1. General description

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

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 3 \text{ A}$
- Reverse voltage: $V_R \leq 60 \text{ V}$
- Low forward voltage
- Low leakage current due to Trench MEGA Schottky technology
- High power capability due to clip-bonding technology
- Small and flat lead SMD power plastic package
- 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
- Low voltage, high frequency inverters

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>$\delta = 0.5$; square wave; $f = 20 \text{ kHz}; T_{sp} \leq 167 \text{ °C}$</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>60</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 3 \text{ A}$; pulsed; $T_j = 25 \text{ °C}$</td>
<td>[1]</td>
<td>550</td>
<td>620</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V}$; pulsed; $T_j = 25 \text{ °C}$</td>
<td>[1]</td>
<td>0.14</td>
<td>0.9</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}$; pulsed; $T_j = 25 \text{ °C}$</td>
<td>[1]</td>
<td>0.3</td>
<td>1.8</td>
<td>µA</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>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>
</tbody>
</table>

![Simplified outline](image.png)

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>PMEG060T030ELPE</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>
<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>PMEG060T030ELPE</td>
<td>060T M03E</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>$T_j = 25 ^\circ C$</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$\delta = 1; T_{sp} \leq 165 ^\circ C$</td>
<td>-</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; \text{square wave}; f = 20 \text{ kHz}; T_{sp} \leq 167 ^\circ C$</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 \text{ ms}; \text{square wave}; T_{j(init)} = 25 ^\circ C$</td>
<td>-</td>
<td>60</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$t_p = 8 \text{ ms}; \text{half sine wave}; T_{j(init)} = 25 ^\circ C$</td>
<td>-</td>
<td>80</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>$T_j$</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] [2]</td>
<td>-</td>
<td>-</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td>[4]</td>
<td>-</td>
<td>-</td>
<td>3</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

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

FR4 PCB, standard footprint

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>$I_R = 1 \text{ mA}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>60</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>380</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 0.5 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>440</td>
<td>510</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>470</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 2 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>515</td>
<td>590</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>550</td>
<td>620</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 \text{ A}; T_j = -40 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>600</td>
<td>680</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 \text{ A}; T_j = 125 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>470</td>
<td>570</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 \text{ A}; T_j = 150 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>450</td>
<td>550</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.14</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 40 \text{ V}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.18</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}; T_j = 25 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.3</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}; T_j = 125 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}; T_j = 150 \degree \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>1.8</td>
<td>9</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>-</td>
<td>560</td>
<td>-</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>-</td>
<td>170</td>
<td>-</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time step recovery</td>
<td>$I_F = 0.5 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>reverse recovery time ramp recovery</td>
<td>$dI/dt = 200 \text{ A/µs}; I_F = 6 \text{ A}; T_j = 25 \degree \text{C}$</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$V_{FRM}$</td>
<td>peak forward recovery voltage</td>
<td>$I_F = 0.5 \text{ A}; dI/dt = 20 \text{ A/µs}; T_j = 25 \degree \text{C}$</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.
60 V, 3 A low leakage current Trench MEGA Schottky barrier rectifier

**Fig. 3.** Forward current as a function of forward voltage; typical values

- Pulsed condition:
  - (1) $T_j = 175 \, ^\circ C$
  - (2) $T_j = 150 \, ^\circ C$
  - (3) $T_j = 125 \, ^\circ C$
  - (4) $T_j = 100 \, ^\circ C$
  - (5) $T_j = 85 \, ^\circ C$
  - (6) $T_j = 25 \, ^\circ C$
  - (7) $T_j = -40 \, ^\circ C$

**Fig. 4.** Reverse current as a function of reverse voltage; typical values

- Pulsed condition:
  - (1) $T_j = 175 \, ^\circ C$
  - (2) $T_j = 150 \, ^\circ C$
  - (3) $T_j = 125 \, ^\circ C$
  - (4) $T_j = 100 \, ^\circ C$
  - (5) $T_j = 85 \, ^\circ C$
  - (6) $T_j = 25 \, ^\circ C$
  - (7) $T_j = -40 \, ^\circ C$

**Fig. 5.** Diode capacitance as a function of reverse voltage; typical values

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

**Fig. 6.** Average forward power dissipation as a function of average forward current; typical values

- $T_j = 100 \, ^\circ C$
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 0.8$
  - (5) $\delta = 1$; DC
Nexperia

PMEG060T030ELPE

60 V, 3 A low leakage current Trench MEGA Schottky barrier rectifier

**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

- FR4 PCB, mounting pad for cathode 1 cm$^2$
- $T_j = 175 \, ^\circ C$
- (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) $\delta = 0.1$; $f = 20 \, kHz$
11. Test information

**Fig. 11. Reverse recovery definition; step recovery**

**Fig. 12. Reverse recovery definition; ramp recovery**

**Fig. 13. 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

\[ I_{RMS} = I_{F(AV)} \] 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**

![Package outline CFP15B (SOT1289B)](image)
13. Soldering

Footprint information for reflow soldering of CFP15B package

SOT1289B

Fig. 16. 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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</thead>
<tbody>
<tr>
<td>PMEG060T030ELPE v.1</td>
<td>20191216</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</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>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>

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Date of release: 16 December 2019