1. General description


2. Features and benefits

- Average forward current $I_{(AV)} \leq 0.5$ A
- Reverse voltage $V_R \leq 20$ V
- Low forward voltage typ. $V_F = 245$ mV
- Low reverse current typ. $I_R = 5$ µA
- Package height typ. 0.3 mm

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Ultra high speed switching
- LED backlight for mobile application

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>$I_{(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20$ kHz; $T_{amb} = 115$ °C; square wave</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 10$ mA; $t_p \leq 300$ µs; $\delta \leq 0.02$; $T_j = 25$ °C</td>
<td>-</td>
<td>245</td>
<td>310</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10$ V; $T_j = 25$ °C; pulsed</td>
<td>5</td>
<td>25</td>
<td>-</td>
<td>µA</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 500$ mA; $I_R = 500$ mA; $I_{R(meas)} = 100$ mA; $T_j = 25$ °C</td>
<td>1.9</td>
<td>-</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] Device mounted on a ceramic Printed-Circuit Board (PCB), $\text{Al}_2\text{O}_3$, standard footprint.
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><img src="image1" alt="Simplified outline" /></td>
<td><img src="image2" alt="Graphic symbol" /></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>PMEG2005AESF</td>
<td>DSN0603-2</td>
<td>DSN0603-2</td>
<td>Leadless ultra small package; 2 terminals; body 0.6 x 0.3 x 0.3 mm</td>
<td>SOD962-2</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>PMEG2005AESF</td>
<td>6</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>20</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 140 , ^\circ C; \delta = 1$</td>
<td>-</td>
<td>0.71</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 , kHz; T_{amb} = 115 , ^\circ C$; square wave</td>
<td>[1]</td>
<td>-</td>
<td>0.5 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\delta = 0.5; f = 20 , kHz; T_{sp} = 145 , ^\circ C$; square wave</td>
<td></td>
<td>-</td>
<td>0.5 A</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>2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , ms; T_{j(init)} = 25 , ^\circ C$; square wave</td>
<td>-</td>
<td>4.5</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>[2]</td>
<td>-</td>
<td>405 mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>660 mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>1200 mW</td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td>-</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td>-55</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td>-65</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm$^2$ each.

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>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1][2]</td>
<td>-</td>
<td>-</td>
<td>310 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>190 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>105 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>40  K/W</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.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm$^2$ each.
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 anode and cathode 1 cm² each

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
## 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 = 100 , \mu A; \ t_p = 300 , \mu s; \ \delta = 0.02; \ T_j = 25 , ^\circ C )</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>( V_F )</td>
<td>forward voltage</td>
<td>( I_F = 0.1 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>120</td>
<td>180</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 1 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>180</td>
<td>250</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 10 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>245</td>
<td>310</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 100 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>330</td>
<td>380</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 200 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>375</td>
<td>420</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 500 , mA; \ t_p \leq 300 , \mu s; \ \delta \leq 0.02; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>475</td>
<td>550</td>
<td>mV</td>
</tr>
<tr>
<td>( I_R )</td>
<td>reverse current</td>
<td>( V_R = 6 , V; \ T_j = 25 , ^\circ C; \ pulsed )</td>
<td>-</td>
<td>3.2</td>
<td>-</td>
<td>( \mu A )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 10 , V; \ T_j = 25 , ^\circ C; \ pulsed )</td>
<td>-</td>
<td>5</td>
<td>25</td>
<td>( \mu A )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 20 , V; \ T_j = 25 , ^\circ C; \ pulsed )</td>
<td>-</td>
<td>10</td>
<td>45</td>
<td>( \mu A )</td>
</tr>
<tr>
<td>( C_d )</td>
<td>diode capacitance</td>
<td>( V_R = 1 , V; \ f = 1 , MHz; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 10 , V; \ f = 1 , MHz; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>( t_{rr} )</td>
<td>reverse recovery time</td>
<td>( I_F = 500 , mA; \ I_R = 500 , mA; \ I_{R(meas)} = 100 , mA; \ T_j = 25 , ^\circ C )</td>
<td>-</td>
<td>1.9</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>
Fig. 4. Forward current as a function of forward voltage; typical values

Pulsed condition:
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. 5. Reverse current as a function of reverse voltage; typical values

Pulsed condition:
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. 6. Diode capacitance as a function of reverse voltage; typical values

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

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

$T_j = 150 \, ^\circ\text{C}$
1. $\delta = 0.1$
2. $\delta = 0.2$
3. $\delta = 0.5$
4. $\delta = 1$
**Product data sheet**

**Nexperia**

**PMEG2005AESF**

20 V, 0.5 A low VF MEGA Schottky barrier rectifier

---

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

<table>
<thead>
<tr>
<th>V&lt;sub&gt;R&lt;/sub&gt; (V)</th>
<th>P&lt;sub&gt;R(AV)&lt;/sub&gt; (mW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

T<sub>j</sub> = 125 °C

(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5

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

<table>
<thead>
<tr>
<th>T&lt;sub&gt;amb&lt;/sub&gt; (°C)</th>
<th>I&lt;sub&gt;F(AV)&lt;/sub&gt; (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.8</td>
</tr>
<tr>
<td>25</td>
<td>0.6</td>
</tr>
<tr>
<td>50</td>
<td>0.4</td>
</tr>
<tr>
<td>100</td>
<td>0.2</td>
</tr>
<tr>
<td>175</td>
<td>0.0</td>
</tr>
</tbody>
</table>

FR4 PCB, standard footprint

T<sub>j</sub> = 150 °C

(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

FR4 PCB, mounting pad for anode and cathode

1 cm² each

T<sub>j</sub> = 150 °C

(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

**Fig. 10.** Average forward current as a function of ambient temperature; typical values

FR4 PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint

T<sub>j</sub> = 150 °C

(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

Ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint

T<sub>j</sub> = 150 °C

(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

---
11. Test information

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

\[ T_j = 150 \, ^\circ C \]

(1) \( \delta = 1; \) DC
(2) \( \delta = 0.5; f = 20 \, \text{kHz} \)
(3) \( \delta = 0.2; f = 20 \, \text{kHz} \)
(4) \( \delta = 0.1; f = 20 \, \text{kHz} \)

**Fig. 13.** Reverse recovery definition

**Fig. 14.** Duty cycle 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.

12. Package outline

![Package outline diagram]

Fig. 15. Package outline DSN0603-2 (SOD962-2)

13. Soldering

![Reflow soldering footprint diagram]

Fig. 16. Reflow soldering footprint for DSN0603-2 (SOD962-2)
14. 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>PMEG2005AESF v.2</td>
<td>20150213</td>
<td>Product data sheet</td>
<td>-</td>
<td>PMEG2005AESF v.1</td>
</tr>
<tr>
<td>Modifications:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Product status changed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMEG2005AESF v.1</td>
<td>20141219</td>
<td>Preliminary data sheet</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>
20 V, 0.5 A low VF MEGA Schottky barrier rectifier

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