1. General description

Trench Maximum Efficiency General Application (MEGA) Schottky barrier rectifier encapsulated in a CFP3 (SOD123W) small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Low forward voltage
- Low Qrr and low IRM
- Low leakage current
- High power capability due to clip-bonding technology
- Small and flat lead SMD power 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 applications
- 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>IF(AV)</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 , \text{kHz}; \text{square wave}; T_{sp} \leq 166 , ^\circ\text{C}$</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>VR</td>
<td>reverse voltage</td>
<td>$T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>VF</td>
<td>forward voltage</td>
<td>$I_F = 1 , \text{A}; \text{pulsed}; T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>670</td>
<td>750</td>
<td>mV</td>
</tr>
<tr>
<td>IR</td>
<td>reverse current</td>
<td>$V_R = 100 , \text{V}; \text{pulsed}; T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>0.1</td>
<td>0.9</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 , \text{V}; \text{pulsed}; T_j = 125 , ^\circ\text{C}$</td>
<td>-</td>
<td>0.18</td>
<td>1</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>K</td>
<td>cathode[1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

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>PMEG100T10ELR-Q</td>
<td>CFP3</td>
<td>plastic, surface mounted package; 2 terminals; 2.6 mm x 1.7 mm x 1 mm body</td>
<td>SOD123W</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>PMEG100T10ELR-Q</td>
<td>LA</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>$\delta = 1; ; T_{sp} \leq 163 , ^\circ C$</td>
<td>-</td>
<td>1.4</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; ; f = 20 , kHz; ; square , wave; ; T_{sp} \leq 166 , ^\circ C$</td>
<td>-</td>
<td>1</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>40</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>0.68</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>1.15</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>$R_{\text{th}(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>[2]</td>
<td>-</td>
<td>220 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>130 K/W</td>
</tr>
<tr>
<td>$R_{\text{th}(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>-</td>
<td>18 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>
<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>$I_R = 1 \text{ mA}; T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1 \text{ A};$ pulsed; $T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>440</td>
<td>510</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 0.5 \text{ A};$ pulsed; $T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ A};$ pulsed; $T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>670</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ A};$ pulsed; $T_J = -40 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>680</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ A};$ pulsed; $T_J = 125 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>565</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \text{ A};$ pulsed; $T_J = 150 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>525</td>
<td>600</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 60 \text{ V};$ pulsed; $T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.04</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V};$ pulsed; $T_J = 25 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V};$ pulsed; $T_J = 125 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.18</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 100 \text{ V};$ pulsed; $T_J = 150 ^\circ \text{C}$</td>
<td>[1]</td>
<td>-</td>
<td>0.7</td>
<td>3.5</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V};$ $f = 1 \text{ MHz};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>125</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \text{ V};$ $f = 1 \text{ MHz};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5 \text{ A};$ $I_R = 0.5 \text{ A};$ $I_{RR(\text{meas})} = 0.1 \text{ A};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>step recovery</td>
<td>reverse recovery time</td>
<td>ramp recovery</td>
<td>$dI_F/dt = 200 \text{ A/µs};$ $I_F = 6 \text{ A};$ $V_R = 26 \text{ V};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>peak reverse recovery current</td>
<td>$dI_F/dt = 200 \text{ A/µs};$ $I_F = 6 \text{ A};$ $V_R = 26 \text{ V};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>1.2</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>$Q_{rr}$</td>
<td>reverse recovery charge</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>$V_{FRM}$</td>
<td>peak forward recovery voltage</td>
<td>$I_F = 0.5 \text{ A};$ $dI_F/dt = 20 \text{ A/µs};$ $T_J = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>560</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>

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

PMEG100T10ELR-Q

100 V, 1 A low leakage current Trench MEGA Schottky barrier rectifier

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

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

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

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

- \( T_j = 175 \degree C \)
- (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, 1 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

\[ R_{th} = 220 \text{ K/W} \]

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

FR4 PCB, mounting pad for cathode 1 cm²

\[ R_{th} = 130 \text{ K/W} \]

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

Soldering point of cathode tab

\[ R_{th} = 18 \text{ K/W} \]
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

\[ I_{RMS} = I_{F(AV)} \] 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 CFP3 (SOD123W)
13. Soldering

Footprint information for reflow soldering of CFP3 package

- **Dimensions in mm**
  - 1.1
  - 1.2
  - 1.4
  - 1.6
  - 2.1
  - 2.8
  - 2.9
  - 4.4

- **Recommended stencil thickness**: 0.1 mm
- **Solder land**
- **Solder resist**
- **Solder paste**

**Issue date**
- 17-05-09
- 20-02-28

**Fig. 19. Reflow soldering footprint for CFP3 (SOD123W)**
Wave soldering footprint information

Fig. 20. Wave soldering footprint for CFP3 (SOD123W)
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>PMEG100T10ELR-Q v.2</td>
<td>20210712</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG100T10ELR-Q v.1</td>
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Modifications:
- Figure 6 adapted

<table>
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<th>Release date</th>
<th>Data sheet status</th>
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<tbody>
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<td>20210519</td>
<td>Product data sheet</td>
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15. Legal information

**Data sheet status**

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

[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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For sales office addresses, please send an email to: salesaddresses@nexperia.com
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