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Kind regards,

Team Nexperia
1. Product profile

1.1 General description

1.2 Features
- Average forward current: $I_{F(AV)} \leq 0.2 \ A$
- Reverse voltage: $V_R \leq 40 \ V$
- Low forward voltage
- AEC-Q101 qualified
- Small and flat lead SMD plastic package

1.3 Applications
- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Ultra high-speed switching
- Low power consumption applications

1.4 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>square wave; $\delta = 0.5$; $f = 20 \ kHz$</td>
<td>$T_{amb} \leq 130 \ ^\circ C$</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
</tr>
<tr>
<td>&amp;</td>
<td></td>
<td></td>
<td>$T_{sp} \leq 145 \ ^\circ C$</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.2 \ A$</td>
<td>-</td>
<td>520</td>
<td>600</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 40 \ V$</td>
<td>-</td>
<td>0.7</td>
<td>10</td>
<td>$\mu A$</td>
</tr>
</tbody>
</table>

2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>anode</td>
<td><img src="sym001" alt="Simplified outline" /></td>
<td></td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002EJ</td>
<td>SC-90 plastic surface-mounted package; 2 leads</td>
<td>SOD323F</td>
<td></td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002EJ</td>
<td>1N</td>
</tr>
</tbody>
</table>

5. 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>40</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20 , kHz$</td>
<td>$T_{\text{amb}} \leq 130 , ^\circ C$ [1]</td>
<td>0.2</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{\text{sp}} \leq 145 , ^\circ C$</td>
<td>-</td>
<td>0.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{\text{FRM}}$</td>
<td>repetitive peak forward current</td>
<td>$t_{p} \leq 1 , ms$; $\delta \leq 0.25$</td>
<td>-</td>
<td>2.6</td>
<td>A</td>
</tr>
<tr>
<td>$I_{\text{FSM}}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave; $t_{p} = 8 , ms$</td>
<td>[2]</td>
<td>-</td>
<td>2.75</td>
</tr>
<tr>
<td>$P_{\text{tot}}$</td>
<td>total power dissipation</td>
<td>$T_{\text{amb}} \leq 25 , ^\circ C$</td>
<td>[3][4]</td>
<td>385</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[3][5]</td>
<td>695</td>
<td>mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[3][1]</td>
<td>1045</td>
<td>mW</td>
<td></td>
</tr>
</tbody>
</table>
6. Thermal characteristics

Table 5. Limiting values …continued

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>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>+150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>+150</td>
<td>°C</td>
</tr>
</tbody>
</table>

[3] Reflow soldering is the only recommended soldering method.

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</td>
<td>junction to ambient</td>
<td>[1][2]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in free air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[3]</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>325 K/W</td>
<td></td>
</tr>
<tr>
<td>[5]</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>120 K/W</td>
<td></td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from</td>
<td>junction to solder point</td>
<td>[6]</td>
<td>-</td>
<td>-</td>
<td>25 K/W</td>
</tr>
<tr>
<td></td>
<td>in free air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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.
[2] Reflow soldering is the only recommended soldering method.
FR4 PCB, standard footprint

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

FR4 PCB, mounting pad for cathode 1 cm²

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

Table 7. Characteristics
$T_j = 25^\circ C$ unless otherwise specified.

<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>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1 \ mA$</td>
<td>-</td>
<td>190</td>
<td>220</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 \ mA$</td>
<td>-</td>
<td>250</td>
<td>290</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \ mA$</td>
<td>-</td>
<td>320</td>
<td>360</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100 \ mA$</td>
<td>-</td>
<td>440</td>
<td>500</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 200 \ mA$</td>
<td>-</td>
<td>520</td>
<td>600</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \ V$</td>
<td>-</td>
<td>0.2</td>
<td>0.3</td>
<td>$\mu A$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 25 \ V$</td>
<td>-</td>
<td>0.3</td>
<td>0.5</td>
<td>$\mu A$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 40 \ V$</td>
<td>-</td>
<td>0.7</td>
<td>10</td>
<td>$\mu A$</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$f = 1 \ MHz$</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 1 \ V$</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \ V$</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] When switched from $I_F = 10 \ mA$ to $I_R = 10 \ mA$; $R_L = 100 \ \Omega$; measured at $I_R = 1 \ mA$. 

Ceramic PCB, Al$_2$O$_3$, standard footprint

Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
(1) $T_j = 150 \, ^\circ\text{C}$
(2) $T_j = 125 \, ^\circ\text{C}$
(3) $T_j = 85 \, ^\circ\text{C}$
(4) $T_j = 25 \, ^\circ\text{C}$
(5) $T_j = -40 \, ^\circ\text{C}$

Fig 4.  Forward current as a function of forward voltage; typical values

(1) $T_j = 125 \, ^\circ\text{C}$
(2) $T_j = 85 \, ^\circ\text{C}$
(3) $T_j = 25 \, ^\circ\text{C}$
(4) $T_j = -40 \, ^\circ\text{C}$

Fig 5.  Reverse current as a function of reverse voltage; typical values

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

Fig 6.  Diode capacitance as a function of reverse voltage; typical values
**NXP Semiconductors**

**PMEG4002EJ**

200 mA low $V_F$ MEGA Schottky barrier rectifier

---

**Fig 7.** Average forward power dissipation as a function of average forward current; typical values

**Fig 8.** Average reverse power dissipation as a function of reverse voltage; typical values

---

FR4 PCB, standard footprint

$T_J = 150 \, ^\circ C$

1. $\delta = 0.1$
2. $\delta = 0.2$
3. $\delta = 0.5$
4. $\delta = 1$

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

FR4 PCB, mounting pad for cathode 1 cm$^2$

$T_J = 150 \, ^\circ C$

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 ambient temperature; typical values
8. Test information

Fig 11. Average forward current as a function of ambient temperature; typical values

Fig 12. Average forward current as a function of solder point temperature; typical values

Fig 13. Reverse recovery time test circuit and waveforms
The current ratings for the typical waveforms as shown in Figure 9, 10, 11 and 12 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.

8.1 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.

9. Package outline

![Package outline SOD323F (SC-90)](image)
10. Packing information

Table 8. Packing methods

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002EJ</td>
<td>SOD323F</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>3000 10000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-115 -135</td>
</tr>
</tbody>
</table>

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering

Reflow soldering is the only recommended soldering method.

Fig 16. Reflow soldering footprint SOD323F (SC-90)
12. Revision history

Table 9. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002EJ_1</td>
<td>20090515</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></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.nxp.com.

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14. Contact information

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