1. Product profile

1.1 General description
Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD882D leadless ultra small Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

1.2 Features and benefits
- Forward current: $I_F \leq 0.2$ A
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage: $V_F \leq 480$ mV
- Ultra small and leadless SMD plastic package
- AEC-Q101 qualified
- Solderable side pads
- Package height typ. 0.37 mm

1.3 Applications
- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications
- Ultra high-speed switching

1.4 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>square wave; $\delta = 0.5$; $f = 20$ kHz</td>
<td>$T_{amb} \leq 125$ °C &amp; [1]</td>
<td>-</td>
<td>-</td>
<td>0.2 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 140$ °C &amp;</td>
<td>-</td>
<td>-</td>
<td>0.2 A</td>
<td></td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10$ V &amp;</td>
<td>-</td>
<td>-</td>
<td>3.5</td>
<td>10 μA</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>-</td>
<td>-</td>
<td>3.5</td>
<td>10 μA</td>
<td></td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 200$ mA &amp; [2]</td>
<td>-</td>
<td>-</td>
<td>430</td>
<td>480 mV</td>
</tr>
</tbody>
</table>

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm².

[2] Pulse test: $t_p \leq 300$ μs; $\delta \leq 0.02$. 
2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode</td>
<td><img src="image1" alt="Simplified outline" /></td>
<td>1 2</td>
</tr>
<tr>
<td>2</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

3. 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>PMEG3002AELD</td>
<td></td>
<td>leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm</td>
<td>SOD882D</td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3002AELD</td>
<td>1101 0000</td>
</tr>
</tbody>
</table>

[1] For SOD882D binary marking code description, see Figure 1.

4.1 Binary marking code description

Fig 1. SOD882D binary marking code description
## 5. Limiting values

<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></td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20 \text{ kHz}$</td>
<td>$T_{amb} \leq 125 \degree C$</td>
<td>[1]</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$T_{sp} \leq 140 \degree C$</td>
<td>-</td>
<td>0.2</td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 1 \text{ ms}; \delta \leq 0.25$</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave; $t_p = 8 \text{ ms}$</td>
<td>[2]</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 \degree C$</td>
<td>[3]</td>
<td>340</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>660</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>1000</td>
<td>mW</td>
</tr>
<tr>
<td>$T_J$</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>\degree C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>+150</td>
<td>\degree C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>+150</td>
<td>\degree C</td>
</tr>
</tbody>
</table>

[2] $T_J = 25 \degree C$ prior to surge.
6. 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>[1][2]</td>
<td>-</td>
<td>-</td>
<td>370 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>190 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>125 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>50 K/W</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.


Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
FR4 PCB, mounting pad for cathode 1 cm²

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

Ceramic PCB, Al₂O₃, standard footprint

**Fig 4.** Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
7. 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>$I_F = 0.1 \text{ mA}$</td>
<td>-</td>
<td>120</td>
<td>190</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ mA}$</td>
<td>-</td>
<td>180</td>
<td>250</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ mA}$</td>
<td>-</td>
<td>250</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100 \text{ mA}$</td>
<td>-</td>
<td>355</td>
<td>400</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 200 \text{ mA}$</td>
<td>-</td>
<td>430</td>
<td>480</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V}$</td>
<td>-</td>
<td>3.5</td>
<td>10</td>
<td>$\mu$A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 30 \text{ V}$</td>
<td>-</td>
<td>12</td>
<td>50</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V}; f = 1 \text{ MHz}$</td>
<td>-</td>
<td>18</td>
<td>25</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>(1) $T_j = 150 \degree \text{C}$</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) $T_j = 125 \degree \text{C}$</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) $T_j = 85 \degree \text{C}$</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) $T_j = 25 \degree \text{C}$</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5) $T_j = -40 \degree \text{C}$</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] Pulse test: $t_p \leq 300 \mu$s; $\delta \leq 0.02$.

[2] When switched from $I_F = 10 \text{ mA}$ to $I_R = 10 \text{ mA}$; $R_L = 100 \Omega$; measured at $I_R = 1 \text{ mA}$.

Fig 5. Forward current as a function of forward voltage; typical values

Fig 6. Reverse current as a function of reverse voltage; typical values
**PMEG3002AELD**

30 V, 0.2 A low $V_F$ MEGA Schottky barrier rectifier

---

**Fig 7.** Diode capacitance as a function of reverse voltage; typical values

$$f = 1 \text{ MHz}; \ T_{\text{amb}} = 25 \degree C$$

---

**Fig 8.** Average forward power dissipation as a function of average forward current; typical values

$$T_J = 150 \degree C$$

1. $\delta = 0.1$
2. $\delta = 0.2$
3. $\delta = 0.5$
4. $\delta = 1$

---

**Fig 9.** Average reverse power dissipation as a function of reverse voltage; typical values

$$T_J = 125 \degree C$$

1. $\delta = 1$
2. $\delta = 0.9$
3. $\delta = 0.8$
4. $\delta = 0.5$
FR4 PCB, standard footprint

\[ T_j = 150 ^\circ C \]

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

Ceramic PCB, \( \text{Al}_2\text{O}_3 \), standard footprint

\[ T_j = 150 ^\circ C \]

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

FR4 PCB, mounting pad for cathode 1 cm\(^2\)

\[ T_j = 150 ^\circ C \]

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

FR4 PCB, mounting pad for cathode 1 cm\(^2\)

\[ T_j = 150 ^\circ C \]

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 13. Average forward current as a function of solder point temperature; typical values
8. Test information

The current ratings for the typical waveforms as shown in Figure 10, 11, 12 and 13 are calculated according to the equations: $I_{F(AY)} = I_M \times \delta$ with $I_M$ defined as peak current, $I_{RMS} = I_{F(AY)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with $I_{RMS}$ defined as RMS current.

8.1 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.
9. Package outline

![Package outline SOD882D](image)

Fig 16. Package outline SOD882D

10. Packing information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3002AELD</td>
<td>SOD882D</td>
<td>2 mm pitch, 8 mm tape and reel</td>
<td>-315</td>
</tr>
</tbody>
</table>

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering

![Reflow soldering SOD882D](image)

Fig 17. Reflow soldering SOD882D

Reflow soldering is the only recommended soldering method.
## 12. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3002AELD v.1</td>
<td>20110419</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<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>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

[1] Please consult the most recently issued document before initiating or completing a design.
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