Surface Mount Ultra Fast Rectifier

FEATURES
- Low profile package
- Ideal for automated placement
- Glass passivated pallet chip junction
- Ultrafast reverse recovery time
- Low switching losses, high efficiency
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS
For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, 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, 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 meets JESD 201 class 2 whisker test
Polarity: color band denotes cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>US1A</th>
<th>US1B</th>
<th>US1D</th>
<th>US1G</th>
<th>US1J</th>
<th>US1K</th>
<th>US1M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td>Device marking code</td>
<td>UA</td>
<td>UB</td>
<td>UD</td>
<td>UG</td>
<td>UJ</td>
<td>UK</td>
<td>UM</td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>V_{RRM}</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
<td>1000</td>
<td>V</td>
</tr>
<tr>
<td>Maximum RMS voltage</td>
<td>V_{RMS}</td>
<td>35</td>
<td>70</td>
<td>140</td>
<td>280</td>
<td>420</td>
<td>560</td>
<td>700</td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC blocking voltage</td>
<td>V_{DC}</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
<td>1000</td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current at T_J = 110 °C</td>
<td>I_{F(AV)}</td>
<td>1.0</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load</td>
<td>I_{FSM}</td>
<td>30</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating and storage temperature range</td>
<td>T_J, T_STG</td>
<td>-55 to +150</td>
<td>°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SYMBOL</th>
<th>US1A</th>
<th>US1B</th>
<th>US1D</th>
<th>US1G</th>
<th>US1J</th>
<th>US1K</th>
<th>US1M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum instantaneous forward voltage</td>
<td>1.0 A</td>
<td>V_F (1)</td>
<td>1.0</td>
<td>1.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC reverse current at rated DC blocking voltage</td>
<td>T_A = 25 °C</td>
<td>I_R</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>T_A = 100 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td>Maximum reverse recovery time</td>
<td>I_F = 0.5 A, I_R = 1.0 A, I_TR = 0.25 A</td>
<td>t_R</td>
<td>50</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Typical junction capacitance</td>
<td>4.0 V, 1 MHz</td>
<td>C_J</td>
<td>15</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>pF</td>
</tr>
</tbody>
</table>

**Note**

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

# THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>US1A</th>
<th>US1B</th>
<th>US1D</th>
<th>US1G</th>
<th>US1J</th>
<th>US1K</th>
<th>US1M</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum thermal resistance</td>
<td>R_TH_JA (1)</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>°C/W</td>
</tr>
<tr>
<td></td>
<td>R_TH_JL (1)</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>°C/W</td>
</tr>
</tbody>
</table>

**Note**

(1) PCB mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad area

# 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>US1J-E3/61T</td>
<td>0.064</td>
<td>61T</td>
<td>1800</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>US1J-E3/5AT</td>
<td>0.064</td>
<td>5AT</td>
<td>7500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>US1JHE3_A/H (1)</td>
<td>0.064</td>
<td>H</td>
<td>1800</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>US1JHE3_A/I (1)</td>
<td>0.064</td>
<td>I</td>
<td>7500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>US1J-M3/61T</td>
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<td>61T</td>
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<td>I</td>
<td>7500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

**Note**

(1) AEC-Q101 qualified
RATINGS AND CHARACTERISTICS CURVES (TA = 25 °C unless otherwise noted)

**Fig. 1 - Forward Current Derating Curve**

- Average Forward Rectified Current (A)
- Lead Temperature (°C)
- Resistor or Inductive Load
- 0.2" x 0.2" (5.0 mm x 5.0 mm)
- Copper Pad Areas

**Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current**

- Peak Forward Surge Current (A)
- Number of Cycles at 60 Hz
- TJ = 110 °C
- 8.3 ms Single Half Sine-Wave

**Fig. 3 - Typical Instantaneous Forward Characteristics**

- Instantaneous Forward Voltage (V)
- TJ = 25 °C
- TJ = 100 °C
- TJ = 125 °C
- TJ = 150 °C

**Fig. 4 - Typical Reverse Leakage Characteristics**

- Instantaneous Reverse Leakage Current (µA)
- US1A thru US1G
- TJ = 25 °C
- TJ = 100 °C
- TJ = 125 °C
- TJ = 150 °C

**Fig. 5 - Typical Instantaneous Forward Characteristics**

- Instantaneous Forward Voltage (V)
- US1J thru US1M
- TJ = 25 °C
- TJ = 100 °C
- TJ = 125 °C
- TJ = 150 °C

**Fig. 6 - Typical Reverse Leakage Characteristics**

- Instantaneous Reverse Leakage Current (µA)
- US1J thru US1M
- TJ = 25 °C
- TJ = 100 °C
- TJ = 125 °C
- TJ = 150 °C
Fig. 7 - Typical Junction Capacitance

Fig. 8 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMA (DO-214AC)

Cathode Band

0.065 (1.65) 0.049 (1.25)

0.177 (4.50) 0.157 (3.99)

0.060 (1.52) 0.030 (0.76)

0.090 (2.29) 0.078 (1.98)

0.066 (1.68) MIN.

0.060 (1.52) MIN.

0.074 (1.88) MAX.

0.078 (1.98) REF.

0.028 (0.71)

0.194 (4.93)
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