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; $T_{sp} \leq 169$ °C</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 3$ A; pulsed; $T_j = 25$ °C</td>
<td>650</td>
<td>710</td>
<td>100</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>0.4</td>
<td>2.5</td>
<td>3</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100$ V; pulsed; $T_j = 125$ °C</td>
<td>0.6</td>
<td>3</td>
<td>3</td>
<td>mA</td>
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</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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<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>CFP15B (SOT1289B)</td>
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</tr>
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6. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Version</th>
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</thead>
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<tr>
<td>PMEG100T030ELPE</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>
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<th>Type number</th>
<th>Marking code</th>
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<tbody>
<tr>
<td>PMEG100T030ELPE</td>
<td>100T</td>
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<td></td>
<td>L03E</td>
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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>$T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$\delta = 1; \ T_{sp} \leq 166 , ^\circ C$</td>
<td>-</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; \ square \ wave; \ f = 20 , kHz; \ T_{sp} \leq 169 , ^\circ C$</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8.3 , ms; \ half \ sine \ wave; \ T_{j(init)} = 25 , ^\circ C$</td>
<td>-</td>
<td>100</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>175</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td>-55</td>
<td>175</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td>-65</td>
<td>175</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] [3]</td>
<td>-</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</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.


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
## 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; $T_J = 25 , ^\circ\text{C}$</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.5$ A; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>460</td>
<td>560</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1$ A; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>510</td>
<td>580</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 2$ A; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>580</td>
<td>650</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3$ A; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>650</td>
<td>710</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3$ A; pulsed; $T_J = -40 , ^\circ\text{C}$</td>
<td>-</td>
<td>660</td>
<td>720</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3$ A; pulsed; $T_J = 125 , ^\circ\text{C}$</td>
<td>-</td>
<td>550</td>
<td>610</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 3$ A; pulsed; $T_J = 150 , ^\circ\text{C}$</td>
<td>-</td>
<td>520</td>
<td>580</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 60$ V; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>0.15</td>
<td>0.63</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100$ V; pulsed; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>0.4</td>
<td>2.5</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100$ V; pulsed; $T_J = 125 , ^\circ\text{C}$</td>
<td>-</td>
<td>0.6</td>
<td>3</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100$ V; pulsed; $T_J = 150 , ^\circ\text{C}$</td>
<td>-</td>
<td>2.3</td>
<td>12</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 1$ V; $f = 1$ MHz; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>410</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10$ V; $f = 1$ MHz; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>120</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$dI_F/dt = 200$ A/µs; $I_F = 6$ A; $V_R = 26$ V; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>reverse recovery time step recovery</td>
<td>$I_F = 0.5$ A; $I_R = 0.5$ A; $I_{R_{(meas)}} = 0.1$ A; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>1.3</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>reverse recovery time ramp recovery</td>
<td>$dI_F/dt = 20$ A/µs; $I_F = 6$ A; $V_R = 26$ V; $T_J = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>9.5</td>
<td>-</td>
<td>nC</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>peak reverse recovery current</td>
<td>$dI_F/dt = 200$ A/s; $I_F = 6$ A; $V_R = 26$ V; $T_J = 25 , ^\circ\text{C}$</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.
100 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

- $f = 1 \, \text{MHz}; \ T_{\text{amb}} = 25 \, ^\circ$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) $\delta = 1; \ \text{DC}$
**Fig. 7.** Average reverse power dissipation as a function of reverse voltage; typical values

- $T_j = 100 \degree C$
- (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

- $T_j = 175 \degree C$
- (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$^2$
- $T_j = 175 \degree C$
- (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

- $T_j = 175 \degree C$
- (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
100 V, 3 A low leakage current Trench MEGA Schottky barrier rectifier

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

Fig. 11. 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. 12. Derated maximum reverse voltage as a function of junction temperature; typical values

Soldering point of cathode tab
$R_{th} = 7 \text{ K/W}$

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

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

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14. Revision history

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<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<td>PMEG100T030ELPE v.1</td>
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<td>• Product status changed</td>
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<td>20201019</td>
<td>Preliminary data sheet</td>
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15. Legal Information

Data sheet status

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<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
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<tr>
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<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
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<td>Preliminary</td>
<td>Qualification</td>
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[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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