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

- Low forward voltage
- Low $Q_{rr}$ and low $I_{RM}$
- Low leakage current
- High power capability due to clip-bonding technology
- Small and flat lead SMD power plastic package
- AEC-Q101 qualified

3. Applications

- High efficiency DC-to-DC conversion
- Automotive LED lighting
- Switch mode power supply
- Freewheeling application
- Reverse polarity protection
- OR-ing

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; $f = 20$ kHz; $T_{sp} \leq 162$ °C</td>
<td>-</td>
<td>-</td>
<td>8</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>100</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 8$ A; pulsed; $T_j = 25$ °C</td>
<td>-</td>
<td>730</td>
<td>810</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 100$ V; pulsed; $T_j = 25$ °C</td>
<td>[1]</td>
<td>0.8</td>
<td>4</td>
<td>$\mu$A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100$ V; pulsed; $T_j = 125$ °C</td>
<td>[1]</td>
<td>1.1</td>
<td>6</td>
<td>mA</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>
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</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>
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</tbody>
</table>

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>PMEG100T080ELPE</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>PMEG100T080ELPE</td>
<td>100T L08E</td>
</tr>
</tbody>
</table>

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC60134).

<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>100</td>
<td>V</td>
</tr>
<tr>
<td>I_F</td>
<td>forward current</td>
<td>δ = 1; T_sp ≤ 158 °C</td>
<td>-</td>
<td>11.3</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 ≤ 162 °C</td>
<td>-</td>
<td>8</td>
<td>A</td>
</tr>
<tr>
<td>I_FSM</td>
<td>non-repetitive peak forward current</td>
<td>I_p = 8.3 ms; half sine wave; T_{j(init)} = 25 °C</td>
<td>-</td>
<td>170</td>
<td>A</td>
</tr>
<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>175</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_amb</td>
<td>ambient temperature</td>
<td>-55</td>
<td>175</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_stg</td>
<td>storage temperature</td>
<td>-65</td>
<td>175</td>
<td>°C</td>
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</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>90</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td></td>
<td>-</td>
<td>7</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.


![Diagram](aaa-022093)

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

![Diagram](aaa-022094)

**Fig. 2.** 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>$I_R = 1 \text{ mA}; T_j = 25 \degree C$</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 1 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>465</td>
<td>550  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 2 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>515</td>
<td>600  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>560</td>
<td>630  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>635</td>
<td>710  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 8 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>730</td>
<td>810  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 8 \text{ A}; T_j = -40 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>730</td>
<td>820  mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 100 \text{ V}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>0.28</td>
<td>1.5</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V}; T_j = 125 \degree C$</td>
<td>[1]</td>
<td>0.8</td>
<td>4</td>
<td>µA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V}; f = 1 \text{ MHz}$</td>
<td>-</td>
<td>680</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \text{ V}; f = 1 \text{ MHz}$</td>
<td>-</td>
<td>200</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5 \text{ A}; I_{R \text{ (meas)}} = 0.1 \text{ A}$; $T_j = 25 \degree C$</td>
<td>-</td>
<td>19</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>step recovery</td>
<td>$dI_F/dt = 200 \text{ A/µs}$; $V_R = 26 \text{ V}$; $T_j = 25 \degree C$</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>peak reverse recovery current</td>
<td>$dI_F/dt = 200 \text{ A/s}$; $V_R = 26 \text{ V}$; $T_j = 25 \degree C$</td>
<td>-</td>
<td>1.3</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>$Q_{rr}$</td>
<td>reverse recovery charge</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>$V_{FRM}$</td>
<td>peak forward recovery voltage</td>
<td>$I_F = 0.5 \text{ A}; dI_F/dt = 20 \text{ A/µs}$; $T_j = 25 \degree C$</td>
<td>-</td>
<td>420</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>

[1] Very short pulse, in order to maintain a stable junction temperature.
100 V, 8 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

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

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) $\delta = 1; \ DC$
100 V, 8 A low leakage current Trench MEGA Schottky barrier rectifier

Fig. 7. Average reverse power dissipation as a function of reverse voltage; typical values

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

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

Fig. 10. Average forward current as a function of solder point temperature; typical values
100 V, 8 A low leakage current Trench MEGA Schottky barrier rectifier

Fig. 11. Derated maximum reverse voltage as a function of junction temperature; typical values
FR4 PCB, standard footprint
$R_{th} = 90 \, \text{K/W}$

Fig. 12. Derated maximum reverse voltage as a function of junction temperature; typical values
FR4 PCB, mounting pad for cathode 1 cm$^2$
$R_{th} = 70 \, \text{K/W}$

Fig. 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
Fig. 17. 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

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

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

Fig. 19. Reflow soldering footprint for CFP15B (SOT1289B)
# 14. 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>PMEG100T080ELPE v.1</td>
<td>20200907</td>
<td>Preliminary data sheet</td>
<td>-</td>
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15. Legal information

Data sheet status

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