



# PMEG2005BELD

20 V, 0.5 A low VF Schottky barrier rectifier

2 November 2022

Product data sheet

## 1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a leadless ultra small SOD882D (DFN1006D-2) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 0.5$  A
- Reverse voltage:  $V_R \leq 20$  V
- Low forward voltage  $V_F \leq 390$  mV
- Ultra small and leadless SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm

## 3. Applications

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

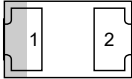

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{sp} \leq 140$ °C	-	-	0.5	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	20	V
$V_F$	forward voltage	$I_F = 500$ mA; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; pulsed; $T_j = 25$ °C	-	353	390	mV
$I_R$	reverse current	$V_R = 20$ V; $T_j = 25$ °C	-	87	200	$\mu$ A

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 Transparent top view <b>DFN1006D-2 (SOD882D)</b>	 <i>aaa-003679</i>
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

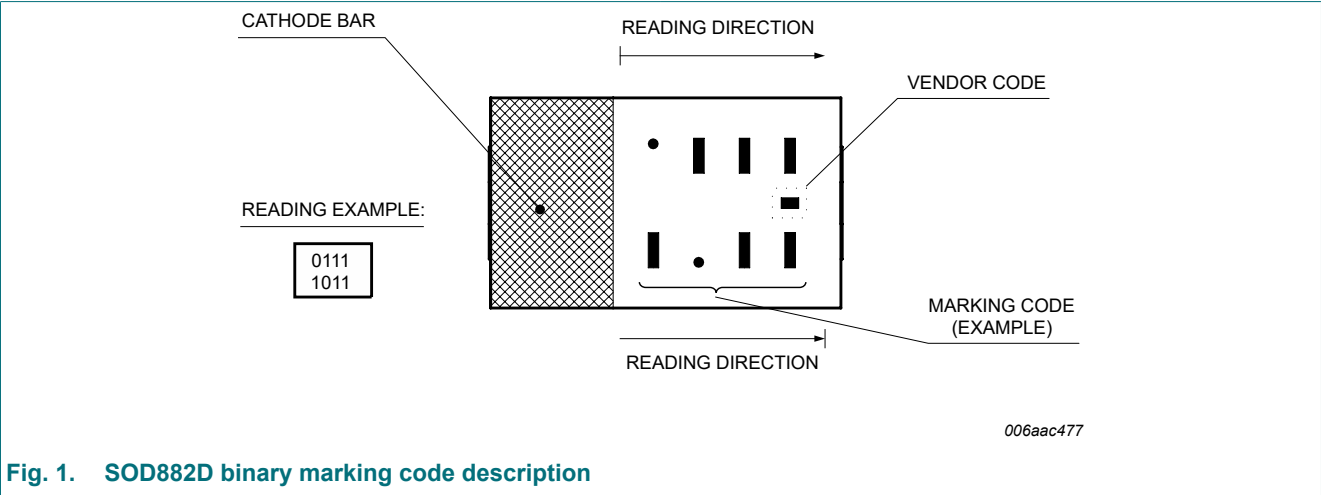
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PMEG2005BELD</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
PMEG2005BELD	0010 1000



## 8. 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	$T_j = 25\text{ }^{\circ}\text{C}$		-	20	V
$I_F$	forward current	$T_{sp} \leq 140\text{ }^{\circ}\text{C}$		-	0.5	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; square wave; $T_{sp} \leq 140\text{ }^{\circ}\text{C}$		-	0.5	A
		$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; square wave; $T_{amb} \leq 115\text{ }^{\circ}\text{C}$	[1]	-	0.5	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	3	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms}$ ; square wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	6	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[2] [3]	-	370	mW
			[1] [3]	-	735	mW
			[4] [3]	-	1135	mW
$T_j$	junction temperature			-	150	$^{\circ}\text{C}$
$T_{amb}$	ambient temperature			-55	150	$^{\circ}\text{C}$
$T_{stg}$	storage temperature			-65	150	$^{\circ}\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

[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 a ceramic PCB,  $\text{Al}_2\text{O}_3$ , standard footprint.

## 9. 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] [3]	-	-	340	K/W
			[1] [4] [3]	-	-	170	K/W
			[1] [5] [3]	-	-	110	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[6]	-	-	25	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.

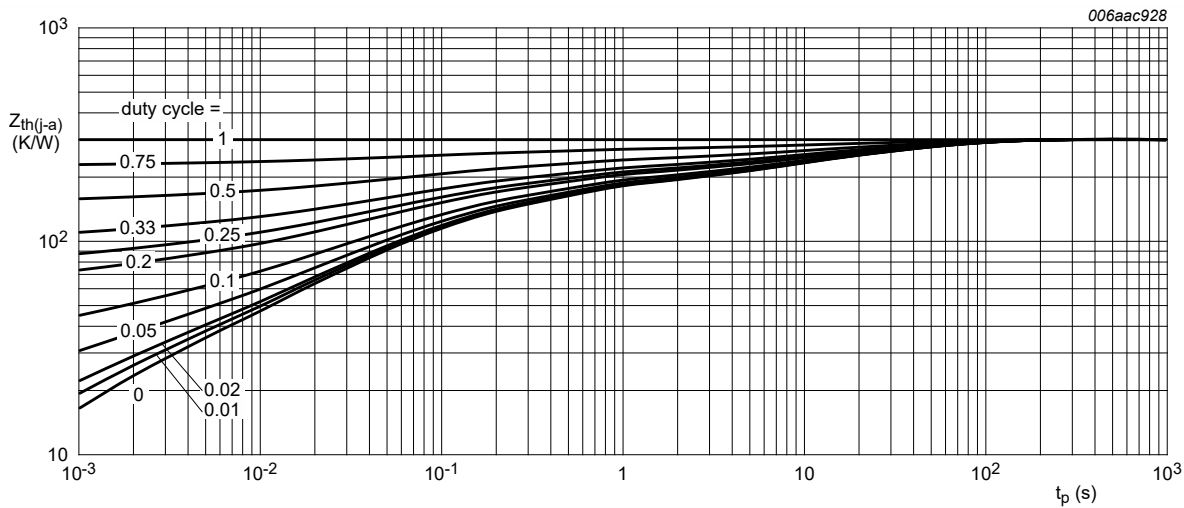
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Reflow soldering is the only recommended soldering method.

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

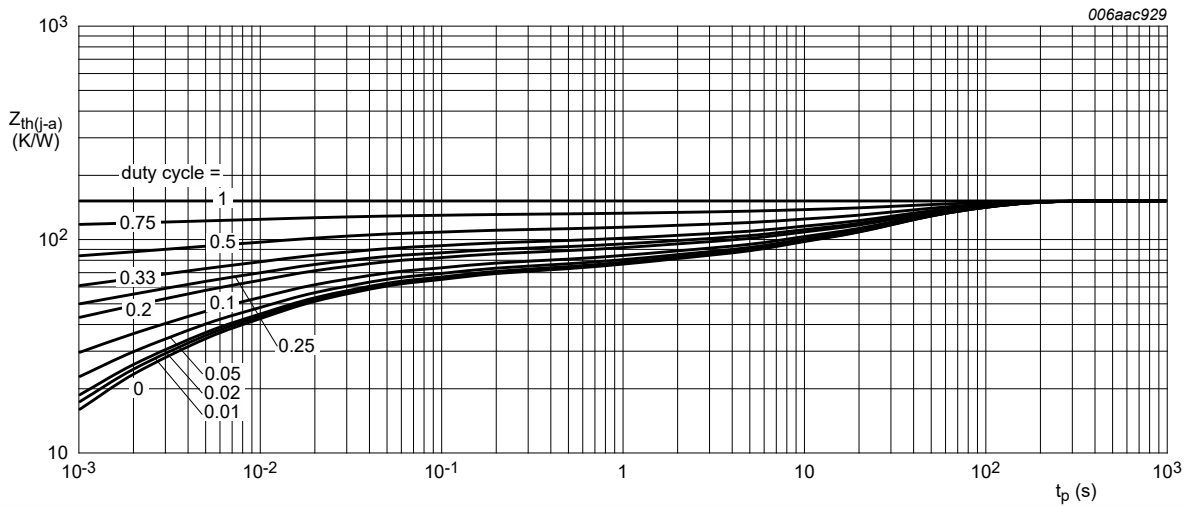
[5] Device mounted on a ceramic PCB,  $\text{Al}_2\text{O}_3$ , standard footprint.

[6] Soldering point of cathode tab.



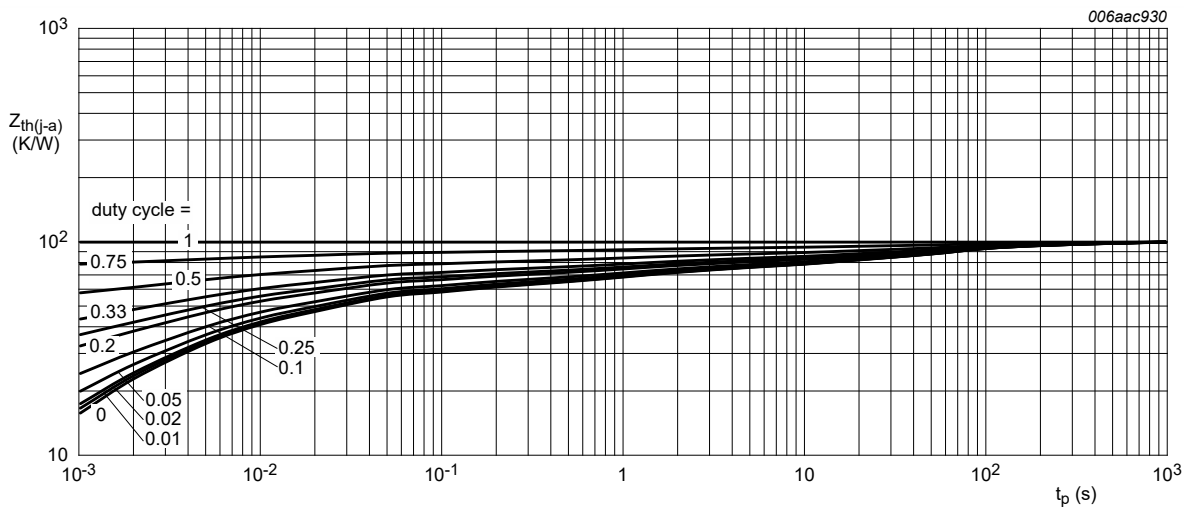
FR4 PCB, standard footprint

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; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>j</sub> = 25 °C	-	79	105	mV
		I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>j</sub> = 25 °C	-	137	170	mV
		I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>j</sub> = 25 °C	-	197	235	mV
		I <sub>F</sub> = 100 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>j</sub> = 25 °C	-	266	310	mV
		I <sub>F</sub> = 500 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>j</sub> = 25 °C	-	353	390	mV
I <sub>R</sub>	reverse current	V <sub>R</sub> = 10 V; T <sub>j</sub> = 25 °C	-	28	50	μA
		V <sub>R</sub> = 20 V; T <sub>j</sub> = 25 °C	-	87	200	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>j</sub> = 25 °C	-	31	40	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 0.5 A; I <sub>R</sub> = 0.5 A; I <sub>R(meas)</sub> = 0.1 A; T <sub>j</sub> = 25 °C	-	1.6	-	ns
V <sub>FRM</sub>	peak forward recovery voltage	I <sub>F</sub> = 0.5 A; dI <sub>F</sub> /dt = 20 A/μs; T <sub>j</sub> = 25 °C	-	565	-	mV

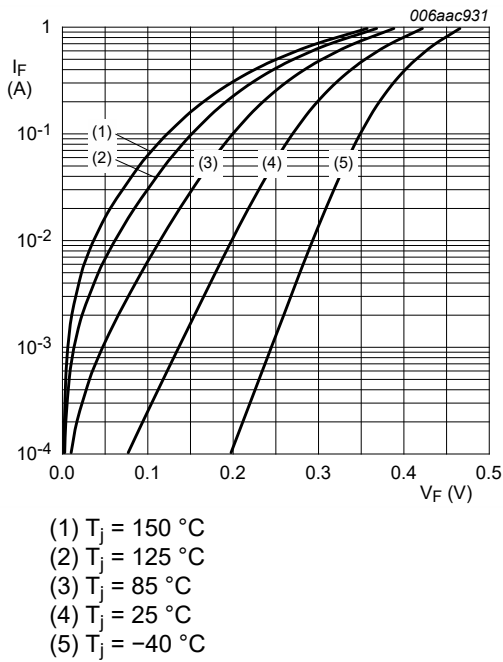


Fig. 5. Forward current as a function of forward voltage; typical values

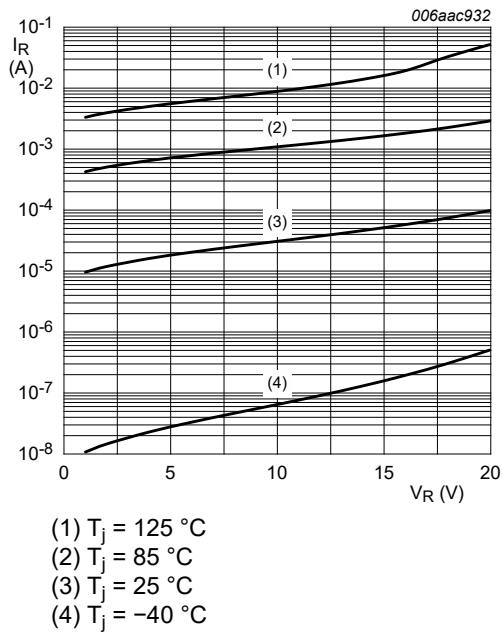
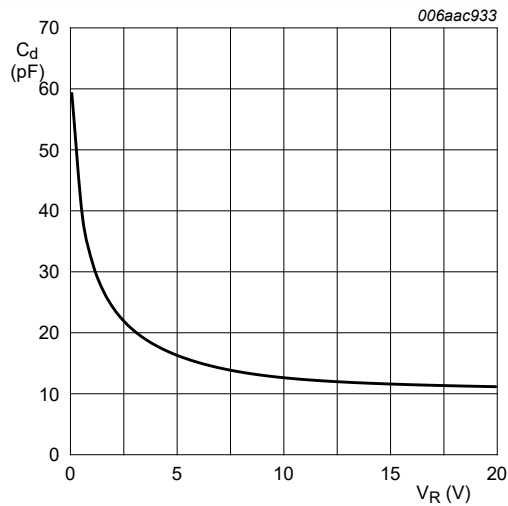
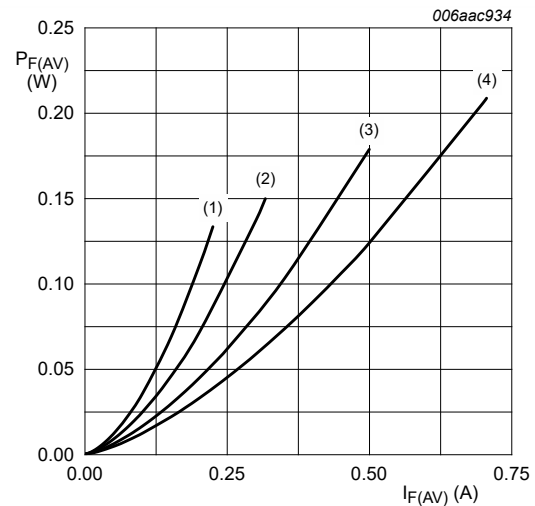


Fig. 6. Reverse current as a function of reverse voltage; typical values



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

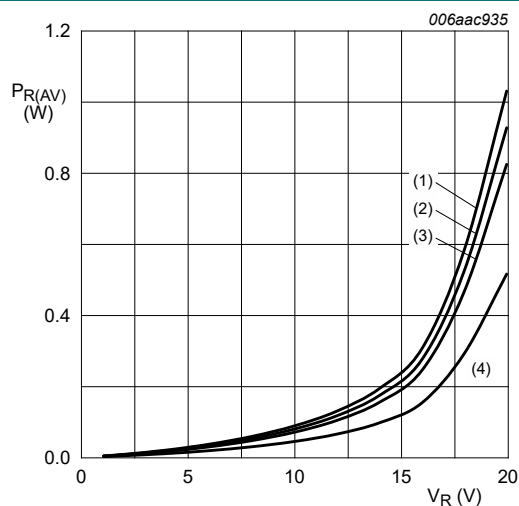
**Fig. 7.** Diode capacitance as a function of reverse voltage; typical values



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

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

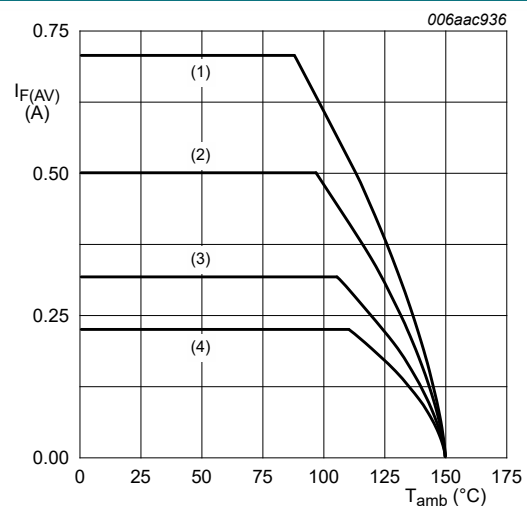
**Fig. 8.** Average forward power dissipation as a function of average forward current; typical values



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

- (1)  $\delta = 1 \text{ (DC)}$
- (2)  $\delta = 0.9$ ;  $f = 20 \text{ kHz}$
- (3)  $\delta = 0.8$ ;  $f = 20 \text{ kHz}$
- (4)  $\delta = 0.5$ ;  $f = 20 \text{ kHz}$

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

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

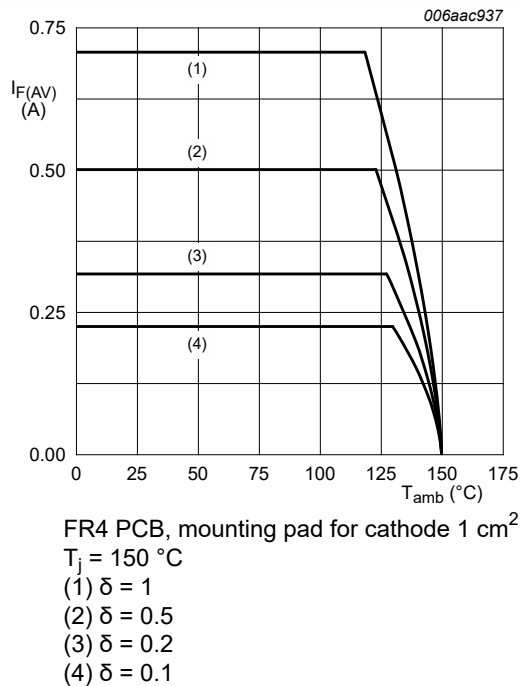


Fig. 11. Average forward current as a function of ambient temperature; typical values

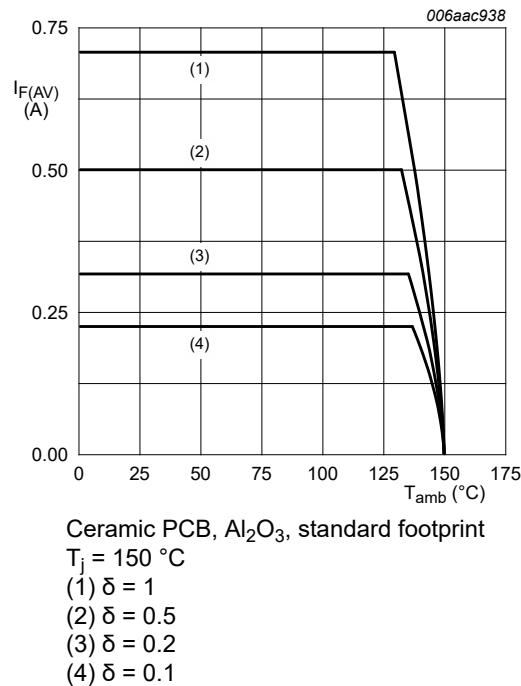


Fig. 12. Average forward current as a function of ambient temperature; typical values

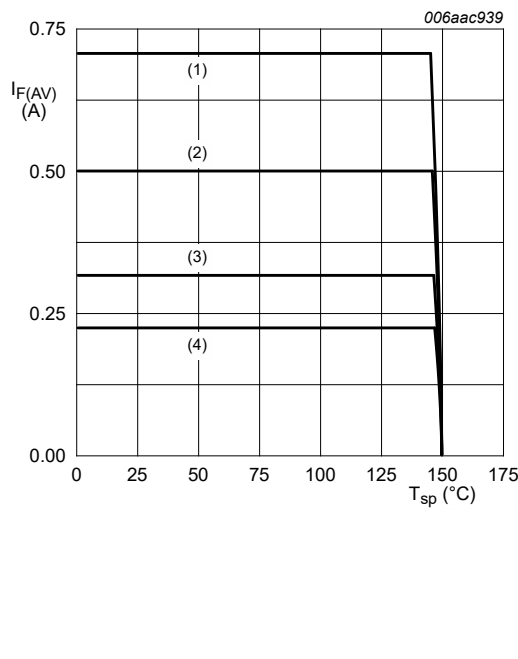


Fig. 13. Average forward current as a function of solder point temperature; typical values

11. Test information

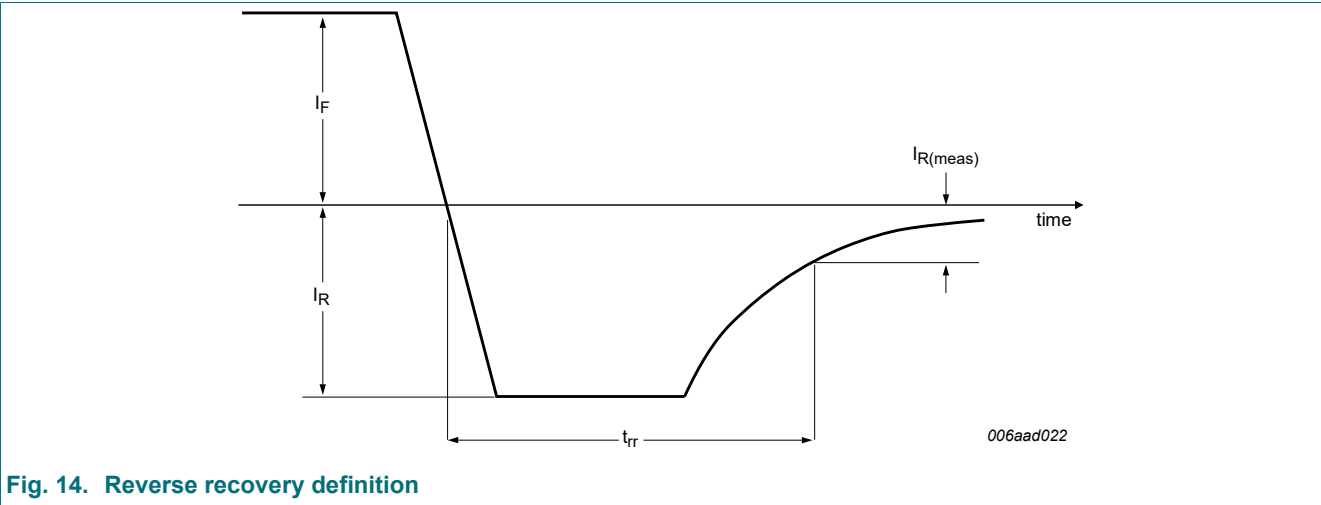


Fig. 14. Reverse recovery definition

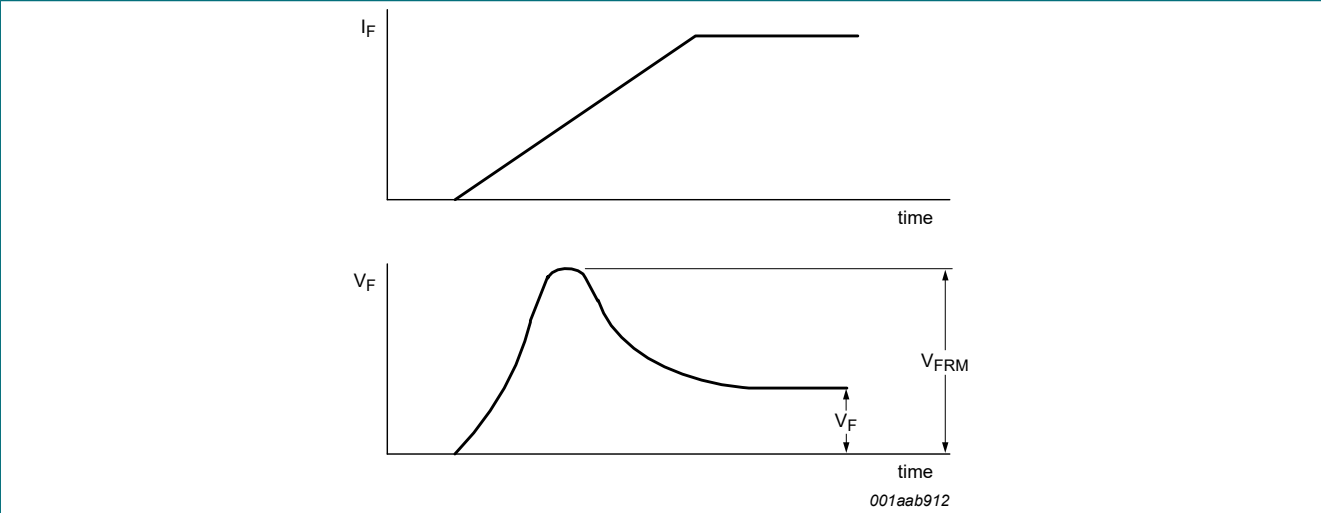


Fig. 15. Forward recovery definition

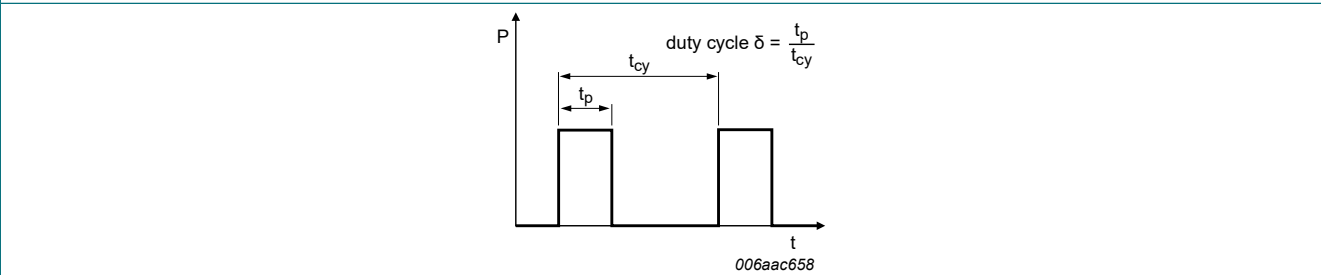
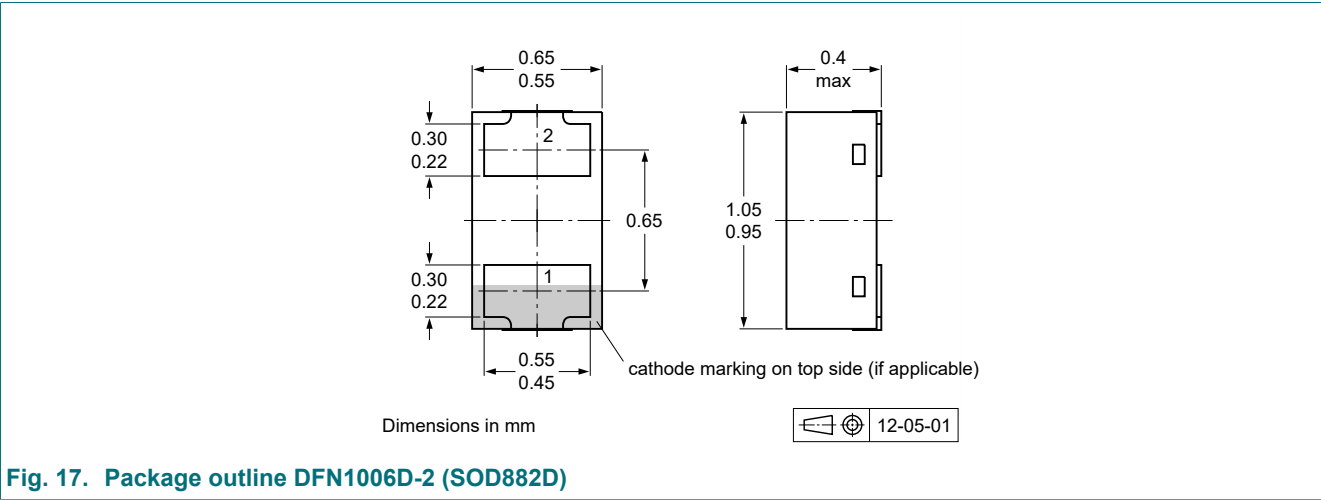


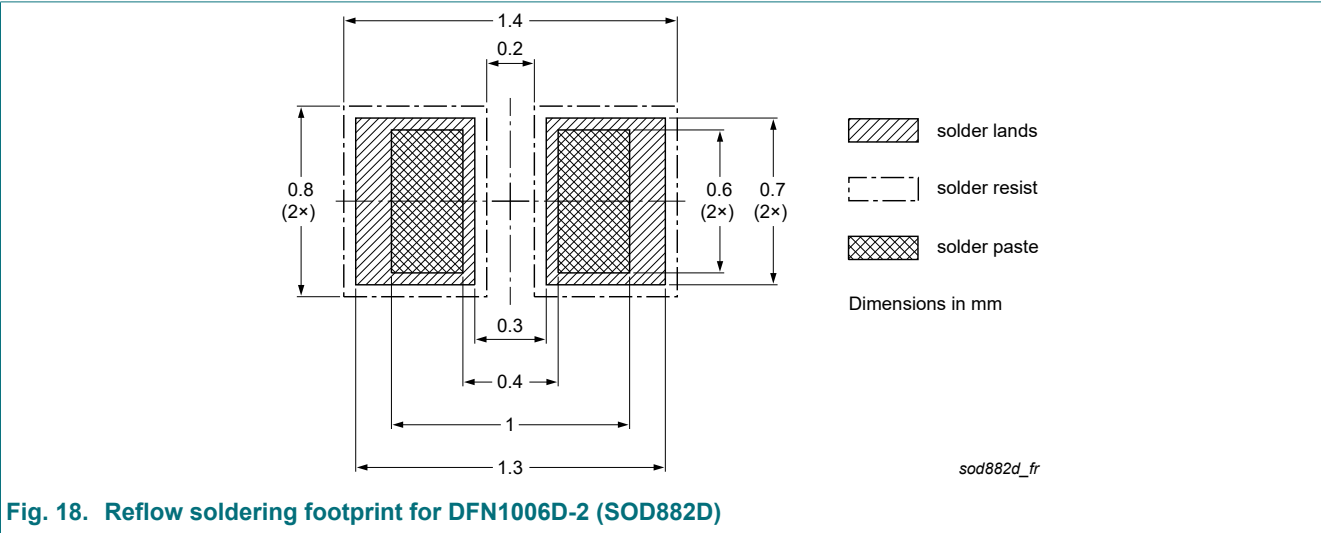
Fig. 16. Duty cycle definition

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



13. Soldering



## 14. Revision history

**Table 8. Revision history**

Document ID	Release date	Document status	Change notice	Supersedes
PMEG2005BELD v.5	20221102	Product data sheet	-	PMEG2005BELD v.4
Modifications:	<ul style="list-style-type: none"><li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li></ul>			
PMEG2005BELD v.4	20150804	Product data sheet	-	PMEG2005BELD v.3
PMEG2005BELD v.3	20120704	Product data sheet	-	PMEG2005BELD v.2
PMEG2005BELD v.2	20120312	Product data sheet	-	PMEG2005BELD v.1
PMEG2005BELD v.1	20120111	Preliminary 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".
- [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 <https://www.nexperia.com>.

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