



# 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.

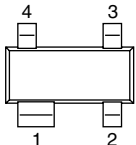
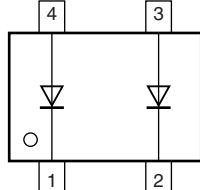
[2] Device mounted on an FR4 Printed-Circuit Board (PCB).

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



## 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		
	Name	Description	Version
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 <sub>RRM</sub>	repetitive peak reverse voltage		-	60	V
		[1]	-	120	V
V <sub>R</sub>	reverse voltage		-	60	V
		[1]	-	120	V
I <sub>F</sub>	forward current		[2][3]	200	mA
			[2][4]	150	mA
I <sub>FRM</sub>	repetitive peak forward current		[3]	600	mA
			[4]	430	mA
I <sub>FSM</sub>	non-repetitive peak forward current	square wave	[5]		
		t <sub>p</sub> = 1 μs	-	9	A
		t <sub>p</sub> = 100 μs	-	3	A
		t <sub>p</sub> = 10 ms	-	1.7	A
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = 25 °C	[2]	250	mW
T <sub>j</sub>	junction temperature		-	150	°C
T <sub>stg</sub>	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<sub>j</sub> = 25 °C prior to surge.

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	500	K/W
R <sub>th(j-t)</sub>	thermal resistance from junction to tie-point		-	-	360	K/W

[1] Device mounted on an FR4 PCB.

## 7. Characteristics

**Table 7. Characteristics**

$T_j = 25\text{ °C}$  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
		$V_R = 60\text{ V}; T_j = 150\text{ °C}$	-	-	100	$\mu\text{A}$
		$V_R = 120\text{ V}$	[2]	-	100	nA
		$V_R = 120\text{ V}; T_j = 150\text{ °C}$	[2]	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}$	-	-	2.5	pF
$t_{rr}$	reverse recovery time		[3]	-	6	ns
$V_{FR}$	forward recovery voltage		[4]	-	2	V
			[5]	-	1.5	V

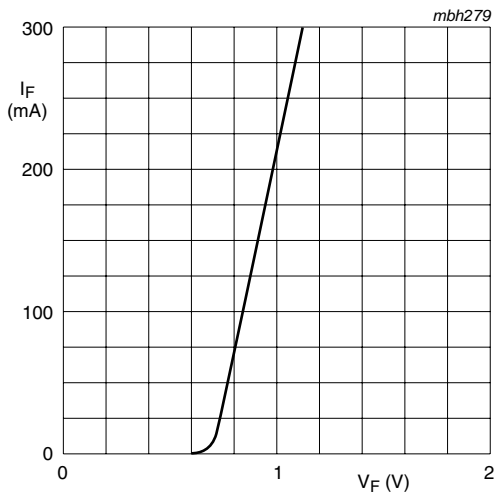
[1]  $T_{amb} = 25\text{ °C}$ ; device has reached the thermal equilibrium when mounted on an FR4 PCB.

[2] Series connection.

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

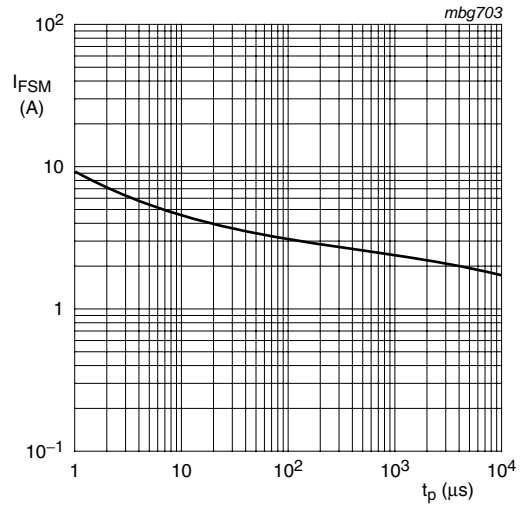
[4] When switched from  $I_F = 400\text{ mA}$ ;  $t_r = 30\text{ ns}$ .

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



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

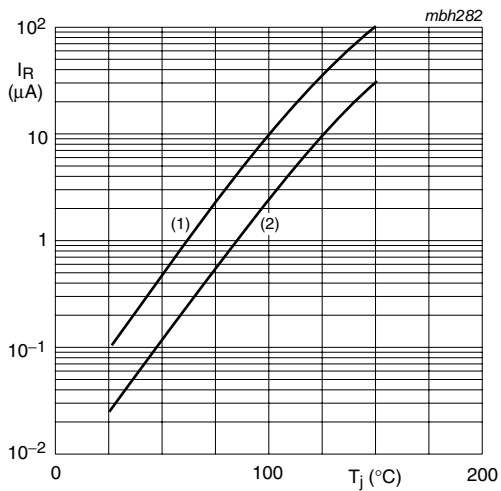
**Fig 1. Forward current as a function of forward voltage; typical values**



Based on square wave currents.

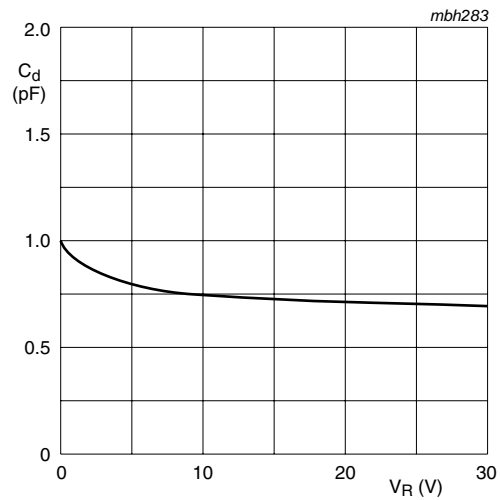
$T_j = 25\text{ }^\circ\text{C}$ ; prior to surge

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



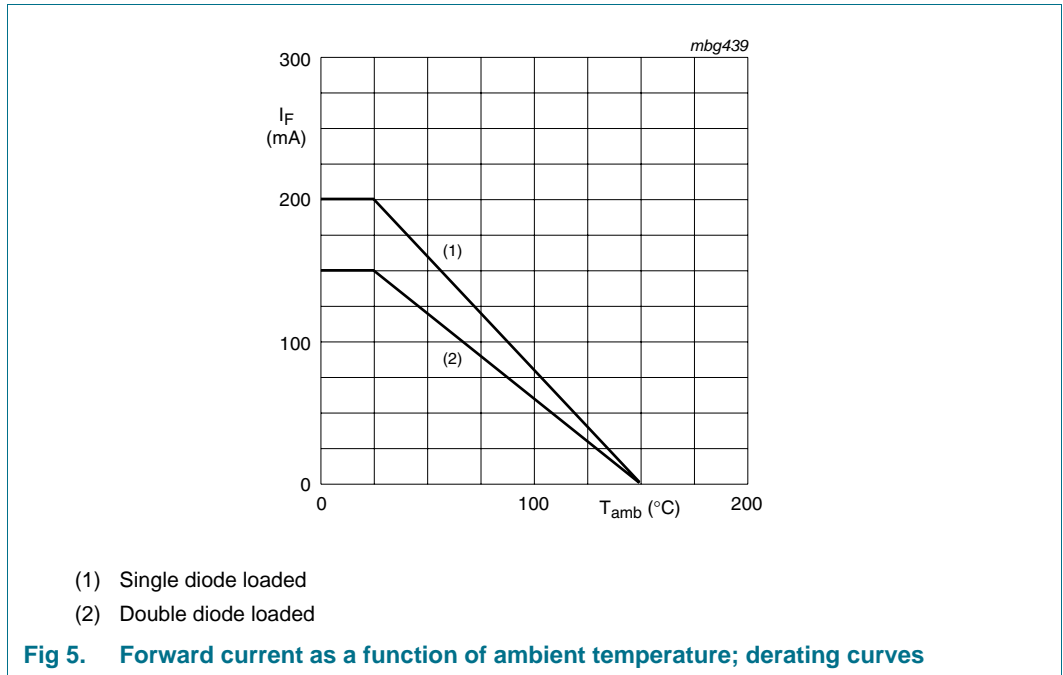
- (1)  $V_R = 60\text{ V}$ ; maximum values
- (2)  $V_R = 60\text{ V}$ ; typical values

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

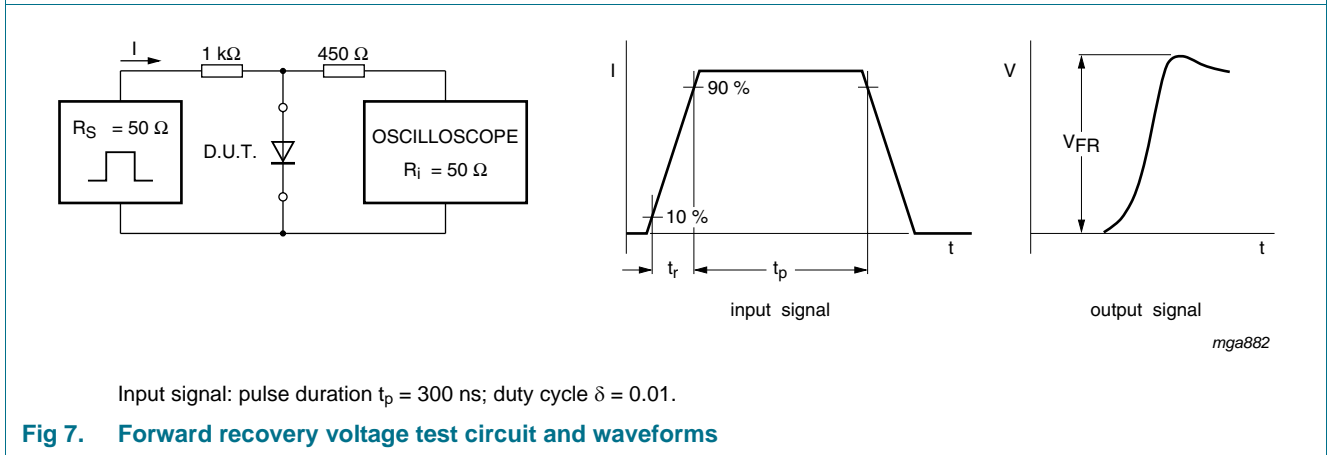
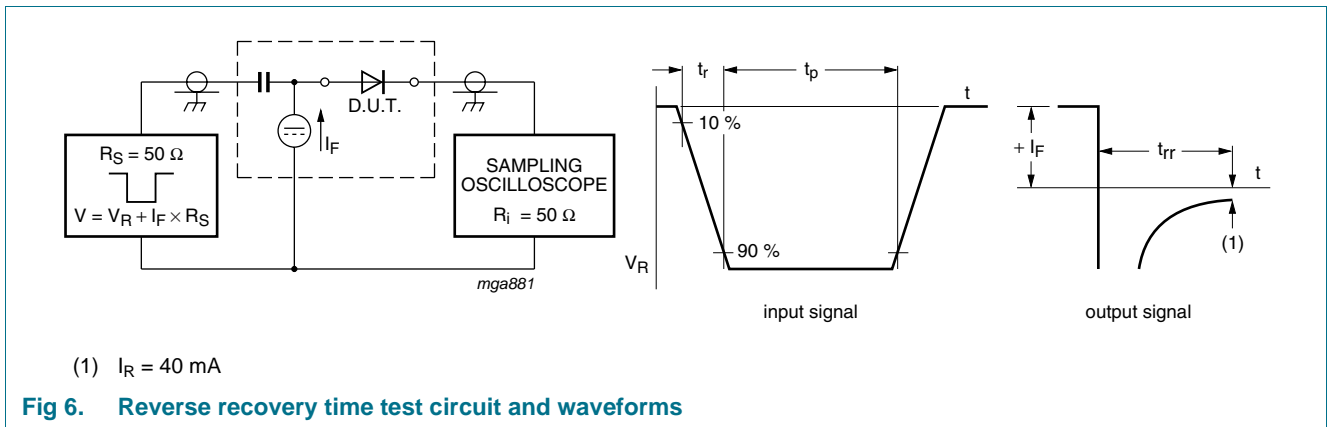


$f = 1\text{ MHz}$ ;  $T_j = 25\text{ }^\circ\text{C}$

**Fig 4. Diode capacitance as a function of reverse voltage; typical values**



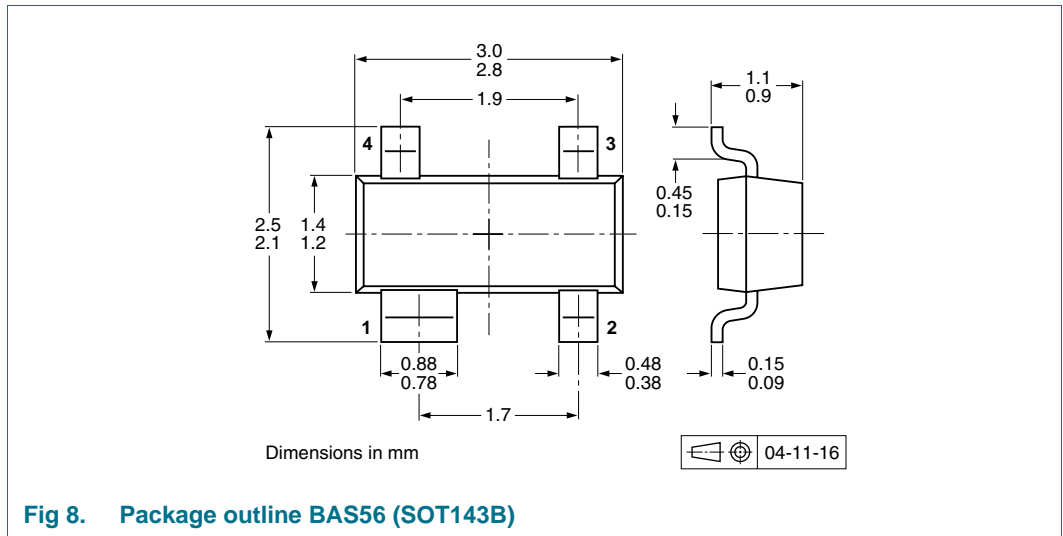
8. Test information



**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**

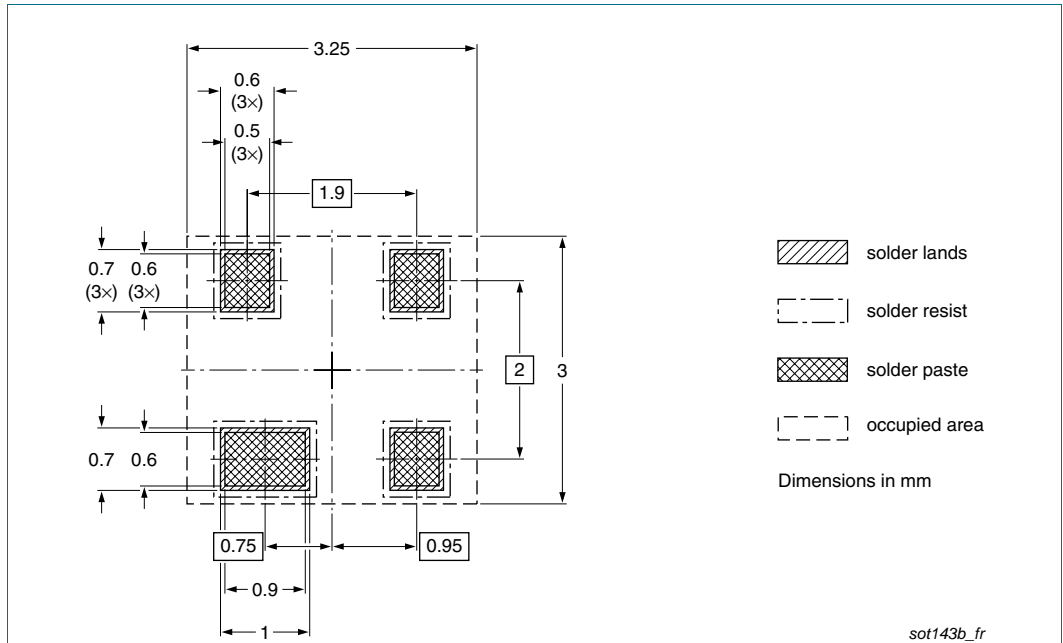
**Table 8. Packing methods**

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

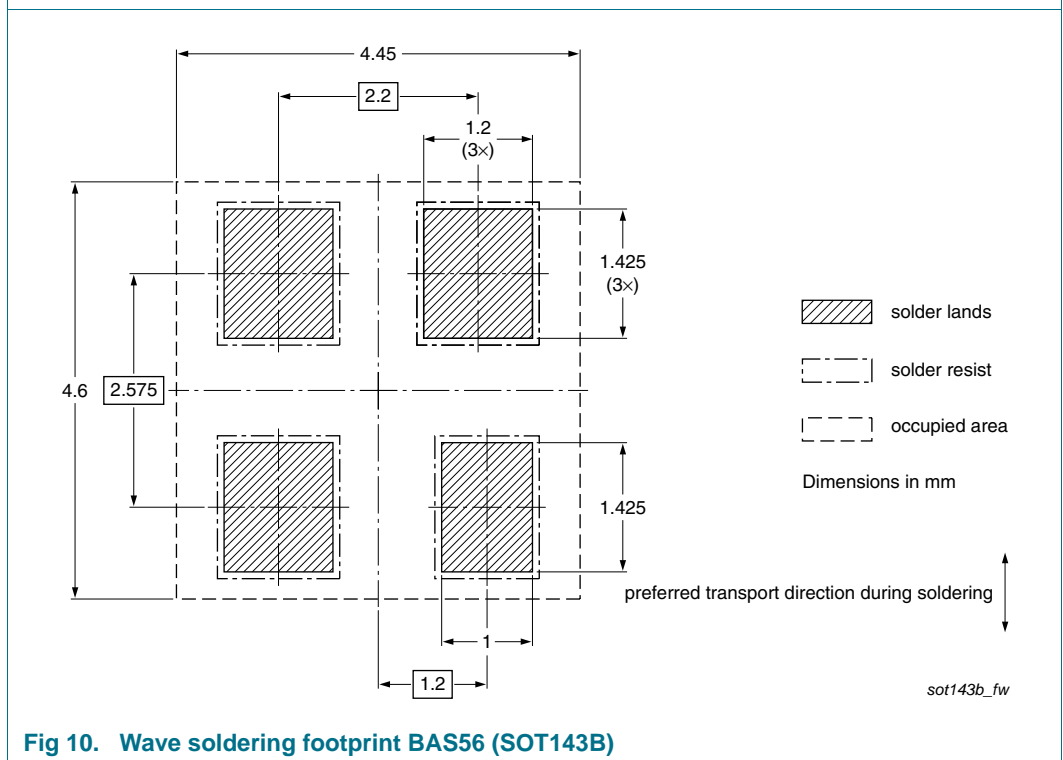
Type number	Package	Description	Packing quantity	
			3000	10000
BAS56	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see [Section 14](#).

**11. Soldering**



**Fig 9. Reflow soldering footprint 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".

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Date of release: 29 June 2010

Document identifier: BAS56

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