1. General description

Planar Maximum Efficiency General Application (MEGA) 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

- Extremely low leakage current $I_{R} = 110 \text{ nA}$
- Reverse voltage: $V_{R} \leq 100 \text{ V}$
- Average forward current: $I_{F(AV)} \leq 3 \text{ A}$
- High power capability due to clip-bonding technology
- High temperature $T_{j} \leq 175 \text{ °C}$
- Small and flat lead SMD plastic package
- AEC-Q101 qualified
- Capable for reflow and wave soldering

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- 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>$\delta = 0.5; f = 20 \text{ kHz}; T_{sp} \leq 160 \text{ °C};$ square wave</td>
<td>-</td>
<td>-</td>
<td>3</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>100</td>
<td>V</td>
</tr>
<tr>
<td>$V_{F}$</td>
<td>forward voltage</td>
<td>$I_{F} = 3 \text{ A}; t_{p} \leq 300 \mu\text{s}; \delta \leq 0.02;$ $T_{j} = 25 \text{ °C}$</td>
<td>-</td>
<td>710</td>
<td>770</td>
<td>mV</td>
</tr>
<tr>
<td>$I_{R}$</td>
<td>reverse current</td>
<td>$V_{R} = 100 \text{ V}; t_{p} \leq 300 \mu\text{s}; \delta \leq 0.02;$ $T_{j} = 25 \text{ °C}$</td>
<td>-</td>
<td>110</td>
<td>450</td>
<td>nA</td>
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</table>
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>
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<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>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG10030ELP</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>
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<th>Marking code</th>
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<tbody>
<tr>
<td>PMEG10030ELP</td>
<td>DJ</td>
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</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>$T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$\delta = 1; , T_{sp} = 155 , ^\circ\text{C}$</td>
<td>-</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; , f = 20 , \text{kHz}; , T_{amb} \leq 55 , ^\circ\text{C}; , \text{square wave}$</td>
<td>[1]</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\delta = 0.5; , f = 20 , \text{kHz}; , T_{sp} \leq 160 , ^\circ\text{C}; , \text{square wave}$</td>
<td></td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , \text{ms}; , \text{square wave}; , T_{j(init)} = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>70</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ\text{C}$</td>
<td>[2]</td>
<td>-</td>
<td>750  mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>1250 mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>2500 mW</td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>175</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]</td>
<td>[2]</td>
<td>-</td>
<td>200 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>120 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[4]</td>
<td>-</td>
<td>60  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>12</td>
<td>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.
FR4 PCB, standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB, mounting pad for cathode 1 cm²

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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>$V_{(BR)R}$</td>
<td>reverse breakdown voltage</td>
<td>$I_R = 1 , mA; t_p = 300 , \mu s; \delta = 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>455</td>
<td>510</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 0.5 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>535</td>
<td>605</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 0.7 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>565</td>
<td>640</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>600</td>
<td>670</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1.6 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>645</td>
<td>720</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 2 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>670</td>
<td>740</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>710</td>
<td>770</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 , A; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 125 , ^\circ C$</td>
<td>-</td>
<td>575</td>
<td>680</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 , V; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 , V; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>35</td>
<td>-</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 , V; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>110</td>
<td>450</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 , V; t_p \leq 300 , \mu s; \delta \leq 0.02;$ $T_j = 125 , ^\circ C$</td>
<td>-</td>
<td>220</td>
<td>1500</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>200</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 4 , V; f = 1 , MHz; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>120</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 , V; f = 1 , MHz; T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>78</td>
<td>-</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>8</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>580</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>
100 V, 3 A low leakage current Schottky barrier rectifier

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

- (1) $T_J = 175 \, ^\circ C$
- (2) $T_J = 150 \, ^\circ C$
- (3) $T_J = 125 \, ^\circ C$
- (4) $T_J = 85 \, ^\circ C$
- (5) $T_J = 25 \, ^\circ C$
- (6) $T_J = -40 \, ^\circ C$

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

- (1) $T_J = 175 \, ^\circ C$
- (2) $T_J = 150 \, ^\circ C$
- (3) $T_J = 125 \, ^\circ C$
- (4) $T_J = 85 \, ^\circ C$
- (5) $T_J = 25 \, ^\circ C$
- (6) $T_J = -40 \, ^\circ C$

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

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

**Fig. 7.** Average forward power dissipation as a function of average forward current; typical values

- $T_J = 175 \, ^\circ C$
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 1$
100 V, 3 A low leakage current Schottky barrier rectifier

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

- **FR4 PCB, standard footprint**
  - $T_j = 175 \, ^\circ C$
  - (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. 9.** Average forward current as a function of ambient temperature; typical values

- **FR4 PCB, mounting pad for cathode 1 cm$^2$**
  - $T_j = 175 \, ^\circ C$
  - (1) $\delta = 1; \text{ DC}$
  - (2) $\delta = 0.5; f = 20 \, \text{kHz}$
  - (3) $\delta = 0.2; f = 20 \, \text{kHz}$
  - (4) $\delta = 0.1; f = 20 \, \text{kHz}$

- **Ceramic PCB, $\text{Al}_2\text{O}_3$, standard footprint**
  - $T_j = 175 \, ^\circ C$
  - (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

- **Fig. 11.** Average forward current as a function of ambient temperature; typical values
Fig. 12. Average forward current as a function of solder point temperature; typical values

\( T_J = 175 \, ^\circ\text{C} \)

(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:
\[ I_{F(AV)} = I_M \times \delta \] with \( I_M \) defined as peak current, \( I_{RMS} = I_{(AV)} \) at DC, and \( I_{RMS} = I_M \times \sqrt{\delta} \) with \( I_{RMS} \) 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. 16. Package outline CFP5 (SOD128)

13. Soldering

Fig. 17. Reflow soldering footprint for CFP5 (SOD128)
Wave soldering footprint information

Fig. 18. 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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<td>PMEG10030ELP v.3</td>
<td>20181212</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG10030ELP v.2</td>
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<td>Modifications:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Features and benefits: Capable for reflow and wave soldering added</td>
<td></td>
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<td></td>
<td></td>
<td>• Soldering: Wave soldering footprint added</td>
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<td>PMEG10030ELP v.2</td>
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15. Legal information

Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
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</table>

Objective [short] data sheet Development This document contains data from the objective specification for product development.

Preliminary [short] data sheet Qualification This document contains data from the preliminary specification.

Product [short] data sheet Production This document contains the product specification.

[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".
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