1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a CFP15 (SOT1289) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 10$ A
- Reverse voltage: $V_R \leq 60$ V
- Low forward voltage
- High power capability due to clip-bonding technology and heat sink
- Small and thin SMD power plastic package, typical height 0.78 mm
- AEC-Q101 qualified

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Freewheeling application
- Reverse polarity protection
- Low power consumption application

4. Quick reference data

<table>
<thead>
<tr>
<th>Table 1. Quick reference data</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>$\delta = 0.5; f = 20$ kHz; $T_{sp} \leq 165$ °C; square wave</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>60</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 10$ A; $t_p \leq 300$ µs; $\delta \leq 0.02$; $T_j = 25$ °C; pulsed</td>
<td>-</td>
<td>480</td>
<td>560</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10$ V; $t_p \leq 3$ ms; $\delta \leq 0.3$; $T_j = 25$ °C; pulsed</td>
<td>-</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60$ V; $t_p \leq 3$ ms; $\delta \leq 0.3$; $T_j = 25$ °C; pulsed</td>
<td>-</td>
<td>200</td>
<td>700</td>
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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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<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>K</td>
<td>cathode</td>
<td></td>
<td></td>
</tr>
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</table>

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>PMEG060V100EPD</td>
<td>CFP15</td>
<td>plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm</td>
<td>SOT1289</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>PMEG060V100EPD</td>
<td>060V 100E</td>
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</tbody>
</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 C )</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>( I_F )</td>
<td>forward current</td>
<td>( T_{sp} = 160 , ^\circ C ; \delta = 1 )</td>
<td>-</td>
<td>14</td>
<td>A</td>
</tr>
<tr>
<td>( I_F(AV) )</td>
<td>average forward current</td>
<td>( \delta = 0.5 ; f = 20 , kHz ; T_{sp} \leq 165 , ^\circ C ; ) square wave</td>
<td>-</td>
<td>10</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>210</td>
<td>A</td>
</tr>
<tr>
<td>( P_{tot} )</td>
<td>total power dissipation</td>
<td>( T_{amb} \leq 25 , ^\circ C )</td>
<td>[1]</td>
<td>1.66</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>2.15</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>3.75</td>
<td>W</td>
</tr>
<tr>
<td>( T_j )</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>175</td>
<td>(^\circ C)</td>
</tr>
<tr>
<td>( T_{amb} )</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>175</td>
<td>(^\circ C)</td>
</tr>
<tr>
<td>( T_{stg} )</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>175</td>
<td>(^\circ 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></td>
<td></td>
<td>90</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1][2]</td>
<td>-</td>
<td>-</td>
<td>90</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>70</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>40</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></td>
<td></td>
<td>3</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>K/W</td>
</tr>
</tbody>
</table>

[1] For Schottky 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
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
## 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)\text{R}} )</td>
<td>reverse breakdown voltage</td>
<td>( I_R = 5 \text{ mA}; \ T_j = 25 \degree \text{C}; \ t_p \leq 1.2 \text{ ms}; \ \delta \leq 0.12; \text{ pulsed} )</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>( V_F )</td>
<td>forward voltage</td>
<td>( I_F = 1 \text{ A}; \ t_p \leq 300 \mu\text{s}; \ \delta \leq 0.02; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>325</td>
<td>370</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 2 \text{ A}; \ t_p \leq 300 \mu\text{s}; \ \delta \leq 0.02; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>350</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 5 \text{ A}; \ t_p \leq 300 \mu\text{s}; \ \delta \leq 0.02; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>410</td>
<td>470</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 10 \text{ A}; \ t_p \leq 300 \mu\text{s}; \ \delta \leq 0.02; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>480</td>
<td>560</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 10 \text{ A}; \ t_p \leq 300 \mu\text{s}; \ \delta \leq 0.02; \ T_j = 125 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>435</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td>( I_R )</td>
<td>reverse current</td>
<td>( V_R = 5 \text{ V}; \ t_p \leq 3 \text{ ms}; \ \delta \leq 0.3; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 10 \text{ V}; \ t_p \leq 3 \text{ ms}; \ \delta \leq 0.3; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>20</td>
<td>50</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 30 \text{ V}; \ t_p \leq 3 \text{ ms}; \ \delta \leq 0.3; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 60 \text{ V}; \ t_p \leq 3 \text{ ms}; \ \delta \leq 0.3; \ T_j = 25 \degree \text{C}; \text{ pulsed} )</td>
<td>-</td>
<td>200</td>
<td>700</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td>( C_d )</td>
<td>diode capacitance</td>
<td>( V_R = 1 \text{ V}; \ f = 1 \text{ MHz}; \ T_j = 25 \degree \text{C} )</td>
<td>-</td>
<td>1050</td>
<td>-</td>
<td>( \text{pF} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 10 \text{ V}; \ f = 1 \text{ MHz}; \ T_j = 25 \degree \text{C} )</td>
<td>-</td>
<td>350</td>
<td>-</td>
<td>( \text{pF} )</td>
</tr>
<tr>
<td>( t_{rr} )</td>
<td>reverse recovery time step recovery</td>
<td>( I_F = 0.5 \text{ A}; \ I_R = 0.5 \text{ A}; \ I_R(\text{meas}) = 0.1 \text{ A}; \ T_j = 25 \degree \text{C} )</td>
<td>-</td>
<td>33</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>( t_{tr} )</td>
<td>reverse recovery time ramp recovery</td>
<td>( dI_F/dt = 200 \text{ A}/\mu\text{s}; \ T_j = 25 \degree \text{C}; \ I_F = 6 \text{ A}; \ V_R = 26 \text{ V} )</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>( V_{FRM} )</td>
<td>peak forward recovery voltage</td>
<td>( I_F = 0.5 \text{ A}; \ dV_F/dt = 20 \text{ A}/\mu\text{s}; \ T_j = 25 \degree \text{C} )</td>
<td>-</td>
<td>313</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>
60 V, 10 A low VF MEGA Schottky barrier rectifier

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

- Pulsed condition
  1. $T_j = 175 \, ^\circ\text{C}$
  2. $T_j = 150 \, ^\circ\text{C}$
  3. $T_j = 125 \, ^\circ\text{C}$
  4. $T_j = 100 \, ^\circ\text{C}$
  5. $T_j = 85 \, ^\circ\text{C}$
  6. $T_j = 25 \, ^\circ\text{C}$
  7. $T_j = -40 \, ^\circ\text{C}$

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

- Pulsed condition
  1. $T_j = 150 \, ^\circ\text{C}$
  2. $T_j = 125 \, ^\circ\text{C}$
  3. $T_j = 100 \, ^\circ\text{C}$
  4. $T_j = 85 \, ^\circ\text{C}$
  5. $T_j = 25 \, ^\circ\text{C}$
  6. $T_j = -40 \, ^\circ\text{C}$

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

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

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

- $T_j = 100 \, ^\circ\text{C}$
  1. $\delta = 0.1$
  2. $\delta = 0.2$
  3. $\delta = 0.5$
  4. $\delta = 0.8$
  5. $\delta = 1$
Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values

- $T_j = 100 \, ^\circ C$
- (1) $\delta = 1$
- (2) $\delta = 0.9$
- (3) $\delta = 0.8$
- (4) $\delta = 0.5$
- (5) $\delta = 0.2$

Fig. 9. Average forward current as a function of ambient temperature; typical values

- FR4 PCB, standard footprint
  - $T_j = 175 \, ^\circ C$
  - (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, $\text{Al}_2\text{O}_3$, standard footprint
  - $T_j = 175 \, ^\circ C$
  - (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 solder point temperature; typical values

11. Test information

Fig. 13. Reverse recovery definition; step recovery
Fig. 14. Reverse recovery definition; ramp recovery

Fig. 15. Forward recovery definition

Fig. 16. Duty cycle definition

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

\[ I_{F(AV)} = I_M \times \delta \] 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.
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

Fig. 17. Package outline CFP15 (SOT1289)

13. Soldering

Footprint information for reflow soldering of CFP15 package

Fig. 18. Reflow soldering footprint for CFP15 (SOT1289)
14. Revision history

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<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG060V100EPD v.1</td>
<td>20150122</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
15. Legal information

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