1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD128 small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 3$ A
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage
- High power capability due to clip-bond technology
- Small and flat lead SMD plastic package
- Suitable for both reflow and wave soldering
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications

4. Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20$ kHz; square wave; $T_{amb} \leq 85$ °C</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\delta = 0.5; f = 20$ kHz; square wave; $T_{sp} \leq 140$ °C</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 3$ A; $T_j = 25$ °C</td>
<td>-</td>
<td>315</td>
<td>360</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 30$ V; $T_j = 25$ °C</td>
<td>-</td>
<td>1.5</td>
<td>5</td>
<td>mA</td>
</tr>
</tbody>
</table>

[1] Device mounted on a ceramic PCB, $\text{Al}_2\text{O}_3$, standard footprint.
5. Pinning information

Table 2. Pinning information

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K</td>
<td>cathode[1]</td>
<td>1</td>
<td>K</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td>2</td>
<td>A</td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3030EP-Q</td>
<td>CFP5</td>
<td>plastic, surface mounted package; 2 terminals; 4 mm pitch; 3.8 mm x 2.6 mm x 1 mm body</td>
<td>SOD128</td>
</tr>
</tbody>
</table>

7. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3030EP-Q</td>
<td>A5</td>
</tr>
</tbody>
</table>
8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>VR</td>
<td>reverse voltage</td>
<td>$T_j = 25 , ^\circ \text{C}$</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>IF(AV)</td>
<td>average forward current</td>
<td>$\delta = 0.5; , f = 20 , \text{kHz}; , \text{square wave}; , T_{\text{amb}} \leq 85 , ^\circ \text{C}$</td>
<td>3</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\delta = 0.5; , f = 20 , \text{kHz}; , \text{square wave}; , T_{\text{sp}} \leq 140 , ^\circ \text{C}$</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>IFSM</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , \text{ms}; , \text{square wave}; , T_{j(\text{init})} = 25 , ^\circ \text{C}$</td>
<td>-</td>
<td>50</td>
<td>A</td>
</tr>
<tr>
<td>Ptot</td>
<td>total power dissipation</td>
<td>$T_{\text{amb}} \leq 25 , ^\circ \text{C}$</td>
<td>[2]</td>
<td>0.625</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>1.05</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>2.1</td>
<td>W</td>
</tr>
<tr>
<td>Tj</td>
<td>junction temperature</td>
<td></td>
<td></td>
<td>-</td>
<td>150 , ^\circ \text{C}</td>
</tr>
<tr>
<td>Tamb</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>150</td>
<td>, ^\circ \text{C}</td>
</tr>
<tr>
<td>Tstg</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>, ^\circ \text{C}</td>
</tr>
</tbody>
</table>

[1] Device mounted on a ceramic PCB, $\text{Al}_2\text{O}_3$, standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rth(j-a)</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>[2]</td>
<td>-</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[4]</td>
<td>-</td>
<td>60</td>
</tr>
<tr>
<td>Rth(j-sp)</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>12</td>
</tr>
</tbody>
</table>

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses $P_R$ are a significant part of the total power losses.
FR4 PCB, standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB, mounting pad for cathode 1 cm²

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

Ceramic PCB, Al₂O₃, standard footprint

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
### 10. Characteristics

#### Table 7. Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.5$ A; $T_j = 25$ °C</td>
<td>-</td>
<td>235</td>
<td>270</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1$ A; $T_j = 25$ °C</td>
<td>-</td>
<td>260</td>
<td>290</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3$ A; $T_j = 25$ °C</td>
<td>-</td>
<td>315</td>
<td>360</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 5$ V; $T_j = 25$ °C</td>
<td>-</td>
<td>190</td>
<td>-</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 30$ V; $T_j = 25$ °C</td>
<td>-</td>
<td>1.5</td>
<td>5</td>
<td>mA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1$ V; $f = 1$ MHz; $T_j = 25$ °C</td>
<td>-</td>
<td>470</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10$ V; $f = 1$ MHz; $T_j = 25$ °C</td>
<td>-</td>
<td>160</td>
<td>-</td>
<td>pF</td>
</tr>
</tbody>
</table>

![Fig. 4. Forward current as a function of forward voltage; typical values](006aab742)

![Fig. 5. Reverse current as a function of reverse voltage; typical values](006aab744)

- (1) $T_j = 150$ °C
- (2) $T_j = 125$ °C
- (3) $T_j = 85$ °C
- (4) $T_j = 25$ °C
- (5) $T_j = -40$ °C
f = 1 MHz; $T_{amb} = 25 \, ^\circ C$

Fig. 6. Diode capacitance as a function of reverse voltage; typical values

$T_J = 150 \, ^\circ C$
(1) $\delta = 0.1$
(2) $\delta = 0.2$
(3) $\delta = 0.5$
(4) $\delta = 1$

Fig. 7. Average forward power dissipation as a function of average forward current; typical values

$T_J = 125 \, ^\circ C$
(1) $\delta = 1$
(2) $\delta = 0.9$
(3) $\delta = 0.8$
(4) $\delta = 0.5$

Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values

FR4 PCB, standard footprint
$T_J = 150 \, ^\circ C$
(1) $\delta = 1$; DC
(2) $\delta = 0.5$; $f = 20 \, kHz$
(3) $\delta = 0.2$; $f = 20 \, kHz$
(4) $\delta = 0.1$; $f = 20 \, kHz$

Fig. 9. Average forward current as a function of ambient temperature; typical values
FR4 PCB, mounting pad for cathode 1 cm²
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

Ceramic PCB, Al₂O₃, standard footprint
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

Fig. 10. Average forward current as a function of ambient temperature; typical values

Fig. 11. Average forward current as a function of ambient temperature; typical values

T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

Fig. 12. Average forward current as a function of solder point temperature; typical values
11. Test information

The current ratings for the typical waveforms are calculated according to the equations: 

\[ I_{F(AV)} = I_M \times \delta \] with \( I_M \) defined as peak current, \( I_{RMS} = I_{F(AV)} \) at DC, and \( I_{RMS} = I_M \times \sqrt{\delta} \) with \( I_{RMS} \) defined as RMS current.

**Quality information**

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.
12. Package outline

Plastic surface-mounted package; 2 leads

![Package outline diagram]

**DIMENSIONS (mm are the original dimensions)**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>b_p</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>H_E</th>
<th>L_p</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1.1</td>
<td>0.9</td>
<td>1.9</td>
<td>0.22</td>
<td>4.0</td>
<td>2.7</td>
<td>4.4</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>0.6</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note
1. The marking bar indicates the cathode

Fig. 14. Package outline CFP5 (SOD128)

13. Soldering

![Soldering footprint diagram]

**solder lands**
**solder resist**
**solder paste**
**occupied area**

Dimensions in mm

Fig. 15. Reflow soldering footprint for CFP5 (SOD128)
Fig. 16. Wave soldering footprint for CFP5 (SOD128)
# 14. Revision history

Table 8. Revision history

<table>
<thead>
<tr>
<th>Data sheet ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<td>PMEG3030EP-Q v.1</td>
<td>20210608</td>
<td>Product data sheet</td>
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15. Legal information

Data sheet status

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<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
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<td>[3]</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
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<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
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