



# PMEG6002EJ

60 V, 0.2 A low VF Schottky barrier rectifier

2 January 2023

Product data sheet

## 1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in an SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 0.2$  A
- Reverse voltage:  $V_R \leq 60$  V
- Low forward voltage
- Small and flat lead SMD plastic package

## 3. Applications

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

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq 145$ °C	-	-	0.2	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	60	V
$V_F$	forward voltage	$I_F = 200$ mA; $T_j = 25$ °C	-	540	600	mV
$I_R$	reverse current	$V_R = 60$ V; $T_j = 25$ °C	-	20	100	$\mu$ A

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-90 (SOD323F)	 K  A sym001
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PMEG6002EJ</a>	SC-90	plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body	<a href="#">SOD323F</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG6002EJ	1P

## 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	$T_j = 25\text{ °C}$		-	60	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{amb} \leq 130\text{ °C}$	[1]	-	0.2	A
		square-wave pulse; $\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{sp} \leq 145\text{ °C}$		-	0.2	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	2.6	A
$I_{FSM}$	non-repetitive peak forward current	square-wave pulse; $t_p = 8\text{ ms}$	[2]	-	2.75	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[3] [4]	-	385	mW
			[3] [5]	-	695	mW
			[3] [1]	-	1.045	W
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-65	150	°C

[1] Device mounted on a ceramic PCB,  $Al_2O_3$ , standard footprint.

[2]  $T_j = 25\text{ °C}$  prior to surge.

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

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

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

## 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]	-	-	325	K/W
			[1] [2] [4]	-	-	180	K/W
			[1] [2] [5]	-	-	120	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] Reflow soldering is the only recommended soldering method.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [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.

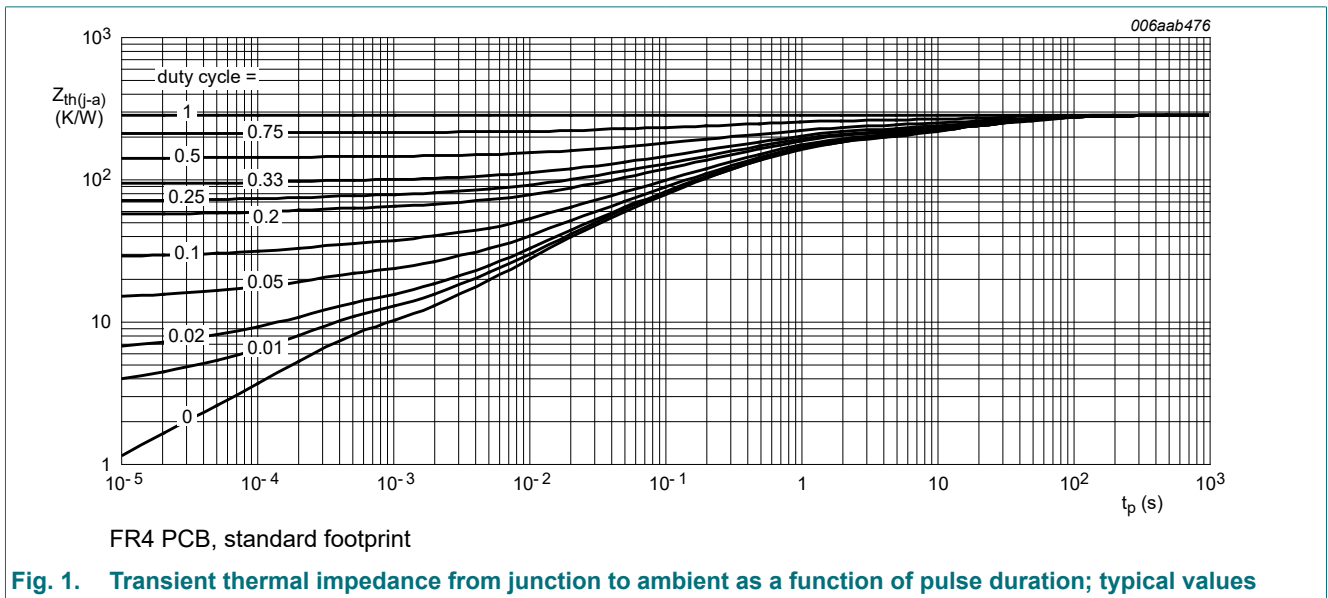


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

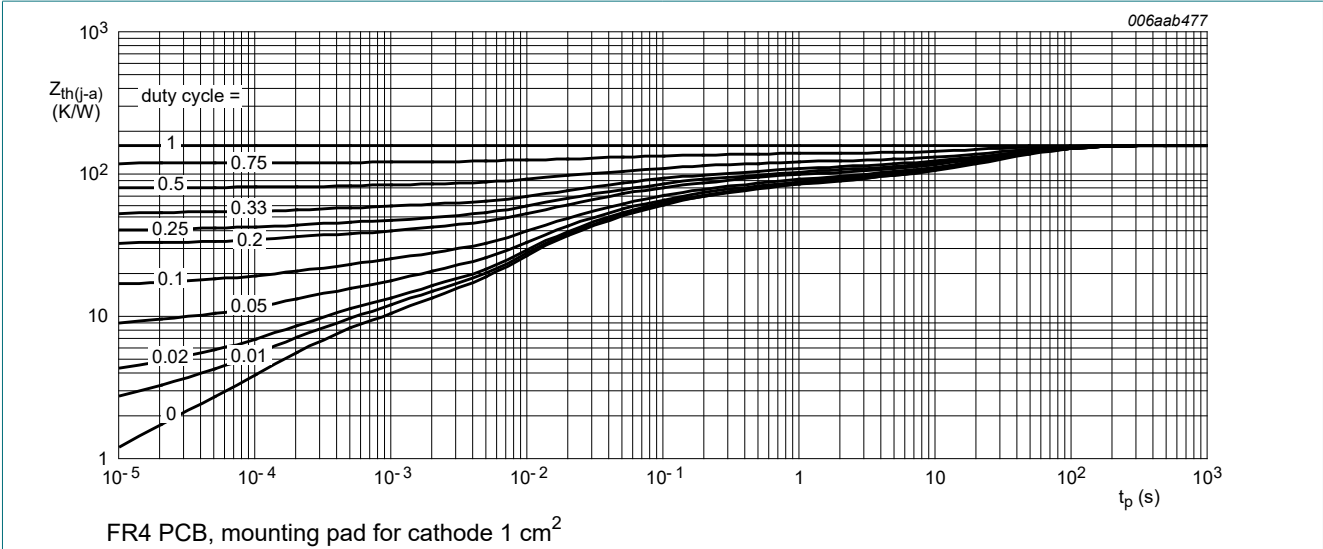


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

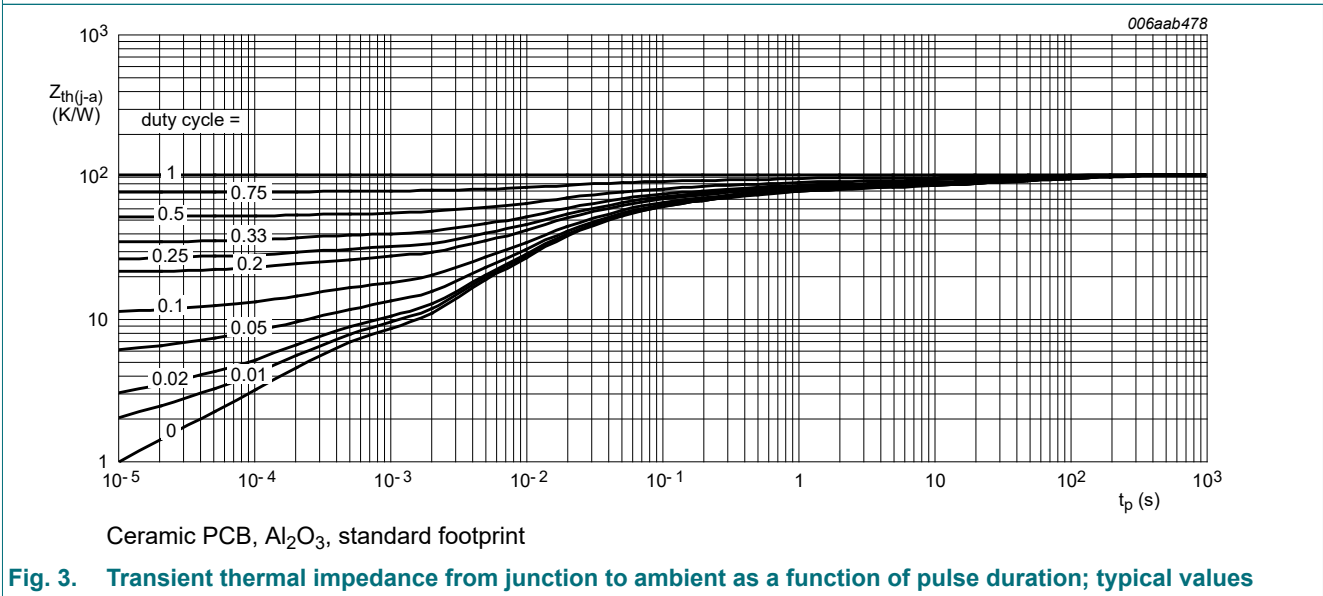
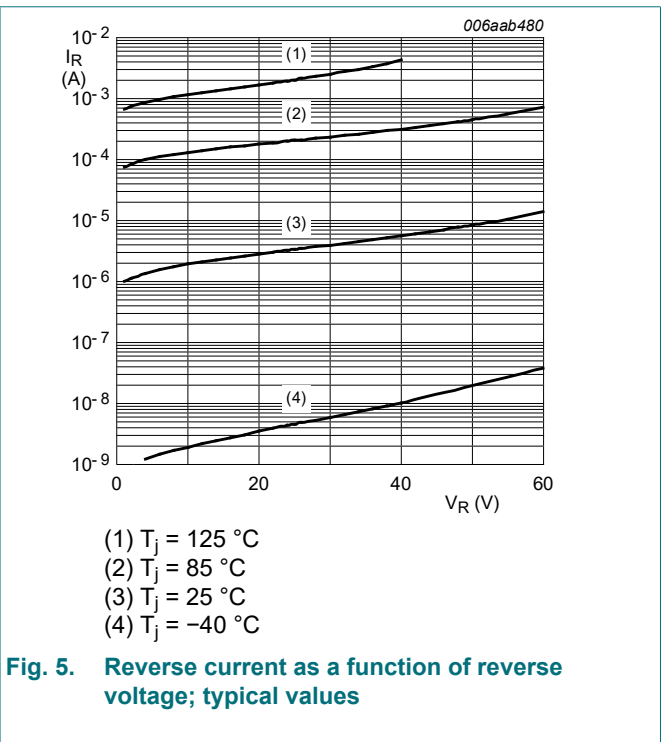
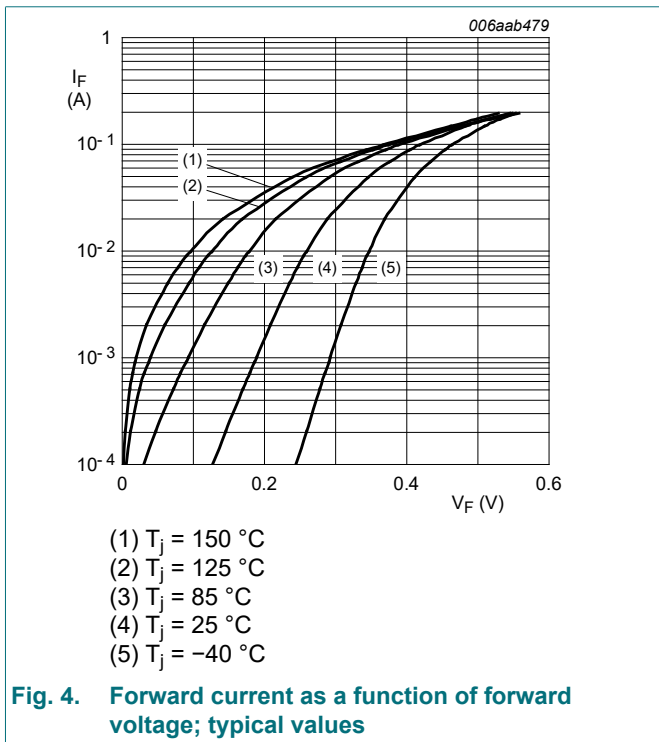


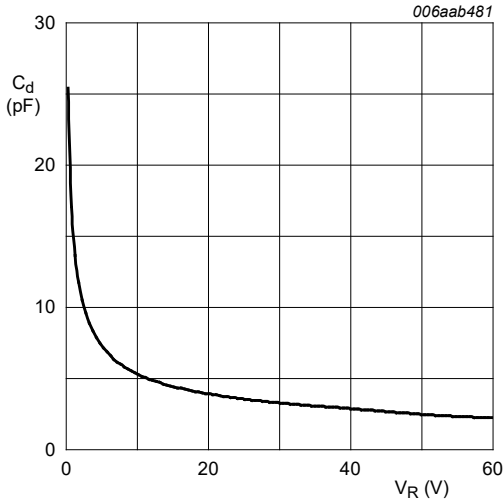
Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 7. Characteristics

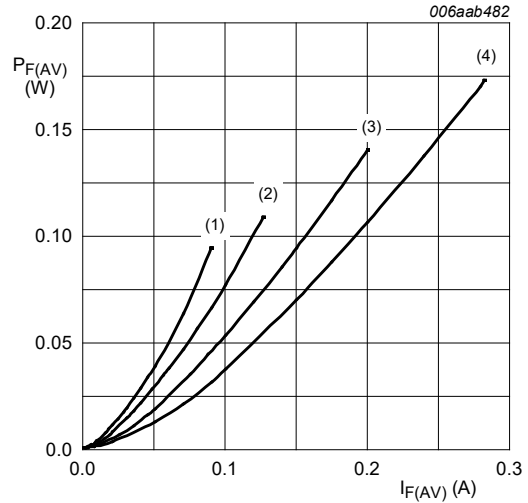
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 0.1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	130	170	mV
		$I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	190	230	mV
		$I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	260	300	mV
		$I_F = 100 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	420	470	mV
		$I_F = 200 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	540	600	mV
$I_R$	reverse current	$V_R = 10 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	2	10	$\mu\text{A}$
		$V_R = 50 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	9	30	$\mu\text{A}$
		$V_R = 60 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	20	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	14	-	pF
		$V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	6	-	pF
$t_{rr}$	reverse recovery time	$T_j = 25 \text{ }^\circ\text{C}$ ; When switched from $I_F = 10 \text{ mA}$ to $I_R = 10 \text{ mA}$ ; $R_L = 100 \text{ } \Omega$ ; measured at $I_R = 1 \text{ mA}$ .	-	5	-	ns





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

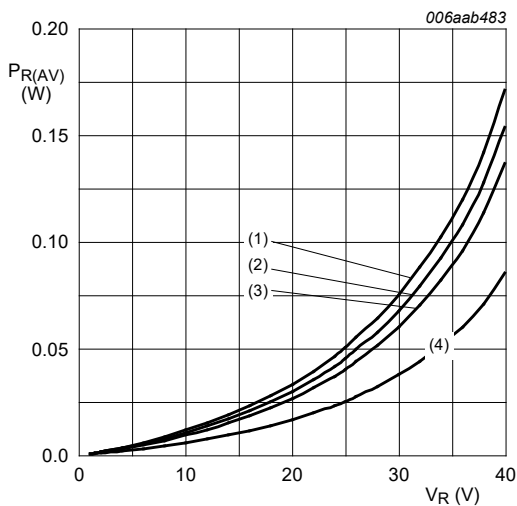
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values**



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

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

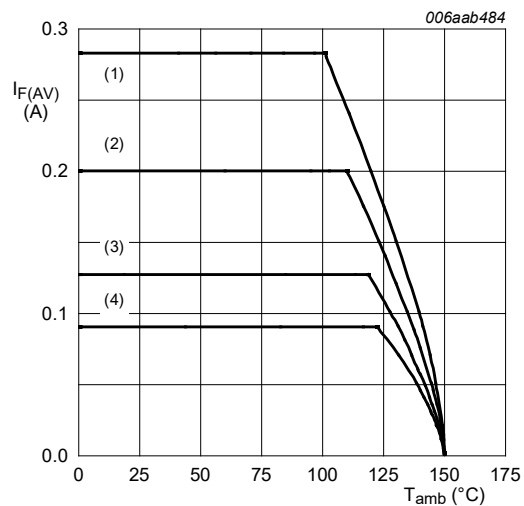
**Fig. 7. Average forward power dissipation as a function of average forward current; typical values**



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

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

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

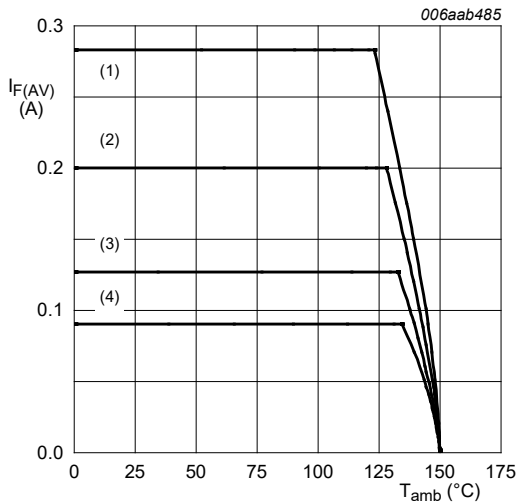


FR4 PCB, standard footprint

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

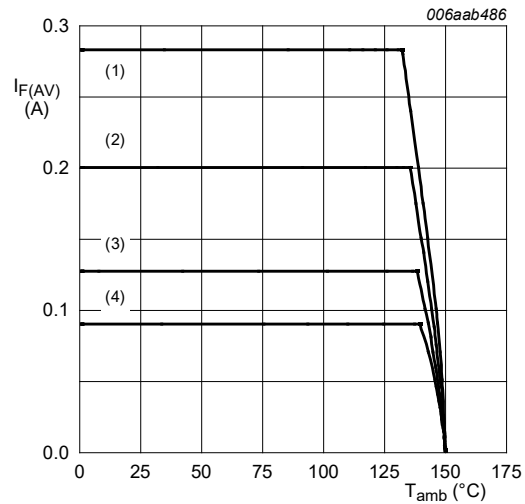
- (1)  $\delta = 1$  (DC)
- (2)  $\delta = 0.5; f = 20 \text{ kHz}$
- (3)  $\delta = 0.2; f = 20 \text{ kHz}$
- (4)  $\delta = 0.1; f = 20 \text{ kHz}$

**Fig. 9. Average forward current as a function of ambient temperature; typical values**



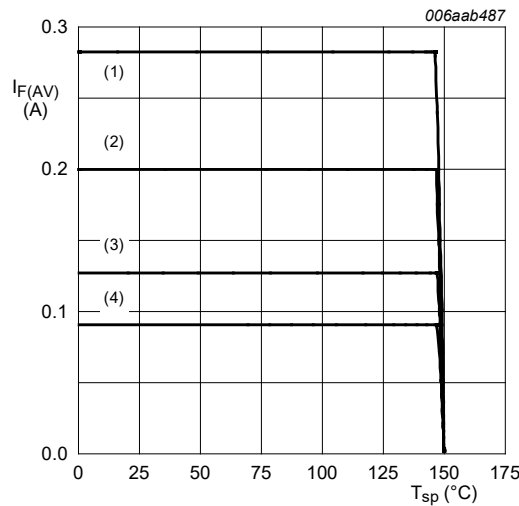
FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>  
 $T_j = 150\text{ °C}$   
 (1)  $\delta = 1$  (DC)  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

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



Ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, 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. 11. 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. 12. Average forward current as a function of solder point temperature; typical values**

### 11. Test information

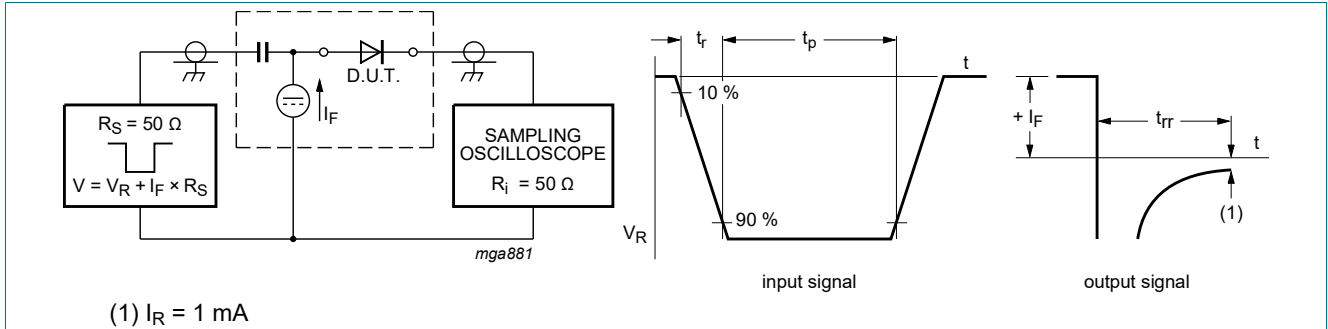


Fig. 13. Reverse recovery time: test circuit and waveforms

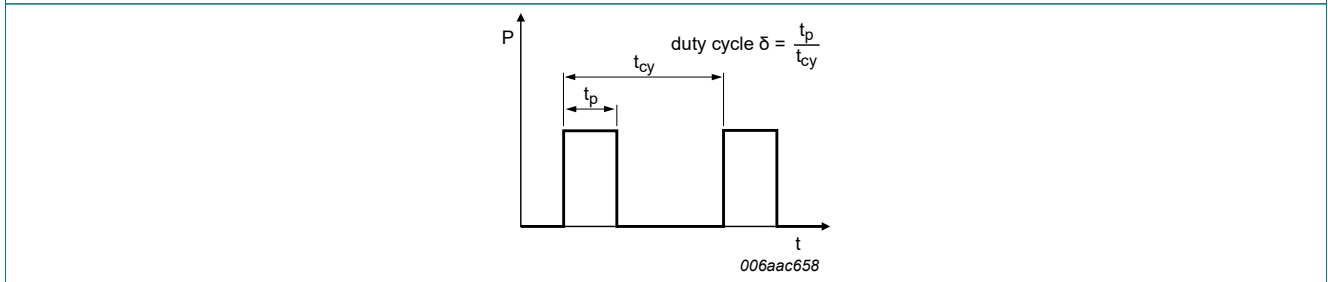


Fig. 14. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:

$$I_{F(AV)} = I_M \times \delta \text{ with } I_M \text{ defined as peak current}$$

$$I_{RMS} = I_{F(AV)} \text{ at DC}$$

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

### 12. Package outline

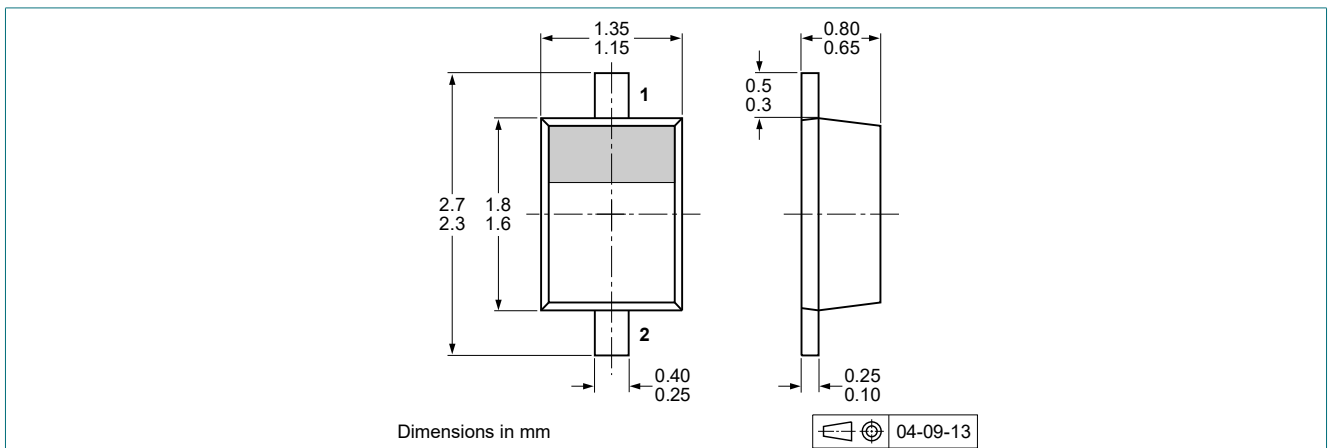


Fig. 15. Package outline SC-90 (SOD323F)



### 13. Soldering

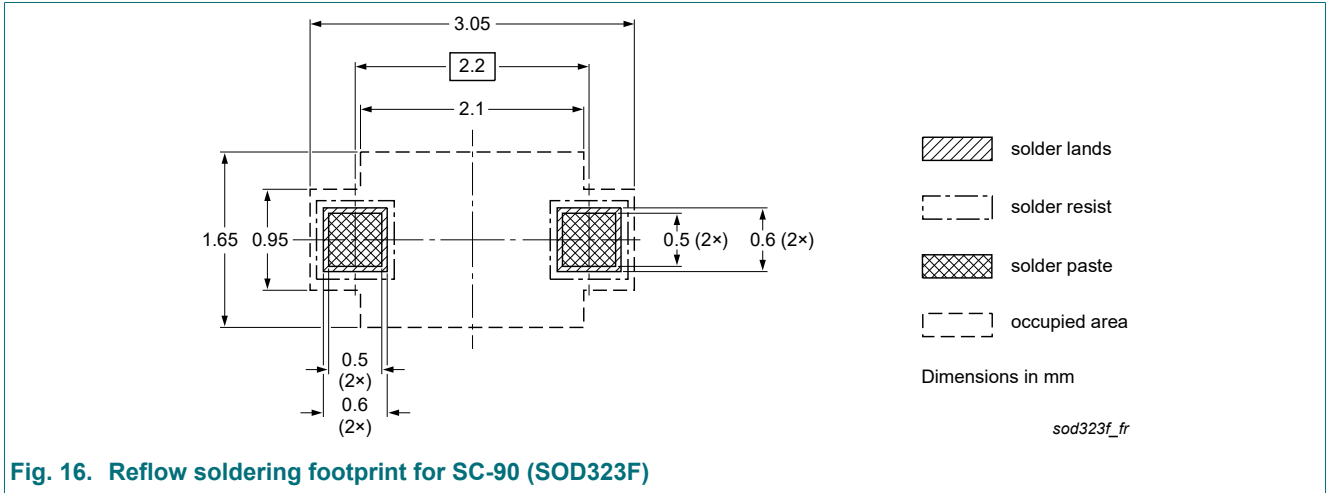


Fig. 16. Reflow soldering footprint for SC-90 (SOD323F)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG6002EJ v.2	20230102	Product data sheet	-	PMEG6002EJ_1
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Section packing information removed.</li> <li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li> </ul>			
PMEG6002EJ_1	20090515	Product data sheet	-	-

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### 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.

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