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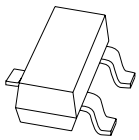
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Team Nexperia



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

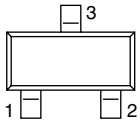
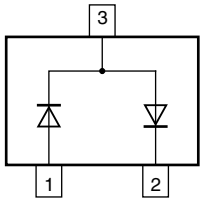
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_R	reverse current	$V_R = 100$ V	-	-	0.5	μA
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[1]
PMBD7000	*5C

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

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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 μs		-	4	A
		t_p = 1 ms		-	1	A
		t_p = 1 s		-	0.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1][4]	-	250	mW
Per device						
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] Single diode loaded.

[2] Double diode loaded.

[3] T_j = 25 °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.

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7. Characteristics

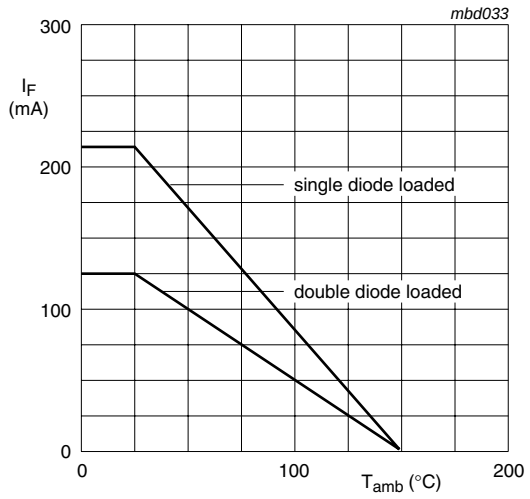
Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

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

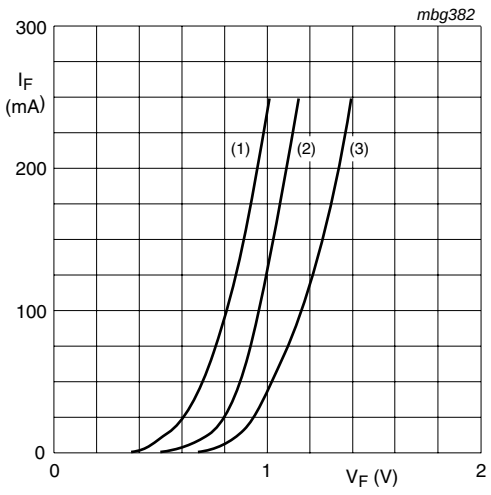
[1] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

[2] When switched from I_F = 10 mA; t_r = 20 ns.



FR4 PCB, standard footprint

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



(1) T_j = 150 °C; typical values

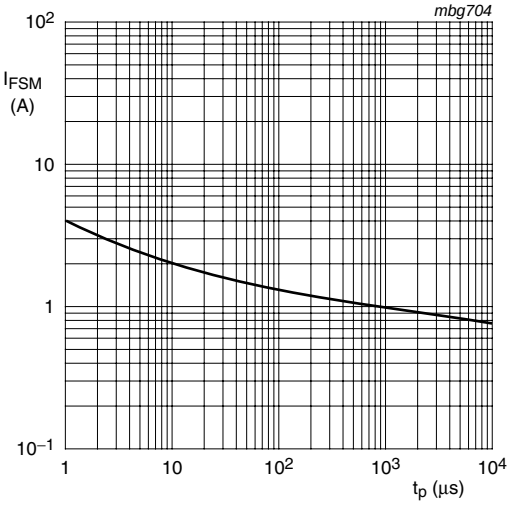
(2) T_j = 25 °C; typical values

(3) T_j = 25 °C; maximum values

Fig 2. Forward current as a function of forward voltage

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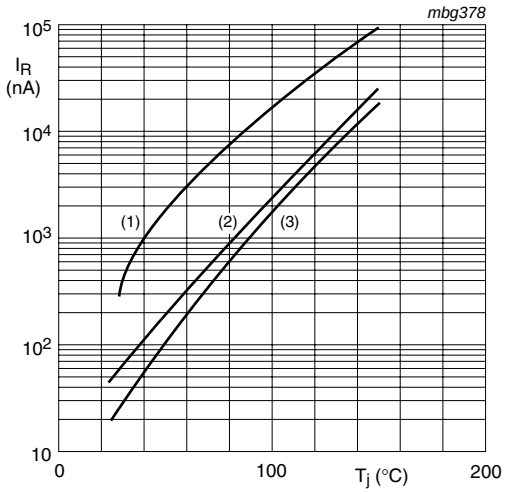
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Based on square wave currents.

T_j = 25 °C; prior to surge

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

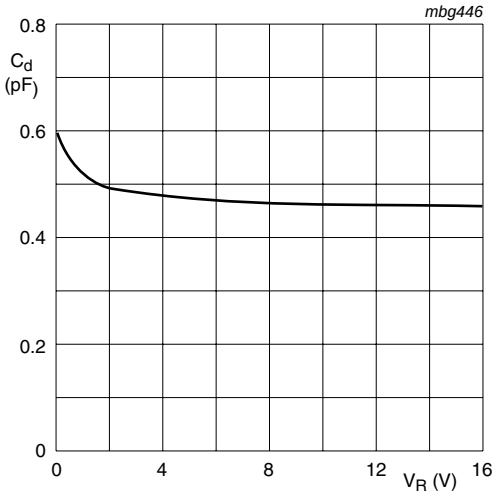


(1) V_R = 50 V; maximum values

(2) V_R = 30 V; typical values

(3) V_R = 50 V; typical values

Fig 4. Reverse current as a function of junction temperature



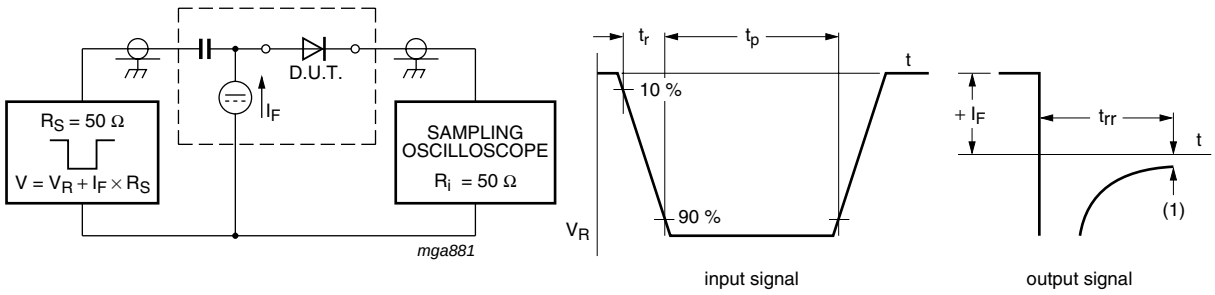
f = 1 MHz; T_{amb} = 25 °C

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

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8. Test information



(1) I_R = 1 mA

Fig 6. Reverse recovery time test circuit and waveforms

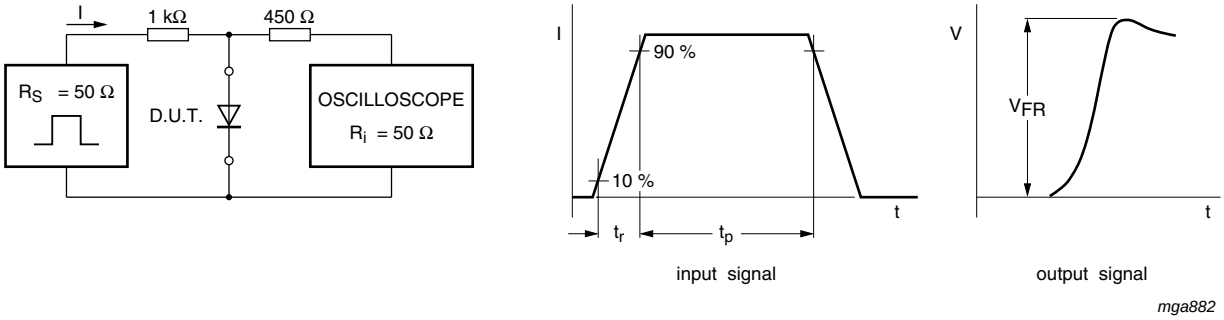


Fig 7. Forward recovery voltage test circuit and waveforms

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.

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9. Package outline

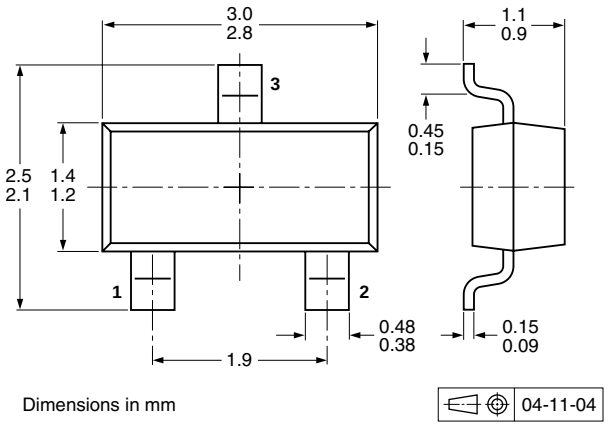


Fig 8. Package outline PMBD7000 (SOT23/TO-236AB)

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.

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11. Soldering

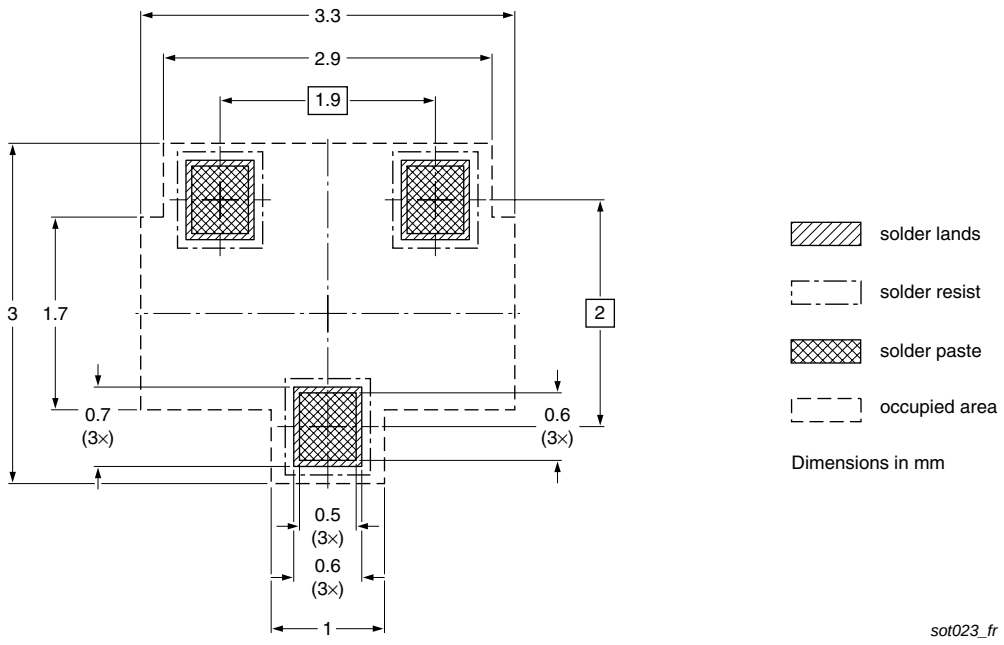


Fig 9. Reflow soldering footprint PMBD7000 (SOT23/TO-236AB)

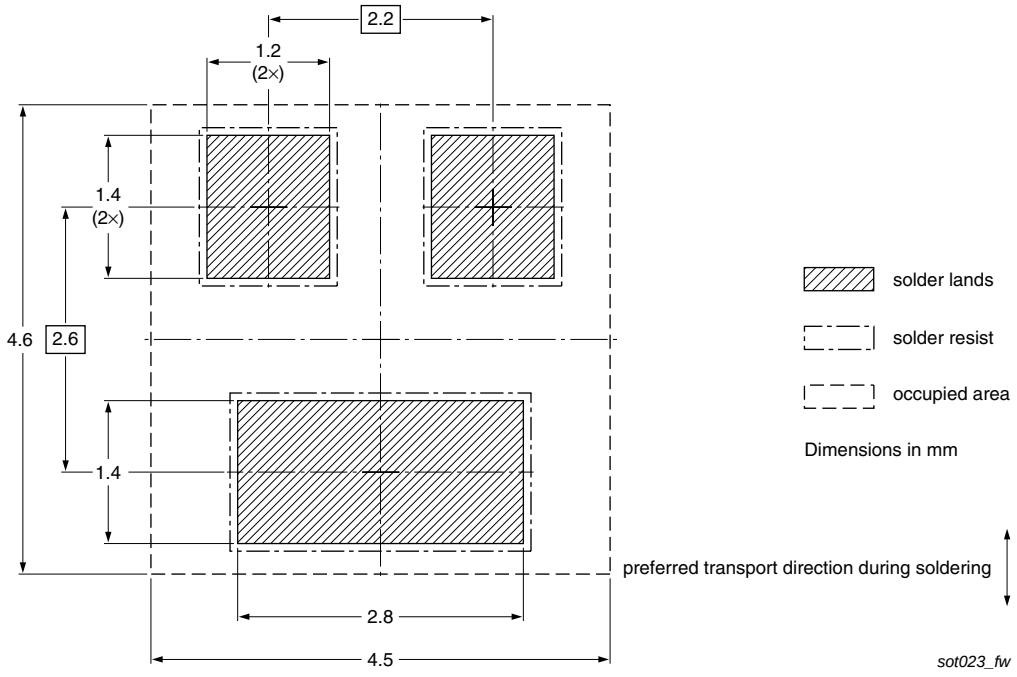


Fig 10. Wave soldering footprint PMBD7000 (SOT23/TO-236AB)

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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:	• 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	-	-

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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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