



# BAS21LS-Q

## High-speed switching diode

3 November 2021

Product data sheet

## 1. General description

High-speed switching diode, encapsulated in a leadless ultra small DFN1006BD-2 (SOD882BD) Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

## 2. Features and benefits

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- High reverse voltage  $V_R \leq 200$  V
- Low capacitance:  $C_d \leq 2$  pF
- Ultra small and leadless SMD plastic package
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- High-speed switching
- General-purpose switching
- Voltage clamping
- Reverse polarity protection

## 4. Quick reference data

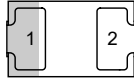

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_F$	forward current	$T_j = 25$ °C	[1]	-	-	250	mA
$V_R$	reverse voltage			-	-	200	V
$V_{RRM}$	repetitive peak reverse voltage			-	-	250	V
$I_R$	reverse current	$V_R = 200$ V; $T_j = 25$ °C		-	-	100	nA
$t_{rr}$	reverse recovery time	$I_F = 30$ mA; $I_R = 30$ mA; $R_L = 100$ Ω; $I_{R(meas)} = 3$ mA; $T_{amb} = 25$ °C		-	-	50	ns

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 70 µm copper, tin-plated and standard footprint.

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>Transparent top view</p> <p><b>DFN1006BD-2 (SOD882BD)</b></p>	 <p>aaa-028035</p>
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21LS-Q	DFN1006BD-2	Leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.47 mm body	SOD882BD

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21LS-Q	M9

## 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	$T_j = 25\text{ °C}$	-	250	V	
$V_R$	reverse voltage		-	200	V	
$I_F$	forward current		[1]	-	250	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 50\text{ }\mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	9.5	A	
		$t_p = 10\text{ ms}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	2.1	A	
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$	-	1	A	
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1]	-	335	mW
			[2]	-	610	mW
$T_j$	junction temperature		-	150	°C	
$T_{\text{amb}}$	ambient temperature		-55	150	°C	
$T_{\text{stg}}$	storage temperature		-65	150	°C	

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 70  $\mu\text{m}$  copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 70  $\mu\text{m}$  copper, tin-plated mounting pad for cathode 1cm<sup>2</sup>.

## 9. 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]	-	-	375	K/W
			[2]	-	-	205	K/W

- [1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 70  $\mu\text{m}$  copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 70  $\mu\text{m}$  copper, tin-plated mounting pad for cathode 1  $\text{cm}^2$ .

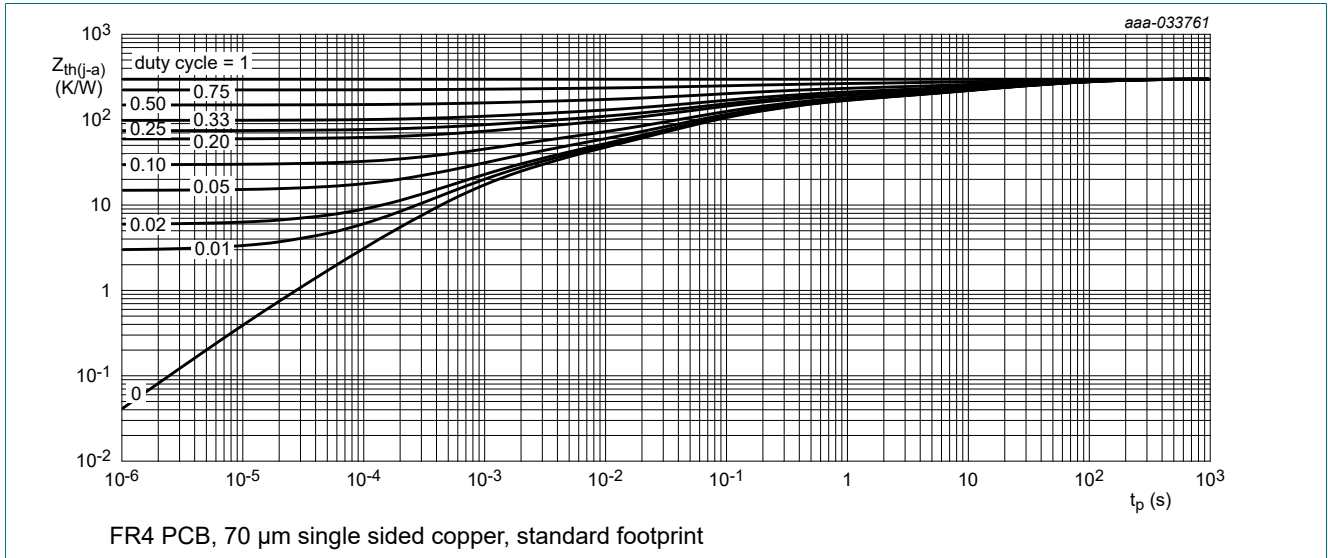


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

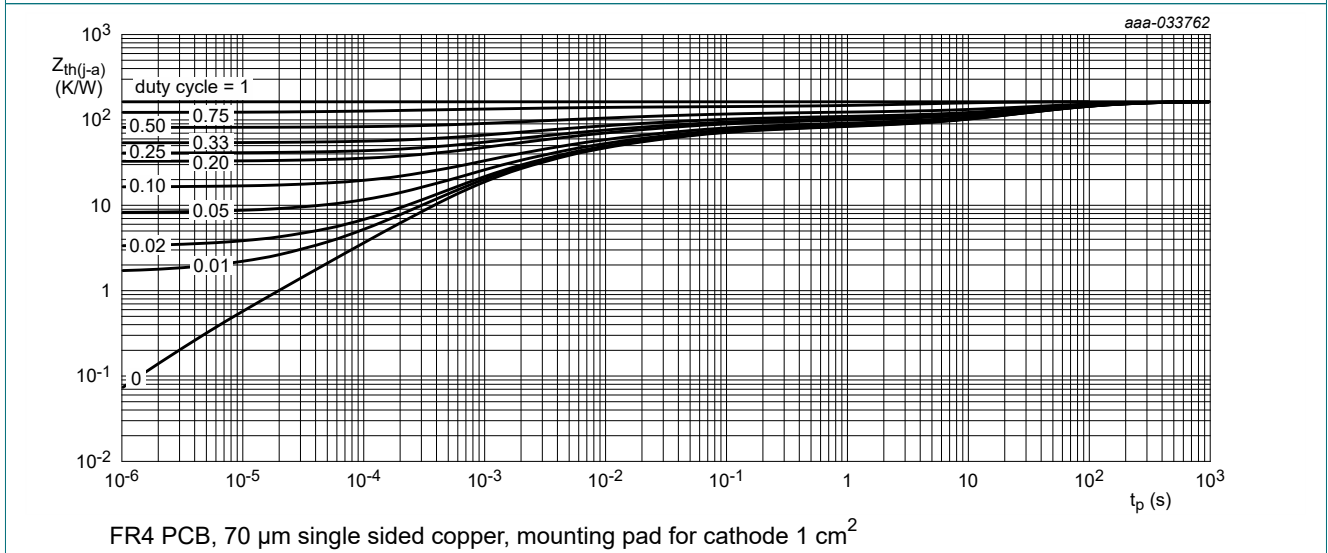
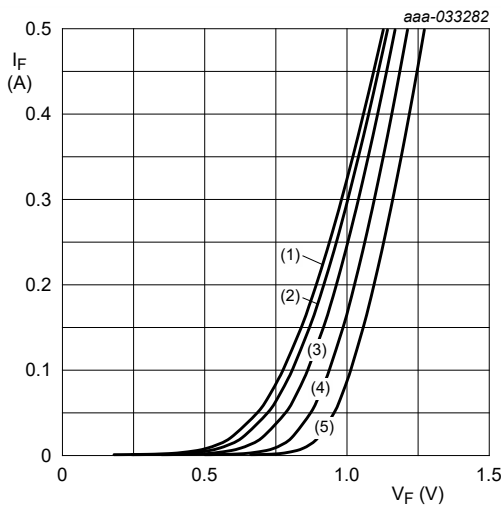


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

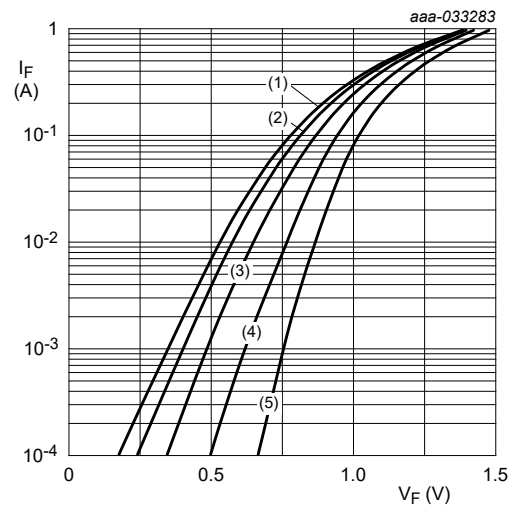
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 100 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	-	1.1	V
		$I_F = 200 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	100	nA
		$V_R = 200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	2	pF
$t_{rr}$	reverse recovery time	$I_F = 30 \text{ mA}; I_R = 30 \text{ mA}; R_L = 100 \text{ }\Omega;$ $I_{R(\text{meas})} = 3 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	50	ns



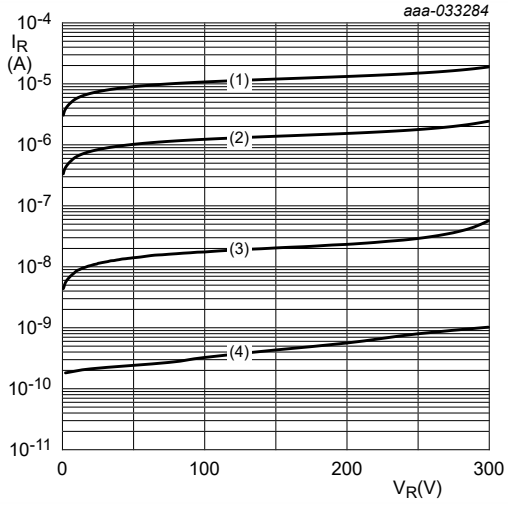
- (1)  $T_j = 150 \text{ }^\circ\text{C}$
- (2)  $T_j = 125 \text{ }^\circ\text{C}$
- (3)  $T_j = 85 \text{ }^\circ\text{C}$
- (4)  $T_j = 25 \text{ }^\circ\text{C}$
- (5)  $T_j = -40 \text{ }^\circ\text{C}$

Fig. 3. Forward current as a function of forward voltage; typical values



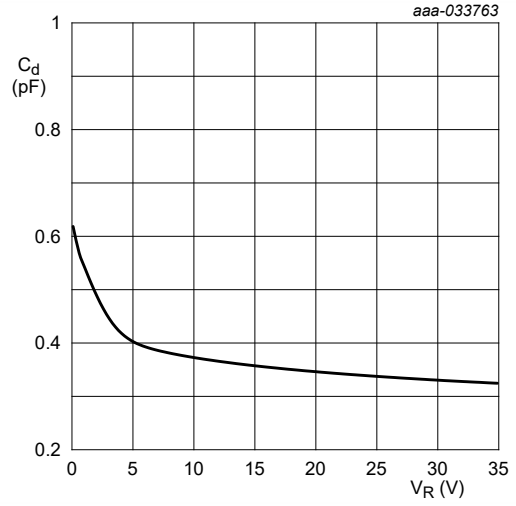
- (1)  $T_j = 150 \text{ }^\circ\text{C}$
- (2)  $T_j = 125 \text{ }^\circ\text{C}$
- (3)  $T_j = 85 \text{ }^\circ\text{C}$
- (4)  $T_j = 25 \text{ }^\circ\text{C}$
- (5)  $T_j = -40 \text{ }^\circ\text{C}$

Fig. 4. Forward current as a function of forward voltage; typical values; (logarithmic scale)



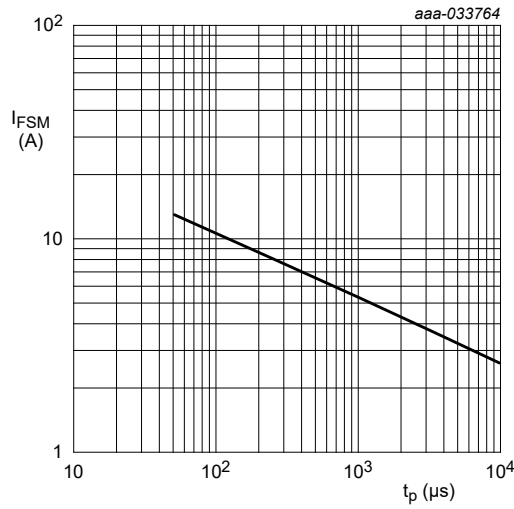
- (1)  $T_j = 125^\circ\text{C}$
- (2)  $T_j = 85^\circ\text{C}$
- (3)  $T_j = 25^\circ\text{C}$
- (4)  $T_j = -40^\circ\text{C}$

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



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

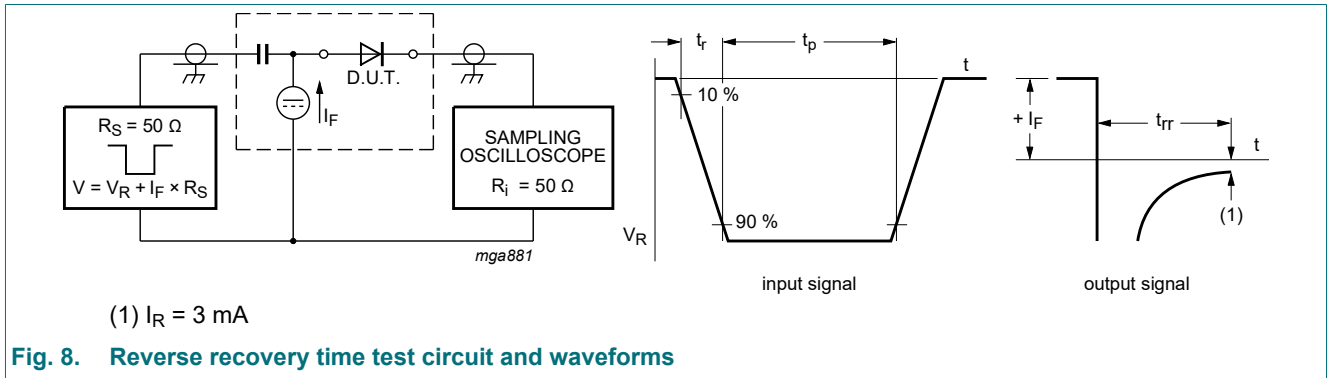
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values**



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

**Fig. 7. Non-repetitive peak forward current as a function of pulse duration; typical values**

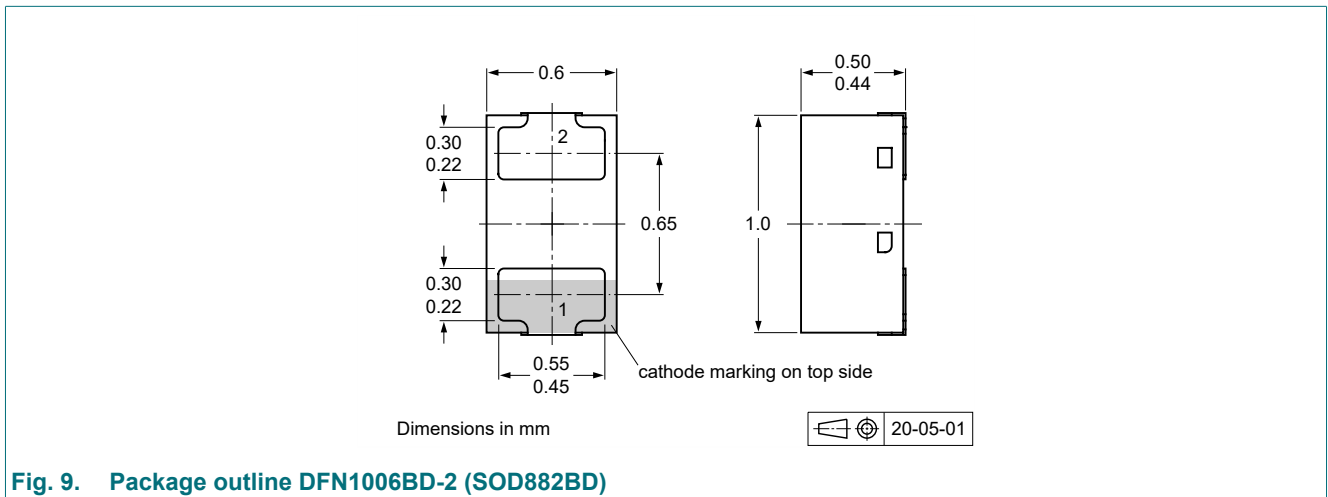
### 11. Test information



#### 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

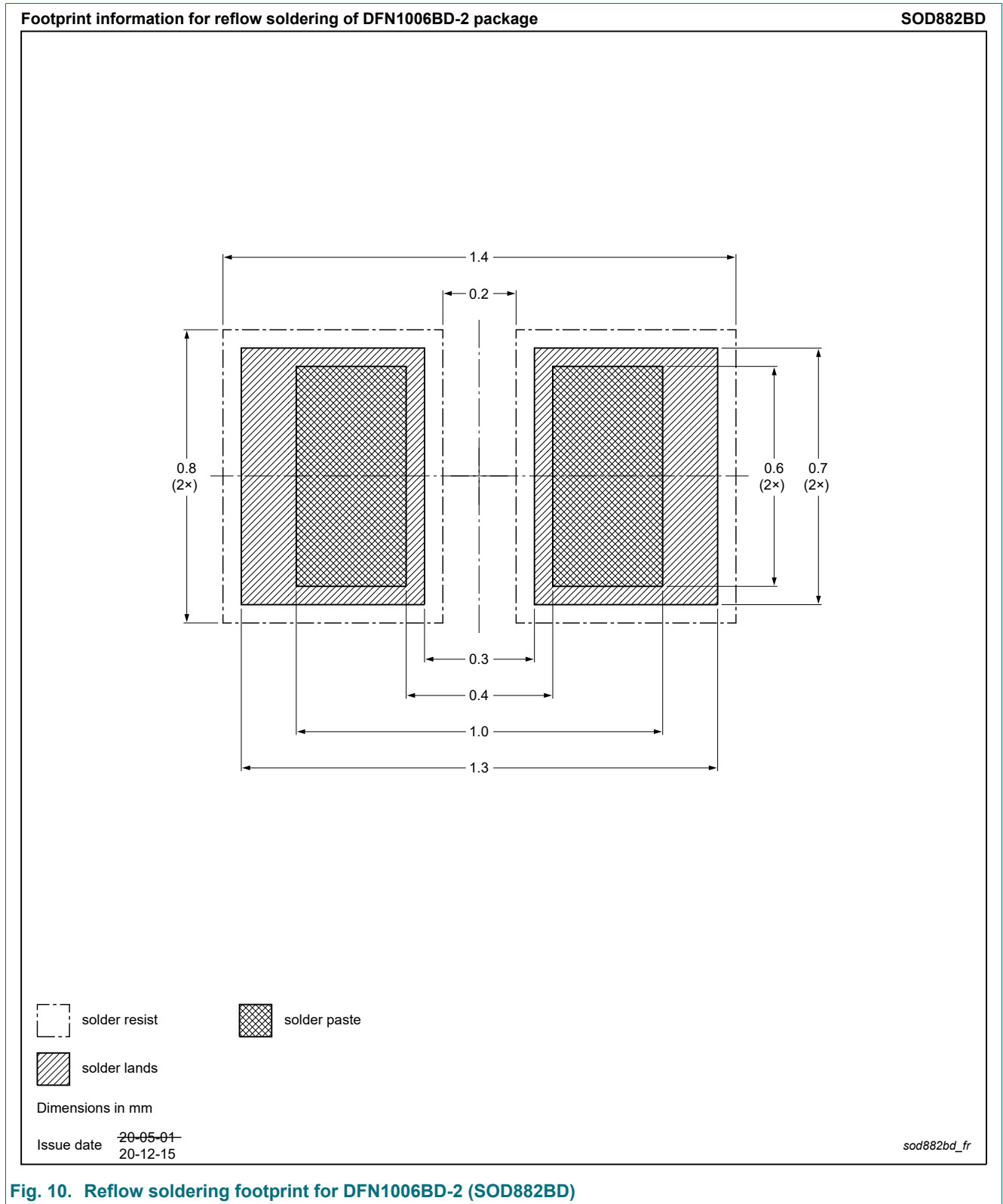


Fig. 10. Reflow soldering footprint for DFN1006BD-2 (SOD882BD)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21LS-Q v.3	20211103	Product data sheet	-	BAS21LS-Q v.2
Modifications:	• Product status changed			
BAS21LS-Q v.2	20211007	Preliminary data sheet	-	BAS21LS-Q v.1
BAS21LS-Q v.1	20210422	Objective 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.

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