1. General description


2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 1 \text{ A}$
- Reverse voltage: $V_R \leq 60 \text{ V}$
- Low forward voltage, typical: $V_F = 625 \text{ mV}$
- Low reverse current, typical: $I_R = 9 \mu\text{A}$
- Package height typ. 270 µm

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Low power consumption applications
- 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>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5$ ; $f = 20 \text{ kHz}$; $T_{sp} \leq 140 ^{\circ} \text{C}$; square wave</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_J = 25 ^{\circ} \text{C}$</td>
<td>-</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 1 \text{ A}$; $t_p \leq 300 \mu\text{s}$; $\delta \leq 0.02$ ; $T_J = 25 ^{\circ} \text{C}$</td>
<td>-</td>
<td>625</td>
<td>730</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 30 \text{ V}$; $t_p \leq 3 \text{ ms}$; $\delta \leq 0.3$ ; $T_J = 25 ^{\circ} \text{C}$</td>
<td>-</td>
<td>1.8</td>
<td>6</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60 \text{ V}$; $t_p \leq 3 \text{ ms}$; $\delta \leq 0.3$ ; $T_J = 25 ^{\circ} \text{C}$</td>
<td>-</td>
<td>9</td>
<td>30</td>
<td>µA</td>
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</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>
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<tbody>
<tr>
<td>1</td>
<td>K</td>
<td>cathode[1]</td>
<td><img src="image" alt="" /></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td><img src="image" alt="" /></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>PMEG6010ESB</td>
<td>DSN1006-2</td>
<td>DSN1006-2, leadless ultra small package; 2 terminals; body 1.0 x 0.6 x 0.27 mm</td>
<td>SOD993</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>PMEG6010ESB</td>
<td>6E</td>
</tr>
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</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 °C</td>
<td>-</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>I_F</td>
<td>forward current</td>
<td>T_sp ≤ 135 °C; δ = 1</td>
<td>-</td>
<td>1.4</td>
<td>A</td>
</tr>
<tr>
<td>I_F(AV)</td>
<td>average forward current</td>
<td>δ = 0.5 ; f = 20 kHz; T_amb ≤ 95 °C; square wave</td>
<td>[1]</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>δ = 0.5 ; f = 20 kHz; T_sp ≤ 140 °C; square wave</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>I_FRM</td>
<td>repetitive peak forward current</td>
<td>I_p ≤ 1 ms; δ ≤ 0.25</td>
<td>-</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>I_FSM</td>
<td>non-repetitive peak forward current</td>
<td>I_p = 8 ms; T_j(inc) = 25 °C; square wave</td>
<td>-</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>P_tot</td>
<td>total power dissipation</td>
<td>T_amb ≤ 25 °C</td>
<td>[2]</td>
<td>-</td>
<td>0.525 W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>1 W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[1]</td>
<td>-</td>
<td>1.78 W</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_amb</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T_slg</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>°C</td>
</tr>
</tbody>
</table>

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm² 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>240 K/W</td>
</tr>
<tr>
<td>$R_{th(j-a)}$</td>
<td></td>
<td></td>
<td>[1][3]</td>
<td>-</td>
<td>-</td>
<td>125 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[1][4]</td>
<td>-</td>
<td>-</td>
<td>70 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td></td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>15 K/W</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.


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

Ceramic PCB, Al₂O₃, standard footprint

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>$I_R = 1\ mA; \ t_p = 300\ \mu s; \ \delta = 0.02; \ T_j = 25\ ^\circ C$</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</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>210</td>
<td>-</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>275</td>
<td>-</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>355</td>
<td>400</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>400</td>
<td>-</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>490</td>
<td>555</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 700\ mA; \ t_p \leq 300\ \mu s; \ \delta \leq 0.02; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>545</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 5\ V; \ t_p \leq 3\ ms; \ \delta \leq 0.3; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>0.6</td>
<td>-</td>
<td>\mu A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10\ V; \ t_p \leq 3\ ms; \ \delta \leq 0.3; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>0.8</td>
<td>2.5</td>
<td>\mu A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 30\ V; \ t_p \leq 3\ ms; \ \delta \leq 0.3; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>1.8</td>
<td>6</td>
<td>\mu A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 60\ V; \ t_p \leq 3\ ms; \ \delta \leq 0.3; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>9</td>
<td>30</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>55</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>20</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$I_F = 0.5\ A; \ I_R = 0.5\ A; \ I_{R(meas)} = 0.1\ A; \ T_j = 25\ ^\circ C$</td>
<td>-</td>
<td>2.4</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>
**PMEG6010ESB**

**60 V, 1 A low VF MEGA Schottky barrier rectifier**

---

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

Pulsed condition:
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

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

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

**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) $\delta = 1$
60 V, 1 A low VF MEGA Schottky barrier rectifier

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

- $T_j = 150 \, ^\circ\text{C}$
- (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
  - $T_j = 150 \, ^\circ\text{C}$
  - (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. 10. Average forward current as a function of ambient temperature; typical values

- FR4 PCB, mounting pad for anode and cathode 1 cm$^2$ each
  - $T_j = 150 \, ^\circ\text{C}$
  - (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. 11. Average forward current as a function of ambient temperature; typical values

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

(1) $\delta = 1; \text{ DC}$
(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. 12. Average forward current as a function of solder point temperature; typical values

11. Test information

Fig. 13. Reverse recovery definition; step recovery

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

**Fig. 15. Package outline DSN1006-2 (SOD993)**

13. Soldering

**Fig. 16. Reflow soldering footprint for DSN1006-2 (SOD993)**
14. Mounting

SOD993 is an ultra small Discretes Silicon No-leads (DSN) package allowing maximized utilization of the package area for active silicon. Due to the special product design, Nexperia investigated the board assembly process parameters. In order to have an optimum soldering quality, Nexperia advises to follow the assembly recommendations explained in AN11689.
## 15. 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>
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<tr>
<td>PMEG6010ESB v.1</td>
<td>20150824</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
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16. Legal information

16.1 Data sheet status

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<tr>
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<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.nexperia.com.

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17. Contents

1 General description ............................................. 1
2 Features and benefits ........................................... 1
3 Applications ....................................................... 1
4 Quick reference data ............................................ 1
5 Pinning information ............................................. 2
6 Ordering information ............................................. 2
7 Marking ............................................................. 2
8 Limiting values .................................................. 3
9 Thermal characteristics ......................................... 4
10 Characteristics .................................................. 6
11 Test information ................................................ 9
12 Package outline ................................................ 10
13 Soldering ........................................................... 10
14 Mounting .......................................................... 11
15 Revision history ................................................ 12
16 Legal information .............................................. 13
  16.1 Data sheet status ............................................ 13
  16.2 Definitions ................................................... 13
  16.3 Disclaimers .................................................. 13
  16.4 Trademarks .................................................. 14

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