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: $I_F \leq 0.5 \, \text{A}$
- Reverse voltage: $V_R \leq 20 \, \text{V}$
- Low forward voltage: $V_F \leq 500 \, \text{mV}$
- AEC-Q101 qualified
- Low reverse current
- Solderable side pads
- Package height typ. 0.37 mm
- Ultra small and leadless SMD plastic package

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; $\delta = 0.5$; $f = 20 , \text{kHz}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb} \leq 85 , ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.5</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 130 , ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>A</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 , \text{V}$</td>
<td>-</td>
<td>5</td>
<td>30</td>
<td>$\mu \text{A}$</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td></td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>$\text{V}$</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 500 , \text{mA}$</td>
<td>[2]</td>
<td>-</td>
<td>450</td>
<td>500</td>
</tr>
</tbody>
</table>

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode $1 \, \text{cm}^2$.

[2] Pulse test: $t_p \leq 300 \, \mu \text{s}; \delta \leq 0.02$. 

PMEG2005ELD
20 V, 0.5 A low $V_F$ MEGA Schottky barrier rectifier
Rev. 1 — 4 May 2011 Product data sheet
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="example.png" alt="Simplified outline" /></td>
<td><img src="example.png" alt="Graphic symbol" /></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</th>
<th>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2005ELD</td>
<td>-</td>
<td>Leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm</td>
<td>SOD882D</td>
<td></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>PMEG2005ELD</td>
<td>0101 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 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter Description</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>20</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20$ kHz</td>
<td>$T_{amb} \leq 85 \degree C$ [1]</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 130 \degree C$</td>
<td>-</td>
<td>0.5</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 1$ ms; $\delta \leq 0.25$</td>
<td>-</td>
<td>2.5</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave; $t_p = 8$ ms [2]</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 \degree C$ [3]</td>
<td>-</td>
<td>660</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb}$</td>
<td>-</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>°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>

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

[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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>125</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</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
**Fig 3.** Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

**Fig 4.** Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
7. Characteristics

Table 7. Characteristics
T_{amb} = 25 °C unless otherwise specified.

<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>IF = 0.1 mA</td>
<td>-</td>
<td>115</td>
<td>180</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IF = 1 mA</td>
<td>-</td>
<td>175</td>
<td>240</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IF = 10 mA</td>
<td>-</td>
<td>240</td>
<td>290</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IF = 100 mA</td>
<td>-</td>
<td>320</td>
<td>380</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IF = 500 mA</td>
<td>-</td>
<td>450</td>
<td>500</td>
<td>mV</td>
</tr>
<tr>
<td>I_R</td>
<td>reverse current</td>
<td>V_R = 10 V</td>
<td>-</td>
<td>5</td>
<td>30</td>
<td>μA</td>
</tr>
<tr>
<td>C_d</td>
<td>diode capacitance</td>
<td>V_R = 1 V; f = 1 MHz</td>
<td>-</td>
<td>24</td>
<td>30</td>
<td>pF</td>
</tr>
<tr>
<td>t_{rr}</td>
<td>reverse recovery time</td>
<td>[2]</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] Pulse test: t_p ≤ 300 μs; δ ≤ 0.02.
[2] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.
Fig 7. Diode capacitance as a function of reverse voltage; typical values

\[ f = 1 \text{ MHz}; \ T_{\text{amb}} = 25^\circ \text{C} \]

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

\[ T_{\text{j}} = 150^\circ \text{C} \]

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

\[ T_{\text{j}} = 125^\circ \text{C} \]

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

$T_j = 150 \degree C$

(1) $\delta = 1; \text{ DC}$
(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 $1 \text{ cm}^2$

$T_j = 150 \degree C$

(1) $\delta = 1; \text{ DC}$
(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, $\text{Al}_2\text{O}_3$, standard footprint

$T_j = 150 \degree C$

(1) $\delta = 1; \text{ DC}$
(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

$T_j = 150 \degree C$

(1) $\delta = 1; \text{ DC}$
(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: $I_{F(AV)} = I_M \times \delta$ 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.

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 8. Packing methods

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2005ELD</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 9. 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>PMEG2005ELD v.1</td>
<td>20110504</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.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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14. Contact information

For more information, please visit: **http://www.nexperia.com**

For sales office addresses, please send an email to: **salesaddresses@nexperia.com**
Nexperia

PMEG2005ELD
20 V, 0.5 A low Vf MEGA Schottky barrier rectifier

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