

# 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

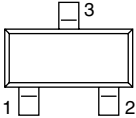
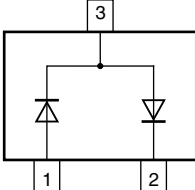
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_R$	reverse current	$V_R = 100$ V	-	-	0.5	$\mu$ A
$V_R$	reverse voltage		-	-	100	V
$t_{rr}$	reverse recovery time		[1]	-	4	ns

[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.

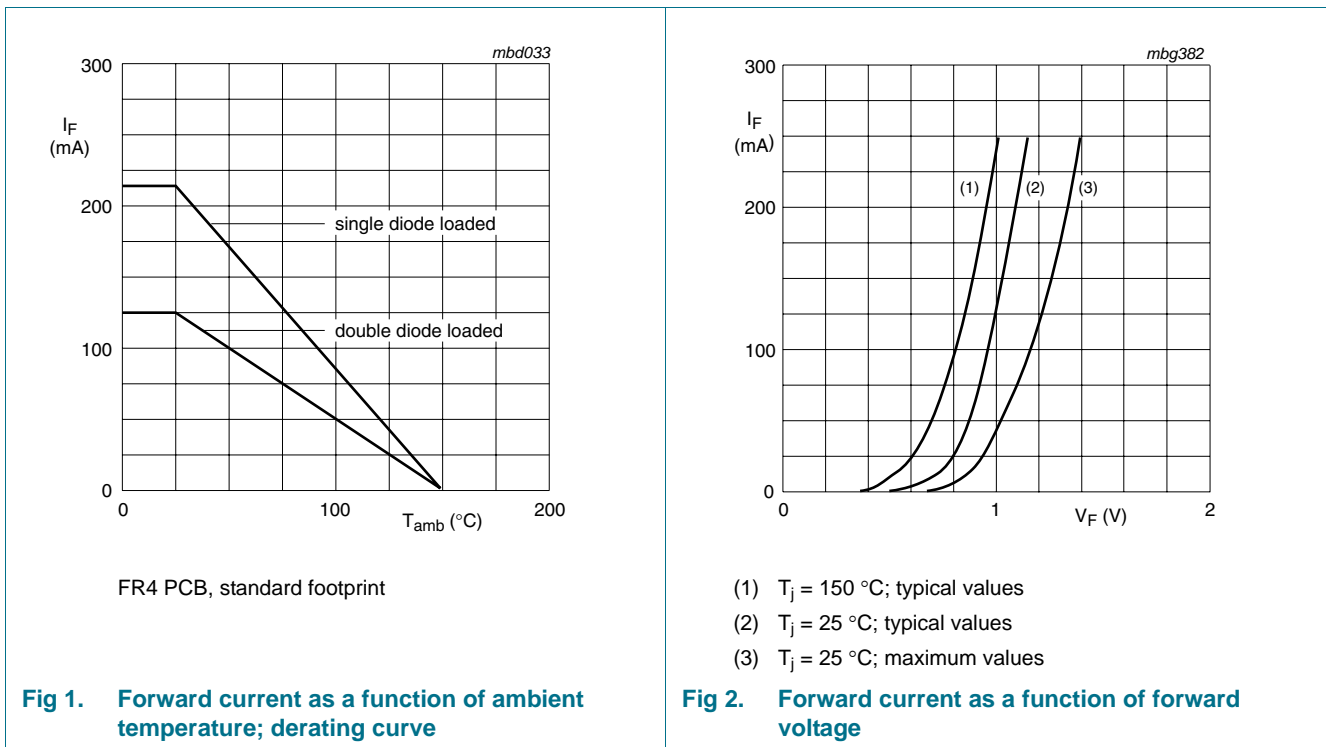
7. Characteristics

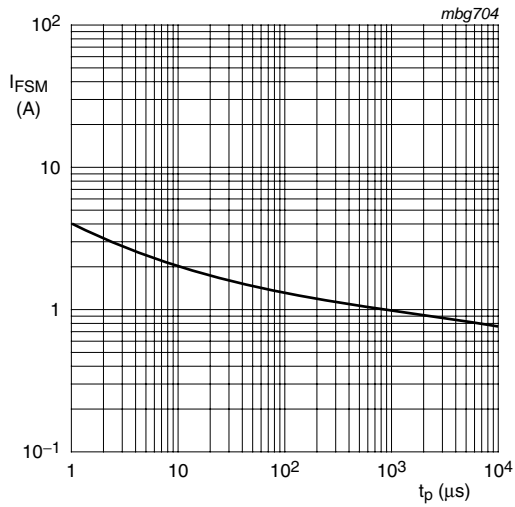
**Table 7. Characteristics**  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA	-	550	700	mV
		I <sub>F</sub> = 10 mA	-	670	820	mV
		I <sub>F</sub> = 50 mA	-	-	1	V
		I <sub>F</sub> = 100 mA	-	0.75	1.1	V
		I <sub>F</sub> = 150 mA	-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 50 V	-	-	300	nA
		V <sub>R</sub> = 100 V	-	-	500	nA
		V <sub>R</sub> = 50 V; T <sub>j</sub> = 150 °C	-	-	100	μA
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 0 V	-	-	1.5	pF
t <sub>rr</sub>	reverse recovery time		[1]	-	4	ns
V <sub>FR</sub>	forward recovery voltage		[2]	-	1.75	V

[1] When switched from I<sub>F</sub> = 10 mA to I<sub>R</sub> = 10 mA; R<sub>L</sub> = 100 Ω; measured at I<sub>R</sub> = 1 mA.

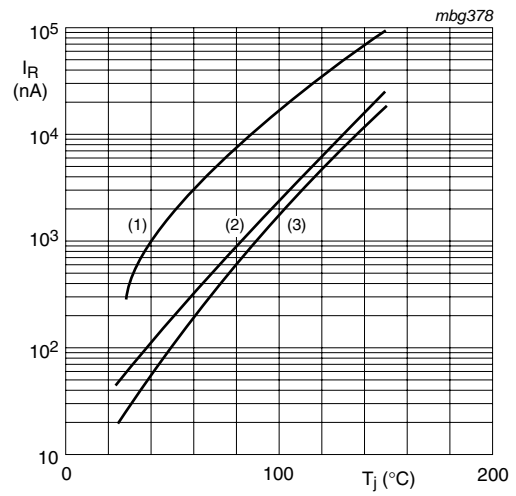
[2] When switched from I<sub>F</sub> = 10 mA; t<sub>r</sub> = 20 ns.





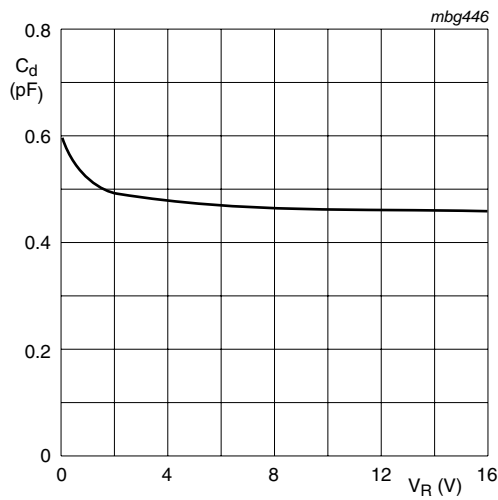
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$ ; prior to surge

**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

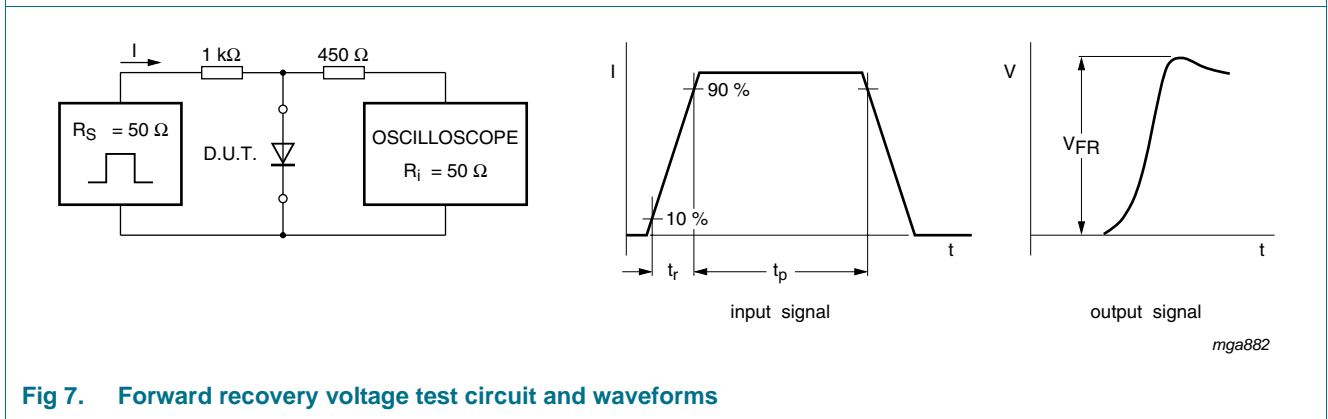
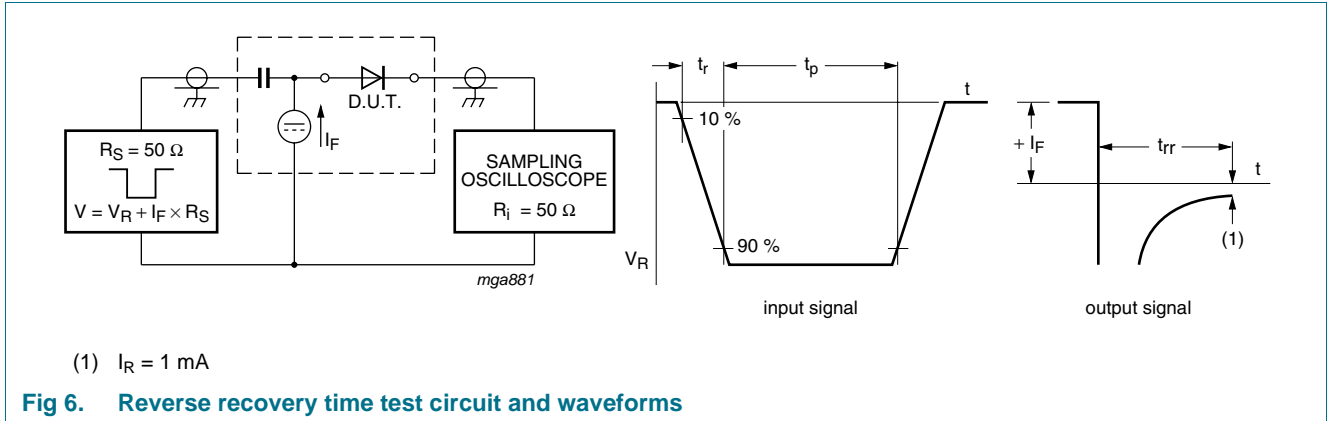
**Fig 4. Reverse current as a function of junction temperature**



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

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

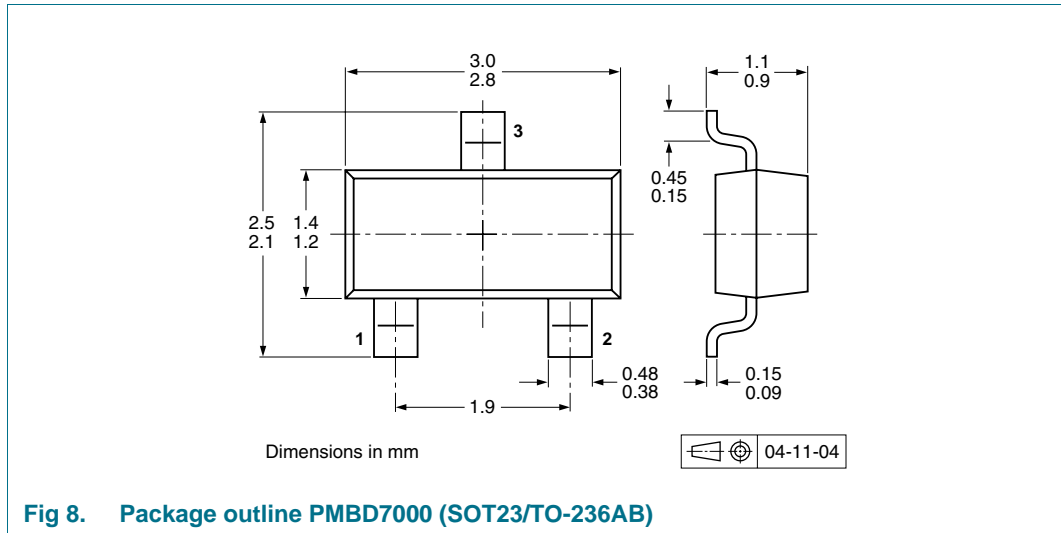
### 8. Test information



#### 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

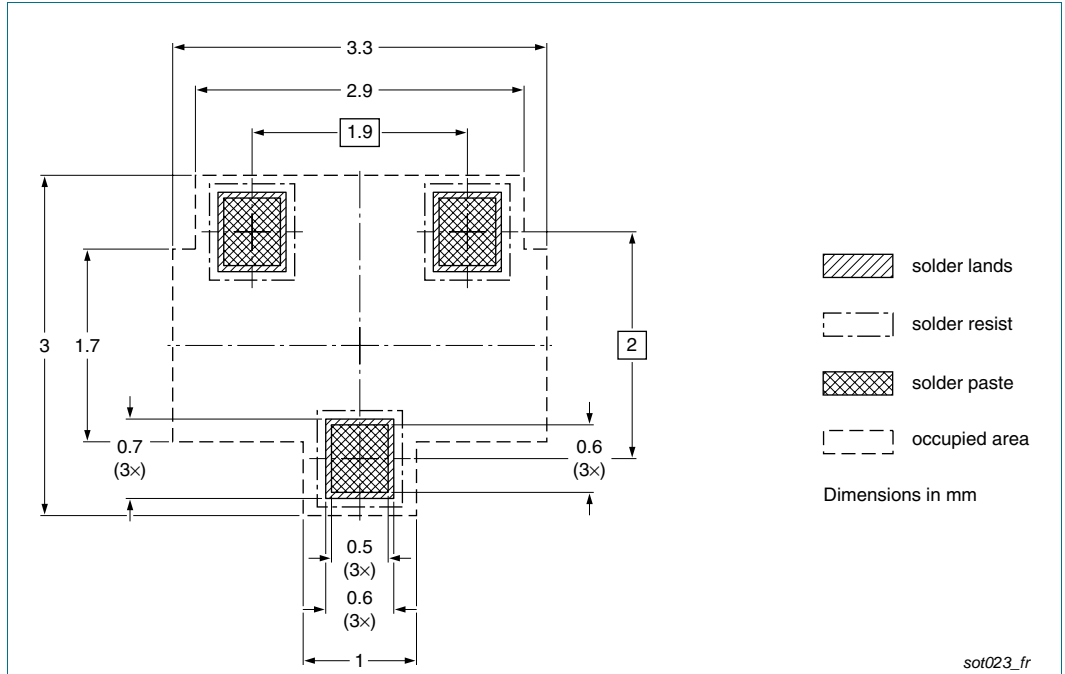
**Table 8. Packing methods**

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

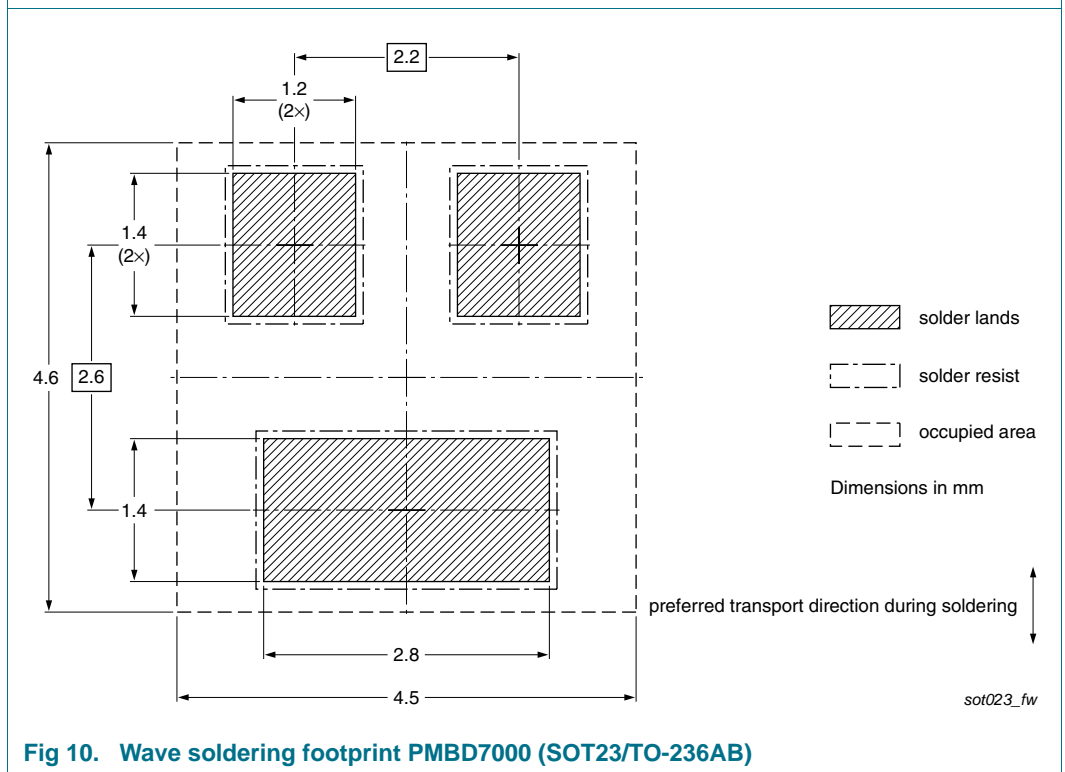
Type number	Package	Description	Packing quantity	
			3000	10000
PMBD7000	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

[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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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