1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a leadless ultra small SOD882D (DFN1006D-2) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 0.2 \text{ A}$
- Reverse voltage: $V_R \leq 60 \text{ V}$
- Low forward voltage $V_F \leq 600 \text{ mV}$
- AEC-Q101 qualified
- Solderable side pads
- Package height typ. 0.37 mm

3. Applications

- LED backlight for mobile application
- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- 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>$\delta = 0.5; f = 20 \text{ kHz}; T_{amb} \leq 130 \text{ °C};$ square wave</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\delta = 0.5; f = 20 \text{ kHz}; T_{sp} \leq 140 \text{ °C};$ square wave</td>
<td>-</td>
<td>-</td>
<td>0.2</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>60</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 200 \text{ mA};$ pulsed; $t_p \leq 300 \mu s; \delta \leq 0.02; T_J = 25 \text{ °C}$</td>
<td>-</td>
<td>540</td>
<td>600</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V};$ pulsed; $t_p \leq 2 \text{ ms}; \delta \leq 0.02; T_J = 25 \text{ °C}$</td>
<td>-</td>
<td>2</td>
<td>10</td>
<td>μA</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></td>
<td></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>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG6002ELD</td>
<td>DFN1006D-2</td>
<td>DFN1006D-2: leadless ultra small plastic package; 2 terminals</td>
<td>SOD882D</td>
<td></td>
</tr>
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7. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG6002ELD</td>
<td>1111 1010</td>
</tr>
</tbody>
</table>

Fig. 1. SOD882D binary marking code description
8. Limiting values

Table 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>$T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 140 , ^\circ C$</td>
<td>-</td>
<td>0.28</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; , f = 20 , kHz; , T_{amb} \leq 130 , ^\circ C; , square , wave$</td>
<td>-</td>
<td>0.2</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>1</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , ms; , T_{j(init)} = 25 , ^\circ C; , square , wave$</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>-</td>
<td>370</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>[2]</td>
<td>735</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>1090</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>$T_{slg}$</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>[1][2]</td>
<td>-</td>
<td>-</td>
<td>340</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>115</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>20</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
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>$I_F = 0.1 \text{ mA}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>130</td>
<td>170</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ mA}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>190</td>
<td>230</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ mA}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>260</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100 \text{ mA}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>410</td>
<td>470</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 200 \text{ mA}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>540</td>
<td>600</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V}; \text{ pulsed}; t_p \leq 2 \text{ ms}; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>2</td>
<td>10</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}; \text{ pulsed}; t_p \leq 2 \text{ ms}; \delta \leq 0.02; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>20</td>
<td>100</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \text{ V}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_{amb} = 100 \text{ °C}$</td>
<td>-</td>
<td>310</td>
<td>-</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}; \text{ pulsed}; t_p \leq 300 \mu s; \delta \leq 0.02; T_{amb} = 100 \text{ °C}$</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>15</td>
<td>20</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega; \bar{I}_R(\text{meas}) = 1 \text{ mA}; T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>4.5</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
60 V, 0.2 A low VF MEGA Schottky barrier rectifier

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

- (1) $T_j = 150 ^\circ C$
- (2) $T_j = 125 ^\circ C$
- (3) $T_j = 85 ^\circ C$
- (4) $T_j = 25 ^\circ C$
- (5) $T_j = -40 ^\circ C$

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

- (1) $T_j = 150 ^\circ C$
- (2) $T_j = 125 ^\circ C$
- (3) $T_j = 85 ^\circ C$
- (4) $T_j = 25 ^\circ C$
- (5) $T_j = -40 ^\circ C$

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

- $f = 1$ MHz; $T_{amb} = 25 ^\circ C$

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

- $T_j = 150 ^\circ C$
  - (1) $\delta = 0.1$; $f = 20$ kHz
  - (2) $\delta = 0.2$; $f = 20$ kHz
  - (3) $\delta = 0.5$; $f = 20$ kHz
  - (4) $\delta = 1$ (DC)
Fig. 9. Average reverse power dissipation as a function of reverse voltage; typical values

- $T_J = 125 \, ^\circ C$
  - (1) $\delta = 1$ (DC)
  - (2) $\delta = 0.9; f = 20 \, kHz$
  - (3) $\delta = 0.8; f = 20 \, kHz$
  - (4) $\delta = 0.5; f = 20 \, kHz$

Fig. 10. Average reverse power dissipation as a function of reverse voltage; typical values

- $T_J = 85 \, ^\circ C$
  - (1) $\delta = 1$ (DC)
  - (2) $\delta = 0.9; f = 20 \, kHz$
  - (3) $\delta = 0.8; f = 20 \, kHz$
  - (4) $\delta = 0.5; f = 20 \, kHz$

Fig. 11. Average forward current as a function of ambient temperature; 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. 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) $\delta = 0.5; f = 20 \, kHz$
    - (3) $\delta = 0.2; f = 20 \, kHz$
    - (4) $\delta = 0.1; f = 20 \, kHz$
Ceramic PCB, Al₂O₃, 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. 13. Average forward current as a function of ambient temperature; typical values

$T_j = 150 \, ^\circ\text{C}$

- (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. 14. Average forward current as a function of solder point temperature; typical values
11. Test information

Fig. 15. Reverse recovery time: test circuit and waveforms

Fig. 16. Duty cycle definition

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

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

11.1 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.
12. Package outline

![Package outline DFN1006D-2 (SOD882D)](image)

Fig. 17. Package outline DFN1006D-2 (SOD882D)

13. Soldering

![Reflow soldering footprint for DFN1006D-2 (SOD882D)](image)

Fig. 18. Reflow soldering footprint for DFN1006D-2 (SOD882D)
14. Revision history

Table 8. Revision history

<table>
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<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>20140205</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG6002ELD v.2</td>
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<td><strong>Modifications:</strong></td>
<td></td>
<td></td>
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<td></td>
<td>• Table 7. Characteristics: (I_R) conditions corrected</td>
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<tr>
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<td>20131210</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG6002ELD v.1</td>
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<tr>
<td>PMEG6002ELD v.1</td>
<td>20130503</td>
<td>Product data sheet</td>
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15. Legal information

15.1 Data sheet status

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<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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