



# 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

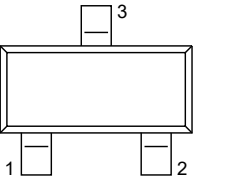
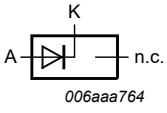
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage	$T_j = 25$ °C	-	-	100	V
$I_F$	forward current		[1]	-	215	mA
$V_R$	reverse voltage		-	-	100	V
$V_F$	forward voltage	$I_F = 150$ mA	[2]	-	1.25	V
$I_R$	reverse current	$V_R = 80$ V; $T_j = 25$ °C	-	-	0.5	µA
$t_{rr}$	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω; $I_{R(meas)} = 1$ 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	 <p>TO-236AB (SOT23)</p>	
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

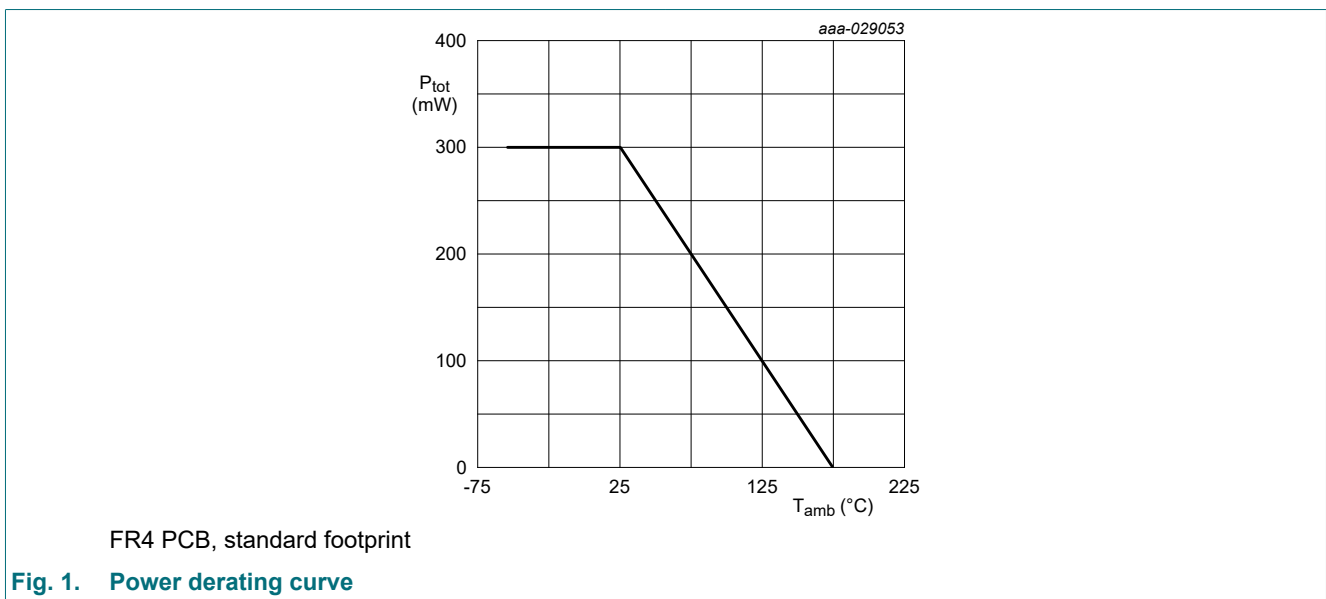
## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage	$T_j = 25\text{ °C}$		-	100	V
$V_R$	reverse voltage			-	100	V
$I_F$	forward current		[1]	-	215	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\ \mu\text{s}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$		-	4	A
		$t_p = 1\ \text{ms}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$		-	1	A
		$t_p = 1\ \text{s}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$		-	0.5	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 0.5\ \text{ms}; \delta = 0.25$		-	500	mA
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1]	-	300	mW
$T_j$	junction temperature			-	175	°C
$T_{\text{amb}}$	ambient temperature			-55	175	°C
$T_{\text{stg}}$	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
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{\text{th}(j-sp)}$	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.

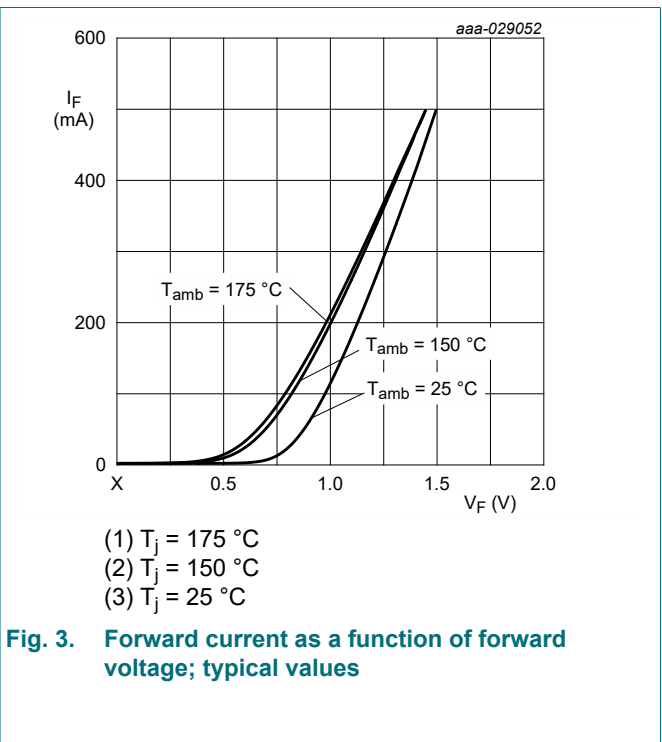
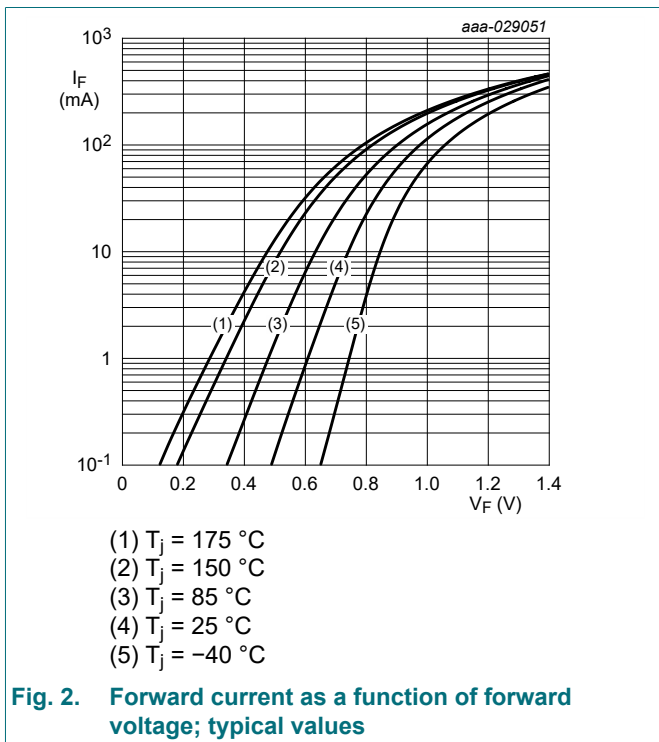
[2] Soldering point of cathode tab.

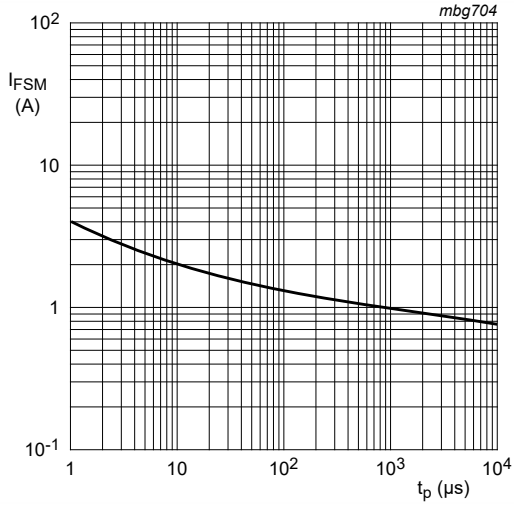
## 10. Characteristics

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; 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	

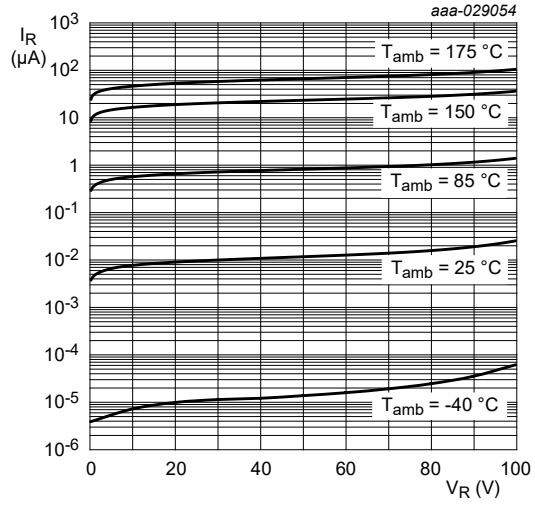
[1] Pulsed test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02



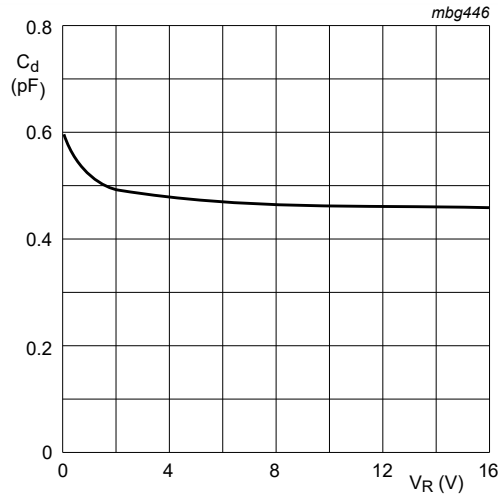


Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ °C}$

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



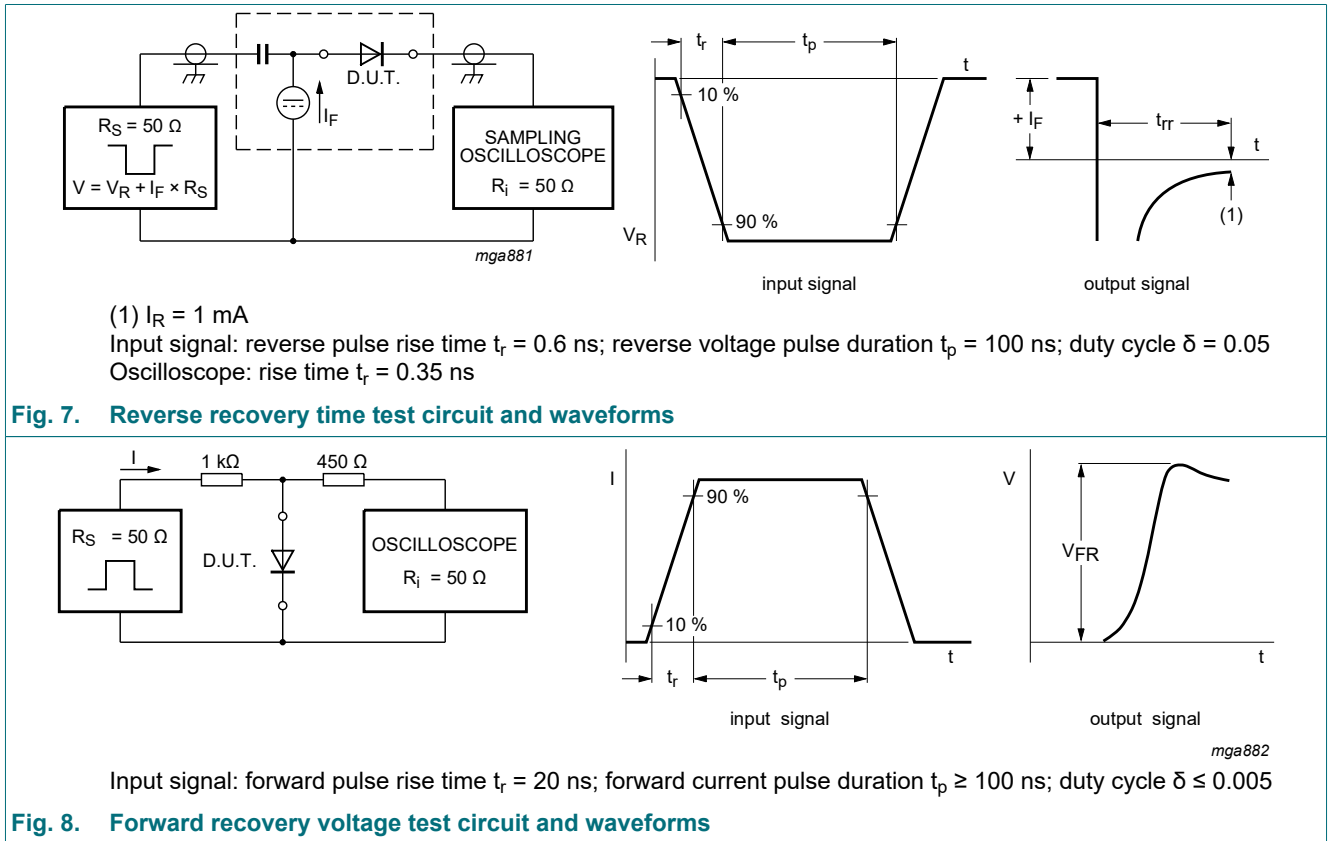
**Fig. 5. Reverse current as a function of reverse voltage; typical values**



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

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

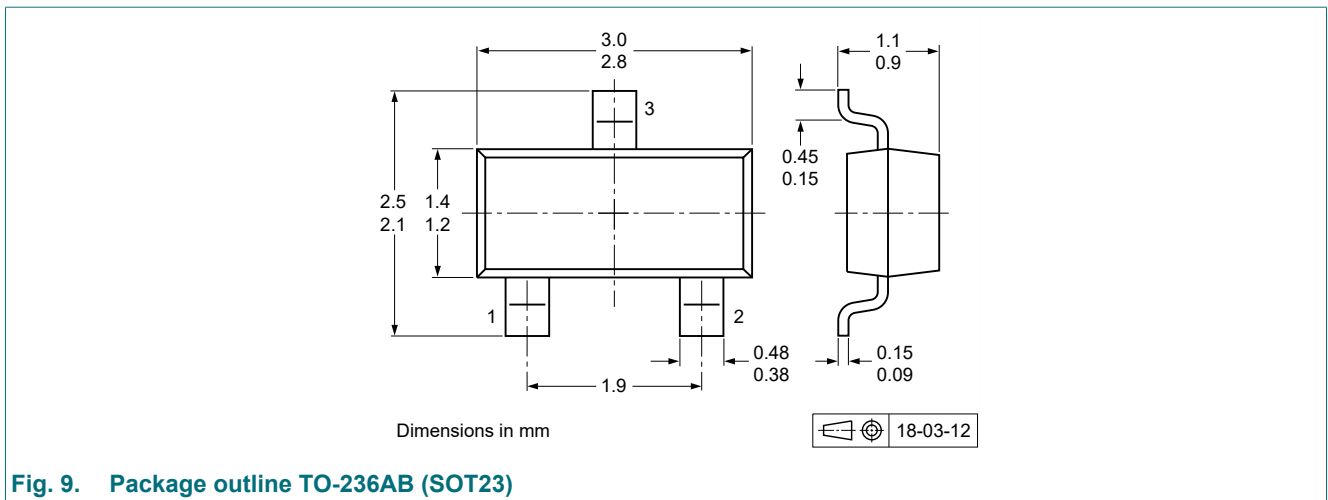
## 11. Test information



### 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

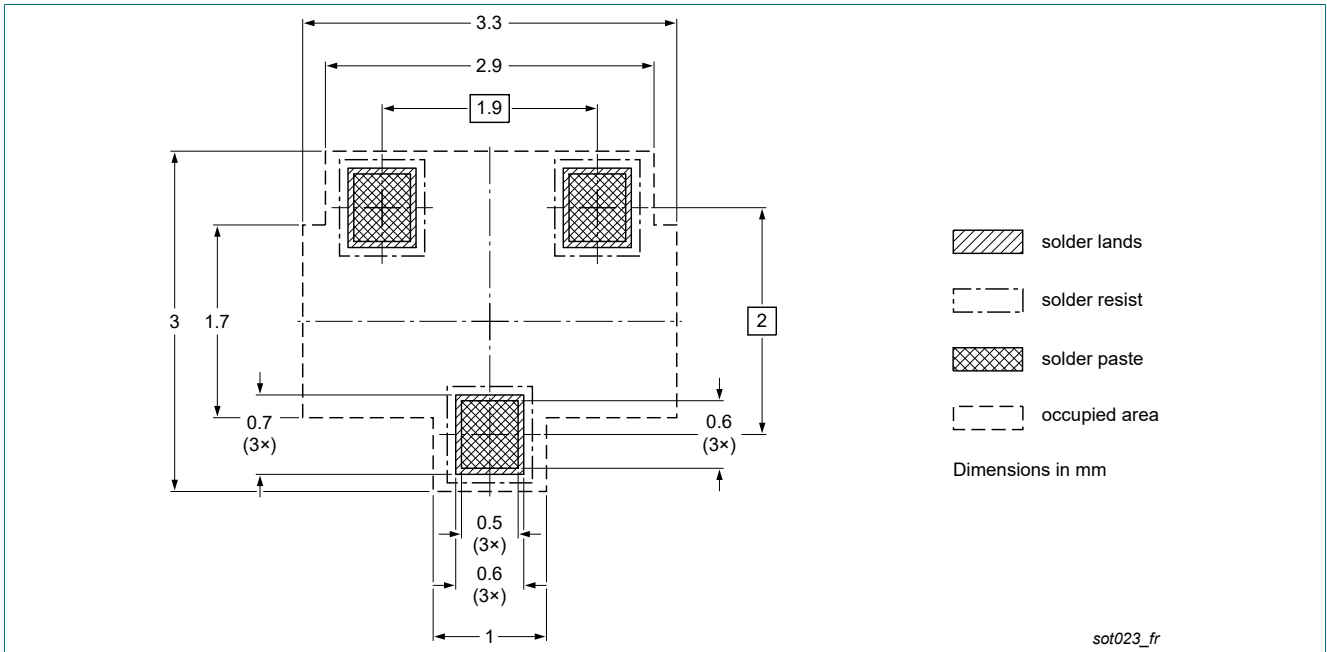


Fig. 10. Reflow soldering footprint for TO-236AB (SOT23)

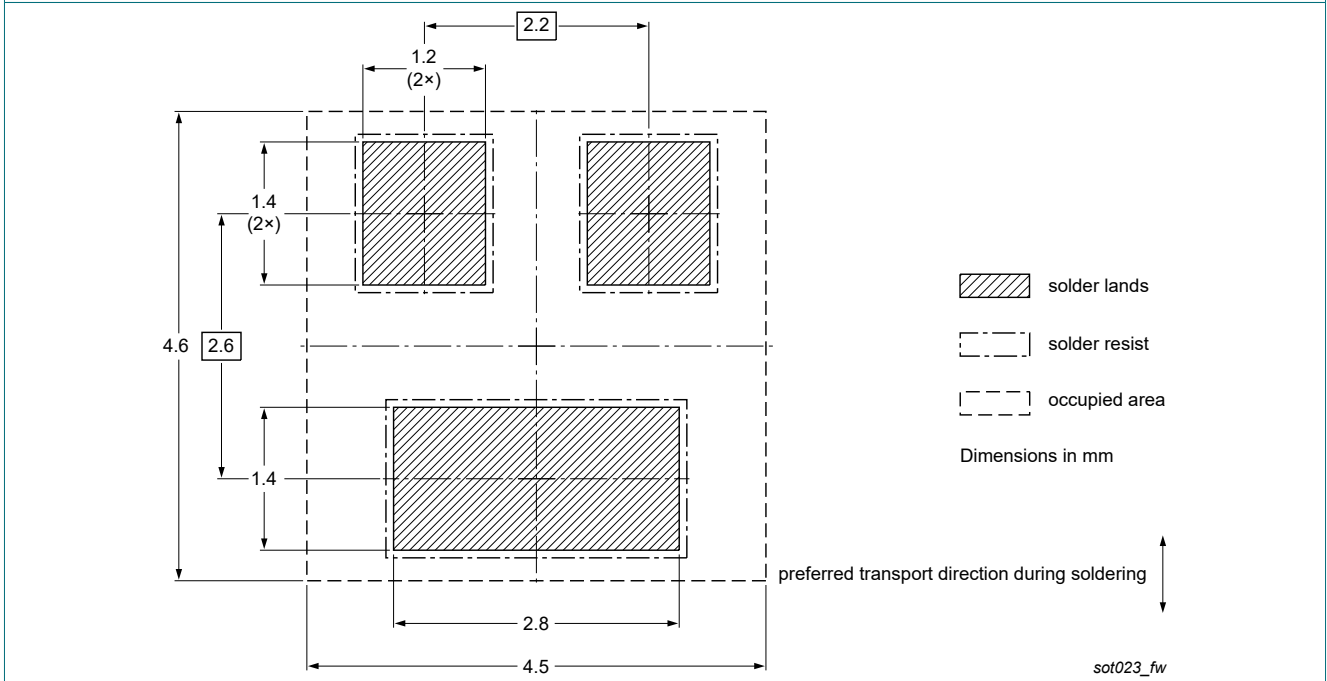


Fig. 11. Wave soldering footprint for TO-236AB (SOT23)

## 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 [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 <https://www.nexperia.com>.

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