



# 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

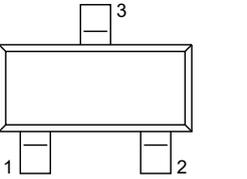
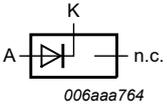
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage	$T_j = 25$ °C	-	-	100	V
$I_F$	forward current		[1]	-	215	mA
$V_R$	reverse voltage		-	-	100	V
$V_F$	forward voltage	$I_F = 150$ mA	[2]	-	1.25	V
$I_R$	reverse current	$V_R = 80$ V; $T_j = 25$ °C	-	-	0.5	µA
$t_{rr}$	reverse 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>	 <p>006aaa764</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

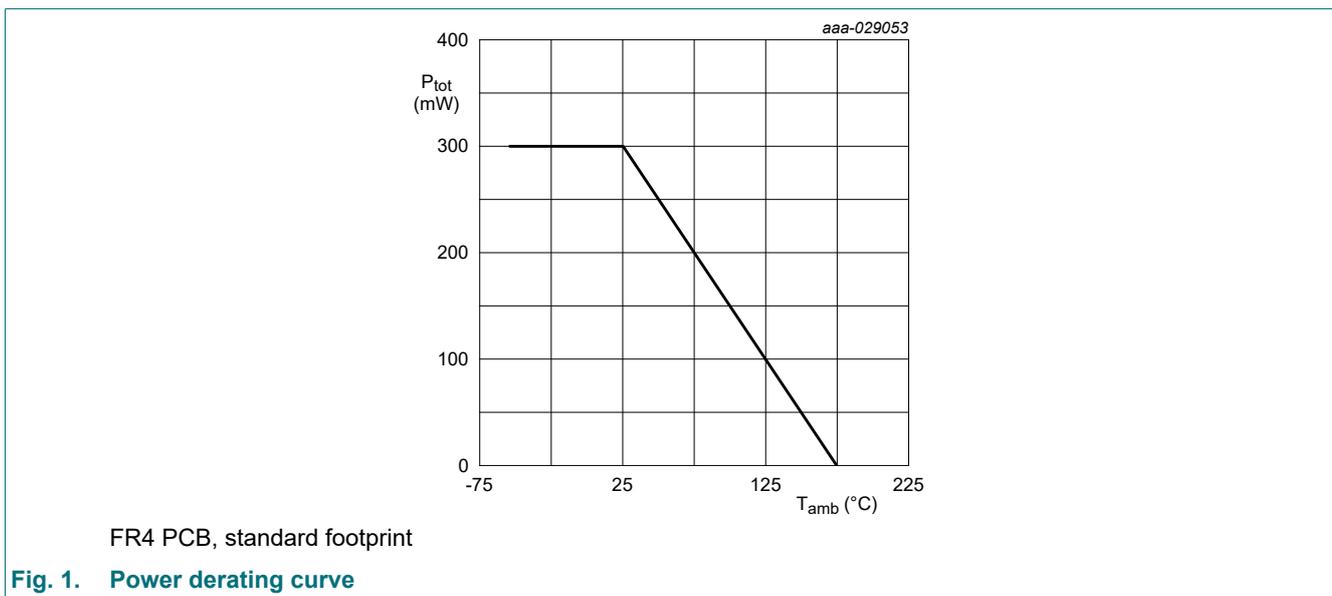
## 8. Limiting values

**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.

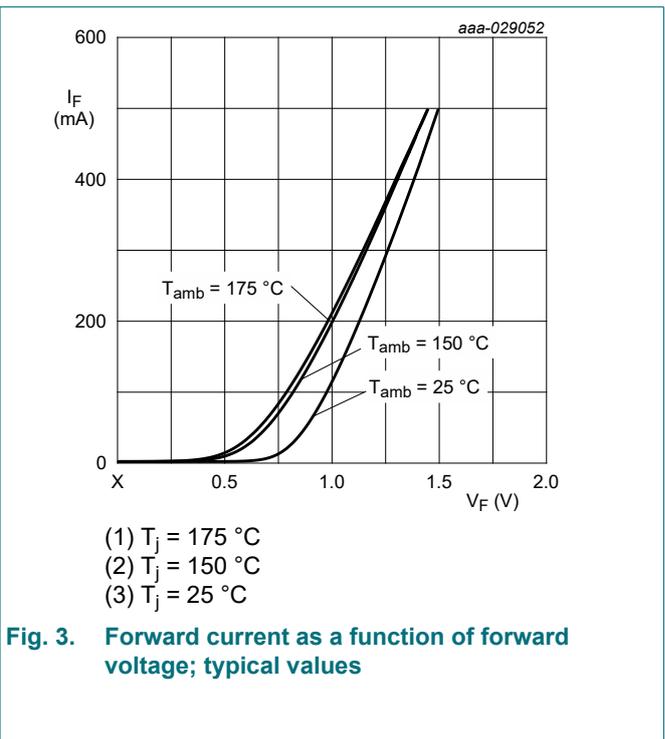
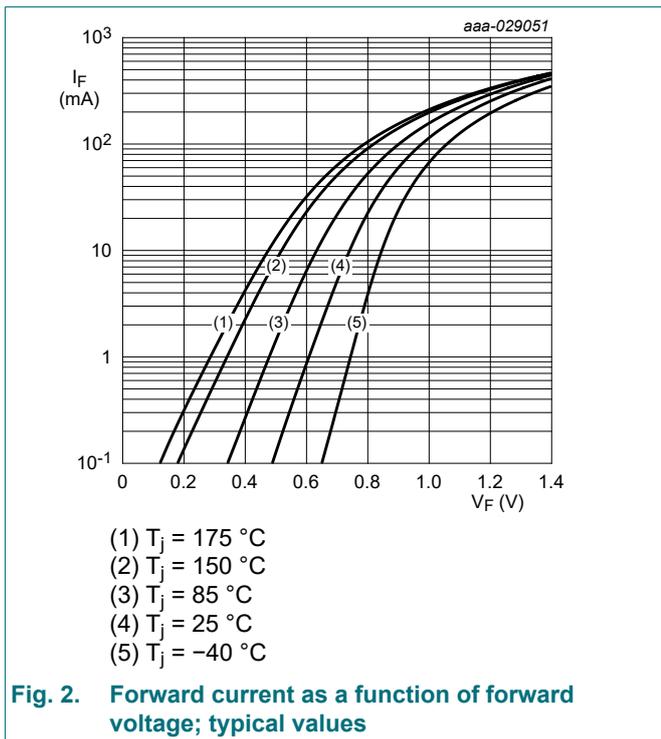
[2] Soldering point of cathode tab.

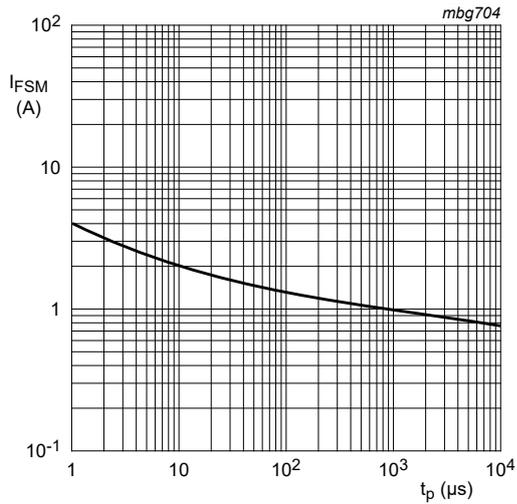
## 10. Characteristics

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	

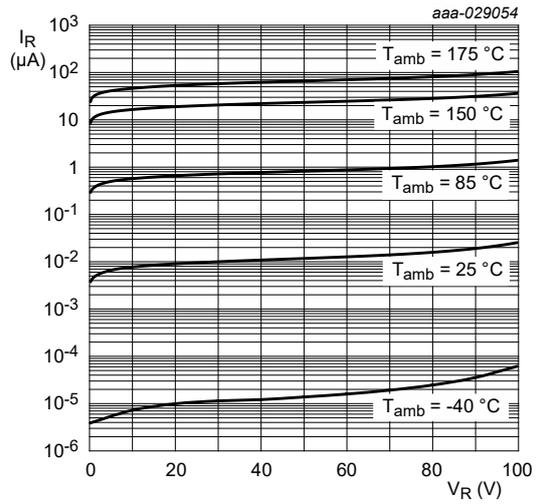
[1] Pulsed test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02



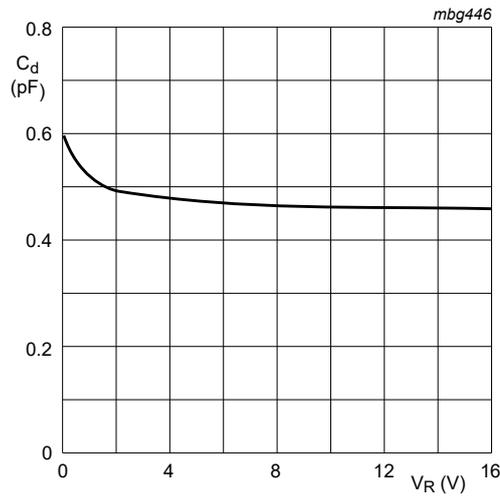


Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ °C}$

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



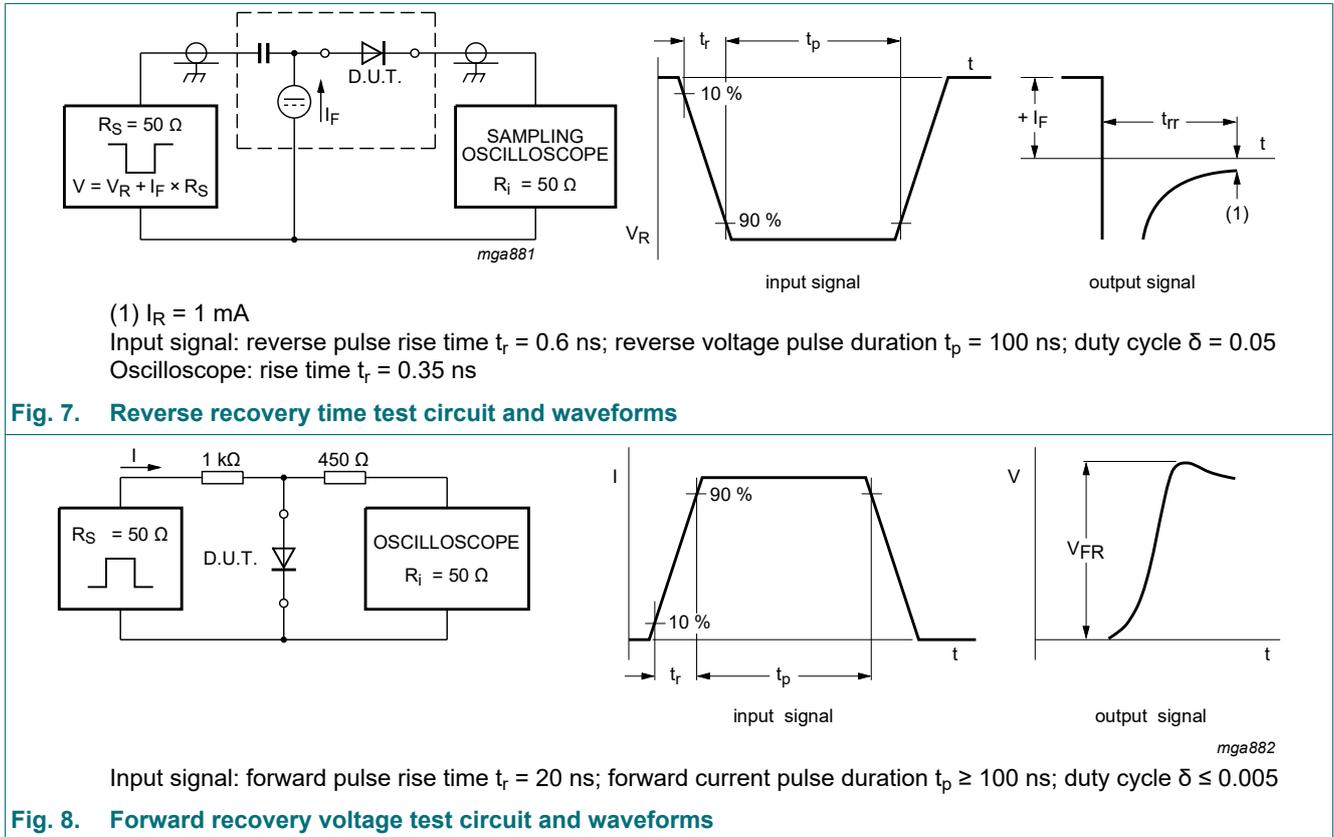
**Fig. 5. Reverse current as a function of reverse voltage; typical values**



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

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

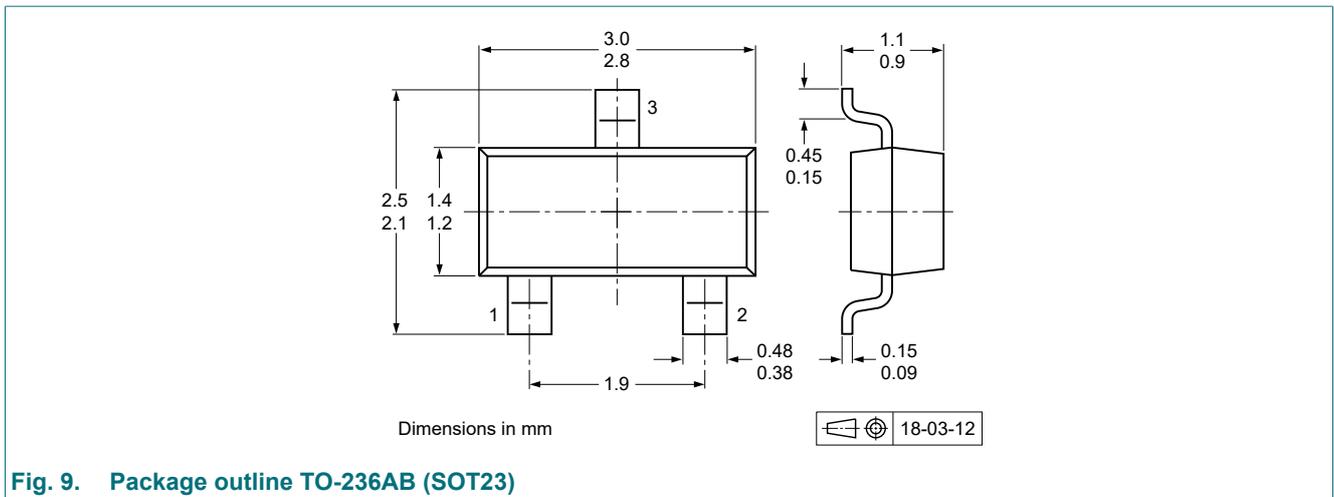
### 11. Test information



#### 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

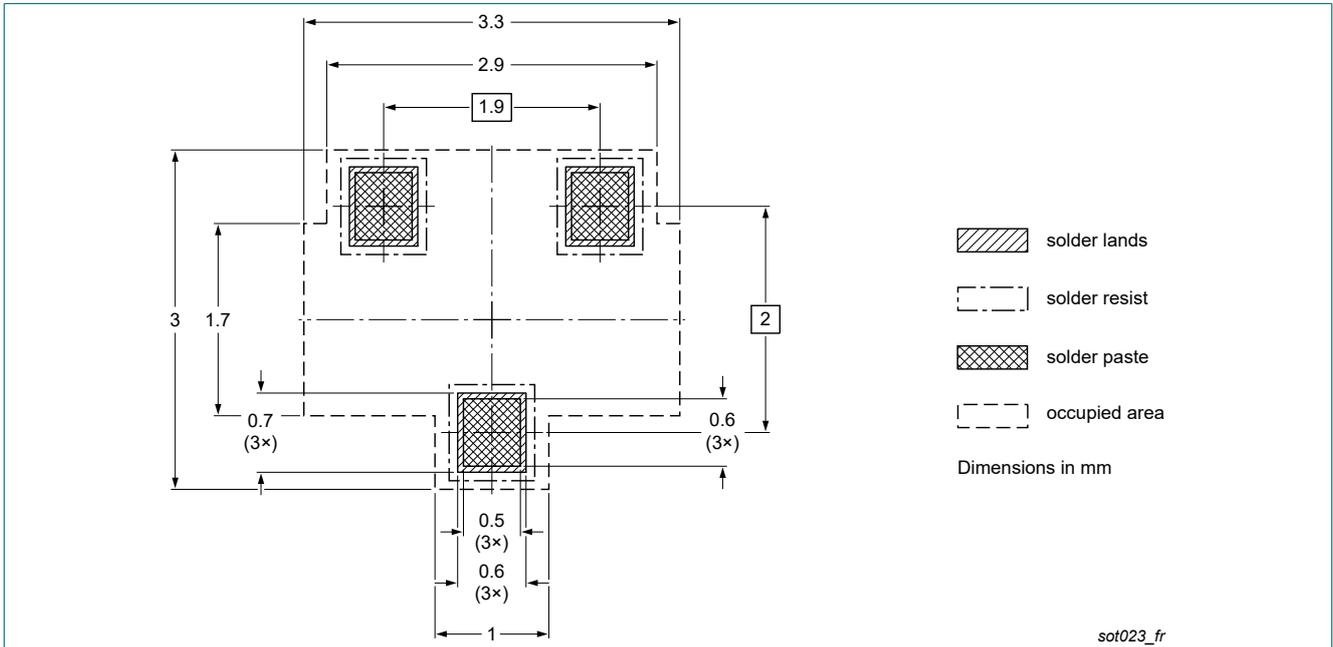


Fig. 10. Reflow soldering footprint for TO-236AB (SOT23)

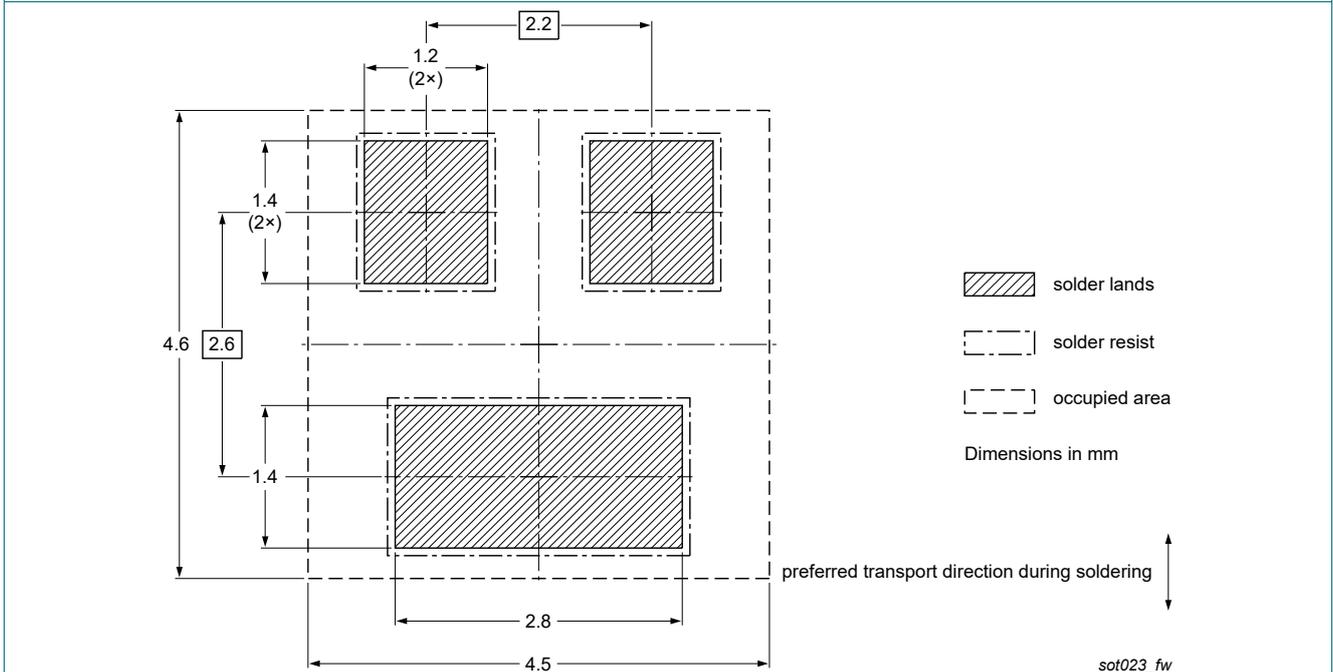


Fig. 11. Wave soldering footprint for TO-236AB (SOT23)

## 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".
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