



# BAS56

## High-speed double diode

Rev. 3 — 29 June 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Two high-speed switching diodes fabricated in planar technology, and encapsulated in a small SOT143B Surface-Mounted Device (SMD) plastic package. The diodes are not connected.

### 1.2 Features and benefits

- High switching speed:  $t_{rr} \leq 6$  ns
- Reverse voltage:  $V_R \leq 60$  V
- Repetitive peak reverse voltage:  $V_{RRM} \leq 60$  V
- Repetitive peak forward current:  $I_{FRM} \leq 600$  mA
- AEC-Q101 qualified
- Small SMD plastic package

### 1.3 Applications

- High-speed switching in e.g. surface-mounted circuits

### 1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current		[1][2]	-	-	200 mA
$I_R$	reverse current	$V_R = 60$ V	-	-	100 nA	
$V_R$	reverse voltage		-	-	60 V	
$t_{rr}$	reverse recovery time		[3]	-	-	6 ns

[1] Single diode loaded.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB).

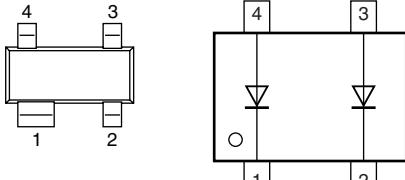
[3] When switched from  $I_F = 400$  mA to  $I_R = 400$  mA;  $R_L = 100 \Omega$ ; measured at  $I_R = 40$  mA.

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## 2. Pinning information

Table 2. Pinning

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



006aab100

## 3. Ordering information

Table 3. Ordering information

Type number	Package			Version
	Name	Description		
BAS56	-	plastic surface-mounted package; 4 leads		SOT143B

## 4. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
BAS56	*L5

[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
$V_{RRM}$	repetitive peak reverse voltage		-	60	V
			[1]	120	V
$V_R$	reverse voltage		-	60	V
			[1]	120	V
$I_F$	forward current		[2][3]	200	mA
			[2][4]	150	mA
$I_{FRM}$	repetitive peak forward current		[3]	600	mA
			[4]	430	mA
$I_{FSM}$	non-repetitive peak forward current	square wave	[5]		
		$t_p = 1 \mu s$	-	9	A
		$t_p = 100 \mu s$	-	3	A
		$t_p = 10 ms$	-	1.7	A
			[2]	250	mW
			-	150	°C
$P_{tot}$	total power dissipation	$T_{amb} = 25 \text{ }^{\circ}\text{C}$	[2]	-	
$T_j$	junction temperature		-	150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1] Series connection.

[2] Device mounted on an FR4 PCB.

[3] Single diode loaded.

[4] Double diode loaded.

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

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

[1] Device mounted on an FR4 PCB.

## 7. Characteristics

**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 200 \text{ mA}$	[1]	-	-	1 V
$I_R$	reverse current	$V_R = 60 \text{ V}$	-	-	100	nA
		$V_R = 60 \text{ V}; T_j = 150^\circ\text{C}$	-	-	100	$\mu\text{A}$
		$V_R = 120 \text{ V}$	[2]	-	-	100 nA
$C_d$	diode capacitance	$V_R = 120 \text{ V}; T_j = 150^\circ\text{C}$	[2]	-	-	100 $\mu\text{A}$
		$f = 1 \text{ MHz}; V_R = 0 \text{ V}$	-	-	2.5	pF
$t_{rr}$	reverse recovery time		[3]	-	-	6 ns
$V_{FR}$	forward recovery voltage		[4]	-	-	2 V
			[5]	-	-	1.5 V

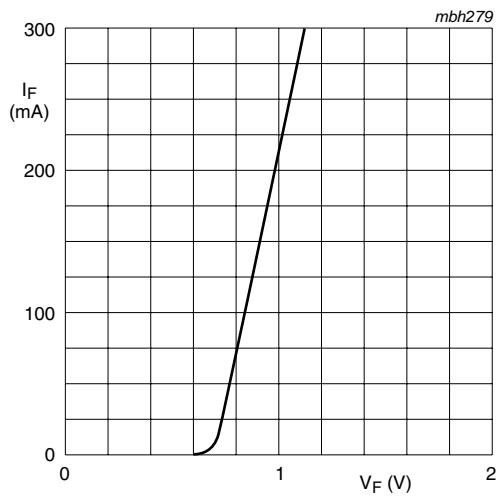
[1]  $T_{amb} = 25^\circ\text{C}$ ; device has reached the thermal equilibrium when mounted on an FR4 PCB.

[2] Series connection.

[3] When switched from  $I_F = 400 \text{ mA}$  to  $I_R = 400 \text{ mA}$ ;  $R_L = 100 \Omega$ ; measured at  $I_R = 40 \text{ mA}$ .

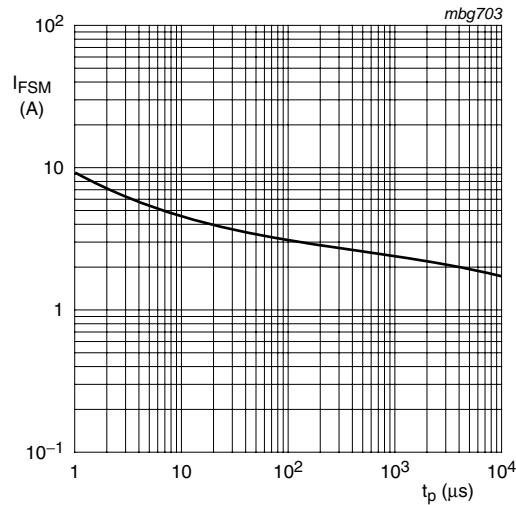
[4] When switched from  $I_F = 400 \text{ mA}$ ;  $t_r = 30 \text{ ns}$ .

[5] When switched from  $I_F = 400 \text{ mA}$ ;  $t_r = 100 \text{ ns}$ .



$T_j = 25^\circ\text{C}$

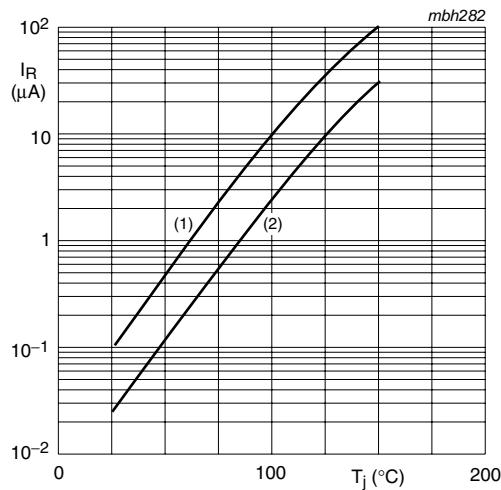
**Fig 1. Forward current as a function of forward voltage; typical values**



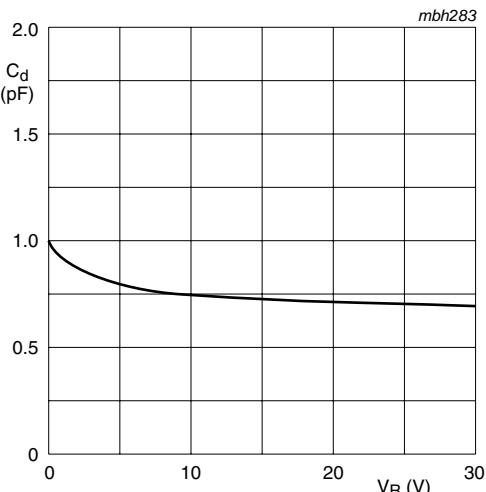
Based on square wave currents.

$T_j = 25^\circ\text{C}$ ; prior to surge

**Fig 2. Non-repetitive peak forward current as a function of pulse duration**

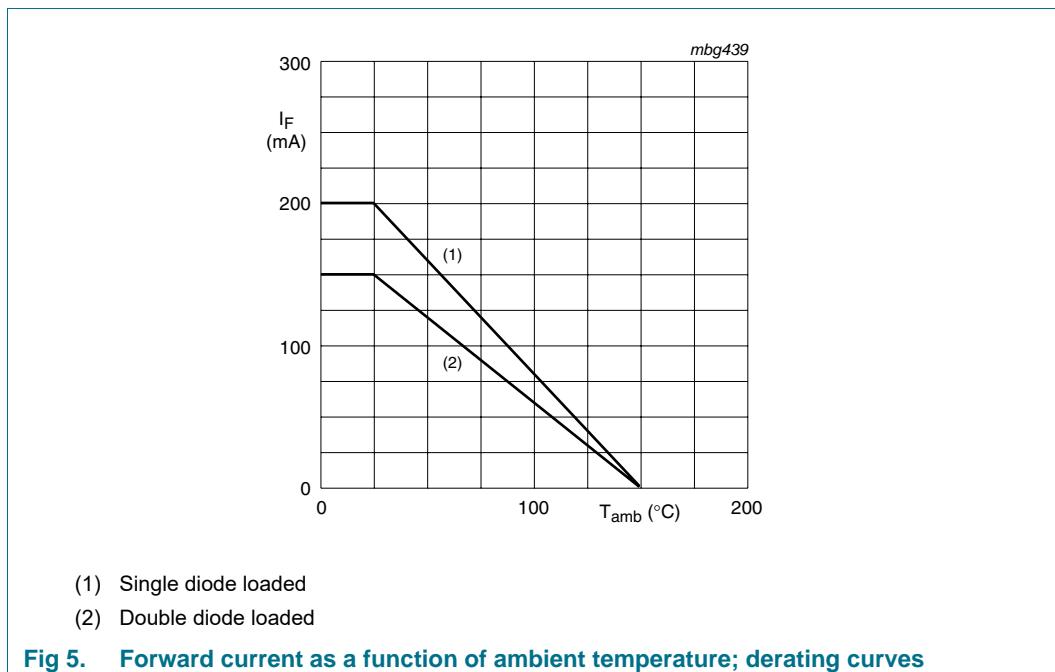


**Fig 3. Reverse current as a function of junction temperature**

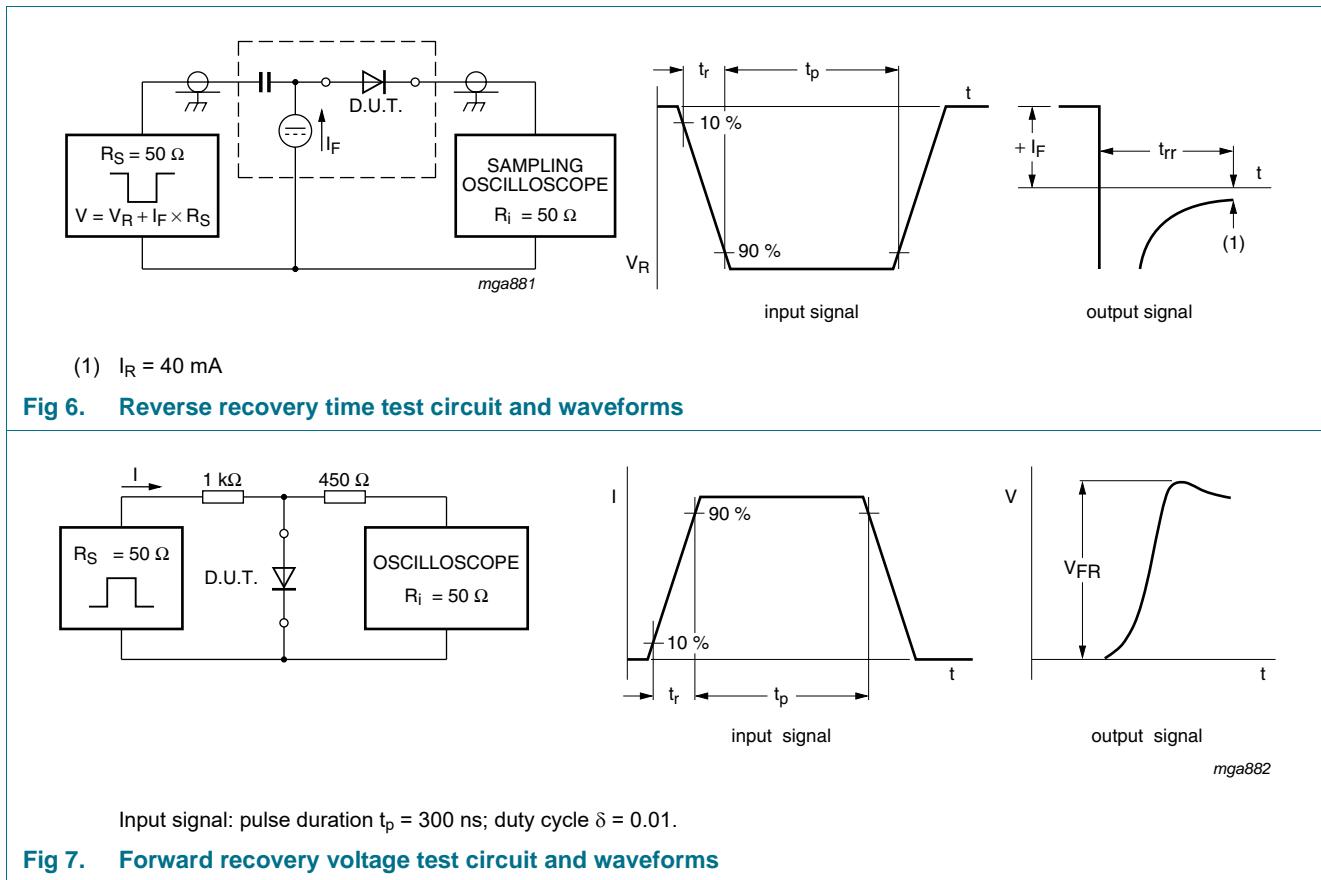


$f = 1$  MHz;  $T_j = 25^\circ\text{C}$

**Fig 4. 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

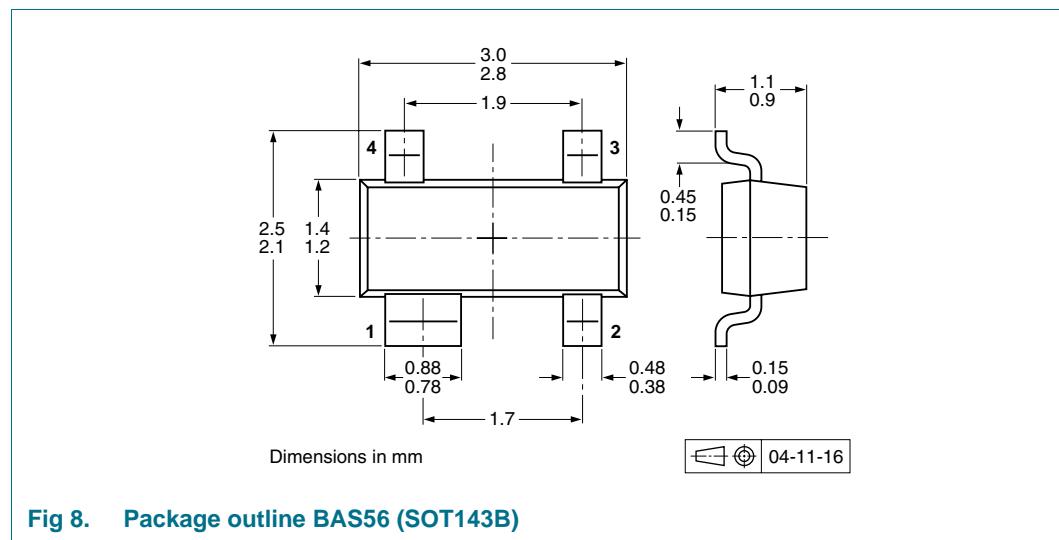
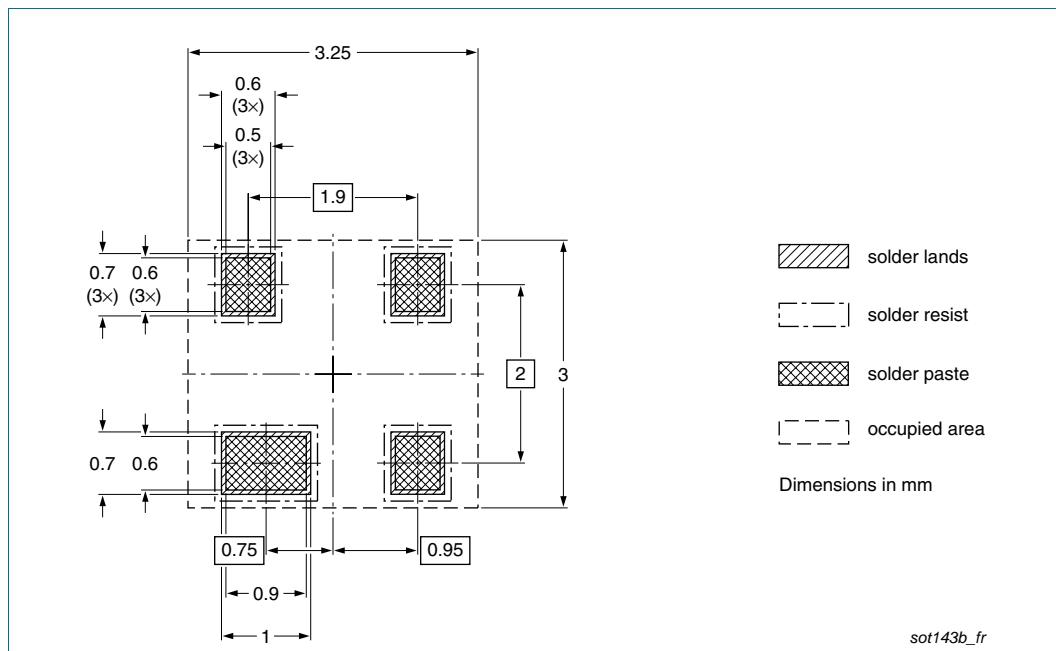


Fig 8. Package outline BAS56 (SOT143B)

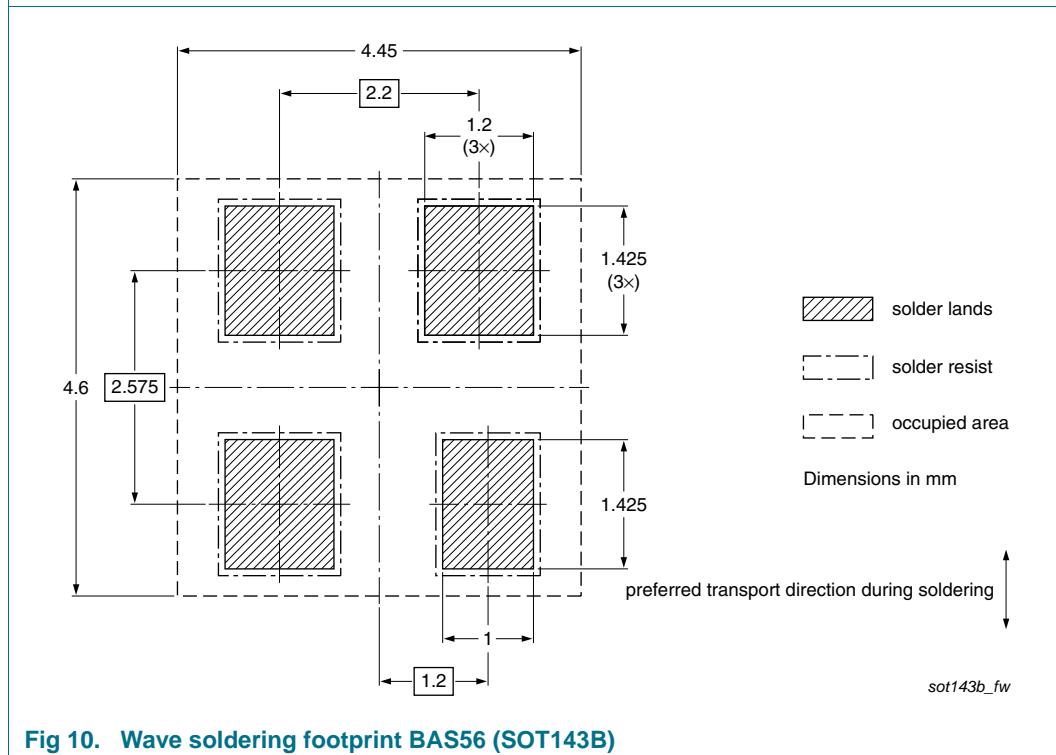
## 10. Packing information

Please refer to packing information on [www.nexperia.com](http://www.nexperia.com).

## 11. Soldering



**Fig 9. Reflow soldering footprint BAS56 (SOT143B)**



**Fig 10. Wave soldering footprint BAS56 (SOT143B)**

## 12. Revision history

**Table 9. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS56 v.3	20100629	Product data sheet	-	BAS56_2
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="#">Section 1.1 "General description"</a>: amended</li><li><a href="#">Section 4 "Marking"</a>: updated</li><li><a href="#">Table 1 "Quick reference data"</a>: added</li><li><a href="#">Section 8 "Test information"</a>: added</li><li><a href="#">Figure 8</a>: superseded by minimized package outline drawing</li><li><a href="#">Section 10 "Packing information"</a>: added</li><li><a href="#">Section 11 "Soldering"</a>: added</li><li><a href="#">Section 13 "Legal information"</a>: updated</li></ul>			
BAS56_2	19960910	Product specification	-	BAS56_1
BAS56_1	19960423	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.nexperia.com>.

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