



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	μ 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
PMEG6002EJ	SC-90	plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body	SOD323F

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 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 cm².
- [5] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
- [6] Soldering point of cathode tab.

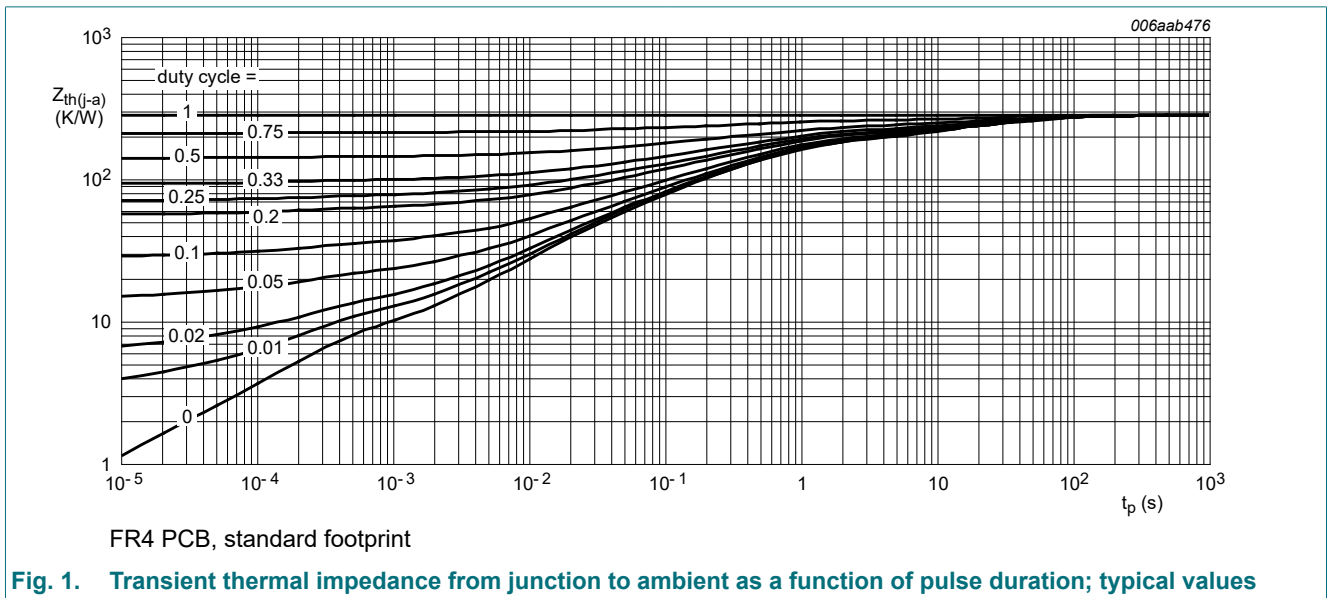


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

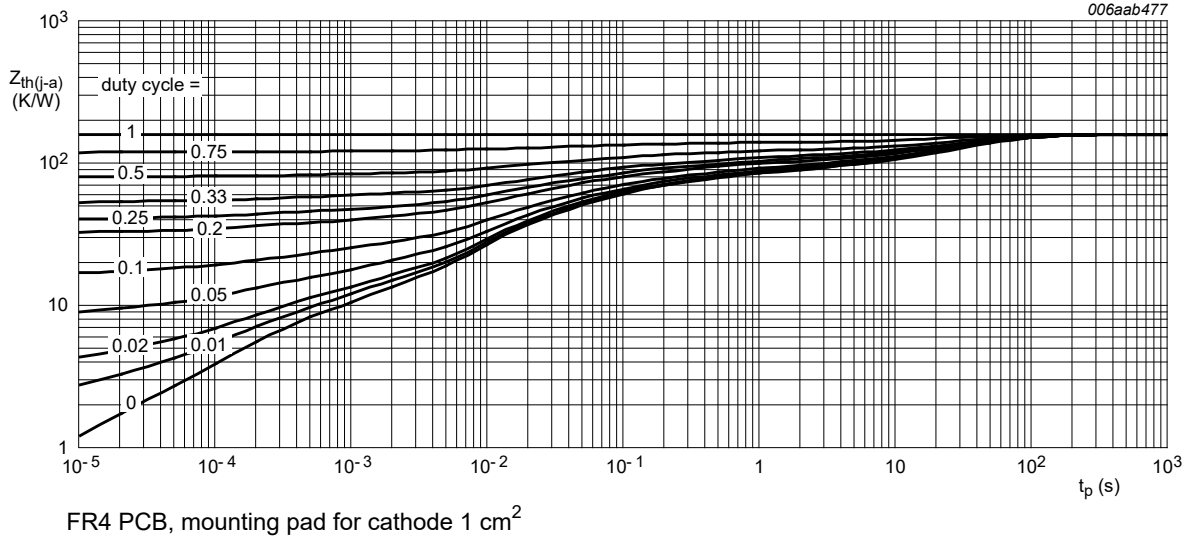


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

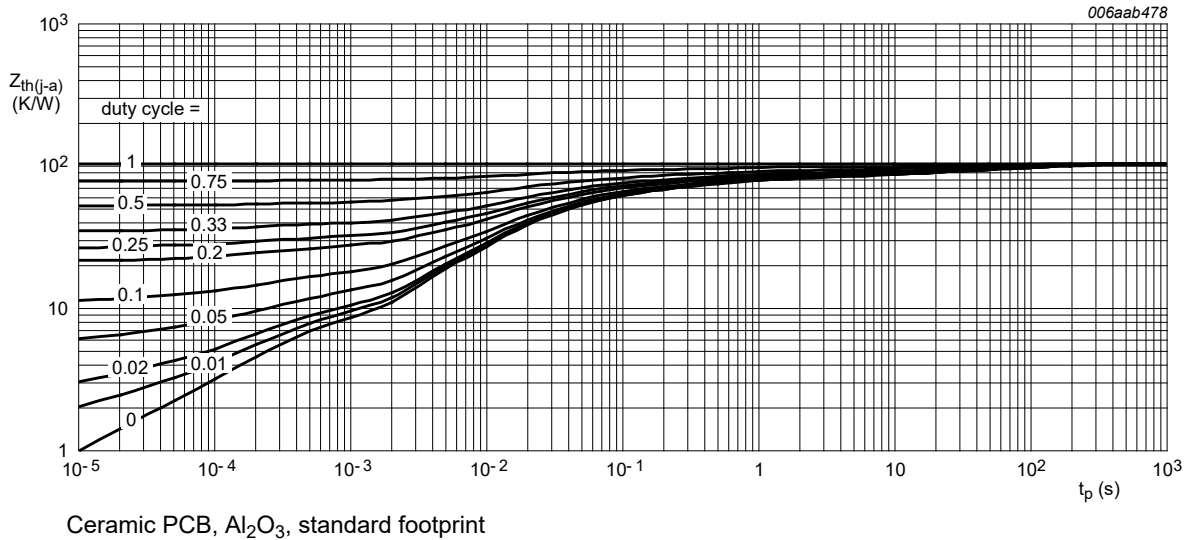
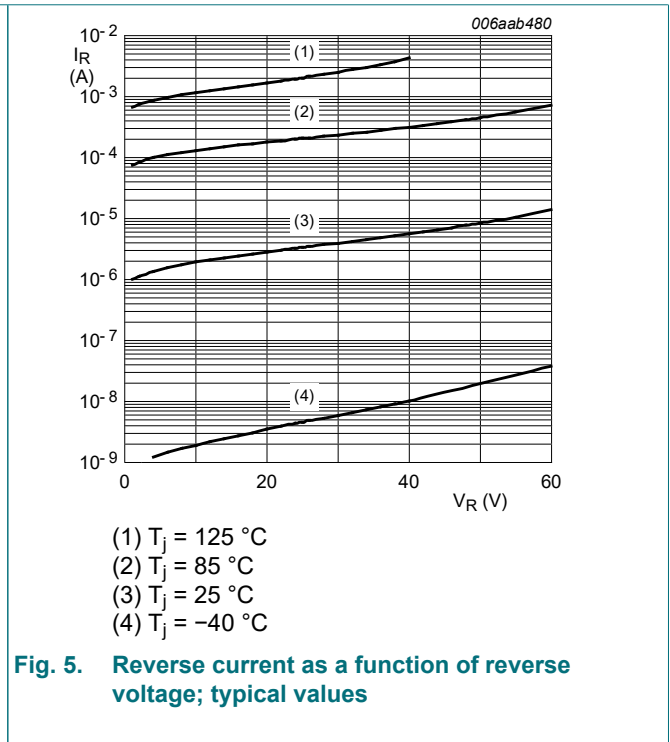
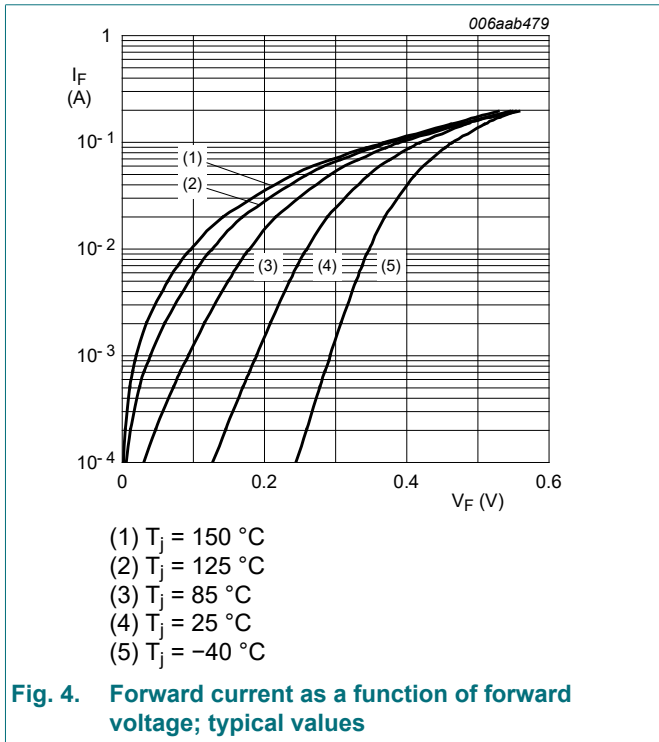


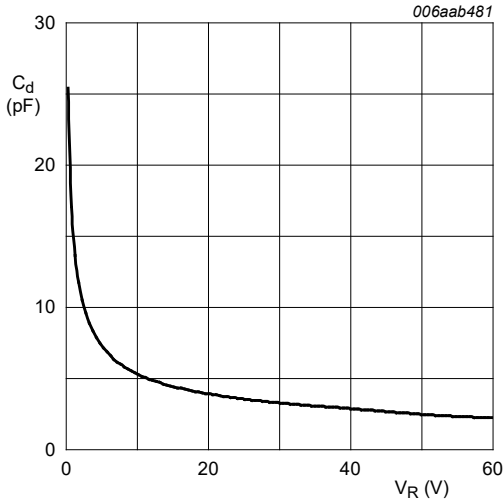
Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

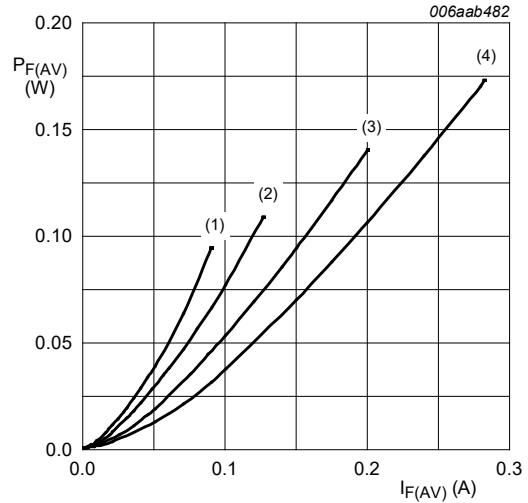
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 0.1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	130	170	mV
		$I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	190	230	mV
		$I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	260	300	mV
		$I_F = 100 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	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	μA
		$V_R = 50 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	9	30	μA
		$V_R = 60 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	20	100	μA
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





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

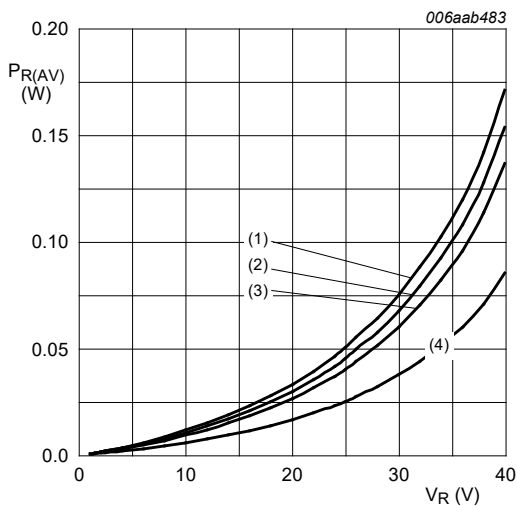
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



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

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

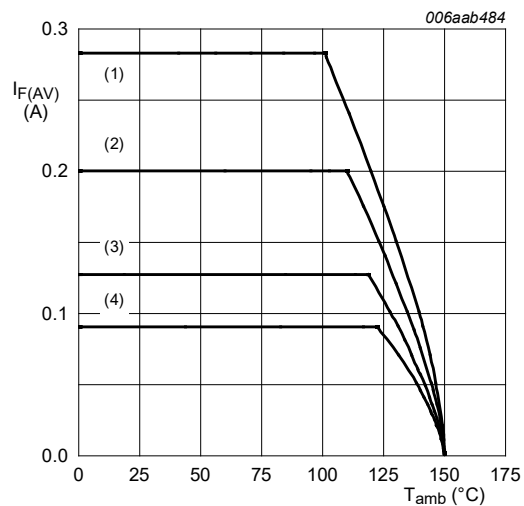
Fig. 7. Average forward power dissipation as a function of average forward current; typical values



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

- (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

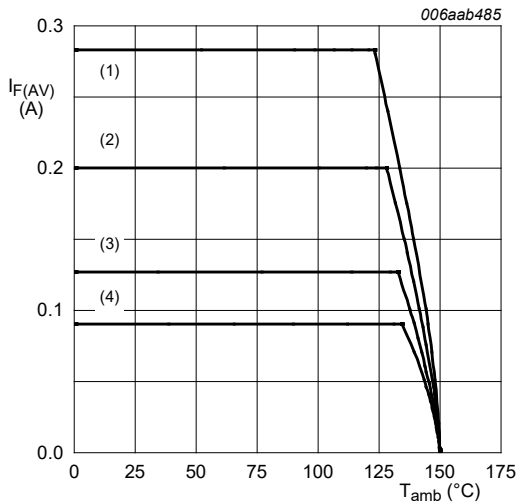


FR4 PCB, standard footprint

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

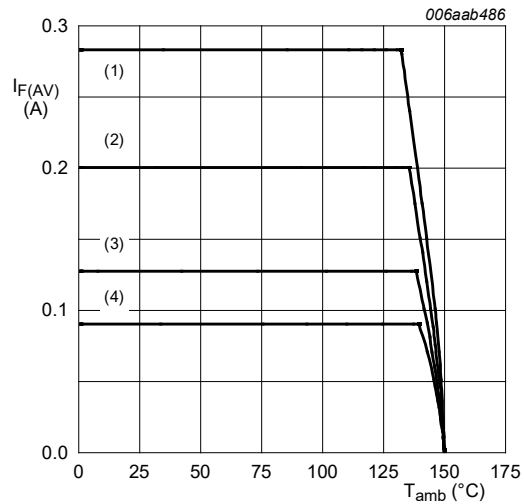
- (1) $\delta = 1$ (DC)
- (2) $\delta = 0.5; f = 20 \text{ kHz}$
- (3) $\delta = 0.2; f = 20 \text{ kHz}$
- (4) $\delta = 0.1; f = 20 \text{ kHz}$

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



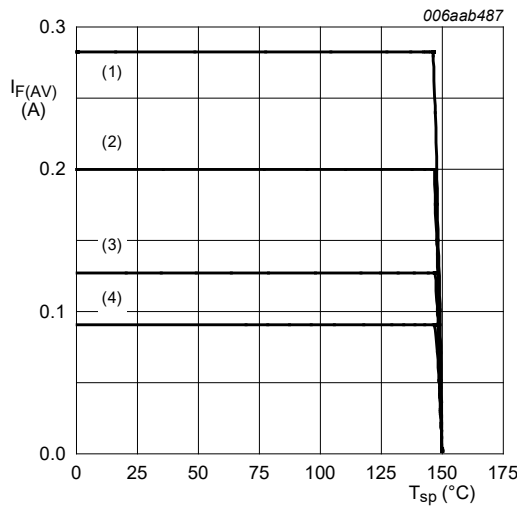
FR4 PCB, mounting pad for cathode 1 cm²
 $T_j = 150\text{ °C}$
 (1) $\delta = 1$ (DC)
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



Ceramic PCB, Al₂O₃, 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

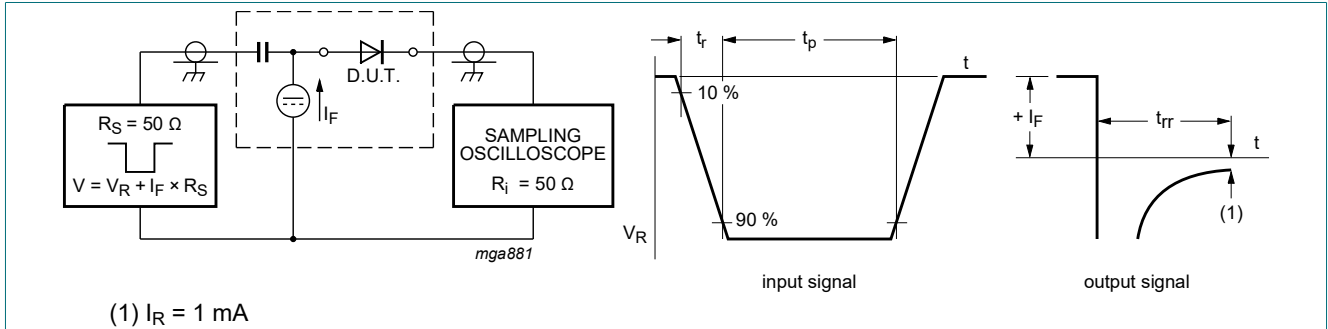


Fig. 13. Reverse recovery time: test circuit and waveforms

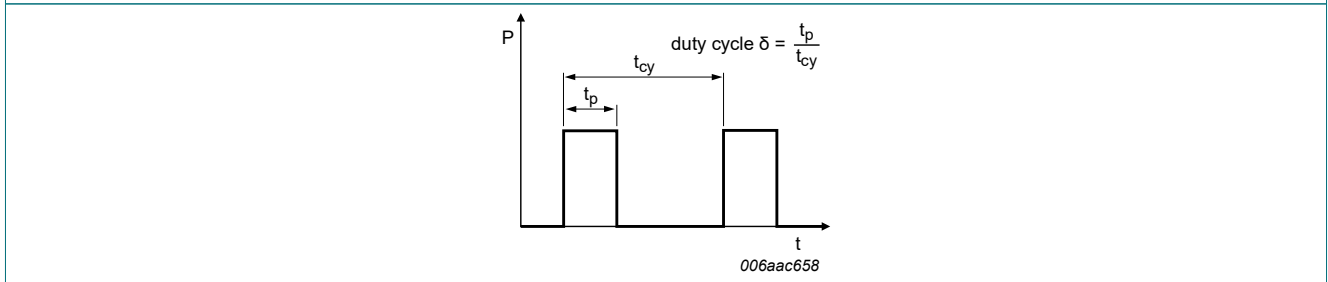


Fig. 14. Duty cycle definition

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

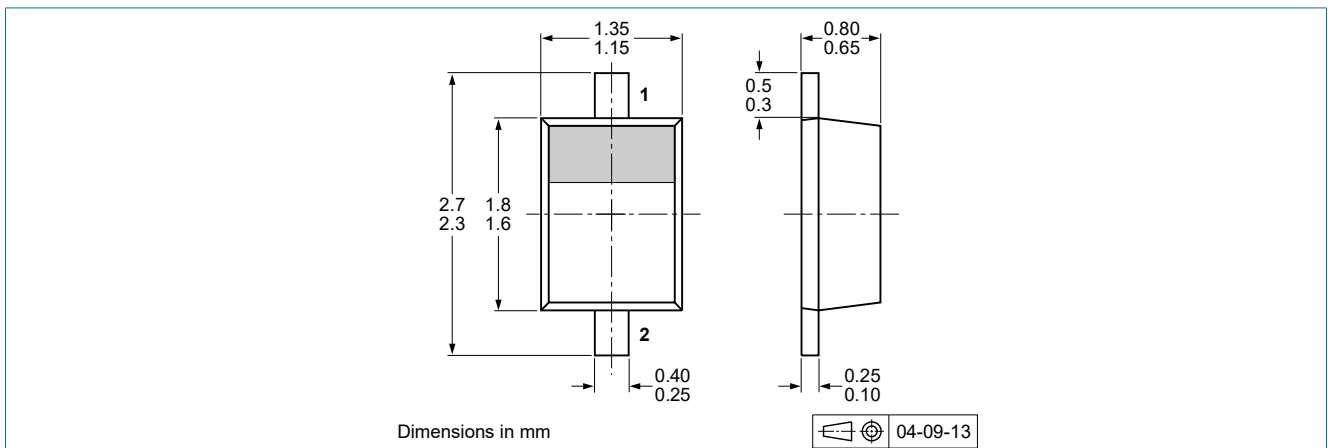


Fig. 15. Package outline SC-90 (SOD323F)

13. Soldering

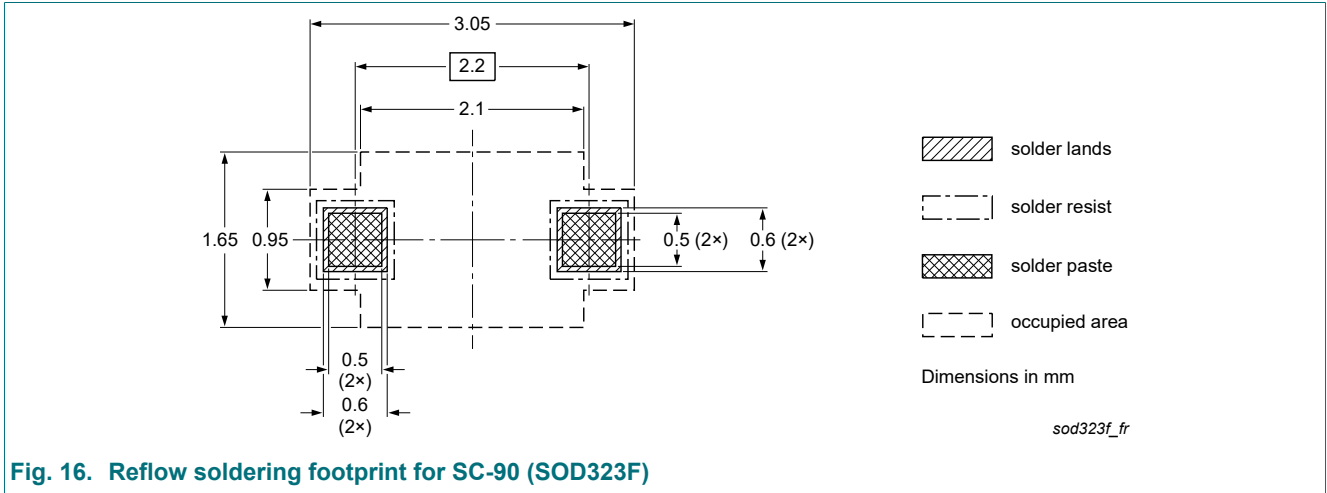


Fig. 16. Reflow soldering footprint for SC-90 (SOD323F)

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"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Section packing information removed. Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
PMEG6002EJ_1	20090515	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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