

# 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]			
		$t_p = 1 \mu s$		-	4	A
		$t_p = 1 ms$		-	1	A
		$t_p = 1 s$		-	0.5	A

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

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

Symbol	Parameter	Conditions	Min	Max	Unit
$P_{tot}$	total power dissipation	$T_{amb} = 25\text{ °C}$	[1] -	500	mW
$T_j$	junction temperature		-	200	°C
$T_{amb}$	ambient temperature		-65	+200	°C
$T_{stg}$	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
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	350	K/W
$R_{th(j-sp)}$	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

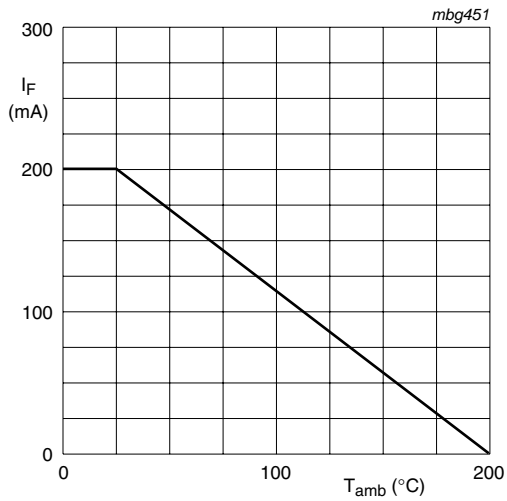
**Table 8. Characteristics**

$T_{amb} = 25\text{ °C}$  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
			$I_F = 100\text{ mA}$	-	-	1	V
$I_R$	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
$t_{rr}$	reverse recovery time		[1] -	-	4	ns	
$V_{FR}$	forward recovery voltage		[2] -	-	2.5	V	

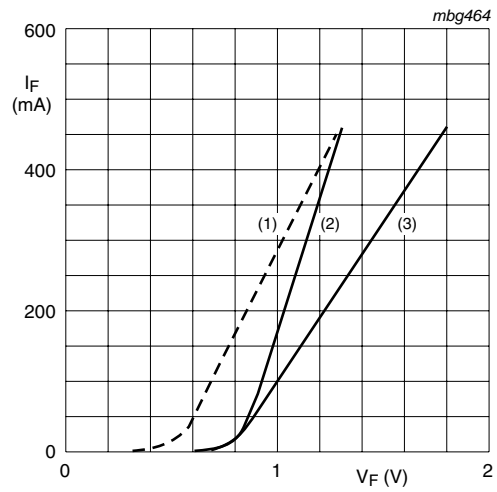
[1] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 60\text{ mA}$ ;  $R_L = 100\text{ Ω}$ ; measured at  $I_R = 1\text{ mA}$ .

[2] When switched from  $I_F = 50\text{ mA}$ ;  $t_r = 20\text{ ns}$ .



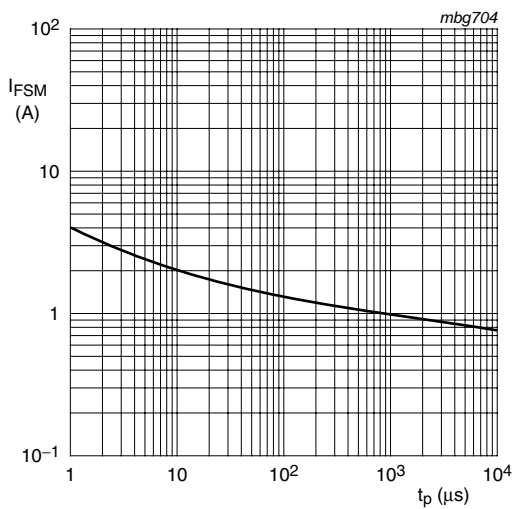
FR4 PCB, standard footprint

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



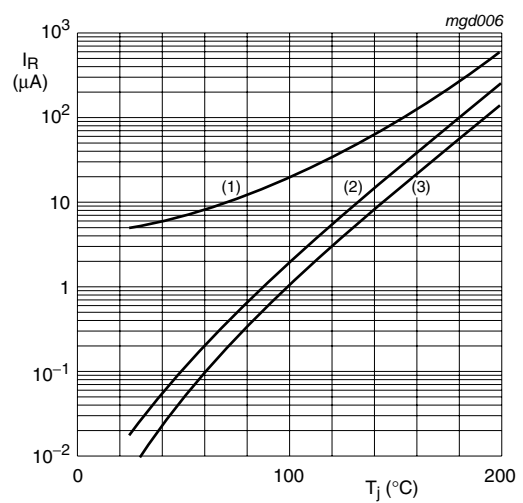
- (1)  $T_j = 175\text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 25\text{ }^\circ\text{C}$ ; typical values
- (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

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



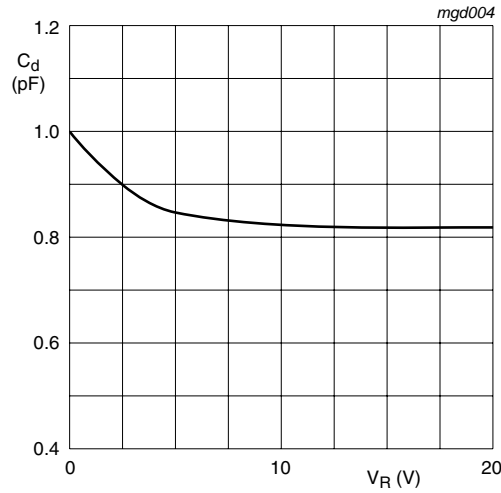
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$ ; prior to surge

**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

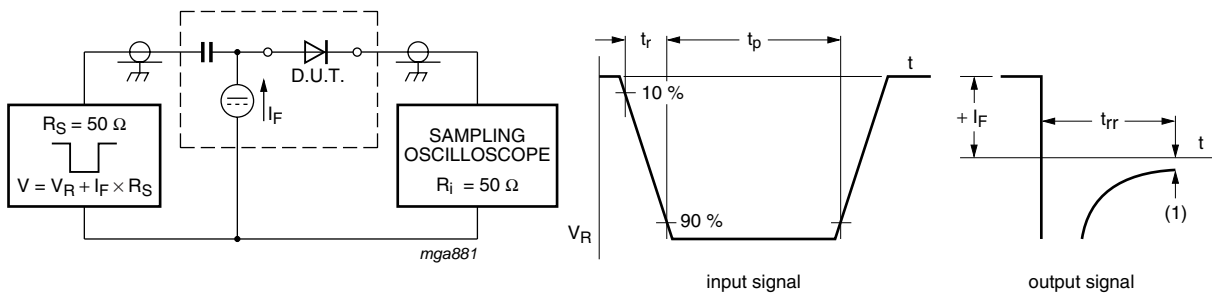
**Fig 4. Reverse current as a function of junction temperature**



f = 1 MHz; Tj = 25 °C

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

## 8. Test information

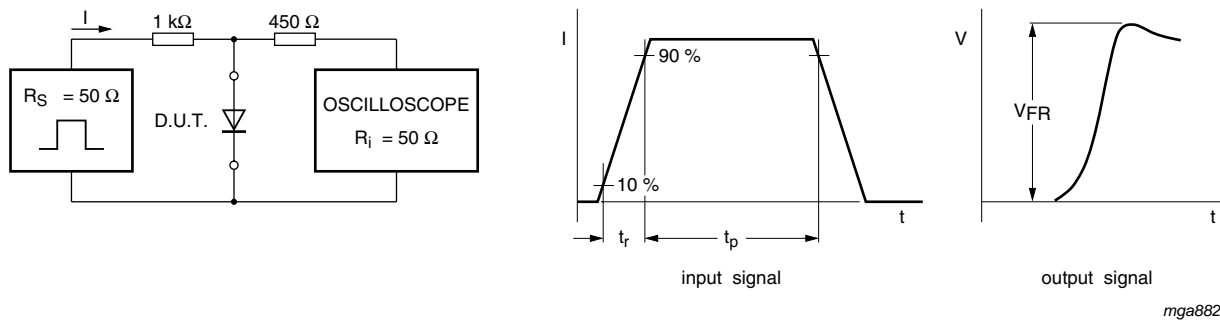


(1)  $I_R = 1 \text{ mA}$

Input signal: reverse pulse rise time  $t_r = 0.6 \text{ ns}$ ; reverse voltage pulse duration  $t_p = 100 \text{ ns}$ ; duty cycle  $\delta \leq 0.05$

Oscilloscope: rise time  $t_r = 0.35 \text{ ns}$

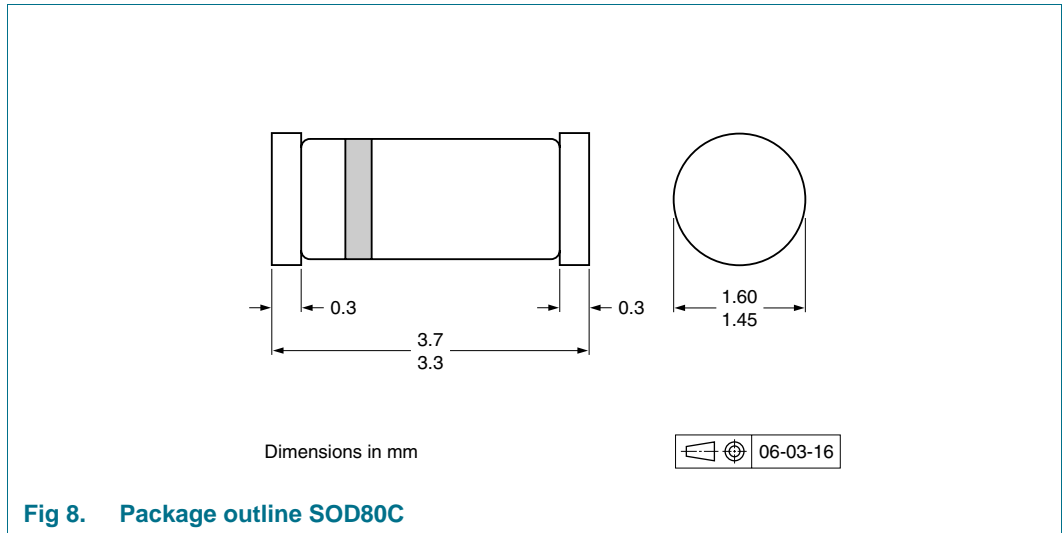
Fig 6. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time  $t_r = 20 \text{ ns}$ ; forward current pulse duration  $t_p \geq 100 \text{ ns}$ ; duty cycle  $\delta \leq 0.005$

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

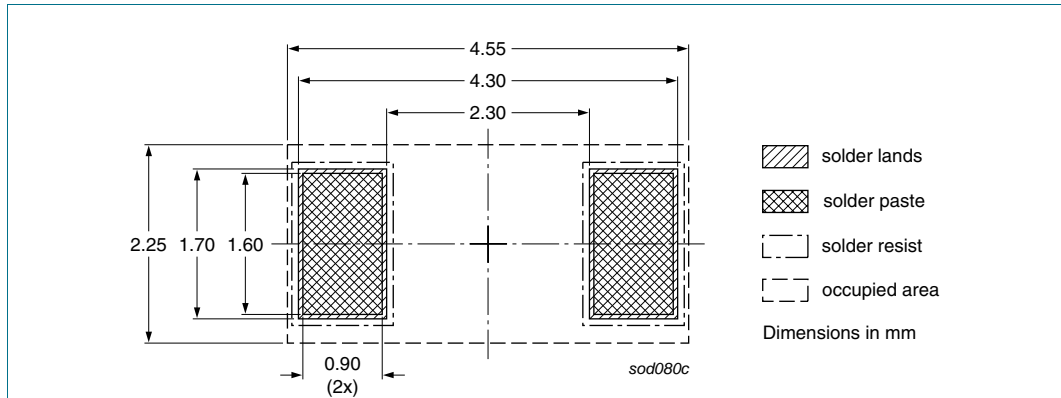


Fig 9. Reflow soldering footprint SOD80C

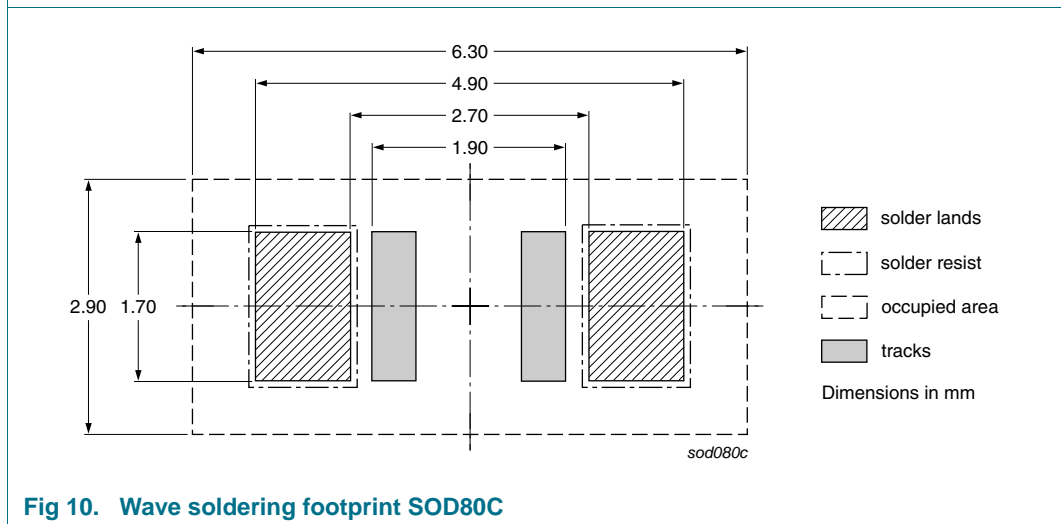


Fig 10. Wave soldering footprint SOD80C

## 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.
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