BCR16CM-12LC
600V - 12A - Triac
Medium Power Use

Features
- $I_{T\text{ (RMS)}}$: 16 A
- $V_{\text{DRM}}$: 600 V
- $I_{\text{FGTI}}, I_{\text{IRGT}}, I_{\text{IRGT III}}$: 50 mA
- $T_j$: 150°C
- Non-insulated Type
- Planar Passivation Type

Outline

Application
Low inrush current applications

Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Voltage class</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive peak off-state voltage $^\text{Note1}$</td>
<td>$V_{\text{DRM}}$</td>
<td>600</td>
<td>V</td>
</tr>
<tr>
<td>Non-repetitive peak off-state voltage $^\text{Note1}$</td>
<td>$V_{\text{DSM}}$</td>
<td>700</td>
<td>V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS on-state current</td>
<td>$I_{T\text{ (RMS)}}$</td>
<td>16</td>
<td>A</td>
<td>Commercial frequency, sine full wave 360° conduction, $T_c = 110°C^\text{Note3}$</td>
</tr>
<tr>
<td>Surge on-state current</td>
<td>$I_{\text{TSM}}$</td>
<td>96</td>
<td>A</td>
<td>60 Hz sinewave 1 full cycle, peak value, non-repetitive</td>
</tr>
<tr>
<td>$I^t$ for fusion</td>
<td>$I^t$</td>
<td>38</td>
<td>$A^2$s</td>
<td>Value corresponding to 1 cycle of half wave 60 Hz, surge on-state current</td>
</tr>
<tr>
<td>Peak gate power dissipation</td>
<td>$P_{\text{GM}}$</td>
<td>5</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Average gate power dissipation</td>
<td>$P_{\text{G (AV)}}$</td>
<td>0.5</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Peak gate voltage</td>
<td>$V_{\text{GM}}$</td>
<td>10</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Peak gate current</td>
<td>$I_{\text{GM}}$</td>
<td>2</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_j$</td>
<td>$-40$ to $+150$</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{\text{stg}}$</td>
<td>$-40$ to $+150$</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>
### Electrical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Test conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive peak off-state current</td>
<td>I_{DRM}</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>mA</td>
<td>Tj = 125°C, V_{DRM} applied</td>
</tr>
<tr>
<td>On-state voltage</td>
<td>V_{TM}</td>
<td>—</td>
<td>—</td>
<td>1.75</td>
<td>V</td>
<td>Tc = 25°C, I_{TM} = 25 A, instantaneous measurement</td>
</tr>
<tr>
<td>Gate trigger voltage(^\text{Note2})</td>
<td>V_{FGT1}</td>
<td>—</td>
<td>—</td>
<td>1.5</td>
<td>V</td>
<td>Tj = 25°C, V_{D} = 6 V, R_{L} = 6 Ω, R_{G} = 330 Ω</td>
</tr>
<tr>
<td></td>
<td>V_{RG1}</td>
<td>—</td>
<td>—</td>
<td>1.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V_{RG3}</td>
<td>—</td>
<td>—</td>
<td>1.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Gate trigger current(^\text{Note2})</td>
<td>I_{FGT1}</td>
<td>—</td>
<td>—</td>
<td>50</td>
<td>mA</td>
<td>Tj = 25°C, V_{D} = 6 V, R_{L} = 6 Ω, R_{G} = 330 Ω</td>
</tr>
<tr>
<td></td>
<td>I_{RG1}</td>
<td>—</td>
<td>—</td>
<td>50</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I_{RG3}</td>
<td>—</td>
<td>—</td>
<td>50</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Gate non-trigger voltage</td>
<td>V_{GD}</td>
<td>0.2</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>Tj = 125°C, V_{D} = 1/2 V_{DRM}</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>R_{thjc}</td>
<td>—</td>
<td>—</td>
<td>1.8</td>
<td>°C/W</td>
<td>Junction to case(^\text{Note3 Note4})</td>
</tr>
<tr>
<td>Critical-rate of rise of off-state</td>
<td>(dv/dt)c</td>
<td>10</td>
<td>—</td>
<td>—</td>
<td>V/μs</td>
<td>Tj = 125°C</td>
</tr>
</tbody>
</table>

**Notes:**
1. Gate open.
2. Measurement using the gate trigger characteristics measurement circuit.
3. Case temperature is measured at the T\(_2\) tab 1.5 mm away from the molded case.
4. The contact thermal resistance R\(_{thcf}\) in case of greasing is 1.0°C/NW.
5. Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.

### Test conditions

<table>
<thead>
<tr>
<th>Supply Voltage</th>
<th>Main Current</th>
<th>(dv/dt)c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Time</td>
<td>Time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commutating voltage and current waveforms (inductive load)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Junction temperature</td>
</tr>
<tr>
<td>Tj = 125°C</td>
</tr>
<tr>
<td>2. Rate of decay of on-state commutating current</td>
</tr>
<tr>
<td>(di/dt)c = –8 A/ms</td>
</tr>
<tr>
<td>3. Peak off-state voltage</td>
</tr>
<tr>
<td>V_{D} = 400 V</td>
</tr>
</tbody>
</table>
Performance Curves

Maximum On-State Characteristics

On-State Voltage (V) vs. On-State Current (A) for various values of Junction Temperature (Tj).

Rated Surge On-State Current

Surge On-State Current (A) vs. Conduction Time (cycles at 60Hz).

Gate Characteristics (I, II and III)

Gate Voltage (V) vs. Gate Current (mA) for different Gate Trigger Voltages.

Gate Trigger Current vs. Junction Temperature

Gate Trigger Current normalized to 100% at different Junction Temperatures.

Gate Trigger Voltage vs. Junction Temperature

Gate Trigger Voltage vs. Junction Temperature for different Gate Current Pulse Widths.

Gate Trigger Current vs. Gate Current Pulse Width

Gate Trigger Current vs. Gate Current Pulse Width for different Junction Temperatures.
Maximum Transient Thermal Impedance Characteristics (Junction to case)

Conduction Time (Cycles at 60Hz)

Maximum Transient Thermal Impedance Characteristics (Junction to ambient)

Conduction Time (Cycles at 60Hz)

Maximum On-State Power Dissipation

RMS On-State Current (A)

Allowable Case Temperature vs. RMS On-State Current

RMS On-State Current (A)

Allowable Ambient Temperature vs. RMS On-State Current

RMS On-State Current (A)

Curves apply regardless of conduction angle

Resistive, inductive loads

Natural convection

360° Conduction

All fins are black painted aluminum and greased

Curves apply regardless of conduction angle

Resistive, inductive loads

Natural convection

No Fins

Resistive, inductive loads

Natural convection

No Fins
Gate Trigger Characteristics

Test Circuits

- Test Procedure I
- Test Procedure II
- Test Procedure III

Recommended peripheral components for Triac

- \( C_1 = 0.1 \text{ to } 0.47 \mu F \)
- \( R_1 = 47 \text{ to } 100 \Omega \)
- \( C_0 = 0.1 \mu F \)
- \( R_0 = 100 \Omega \)
## Package Dimensions

### Ordering code: #BH0

<table>
<thead>
<tr>
<th>Package Name</th>
<th>JEDEC Package Code</th>
<th>RENESAS Code</th>
<th>Previous Code</th>
<th>MASS[Typ.]</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-220BA</td>
<td>TO-220AB</td>
<td>PRSS0004AT-A</td>
<td>TO-220BA</td>
<td>2.1g</td>
<td></td>
</tr>
</tbody>
</table>

### Ordering code: #BB0

<table>
<thead>
<tr>
<th>Package Name</th>
<th>JEITA Package Code</th>
<th>RENESAS Code</th>
<th>Previous Code</th>
<th>MASS[Typ.]</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-220AB</td>
<td>SC-46</td>
<td>PRSS0004AG-A</td>
<td>TO-220ABS</td>
<td>2.1g</td>
<td></td>
</tr>
</tbody>
</table>

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**EOL announced**
## Ordering Information

<table>
<thead>
<tr>
<th>Orderable Part Number</th>
<th>Package</th>
<th>Quantity Noted</th>
<th>Remark</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCR16CM-12LC#BH0</td>
<td>TO-220ABA</td>
<td>50 pcs./tube</td>
<td>Straight type</td>
<td>Mass Production</td>
</tr>
<tr>
<td>BCR16CM-12LC#BB0</td>
<td>TO-220ABS</td>
<td>50 pcs./tube</td>
<td>Straight type</td>
<td>EOL announced</td>
</tr>
</tbody>
</table>

Notes: 6. Please confirm the specification about the shipping in detail.
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