

# 1PS76SB21; BAT721 series

Schottky barrier diodes in small packages

Rev. 06 — 21 December 2006

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Schottky barrier diodes with an integrated guard ring for stress protection. Encapsulated in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
1PS76SB21	SOD323	SC-76	single
BAT721	SOT23	-	single
BAT721A	SOT23	-	dual common anode
BAT721C	SOT23	-	dual common cathode
BAT721S	SOT23	-	dual series

### 1.2 Features

- Low forward voltage
- Small SMD plastic packages
- Low capacitance

### 1.3 Applications

- Ultra high-speed switching
- Voltage clamping
- Line termination
- Reverse polarity protection

### 1.4 Quick reference data


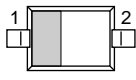
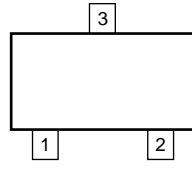
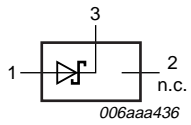
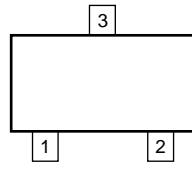
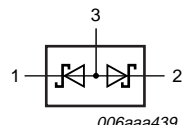
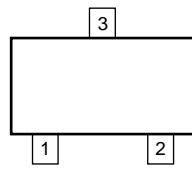
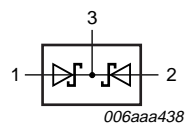
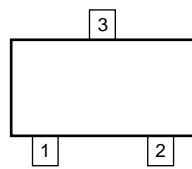
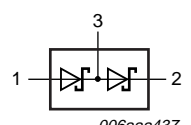
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_F$	forward current		-	-	200	mA
$V_R$	reverse voltage		-	-	40	V
$V_F$	forward voltage	$I_F = 200 \text{ mA}$	[1]	-	550	mV

[1] Pulse test:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$ .

## 2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
<b>1PS76SB21</b>			
1	cathode	[1]	1  2
2	anode		<i>sym001</i>
<b>BAT721</b>			
1	anode		
2	not connected		
3	cathode		
		<i>006aaa144</i>	<i>006aaa436</i>
<b>BAT721A</b>			
1	cathode (diode 1)		
2	cathode (diode 2)		
3	anode (diode 1), anode (diode 2)		
		<i>006aaa144</i>	<i>006aaa439</i>
<b>BAT721C</b>			
1	anode (diode 1)		
2	anode (diode 2)		
3	cathode (diode 1), cathode (diode 2)		
		<i>006aaa144</i>	<i>006aaa438</i>
<b>BAT721S</b>			
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		
		<i>006aaa144</i>	<i>006aaa437</i>

[1] The marking bar indicates the cathode.

### 3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
1PS76SB21	SC-76	plastic surface-mounted package; 2 leads	SOD323
BAT721	-	plastic surface-mounted package; 3 leads	SOT23
BAT721A			
BAT721C			
BAT721S			

### 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
1PS76SB21	S1
BAT721	L7*
BAT721A	L8*
BAT721C	L9*
BAT721S	L0*

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

### 5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$V_R$	reverse voltage		-	40	V
$I_F$	forward current		-	200	mA
$I_{FSM}$	non-repetitive peak forward current	half sine wave; JEDEC method; $t_p = 8.3$ ms	-	1	A
$T_j$	junction temperature		-	125	°C
$T_{amb}$	ambient temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]			
	1PS76SB21		-	-	450	K/W
	BAT721		-	-	500	K/W
	BAT721A		-	-	500	K/W
	BAT721C		-	-	500	K/W
	BAT721S		-	-	500	K/W

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

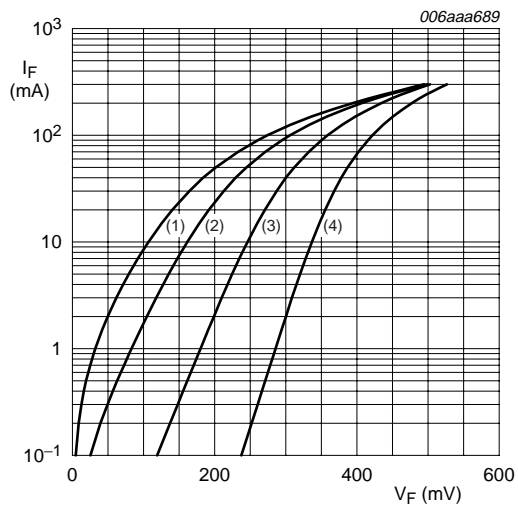
## 7. Characteristics

**Table 8. Characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

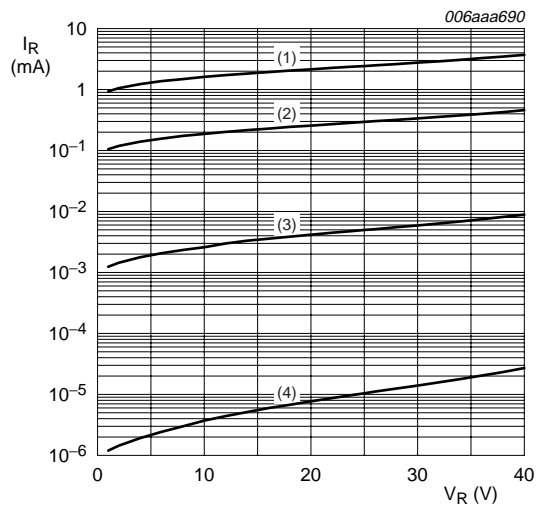
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 10\text{ mA}$	[1]	-	300	mV
		$I_F = 100\text{ mA}$	[1]	-	420	mV
		$I_F = 200\text{ mA}$	[1]	-	550	mV
$I_R$	reverse current	$V_R = 30\text{ V}$	-	-	15	$\mu\text{A}$
		$V_R = 30\text{ V}; T_j = 100\text{ }^{\circ}\text{C}$	-	-	3	mA
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	40	50	pF

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .



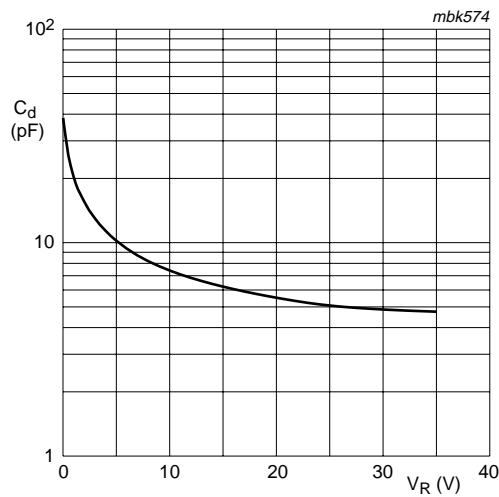
- (1)  $T_{amb} = 125\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = -40\text{ °C}$

**Fig 1. Forward current as a function of forward voltage; typical values**



- (1)  $T_{amb} = 125\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = -40\text{ °C}$

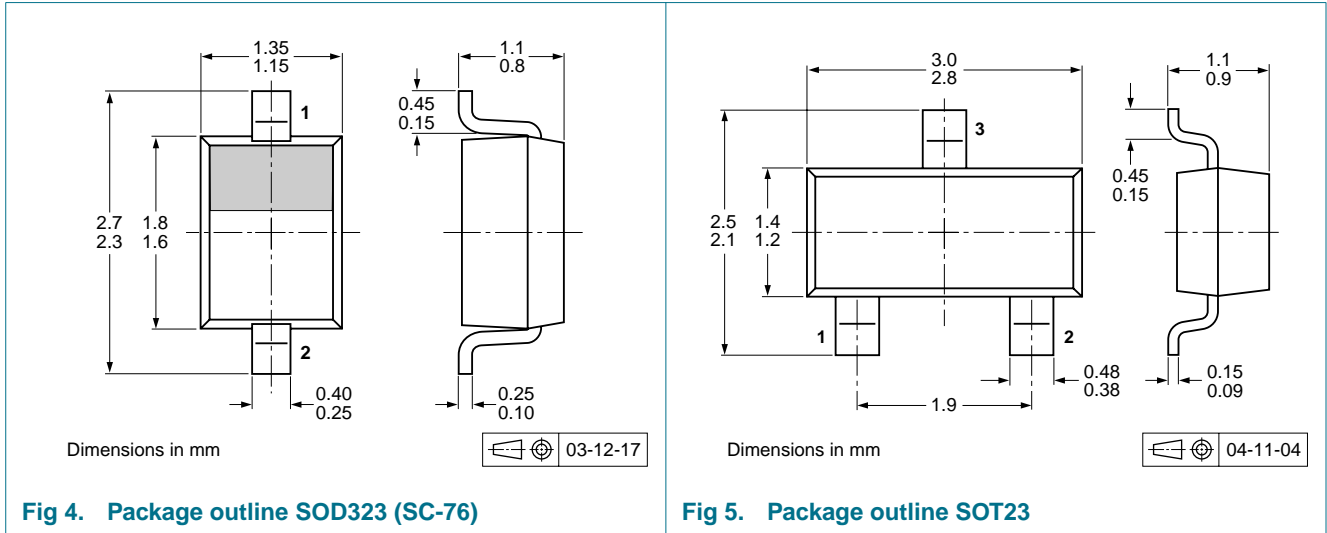
**Fig 2. Reverse current as a function of reverse voltage; typical values**



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

**Fig 3. Diode capacitance as a function of reverse voltage; typical values**

## 8. Package outline



## 9. Packing information

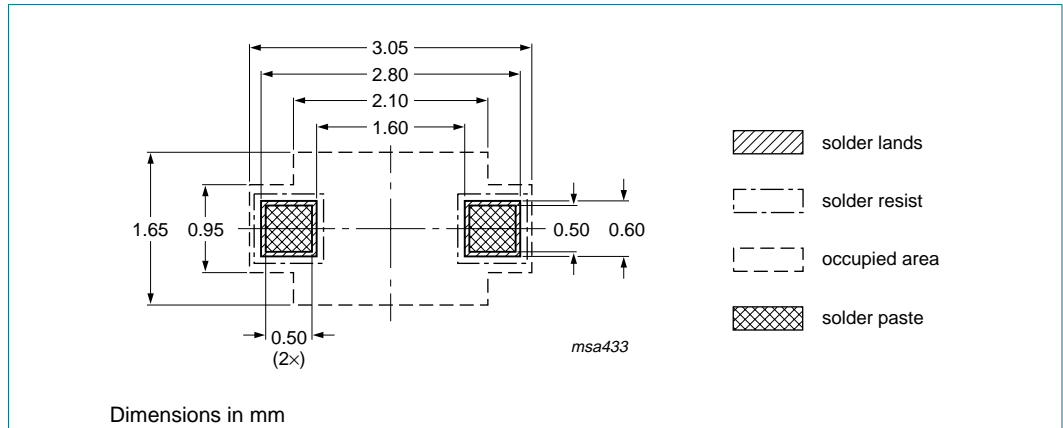
**Table 9. Packing methods**

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

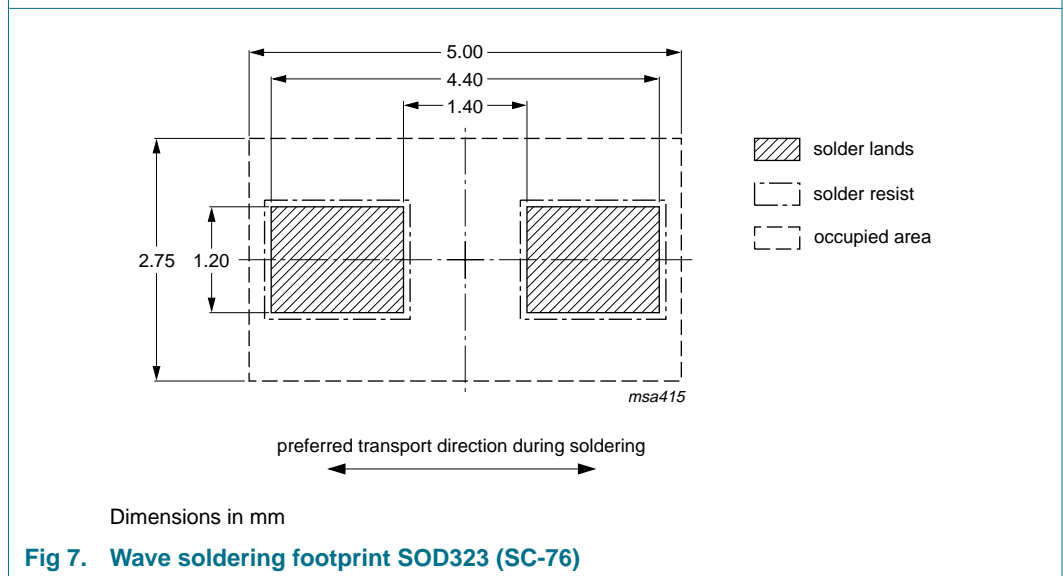
Type number	Package	Description	Packing quantity	
			3000	10000
1PS76SB21	SOD323	4 mm pitch, 8 mm tape and reel	-115	-135
BAT721	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
BAT721A				
BAT721C				
BAT721S				

[1] For further information and the availability of packing methods, see [Section 13](#).

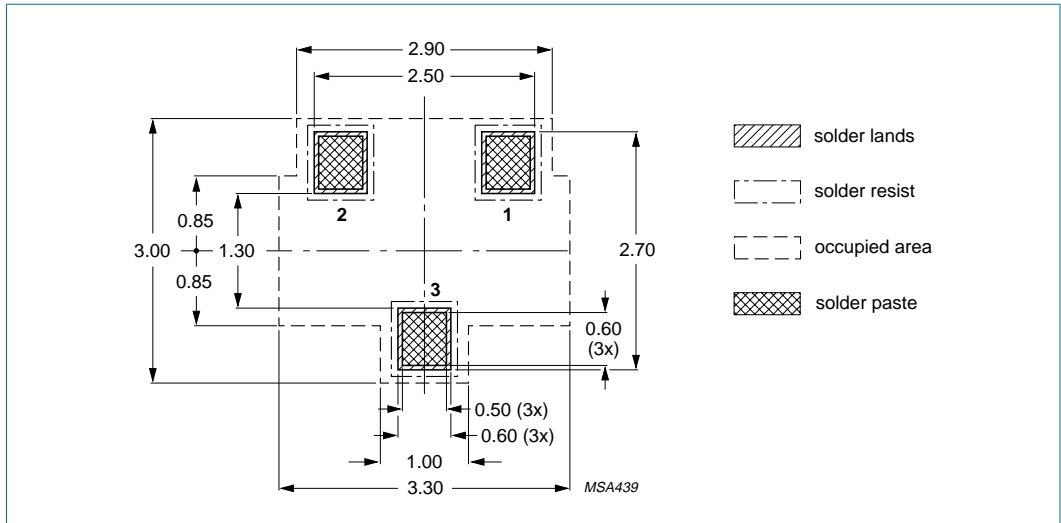
## 10. Soldering



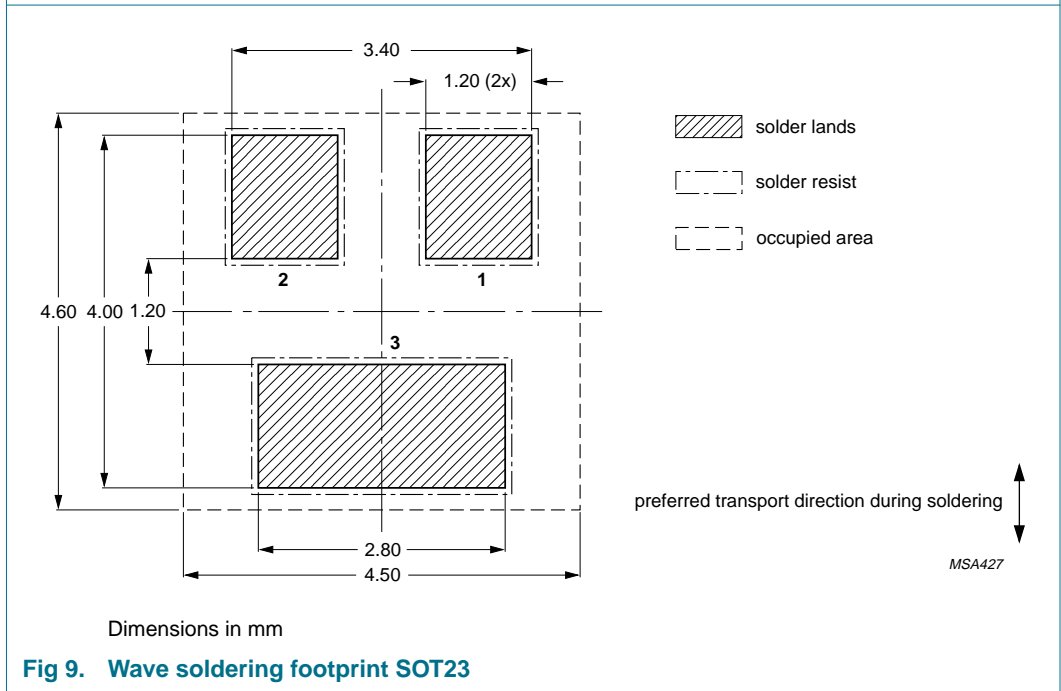
**Fig 6. Reflow soldering footprint SOD323 (SC-76)**



**Fig 7. Wave soldering footprint SOD323 (SC-76)**



**Fig 8. Reflow soldering footprint SOT23**



**Fig 9. Wave soldering footprint SOT23**



## 11. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
1PS76SB21_BAT721_SER_6	20061221	Product data sheet	-	1PS76SB21_BAT721_SER_5
Modifications:	<ul style="list-style-type: none"> <li>Amended <a href="#">Table 10 "Revision history"</a></li> </ul>			
1PS76SB21_BAT721_SER_5	20061205	Product data sheet	-	BAT721_SERIES_4 1PS76SB21_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>This data sheet is a combination of data sheets BAT721_SERIES_4 and 1PS76SB21_3.</li> <li><a href="#">Table 1 "Product overview"</a>: added</li> <li><a href="#">Section 1.2 "Features"</a>: amended</li> <li><a href="#">Section 1.3 "Applications"</a>: amended</li> <li><a href="#">Table 2 "Quick reference data"</a>: added</li> <li><a href="#">Table 5 "Marking codes"</a>: for 1PS76SB21 amended</li> <li><a href="#">Table 5 "Marking codes"</a>: enhanced table note section</li> <li><a href="#">Table 6 "Limiting values"</a>: indication per diode added</li> <li><a href="#">Table 6 "Limiting values"</a>: for 1PS76SB21 <math>I_{FSM}</math> condition amended</li> <li><a href="#">Table 6 "Limiting values"</a>: <math>T_{amb}</math> ambient temperature added</li> <li><a href="#">Table 7 "Thermal characteristics"</a>: indication per diode added</li> <li><a href="#">Table 7</a>: <math>R_{th(j-a)}</math> thermal resistance from junction to ambient condition amended</li> <li><a href="#">Table 8 "Characteristics"</a>: indication per diode added</li> <li><a href="#">Table 8 "Characteristics"</a>: reference to <a href="#">Table note 1</a> amended</li> <li><a href="#">Table 8</a>: for 1PS76SB21 <math>C_d</math> minimum value changed to typical value</li> <li><a href="#">Figure 1</a> and <a href="#">2</a>: amended</li> <li><a href="#">Figure 4</a> and <a href="#">5</a>: superseded by minimized package outlines</li> <li><a href="#">Section 9 "Packing information"</a>: added</li> <li><a href="#">Section 10 "Soldering"</a>: added</li> <li><a href="#">Section 12 "Legal information"</a>: updated</li> </ul>			
BAT721_SERIES_4	20040315	Product specification	-	BAT721_SERIES_3
1PS76SB21_3	20040126	Product specification	-	1PS76SB21_2

## 12. Legal information

### 12.1 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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