# BAS21LD

## High-voltage switching diode

**28 February 2018** **Product data sheet**

## 1. General description

High-voltage switching diode, encapsulated in an leadless ultra small DFN1006D-2 (SOD882D) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

## 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 and leadless SMD plastic package
- Soldarable side pads
- Package height typ. 0.37 mm
- 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; $t_p \leq 300$ µs; $\delta \leq 0.02$ ; $T_j = 25$ °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; $R_L = 100$ Ω; $I_{R(meas)} = 3$ 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.

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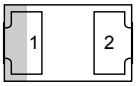
## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode |  Transparent top view **DFN1006D-2 (SOD882D)** |  aaa-028035 |
| 2 | A | anode | | |

## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BAS21LD | DFN1006D-2 | leadless ultra small plastic package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.4 mm body | SOD882D |

## 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| BAS21LD | 0110 0001 |

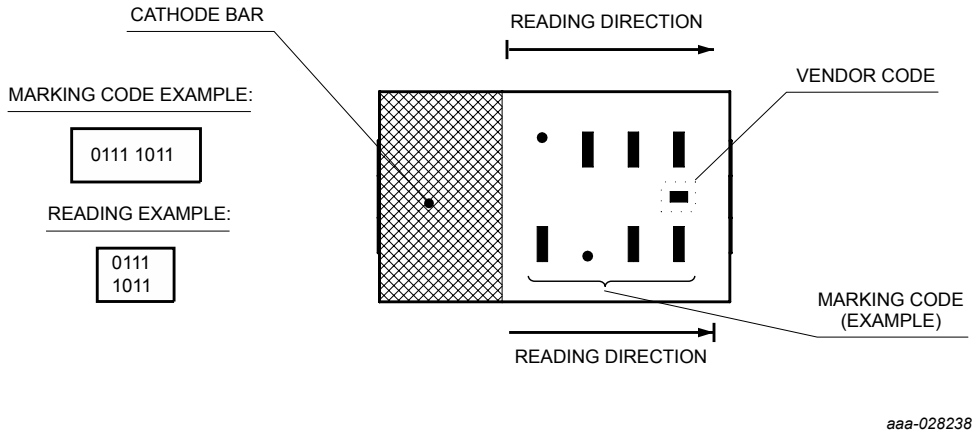



**Fig. 1. SOD882D binary marking code description**

# 8. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating Sytem (IEC 60134)*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | repetitive peak reverse voltage | $T_j$ = 25 °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 µs; $T_{j(init)}$ = 25 °C; square wave | | - | 9 | A |
| | | $t_p$ = 100 µs; $T_{j(init)}$ = 25 °C; square wave | | - | 3 | A |
| | | $t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; square wave | | - | 1.7 | A |
| $I_{FRM}$ | repetitive peak forward current | $t_p \leq$ 1 ms; $\delta \leq$ 0.25 | | - | 900 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq$ 25 °C | [1] | - | 335 | mW |
| | | | [2] | - | 610 | mW |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -55 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

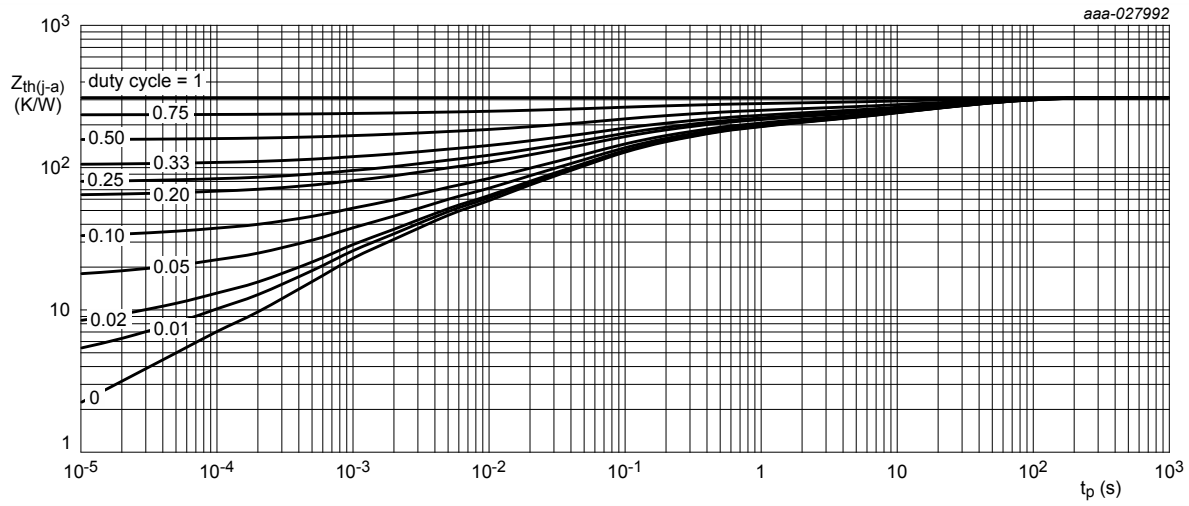
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated mounting pad for cathode 1cm$^2$.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

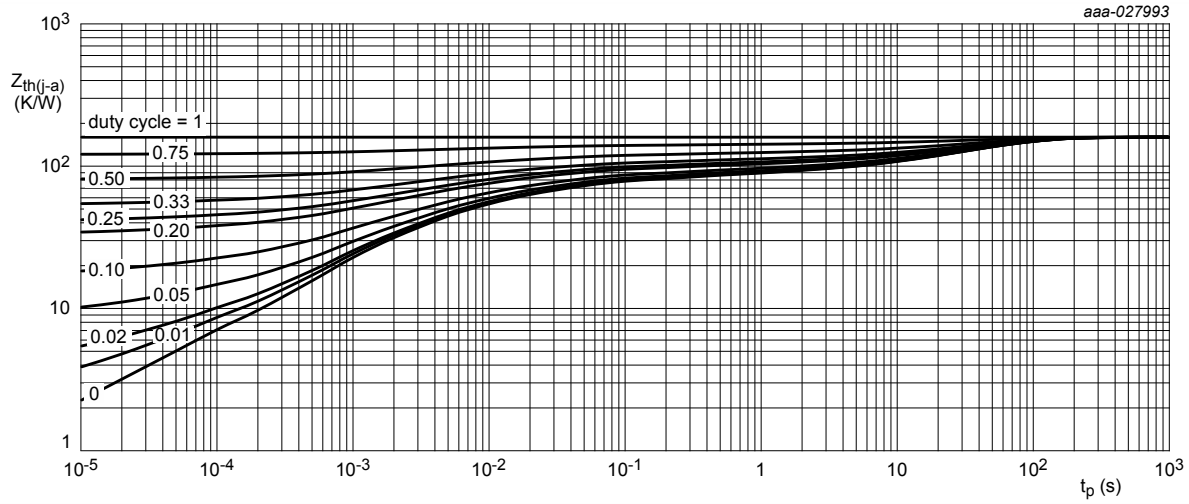
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | In free air | [1] | - | - | 375 | K/W |
| | | | [2] | - | - | 205 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [3] | - | - | 40 | 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 1cm$^2$.
[3] Soldering point of cathode tab.




FR4 PCB, standard footprint

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



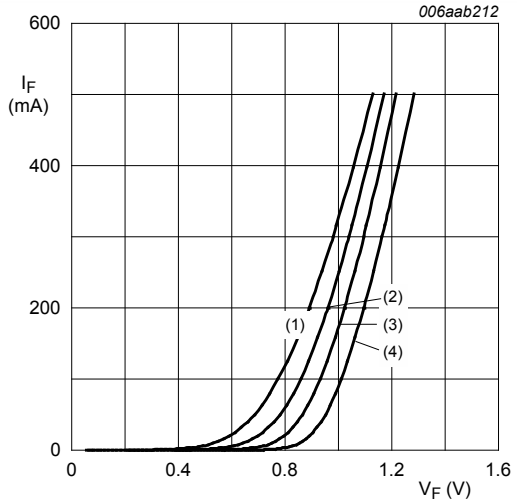

FR4 PCB, mounting pad for cathode 1 $cm^2$

**Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

# 10. Characteristics

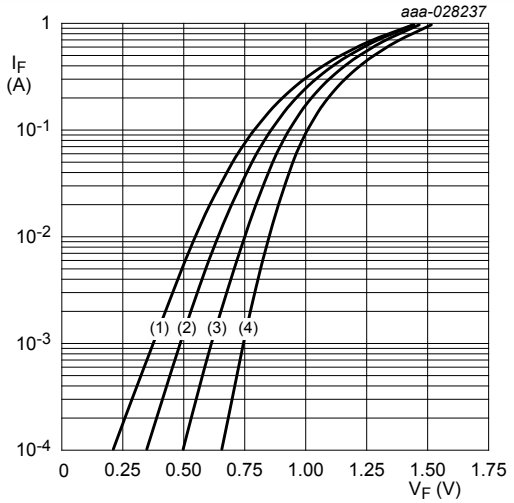
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 100 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02 ; $T_j$ = 25 °C | | - | - | 1 | V |
| | | $I_F$ = 200 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02 ; $T_j$ = 25 °C | | - | - | 1.25 | V |
| $I_R$ | reverse current | $V_R$ = 200 V; pulsed; $T_j$ = 25 °C | | - | - | 100 | nA |
| | | $V_R$ = 200 V; pulsed; $T_j$ = 150 °C | | - | - | 100 | µA |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz; $T_j$ = 25 °C | | - | - | 2 | pF |
| $t_{rr}$ | reverse recovery time | $I_F$ = 30 mA; $I_R$ = 30 mA; $R_L$ = 100 Ω; $I_{R(meas)}$ = 3 mA; $T_j$ = 25 °C | | - | - | 50 | ns |



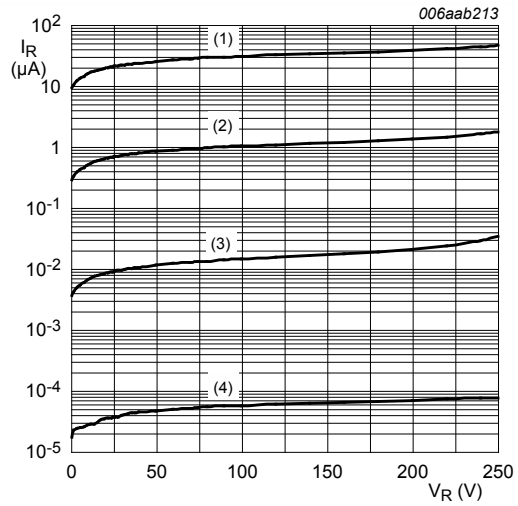

(1) $T_{amb}$ = 150° C
(2) $T_{amb}$ = 85° C
(3) $T_{amb}$ = 25° C
(4) $T_{amb}$ = -40° C

**Fig. 4. Forward current as a function of forward voltage; typical values**



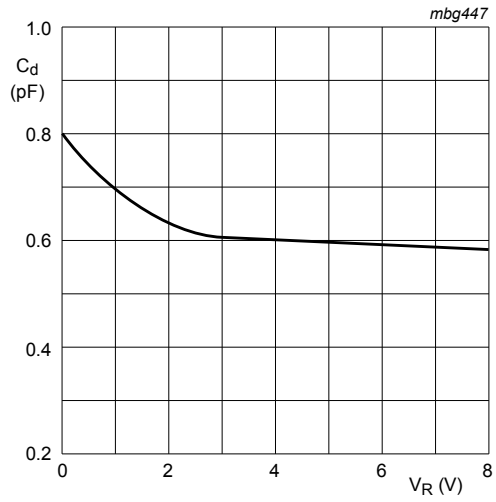

(1) $T_j$ = 150° C
(2) $T_j$ = 85° C
(3) $T_j$ = 25° C
(4) $T_j$ = -40° C

**Fig. 5. Forward current as a function of forward voltage; typical values; (logarithmic scale)**



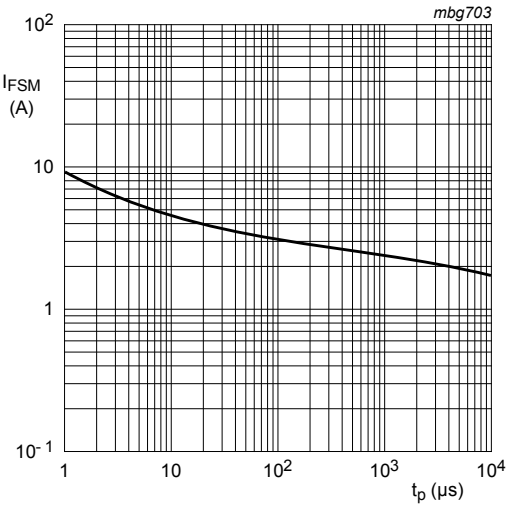

(1) $T_{amb}$ = 150° C
(2) $T_{amb}$ = 85° C
(3) $T_{amb}$ = 25° C
(4) $T_{amb}$ = -40° C

**Fig. 6. Reverse current as a function of reverse voltage; typical values**




f = 1 MHz
$T_j$ = 25 °C.

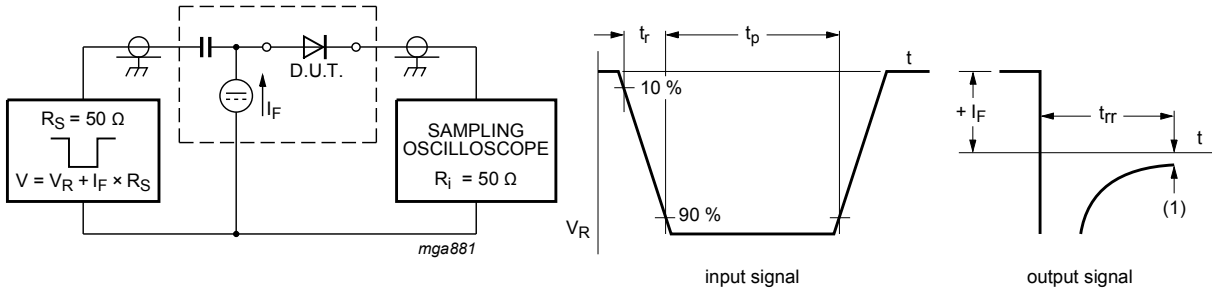
**Fig. 7. Diode capacitance as a function of reverse voltage; typical values.**




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

**Fig. 8. Non-repetitive peak forward current as a function of pulse duration; maximum values**

## 11. Test information




(1) $I_R$ = 3 mA

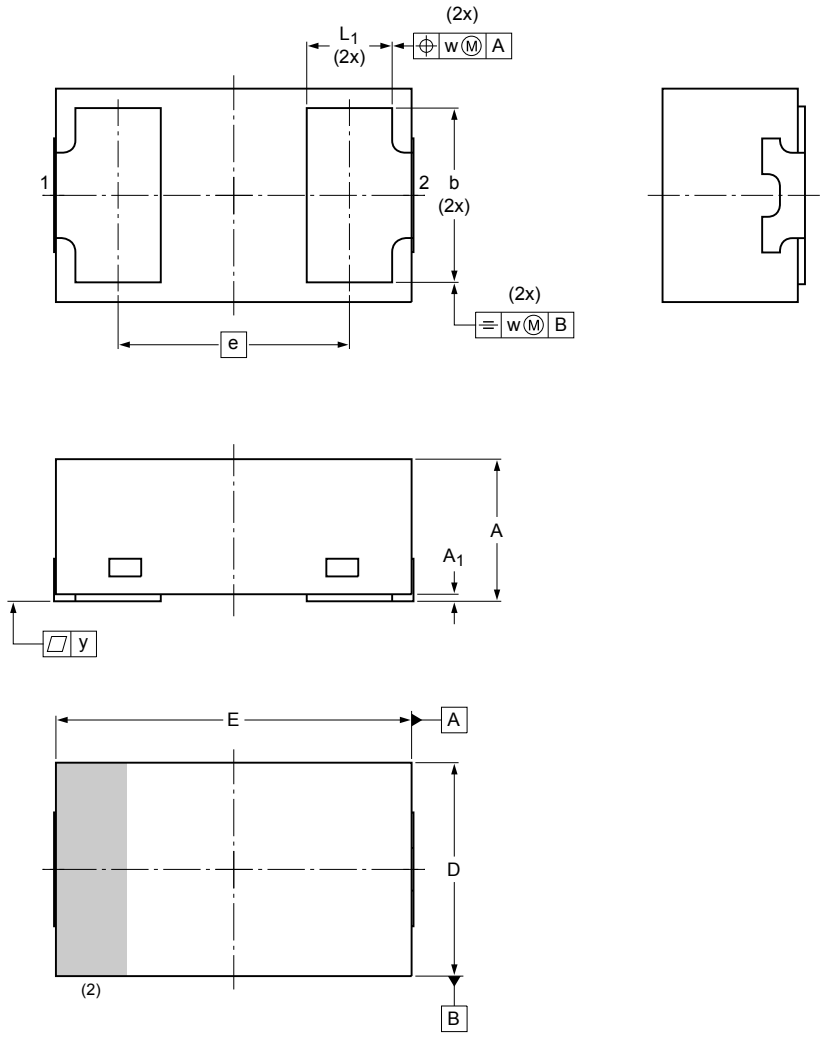
**Fig. 9. Reverse recovery time test circuit and waveforms**

### 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

**DFN1006D-2: Leadless ultra small plastic package; 2 terminals; body 1 x 0.6 x 0.4 mm** **SOD882D**




Dimensions

| Unit | | A(1) | A1 | b | D | E | e | L1 | w | y |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.4 | 0.04 | 0.55 | 0.65 | 1.05 | | 0.30 | 0.1 | 0.03 |
| | nom | | | 0.50 | 0.60 | 1.00 | 0.65 | 0.25 | | |
| | min | | | 0.45 | 0.55 | 0.95 | | 0.22 | | |

Note
1. Dimension including plating thickness.
2. The marking bar indicates the cathode (if applicable).

*sod882d_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD882D | | | | | | ~~10-09-27~~ 12-05-01 |

**Fig. 10. Package outline DFN1006D-2 (SOD882D)**

## 13. Soldering

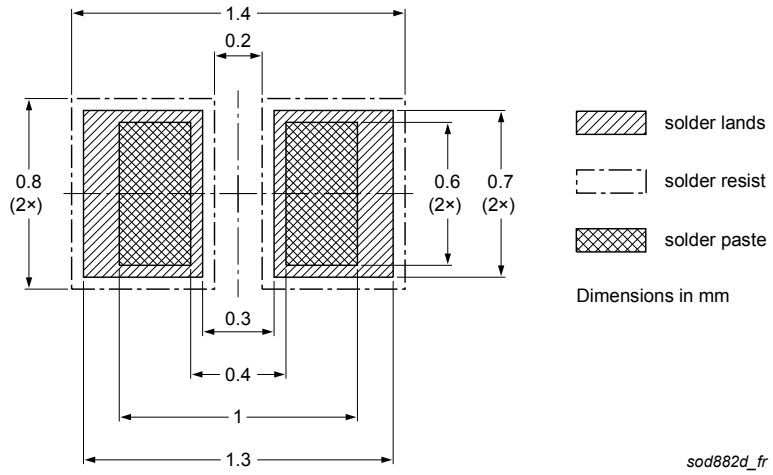



**Fig. 11. Reflow soldering footprint for DFN1006D-2 (SOD882D)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAS21LD v.1 | 20180228 | 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. |
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## 16. Contents





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