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Kind regards,

Team Nexperia



# PMBD7000

Double high-speed switching diode

Rev. 4 — 16 September 2010

Product data sheet

## 1. Product profile

### 1.1 General description

The PMBD7000 consists of two high-speed switching diodes connected in series, fabricated in planar technology, and encapsulated in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Repetitive peak forward current:  $I_{FRM} \leq 450$  mA
- Small SMD plastic package
- Reverse voltage:  $V_R \leq 100$  V
- Repetitive peak reverse voltage:  $V_{RRM} \leq 100$  V
- AEC-Q101 qualified

### 1.3 Applications

- High-speed switching
- General-purpose switching

### 1.4 Quick reference data

Table 1. Quick reference data

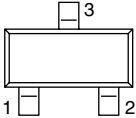
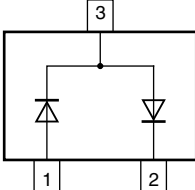
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_R$	reverse current	$V_R = 100$ V	-	-	0.5	$\mu$ A
$V_R$	reverse voltage		-	-	100	V
$t_{rr}$	reverse recovery time		[1]	-	4	ns

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



## 2. Pinning information

**Table 2. Pinning**

Pin	Description	Simplified outline	Graphic symbol
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		

006aaa763

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
PMBD7000	-	plastic surface-mounted package; 3 leads	SOT23

## 4. Marking

**Table 4. Marking codes**

Type number	Marking code <sup>[1]</sup>
PMBD7000	*5C

[1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$V_{RRM}$	repetitive peak reverse voltage		-	100	V
$V_R$	reverse voltage		-	100	V
$I_F$	forward current		[1] -	215	mA
			[2] -	125	mA
$I_{FRM}$	repetitive peak forward current		-	450	mA
$I_{FSM}$	non-repetitive peak forward current	square wave	[3]		
		$t_p = 1 \mu\text{s}$	-	4	A
		$t_p = 1 \text{ms}$	-	1	A
		$t_p = 1 \text{s}$	-	0.5	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1][4] -	250	mW
<b>Per device</b>					
$T_j$	junction temperature		-	150	$^\circ\text{C}$
$T_{amb}$	ambient temperature		-55	+150	$^\circ\text{C}$
$T_{stg}$	storage temperature		-65	+150	$^\circ\text{C}$

[1] Single diode loaded.

[2] Double diode loaded.

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

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

## 6. 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] -	-	500	K/W
$R_{th(j-t)}$	thermal resistance from junction to tie-point		-	-	360	K/W

[1] Single diode loaded.

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

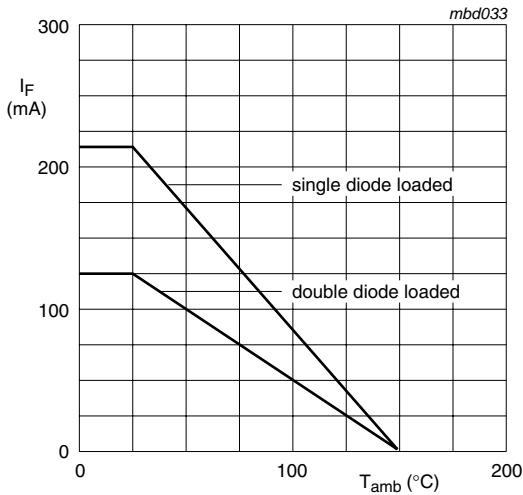
## 7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 1\text{ mA}$	-	550	700	mV
		$I_F = 10\text{ mA}$	-	670	820	mV
		$I_F = 50\text{ mA}$	-	-	1	V
		$I_F = 100\text{ mA}$	-	0.75	1.1	V
		$I_F = 150\text{ mA}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 50\text{ V}$	-	-	300	nA
		$V_R = 100\text{ V}$	-	-	500	nA
		$V_R = 50\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}$	-	-	1.5	pF
$t_{rr}$	reverse recovery time		[1]	-	4	ns
$V_{FR}$	forward recovery voltage		[2]	-	1.75	V

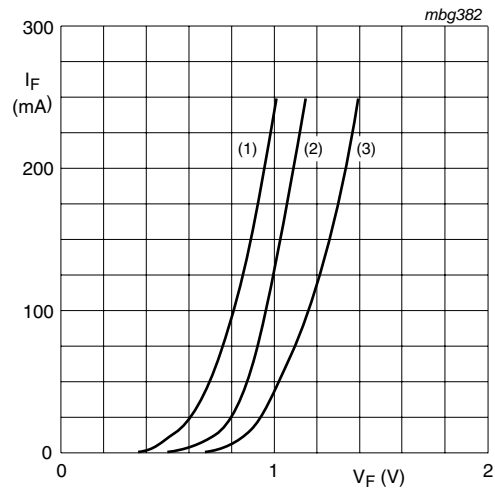
[1] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 10\text{ mA}$ ;  $R_L = 100\ \Omega$ ; measured at  $I_R = 1\text{ mA}$ .

[2] When switched from  $I_F = 10\text{ mA}$ ;  $t_r = 20\text{ ns}$ .



FR4 PCB, standard footprint

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

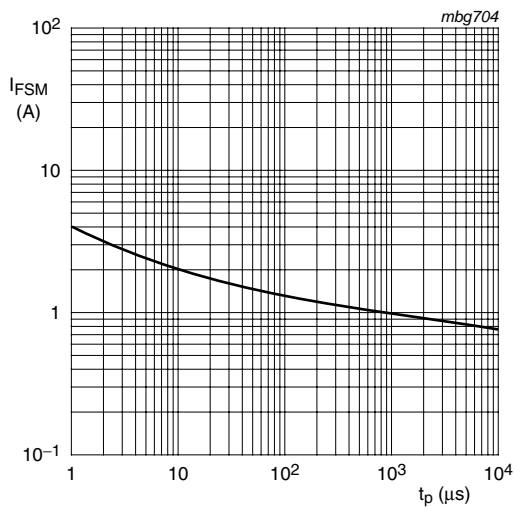


(1)  $T_j = 150\text{ }^\circ\text{C}$ ; typical values

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

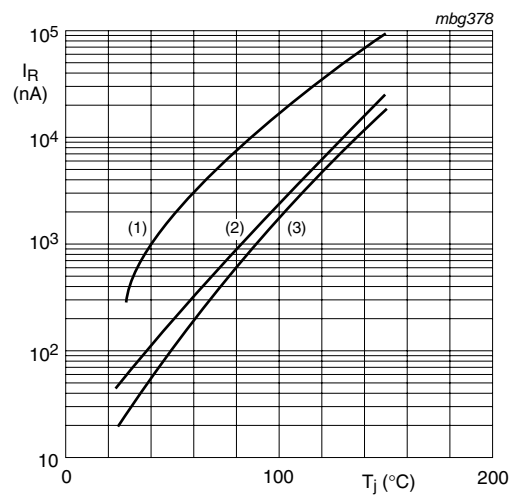
(3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

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



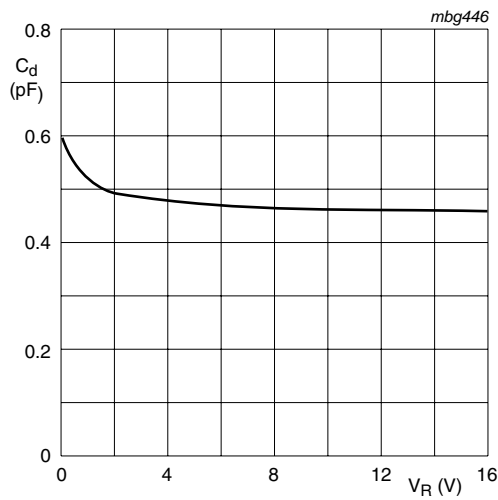
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$ ; prior to surge

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



- (1)  $V_R = 50\text{ V}$ ; maximum values
- (2)  $V_R = 30\text{ V}$ ; typical values
- (3)  $V_R = 50\text{ V}$ ; typical values

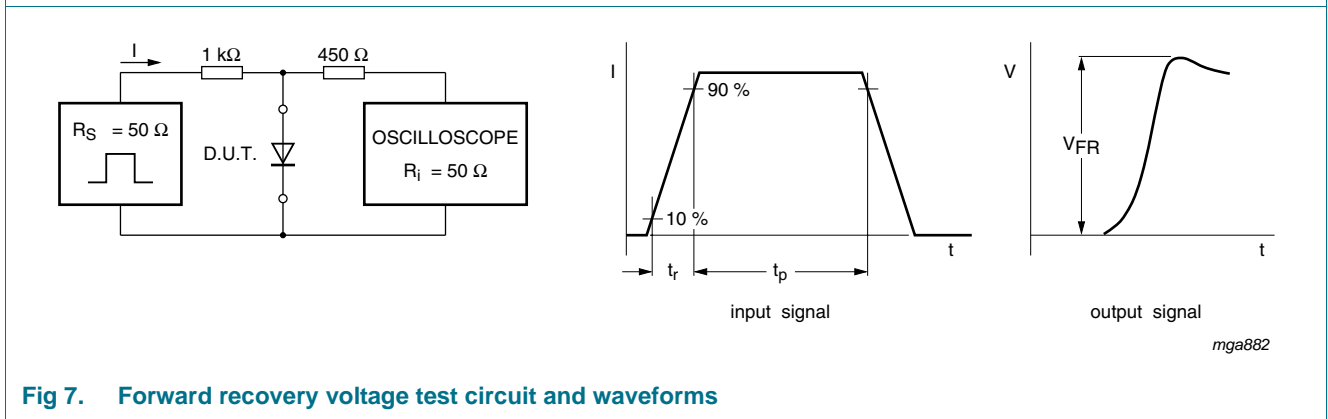
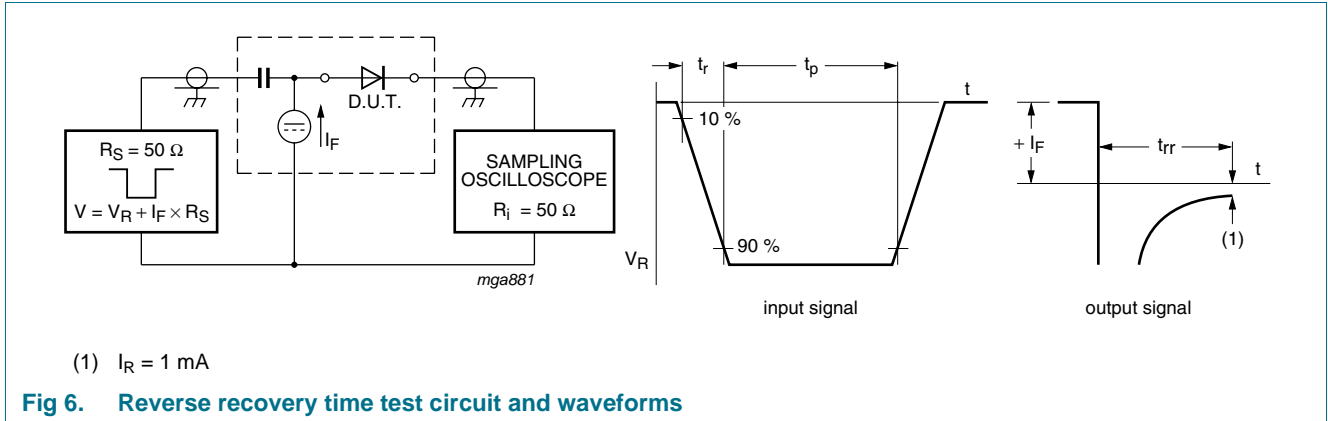
**Fig 4. Reverse current as a function of junction temperature**



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

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

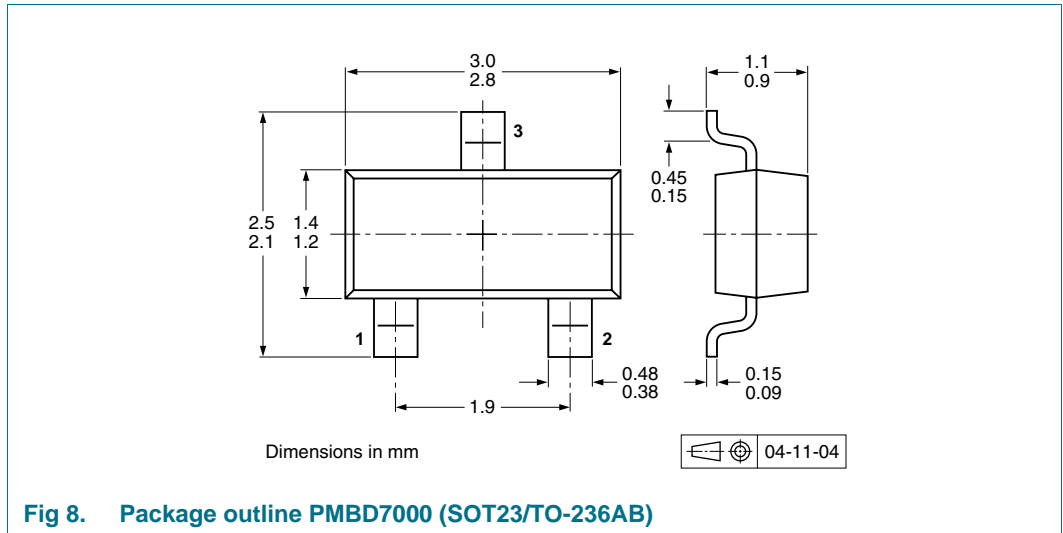
### 8. Test information



#### 8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 9. Package outline



## 10. Packing information

**Table 8. Packing methods**

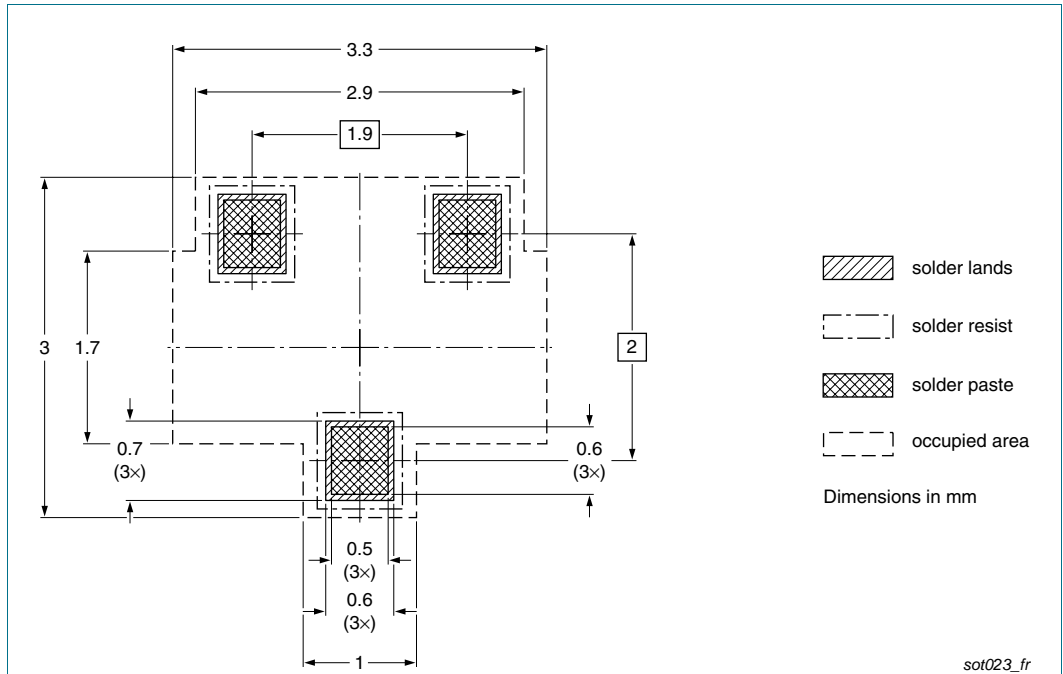
The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity	
			3000	10000
PMBD7000	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

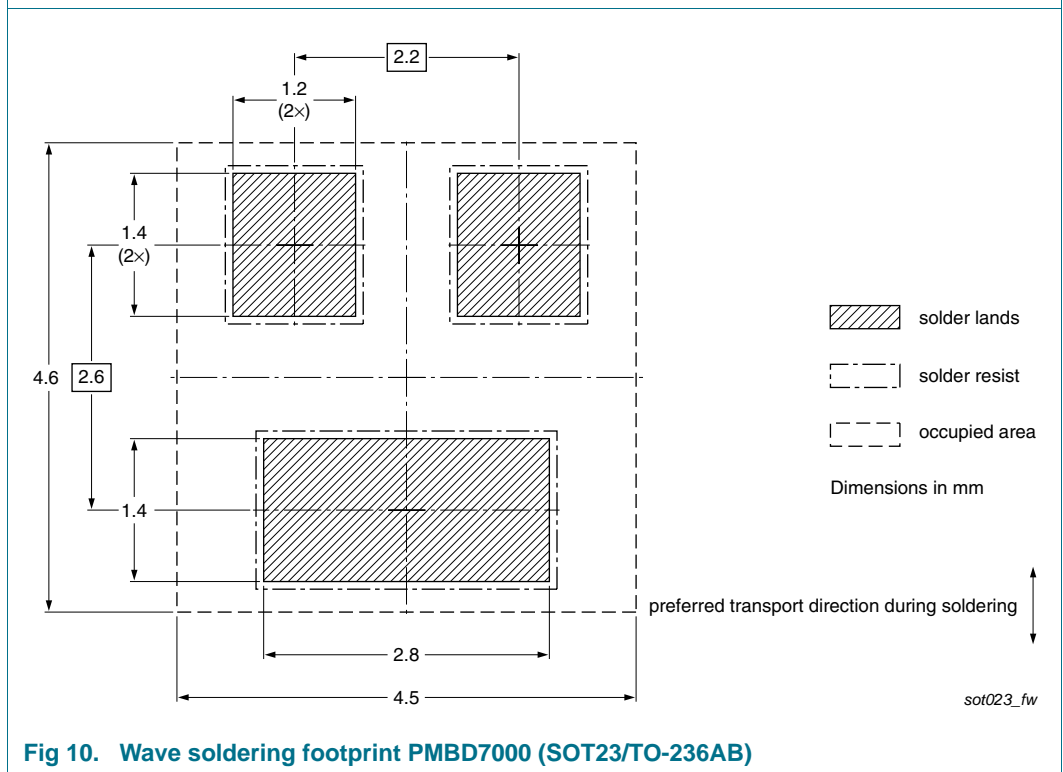
[1] For further information and the availability of packing methods, see [Section 14](#).



**11. Soldering**



**Fig 9. Reflow soldering footprint PMBD7000 (SOT23/TO-236AB)**



**Fig 10. Wave soldering footprint PMBD7000 (SOT23/TO-236AB)**

## 12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMBD7000 v.4	20100916	Product data sheet	-	PMBD7000_3
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>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Table 4 “Marking codes”</a>: updated</li> <li>• <a href="#">Table 7 “Characteristics”</a>: corrected <math>V_F</math> unit for condition <math>I_F = 150</math> mA</li> <li>• <a href="#">Figure 2</a>: updated</li> <li>• <a href="#">Section 8 “Test information”</a>: figure title of <a href="#">Figure 6</a> amended</li> <li>• <a href="#">Section 8.1 “Quality information”</a>: added</li> <li>• <a href="#">Section 13 “Legal information”</a>: updated</li> </ul>			
PMBD7000_3	19990511	Product specification	-	PMBD7000_2
PMBD7000_2	19960918	Product specification	-	PMBD7000_1
PMBD7000_1	19960419	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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