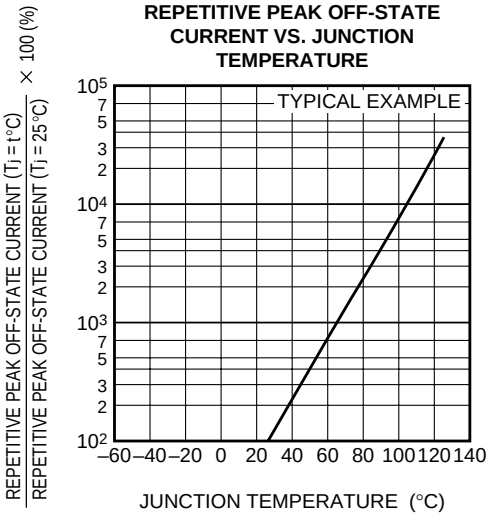
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



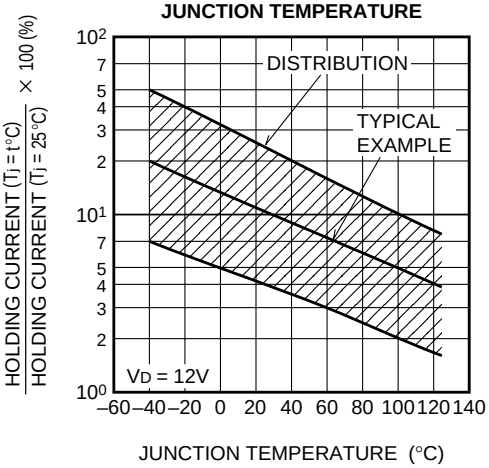
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



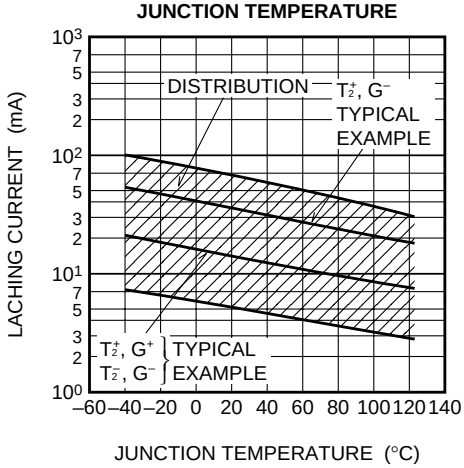
REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE



HOLDING CURRENT VS. JUNCTION TEMPERATURE



LACHING CURRENT VS. JUNCTION TEMPERATURE

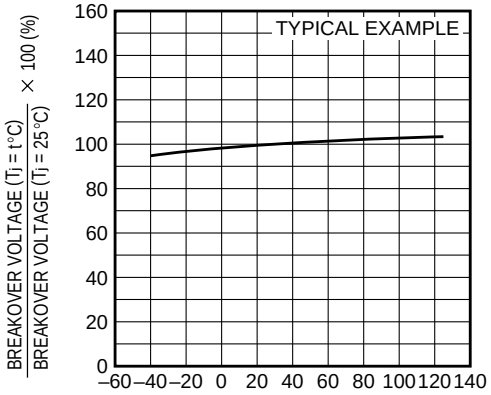


BCR5KM

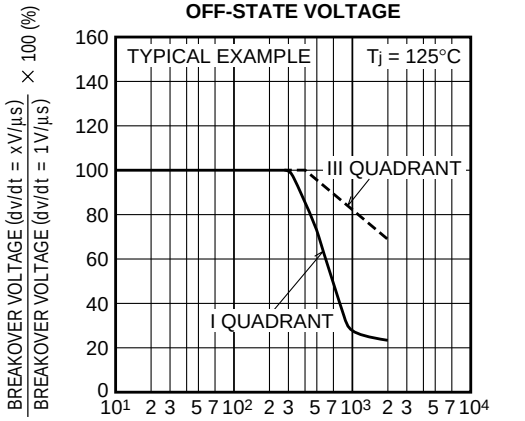
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

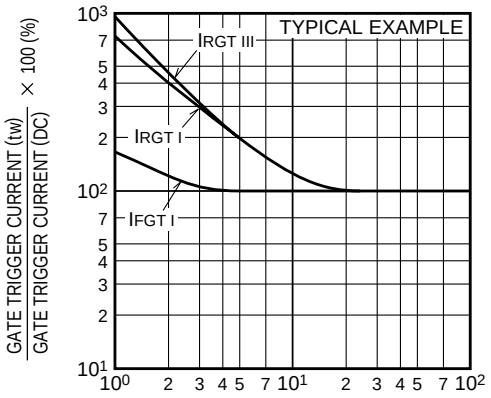
BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE



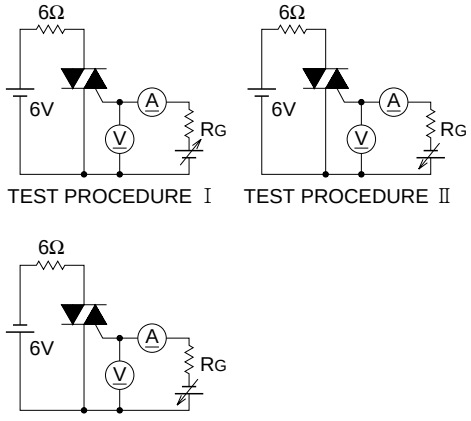
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



BCR5KM

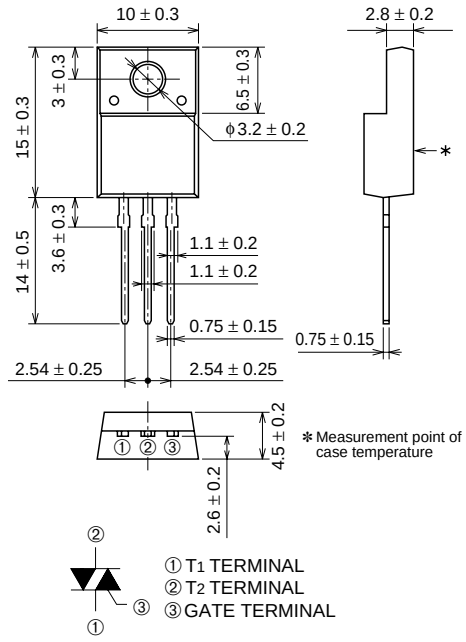
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

BCR5KM

- $I_{T\ (RMS)}$ 5A
- V_{DRM} 600V
- $I_{FGT\ I}$, $I_{RGT\ I}$, $I_{RGT\ III}$ 15mA (10mA) *3
- UL Recognized: Yellow Card No.E80276(N)
  File No. E80271

OUTLINE DRAWING Dimensions in mm



TO-220FN

APPLICATION

Control of heater such as electric rice cooker, electric pot

(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, Tc=128°C	5	A
I_{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	50	A
I^2t	I^2t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	10.4	A^2s
P_{GM}	Peak gate power dissipation		3	W
$P_{G\ (AV)}$	Average gate power dissipation		0.3	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		2.0	g
V_{iso}	Isolation voltage	T_a=25°C, AC 1 minute, T_1 · T_2 · G terminal to case	2000	V

*1. Gate open.

BCR5KM

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

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

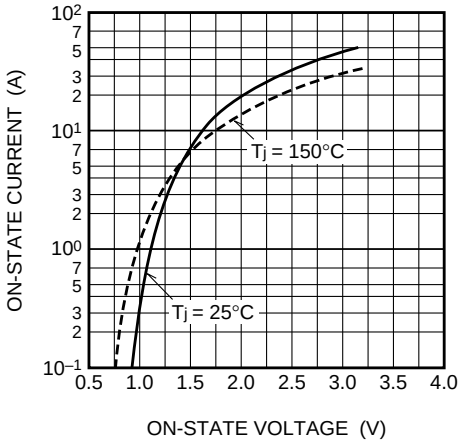
ELECTRICAL CHARACTERISTICS

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}=7A, 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	—	—	15*3	mA
$I_{RGT\ I}$		II		—	—	15*3	mA
$I_{RGT\ III}$		III		—	—	15*3	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 *4	—	—	3.8	°C/W
$R_{th\ (j-a)}$	Thermal resistance		Junction to ambient	—	—	50	°C/W

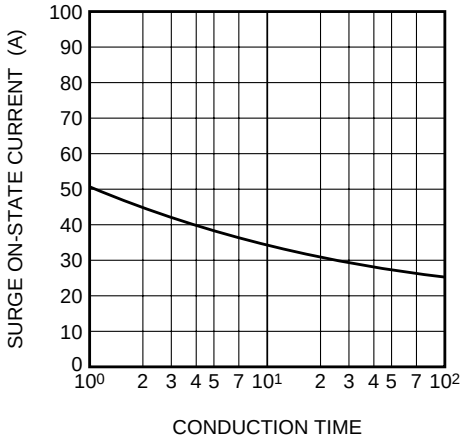
*2. Measurement using the gate trigger characteristics measurement circuit.
*3. High sensitivity (I_{GT}≤ 10mA) is also available. (I_{GT} item ①)
*4. The contact thermal resistance $R_{th\ (c-f)}$ in case of greasing is 0.5°C/W.

PERFORMANCE CURVES

MAXIMUM ON-STATE CHARACTERISTICS



RATED SURGE ON-STATE CURRENT

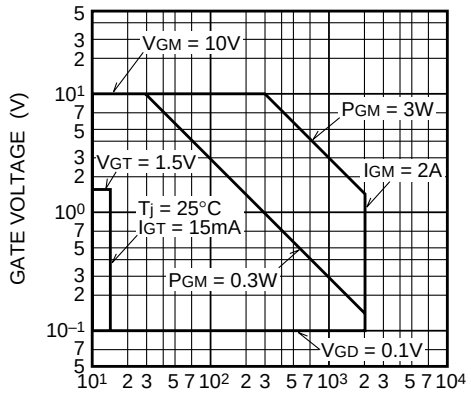


BCR5KM

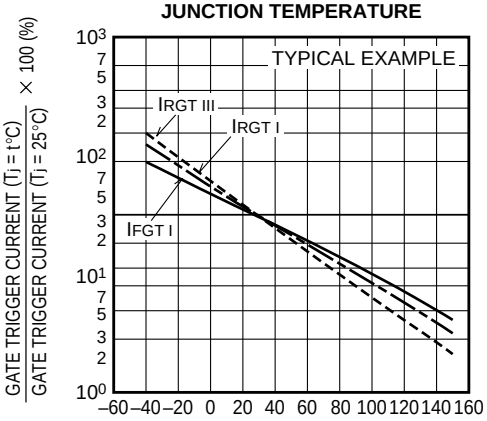
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

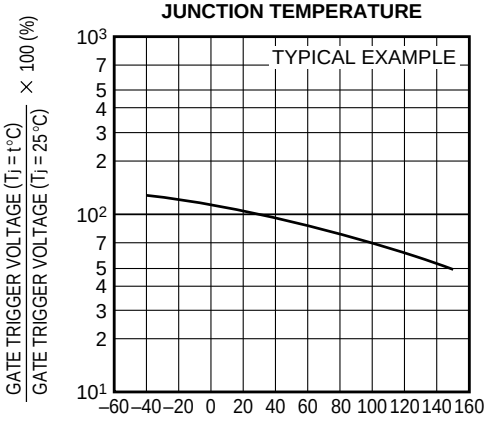
GATE CHARACTERISTICS (I, II AND III)



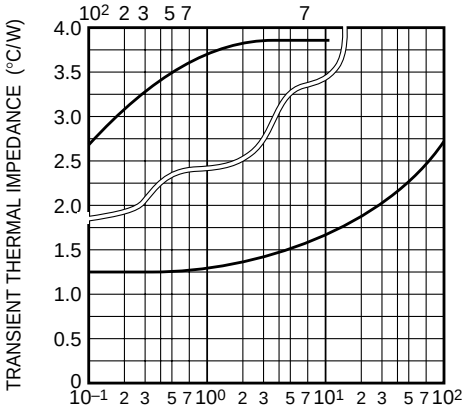
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



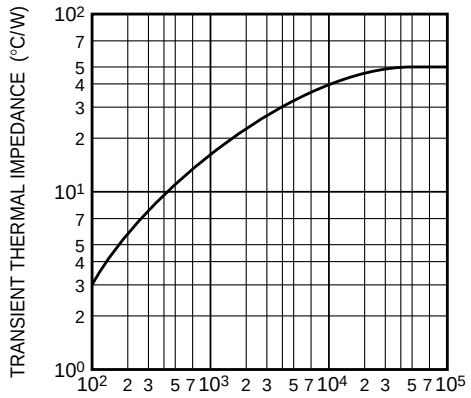
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



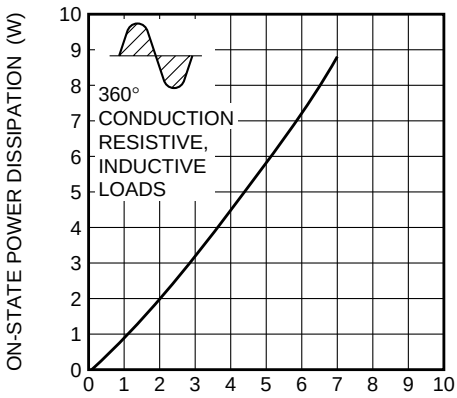
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO AMBIENT)



MAXIMUM ON-STATE POWER DISSIPATION

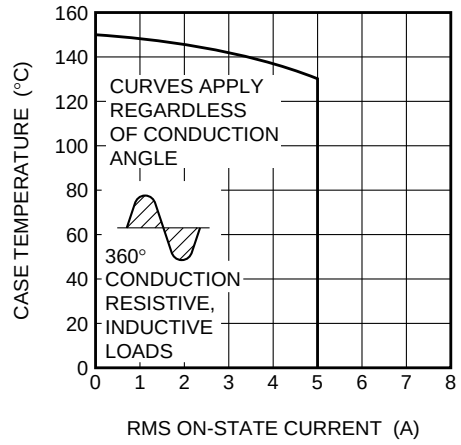


BCR5KM

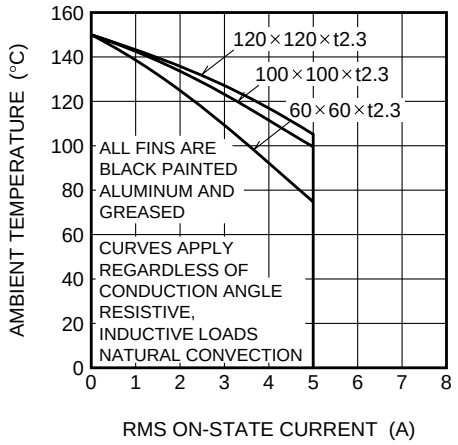
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

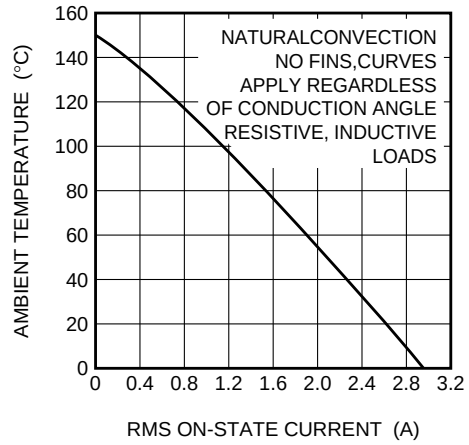
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



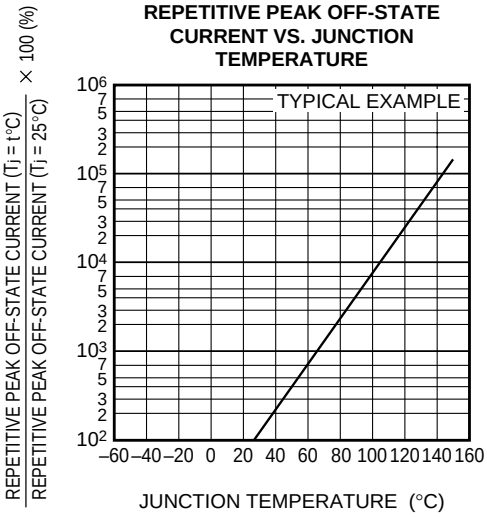
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



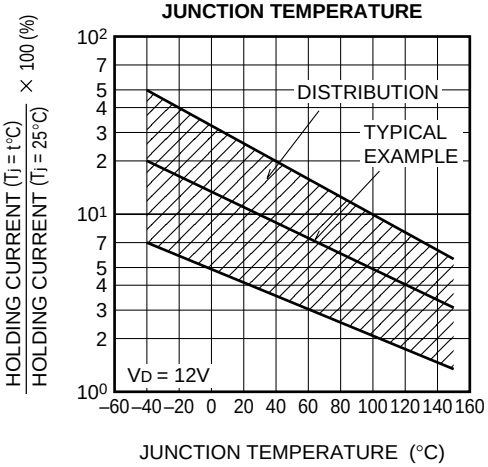
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



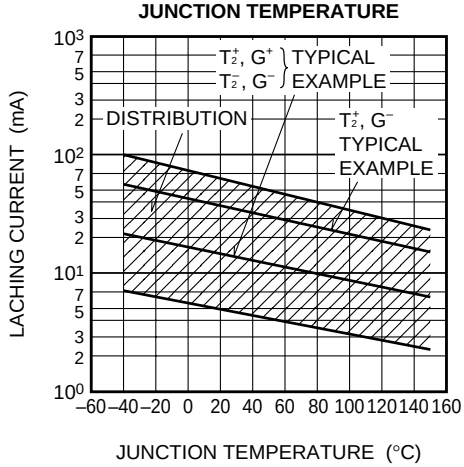
REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE



HOLDING CURRENT VS. JUNCTION TEMPERATURE



LACHING CURRENT VS. JUNCTION TEMPERATURE

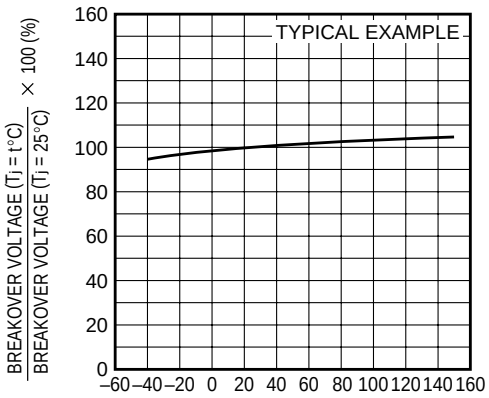


BCR5KM

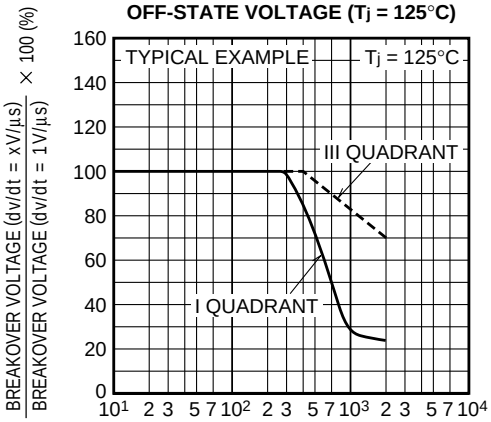
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

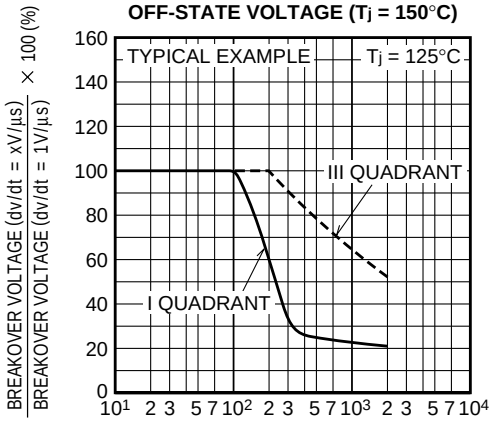
BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE



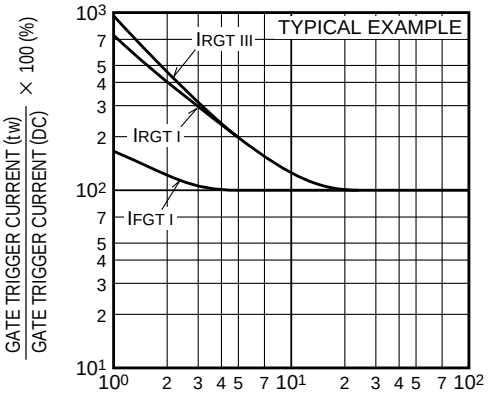
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE (T_j = 125°C)



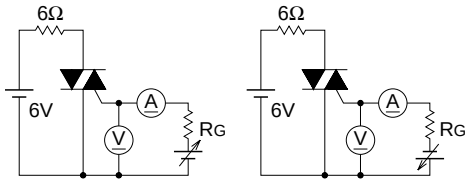
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE (T_j = 150°C)

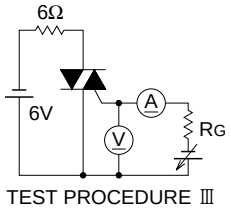


GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH

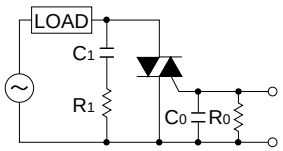


GATE TRIGGER CHARACTERISTICS TEST CIRCUITS





RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



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