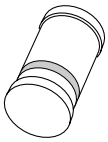


PMLL4148L; PMLL4448

High-speed switching diodes

Rev. 06 — 4 April 2005 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 SMD packages.

Table 1: Product overview

Type number	Package		Configuration
	Philips	JEITA	
PMLL4148L	SOD80C	-	single diode
PMLL4448	SOD80C	-	single diode

1.2 Features

- Small hermetically sealed glass SMD package
- High switching speed: ≤ 4 ns
- Continuous reverse voltage: ≤ 75 V
- Repetitive peak reverse voltage: ≤ 100 V
- Repetitive peak forward current: ≤ 450 mA

1.3 Applications

- High-speed switching
- Inverse-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	I_F = 100 mA		-	-	1000	mV
	PMLL4148L	I_F = 10 mA		-	-	1000	mV
	PMLL4448	I_F = 5 mA		620	-	720	mV
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 Ω; measured at I_R = 1 mA

PHILIPS

2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	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; 2 connectors	SOD80C
PMLL4448	-	hermetically sealed glass surface mounted package; 2 connectors	SOD80C

4. Marking

Table 5: Marking codes

Type number	Marking code [1]
PMLL4148L	marking band
PMLL4448	marking band

[1] black: made in Philippines
brown: made in China

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 µs		-	4	A
		t_p = 1 ms		-	1	A
		t_p = 1 s		-	0.5	A
P_{tot}	total power dissipation	T_{amb} = 25 °C	[1]	-	500	mW

Table 6: Limiting values *...continued*

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

Symbol	Parameter	Conditions	Min	Max	Unit
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 °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

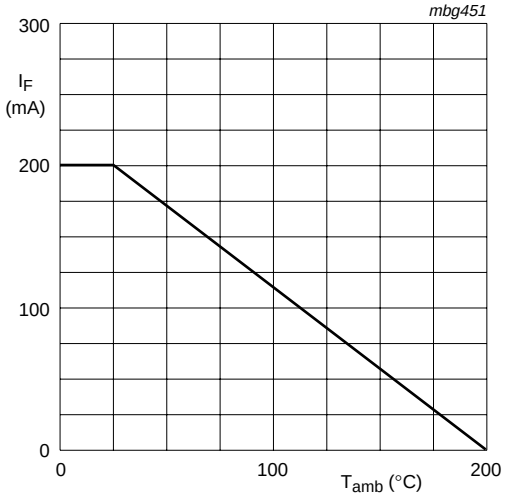
Table 8: Characteristics

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA		-	-	1000	mV
	PMLL4148L	I_F = 10 mA		-	-	1000	mV
	PMLL4448	I_F = 5 mA		620	-	720	mV
I_R	reverse current	V_R = 20 V		-	-	25	nA
		V_R = 20 V; T_j = 150 °C		-	-	50	µA
	PMLL4448	V_R = 20 V; T_j = 100 °C		-	-	3	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz		-	-	4	pF
t_{rr}	reverse recovery time		[1]	-	-	4	ns
V_{FR}	forward recovery voltage		[2]	-	-	2.5	V

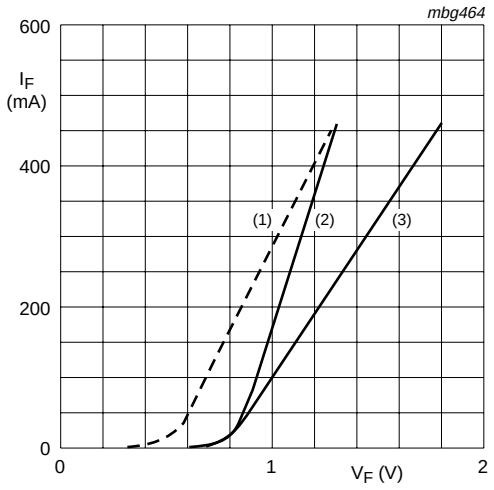
[1] When switched from I_F = 10 mA to I_R = 60 mA; R_L = 100 Ω; measured at I_R = 1 mA

[2] When switched from I_F = 50 mA; t_r = 20 ns



FR4 PCB; standard footprint

Fig 1. Maximum permissible forward current as a function of ambient temperature

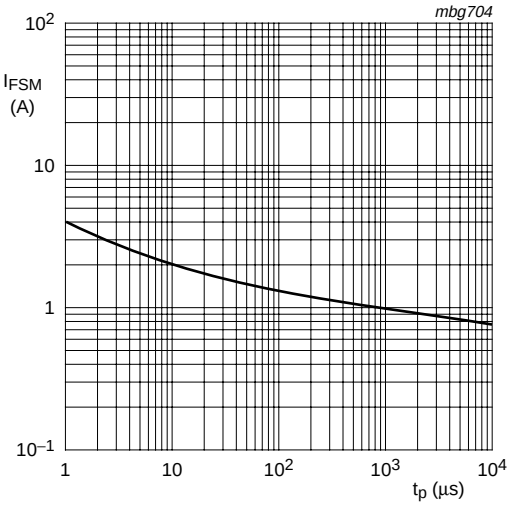


(1) T_j = 175 °C; typical values

(2) T_j = 25 °C; typical values

(3) T_j = 25 °C; maximum values

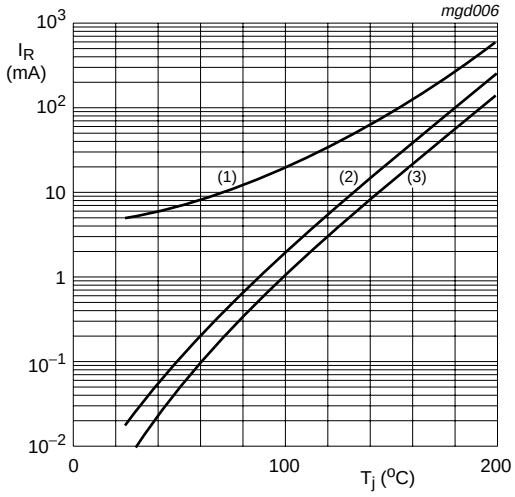
Fig 2. Forward current as a function of forward voltage



Based on square wave currents

T_j = 25 °C prior to surge

Fig 3. Maximum permissible non-repetitive peak forward current as a function of pulse duration

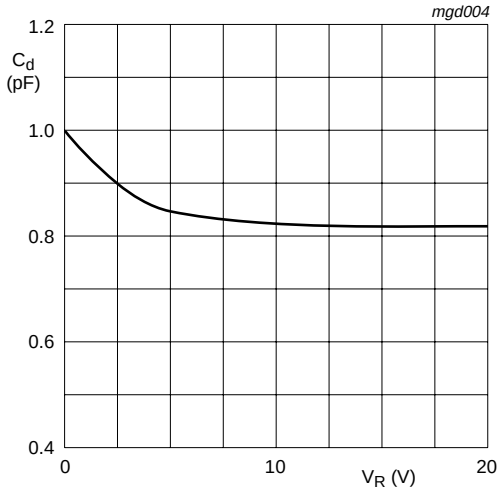


(1) V_R = 75 V; maximum values

(2) V_R = 75 V; typical values

(3) V_R = 20 V; typical values

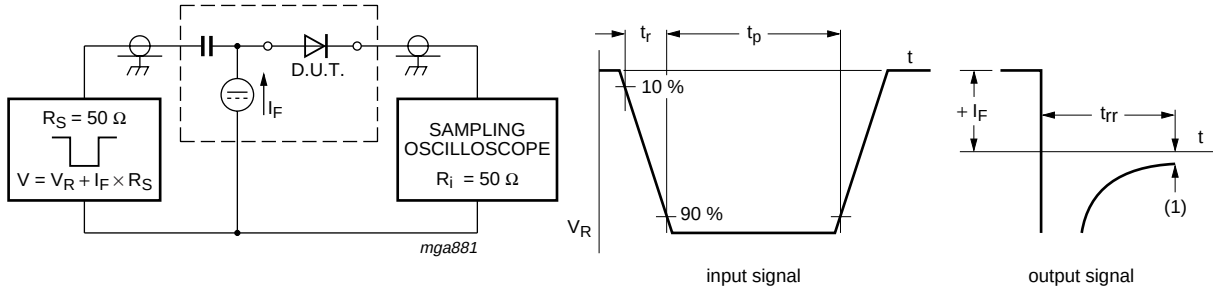
Fig 4. Reverse current as a function of junction temperature



T_j = 25 °C; f = 1 MHz

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

8. Test information

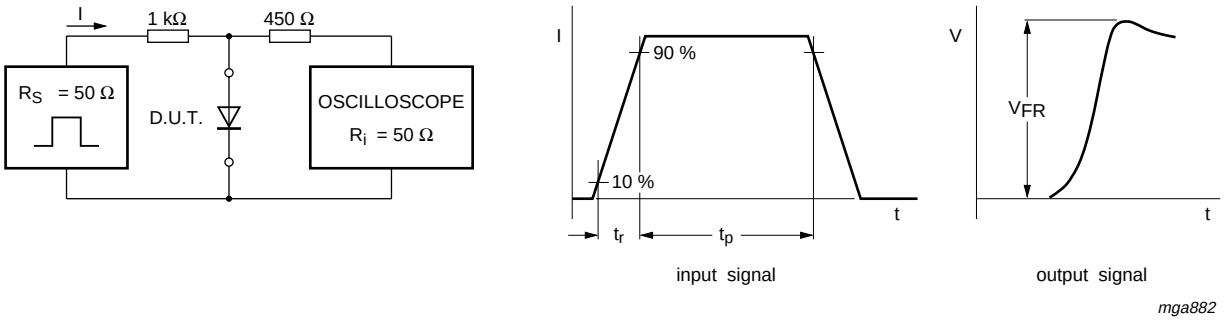


Input signal: Reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty factor δ ≤ 0.05

Oscilloscope: Rise time t_r = 0.35 ns

(1) I_R = 1 mA

Fig 6. Reverse recovery time test circuit and waveforms

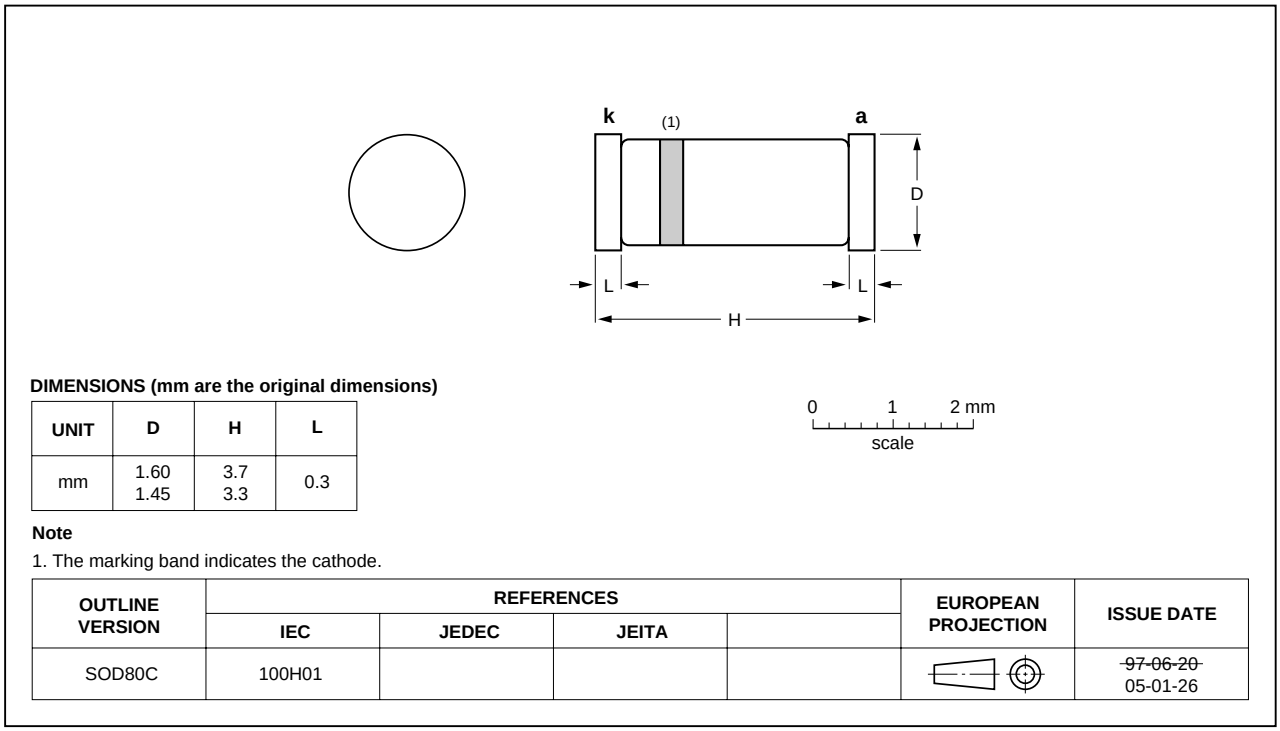


Input signal: Forward pulse rise time t_r = 20 ns; forward current pulse duration t_p ≥ 100 ns; duty factor δ ≤ 0.005

Fig 7. Forward recovery voltage test circuit and waveforms

9. Package outline

Hermetically sealed glass surface mounted package; 2 connectors **SOD80C**



DIMENSIONS (mm are the original dimensions)

UNIT	D	H	L
mm	1.60 1.45	3.7 3.3	0.3

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD80C	100H01					~~97-06-20~~ 05-01-26

Fig 8. Package outline SOD80C

10. Packing information

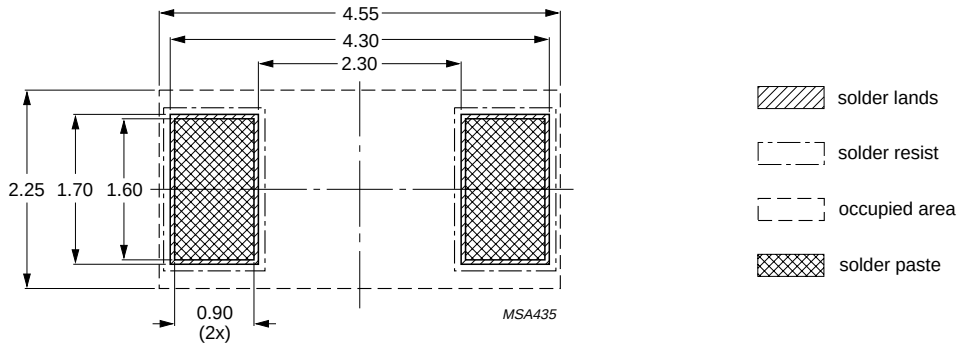
Table 9: Packing methods

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

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

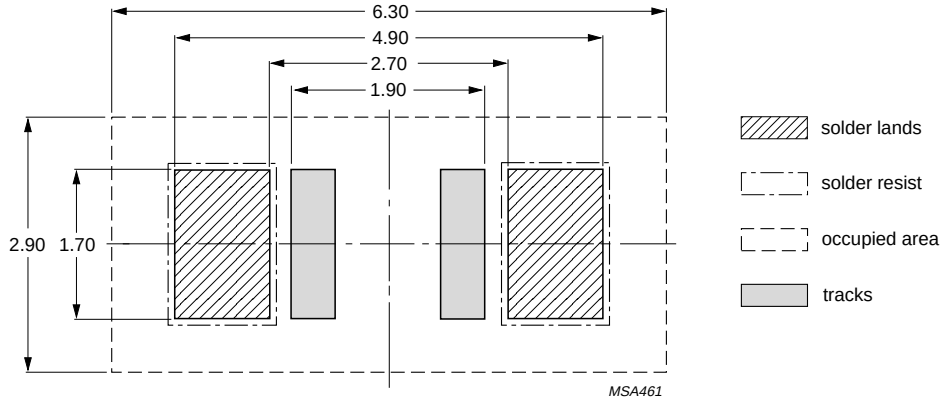
[1] For further information and the availability of packing methods, see Section 16.

11. Soldering



Dimensions in mm

Fig 9. Reflow soldering footprint SOD80C



Dimensions in mm

Fig 10. Wave soldering footprint SOD80C

12. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PMLL4148L_ PMLL4448_6	20050404	Product data sheet	-	9397 750 14606	PMLL4148L_4448_5
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors. • Table 1 “Product overview” added • Section 4 “Marking” added • Table 7 “Thermal characteristics” $R_{th(j-tp)}$ thermal resistance from junction to tie-point redefined to $R_{th(j-sp)}$ thermal resistance from junction to solder point • Section 10 “Packing information” added • Section 11 “Soldering” added				
PMLL4148L_4448_5	20020123	Product specification	-	9397 750 09265	PMLL4148_4448_4
PMLL4148L_4448_4	20001115	Product specification	-	9397 750 07615	PMLL4148_3
PMLL4148_3	19990527	Product specification	-	9397 750 05889	PMLL4148_2
PMLL4148_2	19960918	Product specification	-	117021	PMLL4148_1
PMLL4148_1	19960423	Product specification	-	117011	-

13. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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17. Contents

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