Triacs
Silicon Bidirectional Thyristors

... designed for full-wave ac control applications primarily in industrial environments needing noise immunity.

- Guaranteed High Commutation Voltage
dv/dt — 500 V/µs Min @ TC = 25°C
- High Blocking Voltage — VDRM to 800 V
- Photo Glass Passivated Junction for Improved Power Cycling Capability and Reliability

MAXIMUM RATINGS (TC = 25°C unless otherwise noted.)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Repetitive Off-State Voltage (1) (TJ = –40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Open Gate)</td>
<td>VDRM</td>
<td>200</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>600</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Peak Gate Voltage</td>
<td>VGM</td>
<td>10</td>
<td>Volts</td>
</tr>
<tr>
<td>On-State Current RMS (TC = +75°C)</td>
<td>IT(RMS)</td>
<td>20</td>
<td>Amp</td>
</tr>
<tr>
<td>Full Cycle Sine Wave 50 to 60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Surge Current (One Full Cycle, 60 Hz, TC = +75°C preceded and followed by Rated Current)</td>
<td>ITSM</td>
<td>150</td>
<td>Amp</td>
</tr>
<tr>
<td>Circuit Fusing Considerations (t = 8.3 ms)</td>
<td>I2t</td>
<td>93</td>
<td>A²s</td>
</tr>
<tr>
<td>Peak Gate Power (TC = +75°C, Pulse Width = 2.0 µs)</td>
<td>PG</td>
<td>20</td>
<td>Watts</td>
</tr>
<tr>
<td>Average Gate Power (TC = +75°C, t = 8.3 ms)</td>
<td>P(GAV)</td>
<td>0.5</td>
<td>Watt</td>
</tr>
<tr>
<td>Peak Gate Current</td>
<td>IG</td>
<td>2.0</td>
<td>Amp</td>
</tr>
<tr>
<td>Operating Junction Temperature Range</td>
<td>TJ</td>
<td>–40 to +125</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tstg</td>
<td>–40 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>RθJC</td>
<td>1.8</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

1. VDRM for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
**MAC321 Series**

**ELECTRICAL CHARACTERISTICS** (TC = 25°C unless otherwise noted.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Blocking Current (V_D = Rated V_DRM, Gate Open)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_J = 25°C</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>T_J = +125°C</td>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Peak On-State Voltage (Either Direction) (I_TM = 28 A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2.0%)</td>
<td></td>
<td>1.4</td>
<td>1.7</td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td>Gate Trigger Current (Continuous dc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT2(+), G(+)</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>MT2(+), G(–)</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>MT2(–), G(–)</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Gate Trigger Voltage (Continuous dc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT2(+), G(+)</td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td>MT2(+), G(–)</td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td>MT2(–), G(–)</td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td>(Main Terminal Voltage = Rated V_DRM, R_L = 10 kΩ, T_J = +125°C)</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td>MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Holding Current (Either Direction)</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>(Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 200 mA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn-On Time</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td>µs</td>
</tr>
<tr>
<td>(V_D = Rated V_DRM, I_TM = 28 A, I_GT = 120 mA, Rise Time = 0.1 µs, Pulse Width = 2.0 µs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Rate of Rise of Off-State Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V_D = Rated V_DRM, Exponential Voltage Rise, Gate Open)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T_J = 25°C</td>
<td></td>
<td>500</td>
<td></td>
<td></td>
<td>V/µs</td>
</tr>
<tr>
<td>T_J = +125°C</td>
<td></td>
<td>200</td>
<td></td>
<td></td>
<td>V/µs</td>
</tr>
</tbody>
</table>

**TYPICAL CHARACTERISTICS**

**Figure 1. RMS Current Derating**

**Figure 2. On-State Power Dissipation**
Figure 3. Typical Gate Trigger Voltage

Figure 4. Typical Gate Trigger Current

Figure 5. Maximum On-State Characteristics

Figure 6. Typical Holding Current

Figure 7. Maximum On-Repetitive Surge Current
MAC321 Series

Figure 8. Thermal Response

$Z_{\theta JC}(t) = r(t) \cdot R_{\theta JC}$
PACKAGE DIMENSIONS

NOTES:
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

<table>
<thead>
<tr>
<th>DIM</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
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<tbody>
<tr>
<td>A</td>
<td>0.570</td>
<td>14.48</td>
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<tr>
<td></td>
<td>0.620</td>
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<td>B</td>
<td>0.380</td>
<td>9.66</td>
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<td></td>
<td>0.405</td>
<td>10.28</td>
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<tr>
<td>C</td>
<td>0.160</td>
<td>4.06</td>
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<tr>
<td></td>
<td>0.191</td>
<td>4.85</td>
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<tr>
<td>D</td>
<td>0.025</td>
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<td></td>
<td>0.036</td>
<td>0.92</td>
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<tr>
<td>E</td>
<td>0.142</td>
<td>3.61</td>
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<td>0.147</td>
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<tr>
<td>F</td>
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<td>2.42</td>
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<td>G</td>
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<td>2.80</td>
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<td>0.155</td>
<td>3.94</td>
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<tr>
<td>J</td>
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<td>0.36</td>
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<td></td>
<td>0.022</td>
<td>0.56</td>
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<td>K</td>
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<td></td>
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<tr>
<td>L</td>
<td>0.045</td>
<td>1.15</td>
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<tr>
<td></td>
<td>0.055</td>
<td>1.39</td>
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<tr>
<td>M</td>
<td>0.180</td>
<td>4.57</td>
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<td></td>
<td>0.210</td>
<td>5.33</td>
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<tr>
<td>N</td>
<td>0.100</td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td>0.120</td>
<td>3.05</td>
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<tr>
<td>Q</td>
<td>0.080</td>
<td>2.03</td>
</tr>
<tr>
<td></td>
<td>0.110</td>
<td>2.80</td>
</tr>
<tr>
<td>R</td>
<td>0.045</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>0.055</td>
<td>1.39</td>
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<tr>
<td>S</td>
<td>0.235</td>
<td>5.97</td>
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<tr>
<td></td>
<td>0.255</td>
<td>6.47</td>
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<td>0.00</td>
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<td>1.27</td>
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<tr>
<td>V</td>
<td>0.045</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>0.080</td>
<td>2.03</td>
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</table>

CASE 221A-04
(ToF-220AB)
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