



# PMEG4005CT

500 mA low VF dual Schottky barrier rectifier

8 October 2024

Product data sheet

## 1. General description

Planar Schottky barrier rectifier in common cathode configuration with an integrated guard ring for stress protection, encapsulated in a SOT23 small Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 0.5$  A
- Reverse voltage:  $V_R \leq 40$  V
- Small SMD plastic package
- Low forward voltage

## 3. Applications

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

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq 130$ °C	-	-	0.5	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	40	V
$V_F$	forward voltage	$I_F = 500$ mA; $T_j = 25$ °C	-	410	470	mV
$I_R$	reverse current	$V_R = 40$ V; $T_j = 25$ °C	-	27	100	µA

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode (diode 1)	 SOT23	 006aaa438
2	A	anode (diode 2)		
3	K1, K2	common cathode (diode 1 and diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG4005CT	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMEG4005CT	PA%

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	40	V
I <sub>F(AV)</sub>	average forward current	square-wave pulse; δ = 0.5; f = 20 kHz; T <sub>amb</sub> ≤ 85 °C	[1]	-	0.5	A
		square-wave pulse; δ = 0.5; f = 20 kHz; T <sub>sp</sub> ≤ 130 °C		-	0.5	A
I <sub>FRM</sub>	repetitive peak forward current	t <sub>p</sub> ≤ 1 ms; δ ≤ 0.25		-	3.9	A
I <sub>FSM</sub>	non-repetitive peak forward current	square-wave pulse; t <sub>p</sub> = 8 ms; T <sub>j(init)</sub> = 25 °C		-	10	A
Per device; one diode loaded						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[2]	-	330	mW
			[3]	-	400	mW
			[1]	-	460	mW
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 a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [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>.

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]	-	-	375	K/W
			[1] [3]	-	-	310	K/W
			[1] [4]	-	-	270	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[1] [5]	-	-	60	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.

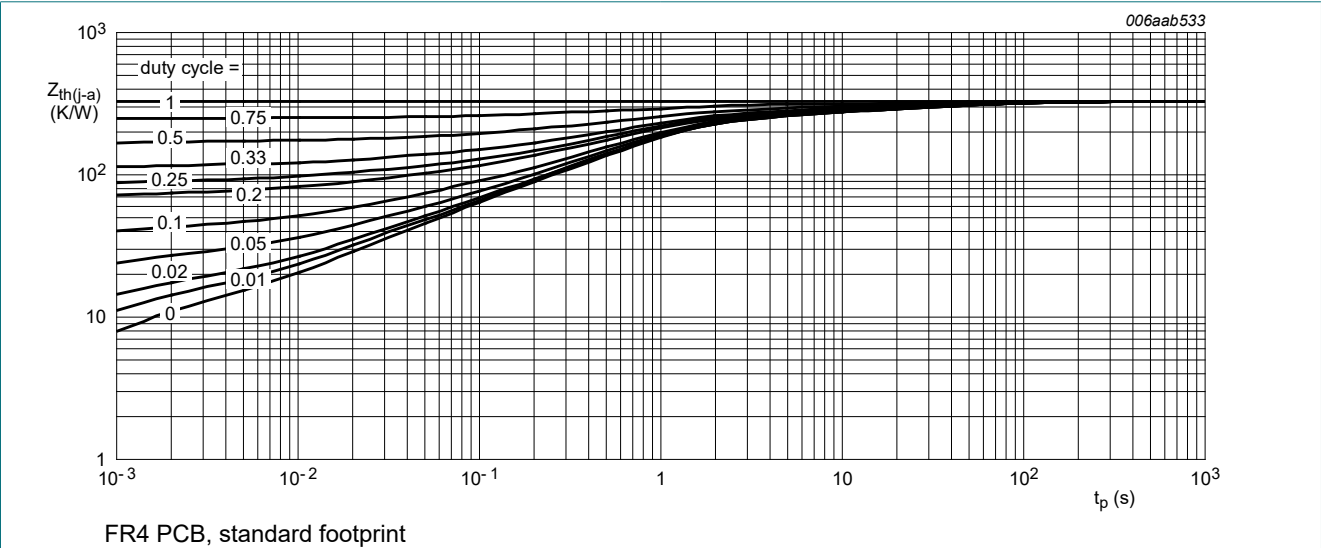


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

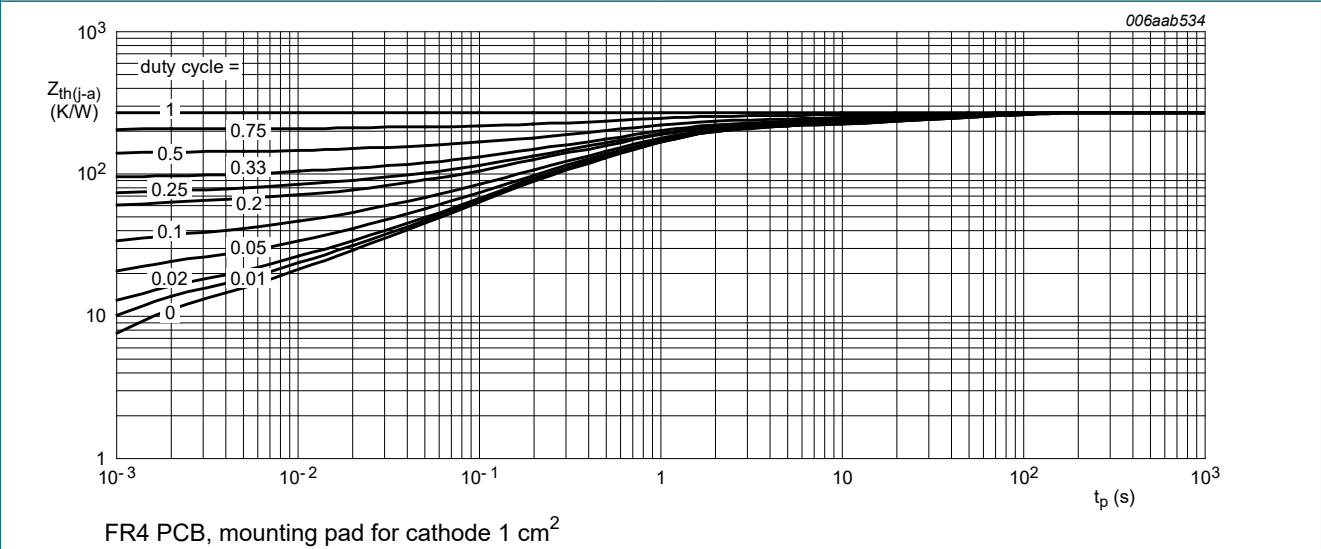
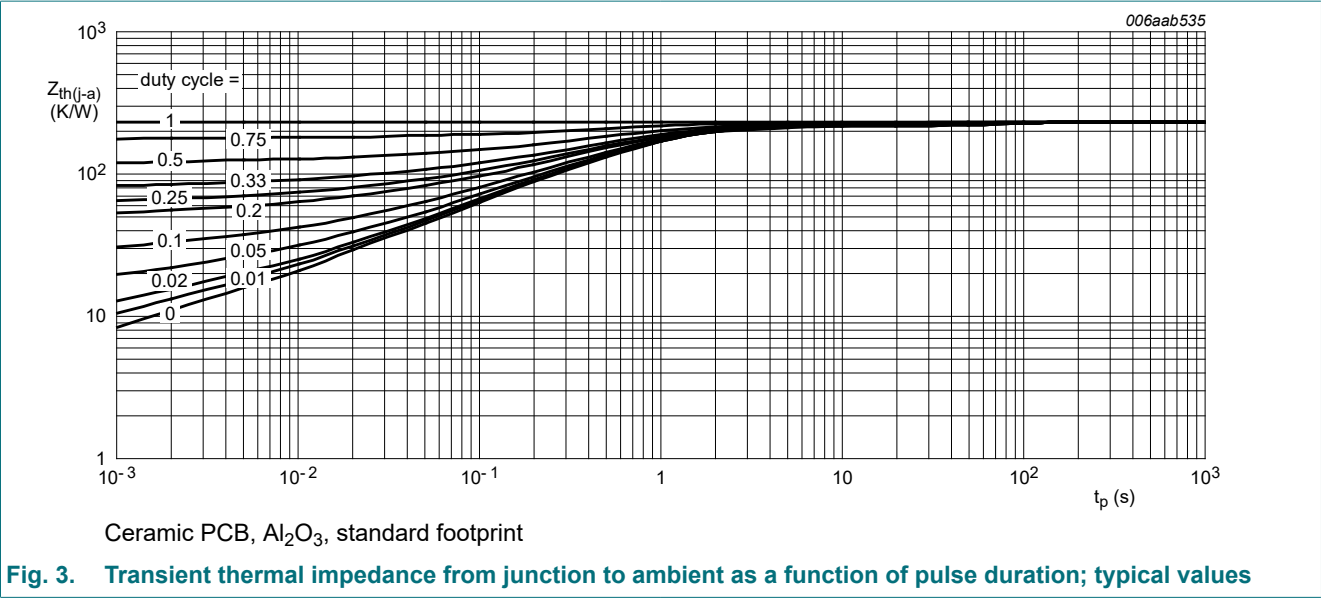


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
$V_F$	forward voltage	$I_F = 0.1\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	95	130	mV
		$I_F = 1\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	155	210	mV
		$I_F = 10\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	220	270	mV
		$I_F = 100\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	295	350	mV
		$I_F = 500\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	410	470	mV
$I_R$	reverse current	$V_R = 10\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$	-	7	20	$\mu\text{A}$
		$V_R = 40\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$	-	27	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^{\circ}\text{C}$	-	43	50	pF
$t_{rr}$	reverse recovery time	$I_F = 10\text{ mA}; I_R = 10\text{ mA}; I_{R(meas)} = 1\text{ mA}; R_L = 100\text{ }\Omega; T_j = 25\text{ }^{\circ}\text{C}$	-	13	-	ns

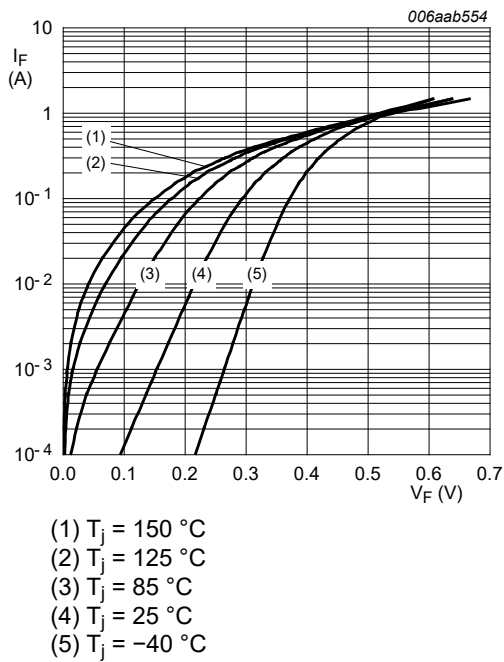


Fig. 4. Forward current as a function of forward voltage; typical values

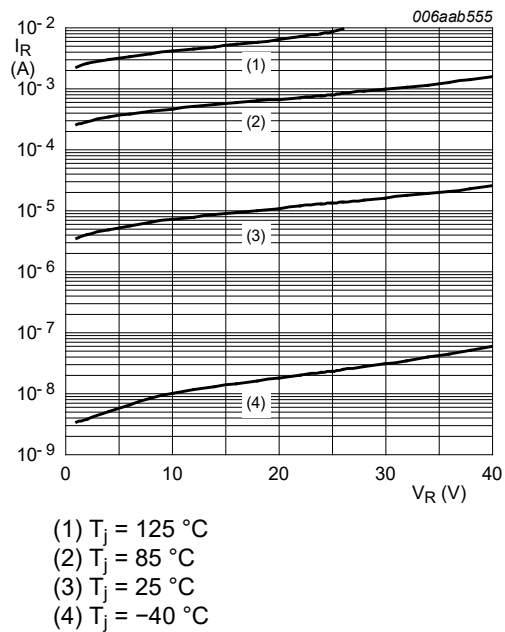


Fig. 5. Reverse current as a function of reverse voltage; typical values

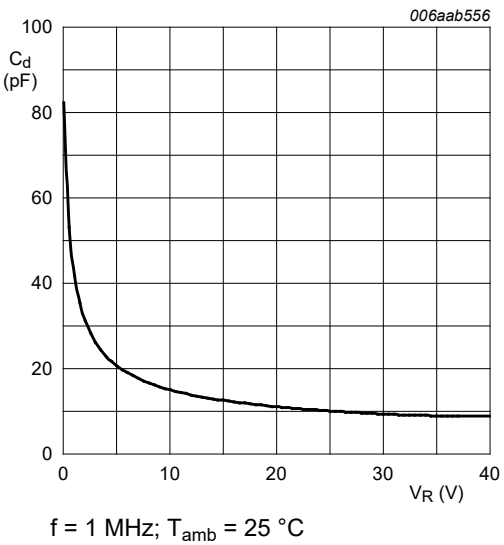


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

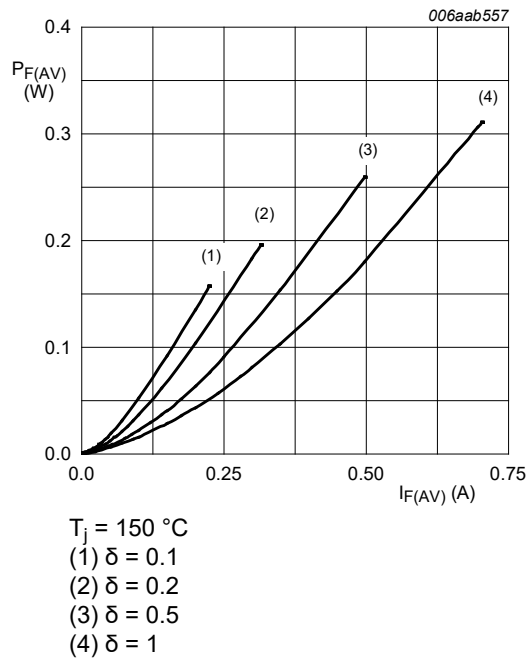
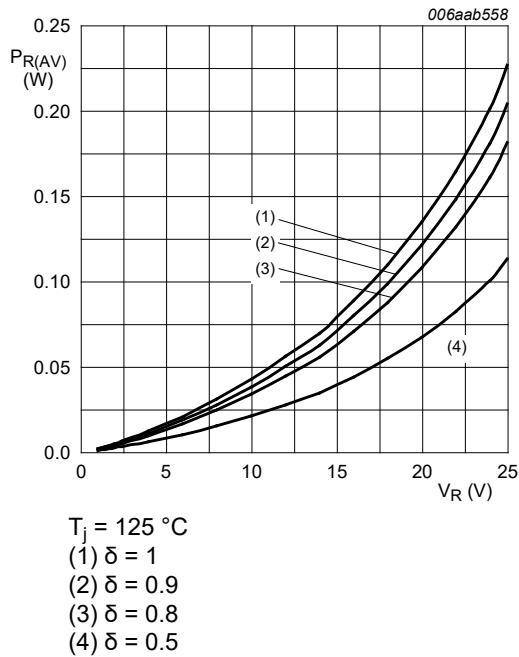
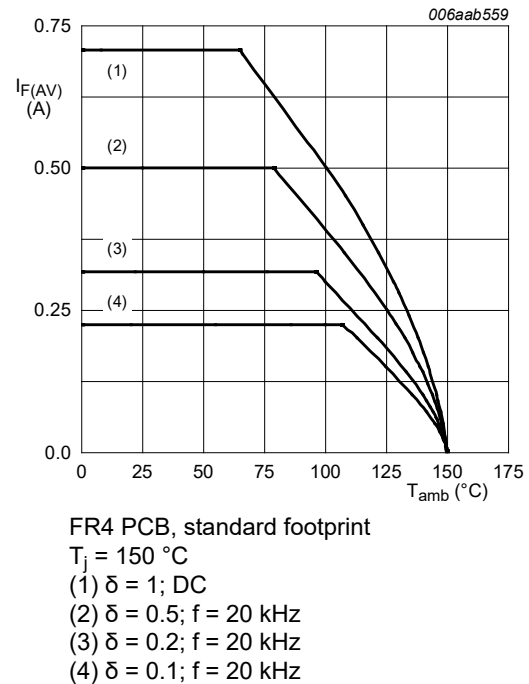


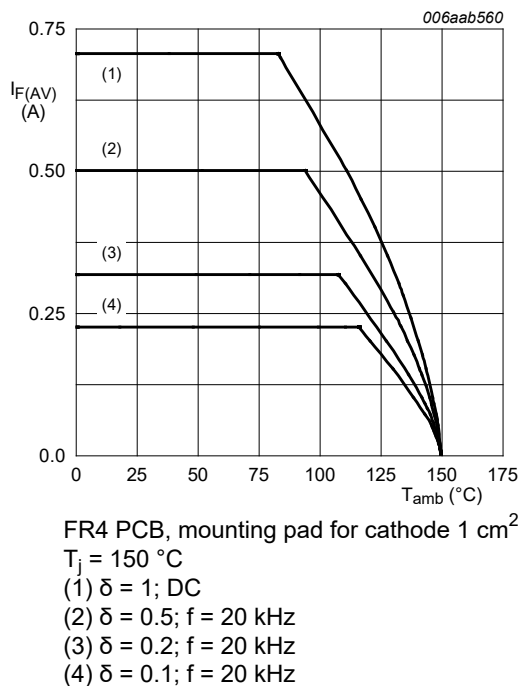
Fig. 7. Average forward power dissipation as a function of average forward current; typical values



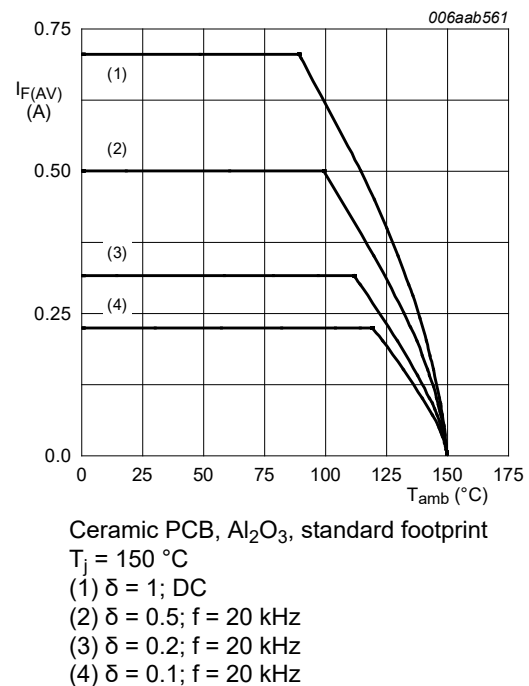
**Fig. 8.** Average reverse power dissipation as a function of reverse voltage; typical values



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



**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

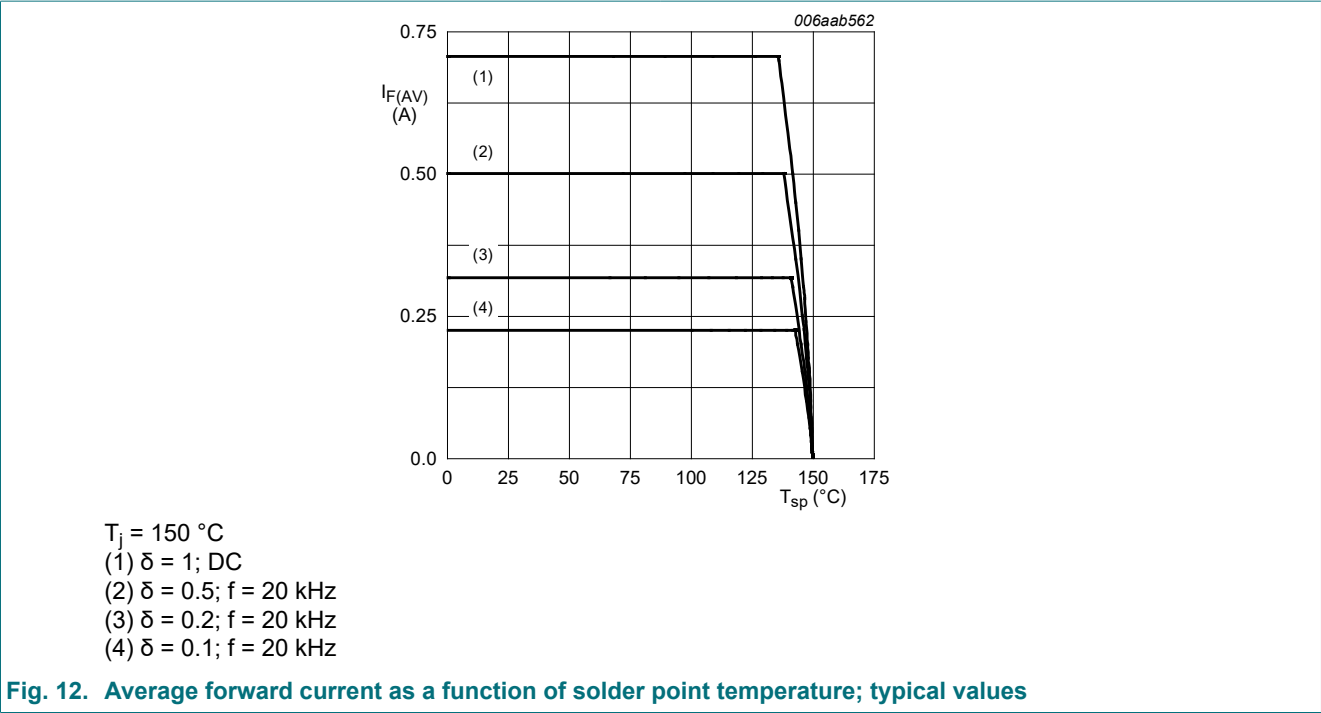


Fig. 12. Average forward current as a function of solder point temperature; typical values

11. Test information

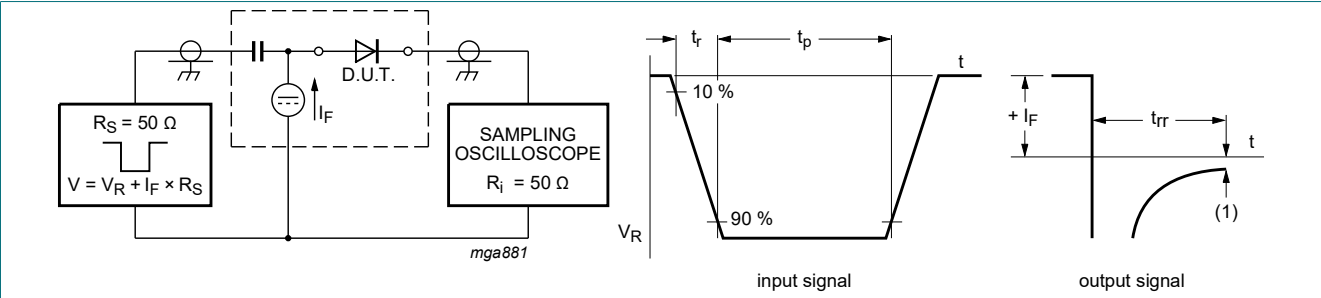


Fig. 13. Reverse recovery time: test circuit and waveforms

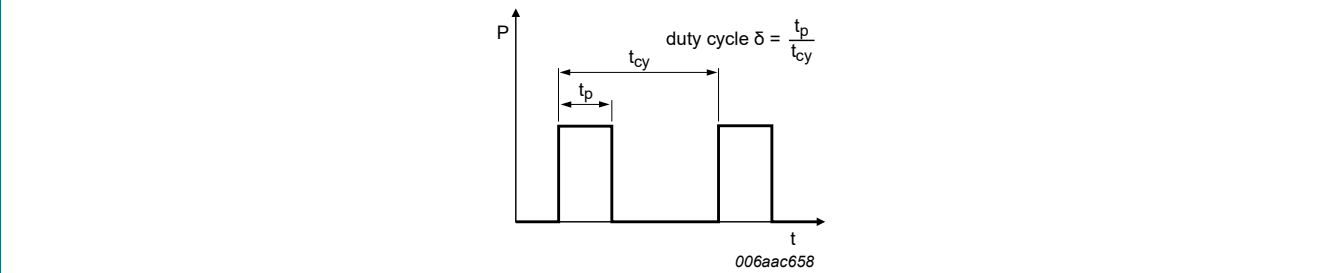
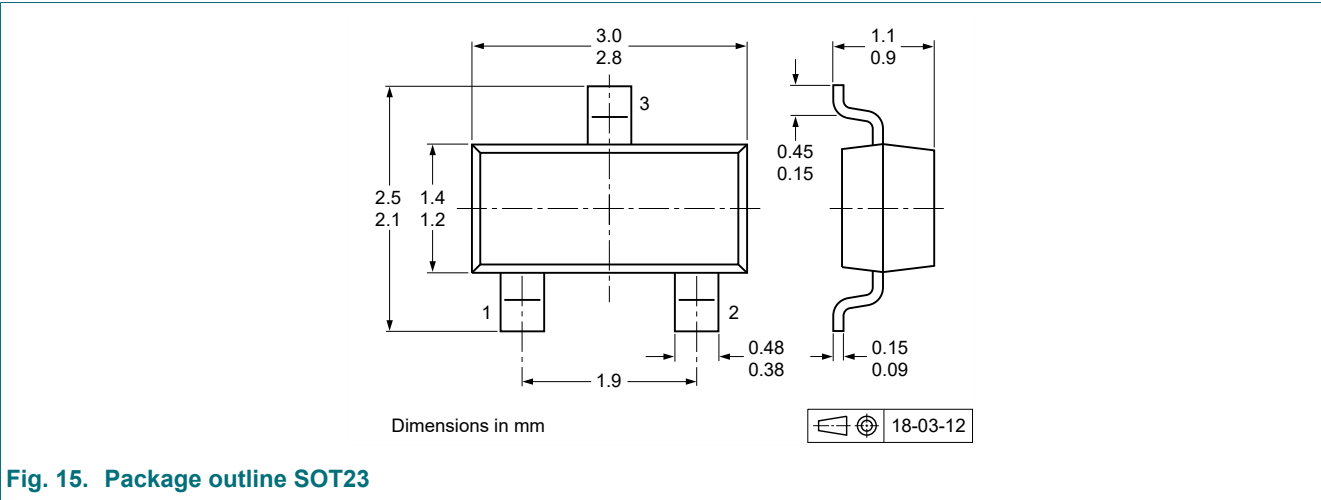


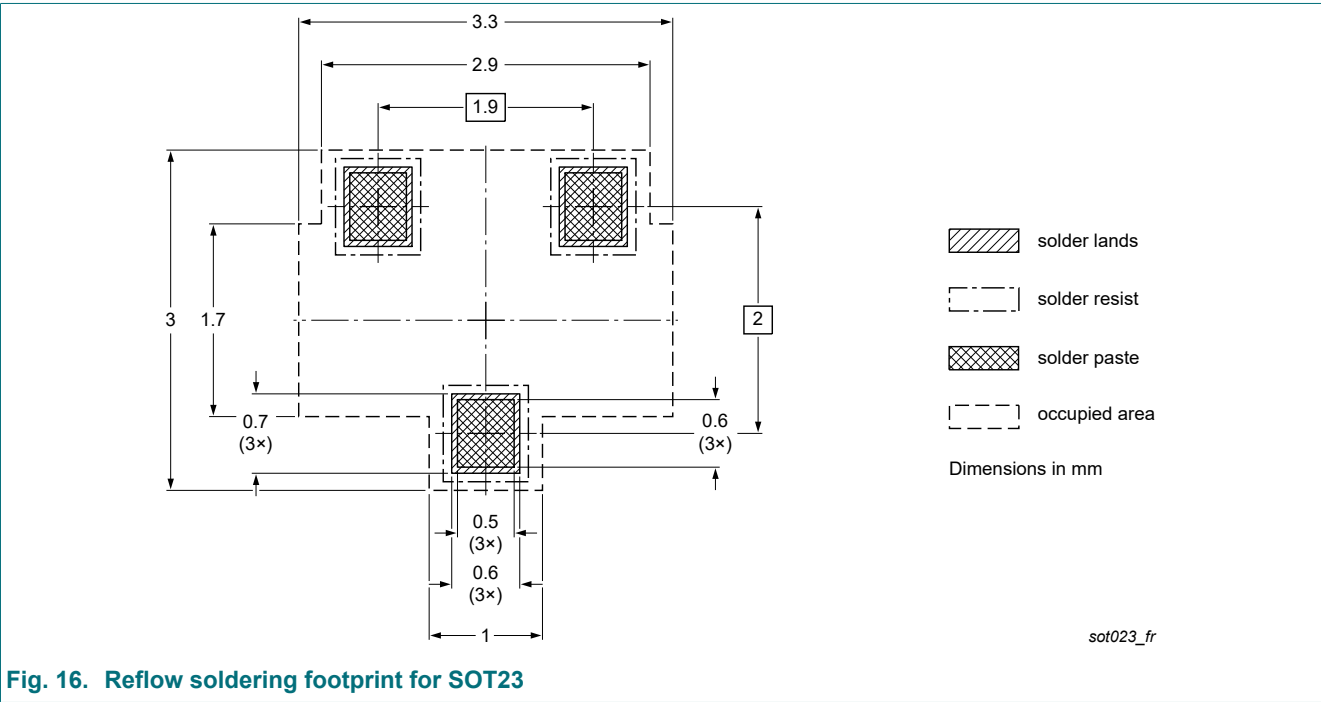
Fig. 14. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:  
 $I_{F(AV)} = I_M \times \delta$  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





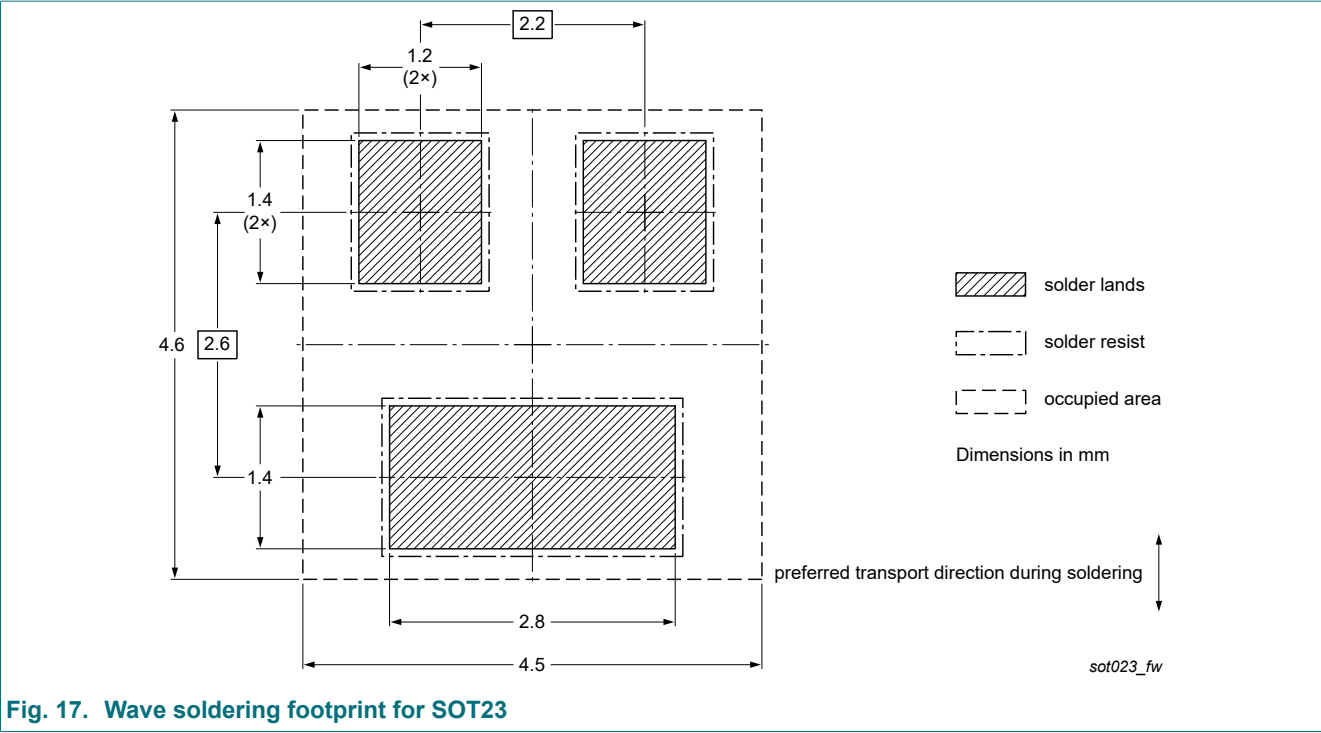


Fig. 17. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG4005CT v.4	20241008	Product data sheet	-	PMEG4005CT v.3
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>			
PMEG4005CT v.3	20190924	Product data sheet	-	PMEG4005CT v.2
PMEG4005CT v.2	20100920	Product data sheet	-	PMEG4005CT v.1
PMEG4005CT v.1	20090605	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.

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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information..... 1

6. Ordering information..... 2

7. Marking..... 2

8. Limiting values..... 2

9. Thermal characteristics..... 3

10. Characteristics..... 4

11. Test information..... 7

12. Package outline..... 8

13. Soldering..... 8

14. Revision history..... 10

15. Legal information..... 11

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