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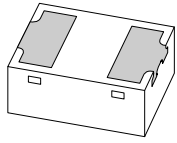
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Kind regards,

Team Nexperia



PMEG4002ELD

40 V, 0.2 A low V_F MEGA Schottky barrier rectifier

Rev. 1 — 20 April 2011

Product data sheet

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD882D leadless ultra small Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

1.2 Features and benefits

- Forward current: $I_F \leq 0.2$ A
- Reverse voltage: $V_R \leq 40$ V
- Low forward voltage: $V_F \leq 600$ mV
- Ultra small and leadless SMD plastic package
- AEC-Q101 qualified
- Solderable side pads
- Package height typ. 0.37 mm

1.3 Applications

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

1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|-------------|-------------------------|--|-----|-----|-----|---------|----|
| $I_{F(AV)}$ | average forward current | square wave; $\delta = 0.5$; $f = 20$ kHz | | | | | |
| | | $T_{amb} \leq 120$ °C | [1] | - | - | 0.2 | A |
| | | $T_{sp} \leq 140$ °C | - | - | - | 0.2 | A |
| I_R | reverse current | $V_R = 25$ V | - | 0.3 | 0.5 | μ A | |
| V_R | reverse voltage | | - | - | 40 | V | |
| V_F | forward voltage | $I_F = 200$ mA | [2] | - | 540 | 600 | mV |

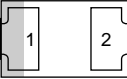

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm².

[2] Pulse test: $t_p \leq 300$ μ s; $\delta \leq 0.02$.



2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|---|---|
| 1 | cathode |  <p>Transparent top view</p> |  <p>sym001</p> |
| 2 | anode | | |

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMEG4002ELD | - | leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm | SOD882D |

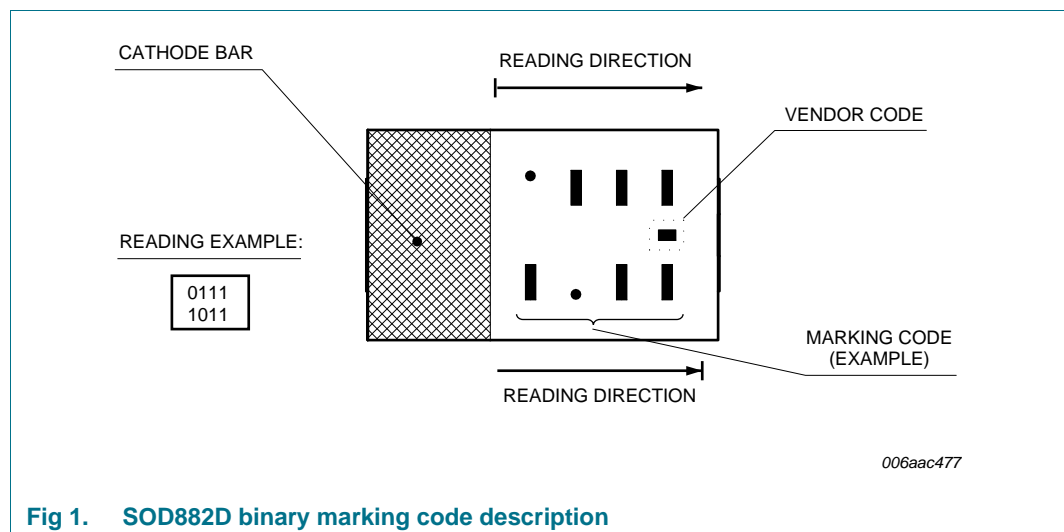
4. Marking

Table 4. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PMEG4002ELD | 1011 0000 |

[1] For SOD882D binary marking code description, see [Figure 1](#).

4.1 Binary marking code description



5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------|-------------------------------------|---|-------|------|------|
| V_R | reverse voltage | | - | 40 | V |
| $I_{F(AV)}$ | average forward current | square wave; $\delta = 0.5$; $f = 20$ kHz | | | |
| | | $T_{amb} \leq 120$ °C | [1] - | 0.2 | A |
| | | $T_{sp} \leq 140$ °C | - | 0.2 | A |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1$ ms; $\delta \leq 0.25$ | - | 1 | A |
| I_{FSM} | non-repetitive peak forward current | square wave; $t_p = 8$ ms | [2] - | 3 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25$ °C | [3] - | 340 | mW |
| | | | [1] - | 660 | mW |
| | | | [4] - | 1000 | mW |
| T_j | junction temperature | | - | 150 | °C |
| T_{amb} | ambient temperature | | -55 | +150 | °C |
| T_{stg} | storage temperature | | -65 | +150 | °C |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

[2] $T_j = 25$ °C prior to surge.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

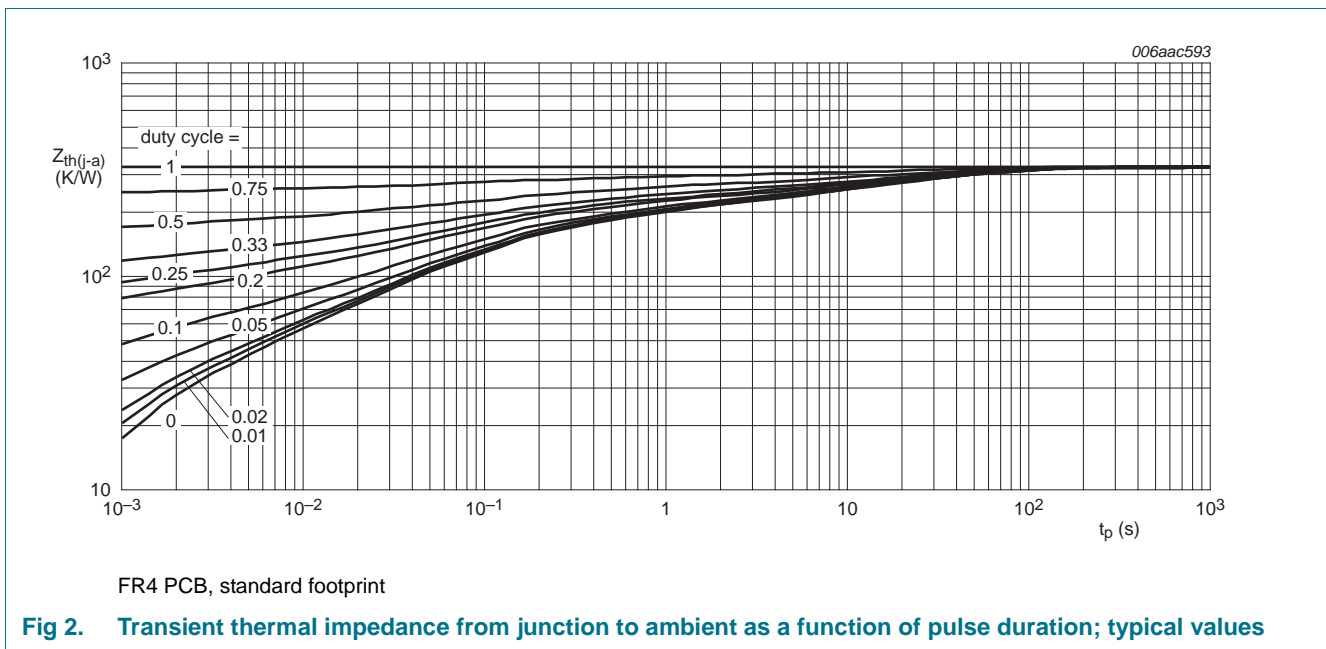
[4] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

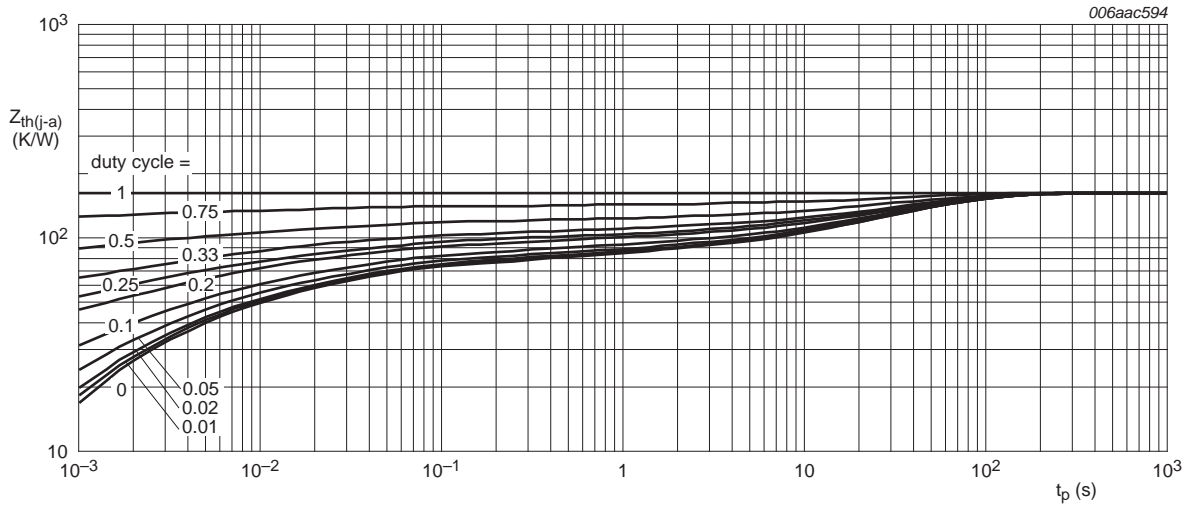
6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|----------------|--|-------------|--------|-----|-----|------|-----|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1][2] | - | - | 370 | K/W |
| | | | [1][3] | - | - | 190 | K/W |
| | | | [1][4] | - | - | 125 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [5] | - | 50 | K/W | |

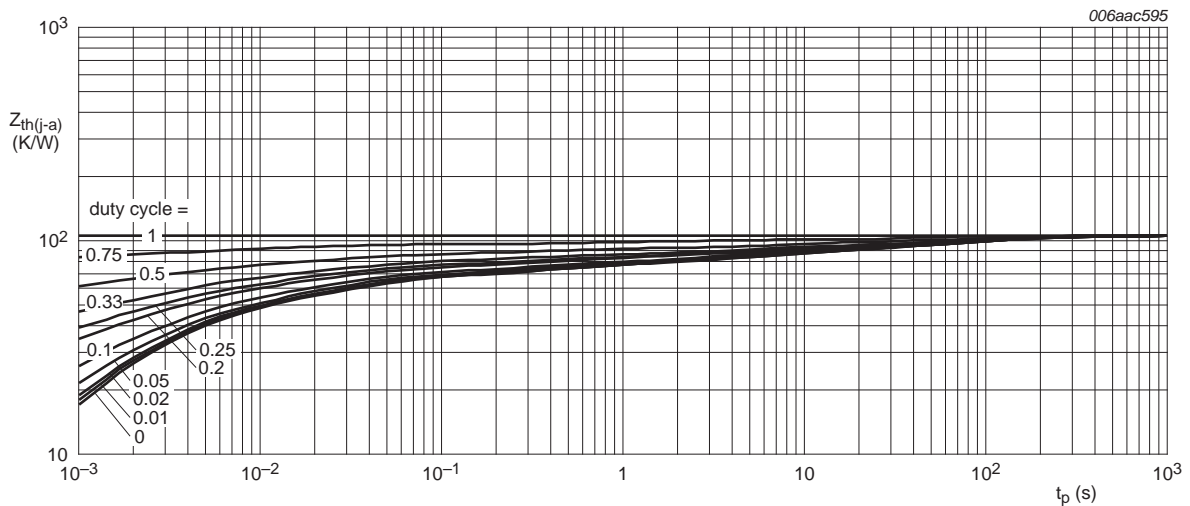
- [1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
- [4] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
- [5] Soldering point of cathode tab.





FR4 PCB, mounting pad for cathode 1 cm²

Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



Ceramic PCB, Al₂O₃, standard footprint

Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

7. Characteristics

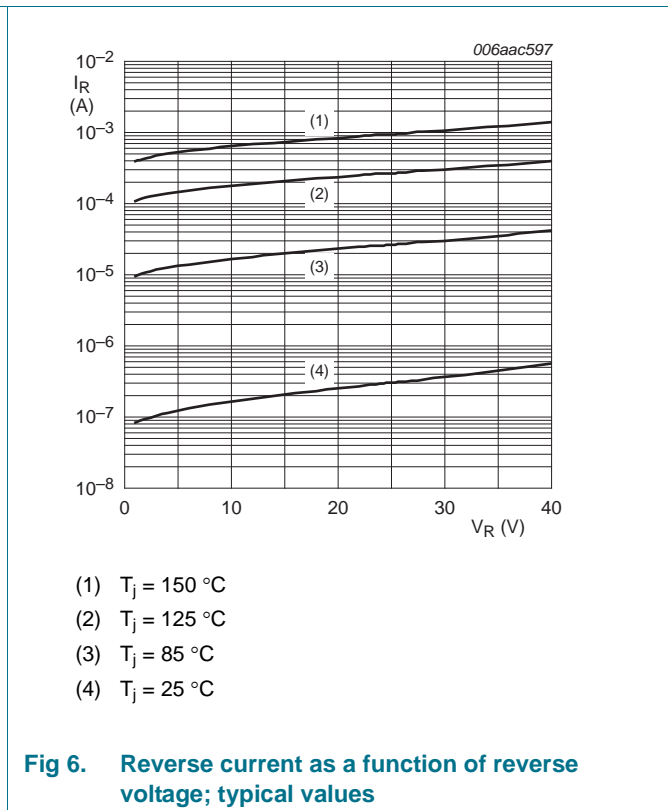
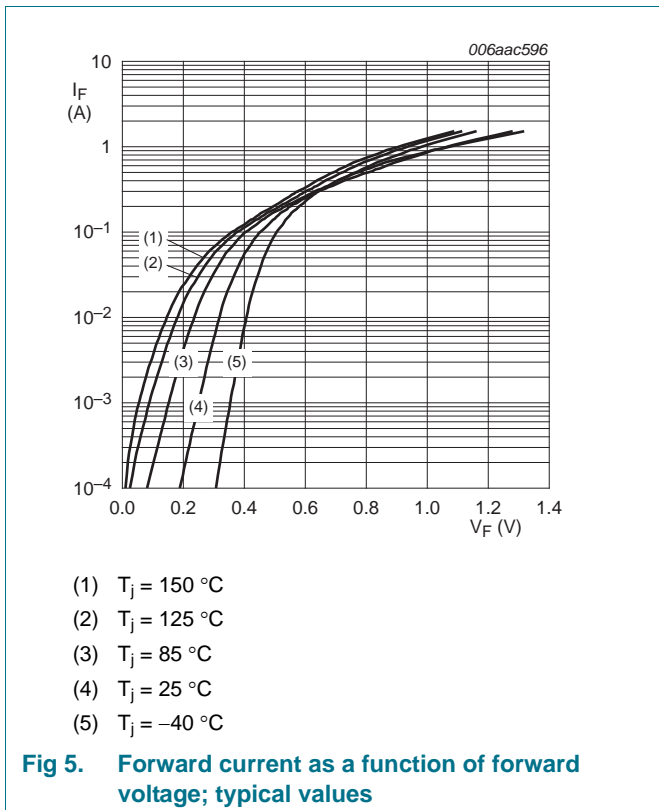
Table 7. Characteristics

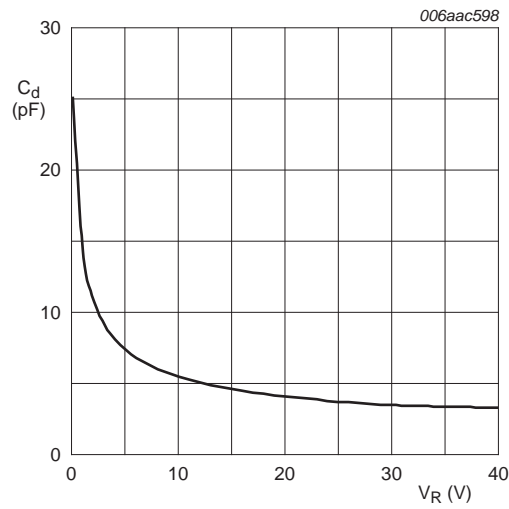
$T_{amb} = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------|-----------------------|--------------------------------------|-----|-----|-----|---------------|
| V_F | forward voltage | | [1] | | | |
| | | $I_F = 0.1\text{ mA}$ | - | 190 | 220 | mV |
| | | $I_F = 1\text{ mA}$ | - | 250 | 290 | mV |
| | | $I_F = 10\text{ mA}$ | - | 320 | 360 | mV |
| | | $I_F = 100\text{ mA}$ | - | 450 | 500 | mV |
| I_R | reverse current | $V_R = 25\text{ V}$ | - | 0.3 | 0.5 | μA |
| | | $V_R = 40\text{ V}$ | - | 0.6 | 10 | μA |
| C_d | diode capacitance | $V_R = 1\text{ V}; f = 1\text{ MHz}$ | - | 14 | 20 | pF |
| t_{rr} | reverse recovery time | | [2] | 4 | - | ns |

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

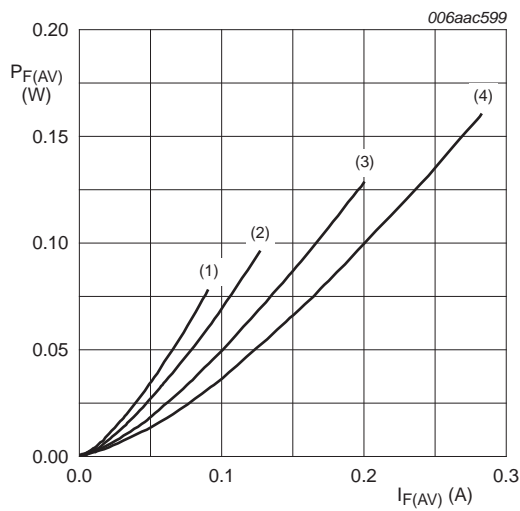
[2] When switched from $I_F = 10\text{ mA}$ to $I_R = 10\text{ mA}; R_L = 100\text{ }\Omega$; measured at $I_R = 1\text{ mA}$.





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

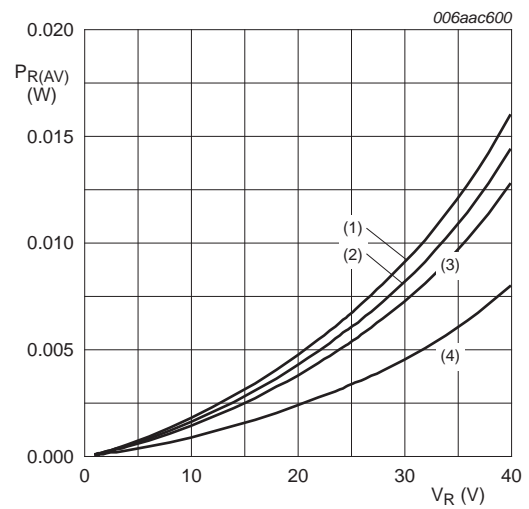
Fig 7. Diode capacitance as a function of reverse voltage; typical values



$T_j = 150 \text{ }^\circ\text{C}$

- (1) $\delta = 0.1$
- (2) $\delta = 0.2$
- (3) $\delta = 0.5$
- (4) $\delta = 1$

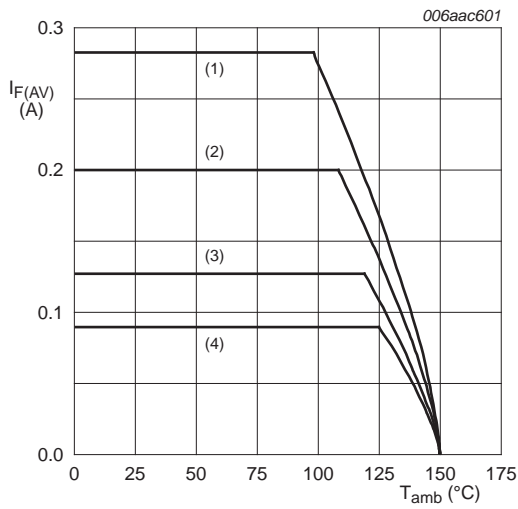
Fig 8. Average forward power dissipation as a function of average forward current; typical values



$T_j = 125 \text{ }^\circ\text{C}$

- (1) $\delta = 1$
- (2) $\delta = 0.9$
- (3) $\delta = 0.8$
- (4) $\delta = 0.5$

Fig 9. Average reverse power dissipation as a function of reverse voltage; typical values

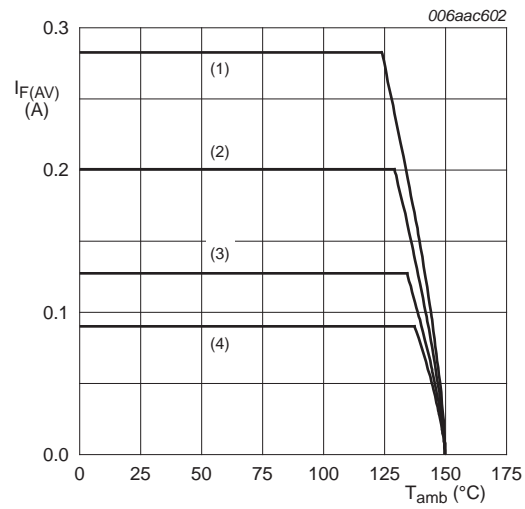


FR4 PCB, standard footprint

$T_j = 150\text{ }^{\circ}C$

- (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 10. Average forward current as a function of ambient temperature; typical values

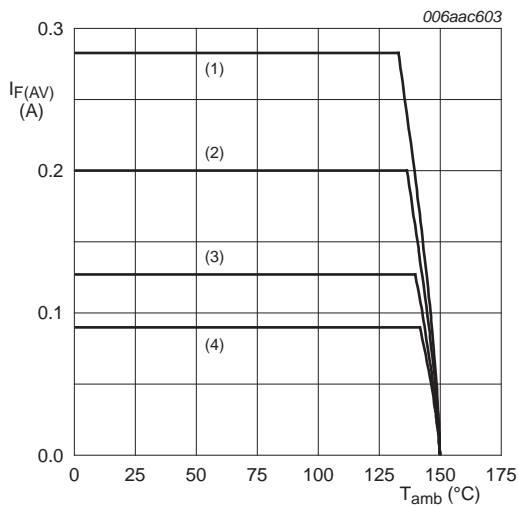


FR4 PCB, mounting pad for cathode 1 cm^2

$T_j = 150\text{ }^{\circ}C$

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

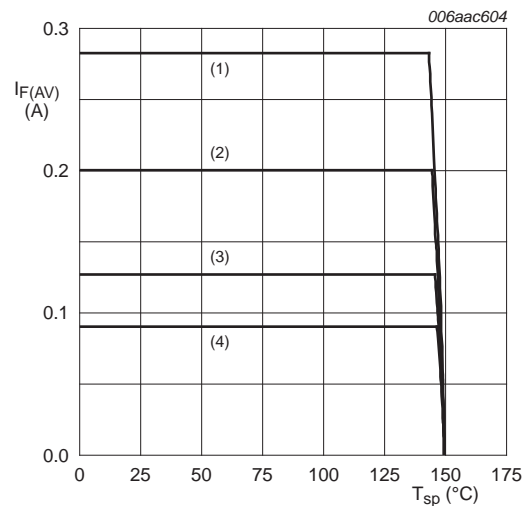


Ceramic PCB, Al_2O_3 , standard footprint

$T_j = 150\text{ }^{\circ}C$

- (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 12. Average forward current as a function of ambient temperature; typical values

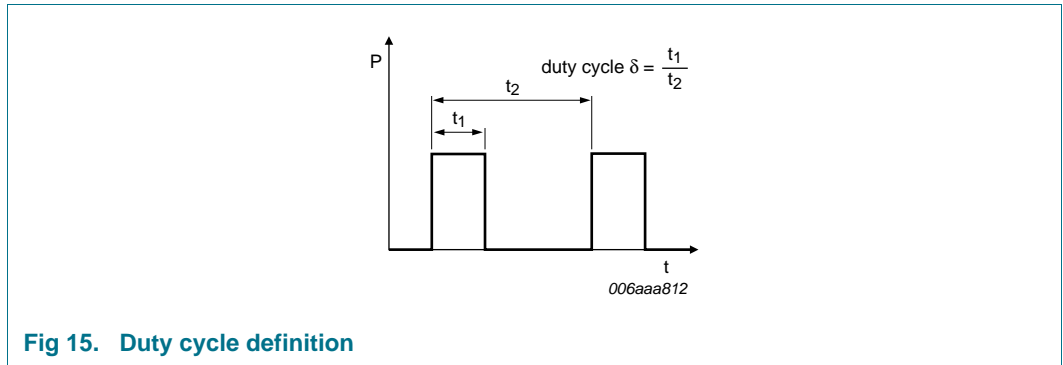
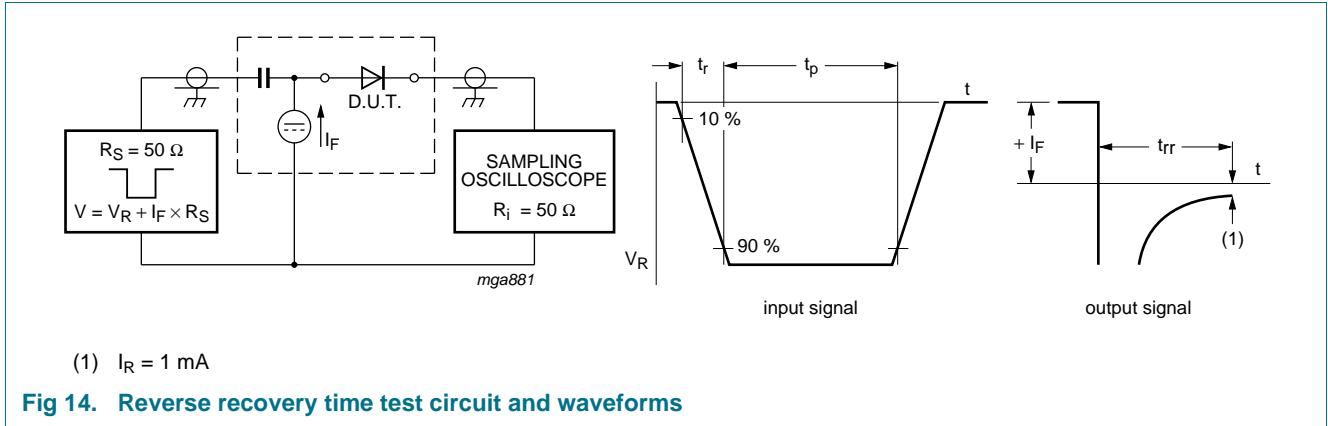


$T_j = 150\text{ }^{\circ}C$

- (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. Average forward current as a function of solder point temperature; typical values

8. Test information

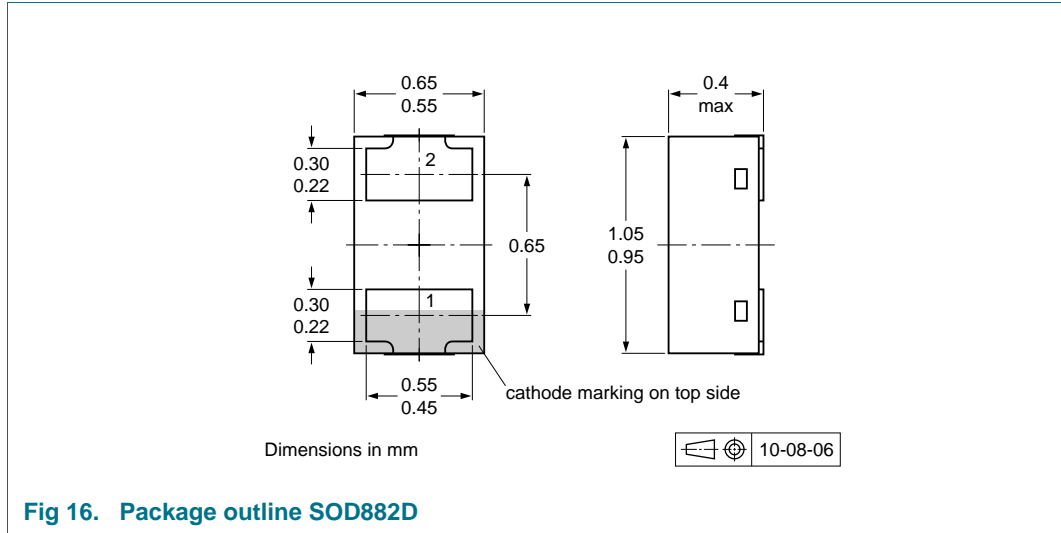


The current ratings for the typical waveforms as shown in [Figure 10](#), [11](#), [12](#) and [13](#) are calculated according to the equations: $I_{F(AV)} = I_M \times \delta$ with I_M defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined 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



10. Packing information

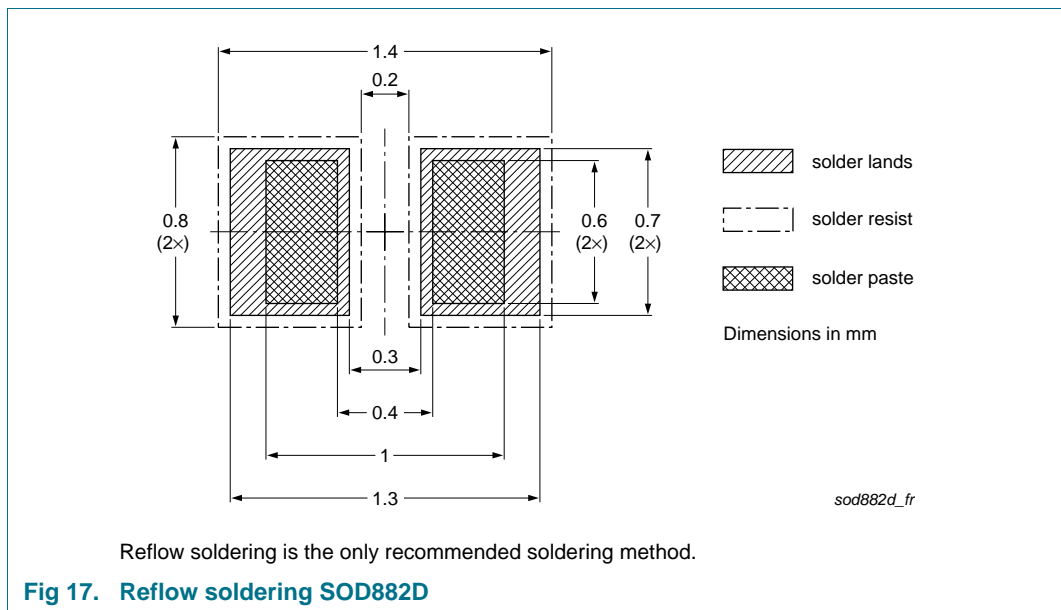
Table 8. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

| Type number | Package | Description | Packing quantity |
|-------------|---------|--------------------------------|------------------|
| PMEG4002ELD | SOD882D | 2 mm pitch, 8 mm tape and reel | 10000 -315 |

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

11. Soldering



12. Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|--------------|--------------------|---------------|------------|
| PMEG4002ELD v.1 | 20110420 | Product data sheet | - | - |

13. Legal information

13.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[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".

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