



# PMEG2005ELD

20 V, 0.5 A low  $V_F$  MEGA Schottky barrier rectifier

Rev. 1 — 4 May 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:  $I_F \leq 0.5$  A
- Reverse voltage:  $V_R \leq 20$  V
- Low forward voltage:  $V_F \leq 500$  mV
- Low reverse current
- AEC-Q101 qualified
- Solderable side pads
- Package height typ. 0.37 mm
- Ultra small and leadless SMD plastic package

### 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

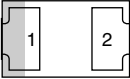
| Symbol      | Parameter               | Conditions                                 | Min | Typ | Max | Unit    |
|-------------|-------------------------|--------------------------------------------|-----|-----|-----|---------|
| $I_{F(AV)}$ | average forward current | square wave; $\delta = 0.5$ ; $f = 20$ kHz |     |     |     |         |
|             |                         | $T_{amb} \leq 85$ °C                       | [1] | -   | 0.5 | A       |
|             |                         | $T_{sp} \leq 130$ °C                       | -   | -   | 0.5 | A       |
| $I_R$       | reverse current         | $V_R = 10$ V                               | -   | 5   | 30  | $\mu$ A |
| $V_R$       | reverse voltage         |                                            | -   | -   | 20  | V       |
| $V_F$       | forward voltage         | $I_F = 500$ mA                             | [2] | 450 | 500 | mV      |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

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

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline                                                                  | Graphic symbol                                                                      |
|-----|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | cathode     |  |  |
| 2   | anode       |                                                                                     |                                                                                     |

Transparent top view

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                          |         |
|-------------|---------|--------------------------------------------------------------------------|---------|
|             | Name    | Description                                                              | Version |
| PMEG2005ELD | -       | leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm | SOD882D |

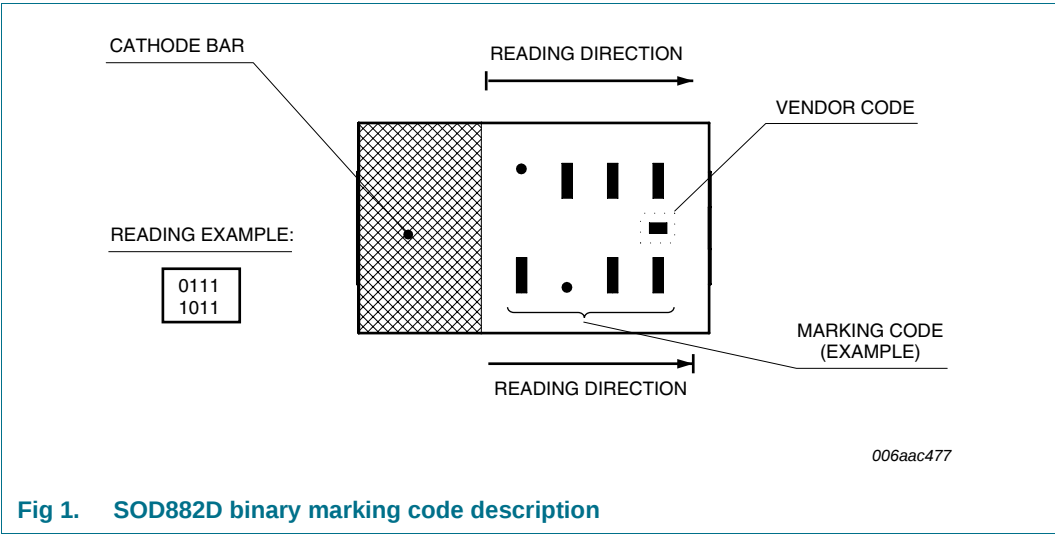
4. Marking

Table 4. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PMEG2005ELD | 0101 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                     |                                               | -     | 20   | V    |
| $I_{F(AV)}$ | average forward current             | square wave; $\delta = 0.5$ ;<br>$f = 20$ kHz |       |      |      |
|             |                                     | $T_{amb} \leq 85$ °C                          | [1] - | 0.5  | A    |
|             |                                     | $T_{sp} \leq 130$ °C                          | -     | 0.5  | A    |
| $I_{FRM}$   | repetitive peak forward current     | $t_p \leq 1$ ms; $\delta \leq 0.25$           | -     | 2.5  | 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 cm<sup>2</sup>.

[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, Al<sub>2</sub>O<sub>3</sub>, 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 cm<sup>2</sup>.
- [4] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [5] Soldering point of cathode tab.

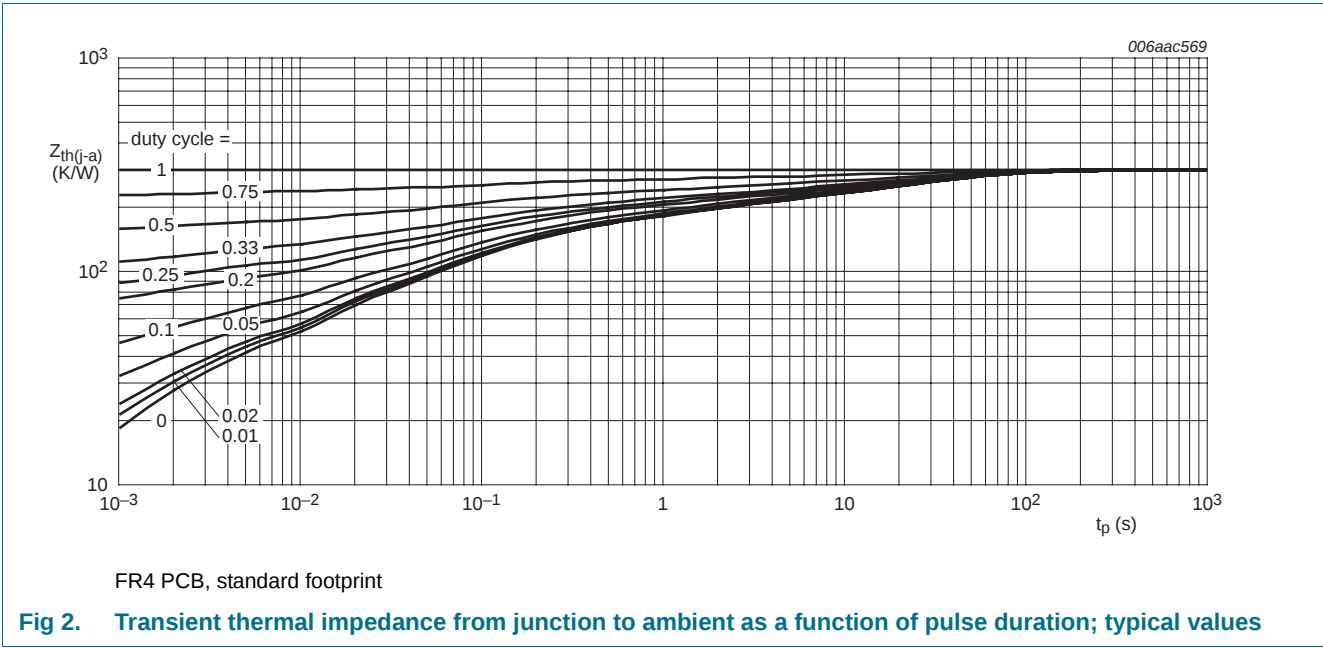
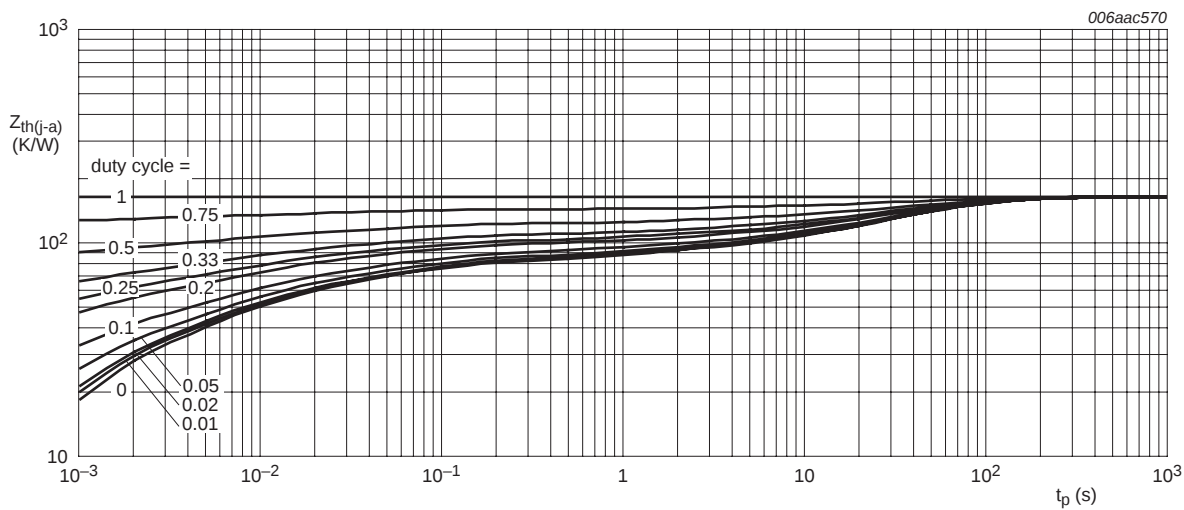
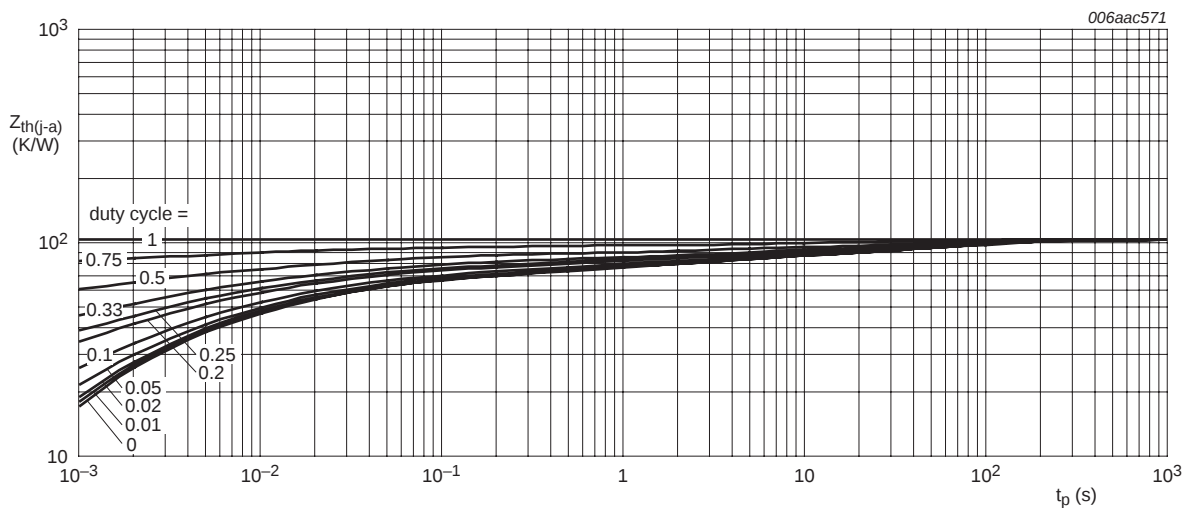


Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>

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



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

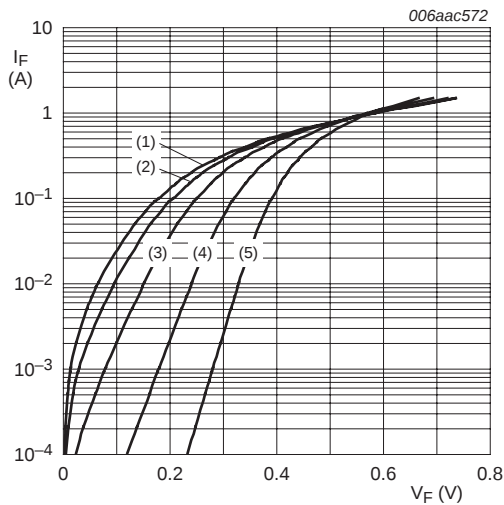
Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

7. Characteristics

Table 7. Characteristics  
 $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

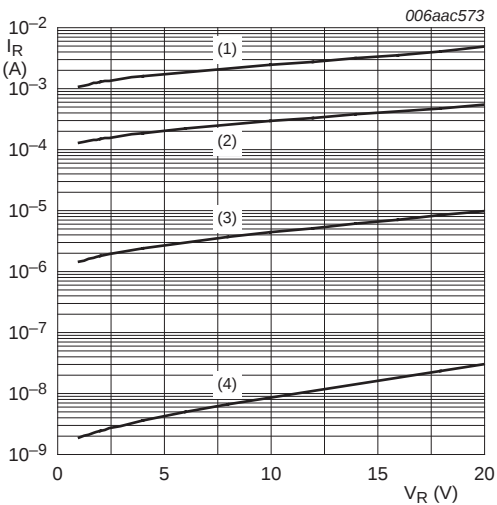
| Symbol   | Parameter             | Conditions                           | Min | Typ | Max | Unit          |
|----------|-----------------------|--------------------------------------|-----|-----|-----|---------------|
| $V_F$    | forward voltage       |                                      | [1] |     |     |               |
|          |                       | $I_F = 0.1\text{ mA}$                | -   | 115 | 180 | mV            |
|          |                       | $I_F = 1\text{ mA}$                  | -   | 175 | 240 | mV            |
|          |                       | $I_F = 10\text{ mA}$                 | -   | 240 | 290 | mV            |
|          |                       | $I_F = 100\text{ mA}$                | -   | 320 | 380 | mV            |
|          |                       | $I_F = 500\text{ mA}$                | -   | 450 | 500 | mV            |
| $I_R$    | reverse current       | $V_R = 10\text{ V}$                  | -   | 5   | 30  | $\mu\text{A}$ |
| $C_d$    | diode capacitance     | $V_R = 1\text{ V}; f = 1\text{ MHz}$ | -   | 24  | 30  | pF            |
| $t_{rr}$ | reverse recovery time |                                      | [2] | 7   | -   | 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  $I_R = 1\text{ mA}$ .



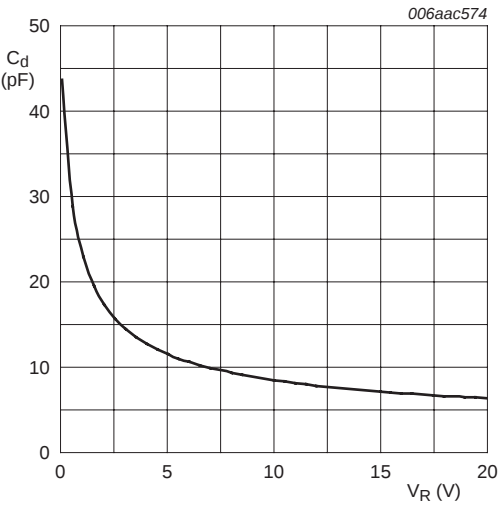
- (1)  $T_j = 150\text{ }^{\circ}\text{C}$
- (2)  $T_j = 125\text{ }^{\circ}\text{C}$
- (3)  $T_j = 85\text{ }^{\circ}\text{C}$
- (4)  $T_j = 25\text{ }^{\circ}\text{C}$
- (5)  $T_j = -40\text{ }^{\circ}\text{C}$

Fig 5. Forward current as a function of forward voltage; typical values



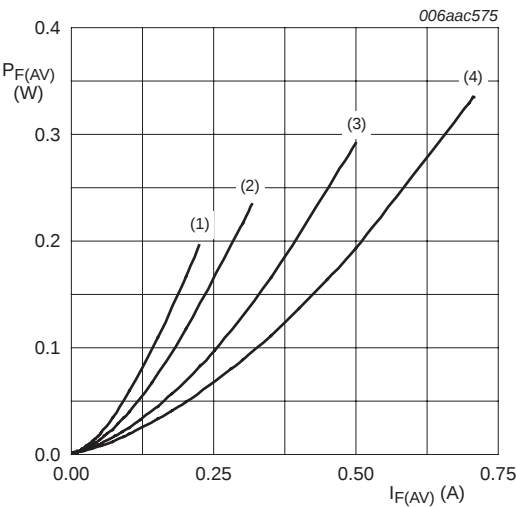
- (1)  $T_j = 125\text{ }^{\circ}\text{C}$
- (2)  $T_j = 85\text{ }^{\circ}\text{C}$
- (3)  $T_j = 25\text{ }^{\circ}\text{C}$
- (4)  $T_j = -40\text{ }^{\circ}\text{C}$

Fig 6. Reverse current as a function of reverse voltage; typical values



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

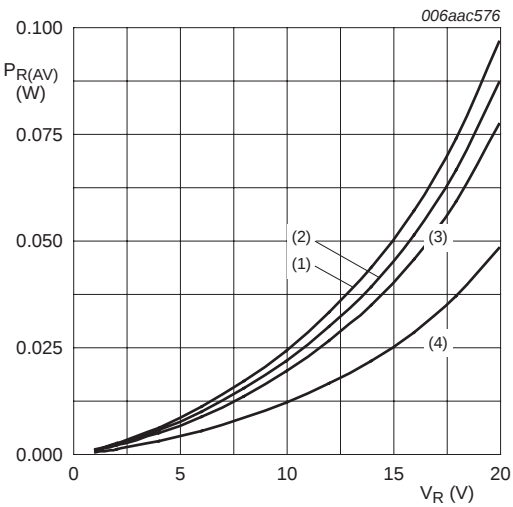
Fig 7. Diode capacitance as a function of reverse voltage; typical values



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

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

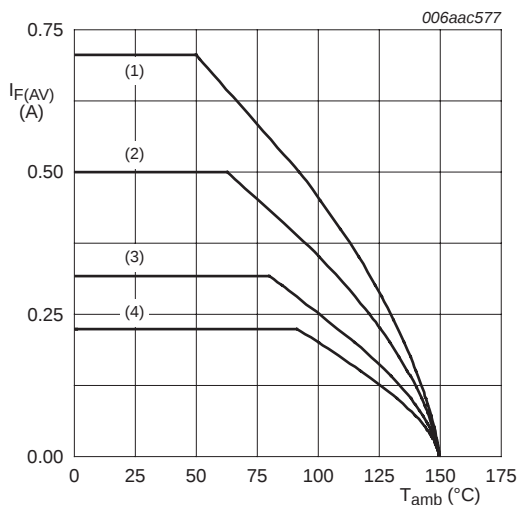
Fig 8. Average forward power dissipation as a function of average forward current; typical values



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

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

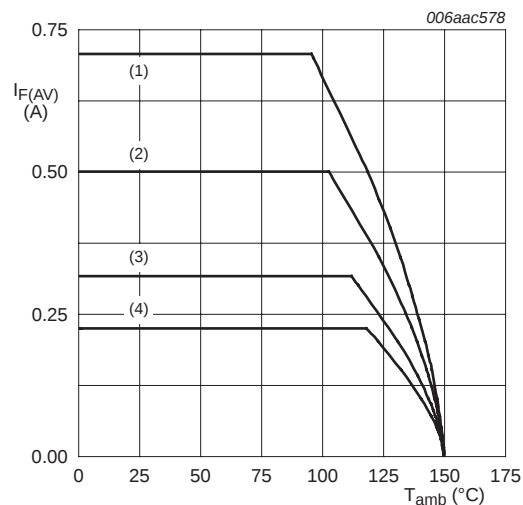
Fig 9. Average reverse power dissipation as a function of reverse voltage; typical values



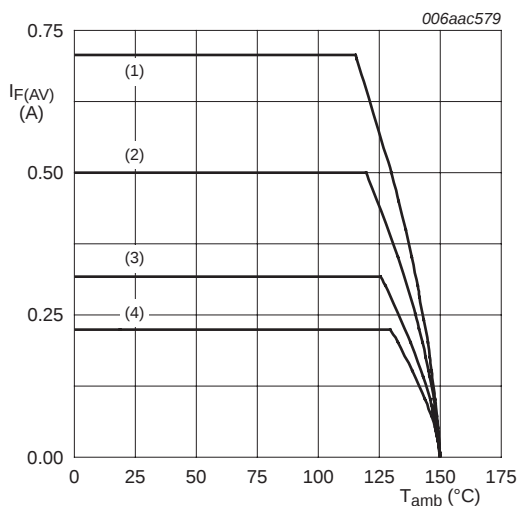
FR4 PCB, standard footprint

 $T_j = 150\text{ °C}$ 

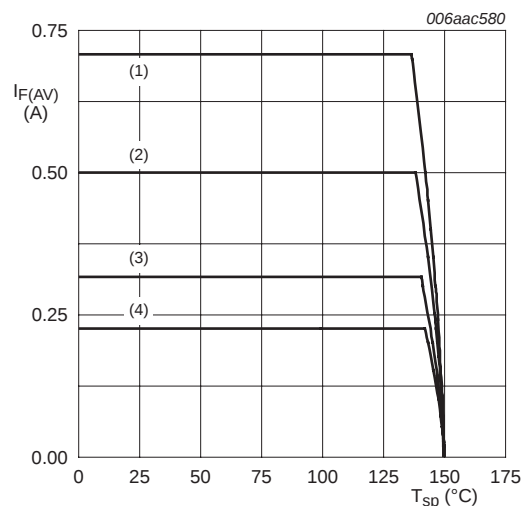
- (1)  $\delta = 1$ ; DC
- (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$
- (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$
- (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**Fig 10.** Average forward current as a function of ambient temperature; typical valuesFR4 PCB, mounting pad for cathode  $1\text{ cm}^2$  $T_j = 150\text{ °C}$ 

- (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 valuesCeramic PCB,  $\text{Al}_2\text{O}_3$ , standard footprint $T_j = 150\text{ °C}$ 

- (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 12.** Average forward current as a function of ambient temperature; typical values $T_j = 150\text{ °C}$ 

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

## 8. Test information

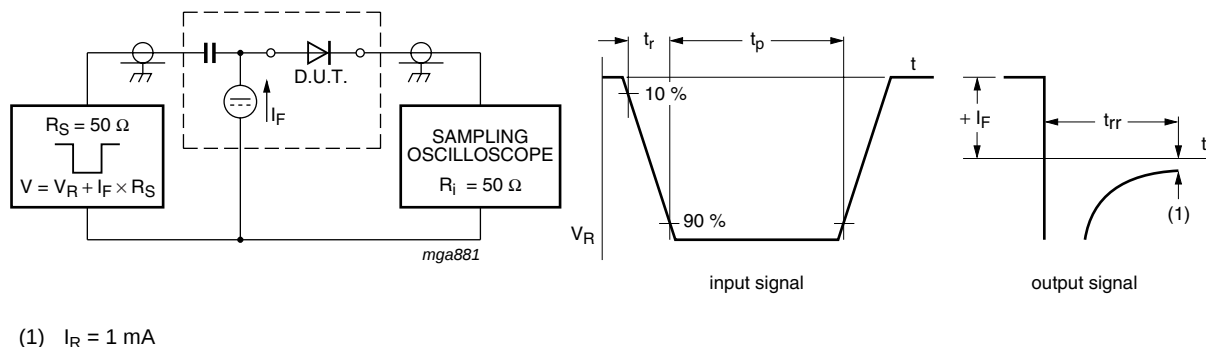


Fig 14. Reverse recovery time test circuit and waveforms

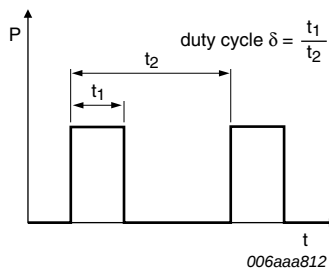


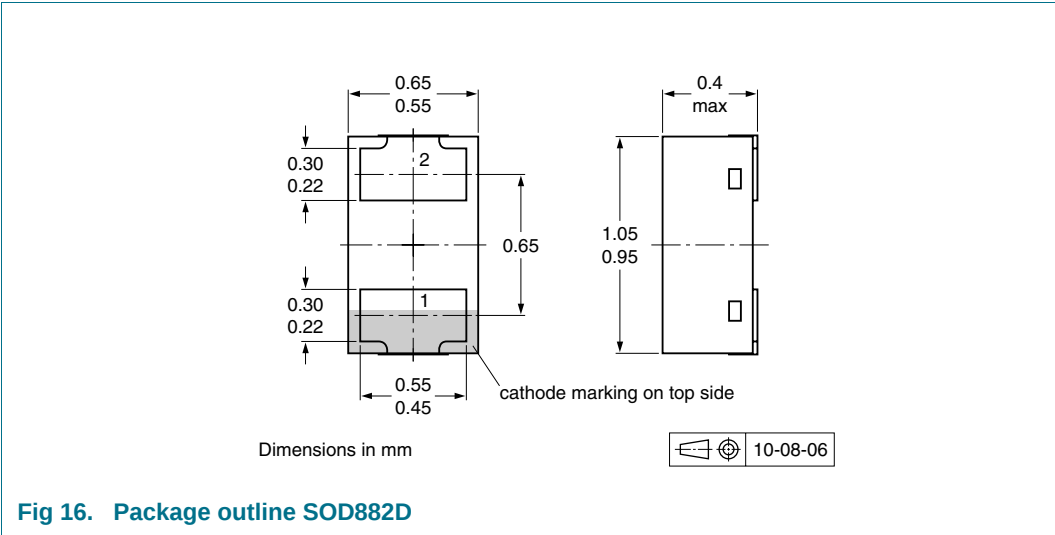
Fig 15. Duty cycle definition

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



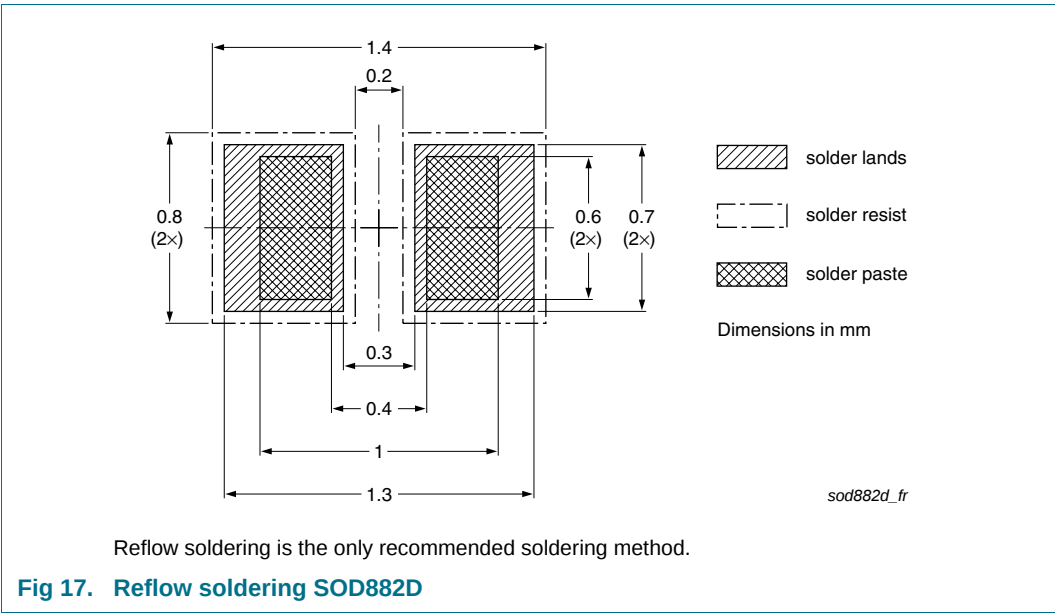
10. Packing information

**Table 8. Packing methods**  
The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number | Package | Description                    | Packing quantity |
|-------------|---------|--------------------------------|------------------|
|             |         |                                | 10000            |
| PMEG2005ELD | SOD882D | 2 mm pitch, 8 mm tape and reel | -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 |
|-----------------|--------------|--------------------|---------------|------------|
| PMEG2005ELD v.1 | 20110504     | Product data sheet | -             | -          |

## 13. Legal information

### 13.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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".

[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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## 14. Contact information

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

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## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

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Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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