



# PMEG3002AELD-Q

30 V, 0.2 A low VF Schottky barrier rectifier

26 June 2023

Product data sheet

## 1. General description

Planar 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.

## 2. Features and benefits

- Forward current:  $I_F \leq 0.2$  A
- Reverse voltage:  $V_R \leq 30$  V
- Low forward voltage:  $V_F \leq 480$  mV
- Ultra small and leadless SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 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

## 4. Quick reference data

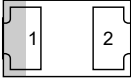
Table 1. Quick reference data

| Symbol      | Parameter               | Conditions                                                                     | Min | Typ | Max | Unit    |
|-------------|-------------------------|--------------------------------------------------------------------------------|-----|-----|-----|---------|
| $V_R$       | reverse voltage         | $T_j = 25$ °C                                                                  | -   | -   | 30  | V       |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{amb} \leq 125$ °C              | -   | -   | 0.2 | A       |
|             |                         | $\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{sp} \leq 140$ °C               | -   | -   | 0.2 | A       |
| $V_F$       | forward voltage         | $I_F = 200$ mA; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C | -   | 430 | 480 | mV      |
| $I_R$       | reverse current         | $V_R = 10$ V; $T_{amb} = 25$ °C                                                | -   | 3.5 | 10  | $\mu$ A |

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

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                                                                          | Graphic symbol                                                                                       |
|-----|--------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 1   | K      | cathode[1]  | <br>Transparent<br>top view<br><b>DFN1006D-2 (SOD882D)</b> | <br><i>sym001</i> |
| 2   | A      | anode       |                                                                                                                                             |                                                                                                      |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number                    | Package    |                                                                                                                               |                         |
|--------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                                | Name       | Description                                                                                                                   | Version                 |
| <a href="#">PMEG3002AELD-Q</a> | DFN1006D-2 | leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.4 mm body | <a href="#">SOD882D</a> |

7. Marking

Table 4. Marking codes

| Type number    | Marking code |
|----------------|--------------|
| PMEG3002AELD-Q | 1101<br>0000 |

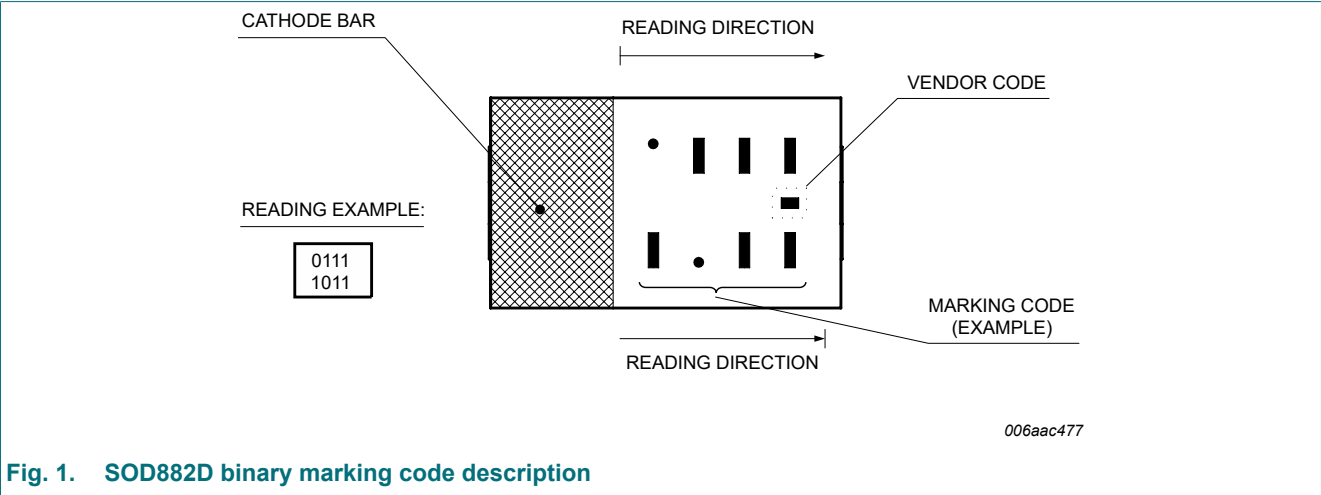


Fig. 1. SOD882D binary marking code description

8. Limiting values

Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol             | Parameter                           | Conditions                                                       |     | Min | Max  | Unit |
|--------------------|-------------------------------------|------------------------------------------------------------------|-----|-----|------|------|
| V <sub>R</sub>     | reverse voltage                     | T <sub>j</sub> = 25 °C                                           |     | -   | 30   | V    |
| I <sub>F(AV)</sub> | average forward current             | δ = 0.5; f = 20 kHz; square wave; T <sub>amb</sub> ≤ 125 °C      | [1] | -   | 0.2  | A    |
|                    |                                     | δ = 0.5; f = 20 kHz; square wave; T <sub>sp</sub> ≤ 140 °C       |     | -   | 0.2  | A    |
| I <sub>FRM</sub>   | repetitive peak forward current     | t <sub>p</sub> ≤ 1 ms; δ ≤ 0.25                                  |     | -   | 1    | A    |
| I <sub>FSM</sub>   | non-repetitive peak forward current | t <sub>p</sub> = 8 ms; square wave; T <sub>j(init)</sub> = 25 °C |     | -   | 3    | A    |
| P <sub>tot</sub>   | total power dissipation             | T <sub>amb</sub> ≤ 25 °C                                         | [2] | -   | 0.34 | W    |
|                    |                                     |                                                                  | [1] | -   | 0.66 | W    |
|                    |                                     |                                                                  | [3] | -   | 1    | W    |
| T <sub>j</sub>     | junction temperature                |                                                                  |     | -   | 150  | °C   |
| T <sub>amb</sub>   | ambient temperature                 |                                                                  |     | -55 | 150  | °C   |
| T <sub>stg</sub>   | storage temperature                 |                                                                  |     | -65 | 150  | °C   |

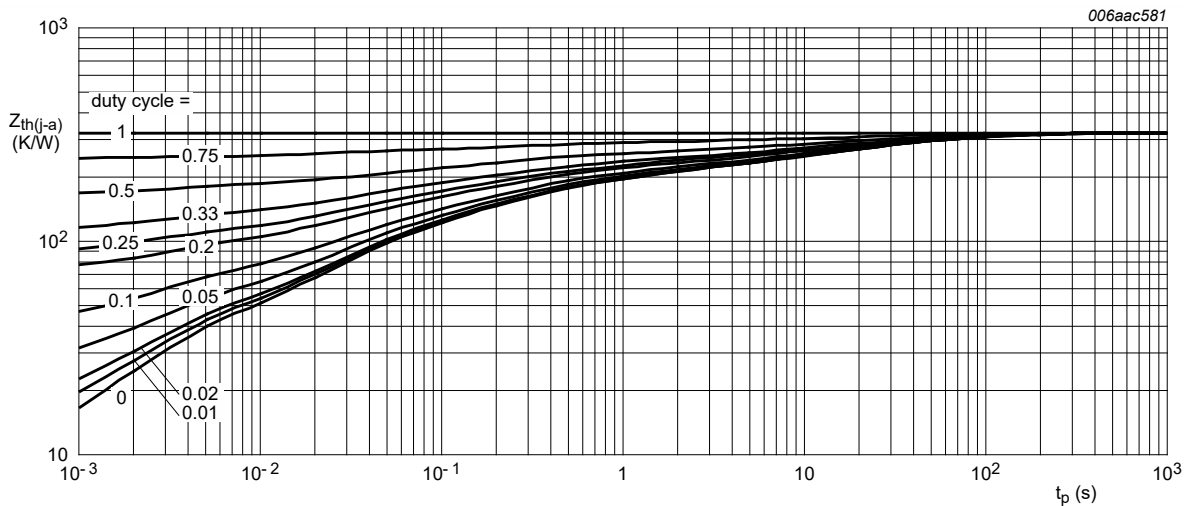
- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.  
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.  
[3] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

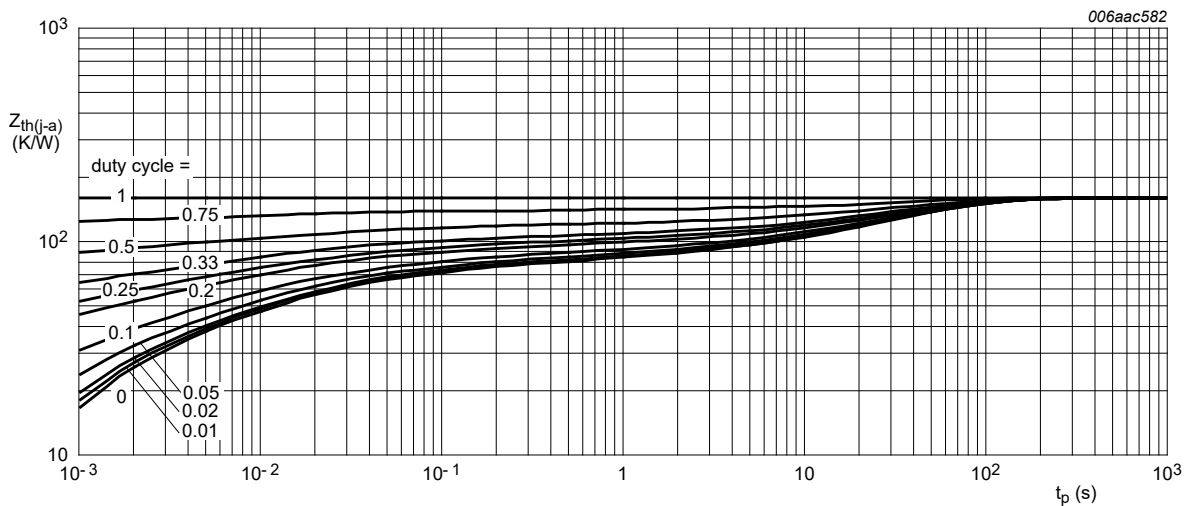
| Symbol                | Parameter                                        | Conditions  |             | Min | Typ | Max | Unit |
|-----------------------|--------------------------------------------------|-------------|-------------|-----|-----|-----|------|
| R <sub>th(j-a)</sub>  | thermal resistance from junction to ambient      | in free air | [1] [2] [3] | -   | -   | 370 | K/W  |
|                       |                                                  |             | [1] [4] [3] | -   | -   | 190 | K/W  |
|                       |                                                  |             | [1] [5] [3] | -   | -   | 125 | K/W  |
| R <sub>th(j-sp)</sub> | thermal resistance from junction to solder point |             | [6]         | -   | -   | 50  | K/W  |

- [1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P<sub>R</sub> 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] Reflow soldering is the only recommended soldering method.  
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.  
[5] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.  
[6] Soldering point of cathode tab.



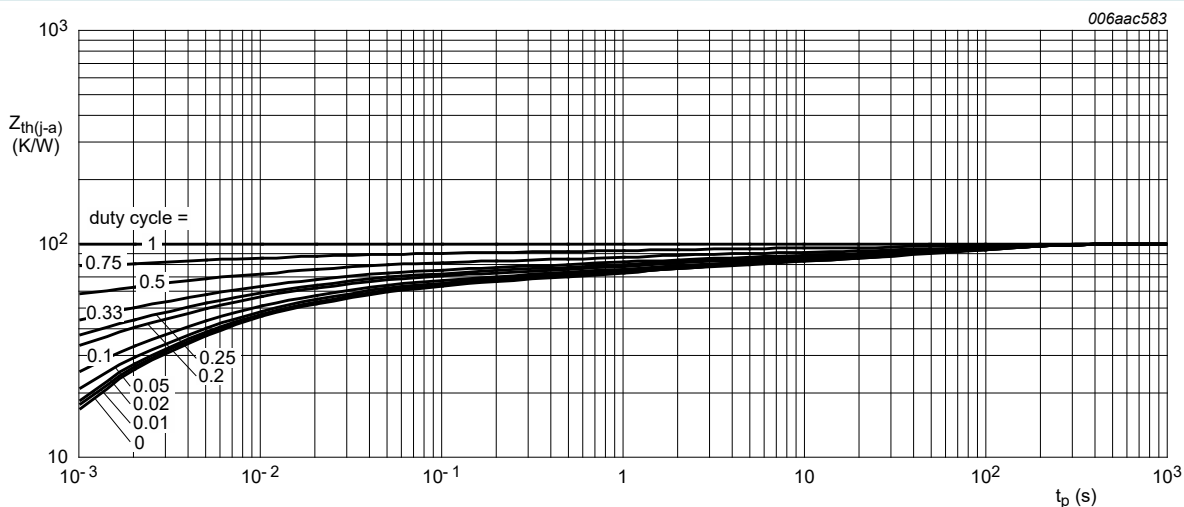
FR4 PCB, standard footprint

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



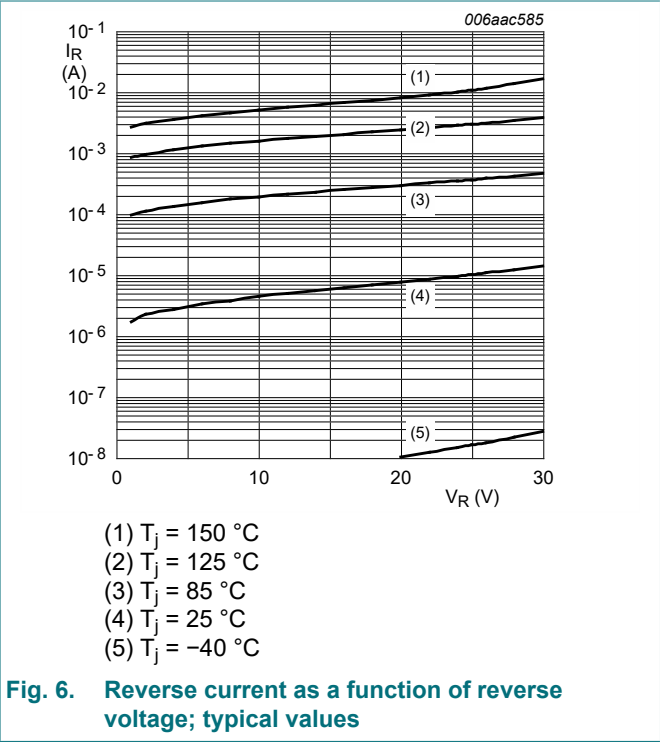
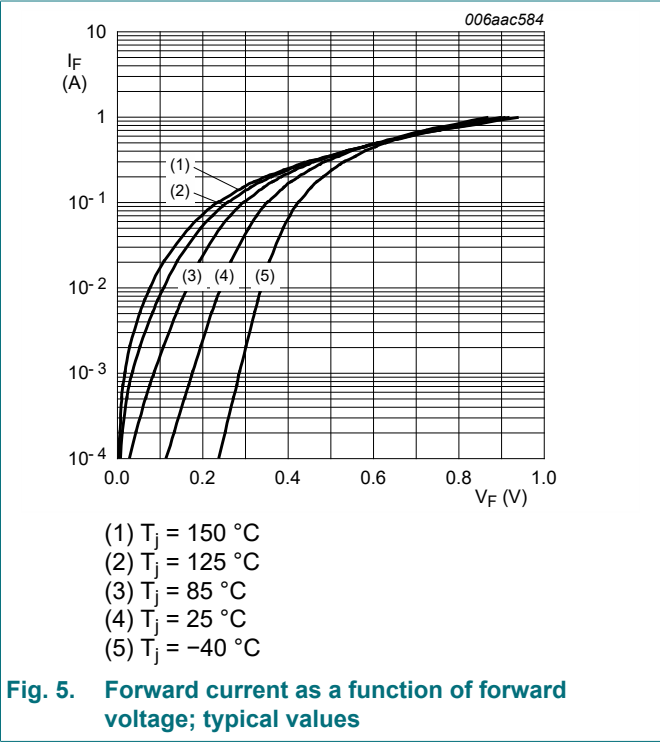
Ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint

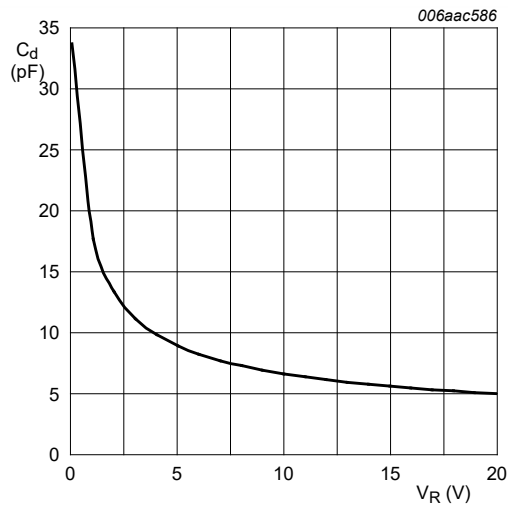
Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

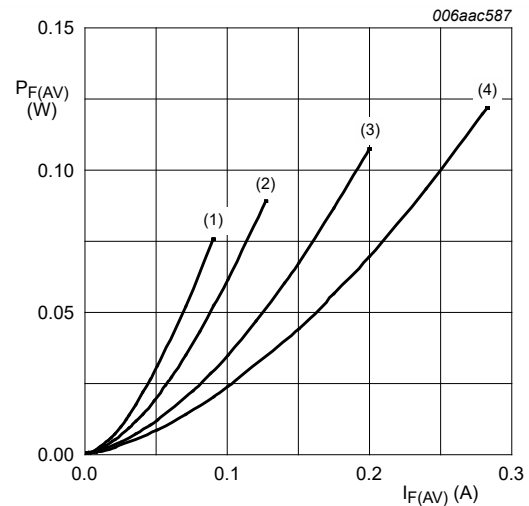
| Symbol          | Parameter             | Conditions                                                                                                                  | Min | Typ | Max | Unit |
|-----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| V <sub>F</sub>  | forward voltage       | I <sub>F</sub> = 0.1 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C                                | -   | 120 | 190 | mV   |
|                 |                       | I <sub>F</sub> = 1 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C                                    | -   | 180 | 250 | mV   |
|                 |                       | I <sub>F</sub> = 10 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C                                 | -   | 250 | 300 | mV   |
|                 |                       | I <sub>F</sub> = 100 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C                                        | -   | 355 | 400 | mV   |
|                 |                       | I <sub>F</sub> = 200 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C                                        | -   | 430 | 480 | mV   |
| I <sub>R</sub>  | reverse current       | V <sub>R</sub> = 10 V; T <sub>amb</sub> = 25 °C                                                                             | -   | 3.5 | 10  | μA   |
|                 |                       | V <sub>R</sub> = 30 V; T <sub>amb</sub> = 25 °C                                                                             | -   | 12  | 50  | μA   |
| C <sub>d</sub>  | diode capacitance     | V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>amb</sub> = 25 °C                                                                   | -   | 18  | 25  | pF   |
| t <sub>rr</sub> | reverse recovery time | I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; I <sub>R(meas)</sub> = 1 mA; R <sub>L</sub> = 100 Ω; T <sub>j</sub> = 25 °C | -   | 6   | -   | ns   |





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

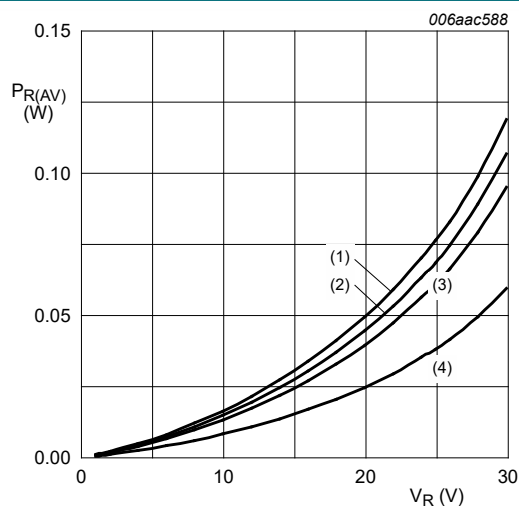
**Fig. 7.** Diode capacitance as a function of reverse voltage; typical values



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

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

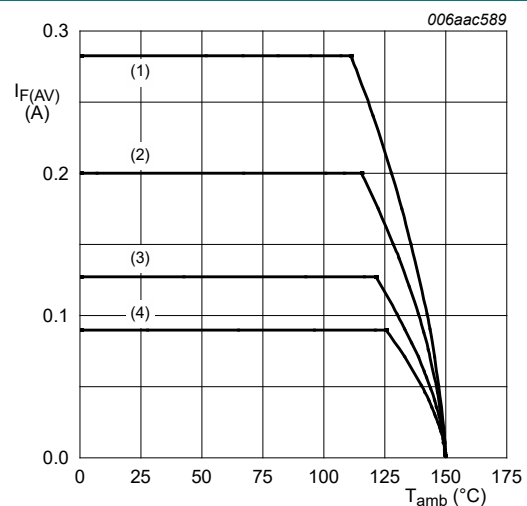
**Fig. 8.** Average forward power dissipation as a function of average forward current; typical values



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

- (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

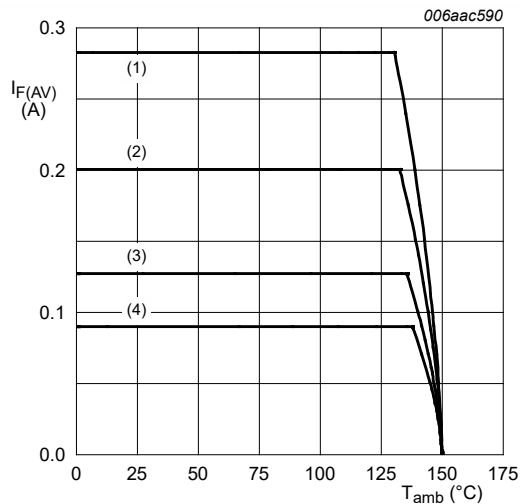


FR4 PCB, standard footprint

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

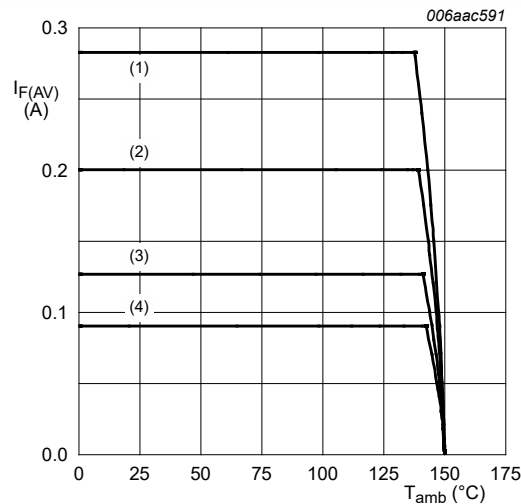
- (1)  $\delta = 1$ ; DC
- (2)  $\delta = 0.5$ ;  $f = 20 \text{ kHz}$
- (3)  $\delta = 0.2$ ;  $f = 20 \text{ kHz}$
- (4)  $\delta = 0.1$ ;  $f = 20 \text{ kHz}$

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



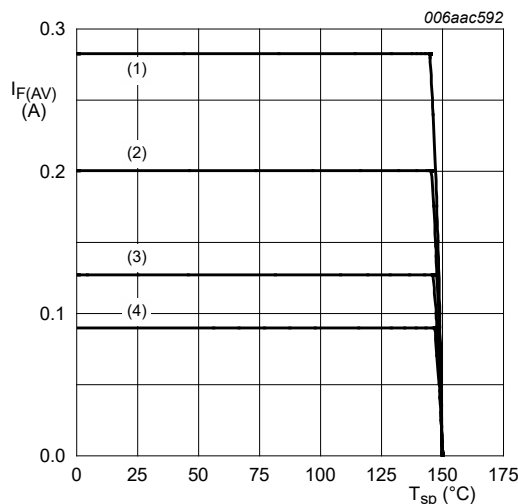
FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>  
 $T_j = 150\text{ }^{\circ}\text{C}$   
(1)  $\delta = 1$ ; DC  
(2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
(3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
(4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

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



Ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint  
 $T_j = 150\text{ }^{\circ}\text{C}$   
(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. 12. Average forward current as a function of ambient temperature; typical values



$T_j = 150\text{ }^{\circ}\text{C}$   
(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. 13. Average forward current as a function of solder point temperature; typical values

11. Test information

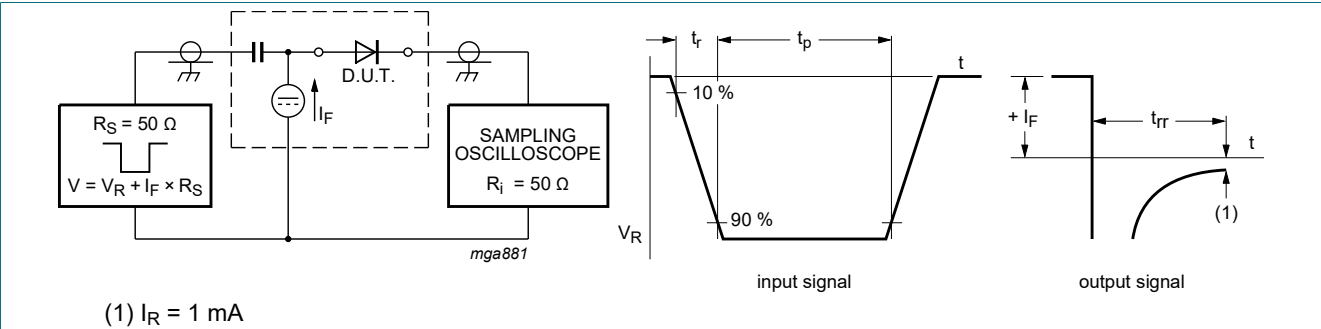


Fig. 14. Reverse recovery time: test circuit and waveforms

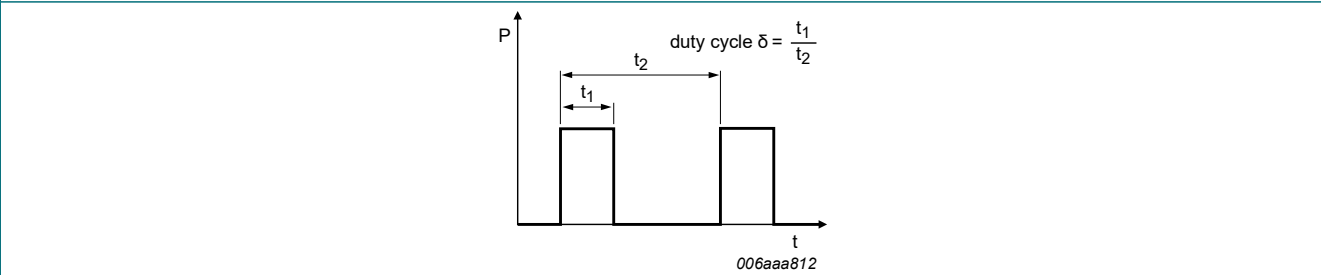


Fig. 15. Duty cycle definition

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

$I_{RMS} = I_M \times \sqrt{\delta}$  with  $I_{RMS}$  defined as RMS current

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.

12. Package outline

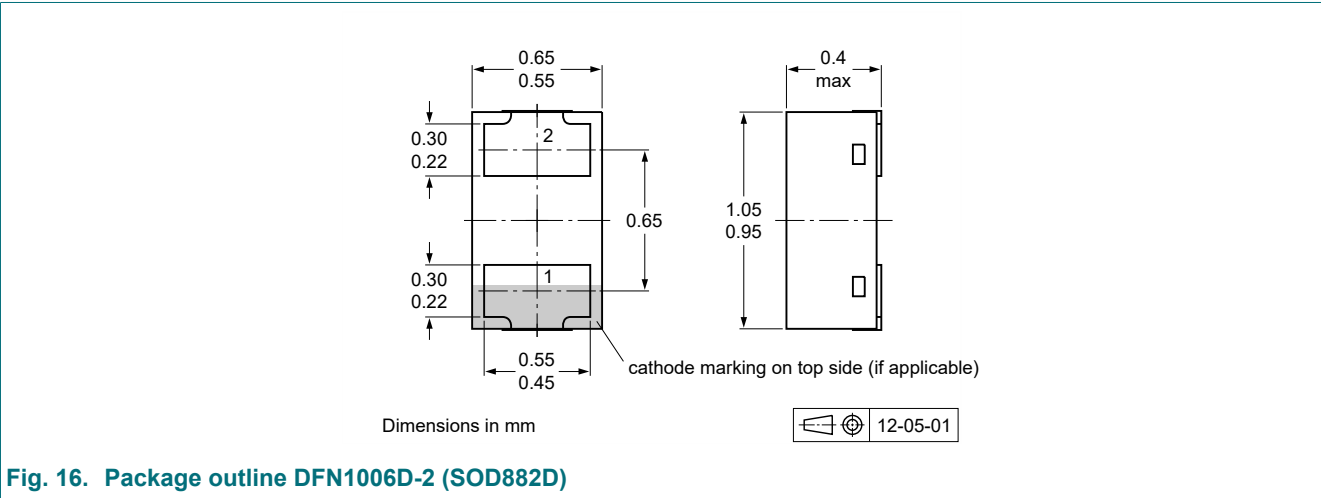


Fig. 16. Package outline DFN1006D-2 (SOD882D)

13. Soldering

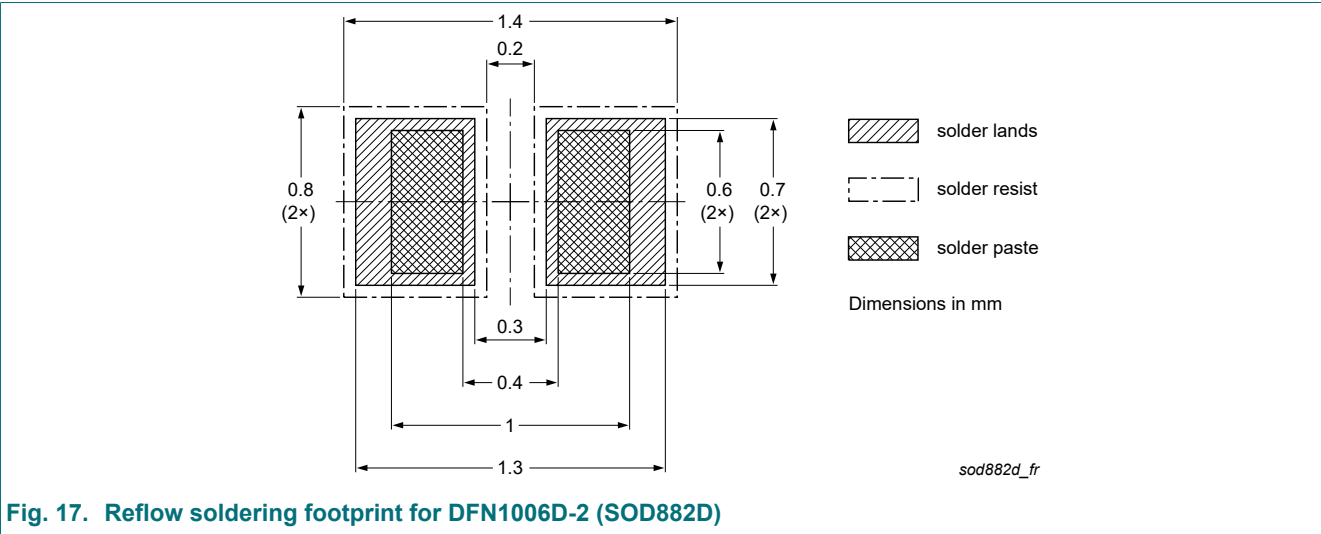


Fig. 17. Reflow soldering footprint for DFN1006D-2 (SOD882D)

14. Revision history

Table 8. Revision history

| Data sheet ID      | Release date | Data sheet status  | Change notice | Supersedes |
|--------------------|--------------|--------------------|---------------|------------|
| PMEG3002AELD-Q v.1 | 20230626     | Product data sheet | -             | -          |

## 15. Legal information

### 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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