Three Phase Bridge, 160 A
(Power Modules)

FEATURES
- Blocking voltage up to 1800 V
- High surge capability
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio
- 3600 V<sub>RMS</sub> isolating voltage
- UL approved file E78996
- Designed for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION
A range of extremely compact, encapsulated three phase bridge rectifiers offering efficient and reliable operation. They are intended for use in general purpose and heavy duty applications.

PRIMARY CHARACTERISTICS
<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Io</td>
<td>160 A at 118 °C</td>
</tr>
<tr>
<td>V&lt;sub&gt;RRM&lt;/sub&gt;</td>
<td>1600 V to 1800 V</td>
</tr>
<tr>
<td>Package</td>
<td>MTC</td>
</tr>
</tbody>
</table>

MAJOR RATINGS AND CHARACTERISTICS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>CHARACTERISTIC</th>
<th>VALUE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Io</td>
<td></td>
<td>257</td>
<td>A</td>
</tr>
<tr>
<td>TC</td>
<td></td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>IFSM</td>
<td>50 Hz</td>
<td>1540</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>60 Hz</td>
<td>1610</td>
<td></td>
</tr>
<tr>
<td>IPt</td>
<td>50 Hz</td>
<td>11 860</td>
<td>A&lt;sup&gt;2&lt;/sup&gt;s</td>
</tr>
<tr>
<td></td>
<td>60 Hz</td>
<td>10 825</td>
<td></td>
</tr>
<tr>
<td>IPt&lt;sub&gt;t&lt;/sub&gt;</td>
<td></td>
<td>118 580</td>
<td>A&lt;sup&gt;2&lt;/sup&gt;/s</td>
</tr>
<tr>
<td>V&lt;sub&gt;BRM&lt;/sub&gt;</td>
<td>Range</td>
<td>1600 to 1800</td>
<td>V</td>
</tr>
<tr>
<td>T&lt;sub&gt;Stg&lt;/sub&gt;</td>
<td>Range</td>
<td>-40 to +125</td>
<td>°C</td>
</tr>
<tr>
<td>TJ</td>
<td>Range</td>
<td>-40 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Note
(1) Maximum output current must be limited to 220 A to do not exceed the maximum temperature of terminals

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>VOLTAGE CODE</th>
<th>V&lt;sub&gt;BRM&lt;/sub&gt;, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V</th>
<th>V&lt;sub&gt;BRM&lt;/sub&gt;, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V</th>
<th>Io&lt;sub&gt;RM&lt;/sub&gt; MAXIMUM AT TJ = MAXIMUM mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS-161MT...C</td>
<td>160</td>
<td>1600</td>
<td>1700</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>180</td>
<td>1800</td>
<td>1900</td>
<td></td>
</tr>
</tbody>
</table>
### FORWARD CONDUCTION

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS</th>
<th>VALUES</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum DC output current at case temperature</td>
<td>( I_0 )</td>
<td>120° rect. conduction angle</td>
<td>160</td>
<td>A</td>
</tr>
<tr>
<td>Maximum peak, one-cycle forward, non-repetitive surge current</td>
<td>( I_{FSM} )</td>
<td>( t = 10 ) ms, No voltage reapplied, initial ( T_J = T_J ) maximum</td>
<td>1540</td>
<td>A</td>
</tr>
<tr>
<td>Maximum ( P_t ) for fusing</td>
<td>( P_t )</td>
<td>( t = 10 ) ms, No voltage reapplied, initial ( T_J = T_J ) maximum</td>
<td>11,860</td>
<td>A( ^2 )s</td>
</tr>
<tr>
<td>Maximum ( P_t ) for fusing</td>
<td>( P_t )</td>
<td>( t = 10 ) ms, No voltage reapplied, initial ( T_J = T_J ) maximum</td>
<td>10,825</td>
<td>A( ^2 )s</td>
</tr>
<tr>
<td>Low level value of threshold voltage</td>
<td>( V_{FT(TJ1)} )</td>
<td>( (16.7 % x \pi x I_{F(AV)} &lt; I &lt; \pi x I_{F(AV)}) ), ( T_J ) maximum</td>
<td>0.81</td>
<td>V</td>
</tr>
<tr>
<td>High level value of threshold voltage</td>
<td>( V_{FT(TJ2)} )</td>
<td>( (I &gt; \pi x I_{F(AV)}) ), ( T_J ) maximum</td>
<td>0.98</td>
<td>V</td>
</tr>
<tr>
<td>Low level value of forward slope resistance</td>
<td>( r_{f1} )</td>
<td>( (16.7 % x \pi x I_{F(AV)} &lt; I &lt; \pi x I_{F(AV)}) ), ( T_J ) maximum</td>
<td>3.89</td>
<td>mΩ</td>
</tr>
<tr>
<td>High level of forward slope resistance</td>
<td>( r_{f2} )</td>
<td>( (I &gt; \pi x I_{F(AV)}) ), ( T_J ) maximum</td>
<td>3.68</td>
<td>mΩ</td>
</tr>
<tr>
<td>Maximum forward voltage drop</td>
<td>( V_{FM} )</td>
<td>( I_{pk} = 300 ) A, ( T_J = 25 ) °C, per junction</td>
<td>1.85</td>
<td>V</td>
</tr>
<tr>
<td>RMS isolation voltage</td>
<td>( V_{ISOL} )</td>
<td>( T_J = 25 ) °C, all terminal shorted ( f = 50 ) Hz, ( t = 1 ) s</td>
<td>3600</td>
<td></td>
</tr>
</tbody>
</table>

### THERMAL AND MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS</th>
<th>VALUES</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum junction operating</td>
<td>( T_J )</td>
<td></td>
<td>-40 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Maximum storage temperature</td>
<td>( T_{Stg} )</td>
<td></td>
<td>-40 to +125</td>
<td>°C</td>
</tr>
<tr>
<td>Maximum thermal resistance, junction to case</td>
<td>( R_{thJC} )</td>
<td>DC operation per module</td>
<td>0.058</td>
<td>°C/W</td>
</tr>
<tr>
<td>Typical thermal resistance, case to heatsink</td>
<td>( R_{thCS} )</td>
<td>Per module, Mounting surface smooth, flat, and greased</td>
<td>0.03</td>
<td>°C/W</td>
</tr>
<tr>
<td>Mounting torque ± 15 %</td>
<td></td>
<td>to heatsink</td>
<td>5</td>
<td>Nm</td>
</tr>
<tr>
<td>Approximate weight</td>
<td></td>
<td>to terminal</td>
<td>235</td>
<td>g</td>
</tr>
</tbody>
</table>

### \( \Delta R \) CONDUCTION PER JUNCTION

<table>
<thead>
<tr>
<th>DEVICES</th>
<th>SINE HALF WAVE CONDUCTION</th>
<th>RECTANGULAR WAVE CONDUCTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180°</td>
<td>120°</td>
<td>90°</td>
</tr>
<tr>
<td>VS-161MT...C Series</td>
<td>0.054</td>
<td>0.061</td>
<td>0.076</td>
</tr>
</tbody>
</table>

Note: Table shows the increment of thermal resistance \( R_{thJC} \) when devices operate at different conduction angles than DC.
Fig. 1 - Current Ratings Characteristics

Fig. 2 - Forward Voltage Drop Characteristics

Fig. 3 - Total Power Loss Characteristics

Fig. 4 - Maximum Non-Repetitive Surge Current

Fig. 5 - Maximum Non-Repetitive Surge Current

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Maximum non-repetitive surge current vs. pulse train duration.

Initial $T_J = 150 \degree C$

No voltage reapplied

Rated $V_{RMM}$ reapplied

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Maximum non-repetitive surge current vs. pulse train duration.

Initial $T_J = 150 \degree C$

No voltage reapplied

Rated $V_{RMM}$ reapplied
Fig. 6 - Thermal Impedance $Z_{thJC}$ Characteristic

ORDERING INFORMATION TABLE

<table>
<thead>
<tr>
<th>Device code</th>
<th>VS-161MT160C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vishay Semiconductors product</td>
</tr>
<tr>
<td>2</td>
<td>Current rating code: 16 = 160 A (average)</td>
</tr>
<tr>
<td>3</td>
<td>Circuit configuration (three phase diodes bridge)</td>
</tr>
<tr>
<td>4</td>
<td>Package indicator</td>
</tr>
<tr>
<td>5</td>
<td>Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)</td>
</tr>
</tbody>
</table>

CIRCUIT CONFIGURATION

LINKS TO RELATED DOCUMENTS

Dimensions [www.vishay.com/doc?96003]
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