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Kind regards,

Team Nexperia
1. **Product profile**

1.1 **General description**

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier in common cathode configuration with an integrated guard ring for stress protection, encapsulated in a SOT23 (TO-236AB) small Surface-Mounted Device (SMD) plastic package.

1.2 **Features and benefits**

- Average forward current: \( I_{F(AV)} \leq 0.5 \text{ A} \)
- Reverse voltage: \( V_R \leq 20 \text{ V} \)
- Low forward voltage
- AEC-Q101 qualified
- Small SMD plastic package

1.3 **Applications**

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- 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 \text{ kHz} )</td>
<td>( T_{\text{amb}} \leq 100 ^\circ \text{C} )</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( T_{\text{sp}} \leq 130 ^\circ \text{C} )</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>( V_R )</td>
<td>reverse voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>( V_F )</td>
<td>forward voltage</td>
<td>( I_F = 0.5 \text{ A} )</td>
<td>-</td>
<td>360</td>
<td>390</td>
<td>mV</td>
</tr>
<tr>
<td>( I_R )</td>
<td>reverse current</td>
<td>( V_R = 20 \text{ V} )</td>
<td>-</td>
<td>30</td>
<td>200</td>
<td>( \mu \text{A} )</td>
</tr>
</tbody>
</table>

[1] Device mounted on a ceramic Printed-Circuit Board (PCB), \( \text{Al}_2\text{O}_3 \), standard footprint.
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>anode (diode 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>anode (diode 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>common cathode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. 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>PMEG2005CT</td>
<td>-</td>
<td>plastic surface-mounted package; 3 leads</td>
<td>SOT23</td>
<td></td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG2005CT</td>
<td>P8*</td>
</tr>
</tbody>
</table>

[1] = -: made in Hong Kong
[2] = p: made in Hong Kong
[3] = t: made in Malaysia

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></td>
<td>Per diode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V_R)</td>
<td>reverse voltage</td>
<td>(T_J = 25 , ^\circ C)</td>
<td>-</td>
<td>20</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_{amb} \leq 100 , ^\circ C)</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(T_{amb} \leq 130 , ^\circ C)</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>(I_{FRM})</td>
<td>repetitive peak forward current</td>
<td>(t_p \leq 1 , ms); (\delta \leq 0.25)</td>
<td>-</td>
<td>3.9</td>
<td>A</td>
</tr>
<tr>
<td>(I_{FSM})</td>
<td>non-repetitive peak forward current</td>
<td>square wave; (t_p = 8 , ms)</td>
<td>(\delta \leq 0.25)</td>
<td>-</td>
<td>10</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></td>
<td>Per device; one diode loaded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R_{\text{th(j-a)}}$ thermal resistance from</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>junction to ambient</td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>$R_{\text{th(j-sp)}}$ thermal resistance from</td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>junction to solder point</td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>-</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>$P_{\text{tot}}$ total power dissipation</td>
<td>$T_{\text{amb}} \leq 25 , ^\circ\text{C}$</td>
<td>[3]</td>
<td>-</td>
<td>330</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>$T_j$ junction temperature</td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>400</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>$T_{\text{amb}}$ ambient temperature</td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>460</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>$T_{\text{tstg}}$ storage temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[2] $T_j = 25 \, ^\circ\text{C}$ prior to surge.
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
7. 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></td>
<td></td>
<td>Per device</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1$ mA</td>
<td>-</td>
<td>95</td>
<td>130</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1$ mA</td>
<td>-</td>
<td>155</td>
<td>190</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10$ mA</td>
<td>-</td>
<td>215</td>
<td>240</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100$ mA</td>
<td>-</td>
<td>285</td>
<td>330</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 500$ mA</td>
<td>-</td>
<td>360</td>
<td>390</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10$ V</td>
<td>-</td>
<td>11</td>
<td>40</td>
<td>$\mu$A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 20$ V</td>
<td>-</td>
<td>30</td>
<td>200</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1$ V; $f = 1$ MHz</td>
<td>-</td>
<td>66</td>
<td>80</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 10$ mA to $I_R = 10$ mA; $R_L = 100$ $\Omega$; measured at $I_R = 1$ mA.</td>
<td>[1]</td>
<td>22</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.
Fig 4. Forward current as a function of forward voltage; typical values

(1) $T_j = 150 \, ^\circ C$
(2) $T_j = 125 \, ^\circ C$
(3) $T_j = 85 \, ^\circ C$
(4) $T_j = 25 \, ^\circ C$
(5) $T_j = -40 \, ^\circ C$

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

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

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

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

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

Fig 10. Average forward current as a function of ambient temperature; typical values
8. Test information

Ceramic PCB, Al₂O₃, standard footprint

\[ T_J = 150 \, ^°C \]

(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 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

\( V = V_R + I_F \times R_S \)
\( R_S = 50 \, \Omega \)
\( R_I = 50 \, \Omega \)

Fig 13. Reverse recovery time test circuit and waveforms

(1) \( I_R = 1 \, mA \)
Input signal: reverse pulse rise time \( t_r = 0.6 \, ns \); reverse voltage pulse duration \( t_p = 100 \, ns \); duty cycle \( \delta = 0.05 \)
Oscilloscope: rise time \( t_r = 0.35 \, ns \)
The current ratings for the typical waveforms as shown in Figure 9, 10, 11 and 12 are calculated according to the equations: $I_{FAV} = I_M \times \delta$ with $I_M$ defined as peak current, $I_{RMS} = I_{FAV}$ 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

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>PMEG2005CT</td>
<td>SOT23</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>3000 10000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-215 -235</td>
</tr>
</tbody>
</table>

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

Fig 16. Reflow soldering footprint SOT23 (TO-236AB)

Fig 17. Wave soldering footprint SOT23 (TO-236AB)
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>
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<tr>
<td>PMEG2005CT v.2</td>
<td>20100622</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG2005CT_1</td>
</tr>
<tr>
<td>Modifications:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Table 2 &quot;Pinning&quot;; Graphic symbol amended</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Section 13 &quot;Legal information&quot;; updated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMEG2005CT_1</td>
<td>20090604</td>
<td>Product data sheet</td>
<td>-</td>
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</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th></th>
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</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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For sales office addresses, please send an email to: salesaddresses@nxp.com

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