



# BAS16TH

## High-speed switching diode

7 December 2018

Product data sheet

### 1. General description

High-speed switching diode, encapsulated in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Low leakage current
- Repetitive peak reverse voltage  $V_{RRM} \leq 100$  V
- Low capacitance
- Small SMD plastic package
- High-temperature applications up to 175 °C
- AEC-Q101 qualified

### 3. Applications

- High-speed switching
- General-purpose switching

### 4. Quick reference data

Table 1. Quick reference data

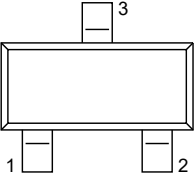
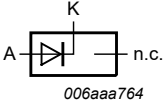
| Symbol    | Parameter                       | Conditions                                                                              |     | Min | Typ | Max  | Unit |
|-----------|---------------------------------|-----------------------------------------------------------------------------------------|-----|-----|-----|------|------|
| $V_{RRM}$ | repetitive peak reverse voltage | $T_j = 25$ °C                                                                           |     | -   | -   | 100  | V    |
| $I_F$     | forward current                 |                                                                                         | [1] | -   | -   | 215  | mA   |
| $V_R$     | reverse voltage                 |                                                                                         |     | -   | -   | 100  | V    |
| $V_F$     | forward voltage                 | $I_F = 150$ mA                                                                          | [2] | -   | -   | 1.25 | V    |
| $I_R$     | reverse current                 | $V_R = 80$ V; $T_j = 25$ °C                                                             |     | -   | -   | 0.5  | µA   |
| $t_{rr}$  | reverse recovery time           | $I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω;<br>$I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C |     | -   | -   | 4    | ns   |

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

[2] Pulsed test:  $t_p \leq 300$  µs;  $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description   | Simplified outline                                                                                    | Graphic symbol                                                                                   |
|-----|--------|---------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1   | A      | anode         | <br>TO-236AB (SOT23) | <br>006aaa764 |
| 2   | n.c.   | not connected |                                                                                                       |                                                                                                  |
| 3   | K      | cathode       |                                                                                                       |                                                                                                  |

6. Ordering information

Table 3. Ordering information

| Type number | Package  |                                                                                          |         |
|-------------|----------|------------------------------------------------------------------------------------------|---------|
|             | Name     | Description                                                                              | Version |
| BAS16TH     | TO-236AB | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | SOT23   |

7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| BAS16TH     | SP%             |

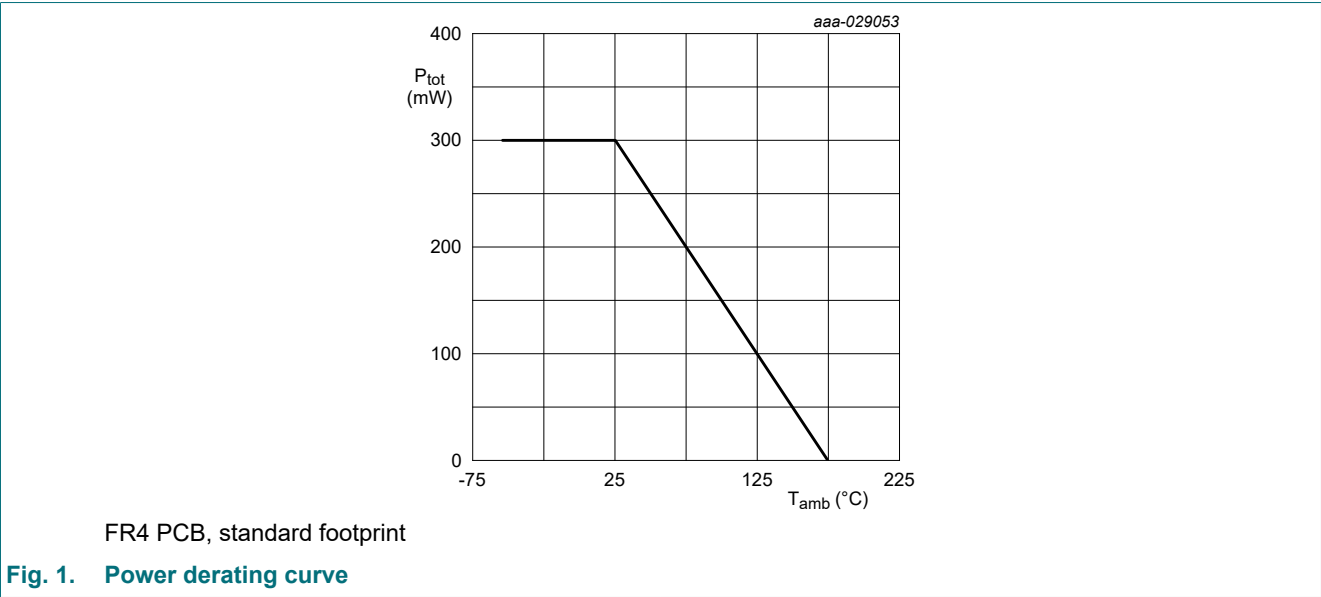
[1] % = placeholder for manufacturing site code

8. 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     | T <sub>j</sub> = 25 °C                                           |     | -   | 100 | V    |
| V <sub>R</sub>   | reverse voltage                     |                                                                  |     | -   | 100 | V    |
| I <sub>F</sub>   | forward current                     |                                                                  | [1] | -   | 215 | mA   |
| I <sub>FSM</sub> | non-repetitive peak forward current | t <sub>p</sub> = 1 µs; T <sub>j(init)</sub> = 25 °C; square wave |     | -   | 4   | A    |
|                  |                                     | t <sub>p</sub> = 1 ms; T <sub>j(init)</sub> = 25 °C; square wave |     | -   | 1   | A    |
|                  |                                     | t <sub>p</sub> = 1 s; T <sub>j(init)</sub> = 25 °C; square wave  |     | -   | 0.5 | A    |
| I <sub>FRM</sub> | repetitive peak forward current     | t <sub>p</sub> ≤ 0.5 ms; δ = 0.25                                |     | -   | 500 | mA   |
| P <sub>tot</sub> | total power dissipation             | T <sub>amb</sub> ≤ 25 °C                                         | [1] | -   | 300 | mW   |
| T <sub>j</sub>   | junction temperature                |                                                                  |     | -   | 175 | °C   |
| T <sub>amb</sub> | ambient temperature                 |                                                                  |     | -55 | 175 | °C   |
| T <sub>stg</sub> | storage temperature                 |                                                                  |     | -65 | 175 | °C   |

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



9. 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-sp)</sub> | thermal resistance from junction to solder point |             | [2] | -   | -   | 330 | K/W  |

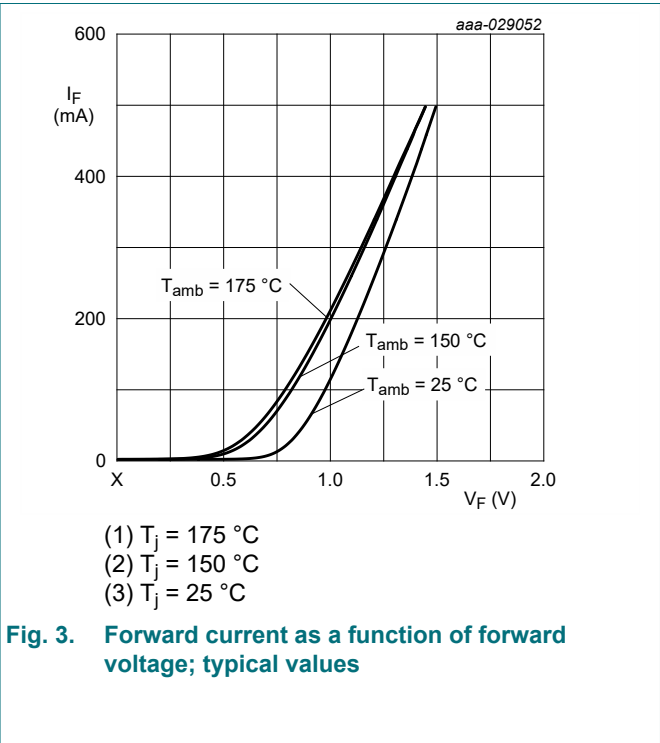
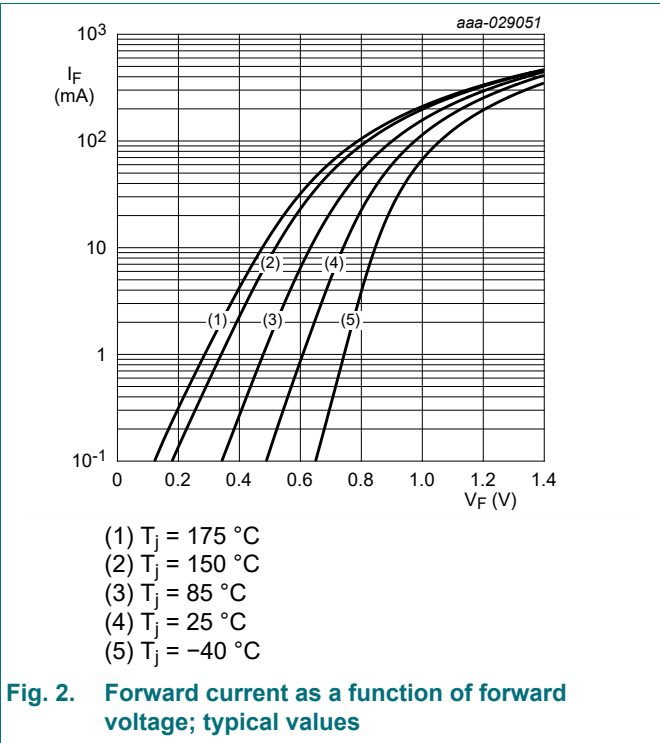
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-side copper, tin-plated and standard footprint.  
[2] Soldering point of cathode tab.

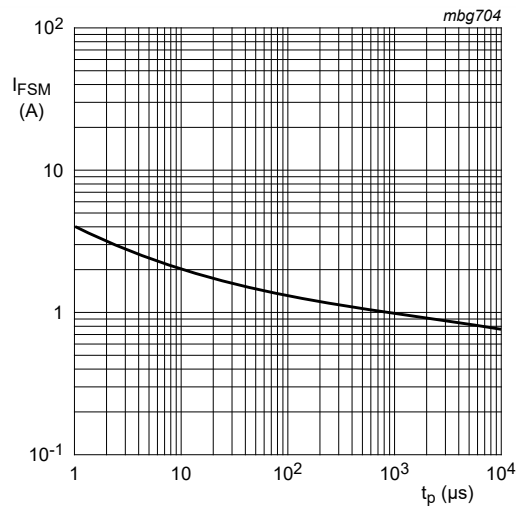
10. Characteristics

Table 7. Characteristics

| Symbol           | Parameter                     | Conditions                                                                                                                       |     | Min | Typ | Max  | Unit |
|------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|------|
| V <sub>F</sub>   | forward voltage               | I <sub>F</sub> = 1 mA                                                                                                            | [1] | -   | -   | 715  | mV   |
|                  |                               | I <sub>F</sub> = 10 mA                                                                                                           | [1] | -   | -   | 855  | mV   |
|                  |                               | I <sub>F</sub> = 50 mA                                                                                                           | [1] | -   | -   | 1    | V    |
|                  |                               | I <sub>F</sub> = 150 mA                                                                                                          | [1] | -   | -   | 1.25 | V    |
| I <sub>R</sub>   | reverse current               | V <sub>R</sub> = 25 V; T <sub>j</sub> = 25 °C                                                                                    |     | -   | -   | 30   | nA   |
|                  |                               | V <sub>R</sub> = 80 V; T <sub>j</sub> = 25 °C                                                                                    |     | -   | -   | 0.5  | μA   |
|                  |                               | V <sub>R</sub> = 25 V; T <sub>j</sub> = 150 °C                                                                                   |     | -   | -   | 30   | μA   |
|                  |                               | V <sub>R</sub> = 80 V; T <sub>j</sub> = 150 °C                                                                                   |     | -   | -   | 50   | μA   |
| C <sub>d</sub>   | diode capacitance             | V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>j</sub> = 25 °C                                                                          |     | -   | -   | 1.5  | pF   |
| t <sub>rr</sub>  | reverse recovery time         | I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω;<br>I <sub>R(meas)</sub> = 1 mA; T <sub>amb</sub> = 25 °C |     | -   | -   | 4    | ns   |
| V <sub>FRM</sub> | peak forward recovery voltage | I <sub>F</sub> = 10 mA; t <sub>r</sub> = 20 ns                                                                                   |     | -   | -   | 1.75 | V    |

[1] Pulsed test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02





Based on square wave currents.  
 $T_{j(init)} = 25\text{ }^{\circ}\text{C}$

Fig. 4. Non-repetitive peak forward current as a function of pulse duration; typical values

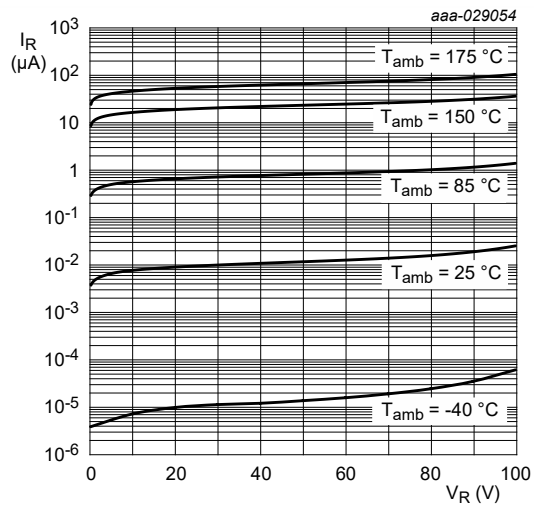
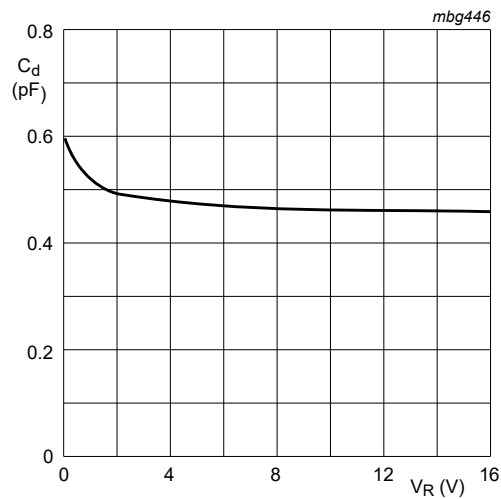


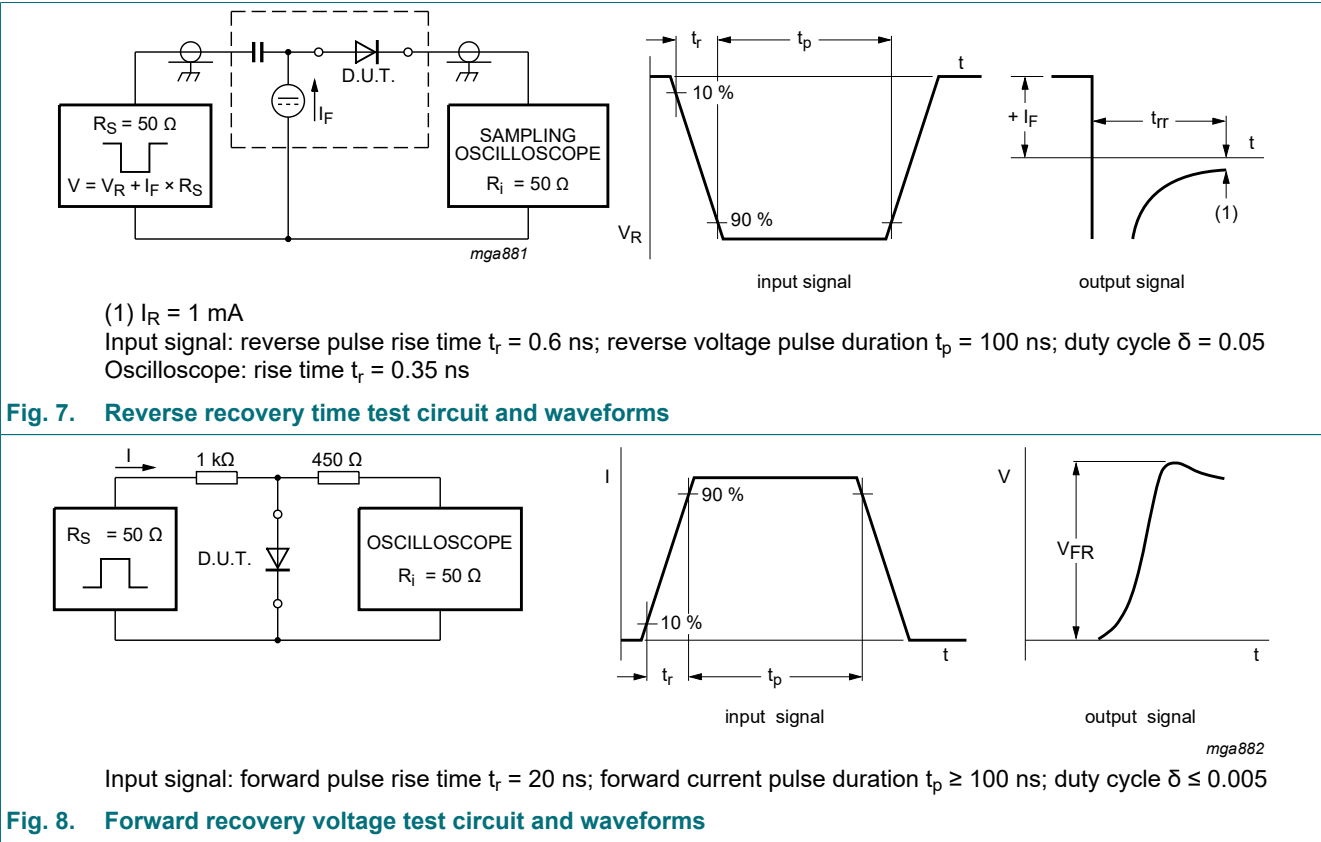
Fig. 5. Reverse current as a function of reverse voltage; typical values



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

Fig. 6. Diode capacitance as a function of reverse voltage; typical values

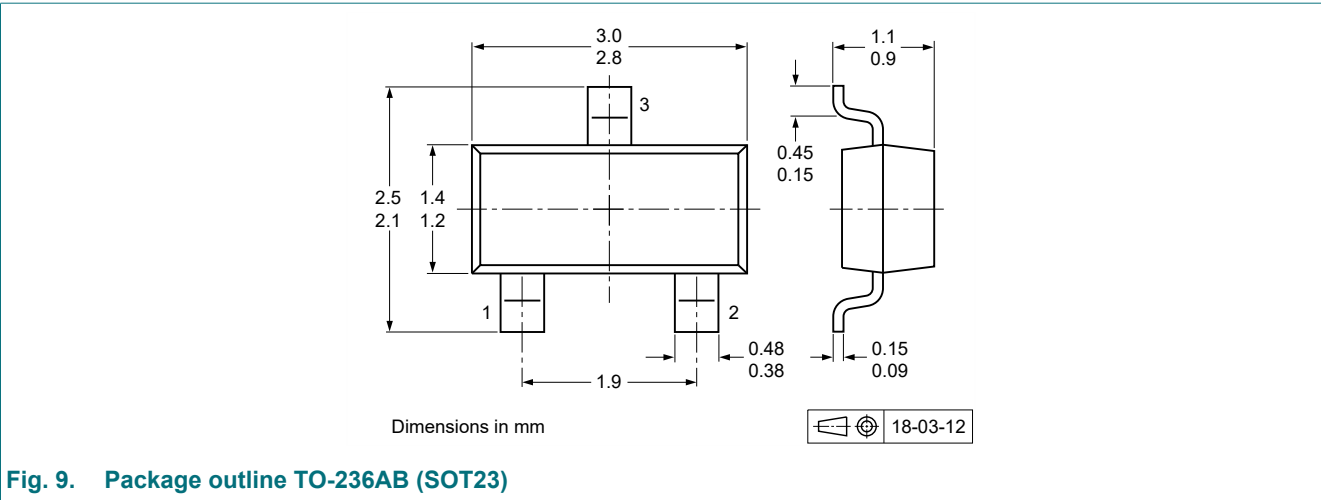
11. Test information



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.

12. Package outline



13. Soldering

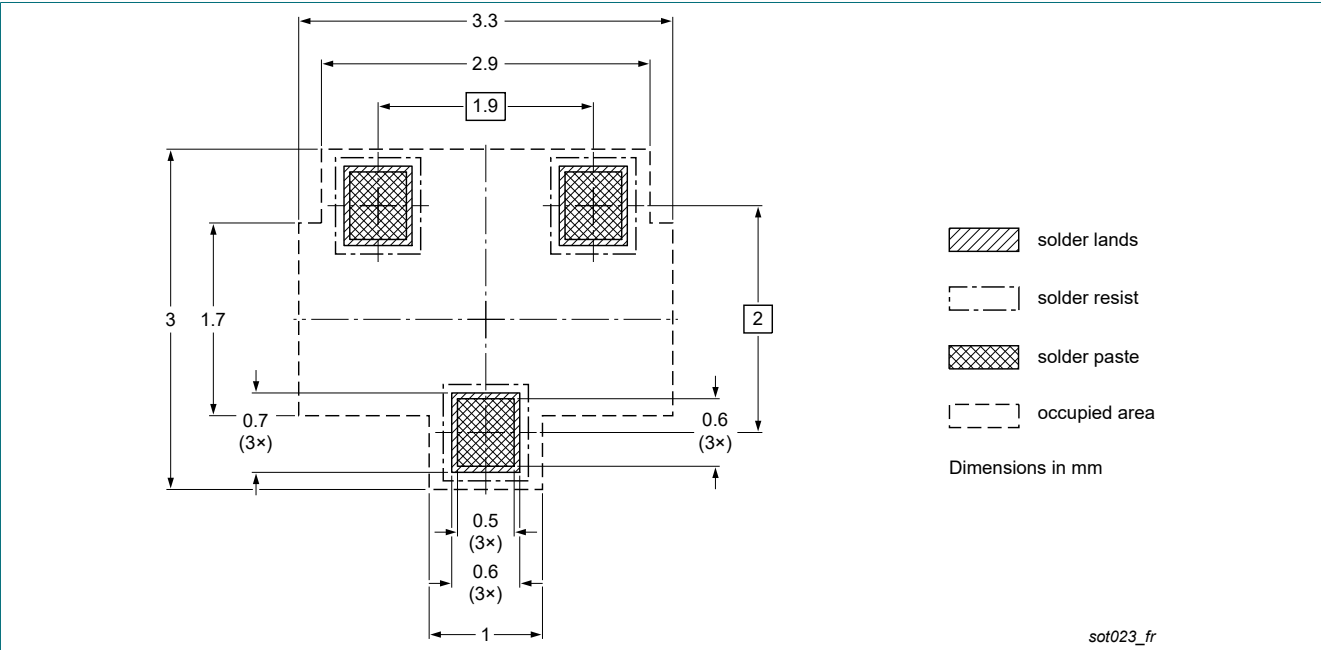


Fig. 10. Reflow soldering footprint for TO-236AB (SOT23)

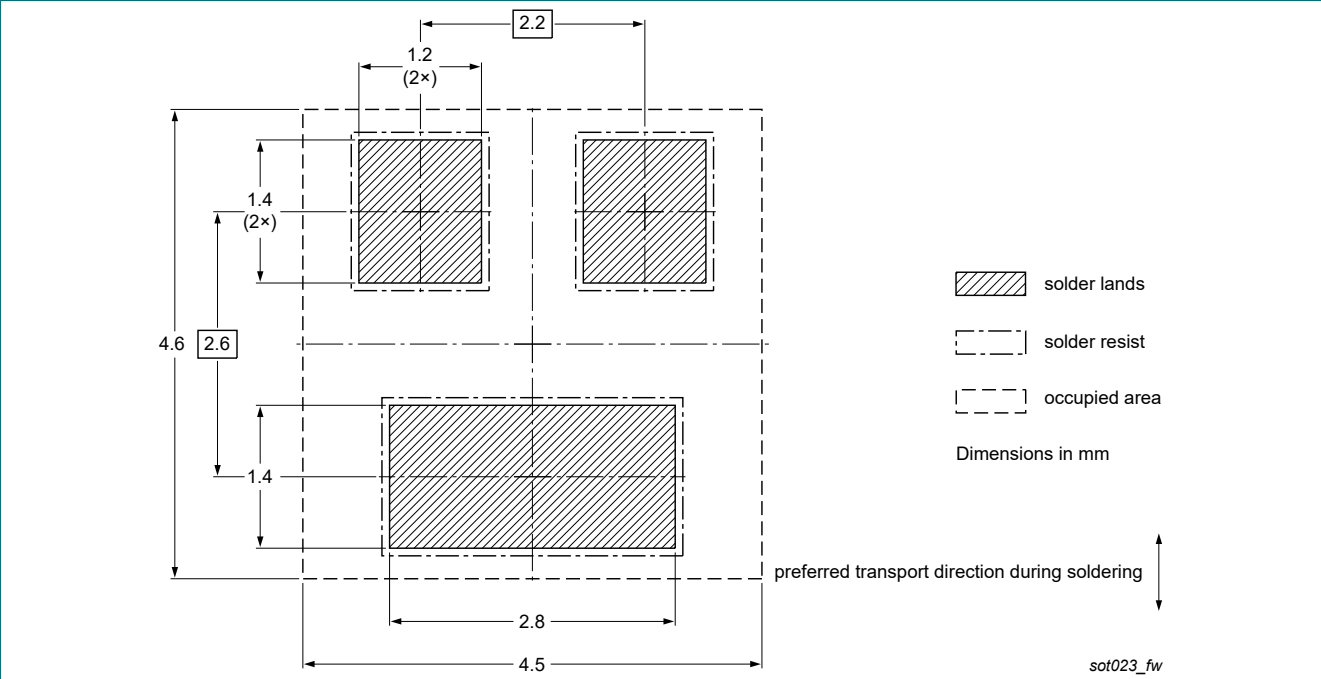


Fig. 11. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAS16TH v.1   | 20181207     | Product data sheet | -             | -          |



## 15. Legal information

### Data sheet status

| Document status<br>[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.
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