



# BAS21LL

## High-voltage switching diode

27 February 2018

Product data sheet

### 1. General description

High-voltage switching diode, encapsulated in a leadless ultra small DFN1006-2 (SOD882) Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current:  $I_R \leq 100$  nA
- High reverse voltage  $V_R \leq 200$  V
- Low capacitance:  $C_d \leq 2$  pF
- Ultra small SMD plastic package
- AEC-Q101 qualified

### 3. Applications

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

### 4. Quick reference data

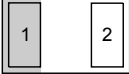

Table 1. Quick reference data

| Symbol    | Parameter                       | Conditions  |     | Min | Typ | Max  | Unit |
|-----------|---------------------------------|---|-----|-----|-----|------|------|
| $I_F$     | forward current                 | $T_j = 25$ °C   | [1] | -   | -   | 330  | mA   |
| $V_R$     | reverse voltage                 |   |     | -   | -   | 200  | V    |
| $V_{RRM}$ | repetitive peak reverse voltage |   |     | -   | -   | 250  | V    |
| $V_F$     | forward voltage                 | $I_F = 200$ mA; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ;<br>$T_j = 25$ °C               |     | -   | -   | 1.25 | V    |
| $I_R$     | reverse current                 | $V_R = 200$ V; pulsed; $T_j = 25$ °C  |     | -   | -   | 100  | nA   |
| $t_{rr}$  | reverse recovery time           | $I_F = 30$ mA; $I_R = 30$ mA; $R_L = 100$ $\Omega$ ;<br>$I_{R(meas)} = 3$ mA; $T_j = 25$ °C |     | -   | -   | 50   | ns   |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 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<br/>top view</p> <p><b>DFN1006-2 (SOD882)</b></p> |  <p>aaa-028035</p> |
| 2   | A      | anode       |  |   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package   |   |         |
|-------------|-----------|---|---------|
|             | Name      | Description   | Version |
| BAS21LL     | DFN1006-2 | plastic, leadless ultra small package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.48 mm body | SOD882  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS21LL     | J3           |

## 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] | -   | 330 | mA   |
| $I_{FSM}$        | non-repetitive peak forward current | $t_p = 1\ \mu\text{s}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$   |     | -   | 9   | A    |
|                  |                                     | $t_p = 100\ \mu\text{s}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$ |     | -   | 3   | A    |
|                  |                                     | $t_p = 10\ \text{ms}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$    |     | -   | 1.7 | A    |
| $I_{FRM}$        | repetitive peak forward current     | $t_p \leq 1\ \text{ms}; \delta \leq 0.25$                                       |     | -   | 900 | mA   |
| $P_{\text{tot}}$ | 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 copper, tin-plated and standard footprint.

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

## 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] | -   | -   | 375 | K/W  |
|                       |  |             | [2] | -   | -   | 205 | K/W  |
| $R_{\text{th}(j-sp)}$ | thermal resistance from junction to solder point |             | [3] | -   | -   | 45  | K/W  |

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for cathode  $1\text{cm}^2$ .

[3] Soldering point of cathode tab.

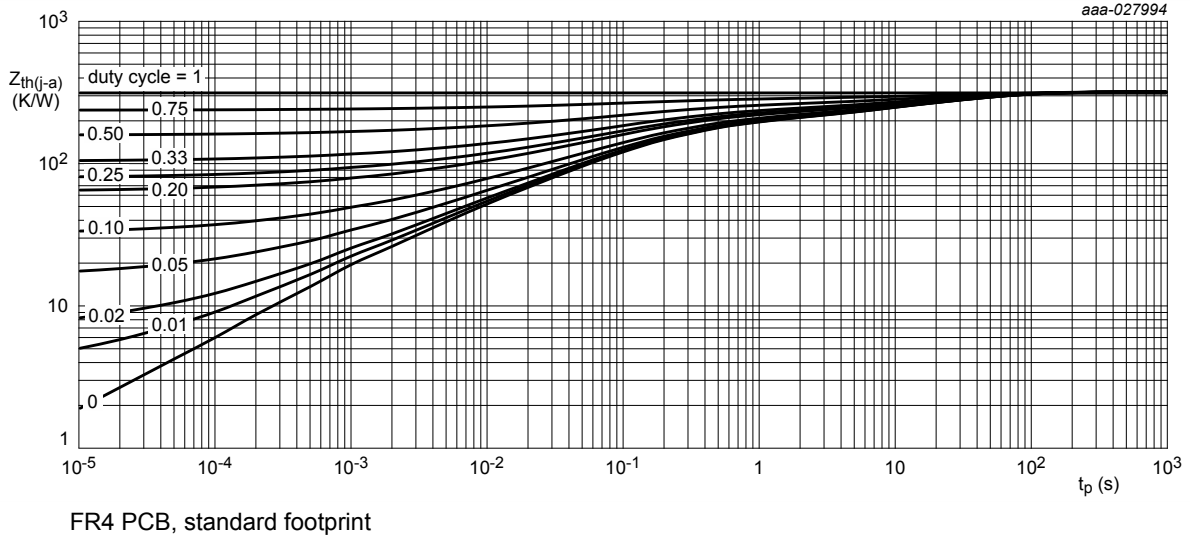


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

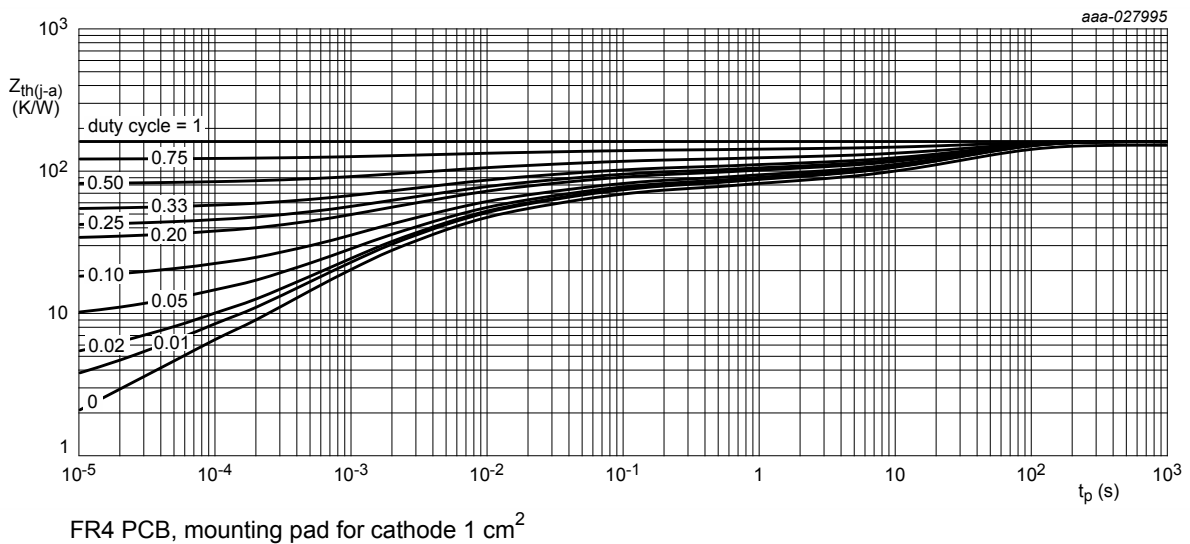
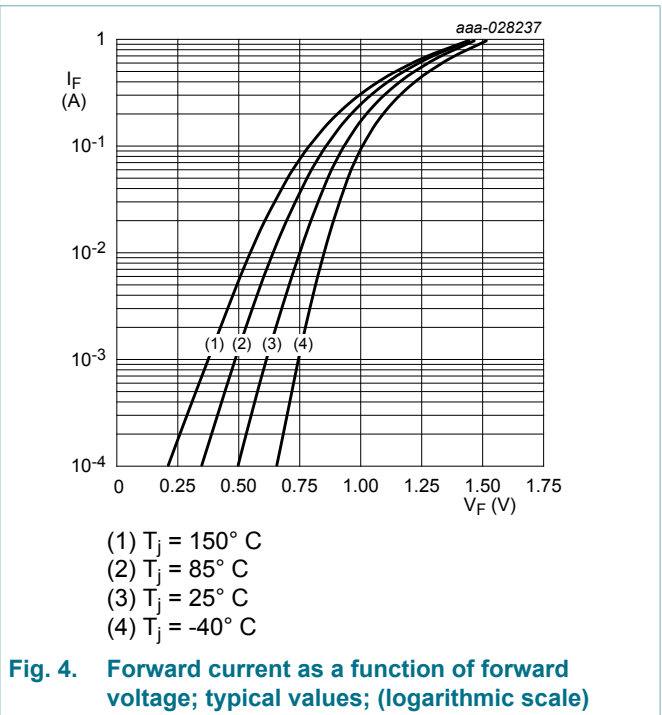
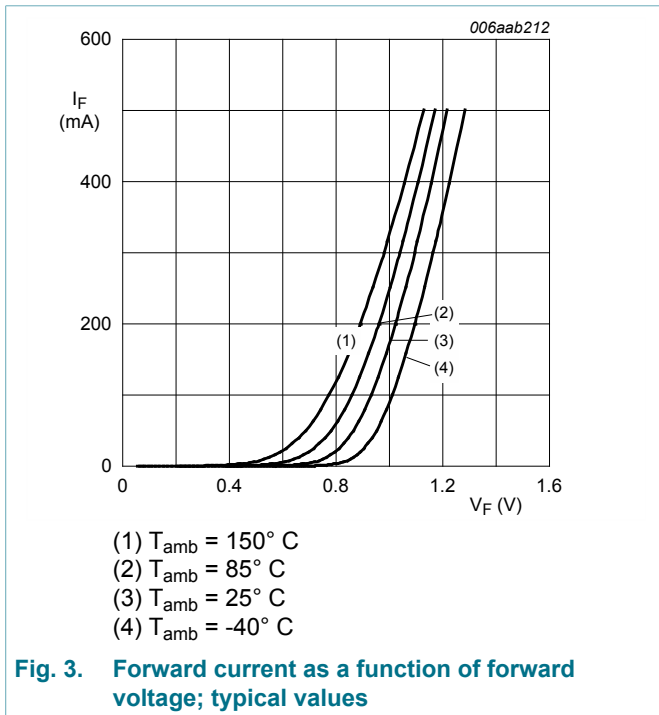


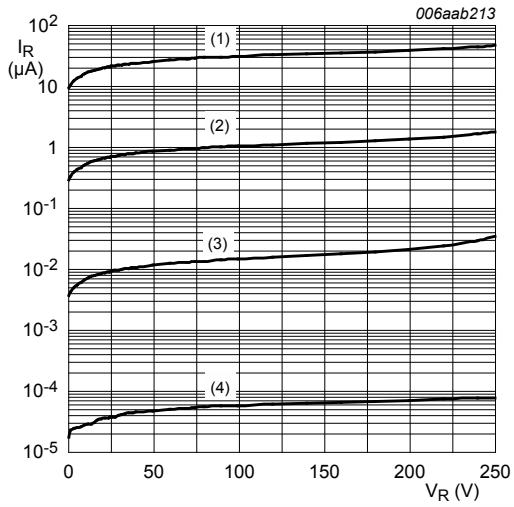
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 7. Characteristics

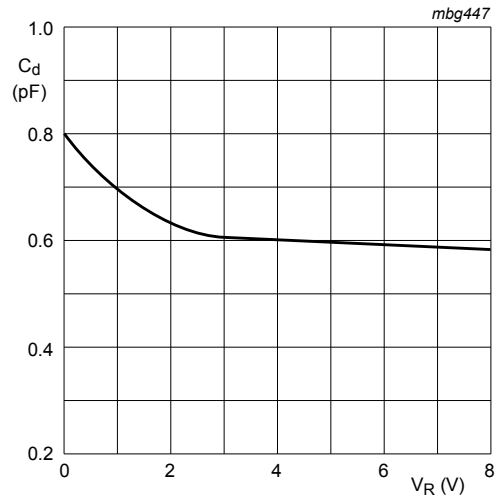
| Symbol   | Parameter             | Conditions   | Min | Typ | Max  | Unit          |
|----------|-----------------------|--|-----|-----|------|---------------|
| $V_F$    | forward voltage       | $I_F = 100 \text{ mA}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ } ^\circ\text{C}$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





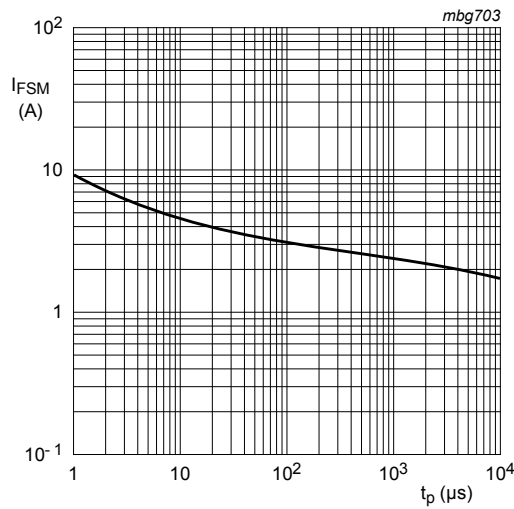
- (1)  $T_{amb} = 150^{\circ}C$
- (2)  $T_{amb} = 85^{\circ}C$
- (3)  $T_{amb} = 25^{\circ}C$
- (4)  $T_{amb} = -40^{\circ}C$

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



$f = 1\text{ MHz}$   
 $T_j = 25^{\circ}C$ .

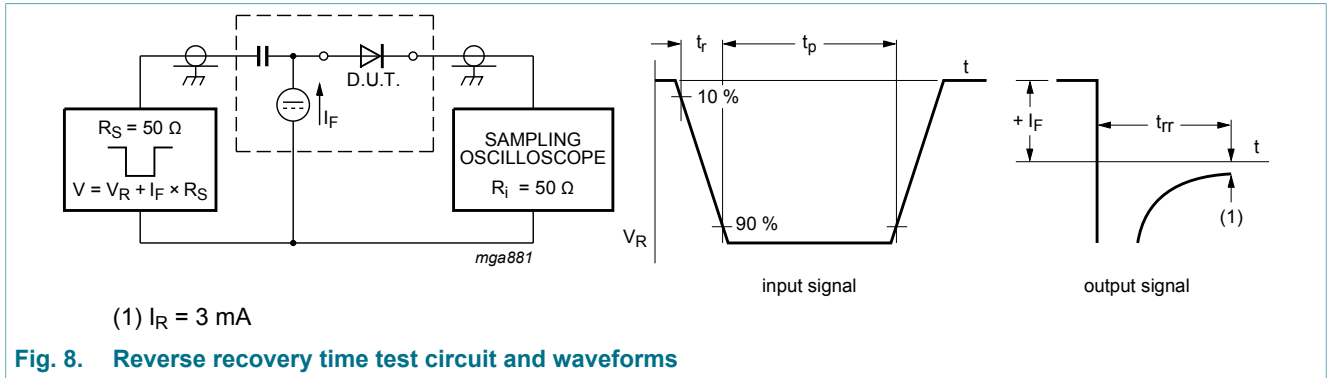
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values.**



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

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

### 11. Test information



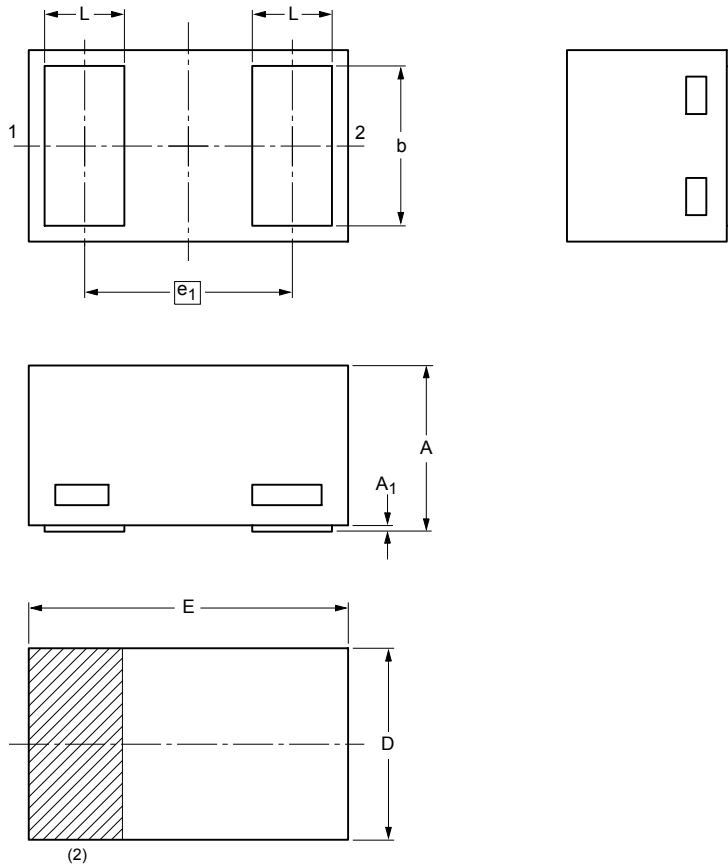
#### Quality information

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

DFN1006-2: Leadless ultra small plastic package; 2 terminals; body 1.0 x 0.6 x 0.5 mm

SOD882



Dimensions (mm are the original dimensions)

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e <sub>1</sub> | L    |
|------|------------------|----------------|------|------|------|----------------|------|
| mm   | max 0.50         | 0.03           | 0.55 | 0.62 | 1.02 | 0.30           |      |
|      | nom              |                |      |      |      | 0.65           |      |
|      | min 0.46         |                | 0.47 | 0.55 | 0.95 |                | 0.22 |

Note

- Including plating thickness
- The marking bar indicates the cathode (if applicable)

sod882\_po

| Outline version | References |       |       | European projection | Issue date                      |
|-----------------|------------|-------|-------|---------------------|---------------------------------|
|                 | IEC        | JEDEC | JEITA |                     |                                 |
| SOD882          |            |       |       |                     | <del>14-08-26</del><br>14-08-27 |

Fig. 9. Package outline DFN1006-2 (SOD882)



### 13. Soldering

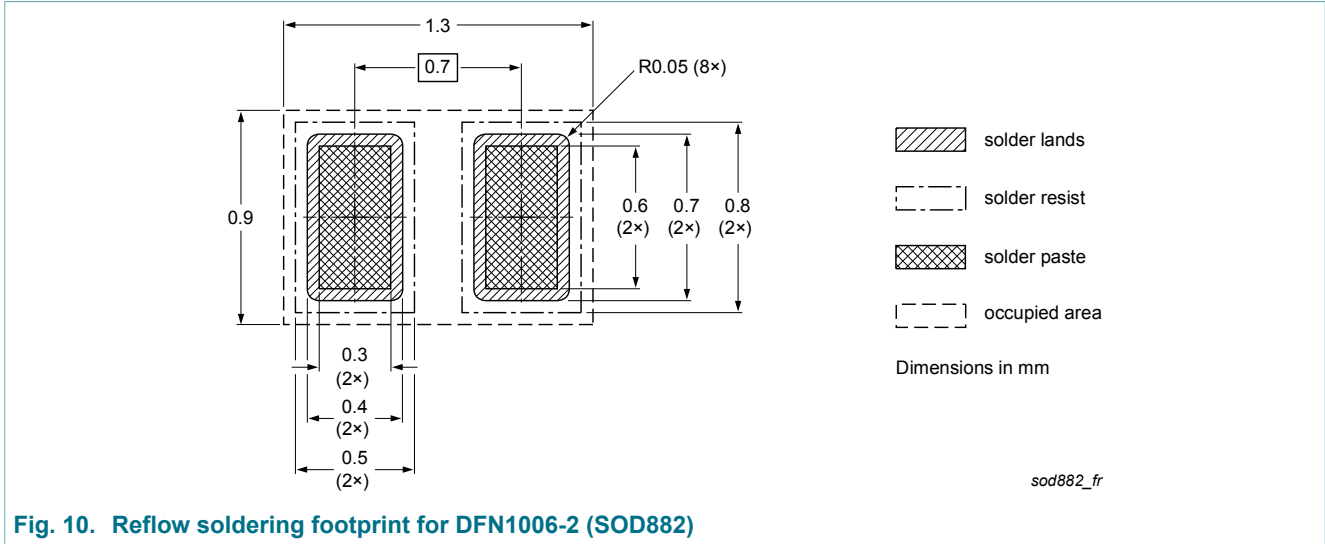


Fig. 10. Reflow soldering footprint for DFN1006-2 (SOD882)

## 14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAS21LL v.1   | 20180227     | 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.                                     |

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