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Kind regards,

Team Nexperia
1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection. PMEG2010EPA is encapsulated in an ultra thin SOT1061 leadless small Surface-Mounted Device (SMD) plastic package with medium power capability.

1.2 Features

- Average forward current: $I_{F(AV)} \leq 1$ A
- Reverse voltage: $V_R \leq 20$ V
- Low forward voltage
- Exposed heat sink (cathode pad) for excellent thermal and electrical conductivity
- Leadless small SMD plastic package with medium power capability
- AEC-Q101 qualified

1.3 Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications
- Battery chargers for mobile equipment

1.4 Quick reference data

Table 1. Quick reference data
$T_j = 25 \, ^\circ$ 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>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20$ kHz $T_{amb} \leq 125 , ^\circ$ C</td>
<td>1 A</td>
<td>-</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_{esp} \leq 145 , ^\circ$ C</td>
<td>-</td>
<td>20</td>
<td>1 A</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 1$ A</td>
<td>320</td>
<td>375</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 20$ V</td>
<td>335</td>
<td>1900</td>
<td>$\mu$A</td>
<td></td>
</tr>
</tbody>
</table>

2. Pinning information

<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>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>cathode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2010EPA</td>
<td>HUSON3</td>
<td></td>
<td>plastic thermal enhanced ultra thin small outline package; no leads; three terminals; body 2 × 2 × 0.65 mm</td>
</tr>
</tbody>
</table>

4. Marking

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2010EPA</td>
<td>A1</td>
</tr>
</tbody>
</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>20</td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20 , k\text{Hz}$</td>
<td></td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb} \leq 125 , ^\circ C$</td>
<td>[1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 145 , ^\circ C$</td>
<td>[2]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 1 , \text{ms}$; $\delta \leq 0.25$</td>
<td>[3]</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave; $t_p = 8 , \text{ms}$</td>
<td>[4][5]</td>
<td>17</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>[6][7]</td>
<td>500</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[6][8]</td>
<td>960</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[9][10]</td>
<td>1800</td>
<td>mW</td>
</tr>
</tbody>
</table>
6. 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></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>250</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>130</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>70</td>
<td>K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td></td>
<td>[6]</td>
<td>-</td>
<td>12</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.


1 A low $V_F$ MEGA Schottky barrier rectifier

**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

FR4 PCB, standard footprint

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

Table 7. Characteristics
$T_j = 25 \, ^\circ\text{C}$ 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>$I_F = 0.5 , \text{A}$</td>
<td>-</td>
<td>280</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 , \text{A}$</td>
<td>-</td>
<td>320</td>
<td>375</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 , \text{V}$</td>
<td>-</td>
<td>135</td>
<td>-</td>
<td>$\mu$A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 20 , \text{V}$</td>
<td>-</td>
<td>335</td>
<td>1900</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$f = 1 , \text{MHz}$</td>
<td>$V_R = 1 , \text{V}$</td>
<td>-</td>
<td>175</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 , \text{V}$</td>
<td>-</td>
<td>65</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>[1]</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

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

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 A low $V_F$ MEGA Schottky barrier rectifier

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

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

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

$f = 1 \text{ MHz}; T_{\text{amb}} = 25 ^\circ \text{C}$
1 A low $V_F$ MEGA Schottky barrier rectifier

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

- $T_j = 150 \, ^\circ C$
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 1$

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

- $T_j = 125 \, ^\circ C$
  - (1) $\delta = 1$
  - (2) $\delta = 0.9$
  - (3) $\delta = 0.8$
  - (4) $\delta = 0.5$

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

- FR4 PCB, standard footprint
  - $T_j = 150 \, ^\circ C$
    - (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

- FR4 PCB, mounting pad for cathode 1 cm²
  - $T_j = 150 \, ^\circ C$
    - (1) $\delta = 1$; DC
    - (2) $\delta = 0.5$; $f = 20 \, kHz$
    - (3) $\delta = 0.2$; $f = 20 \, kHz$
    - (4) $\delta = 0.1$; $f = 20 \, kHz$
Ceramic PCB, Al$_2$O$_3$, standard footprint
$T_J = 150$ °C  
(1) $\delta = 1, \text{ DC}$  
(2) $\delta = 0.5; f = 20$ kHz  
(3) $\delta = 0.2; f = 20$ kHz  
(4) $\delta = 0.1; f = 20$ kHz

**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
8. Test information

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 SOT1061](image-url)
10. Packing information

Table 8. Packing methods
The indicated -xxx are the last three digits of the 12NC ordering code.\[1\]

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2010EPA</td>
<td>SOT1061</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>3000</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 15. Reflow soldering footprint SOT1061
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>PMEG2010EPA_1</td>
<td>20091215</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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