1. General description


2. Features and benefits

- Forward current: $I_F \leq 2$ A
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage typ. $V_F = 510$ mV
- Low reverse current typ. $I_R = 400$ µA
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications
- Automotive applications

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>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 55$ °C</td>
<td>-</td>
<td>-</td>
<td>2 A</td>
<td></td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>30 V</td>
<td></td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 2$ A; $t_p \leq 300$ µs; $\delta \leq 0.02$; $T_j = 25$ °C</td>
<td>-</td>
<td>510</td>
<td>620 mV</td>
<td></td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 30$ V; pulsed; $T_j = 25$ °C</td>
<td>1</td>
<td>400</td>
<td>1000 µA</td>
<td></td>
</tr>
</tbody>
</table>

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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td>SOD123</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>PMEG3020EGW</td>
<td>SOD123</td>
<td>Plastic surface-mounted package; 2 leads</td>
<td>SOD123</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>PMEG3020EGW</td>
<td>G3</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>30</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 55 , ^\circ C$</td>
<td>-</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(\text{AV})}$</td>
<td>average forward current</td>
<td>$\delta = 0.5 , ; f = 20 , \text{kHz} , ; T_{sp} \leq 115 , ^\circ C , ; \text{square wave}$</td>
<td>-</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(\text{RM})}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 1 , \text{ms} , ; \delta \leq 0.25$</td>
<td>-</td>
<td>4.5</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(\text{SM})}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , \text{ms} , ; T_{j(\text{init})} = 25 , ^\circ C , ; \text{square wave}$</td>
<td>-</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td>$P_{\text{tot}}$</td>
<td>total power dissipation</td>
<td>$T_{\text{amb}} \leq 25 , ^\circ C$</td>
<td>400</td>
<td>-</td>
<td>mW</td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{\text{amb}}$</td>
<td>ambient temperature</td>
<td>-</td>
<td>-55</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{\text{stg}}$</td>
<td>storage temperature</td>
<td>-</td>
<td>-65</td>
<td>150</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>310</td>
<td>-</td>
<td>-</td>
<td>KW</td>
</tr>
<tr>
<td>$R_{\text{th}(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>29</td>
<td>-</td>
<td>-</td>
<td>KW</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

FR4 PCB, standard footprint

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

FR4 PCB, mounting pad for cathode 1 cm²

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_p \leq 300 \mu\text{s}; \delta \leq 0.02 ); ( T_j = 25 ^\circ\text{C} )</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>V_F</td>
<td>forward voltage</td>
<td>( I_F = 1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ); ( T_j = 25 ^\circ\text{C} )</td>
<td>-</td>
<td>125</td>
<td>160</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 10 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ); ( T_j = 25 ^\circ\text{C} )</td>
<td>-</td>
<td>185</td>
<td>220</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 100 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ); ( T_j = 25 ^\circ\text{C} )</td>
<td>-</td>
<td>255</td>
<td>290</td>
<td>mV</td>
</tr>
</tbody>
</table>
## Symbol | Parameter | Conditions | Min | Typ | Max | Unit
---|---|---|---|---|---|---
| $I_F$ | forward current | $I_F = 500$ mA; $t_p \leq 300$ µs; $\delta \leq 0.02$ ; $T_J = 25$ °C | - | 330 | 380 | mV
| $I_F$ | forward current | $I_F = 1$ A; $t_p \leq 300$ µs; $\delta \leq 0.02$ ; $T_J = 25$ °C | - | 400 | 480 | mV
| $I_F$ | forward current | $I_F = 2$ A; $t_p \leq 300$ µs; $\delta \leq 0.02$ ; $T_J = 25$ °C | - | 510 | 620 | mV
| $I_R$ | reverse current | $V_R = 10$ V; pulsed; $T_J = 25$ °C | - | 60 | 150 | µA
| $C_d$ | diode capacitance | $V_R = 1$ V; $f = 1$ MHz; $T_J = 25$ °C | - | 60 | 72 | pF


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

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

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11. Test information

The current ratings for the typical waveforms are calculated according to the equations:
\[ I_{F(\text{AV})} = I_M \times \delta \text{ with } I_M \text{ defined as peak current, } I_{\text{RMS}} = I_{F(\text{AV})} \text{ at DC, and } I_{\text{RMS}} = I_M \times \sqrt{\delta} \text{ with } I_{\text{RMS}} \text{ defined as RMS current.} \]

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. 7. Package outline SOD123

13. Soldering

Fig. 8. Reflow soldering footprint for SOD123
Fig. 9. Wave soldering footprint for SOD123
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>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG3020EGW v.1</td>
<td>20161124</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>

[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 URL http://www.nexperia.com.

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