1. General description

Planar 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: $I_{F(AV)} \leq 5 \text{ A}$
- Reverse voltage: $V_R \leq 30 \text{ V}$
- 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>$\delta = 0.5$; $f = 20 \text{ kHz}$; square wave; $T_{sp} \leq 135 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 5 \text{ A}$; $T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>400</td>
<td>450</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 30 \text{ V}$; $T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>90</td>
<td>250</td>
<td>$\mu$A</td>
</tr>
</tbody>
</table>

5. 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>![Simplified outline](CFP5 (SOD128).png)</td>
<td><img src="sym001.png" alt="Graphic symbol" /></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></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</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3050BEP-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>PMEG3050BEP-Q</td>
<td>A8</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>V_R</td>
<td>reverse voltage</td>
<td>T_j = 25 °C</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>I_{F(AV)}</td>
<td>average forward current</td>
<td>δ = 0.5; f = 20 kHz; square wave; T_{amb} ≤ 20 °C</td>
<td>[1]</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>δ = 0.5; f = 20 kHz; square wave; T_{sp} ≤ 135 °C</td>
<td>-</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>I_{FSM}</td>
<td>non-repetitive peak forward current</td>
<td>t_p = 8.3 ms; half-sine wave; T_{j(init)} = 25 °C</td>
<td>-</td>
<td>70</td>
<td>A</td>
</tr>
<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_{amb} ≤ 25 °C</td>
<td>[2]</td>
<td>625</td>
<td>mW</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>[1]</td>
<td>2.1</td>
<td>W</td>
</tr>
<tr>
<td>T_j</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T_{amb}</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>°C</td>
</tr>
</tbody>
</table>

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>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1] [2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[3] [2]</td>
<td></td>
<td></td>
<td>120</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[4] [2]</td>
<td></td>
<td></td>
<td>60</td>
<td>K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>12</td>
<td>K/W</td>
</tr>
</tbody>
</table>

[2] 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](image1.png)

**FR4 PCB, mounting pad for cathode 1 cm$^2$**

![Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values](image2.png)
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 = 0.1 A; T_j = 25 °C</td>
<td>-</td>
<td>270</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 0.5 A; T_j = 25 °C</td>
<td>-</td>
<td>315</td>
<td>360</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 1 A; T_j = 25 °C</td>
<td>-</td>
<td>335</td>
<td>380</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 2 A; T_j = 25 °C</td>
<td>-</td>
<td>360</td>
<td>420</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 3 A; T_j = 25 °C</td>
<td>-</td>
<td>380</td>
<td>440</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 5 A; T_j = 25 °C</td>
<td>-</td>
<td>400</td>
<td>450</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>10</td>
<td>-</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 10 V; T_j = 25 °C</td>
<td>-</td>
<td>15</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>90</td>
<td>250</td>
<td>µA</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>800</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>275</td>
<td>-</td>
<td>pF</td>
</tr>
</tbody>
</table>
30 V, 5 A low VF Schottky barrier rectifier

Fig. 4. Forward current as a function of forward voltage; typical values

Fig. 5. Reverse current as a function of reverse voltage; typical values

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

Fig. 7. Average forward power dissipation as a function of average forward current; typical values
30 V, 5 A low VF Schottky barrier rectifier

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

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

**Fig. 9.** Average forward current as a function of ambient temperature; typical values

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

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

- FR4 PCB, mounting pad for cathode 1 cm$^2$
  - $T_J = 150 \, ^\circ\text{C}$
  - (1) $\delta = 1$; DC
  - (2) $\delta = 0.5$; $f = 20 \, \text{kHz}$
  - (3) $\delta = 0.2$; $f = 20 \, \text{kHz}$
  - (4) $\delta = 0.1$; $f = 20 \, \text{kHz}$

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

- Ceramic PCB, Al$_2$O$_3$, standard footprint
  - $T_J = 150 \, ^\circ\text{C}$
  - (1) $\delta = 1$; DC
  - (2) $\delta = 0.5$; $f = 20 \, \text{kHz}$
  - (3) $\delta = 0.2$; $f = 20 \, \text{kHz}$
  - (4) $\delta = 0.1$; $f = 20 \, \text{kHz}$
11. Test information

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

- \( I_{F(\text{AV})} = IM \times \delta \) with \( IM \) defined as peak current
- \( I_{\text{RMS}} = I_{F(\text{AV})} \) at DC
- \( I_{\text{RMS}} = IM \times \sqrt{\delta} \) with \( I_{\text{RMS}} \) 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

Fig. 14. Package outline CFP5 (SOD128)

13. Soldering

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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<tr>
<td>PMEG3050BEP-Q v.2</td>
<td>20230220</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG3050BEP-Q v.1</td>
</tr>
</tbody>
</table>

Modifications:
- Limiting values: Measurement conditions for $I_{FSM}$ changed from square wave to half-sine wave.

PMEG3050BEP-Q v.1 20210608 Product data sheet - -
15. Legal information

Data sheet status

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<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>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
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</table>

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PMEG3050BEP-Q

30 V, 5 A low VF Schottky barrier rectifier

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Product data sheet 20 February 2023
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