



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 |

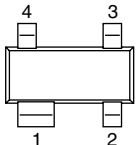
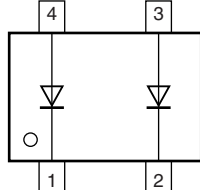
[1] Single diode loaded.

[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] | | |
| | | $t_p = 1 \mu\text{s}$ | - | 9 | A |
| | | $t_p = 100 \mu\text{s}$ | - | 3 | A |
| | | $t_p = 10 \text{ms}$ | - | 1.7 | A |
| P_{tot} | total power dissipation | $T_{amb} = 25 \text{ }^\circ\text{C}$ | [2] | 250 | mW |
| T_j | junction temperature | | - | 150 | $^\circ\text{C}$ |
| T_{stg} | storage temperature | | -65 | +150 | $^\circ\text{C}$ |

[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] | - | 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

$T_j = 25\text{ °C}$ 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 | μA |
| | | $V_R = 120\text{ V}$ | [2] | - | 100 | nA |
| | | $V_R = 120\text{ V}; T_j = 150\text{ °C}$ | [2] | - | 100 | μA |
| 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 |

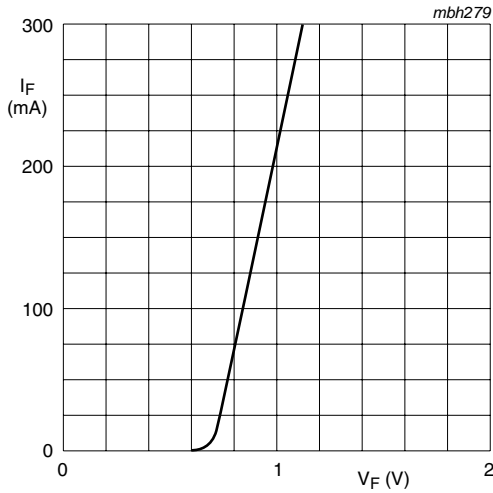
[1] $T_{amb} = 25\text{ °C}$; device has reached the thermal equilibrium when mounted on an FR4 PCB.

[2] Series connection.

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

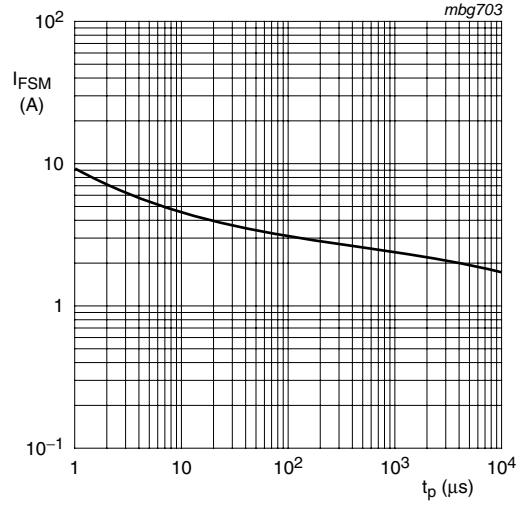
[4] When switched from $I_F = 400\text{ mA}$; $t_r = 30\text{ ns}$.

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



$T_j = 25\text{ °C}$

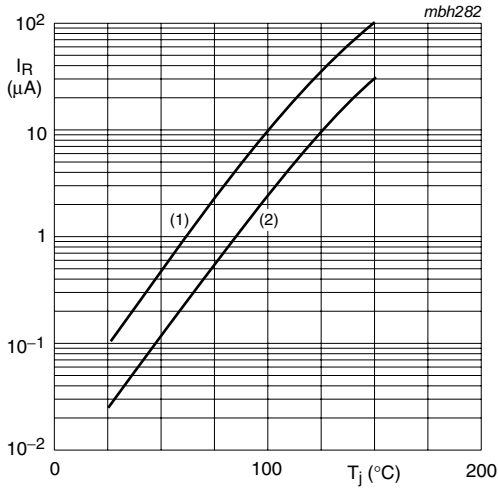
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

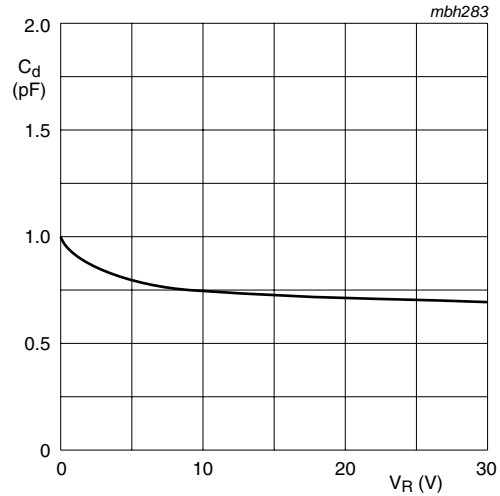
$T_j = 25\text{ °C}$; prior to surge

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



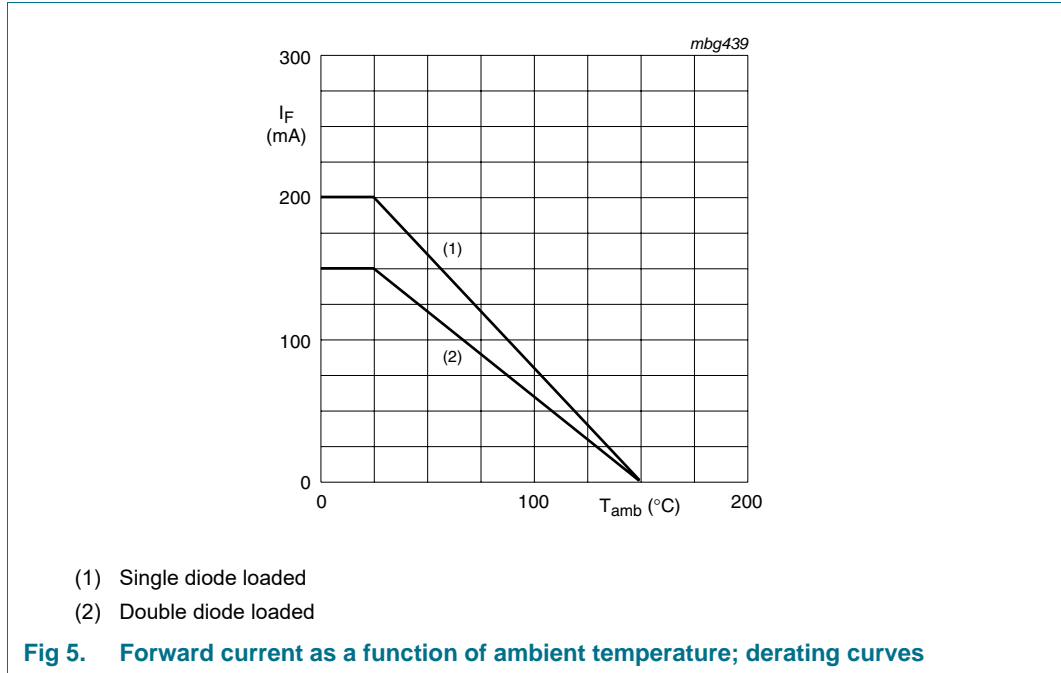
- (1) $V_R = 60\text{ V}$; maximum values
- (2) $V_R = 60\text{ V}$; typical values

Fig 3. Reverse current as a function of junction temperature

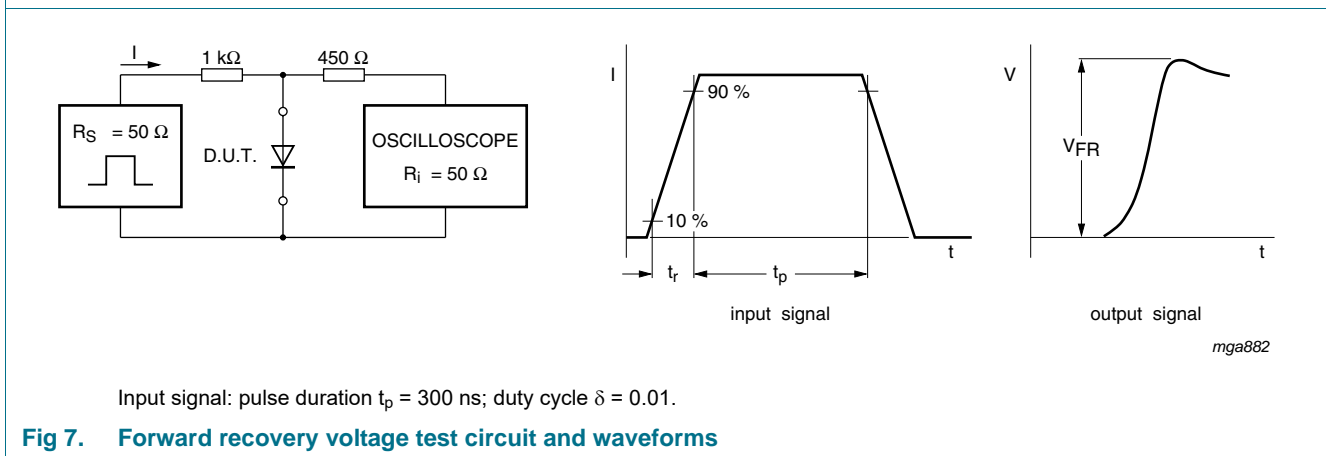
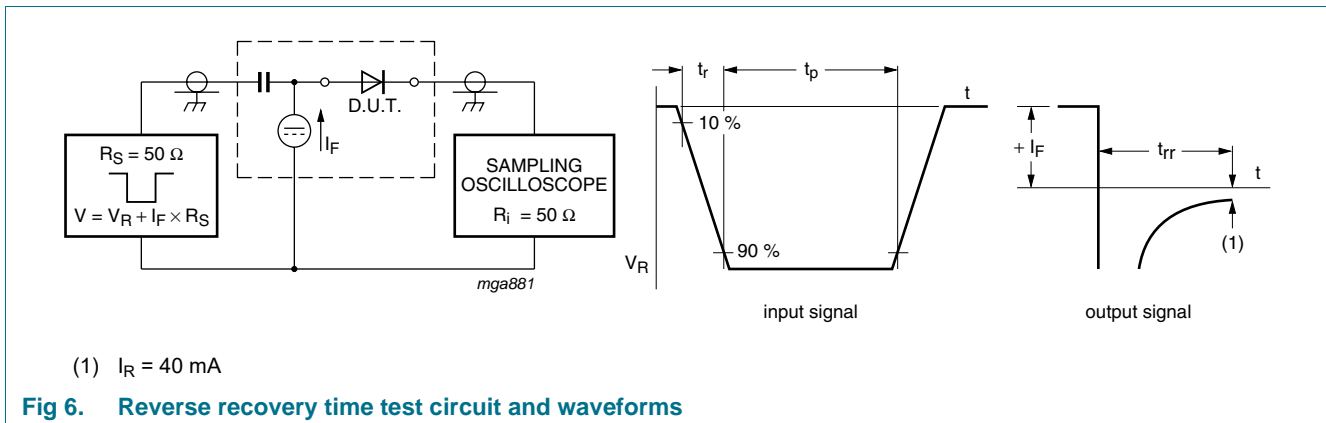


$f = 1\text{ MHz}$; $T_j = 25\text{ °C}$

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

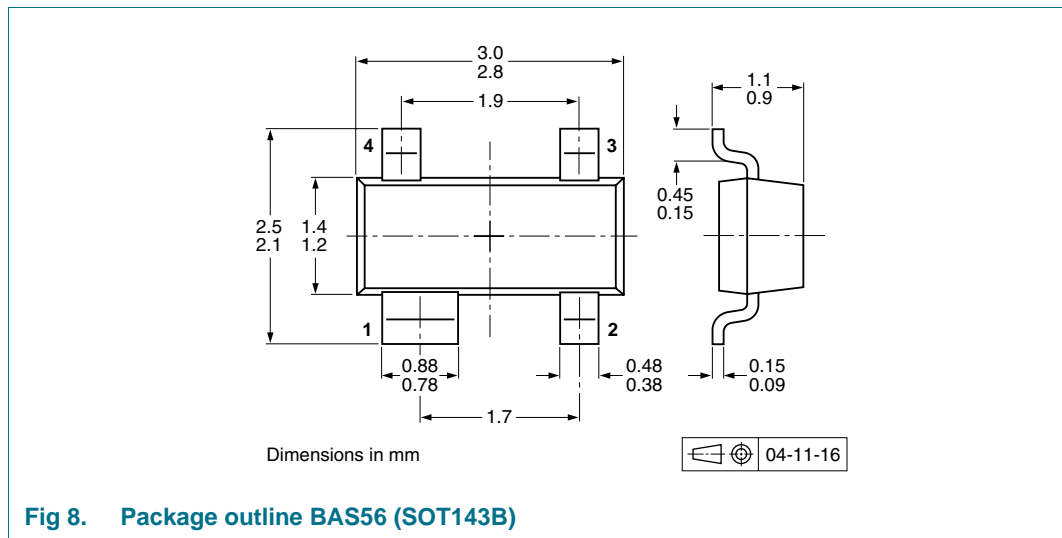


Fig 8. Package outline BAS56 (SOT143B)

10. Packing information

Please refer to packing information on www.nexperia.com.

11. Soldering

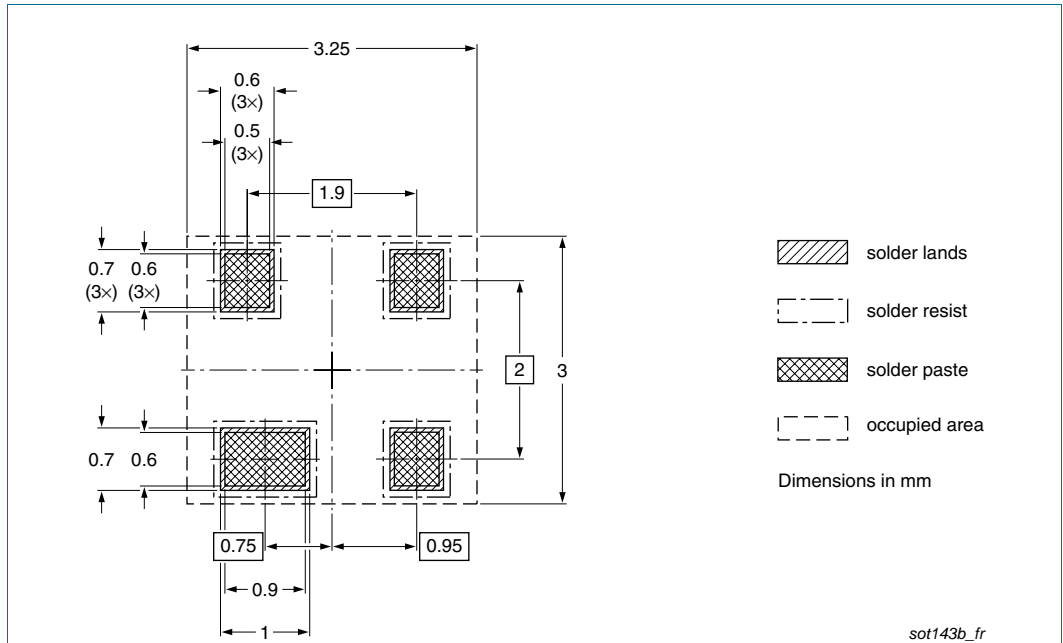


Fig 9. Reflow soldering footprint BAS56 (SOT143B)

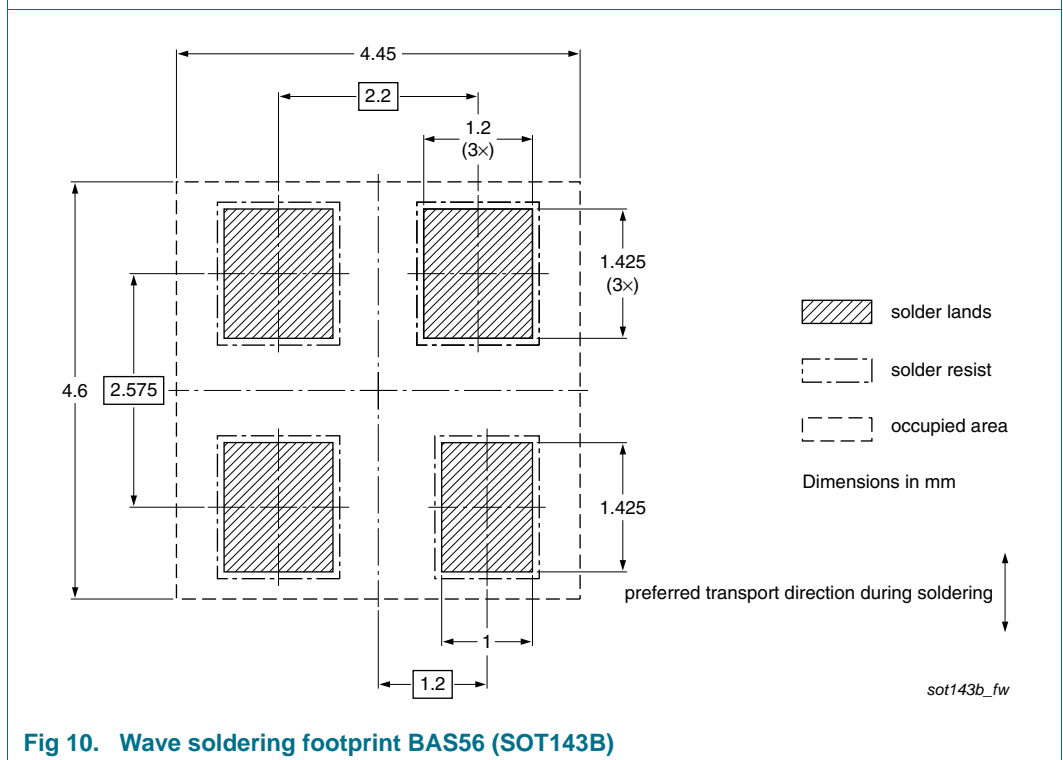


Fig 10. Wave soldering footprint BAS56 (SOT143B)

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">• 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.nexperia.com>.

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