1. General description


2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 1 \text{ A}$
- Reverse voltage: $V_R \leq 20 \text{ V}$
- Low forward voltage $V_F \leq 490 \text{ mV}$
- Qualified according to AEC-Q101 and recommended for use in automotive applications
- Ultra small and leadless SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications
- Ultra high-speed switching
- LED backlight for mobile application

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; $T_{sp} \leq 130 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>1</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>20</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 1 \text{ A};$ $\delta \leq 0.02;$ pulsed; $T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>428</td>
<td>490</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V};$ $T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>28</td>
<td>50</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5 \text{ A};$ $I_R = 0.5 \text{ A};$ $I_{R(meas)} = 0.1 \text{ A};$ $T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>1.6</td>
<td>-</td>
<td>ns</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>PMEG2010BELD-Q</td>
<td>DFN1006D-2</td>
<td>leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.4 mm body</td>
<td>SOD882D</td>
<td></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>PMEG2010BELD-Q</td>
<td>0000 1001</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>20</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 130 , ^\circ C$</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 , kHz; square wave; T_{sp} \leq 130 , ^\circ C$</td>
<td>-</td>
<td>1</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>3</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , ms; square wave; T_{j(init)} = 25 , ^\circ C$</td>
<td>-</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>[2]</td>
<td>370</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>735</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>1135</td>
<td>mW</td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td></td>
<td>-</td>
<td>150</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td></td>
<td>-55</td>
<td>150</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td></td>
<td>-65</td>
<td>150</td>
</tr>
</tbody>
</table>

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

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]</td>
<td>-</td>
<td>340</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>170</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>110</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[6]</td>
<td>-</td>
<td>25</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
</tbody>
</table>

- Thermal characteristics
- Table 6. Thermal characteristics
- [3] Reflow soldering is the only recommended soldering method.
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
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>$I_F = 100 , mA; t_p \leq 300 , \mu s; \delta \leq 0.02; pulsed; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>266</td>
<td>310</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 500 , mA; t_p \leq 300 , \mu s; \delta \leq 0.02; pulsed; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>353</td>
<td>390</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 , A; t_p \leq 300 , \mu s; \delta \leq 0.02; pulsed; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>428</td>
<td>490</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 , V; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>28</td>
<td>50</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 20 , V; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>87</td>
<td>200</td>
<td>µA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 , V; f = 1 , MHz; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>31</td>
<td>40</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5 , A; I_R = 0.5 , A; I_{R(meas)} = 0.1 , A; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>1.6</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$V_{FRM}$</td>
<td>peak forward recovery voltage</td>
<td>$I_F = 0.5 , A; dI_F/dt = 20 , A/\mu s; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>565</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>

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

Fig. 6. Reverse current as a function of reverse voltage; typical values
20 V, 1 A low VF MEGA Schottky barrier rectifier

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

\[ C_d (pF) \]

\[ V_R (V) \]

- \( f = 1 \text{ MHz} \)
- \( T_{amb} = 25 \text{ °C} \)

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

\[ P_{F(AV)} (W) \]

\[ I_{F(AV)} (A) \]

- \( T_j = 150 \text{ °C} \)
- (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

\[ P_{R(AY)} (W) \]

\[ V_R (V) \]

- \( T_j = 125 \text{ °C} \)
- (1) \( \delta = 1 \) (DC)
- (2) \( \delta = 0.9; f = 20 \text{ kHz} \)
- (3) \( \delta = 0.8; f = 20 \text{ kHz} \)
- (4) \( \delta = 0.5; f = 20 \text{ kHz} \)

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

\[ I_{F(AY)} (A) \]

\[ T_{amb} (°C) \]

- \( T_j = 150 \text{ °C} \)
- (1) \( \delta = 1 \)
- (2) \( \delta = 0.5 \)
- (3) \( \delta = 0.2 \)
- (4) \( \delta = 0.1 \)

FR4 PCB, standard footprint

- \( T_j = 150 \text{ °C} \)
- (1) \( \delta = 1 \)
- (2) \( \delta = 0.5 \)
- (3) \( \delta = 0.2 \)
- (4) \( \delta = 0.1 \)
20 V, 1 A low VF MEGA Schottky barrier rectifier

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

FR4 PCB, mounting pad for cathode 1 cm²

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

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

Ceramic PCB, Al₂O₃, standard footprint

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

**Fig. 13.** Average forward current as a function of solder point temperature; typical values

- $T_j = 150 \, ^\circ C$
- (1) $\delta = 1$
- (2) $\delta = 0.5$
- (3) $\delta = 0.2$
- (4) $\delta = 0.1$
11. Test information

Fig. 14. Reverse recovery definition

Fig. 15. Forward recovery definition

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.

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)]

Dimensions in mm

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

13. Soldering

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

solder lands

solder resist

solder paste

Dimensions in mm

Fig. 18. Reflow soldering footprint for DFN1006D-2 (SOD882D)
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>PMEG2010BELD-Q v.2</td>
<td>20210518</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG2010BELD-Q v.1</td>
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<td>Modifications:</td>
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<td></td>
<td></td>
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<tr>
<td>• Features and benefits: added recommendation for automotive applications</td>
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<tr>
<td>PMEG2010BELD-Q v.1</td>
<td>20210315</td>
<td>Product data sheet</td>
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</table>
15. Legal information

Data sheet status

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

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