# BCR5AS

**MEDIUM POWER USE**

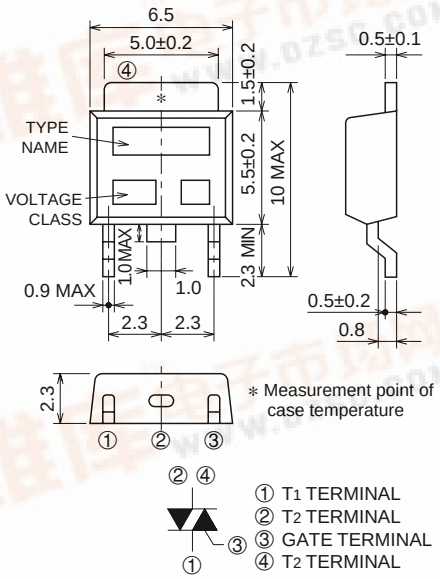
**NON-INSULATED TYPE, PLANAR PASSIVATION TYPE**

**BCR5AS**

- $I_{T\ (RMS)}$ ..... 5A
- $V_{DRM}$ ..... 400V/600V
- $I_{FGT\ I}$, $I_{RGT\ I}$, $I_{RGT\ III}$ ..... 30mA

**OUTLINE DRAWING**

Dimensions in mm




MP-3

## APPLICATION

Hybrid IC, solid state relay, switching mode power supply, light dimmer, electric fan, electric blankets, control of household equipment such as washing machine, other general purpose control applications

## MAXIMUM RATINGS

| Symbol | Parameter | Voltage class | | Unit |
|---|---|---|---|---|
| | | 8 | 12 | |
| $V_{DRM}$ | Repetitive peak off-state voltage *1 | 400 | 600 | V |
| $V_{DSM}$ | Non-repetitive peak off-state voltage *1 | 500 | 720 | V |

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $I_{T\ (RMS)}$ | RMS on-state current | Commercial frequency, sine full wave 360° conduction, $T_C$=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 | Typical value | 0.26 | g |

*1 Gate open.

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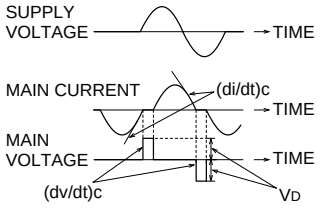
## ELECTRICAL CHARACTERISTICS

| 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 | — | — | 1.8 | 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 | — | — | 30 | mA |
| $I_{RGT\ I}$ | | II | | — | — | 30 | mA |
| $I_{RGT\ III}$ | | III | | — | — | 30 | mA |
| $V_{GD}$ | Gate non-trigger voltage | | $T_j$=125°C, $V_D$=1/2$V_{DRM}$ | 0.2 | — | — | V |
| $R_{th\ (j-c)}$ | Thermal resistance | | Junction to case *4 | — | — | 3 | °C/W |
| $(dv/dt)_c$ | Critical-rate of rise of off-state commutating voltage | | | *3 | — | — | V/μs |

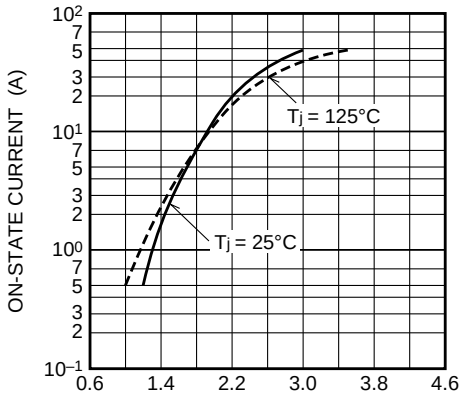
*2. Measurement using the gate trigger characteristics measurement circuit.
*3. The critical-rate of rise of the off-state commutating voltage is shown in the table below.
*4. Case temperature is measured on the $T_2$ terminal.

| Voltage class | $V_{DRM}$ (V) | (dv/dt) c | | Test conditions | Commutating voltage and current waveforms (inductive load) |
|---|---|---|---|---|---|
| | | Min. | Unit | | |
| 8 | 400 | 5 | V/μs | 1. Junction temperature $T_j$=125°C<br>2. Rate of decay of on-state commutating current $(di/dt)_c$=–2.5A/ms<br>3. Peak off-state voltage $V_D$=400V |  |
| 12 | 600 | | | | |



## PERFORMANCE CURVES

**MAXIMUM ON-STATE CHARACTERISTICS**




**RATED SURGE ON-STATE CURRENT**

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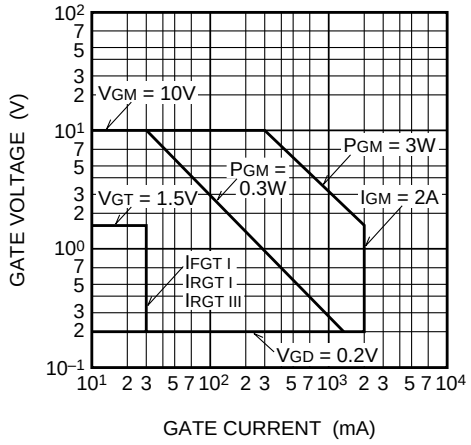
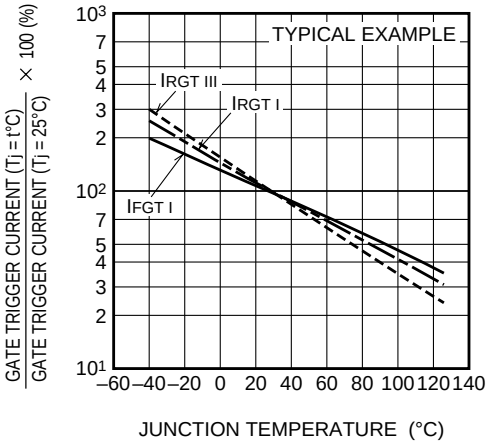
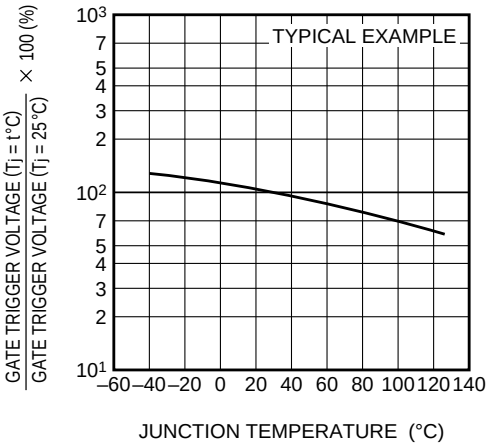
**GATE CHARACTERISTICS**



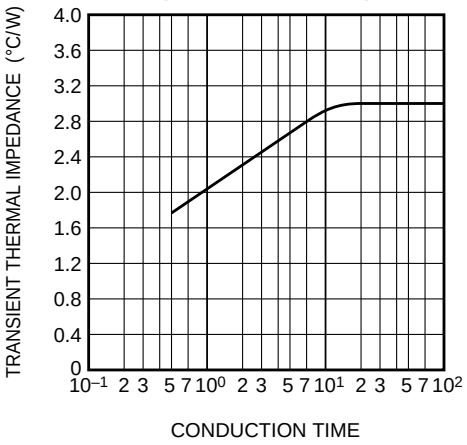

**GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE**



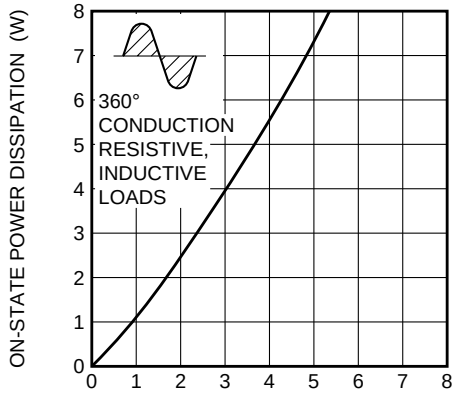

**GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE**



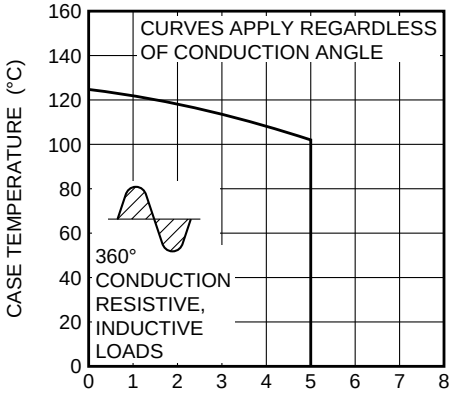

**MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)**




**MAXIMUM ON-STATE POWER DISSIPATION**




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



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**MEDIUM POWER USE**

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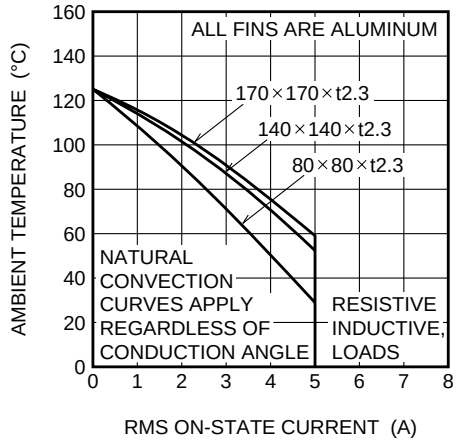
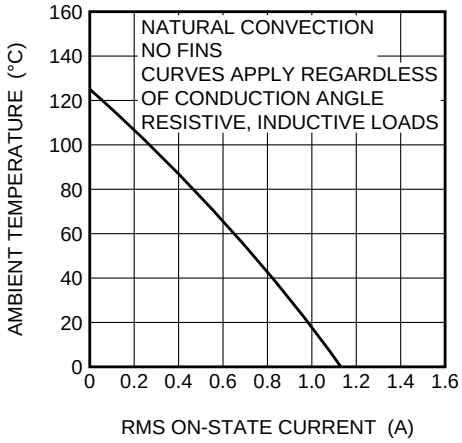
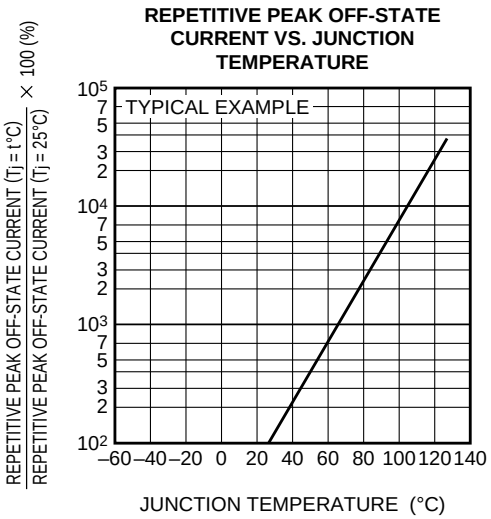
**ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT**



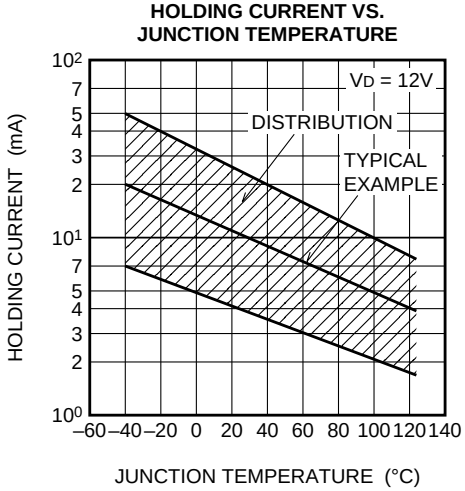

**ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT**



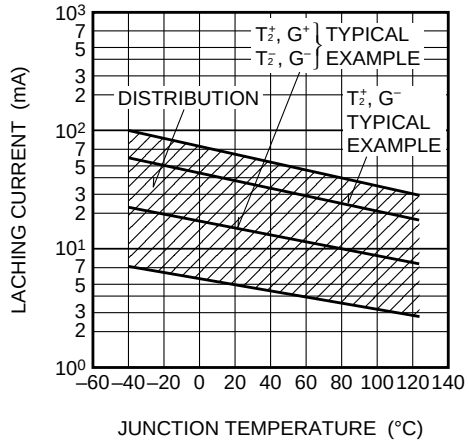

**REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE**



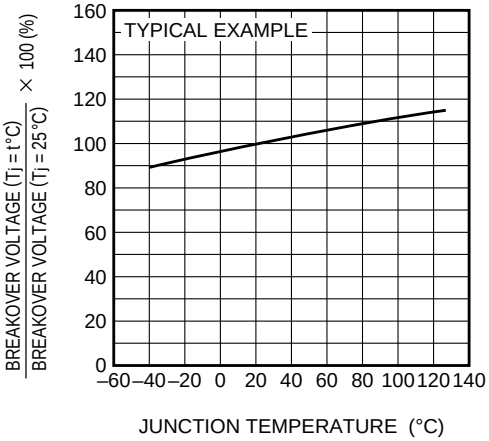

**HOLDING CURRENT VS. JUNCTION TEMPERATURE**




**LACHING CURRENT VS. JUNCTION TEMPERATURE**




**BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE**



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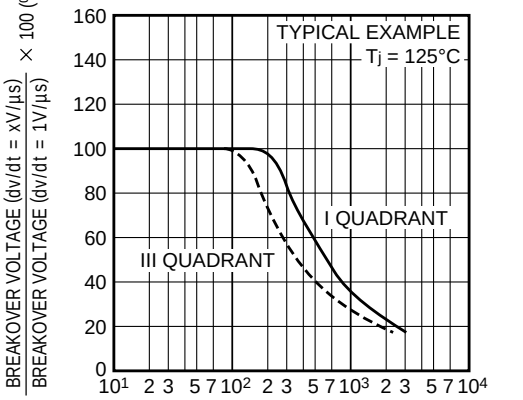
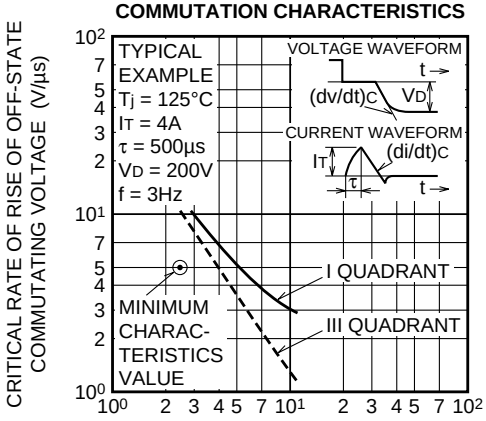
**BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE**



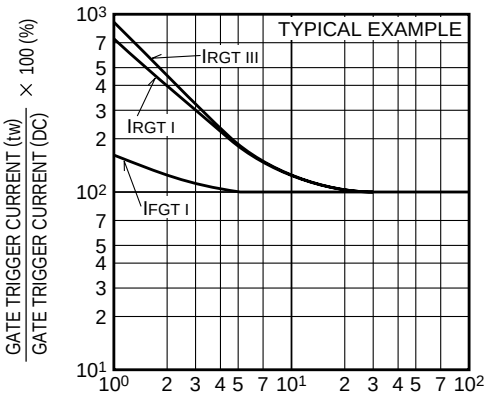

RATE OF RISE OF OFF-STATE VOLTAGE (V/µs)

**COMMUTATION CHARACTERISTICS**



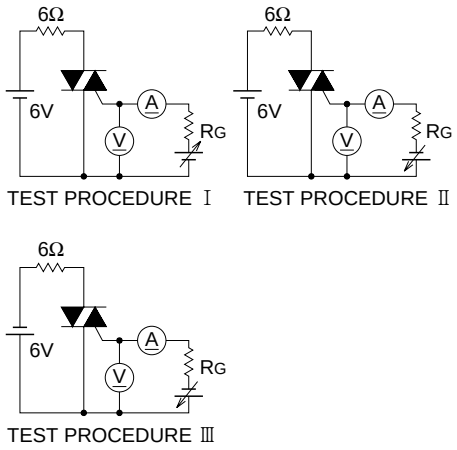

RATE OF DECAY OF ON-STATE COMMUTATING CURRENT (A/ms)

**GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH**




GATE CURRENT PULSE WIDTH (µs)

**GATE TRIGGER CHARACTERISTICS TEST CIRCUITS**



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