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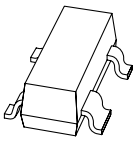
Team Nexperia



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

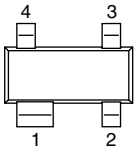
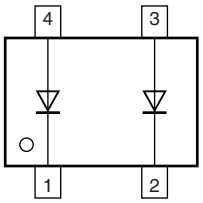
[1] Single diode loaded.

[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 Ω; 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[1]
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 μs		-	9	A
		t_p = 100 μs		-	3	A
		t_p = 10 ms		-	1.7	A
P_{tot}	total power dissipation	T_{amb} = 25 °C	[2]	-	250	mW
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 °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]	-	-	500	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 °C unless otherwise specified.

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

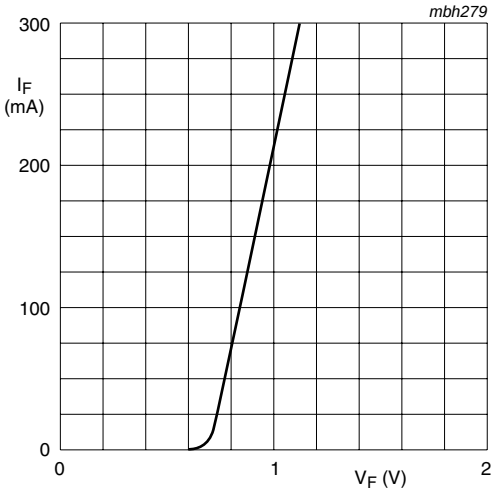
[1] T_{amb} = 25 °C; device has reached the thermal equilibrium when mounted on an FR4 PCB.

[2] Series connection.

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

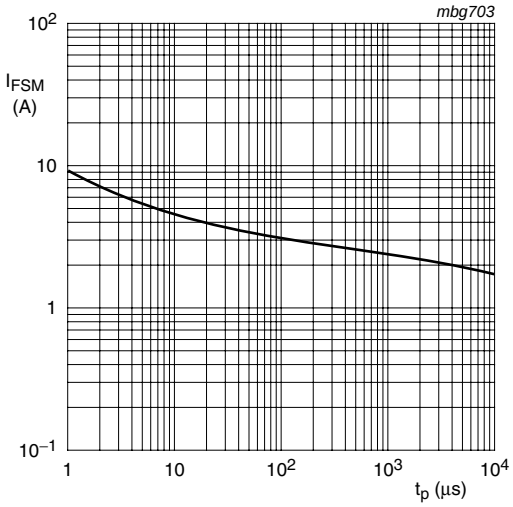
[4] When switched from I_F = 400 mA; t_r = 30 ns.

[5] When switched from I_F = 400 mA; t_r = 100 ns.



T_j = 25 °C

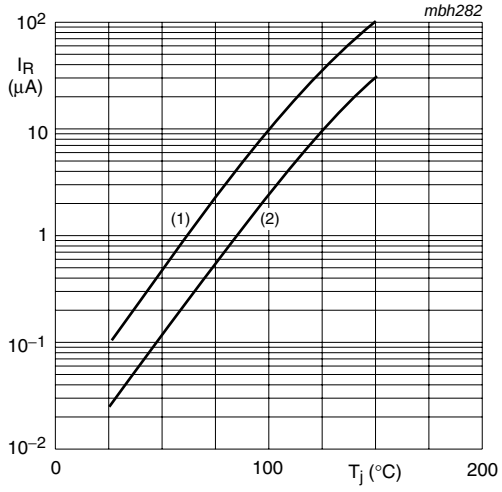
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

T_j = 25 °C; prior to surge

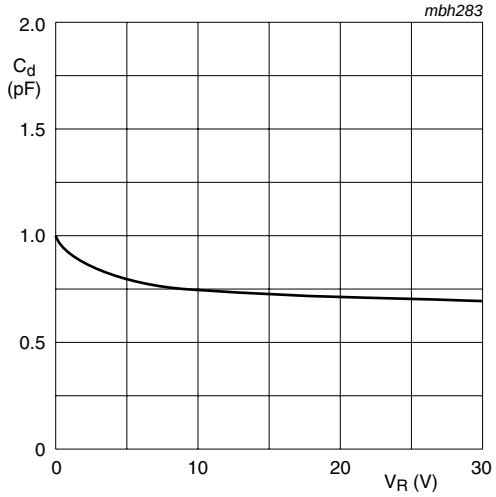
Fig 2. Non-repetitive peak forward current as a function of pulse duration



(1) V_R = 60 V; maximum values

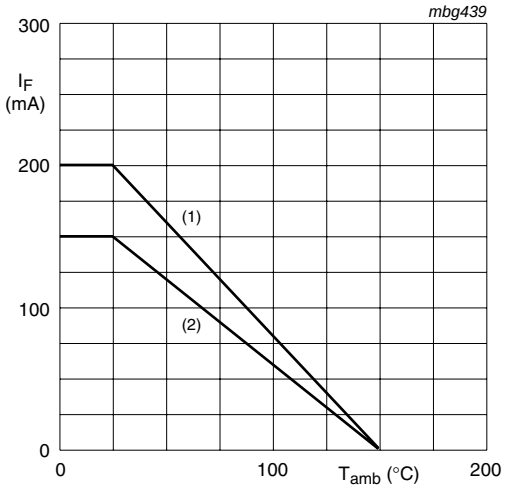
(2) V_R = 60 V; typical values

Fig 3. Reverse current as a function of junction temperature



f = 1 MHz; T_j = 25 °C

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

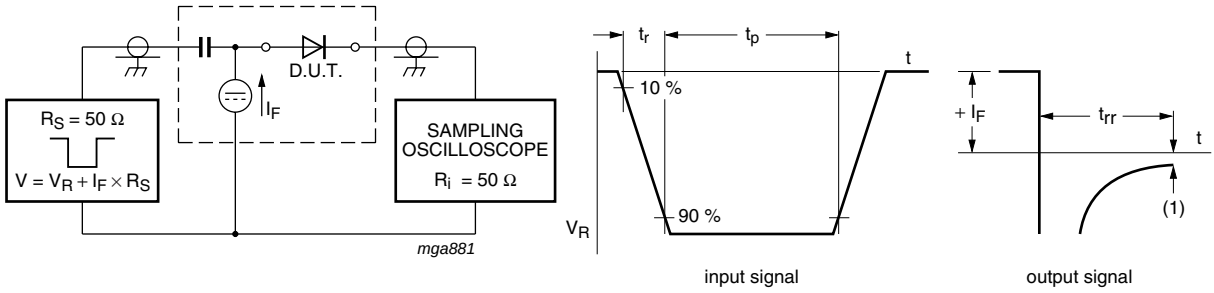


(1) Single diode loaded

(2) Double diode loaded

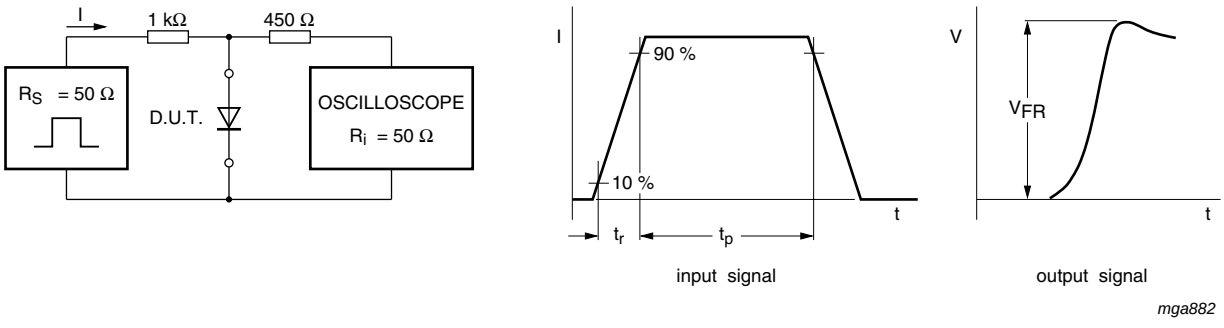
Fig 5. Forward current as a function of ambient temperature; derating curves

8. Test information



(1) I_R = 40 mA

Fig 6. Reverse recovery time test circuit and waveforms



Input signal: pulse duration t_p = 300 ns; duty cycle δ = 0.01.

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.

9. Package outline

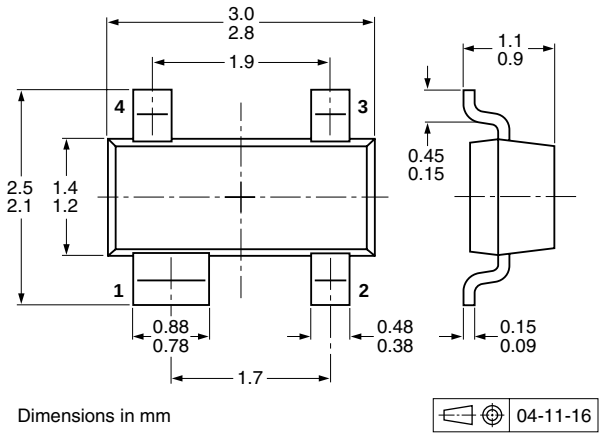


Fig 8. Package outline BAS56 (SOT143B)

10. Packing information

Table 8. Packing methods

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

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

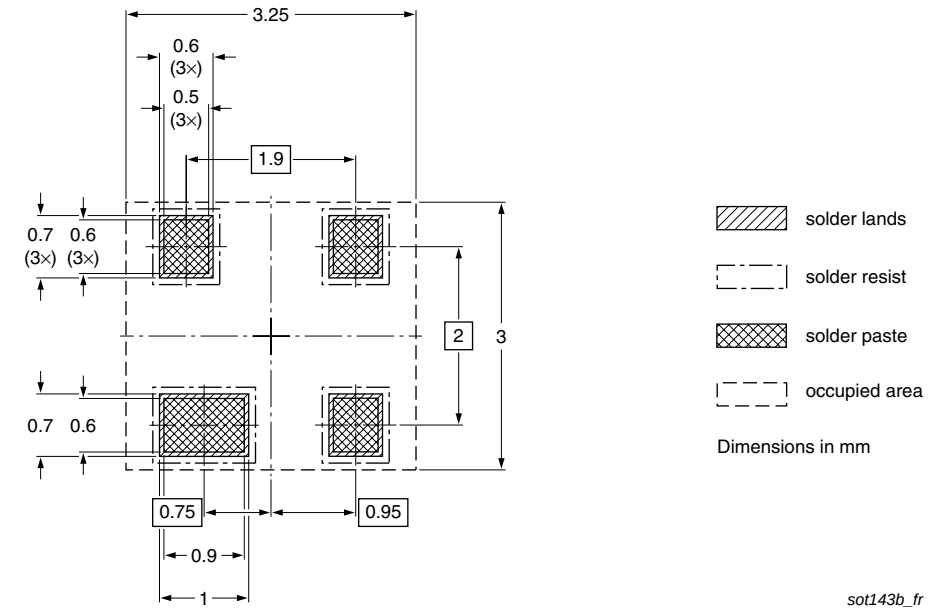


Fig 9. Reflow soldering footprint BAS56 (SOT143B)

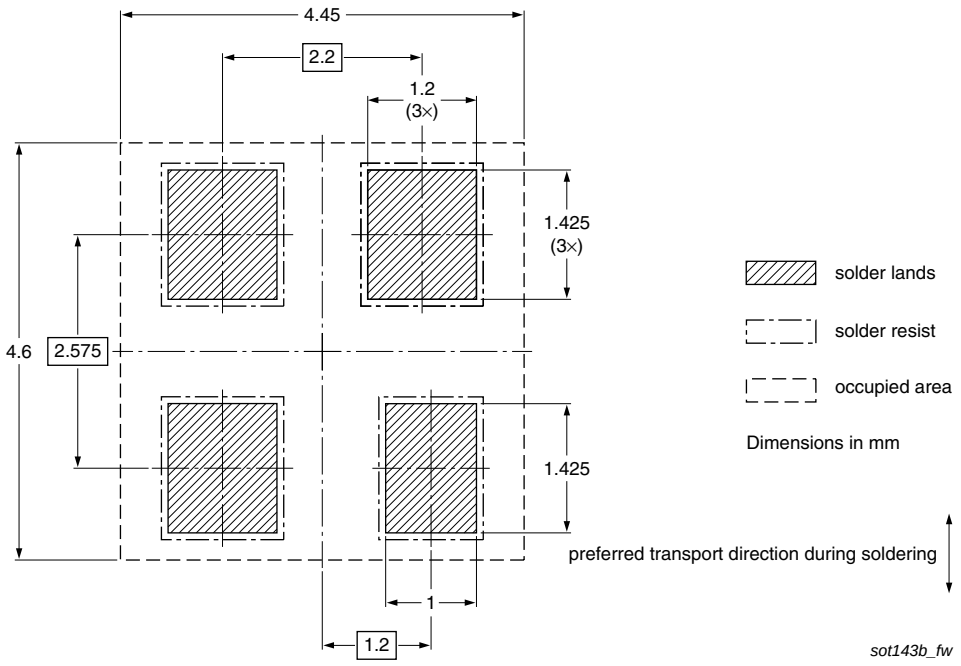


Fig 10. Wave soldering footprint BAS56 (SOT143B)

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:	• 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. • Section 1.1 “General description”: amended • Section 4 “Marking”: updated • Table 1 “Quick reference data”: added • Section 8 “Test information”: added • Figure 8: superseded by minimized package outline drawing • Section 10 “Packing information”: added • Section 11 “Soldering”: added • Section 13 “Legal information”: updated			
BAS56_2	19960910	Product specification	-	BAS56_1
BAS56_1	19960423	Product specification	-	-

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".

[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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15. Contents

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Document identifier: BAS56