

# PMLL4153

High-speed diode

Rev. 3 — 19 August 2010

Product data sheet

## 1. Product profile

### 1.1 General description

High-speed switching diode fabricated in planar technology, and encapsulated in a small hermetically sealed glass SOD80C Surface-Mounted Device (SMD) package.

### 1.2 Features and benefits

- High switching speed: max. 4 ns
- General application
- Reverse voltage: max. 50 V
- Repetitive peak reverse voltage: max. 75 V
- Repetitive peak forward current: max. 450 mA
- Small hermetically sealed glass SMD package

### 1.3 Applications

- High-speed switching
- Military and industrial applications

### 1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current		[1]	-	200	mA
$V_R$	reverse voltage		-	-	50	V
$V_F$	forward voltage	$I_F = 50$ mA	740	-	880	mV

[1] Device mounted on an FR4 Printed-Circuit Board (PCB).

## 2. Pinning information

Table 2. Pinning

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

[1] The marking band indicates the cathode.



### 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMLL4153	-	hermetically sealed glass surface-mounted package; 2 connectors	SOD80C

### 4. Marking

Table 4. Marking codes

Type number	Marking code
PMLL4153	marking band

### 5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	75	V
$V_R$	reverse voltage		-	50	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
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	500	mW
$T_j$	junction temperature		-	200	$^\circ\text{C}$
$T_{stg}$	storage temperature		-65	+200	$^\circ\text{C}$

[1] Device mounted on an FR4 PCB.

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

### 6. Thermal characteristics

Table 6. Thermal characteristics

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

[1] Device mounted on an FR4 PCB.

## 7. Characteristics

**Table 7. Characteristics**

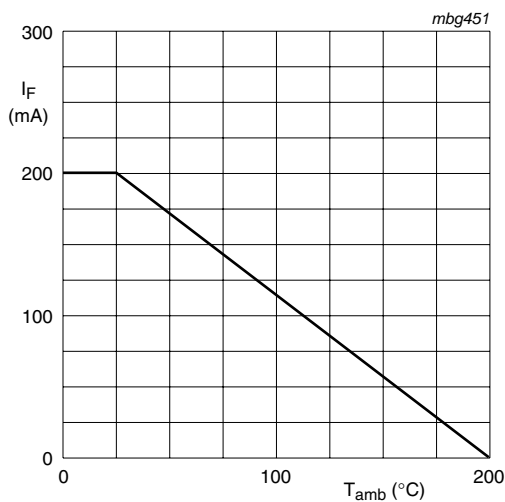
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 0.1\text{ mA}$	490	-	550	mV
		$I_F = 0.25\text{ mA}$	530	-	590	mV
		$I_F = 1\text{ mA}$	590	-	670	mV
		$I_F = 2\text{ mA}$	620	-	700	mV
		$I_F = 10\text{ mA}$	700	-	810	mV
		$I_F = 50\text{ mA}$	740	-	880	mV
$I_R$	reverse current	$V_R = 50\text{ V}$	-	-	0.05	$\mu\text{A}$
		$V_R = 50\text{ V}; T_j = 150\text{ °C}$	-	-	50	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	-	2	pF
$t_{rr}$	reverse recovery time	[1]	-	-	4	ns
		[2]	-	-	2	ns
$t_{fr}$	forward recovery time	[3]	-	-	10	ns

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

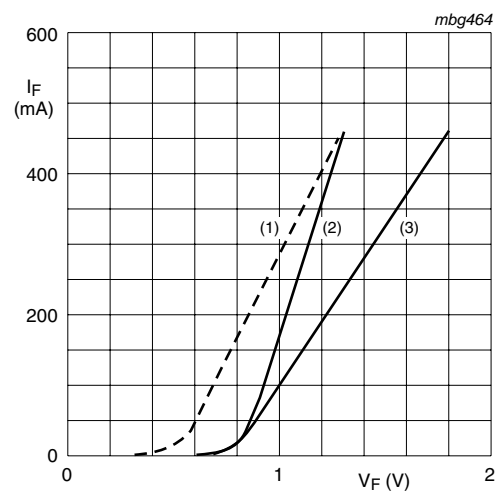
[2] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 60\text{ mA}$ ;  $R_L = 100\ \Omega$ ; measured at  $I_R = 1\text{ mA}$ .

[3] When switched to  $I_F = 200\text{ mA}$ ;  $t_r = 0.4\text{ ns}$ ; measured at  $V_F = 1\text{ V}$ .



Device mounted on an FR4 Printed-Circuit Board (PCB).

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

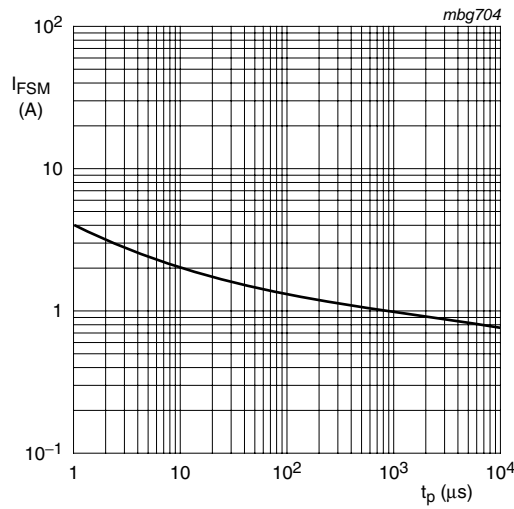


(1)  $T_j = 175\text{ °C}$ ; typical values

(2)  $T_j = 25\text{ °C}$ ; typical values

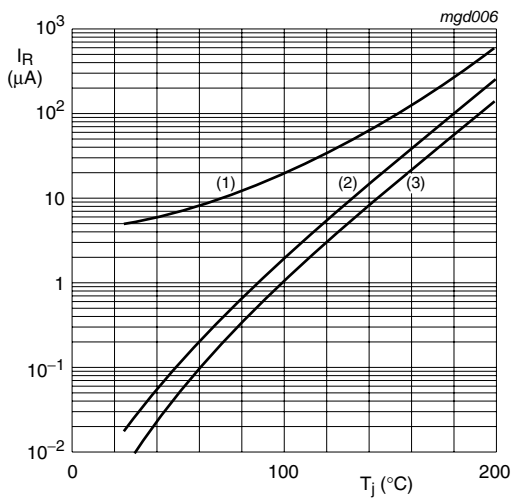
(3)  $T_j = 25\text{ °C}$ ; maximum values

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



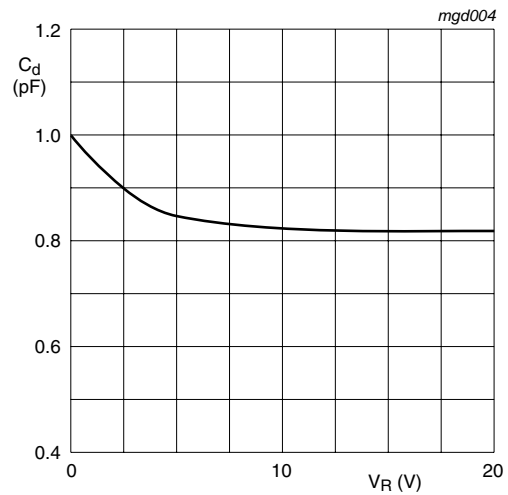
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$  prior to surge

**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**



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

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

### 8. Test information

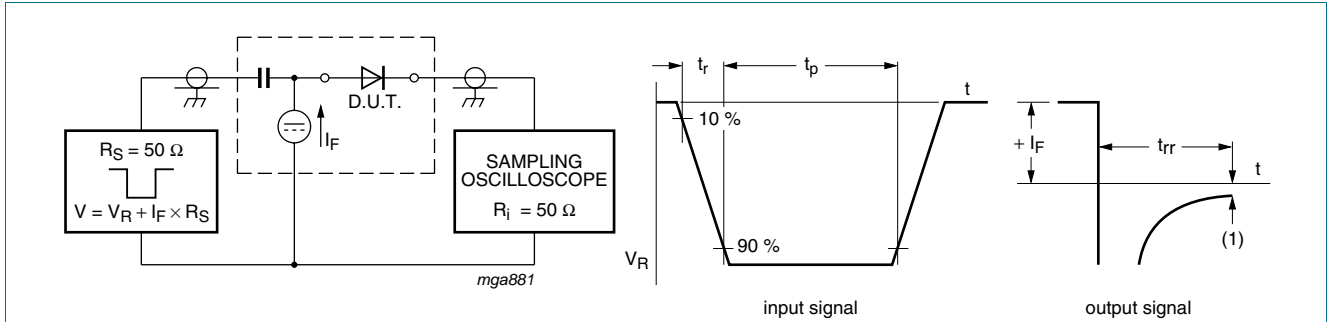
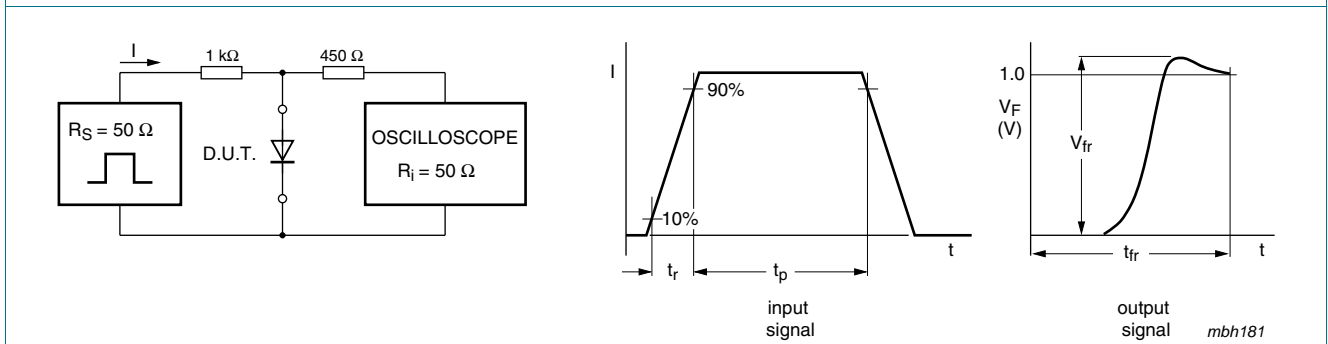


Fig 6. Reverse recovery voltage test circuit and waveforms



Input signal: forward pulse rise time  $t_r = 0.4$  ns; forward pulse duration  $t_p = 100$  ns; duty factor  $\delta = 0.01$

Fig 7. Forward recovery time test circuit and waveforms

### 9. Package outline

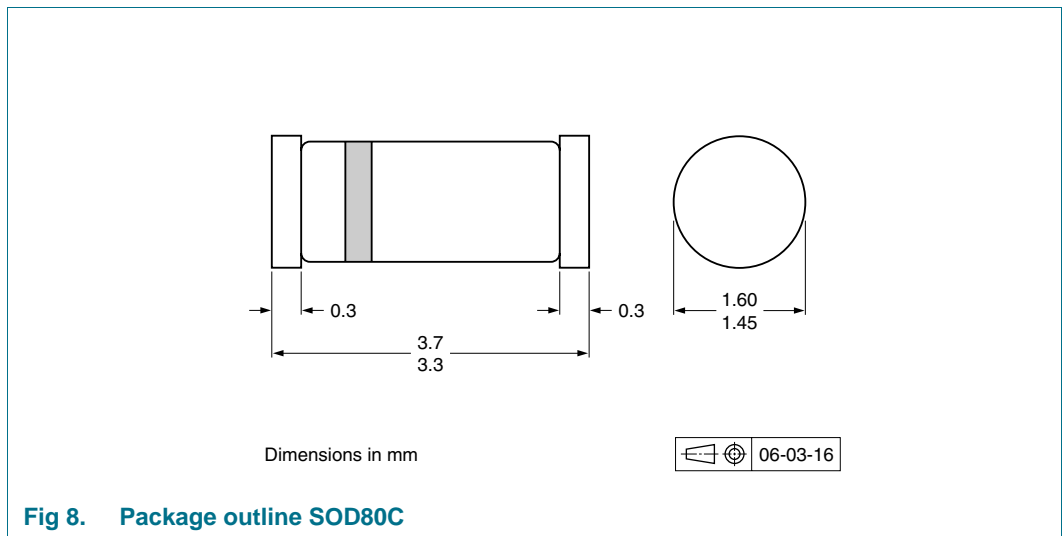


Fig 8. Package outline SOD80C

### 10. Packing information

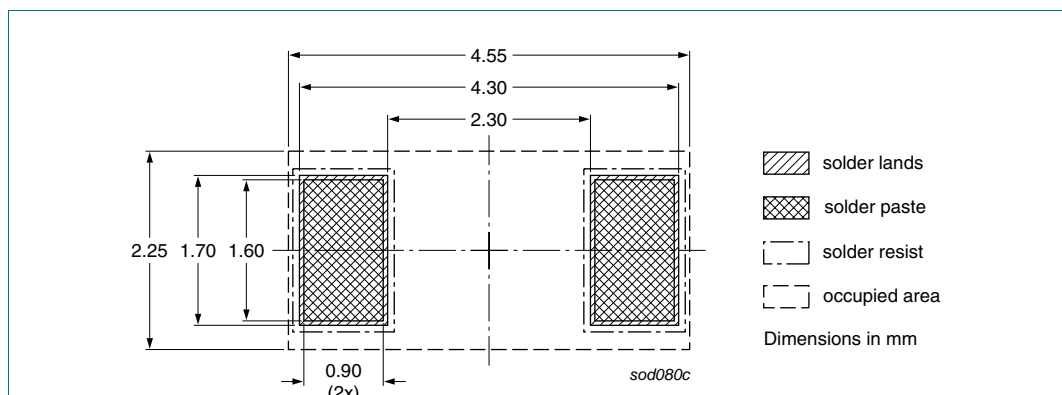
**Table 8. Packing methods**

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

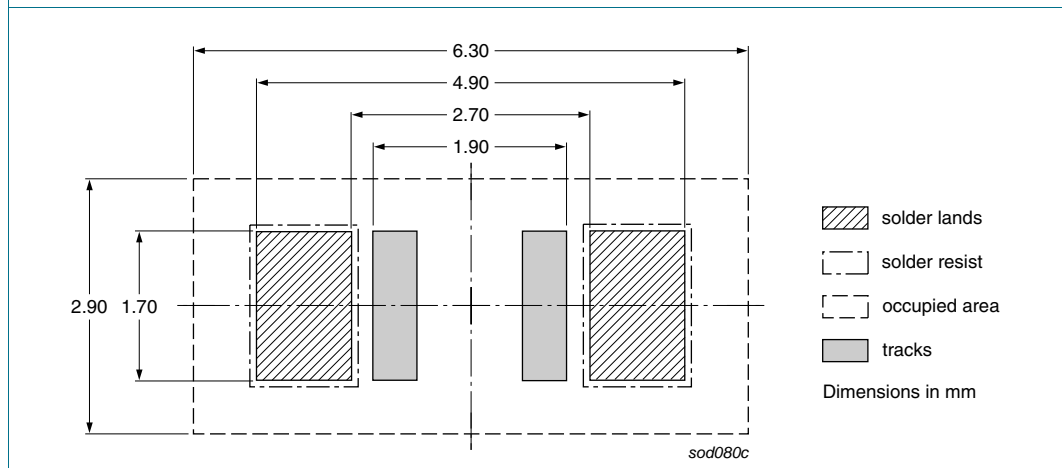
Type number	Package	Description	Packing quantity	
			2500	10000
PMLL4153	SOD80C	4 mm pitch, 8 mm tape and reel	-115	-135

[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 9. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMLL4153 v.3	20100819	Product data sheet	-	PMLL4150_2
Modifications:		<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Type numbers PMLL4150 and PMLL4151 removed.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• <a href="#">Table 1 “Quick reference data”</a>: added</li><li>• <a href="#">Section 4 “Marking”</a>: added</li><li>• <a href="#">Figure 1</a>: updated</li><li>• <a href="#">Figure 8</a>: superseded by minimized package outline drawing</li><li>• <a href="#">Section 10 “Packing information”</a>: added</li><li>• <a href="#">Section 11 “Soldering”</a>: added</li><li>• <a href="#">Section 13 “Legal information”</a>: updated</li></ul>		
PMLL4150_2	19960918	Product specification	-	PMLL4150_1
PMLL4150_1	19960423	Product specification	-	-

## 13. Legal information

### 13.1 Data sheet status

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.

[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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## 15. Contents

<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>1</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>2</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>5</b>
<b>10</b>	<b>Packing information</b> . . . . .	<b>6</b>
<b>11</b>	<b>Soldering</b> . . . . .	<b>6</b>
<b>12</b>	<b>Revision history</b> . . . . .	<b>7</b>
<b>13</b>	<b>Legal information</b> . . . . .	<b>8</b>
13.1	Data sheet status . . . . .	8
13.2	Definitions . . . . .	8
13.3	Disclaimers . . . . .	8
13.4	Trademarks . . . . .	9
<b>14</b>	<b>Contact information</b> . . . . .	<b>9</b>
<b>15</b>	<b>Contents</b> . . . . .	<b>10</b>

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