

# PMLL4148L; PMLL4448

## High-speed switching diodes

Rev. 8 — 1 February 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Single high-speed switching diodes, fabricated in planar technology, and encapsulated in small hermetically sealed glass SOD80C Surface-Mounted Device (SMD) packages.

Table 1. Product overview

Type number	Package	Configuration
PMLL4148L	SOD80C	single
PMLL4448		

### 1.2 Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Reverse voltage:  $V_R \leq 75$  V
- Repetitive peak reverse voltage:  $V_{RRM} \leq 100$  V
- Repetitive peak forward current:  $I_{FRM} \leq 450$  mA
- Small hermetically sealed glass SMD package

### 1.3 Applications

- High-speed switching
- Reverse polarity protection

### 1.4 Quick reference data

Table 2. Quick reference data



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current		[1]	-	200	mA
$I_{FRM}$	repetitive peak forward current		-	-	450	mA
$V_R$	reverse voltage		-	-	75	V
$V_F$	forward voltage					
	PMLL4148L	$I_F = 50$ mA	-	-	1	V
	PMLL4448	$I_F = 5$ mA	620	-	720	mV
		$I_F = 100$ mA	-	-	1	V
$t_{rr}$	reverse recovery time		[2]	-	4	ns

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] When switched from  $I_F = 10$  mA to  $I_R = 60$  mA;  $R_L = 100$   $\Omega$ ; measured at  $I_R = 1$  mA.

## 2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode	[1]	 sym006
2	anode		

[1] The marking band indicates the cathode.

## 3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PMLL4148L	-	hermetically sealed glass surface-mounted package;	SOD80C
PMLL4448	-	2 connectors	

## 4. Marking

Table 5. Marking codes

Type number	Marking code
PMLL4148L	marking band
PMLL4448	marking band

## 5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit	
$V_{RRM}$	repetitive peak reverse voltage		-	100	V	
$V_R$	reverse voltage		-	75	V	
$I_F$	forward current	[1]	-	200	mA	
$I_{FRM}$	repetitive peak forward current		-	450	mA	
$I_{FSM}$	non-repetitive peak forward current	square wave	[2]			
		$t_p = 1 \mu\text{s}$		-	4	A
		$t_p = 1 \text{ms}$		-	1	A
		$t_p = 1 \text{s}$		-	0.5	A

**Table 6. Limiting values ...continued**

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

Symbol	Parameter	Conditions	Min	Max	Unit
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} = 25\text{ °C}$	[1] -	500	mW
$T_j$	junction temperature		-	200	°C
$T_{\text{amb}}$	ambient temperature		-65	+200	°C
$T_{\text{stg}}$	storage temperature		-65	+200	°C

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

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

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	350	K/W
$R_{\text{th}(j-sp)}$	thermal resistance from junction to solder point		-	-	300	K/W

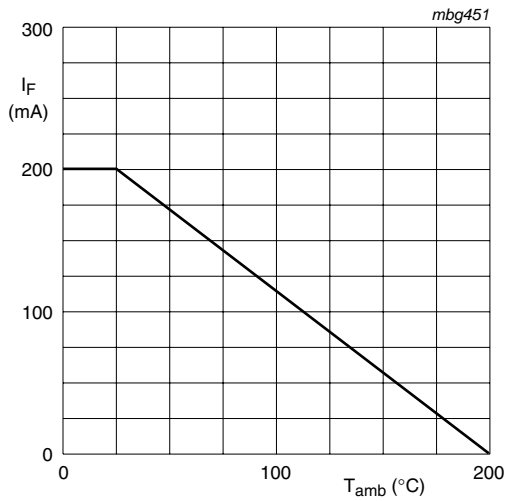
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 7. Characteristics

**Table 8. Characteristics** $T_{\text{amb}} = 25\text{ °C}$  unless otherwise specified.

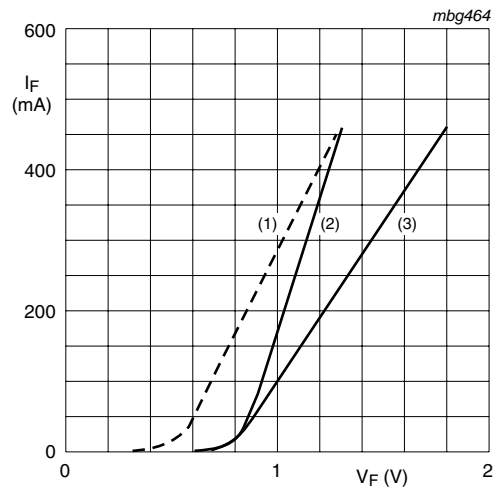
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage					
	PMLL4148L	$I_F = 50\text{ mA}$	-	-	1	V
	PMLL4448	$I_F = 5\text{ mA}$	620	-	720	mV
$I_R$	reverse current	$V_R = 20\text{ V}$	-	-	25	nA
		$V_R = 20\text{ V}; T_j = 150\text{ °C}$	-	-	50	μA
$I_R$	reverse current					
	PMLL4448	$V_R = 20\text{ V}; T_j = 100\text{ °C}$	-	-	3	μA
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	-	4	pF
$t_{rr}$	reverse recovery time		[1] -	-	4	ns
$V_{FR}$	forward recovery voltage		[2] -	-	2.5	V

[1] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 60\text{ mA}$ ;  $R_L = 100\text{ Ω}$ ; measured at  $I_R = 1\text{ mA}$ .[2] When switched from  $I_F = 50\text{ mA}$ ;  $t_r = 20\text{ ns}$ .



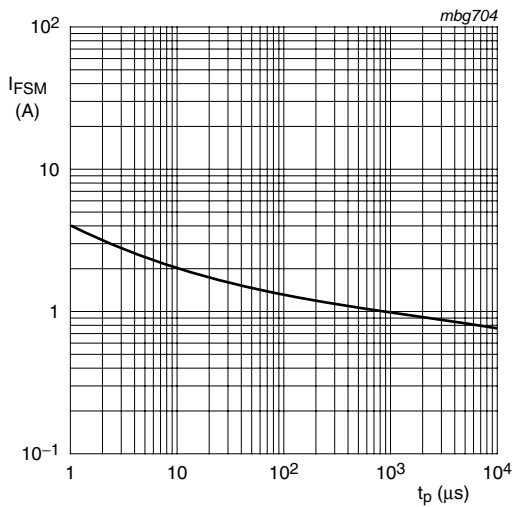
FR4 PCB, standard footprint

**Fig 1. Forward current as a function of ambient temperature; derating curve**



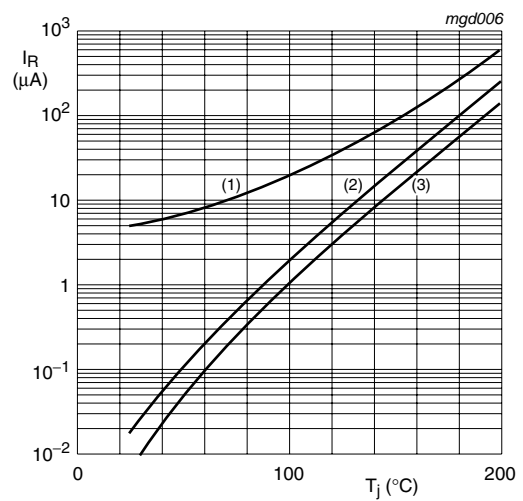
- (1)  $T_j = 175\text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 25\text{ }^\circ\text{C}$ ; typical values
- (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

**Fig 2. Forward current as a function of forward voltage**



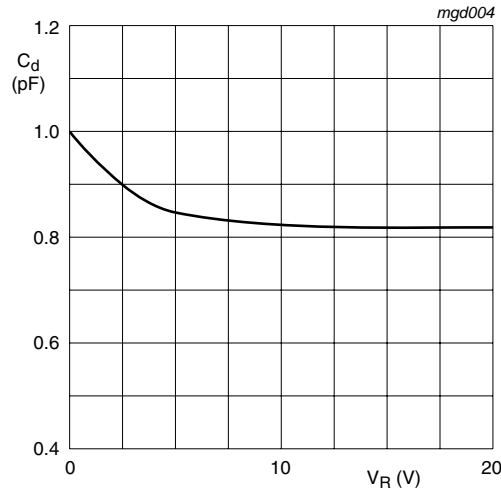
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$ ; prior to surge

**Fig 3. Non-repetitive peak forward current as a function of pulse duration; maximum values**



- (1)  $V_R = 75\text{ V}$ ; maximum values
- (2)  $V_R = 75\text{ V}$ ; typical values
- (3)  $V_R = 20\text{ V}$ ; typical values

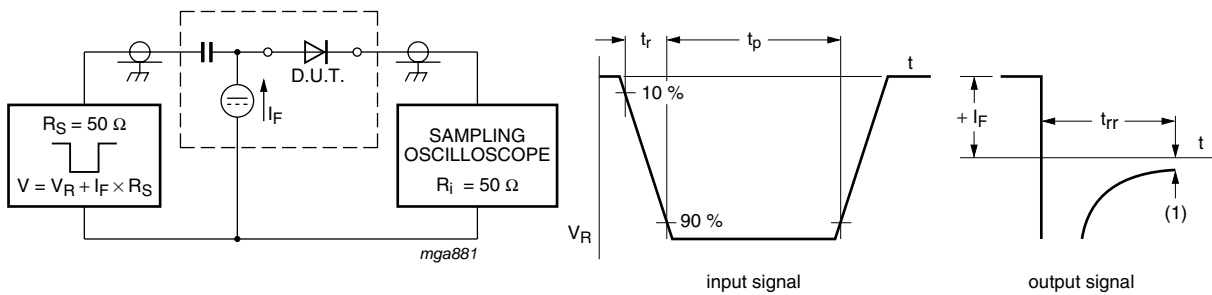
**Fig 4. Reverse current as a function of junction temperature**



f = 1 MHz; T<sub>j</sub> = 25 °C

Fig 5. Diode capacitance as a function of reverse voltage; typical values

## 8. Test information

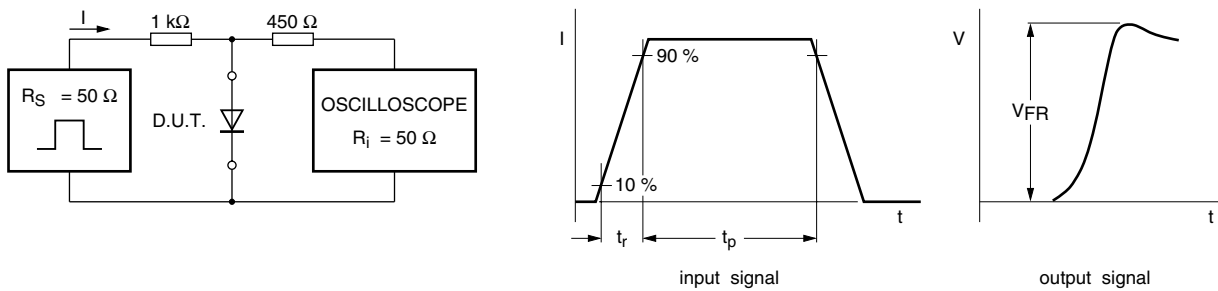


(1) I<sub>R</sub> = 1 mA

Input signal: reverse pulse rise time t<sub>r</sub> = 0.6 ns; reverse voltage pulse duration t<sub>p</sub> = 100 ns; duty cycle δ ≤ 0.05

Oscilloscope: rise time t<sub>r</sub> = 0.35 ns

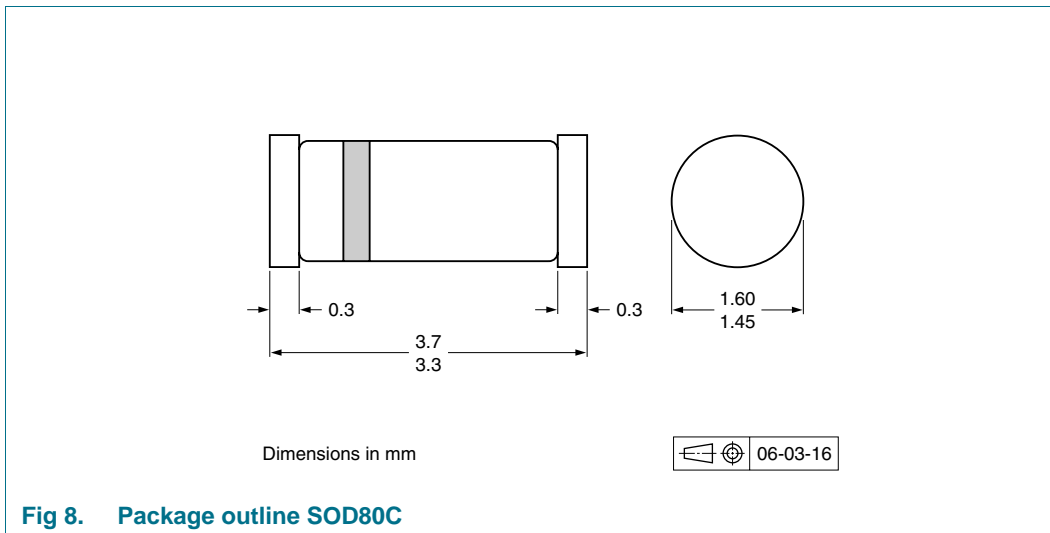
Fig 6. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time t<sub>r</sub> = 20 ns; forward current pulse duration t<sub>p</sub> ≥ 100 ns; duty cycle δ ≤ 0.005

Fig 7. Forward recovery voltage test circuit and waveforms

## 9. Package outline



## 10. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity	
			2500	10000
PMLL4148L	SOD80C	4 mm pitch, 8 mm tape and reel	-115	-135
PMLL4448				

[1] For further information and the availability of packing methods, see [Section 14](#).

## 11. Soldering

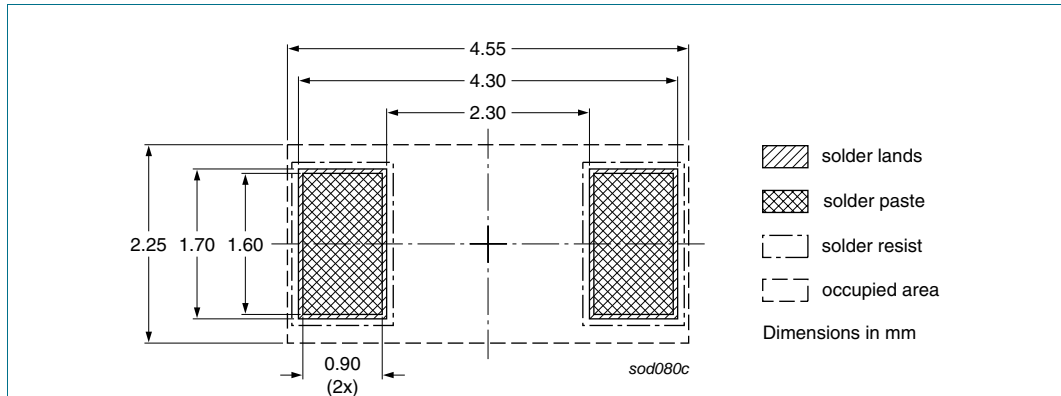


Fig 9. Reflow soldering footprint SOD80C

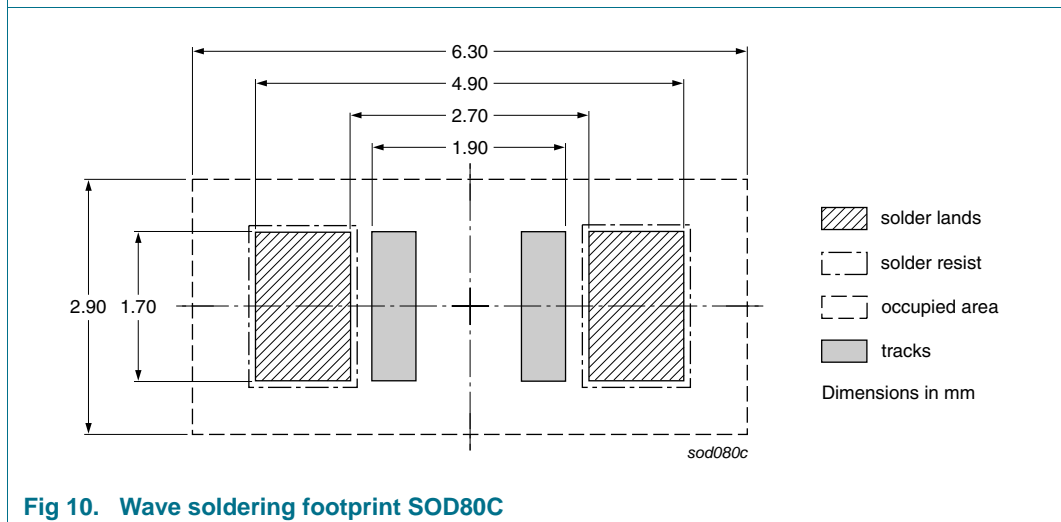


Fig 10. Wave soldering footprint SOD80C

## 12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMLL4148L_PMLL4448 v.8	20110201	Product data sheet	-	PMLL4148L_PMLL4448 v.7
Modifications:		<ul style="list-style-type: none"> <li>• <a href="#">Section 4 “Marking”</a>: amended.</li> <li>• <a href="#">Figure 8</a>: replaced by minimized outline drawing.</li> <li>• <a href="#">Section 13 “Legal information”</a>: updated.</li> </ul>		
PMLL4148L_PMLL4448 v.7	20070131	Product data sheet	-	PMLL4148L_PMLL4448 v.6
PMLL4148L_PMLL4448 v.6	20050404	Product data sheet	-	PMLL4148L_4448 v.5
PMLL4148L_4448 v.5	20020123	Product specification	-	PMLL4148L_4448 v.4
PMLL4148L_4448 v.4	20001115	Product specification	-	PMLL4148 v.3
PMLL4148 v.3	19990527	Product specification	-	PMLL4148 v.2
PMLL4148 v.2	19960918	Product specification	-	PMLL4148 v.1
PMLL4148 v.1	19960423	Product specification	-	-



## 13. Legal information

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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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[2] The term 'short data sheet' is explained in section "Definitions".

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## 15. Contents

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<b>1</b>	<b>Product profile</b> . . . . .	<b>1</b>
1.1	General description . . . . .	1
1.2	Features and benefits . . . . .	1
1.3	Applications . . . . .	1
1.4	Quick reference data . . . . .	1
<b>2</b>	<b>Pinning information</b> . . . . .	<b>2</b>
<b>3</b>	<b>Ordering information</b> . . . . .	<b>2</b>
<b>4</b>	<b>Marking</b> . . . . .	<b>2</b>
<b>5</b>	<b>Limiting values</b> . . . . .	<b>2</b>
<b>6</b>	<b>Thermal characteristics</b> . . . . .	<b>3</b>
<b>7</b>	<b>Characteristics</b> . . . . .	<b>3</b>
<b>8</b>	<b>Test information</b> . . . . .	<b>5</b>
<b>9</b>	<b>Package outline</b> . . . . .	<b>6</b>
<b>10</b>	<b>Packing information</b> . . . . .	<b>6</b>
<b>11</b>	<b>Soldering</b> . . . . .	<b>7</b>
<b>12</b>	<b>Revision history</b> . . . . .	<b>8</b>
<b>13</b>	<b>Legal information</b> . . . . .	<b>9</b>
13.1	Data sheet status . . . . .	9
13.2	Definitions . . . . .	9
13.3	Disclaimers . . . . .	9
13.4	Trademarks . . . . .	10
<b>14</b>	<b>Contact information</b> . . . . .	<b>10</b>
<b>15</b>	<b>Contents</b> . . . . .	<b>11</b>

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