1. General description

Trench Maximum Efficiency General Application (MEGA) dual Schottky barrier rectifier in common cathode configuration encapsulated in a CFP15B (SOT1289B) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Reverse voltage: $V_R \leq 60$ V
- Forward current: $I_F \leq 5$ A (per diode)
- Low forward voltage
- Low leakage current due to Trench MEGA Schottky technology
- Power and flat lead SMD plastic package
- Package height typical 0.95 mm
- High power capability due to clip-bond technology
- AEC-Q101 qualified

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications
- Freewheeling 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>$I_{F(\text{AV})}$</td>
<td>average forward current</td>
<td>$\delta = 0.5$; square wave; $f = 20$ kHz; $T_{sp} \leq 155$ °C</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 5$ A; $T_j = 25$ °C</td>
<td></td>
<td>610</td>
<td>690</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10$ V; $T_j = 25$ °C</td>
<td>[1]</td>
<td>-</td>
<td>0.14</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60$ V; $T_j = 25$ °C</td>
<td>[1]</td>
<td>-</td>
<td>0.3</td>
<td>1.8</td>
</tr>
</tbody>
</table>

[1] Very short pulse, in order to maintain a stable junction temperature.
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>A1</td>
<td>anode (diode 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A2</td>
<td>anode (diode 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CC</td>
<td>common 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>PMEG060T100CLPE</td>
<td>CFP15B</td>
<td>plastic, thermal enhanced ultra thin SMD package; 3 leads; 2.13 mm pitch; 5.8 x 4.3 x 0.95 mm body</td>
<td>SOT1289B</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>PMEG060T100CLPE</td>
<td>060T L10C</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 °C</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>I_F</td>
<td>forward current</td>
<td>δ = 1; T_sp ≤ 154 °C</td>
<td>-</td>
<td>7.1</td>
<td>A</td>
</tr>
<tr>
<td>I_F(AV)</td>
<td>average forward current</td>
<td>δ = 0.5; square wave; f = 20 kHz; T_sp ≤ 155 °C</td>
<td>-</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>I_FSM</td>
<td>non-repetitive peak forward current</td>
<td>t_p = 8.3 ms; half sine wave; T_(jinit) = 25 °C</td>
<td>-</td>
<td>80</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t_p = 8.3 ms; half sine wave; per device; T_(jinit) = 25 °C</td>
<td>-</td>
<td>150</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Per device, one diode loaded</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P_tot</td>
<td>total power dissipation</td>
<td>T_amb ≤ 25 °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>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>90</td>
<td>K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td>[1] [3]</td>
<td>70</td>
<td></td>
<td></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.


![Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values](aaa-030606)

FR4 PCB, standard footprint

![Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values](aaa-030607)

FR4 PCB, mounting pad for cathode 1 cm$^2$
### 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>$I_R = 1 , mA; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>60</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.5 , A; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>440</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 , A; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>470</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5 , A; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>610</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5 , A; T_J = -40 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>650</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5 , A; T_J = 125 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>550</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>[1]</td>
<td>-</td>
<td>0.14</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 40 , V; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>0.18</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 , V; T_J = 25 , ^\circ C$</td>
<td>[1]</td>
<td>-</td>
<td>0.3</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>560</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>180</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time recovery</td>
<td>$I_F = 0.5 , A; I_R = 0.5 , A; I_{R(\text{meas})} = 0.1 , A; T_J = 25 , ^\circ C$</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>step recovery</td>
<td>$dI_F/dt = 200 , A/\mu s; I_F = 6 , A; V_R = 26 , V; T_J = 25 , ^\circ C$</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>ramp recovery</td>
<td>$dI_F/dt = 20 , A/\mu s; T_J = 25 , ^\circ C$</td>
<td>-</td>
<td>460</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>

[1] Very short pulse, in order to maintain a stable junction temperature.
Fig. 3. 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. 4. Reverse current as a function of reverse 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. Diode capacitance as a function of reverse voltage; typical values

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

Fig. 6. 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. $\delta = 1$; DC
**Fig. 7.** Average reverse power dissipation as a function of reverse voltage; typical values

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

**Fig. 8.** Average forward current as a function of ambient temperature; typical values

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

- $T_j = 175 \, ^\circ C$
- (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. 10.** Average forward current as a function of solder point temperature; typical values

- $T_j = 175 \, ^\circ C$
- (1) $\delta = 1$; DC
- (2) $\delta = 0.5$; $f = 20 \, kHz$
- (3) $\delta = 0.2$; $f = 20 \, kHz$
- (4) $\delta = 0.1$; $f = 20 \, kHz$
Figure 11. Derated maximum reverse voltage as a function of junction temperature; typical values

FR4 PCB, standard footprint
$R_{th} = 90 \, \text{K/W}$

Figure 12. Derated maximum reverse voltage as a function of junction temperature; typical values

FR4 PCB, mounting pad for cathode 1 cm$^2$
$R_{th} = 70 \, \text{K/W}$

Figure 13. Derated maximum reverse voltage as a function of junction temperature; typical values

Soldering point of cathode tab
$R_{th} = 7 \, \text{K/W}$
11. Test information

Fig. 14. Reverse recovery definition; step recovery

Fig. 15. Reverse recovery definition; ramp recovery

Fig. 16. Forward recovery 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

\[ I_{RMS} = I_{F(AV)} \text{ at DC, and } I_{RMS} = I_M \times \sqrt{\delta} \]

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. 18. Package outline CFP15B (SOT1289B)**
13. Soldering

Footprint information for reflow soldering of CFP15B package

![Footprint diagram](sot1289b_fr)

**Fig. 19. Reflow soldering footprint for CFP15B (SOT1289B)**
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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<tr>
<td>PMEG060T100CLPE v.2</td>
<td>20200427</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG060T100CLPE v.1</td>
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<tr>
<td>Modifications:</td>
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<td>Product status changed</td>
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<tr>
<td>PMEG060T100CLPE v.1</td>
<td>20200304</td>
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</table>
Nexperia

PMEG060T100CLPE

60 V, 2 x 5 A dual common cathode low leakage current Trench MEGA Schottky barrier rectifier

15. Legal information

Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
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</tr>
<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 https://www.nexperia.com.

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