



BAT74S

Dual Schottky barrier diode

22 November 2012

Product data sheet

1. Product profile

1.1 General description

Planar Schottky barrier dual diode with an integrated guard ring for stress protection. Two electrically isolated Schottky barrier diodes encapsulated in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Low forward voltage
- Low capacitance
- AEC-Q101 qualified

1.3 Applications

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

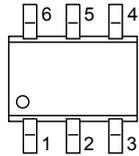
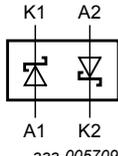
1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|-----------------|--|-----|-----|-----|---------------|
| Per diode | | | | | | |
| I_F | forward current | | - | - | 200 | mA |
| V_R | reverse voltage | | - | - | 30 | V |
| Per diode | | | | | | |
| V_F | forward voltage | $I_F = 100 \text{ mA}$; pulsed; $t_p = 300 \text{ } \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$ | - | - | 800 | mV |
| I_R | reverse current | $V_R = 25 \text{ V}$; pulsed; $t_p = 300 \text{ } \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$ | - | - | 2 | μA |

2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|--|---|
| 1 | A1 | anode (diode 1) |  TSSOP6 (SOT363) |  aaa-005709 |
| 2 | n.c. | not connected | | |
| 3 | K2 | cathode (diode 2) | | |
| 4 | A2 | anode (diode 2) | | |
| 5 | n.c. | not connected | | |
| 6 | K1 | cathode (diode 1) | | |

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| BAT74S | TSSOP6 | plastic surface-mounted package; 6 leads | SOT363 |

4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAT74S | 74% [1] |

[1] % = placeholder for manufacturing site code

5. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|-------------------------------------|---|-----|-----|------|
| Per diode | | | | | |
| V_R | reverse voltage | | - | 30 | V |
| I_F | forward current | | - | 200 | mA |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1$ s; $\delta \leq 0.5$ | - | 300 | mA |
| I_{FSM} | non-repetitive peak forward current | $t_p < 10$ ms; $T_{j(\text{init})} = 25$ °C | - | 600 | mA |
| P_{tot} | total power dissipation | $T_{\text{amb}} \leq 25$ °C | - | 240 | mW |
| T_j | junction temperature | | - | 125 | °C |

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-------------------|---------------------------------|-----------------------------------|-----|-----|-----|------|
| T_{amb} | ambient temperature | | | -55 | 125 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |
| Per device | | | | | | |
| V_R | reverse voltage | series connection | | - | 60 | V |
| | | | | - | 30 | V |
| I_F | forward current | | [1] | - | 110 | mA |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1$ s; $\delta \leq 0.5$ | | - | 200 | mA |

- [1] If both diodes are in forward operation at the same moment, total device current is maximum 110 mA.
If one diode is in reverse and the other in forward operation at the same moment, total device current is maximum 200 mA.

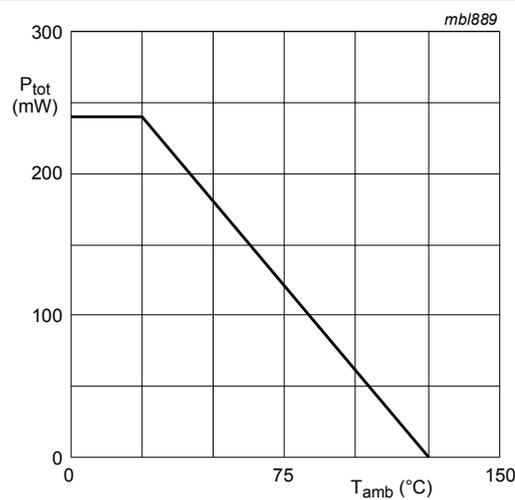


Fig. 1. Power derating curve

6. Thermal characteristics

Table 6. Thermal characteristics

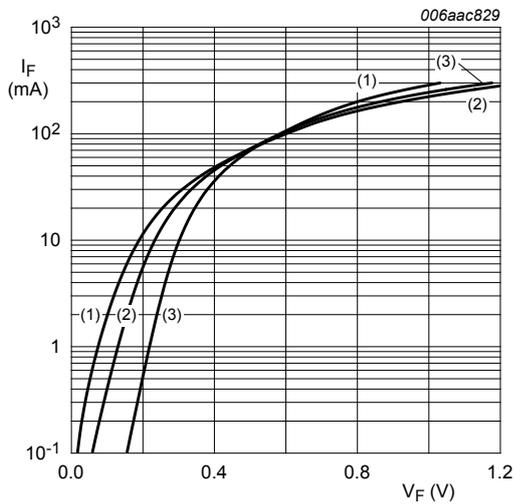
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|------------------|---|-------------|-----|-----|-----|-----|------|
| Per diode | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 416 | K/W |

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

7. Characteristics

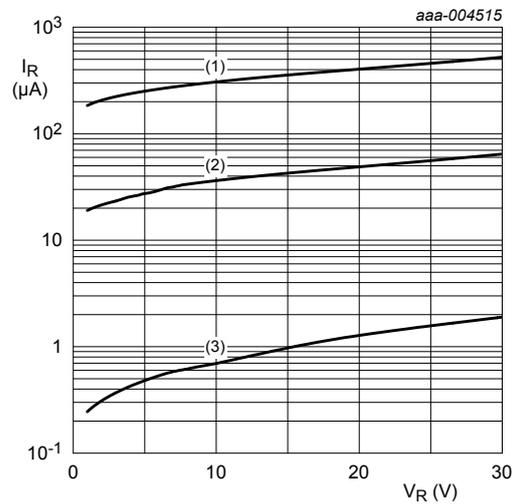
Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|-----------------------|--|-----|-----|-----|---------------|
| Per diode | | | | | | |
| V_F | forward voltage | $I_F = 0.1 \text{ mA}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 240 | mV |
| | | $I_F = 1 \text{ mA}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 320 | mV |
| | | $I_F = 10 \text{ mA}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 400 | mV |
| | | $I_F = 30 \text{ mA}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 500 | mV |
| | | $I_F = 100 \text{ mA}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 800 | mV |
| I_R | reverse current | $V_R = 25 \text{ V}$; pulsed; $t_p = 300 \mu\text{s}$; $\delta = 0.02$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 2 | μA |
| C_d | diode capacitance | $V_R = 1 \text{ V}$; $f = 1 \text{ MHz}$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 10 | pF |
| t_{rr} | reverse recovery time | $I_F = 10 \text{ mA}$; $I_R = 10 \text{ mA}$; $R_L = 100 \Omega$; $I_{R(\text{meas})} = 1 \text{ mA}$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | - | 5 | ns |



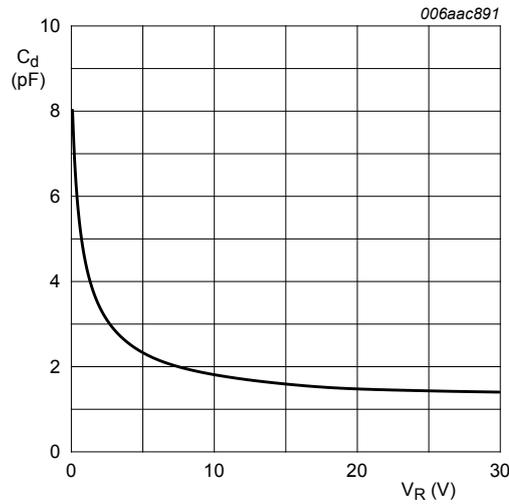
- (1) $T_{\text{amb}} = 125 \text{ }^\circ\text{C}$
- (2) $T_{\text{amb}} = 85 \text{ }^\circ\text{C}$
- (3) $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

Fig. 2. Forward current as a function of forward voltage; typical values



- (1) $T_{\text{amb}} = 125 \text{ }^\circ\text{C}$
- (2) $T_{\text{amb}} = 85 \text{ }^\circ\text{C}$
- (3) $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

Fig. 3. Reverse current as a function of reverse voltage; typical values



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

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

8. Test information

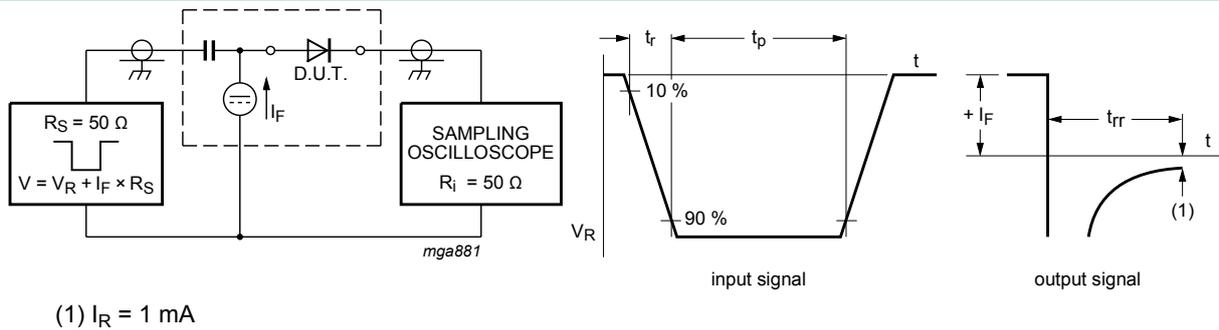


Fig. 5. Reverse recovery time test circuit and waveforms

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

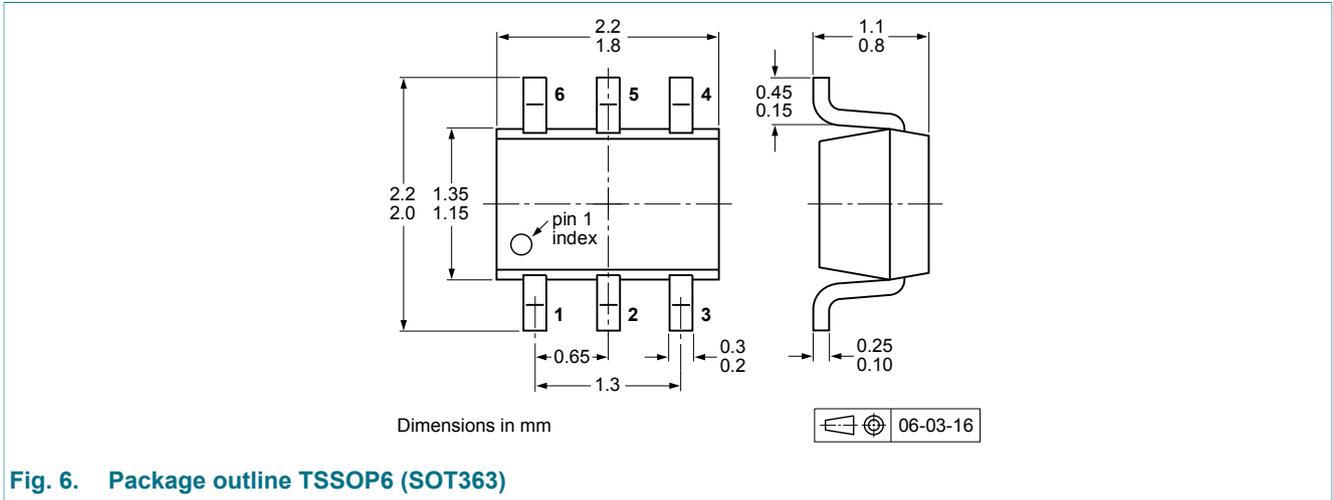


Fig. 6. Package outline TSSOP6 (SOT363)

10. Soldering

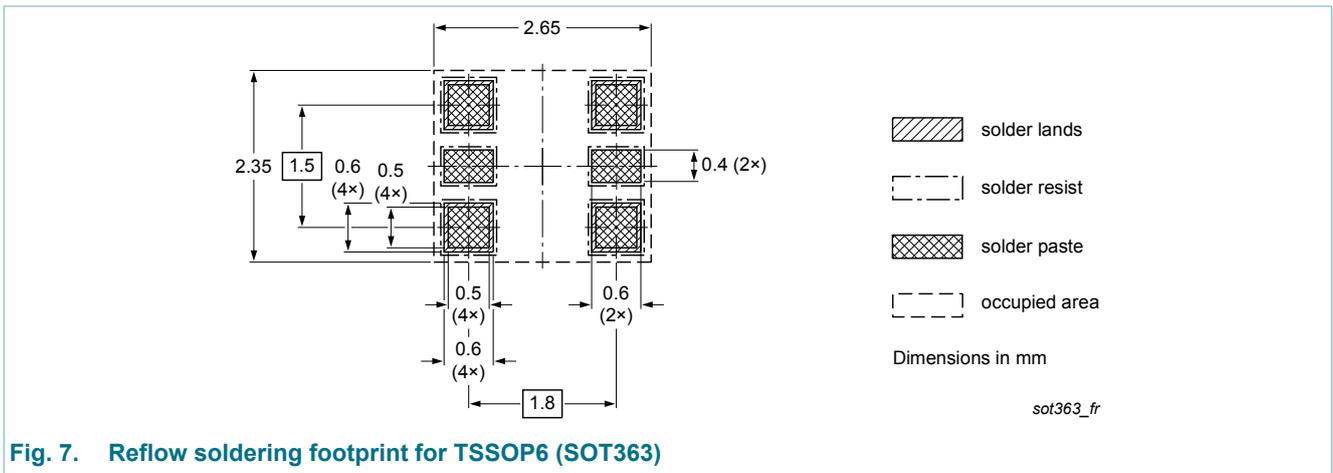


Fig. 7. Reflow soldering footprint for TSSOP6 (SOT363)

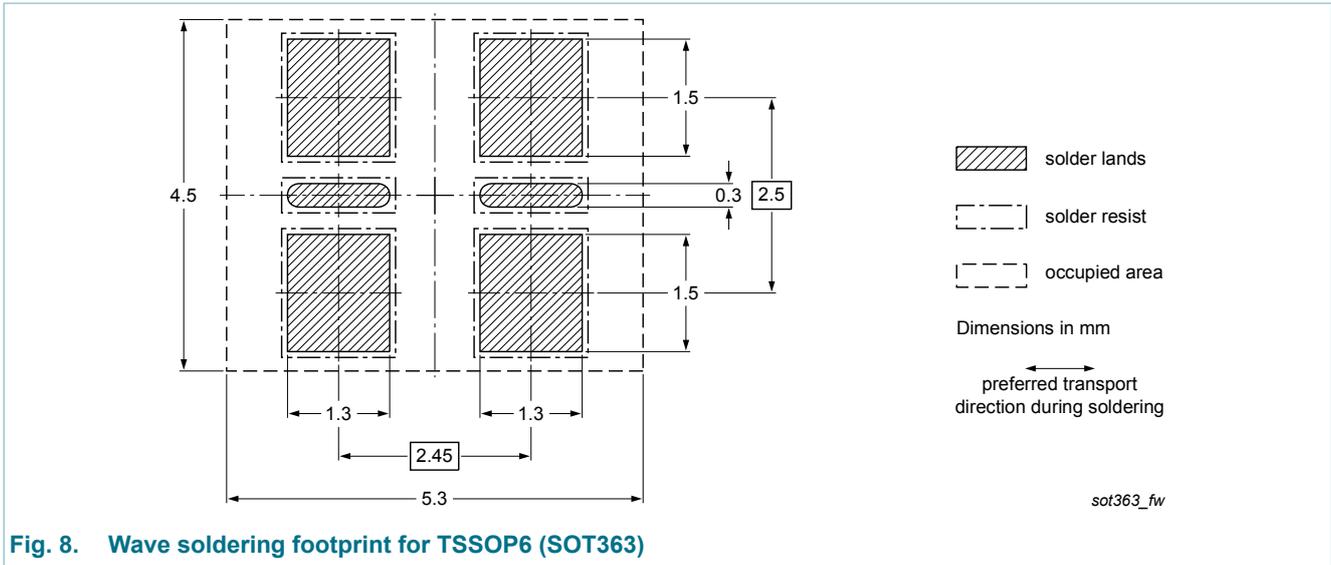


Fig. 8. Wave soldering footprint for TSSOP6 (SOT363)

11. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|-----------------------|---------------|------------|
| BAT74S v.5 | 20121122 | Product data sheet | - | BAT74S v.4 |
| Modifications: | <ul style="list-style-type: none"> The format of this document 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 Product profile: updated Section 4 Marking: updated Table 5 Limiting values: changed Tamb minimum value to -55 °C according to AEC-Q101 Figure 2 and 3: updated Section 8 Test information: added Figure 6: superseded by minimized package outline drawing Section 10 Soldering: added Section 11 Legal information: updated | | | |
| BAT74S v.4 | 20030411 | Product specification | - | BAT74S v.3 |
| BAT74S v.3 | 19980710 | Product specification | - | BAT74S v.2 |
| BAT74S v.2 | 19980206 | Product specification | - | BAT74S v.1 |
| BAT74S v.1 | 19971107 | Product specification | - | - |

12. Legal information

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| 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. |

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- [2] The term 'short data sheet' is explained in section "Definitions".
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13. Contents

| | | |
|-----------|--------------------------------------|----------|
| 1 | Product profile | 1 |
| 1.1 | General description | 1 |
| 1.2 | Features and benefits | 1 |
| 1.3 | Applications | 1 |
| 1.4 | Quick reference data | 1 |
| 2 | Pinning information | 2 |
| 3 | Ordering information | 2 |
| 4 | Marking | 2 |
| 5 | Limiting values | 2 |
| 6 | Thermal characteristics | 3 |
| 7 | Characteristics | 4 |
| 8 | Test information | 5 |
| 8.1 | Quality information | |
| 9 | Package outline | 6 |
| 10 | Soldering | 6 |
| 11 | Revision history | 7 |
| 12 | Legal information | 8 |
| 12.1 | Data sheet status | 8 |
| 12.2 | Definitions | 8 |
| 12.3 | Disclaimers | 8 |
| 12.4 | Trademarks | 9 |

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salesaddresses@nexperia.com Date of release: 22 November 2012