Fast Avalanche SMD Rectifier

FEATURES

• Low profile package
• Ideal for automated placement
• Glass passivated pellet chip junction
• Low reverse current
• Soft recovery characteristic
• Fast reverse recovery time
• Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
• AEC-Q101 qualified available
  - Automotive ordering code P/NHE3 or P/NHM3
• Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

For use in fast switching rectification of power supply, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

MECHANICAL DATA

Case: SMA (DO-214AC)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS-compliant, commercial grade
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
Base P/NHE3_X - RoHS-compliant, and AEC-Q101 qualified
Base P/NHM3_X - halogen-free, RoHS-compliant and AEC-Q101 qualified
("_X" denotes revision code e.g. A, B,...)

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
E3, M3, HE3, and HM3 suffix meet JESD 201 class 2 whisker test
Polarity: color band denotes the cathode end

PRIMARY CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>BYG21K</th>
<th>BYG21M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td>BYG21K</td>
<td>BYG21M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>VRRM</td>
<td>800</td>
<td>1000</td>
<td>V</td>
</tr>
<tr>
<td>Average forward current</td>
<td>IF(AV)</td>
<td>1.5</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Peak forward surge current 10 ms single half sine-wave superimposed on rated load</td>
<td>IFSM</td>
<td>30</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Pulse energy in avalanche mode, non repetitive (inductive load switch off) IBR = 1 A, Tj = 25 °C</td>
<td>ER</td>
<td>20</td>
<td>mJ</td>
<td></td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>TJ, TSTG</td>
<td>-55 to +150</td>
<td>°C</td>
<td></td>
</tr>
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MAXIMUM RATINGS (TA = 25 °C unless otherwise noted)

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ELECTRICAL CHARACTERISTICS \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

<table>
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<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SYMBOL</th>
<th>BYG21K</th>
<th>BYG21M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum instantaneous forward voltage</td>
<td>( I_F = 1 , A ), ( T_J = 25 , ^\circ C )</td>
<td>( V_F (1) )</td>
<td>1.5</td>
<td>1.6</td>
<td>V</td>
</tr>
<tr>
<td>Maximum reverse current</td>
<td>( V_R = V_{BRM} ), ( T_J = 25 , ^\circ C ), ( T_J = 100 , ^\circ C )</td>
<td>( I_R )</td>
<td>1</td>
<td>10</td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Maximum reverse recovery time</td>
<td>( I_C = 0.5 , A, I_R = 1.0 , A, I_R = 0.25 , A )</td>
<td>( t_{rr} )</td>
<td>120</td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>

Note
(1) Pulse test: 300 \( \mu s \) pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

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<th>BYG21M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance, junction to lead, ( T_L = \text{const.} )</td>
<td>( R_{\theta JL} )</td>
<td>25</td>
<td></td>
<td>( ^\circ C/W )</td>
</tr>
<tr>
<td>Typical thermal resistance, junction to ambient</td>
<td>( R_{\theta JA (1)} )</td>
<td>150</td>
<td></td>
<td>( ^\circ C/W )</td>
</tr>
<tr>
<td></td>
<td>( R_{\theta JA (2)} )</td>
<td>125</td>
<td></td>
<td>( ^\circ C/W )</td>
</tr>
<tr>
<td></td>
<td>( R_{\theta JA (3)} )</td>
<td>100</td>
<td></td>
<td>( ^\circ C/W )</td>
</tr>
</tbody>
</table>

Notes
(1) Mounted on epoxy-glass hard tissue
(2) Mounted on epoxy-glass hard tissue, 50 mm\(^2\) 35 \( \mu m \) Cu
(3) Mounted on Al-oxide-ceramic (\( Al_2O_3 \)), 50 mm\(^2\) 35 \( \mu m \) Cu

ORDERING INFORMATION (Example)

<table>
<thead>
<tr>
<th>PREFERRED P/N</th>
<th>UNIT WEIGHT (g)</th>
<th>PREFERRED PACKAGE CODE</th>
<th>BASE QUANTITY</th>
<th>DELIVERY MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BYG21K-E3/TR</td>
<td>0.064</td>
<td>TR</td>
<td>1800</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>BYG21K-E3/TR3</td>
<td>0.064</td>
<td>TR3</td>
<td>7500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>BYG21KHE3_A/H</td>
<td>0.064</td>
<td>H</td>
<td>1800</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>BYG21KHE3_A/I</td>
<td>0.064</td>
<td>I</td>
<td>7500</td>
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<td>BYG21K-M3/TR</td>
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Note
(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

![Instantaneous Forward Current vs. Instantaneous Forward Voltage](image1)

![Max. Average Forward Current vs. Ambient Temperature](image2)

Fig. 1 - Forward Current vs. Forward Voltage

Fig. 2 - Max. Average Forward Current vs. Ambient Temperature
Fig. 3 - Reverse Current vs. Junction Temperature

Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

Fig. 5 - Diode Capacitance vs. Reverse Voltage

Fig. 6 - Max. Reverse Recovery Charge vs. Forward Current

Fig. 7 - Thermal Response
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMA (DO-214AC)

Mounting Pad Layout

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>0.065 (1.65)</td>
<td>Cathode Band</td>
</tr>
<tr>
<td>0.049 (1.25)</td>
<td></td>
</tr>
<tr>
<td>0.177 (4.50)</td>
<td></td>
</tr>
<tr>
<td>0.157 (3.99)</td>
<td></td>
</tr>
<tr>
<td>0.110 (2.79)</td>
<td></td>
</tr>
<tr>
<td>0.100 (2.54)</td>
<td></td>
</tr>
<tr>
<td>0.066 (1.68)</td>
<td>MIN.</td>
</tr>
<tr>
<td>0.060 (1.52)</td>
<td>REF.</td>
</tr>
<tr>
<td>0.074 (1.88)</td>
<td>MAX.</td>
</tr>
<tr>
<td>0.030 (0.76)</td>
<td></td>
</tr>
<tr>
<td>0.028 (0.71)</td>
<td></td>
</tr>
<tr>
<td>0.020 (0.51)</td>
<td></td>
</tr>
<tr>
<td>0.008 (0.203)</td>
<td></td>
</tr>
<tr>
<td>0.006 (0.152)</td>
<td></td>
</tr>
<tr>
<td>0.012 (0.305)</td>
<td></td>
</tr>
<tr>
<td>0.006 (0.152)</td>
<td></td>
</tr>
<tr>
<td>0.078 (1.98)</td>
<td></td>
</tr>
<tr>
<td>0.090 (2.29)</td>
<td></td>
</tr>
<tr>
<td>0.208 (5.28)</td>
<td></td>
</tr>
<tr>
<td>0.194 (4.93)</td>
<td></td>
</tr>
<tr>
<td>0.060 (1.52)</td>
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For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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