1. General description

Low leakage current 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 leakage current
- High thermal stability and large Safe Operation Area
- High power capability due to clip-bonding technology
- Small and flat lead SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

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>$\delta = 0.5; f = 20 \text{ kHz; square wave; } T_{\text{amb}} \leq 168 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>10</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>100</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 10 \text{ A; pulsed; } T_j = 25 \text{ °C}$</td>
<td>[1]</td>
<td>770</td>
<td>850</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 100 \text{ V; pulsed; } T_j = 25 \text{ °C}$</td>
<td>[1]</td>
<td>0.2</td>
<td>0.8</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V; pulsed; } T_j = 125 \text{ °C}$</td>
<td>[1]</td>
<td>0.4</td>
<td>2.5</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>
</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>CFP15B (SOT1289B)</td>
<td></td>
</tr>
</tbody>
</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>PMEG100V100ELPE-Q</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>PMEG100V100ELPE-Q</td>
<td>100V L10E</td>
</tr>
</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>100</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$\delta = 1; T_{sp} \leq 167 ^\circ C$</td>
<td>-</td>
<td>14</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 \text{ kHz};$ square wave; $T_{amb} \leq 168 ^\circ C$</td>
<td>-</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8.3 \text{ ms};$ square wave; $T_{j(init)} = 25 ^\circ C$</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>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td>[2]</td>
<td>2.15</td>
<td>W</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td></td>
<td>-55</td>
<td>175</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td></td>
<td>-65</td>
<td>175</td>
</tr>
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</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>$R_{\text{th(j-a)}}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>[2]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>90</td>
<td>K/W</td>
</tr>
<tr>
<td>$R_{\text{th(j-sp)}}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>70</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</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
## 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>545</td>
<td>650  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>700</td>
<td>790  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ A}; T_j = 25 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>770</td>
<td>850  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ A}; T_j = -40 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>870</td>
<td>960  mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ A}; T_j = 125 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>635</td>
<td>730  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>-</td>
<td>0.2</td>
<td>0.8  µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V}; T_j = 125 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>0.4</td>
<td>2.5  mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V}; T_j = 150 \degree C$</td>
<td>[1]</td>
<td>-</td>
<td>1.5</td>
<td>7.5  mA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \degree C$</td>
<td>-</td>
<td>276</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \degree C$</td>
<td>-</td>
<td>115</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5 \text{ A}; I_R = 0.5 \text{ A}; I_{F(meas)} = 0.1 \text{ A}; T_j = 25 \degree C$</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$V_{FRM}$</td>
<td>peak forward recovery voltage</td>
<td>$I_F = 0.5 \text{ A}; dI_F/dt = 20 \text{ A/µs}; T_j = 25 \degree C$</td>
<td>-</td>
<td>510</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

**Fig. 4.** Reverse current as a function of reverse voltage; typical values
**100 V, 10 A low leakage current Schottky barrier rectifier**

- **Fig. 5.** Diode capacitance as a function of reverse voltage; typical values
  - $f = 1$ MHz; $T_{\text{amb}} = 25$ °C

- **Fig. 6.** Average forward power dissipation as a function of average forward current; typical values
  - $T_j = 100$ °C
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 0.8$
  - (5) $\delta = 1$

- **Fig. 7.** Average reverse power dissipation as a function of reverse voltage; typical values
  - $T_j = 100$ °C
  - (1) $\delta = 1$
  - (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
  - FR4 PCB, standard footprint
  - $T_j = 175$ °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
FR4 PCB, mounting pad for cathode 1 cm²

T_j = 175 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

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

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

FR4 PCB, mounting pad for cathode 1 cm²
R_{th} = 70 K/W

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

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

Soldering point of cathode tab
$R_{th} = 3 \text{ K/W}$

Fig. 14. Reverse recovery definition; step recovery

Fig. 15. Reverse recovery definition; ramp recovery
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)

Fig. 18. Package outline CFP15B (SOT1289B)

13. Soldering

![Footprint information for reflow soldering of CFP15B package](image)

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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<td>PMEG100V100ELPE-Q v.1</td>
<td>20220720</td>
<td>Product data sheet</td>
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Nexperia

PMEG100V100ELPE-Q

100 V, 10 A low leakage current Schottky barrier rectifier

15. Legal information

Data sheet status

<table>
<thead>
<tr>
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<th>Product status</th>
<th>Definition</th>
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<td>[1][2]</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product</td>
<td>Production</td>
<td>This document contains the product specification.</td>
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</tbody>
</table>

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