

BCR20AM

MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

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

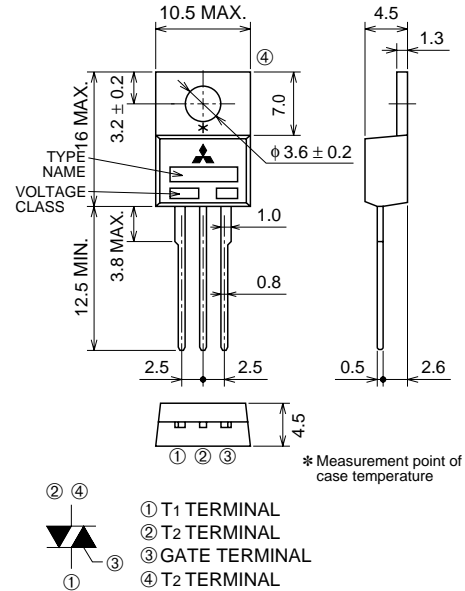
BCR20AM



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

OUTLINE DRAWING

Dimensions in mm



TO-220

APPLICATION

Vacuum cleaner, light dimmer, copying machine, other control of motor and heater

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, Tc=109°C*3 | 20 | A |
| ITSM | Surge on-state current | 60Hz sinewave 1 full cycle, peak value, non-repetitive | 200 | A |
| I ² _t | I ² _t for fusing | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current | 167 | A ² s |
| 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 | 2.0 | 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. | |
| I_{DRM} | Repetitive peak off-state current | $T_j=125^\circ\text{C}$, V_{DRM} applied | — | — | 2.0 | mA |
| V_{TM} | On-state voltage | $T_c=25^\circ\text{C}$, $I_{TM}=30\text{A}$ | — | — | 1.5 | V |
| $V_{FGT\text{ I}}$ | Gate trigger voltage*2 | $T_j=25^\circ\text{C}$, $V_D=6\text{V}$, $R_L=6\Omega$, $R_G=330\Omega$ | — | — | 1.5 | V |
| $V_{RGT\text{ I}}$ | | | — | — | 1.5 | V |
| $V_{RGT\text{ III}}$ | | | — | — | 1.5 | V |
| $I_{FGT\text{ I}}$ | Gate trigger current*2 | $T_j=25^\circ\text{C}$, $V_D=6\text{V}$, $R_L=6\Omega$, $R_G=330\Omega$ | — | — | 20 | mA |
| $I_{RGT\text{ I}}$ | | | — | — | 20 | mA |
| $I_{RGT\text{ III}}$ | | | — | — | 20 | mA |
| V_{GD} | Gate non-trigger voltage | $T_j=125^\circ\text{C}$, $V_D=1/2V_{DRM}$ | 0.2 | — | — | V |
| $R_{th(j-c)}$ | Thermal resistance | Junction to case *3 *4 | — | — | 0.8 | $^\circ\text{C/W}$ |
| $(dv/dt)_c$ | Critical-rate of rise of off-state commutating voltage *5 | $T_j=125^\circ\text{C}$ | 10 | — | — | $\text{V}/\mu\text{s}$ |

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

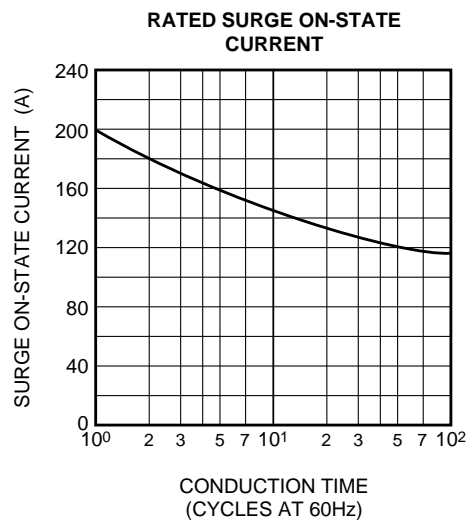
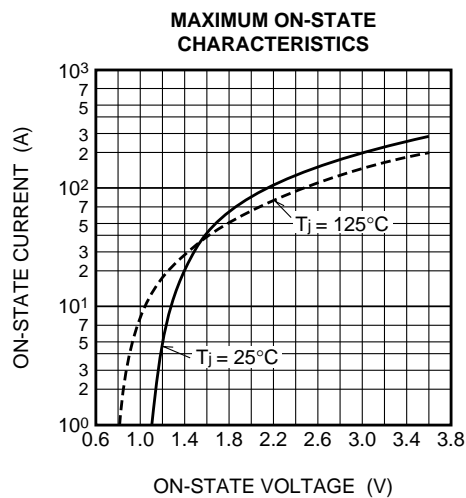
*3. Case temperature is measured at the T2 terminal 1.5mm away from the molded case.

*4. The contact thermal resistance $R_{th(c-f)}$ in case of greasing is 1°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 $T_j=125^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c=10\text{A/ms}$ 3. Peak off-state voltage $V_D=400\text{V}$ | |

PERFORMANCE CURVES

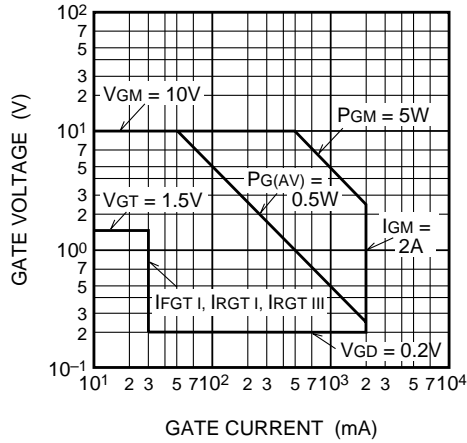


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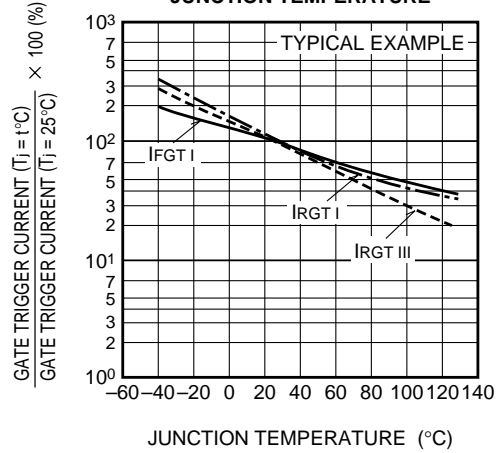
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

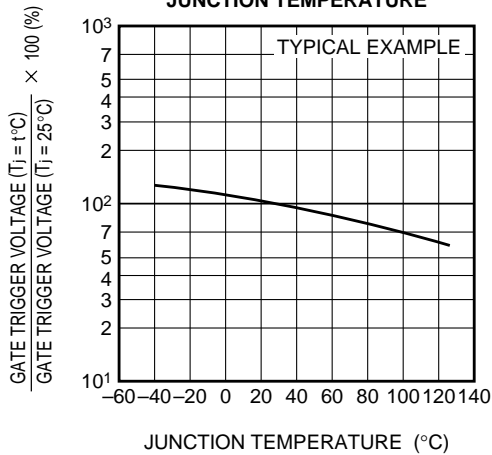
**GATE CHARACTERISTICS
(I, II AND III)**



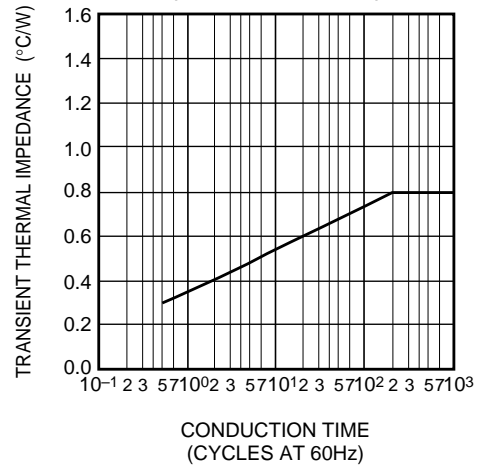
**GATE TRIGGER CURRENT VS.
JUNCTION TEMPERATURE**



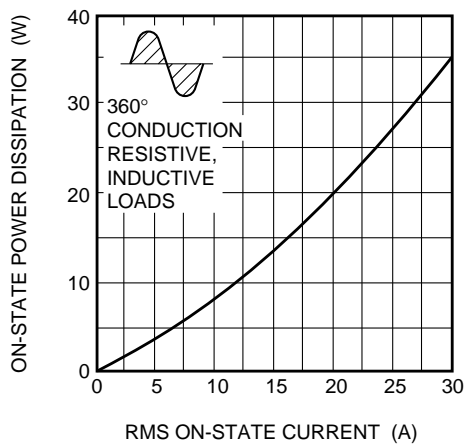
**GATE TRIGGER VOLTAGE VS.
JUNCTION TEMPERATURE**



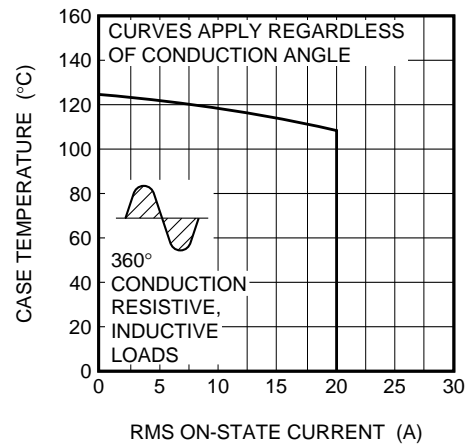
**MAXIMUM TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(JUNCTION TO CASE)**



**MAXIMUM ON-STATE POWER
DISSIPATION**



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

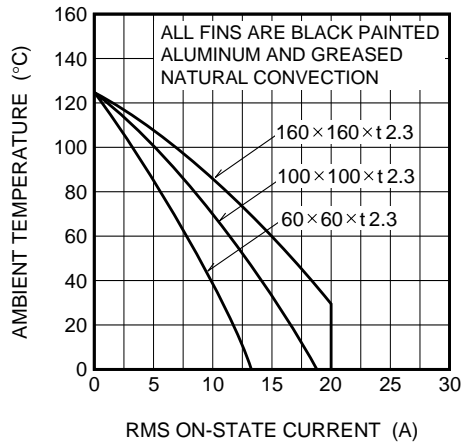


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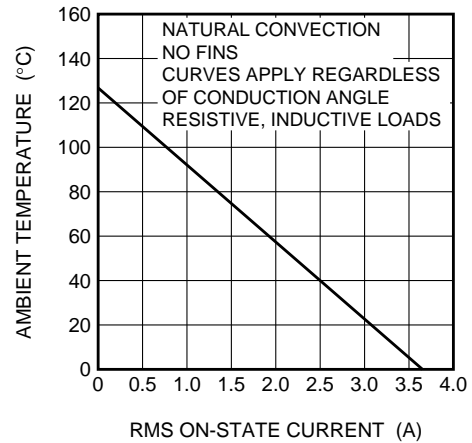
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

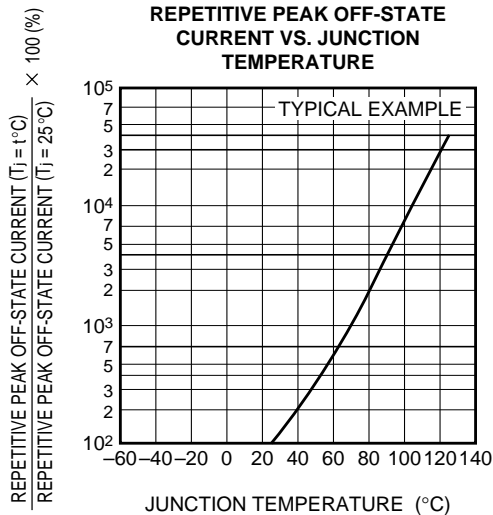
ALLOWABLE AMBIENT TEMPERATURE
VS. RMS ON-STATE CURRENT



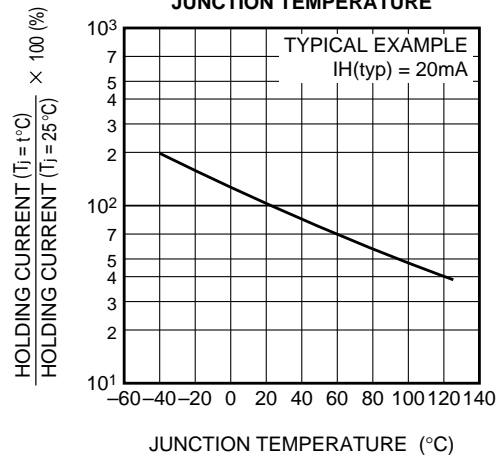
ALLOWABLE AMBIENT TEMPERATURE
VS. RMS ON-STATE CURRENT



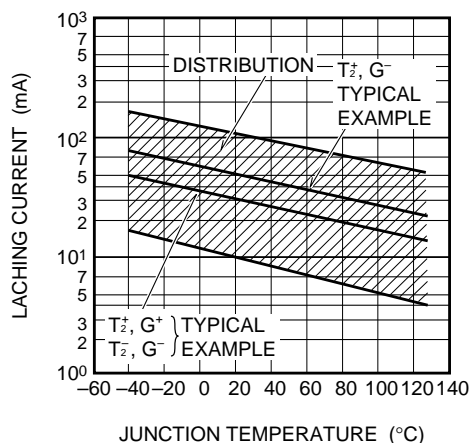
REPETITIVE PEAK OFF-STATE
CURRENT VS. JUNCTION
TEMPERATURE



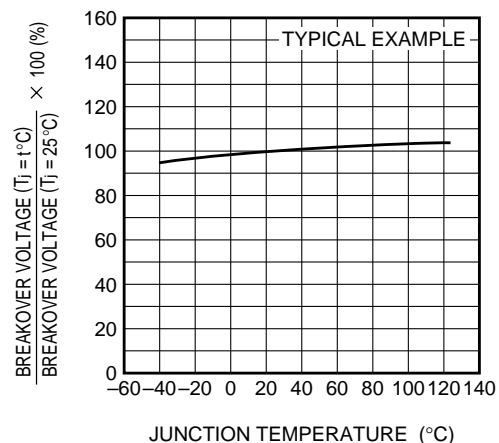
HOLDING CURRENT VS.
JUNCTION TEMPERATURE



LATCHING CURRENT VS.
JUNCTION TEMPERATURE



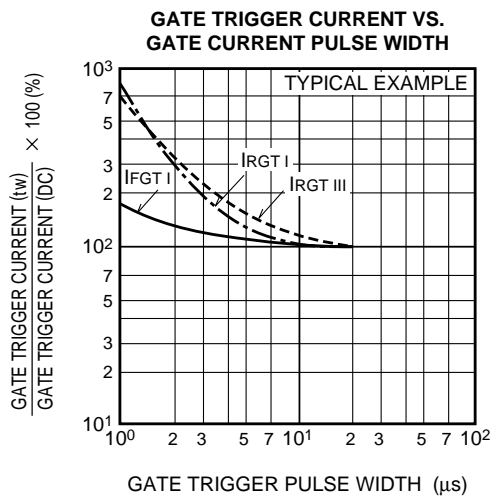
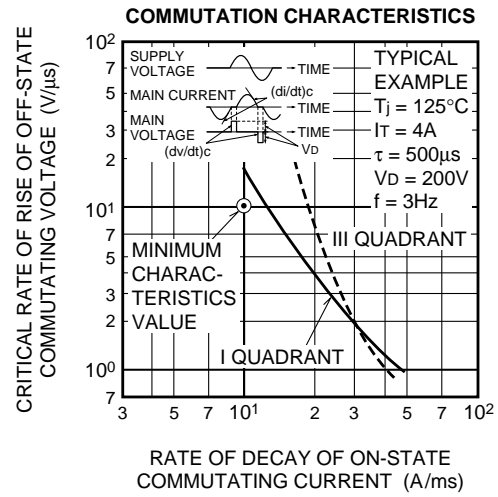
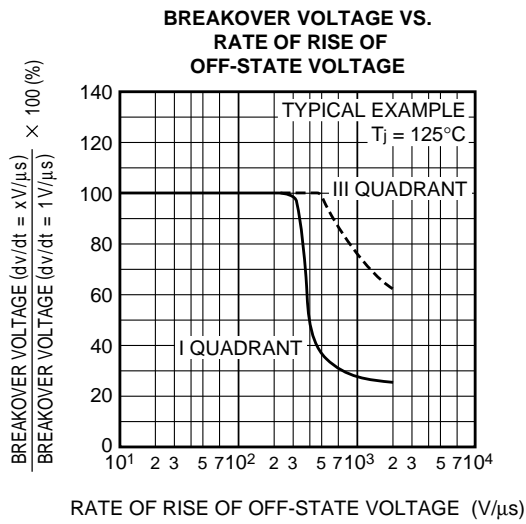
BREAKOVER VOLTAGE VS.
JUNCTION TEMPERATURE



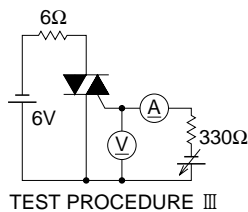
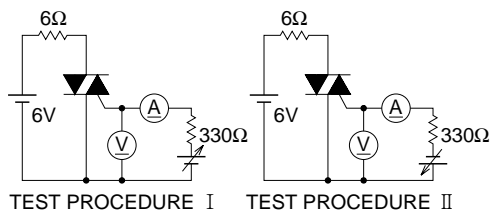
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MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS



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MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

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

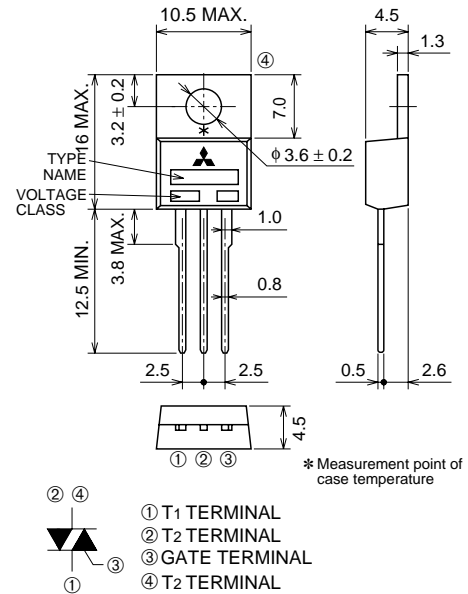
BCR20AM



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

OUTLINE DRAWING

Dimensions in mm



TO-220

APPLICATION

Vacuum cleaner, light dimmer, copying machine, other control of motor and heater

(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, Tc=134°C*3 | 20 | A |
| ITSM | Surge on-state current | 60Hz sinewave 1 full cycle, peak value, non-repetitive | 200 | A |
| I ² _t | I ² _t for fusing | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current | 167 | A ² s |
| 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 | 2.0 | g |

*1. Gate open.

Mar. 2002

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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 =125°C/150°C, V _{DRM} applied | — | — | 2.0/3.0 | mA |
| V _{TM} | On-state voltage | T _c =25°C, I _{TM} =30A | — | — | 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 | — | — | 0.8 | °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.

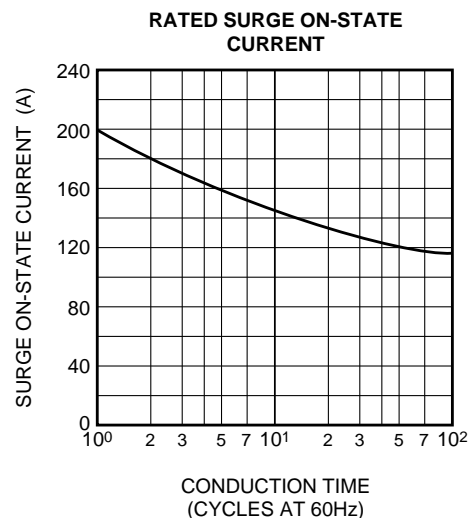
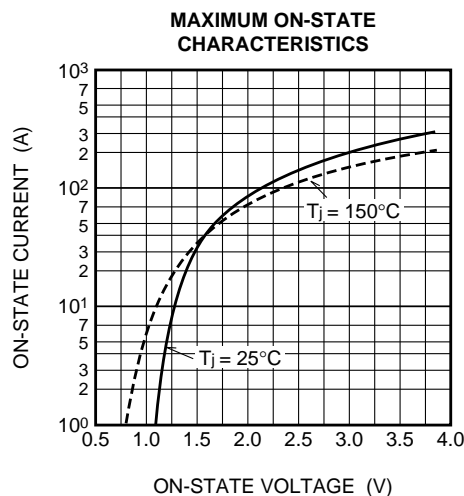
*3. Case temperature is measured at the T2 terminal 1.5mm away from the molded case.

*4. The contact thermal resistance R_{th} (c-f) in case of greasing is 1°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 =-10A/ms 3. Peak off-state voltage V _D =400V | |

PERFORMANCE CURVES

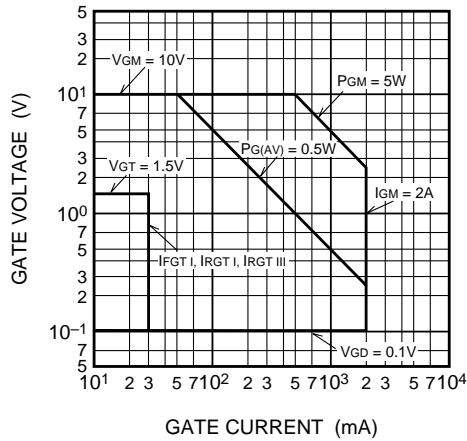


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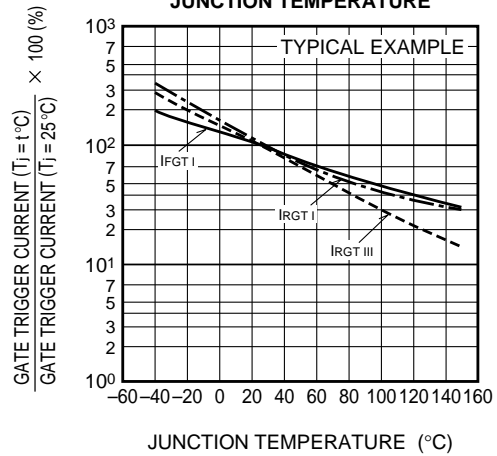
The product guaranteed maximum junction temperature 150°C (See warning.)

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

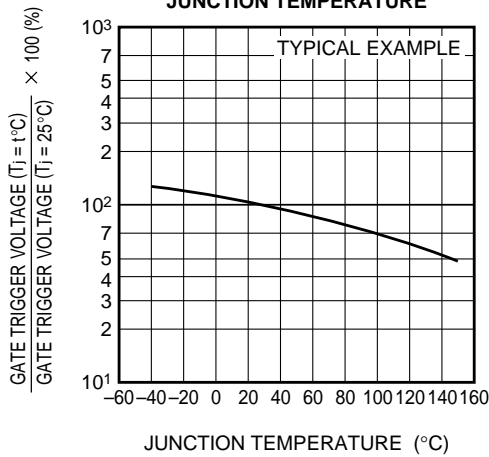
**GATE CHARACTERISTICS
(I, II AND III)**



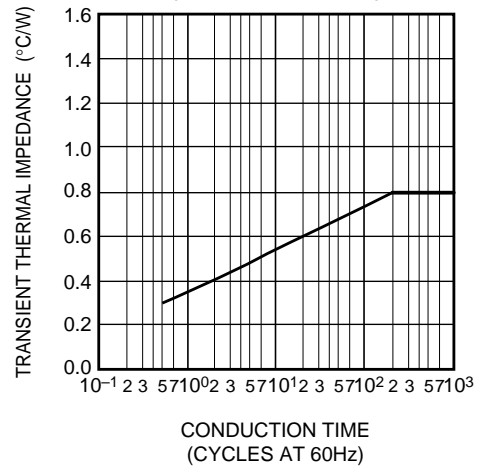
**GATE TRIGGER CURRENT VS.
JUNCTION TEMPERATURE**



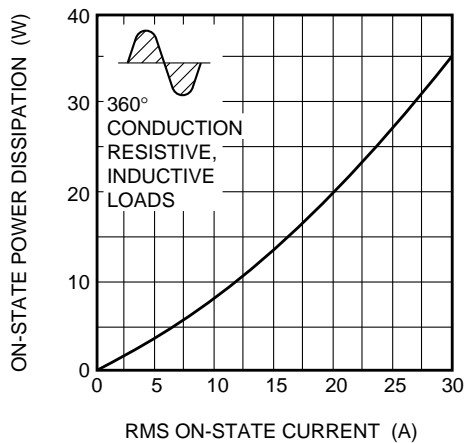
**GATE TRIGGER VOLTAGE VS.
JUNCTION TEMPERATURE**



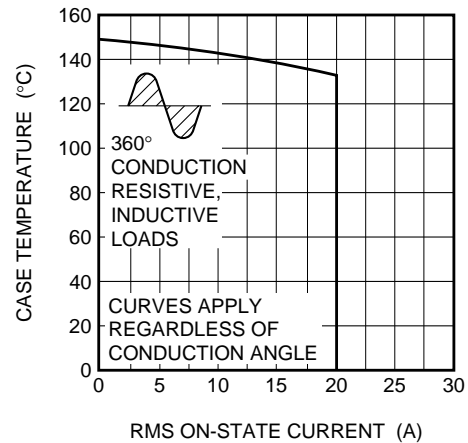
**MAXIMUM TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(JUNCTION TO CASE)**



**MAXIMUM ON-STATE POWER
DISSIPATION**



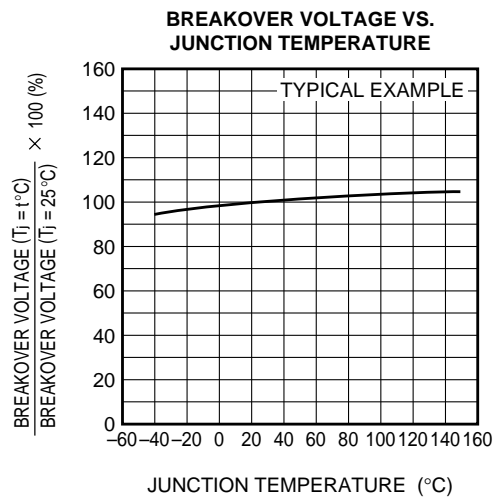
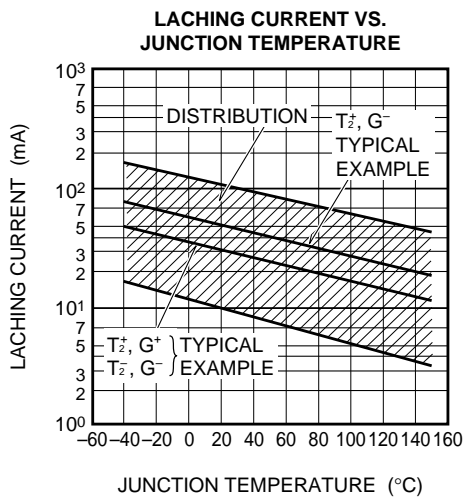
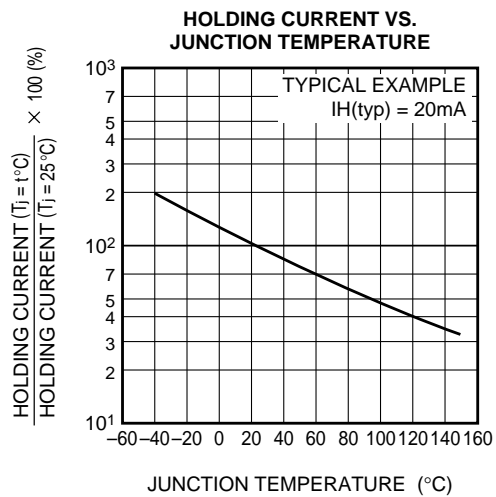
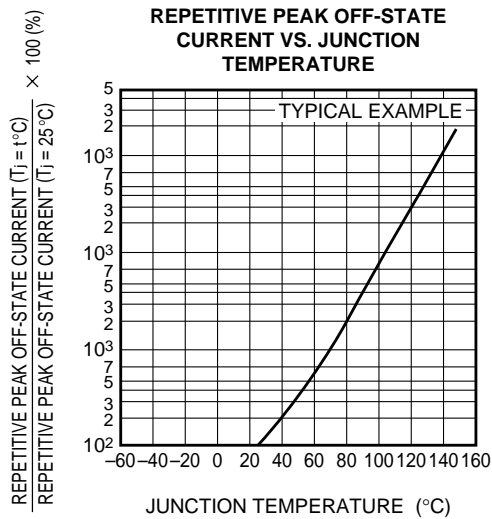
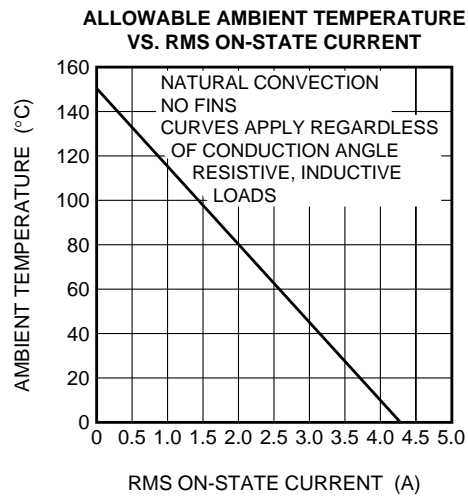
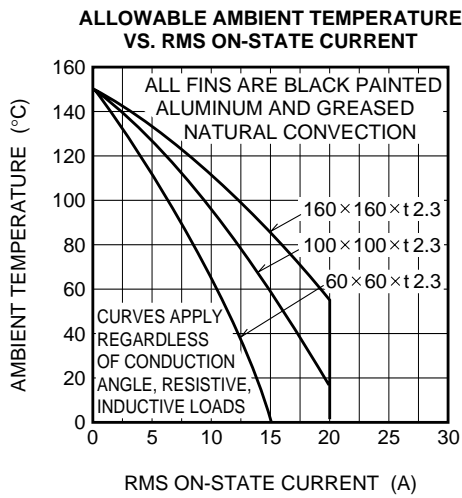
**ALLOWABLE CASE TEMPERATURE
VS. RMS ON-STATE CURRENT**



BCR20AM

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

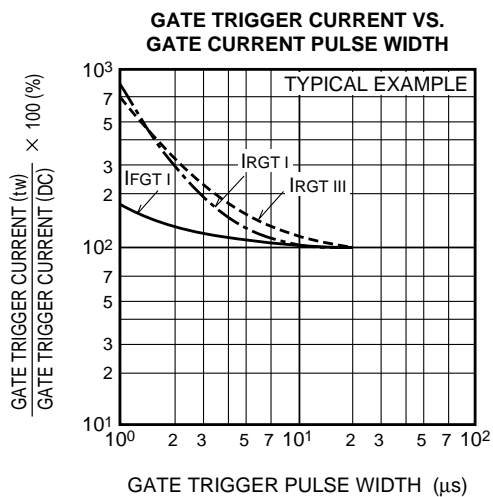
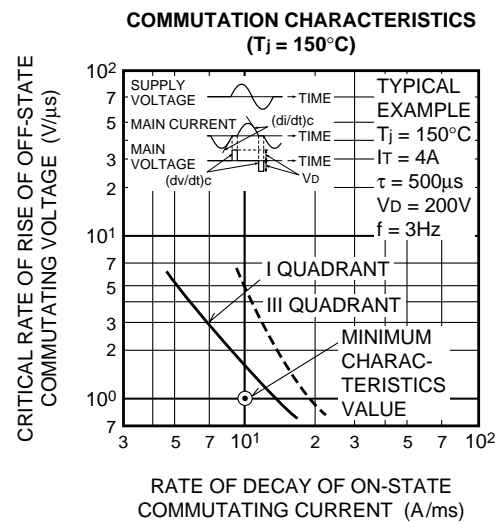
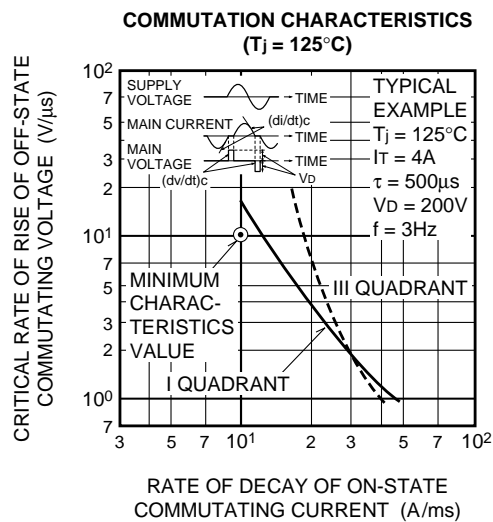
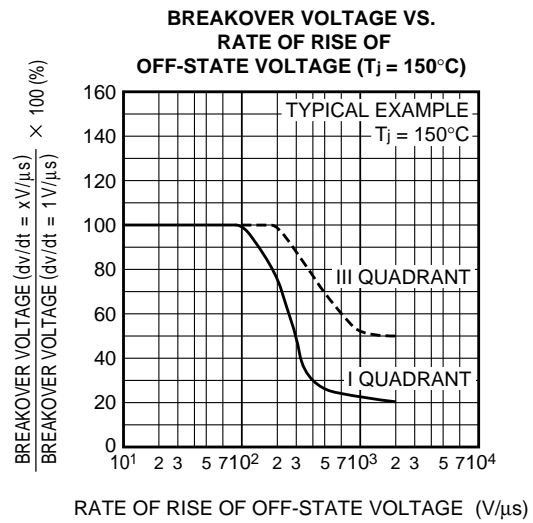
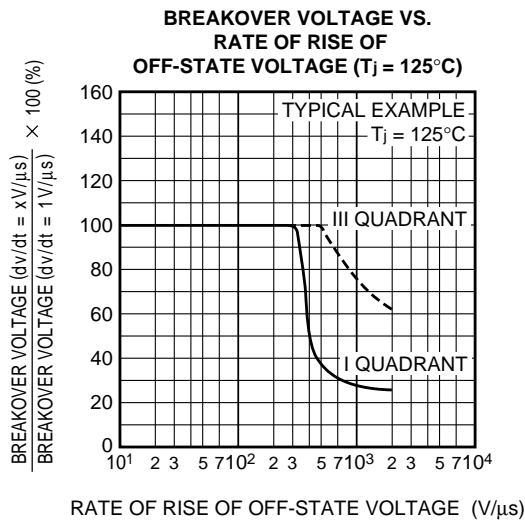
MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE



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

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

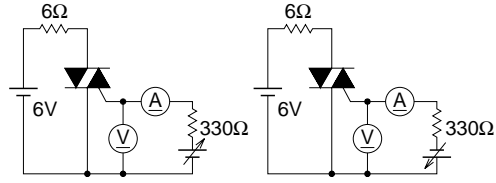


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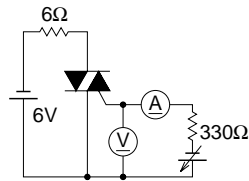
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MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS

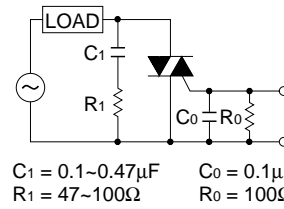


TEST PROCEDURE I TEST PROCEDURE II



TEST PROCEDURE III

RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



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