BCR16PM-12LG
Triac
Medium Power Use

Features
- $I_{T(RMS)}$: 16 A
- $V_{DRM}$: 600 V
- $I_{RGT}$, $I_{RGT}$, $I_{RGT}$ III: 30 mA
- $V_{ISO}$: 2000 V
- The Product guaranteed maximum junction temperature 150°C
- Insulated Type
- Planar Type
- UL Recognized : Yellow Card No. E223904

Outline

Applications
AC no junction Switching, light dimmer, electronic blanket, Control of household electrical appliance such as electric fans, solenoid driver, small motor control, and other general purpose control applications

<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 Note1</td>
<td>$V_{DRM}$</td>
<td>600</td>
<td>V</td>
</tr>
<tr>
<td>Non-repetitive peak off-state voltage Note1</td>
<td>$V_{DSM}$</td>
<td>720</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>$I_{T(RMS)}$</td>
<td>16</td>
<td>A</td>
<td>Commercial frequency, sine full wave 360°conduction, $T_c = 87°C$</td>
</tr>
<tr>
<td>Surge on-state current</td>
<td>$I_{TSM}$</td>
<td>160</td>
<td>A</td>
<td>60Hz sinewave 1 full cycle, peak value, non-repetitive</td>
</tr>
<tr>
<td>$I^t$ for fusion</td>
<td>$I^t$</td>
<td>106.5</td>
<td>A's</td>
<td>Value corresponding to 1 cycle of half wave 60Hz, surge on-state current</td>
</tr>
<tr>
<td>Peak gate power dissipation</td>
<td>$P_{GM}$</td>
<td>5</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Average gate power dissipation</td>
<td>$P_{G(AV)}$</td>
<td>0.5</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Peak gate voltage</td>
<td>$V_{GM}$</td>
<td>10</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Peak gate current</td>
<td>$I_{GM}$</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>$T_{STG}$</td>
<td>–40 to +150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>—</td>
<td>2.0</td>
<td>g</td>
<td>Typical value</td>
</tr>
<tr>
<td>Isolation voltage</td>
<td>$V_{ISO}$</td>
<td>2000</td>
<td>V</td>
<td>$T_a = 25°C$, AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case</td>
</tr>
</tbody>
</table>

Notes: 1. Gate open.
### 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 = 150°C, V_{DRM} applied</td>
</tr>
<tr>
<td>On-state voltage</td>
<td>V_{TM}</td>
<td>—</td>
<td>—</td>
<td>1.5</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,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>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_{RG11}</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>30</td>
<td>mA</td>
<td>Tj = 25°C, V_{D} = 6 V, R_{L} = 6 Ω,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R_{G} = 330 Ω</td>
</tr>
<tr>
<td></td>
<td>I_{RG1}</td>
<td>—</td>
<td>—</td>
<td>30</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I_{RG11}</td>
<td>—</td>
<td>—</td>
<td>30</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Gate non-trigger voltage</td>
<td>V_{GD}</td>
<td>0.2/0.1</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>Tj = 125°C/150°C, V_{D} = 1/2 V_{DRM}</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>R_{th(j-c)}</td>
<td>—</td>
<td>—</td>
<td>3.5</td>
<td>°C/W</td>
<td>Junction to case(^{\text{Note3}})</td>
</tr>
<tr>
<td>Critical-rate of rise of off-state</td>
<td>(dv/dt)c</td>
<td>10/1</td>
<td>—</td>
<td>—</td>
<td>V/μs</td>
<td>Tj = 125°C/150°C</td>
</tr>
<tr>
<td>commutation voltage(^{\text{Note3}})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Measurement using the gate trigger characteristics measurement circuit.
2. The contact thermal resistance R_{th(c-f)} in case of greasing is 0.5°C/W.
3. Test conditions of the critical-rate of rise of off-state commutation voltage is shown in the table below.

<table>
<thead>
<tr>
<th><strong>Test conditions</strong></th>
<th><strong>Commutating voltage and current waveforms</strong> (inductive load)</th>
</tr>
</thead>
</table>
| 1. Junction temperature  
  Tj = 125°C/150°C | ![Supply Voltage](image)                                       |
| 2. Rate of decay of on-state commutating current  
  (di/dt)c = –8.0 A/ms | ![Main Current](image)                                       |
| 3. Peak off-state voltage  
  V_{D} = 400 V | ![Main Voltage](image) | ![Critical-rate of rise of off-state commutation voltage](image) |
Performance Curves

Maximum On-State Characteristics

On-State Voltage (V) vs. On-State Current (A)

Rated Surge On-State Current

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

Gate Characteristics (I, II and III)

Gate Voltage (V) vs. Gate Current (mA)

Gate Trigger Current vs. Junction Temperature

Junction Temperature (°C) vs. Gate Trigger Current (Tj = t°C) x 100 (%)

Gate Trigger Voltage vs. Junction Temperature

Gate Trigger Voltage (Tj = t°C) x 100 (%) vs. Junction Temperature (°C)

Maximum Transient Thermal Impedance Characteristics (Junction to case)

Transient Thermal Impedance (°C/W) vs. Conduction Time (Cycles at 60Hz)

- Tj = 150°C
- Tj = 25°C

Typical Example

- IFGT I, IRGT I, IRGT III
- PG(AV) = 0.5W
- PG = 5W
- GM = 2A
- VGD = 0.1V
- VGM = 10V
- VGT = 1.5V
- GM = 2A
- VGD = 0.1V
- VGM = 10V
- VGT = 1.5V

- IFGT I, IRGT I
- IRGT III
- IRGT II
- IRGT III

Typical Example
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

360° Conduction
Resistive, inductive loads

Curves apply regardless of conduction angle

RMS On-State Current (A)

Allowable Ambient Temperature vs. RMS On-State Current

All fins are black painted aluminum and greased

Curves apply regardless of conduction angle
Resistive, inductive loads
Natural convection

RMS On-State Current (A)

Allowable Ambient Temperature vs. RMS On-State Current

Natural convection
No Fins
Curves apply regardless of conduction angle
Resistive, inductive loads

RMS On-State Current (A)

Repetitive Peak Off-State Current vs. Junction Temperature

Typical Example

Repetitive Peak Off-State Current (Tj = 25°C) × 100 (%)

Junction Temperature (°C)

RMP On-State Current (A)
Rate of Rise of Off-State Voltage (V/μs)

Breakover Voltage vs. Junction Temperature (Tj=125°C)

Breakover Voltage vs. Rate of Rise of Off-State Voltage (Tj=150°C)

Commutation Characteristics (Tj=125°C)

Holding Current vs. Junction Temperature

Latching Current vs. Junction Temperature
Gate Trigger Characteristics Test Circuits

Recommended Circuit Values Around The Triac

R1 = 47 to 100Ω  
C0 = 0.1μF
C1 = 0.1 to 0.47μF
R0 = 100Ω
Package Dimensions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-220F</td>
<td>5C 8F</td>
<td>PR330003AR-A</td>
<td>—</td>
<td>2.5g</td>
</tr>
</tbody>
</table>

Unit: mm

Order Code

<table>
<thead>
<tr>
<th>Lead form</th>
<th>Standard packing</th>
<th>Quantity</th>
<th>Standard order code</th>
<th>Standard order code example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight type</td>
<td>Vinyl sack</td>
<td>100</td>
<td>Type name</td>
<td>BCR16PM-12LG</td>
</tr>
<tr>
<td>Lead form</td>
<td>Plastic Magazine (Tube)</td>
<td>50</td>
<td>Type name – Lead forming code</td>
<td>BCR16PM-12LG-A8</td>
</tr>
</tbody>
</table>

Note: Please confirm the specification about the shipping in detail.
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