

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

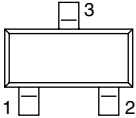
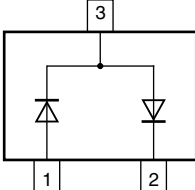
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_R	reverse current	$V_R = 100$ V	-	-	0.5	μ A
V_R	reverse voltage		-	-	100	V
t_{rr}	reverse recovery time		[1]	-	4	ns

[1] When switched from $I_F = 10$ mA to $I_R = 10$ mA; $R_L = 100$ Ω ; 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 ^[1]
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
Per diode					
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
Per device					
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.

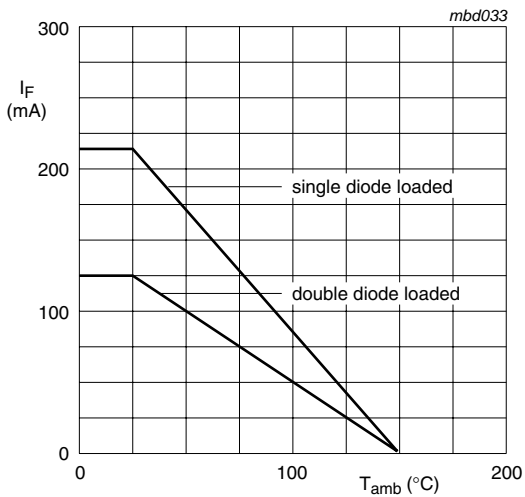
7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
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	μA
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

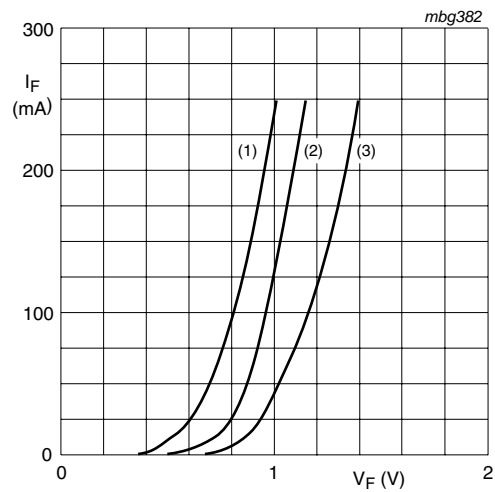
[1] When switched from $I_F = 10\text{ mA}$ to $I_R = 10\text{ mA}$; $R_L = 100\ \Omega$; measured at $I_R = 1\text{ mA}$.

[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

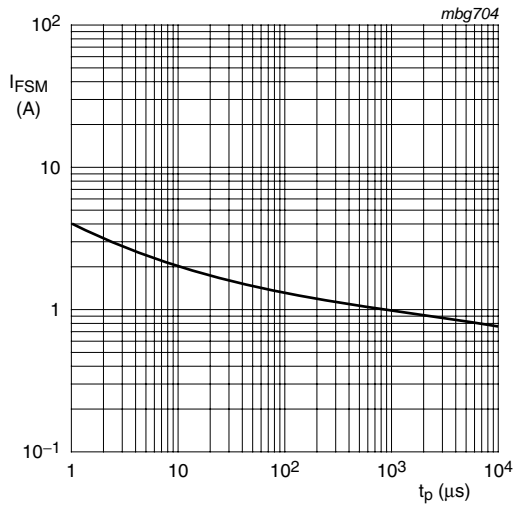


(1) $T_j = 150\text{ }^\circ\text{C}$; typical values

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

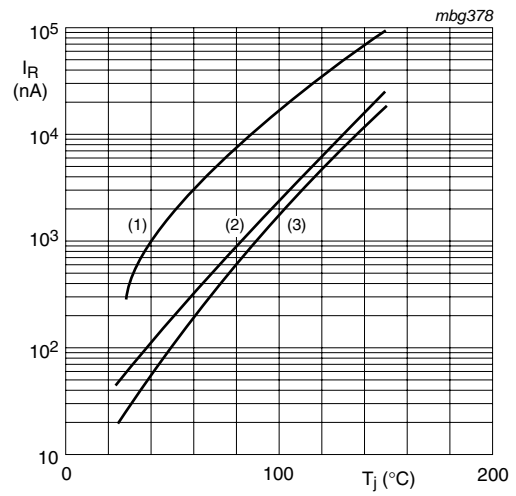
(3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

Fig 2. Forward current as a function of forward voltage



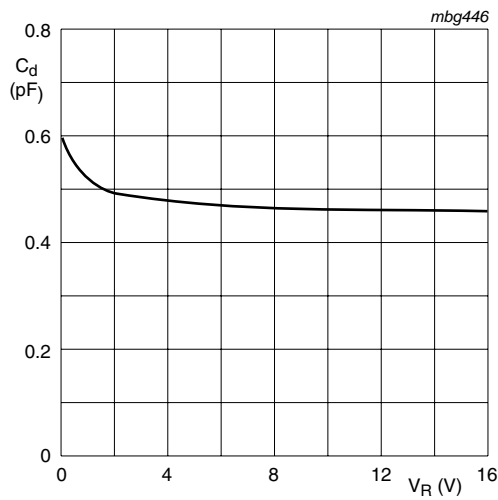
Based on square wave currents.
 $T_j = 25\text{ }^\circ\text{C}$; prior to surge

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

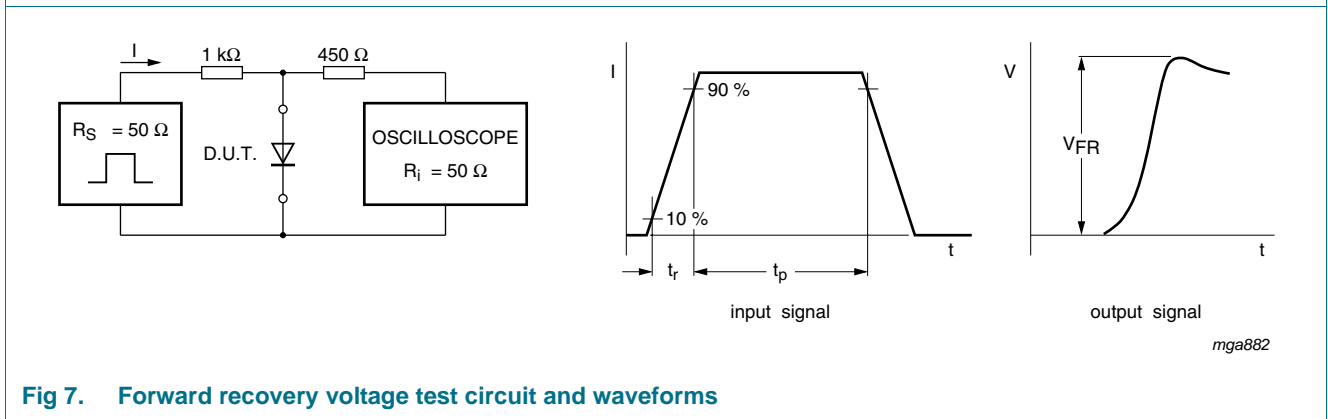
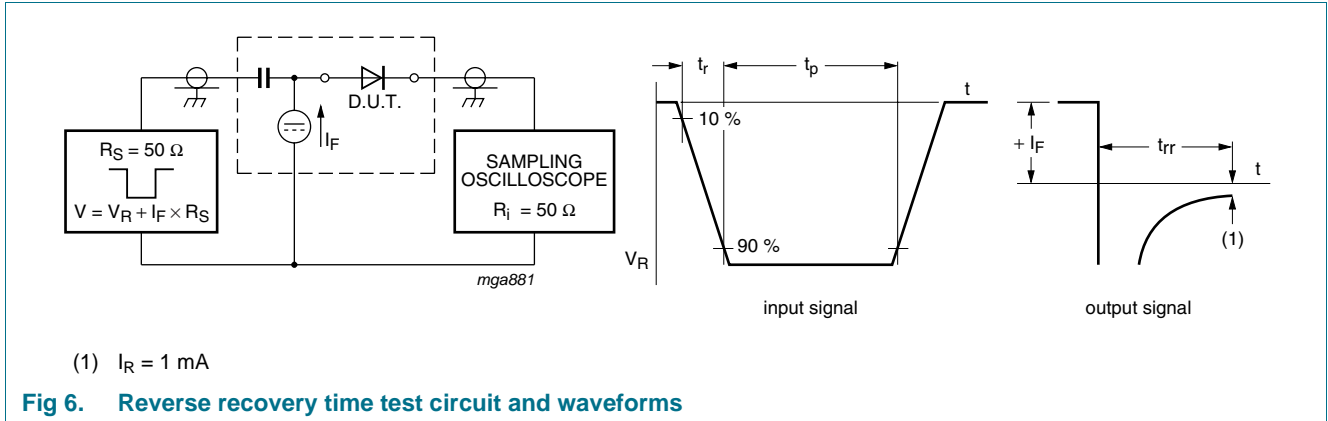
Fig 4. Reverse current as a function of junction temperature



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

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

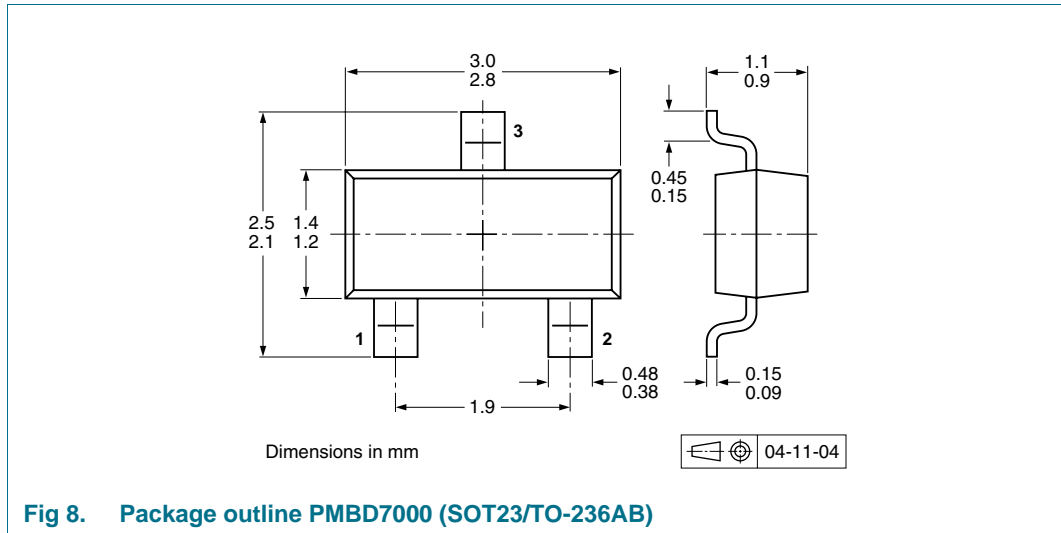
8. Test information



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.^[1]

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

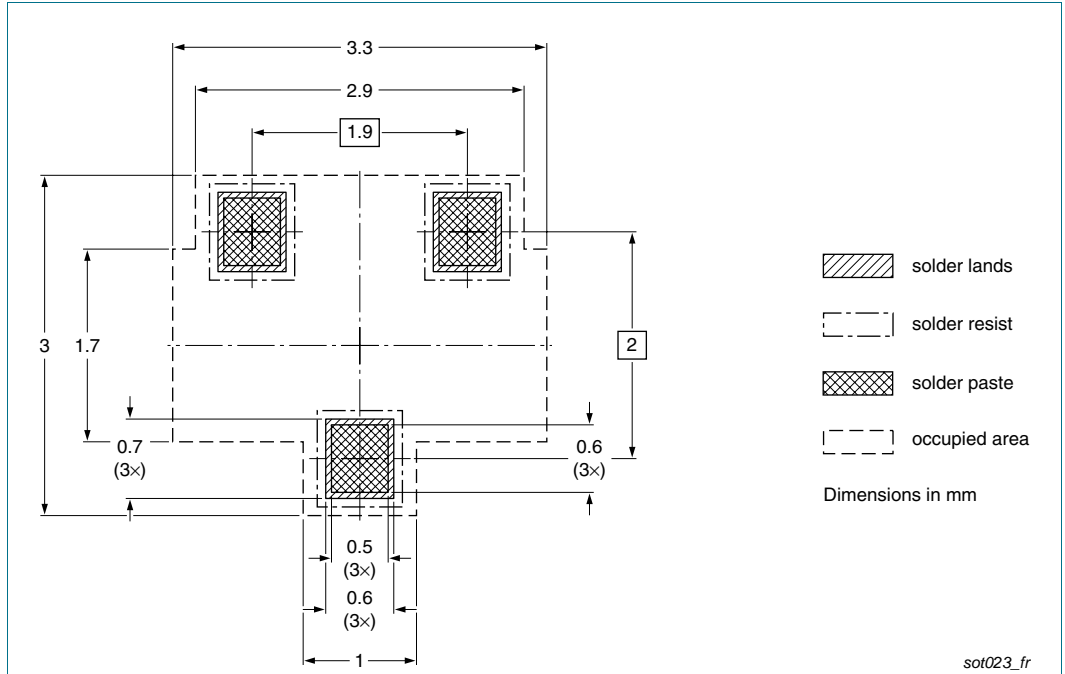


Fig 9. Reflow soldering footprint PMBD7000 (SOT23/TO-236AB)

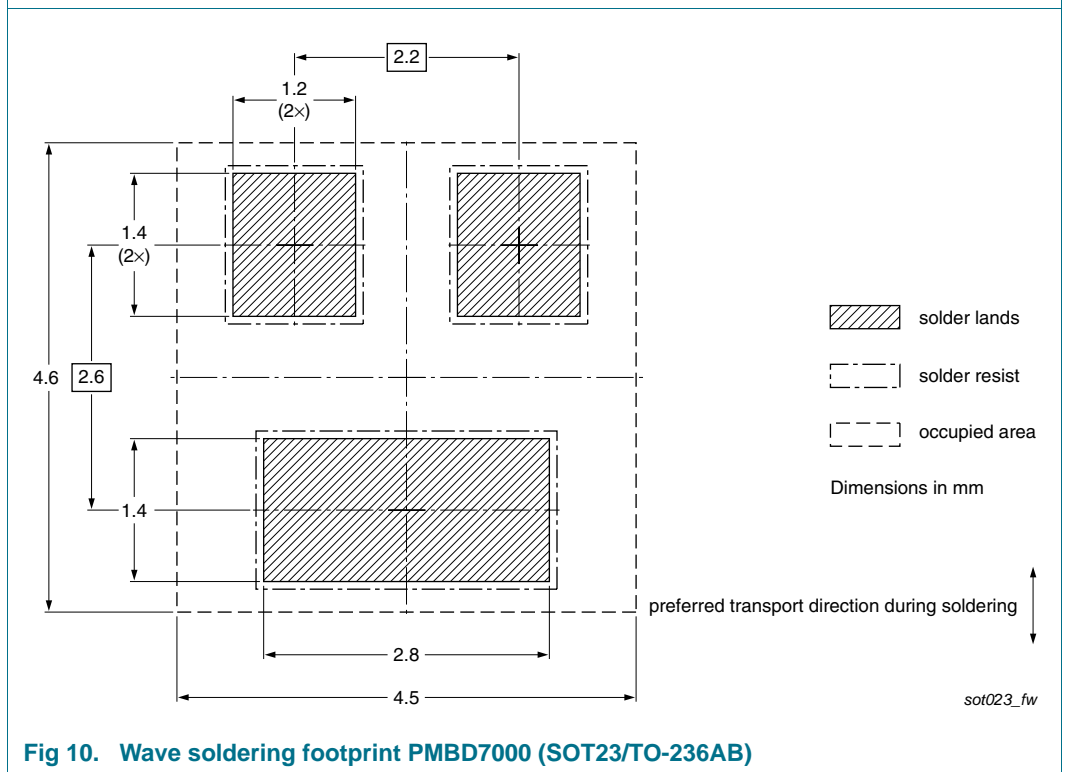


Fig 10. Wave soldering footprint PMBD7000 (SOT23/TO-236AB)

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"> • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 4 “Marking codes”: updated • Table 7 “Characteristics”: corrected V_F unit for condition $I_F = 150$ mA • Figure 2: updated • Section 8 “Test information”: figure title of Figure 6 amended • Section 8.1 “Quality information”: added • Section 13 “Legal information”: updated 			
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 ^{[1][2]}	Product status ^[3]	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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Date of release: 16 September 2010

Document identifier: PMBD7000