



BAS21LL-Q

High-voltage switching diode

29 January 2025

Product data sheet

1. General description

High-voltage switching diode, encapsulated in an SOD123 small 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
- 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]	-	-	330	mA
V_R	reverse voltage			-	-	200	V
V_{RRM}	repetitive peak reverse voltage			-	-	250	V
V_F	forward voltage	$I_F = 200$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °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.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 Transparent top view DFN1006-2 (SOD882)	 <i>aaa-028035</i>
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21LL-Q	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-Q	J3

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 = 50 µs; square wave; T _{j(init)} = 25 °C		-	9.4	A
		t _p = 10 ms; square wave; T _{j(init)} = 25 °C		-	1.7	A
I _{FRM}	repetitive peak forward current	t _p ≤ 1 ms; δ ≤ 0.25		-	900	mA
P _{tot}	total power dissipation	T _{amb} ≤ 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 1cm².

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]	-	-	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 1cm².
[3] Soldering point of cathode tab.

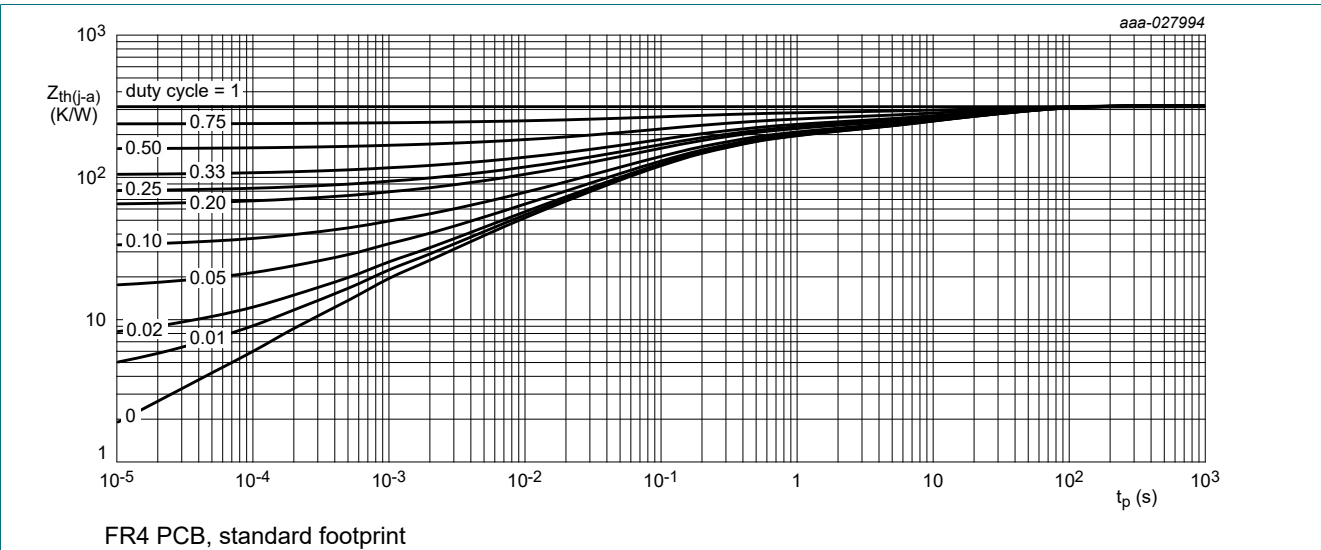


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

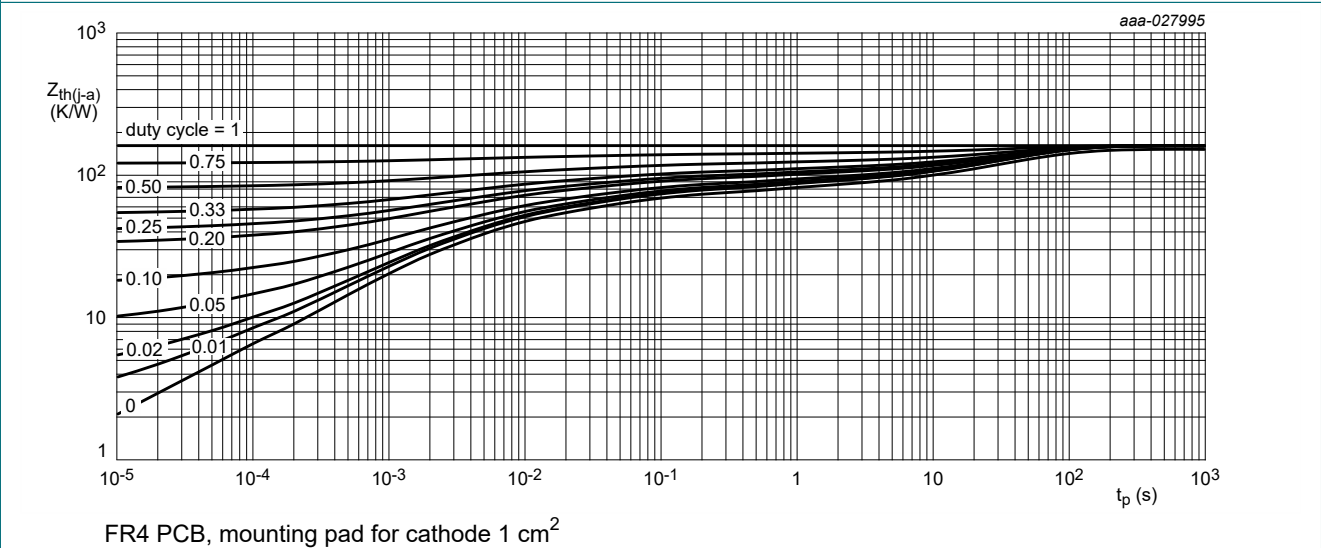
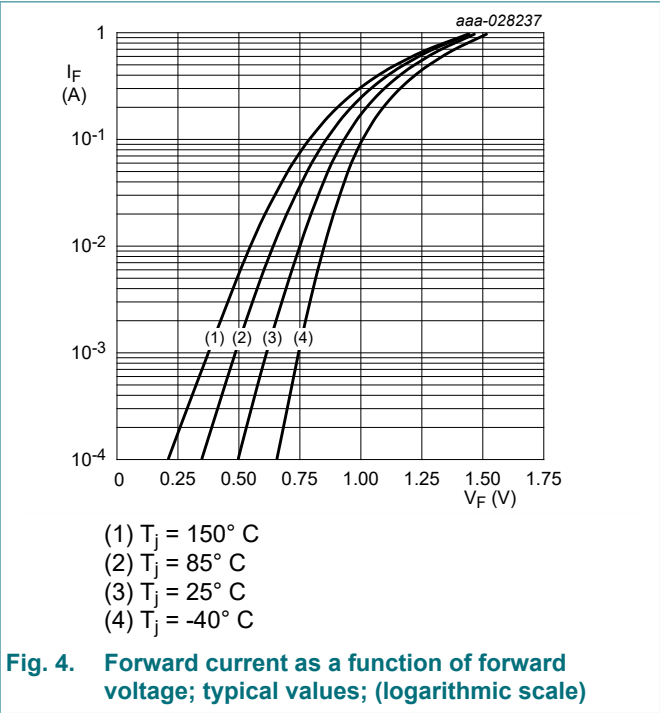
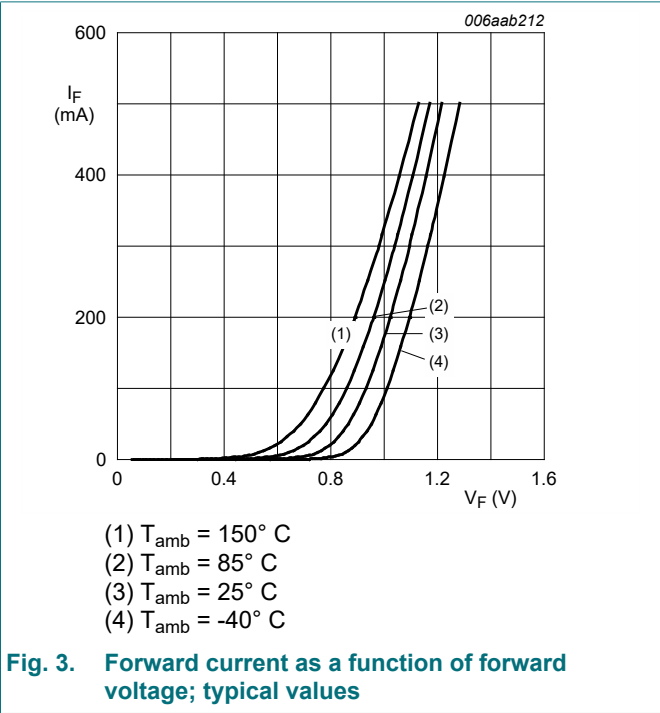


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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	$V_R = 200\text{ V}$; pulsed; $T_j = 25\text{ }^\circ\text{C}$	-	-	100	nA
		$V_R = 200\text{ V}$; pulsed; $T_j = 150\text{ }^\circ\text{C}$	-	-	100	μA
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



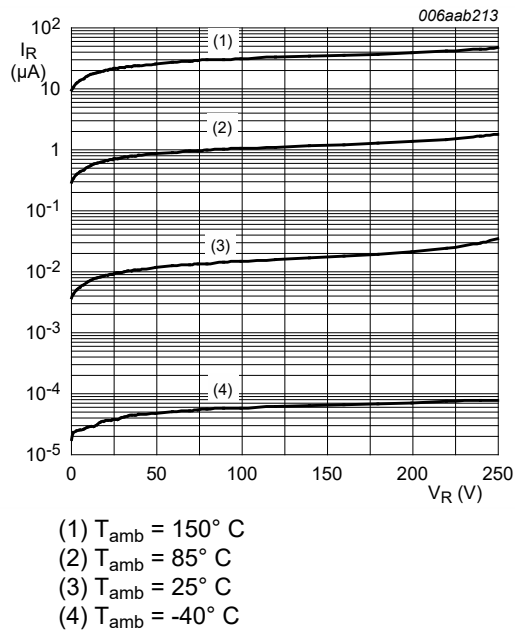


Fig. 5. Reverse current as a function of reverse voltage; typical values

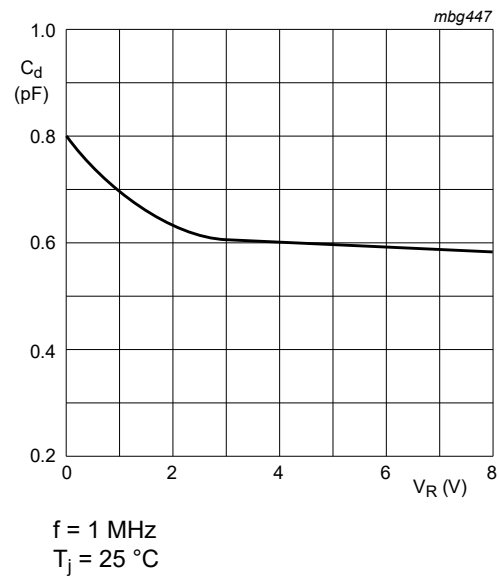
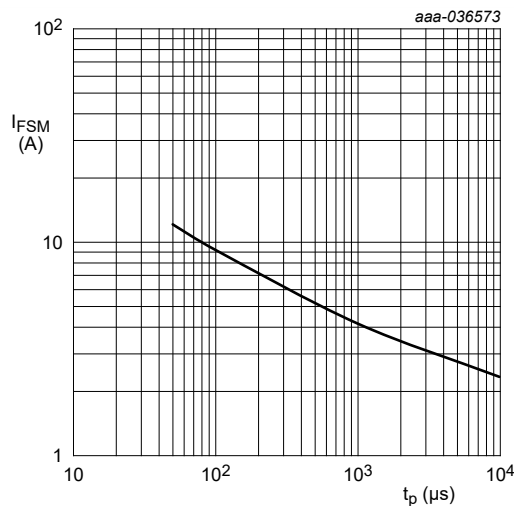


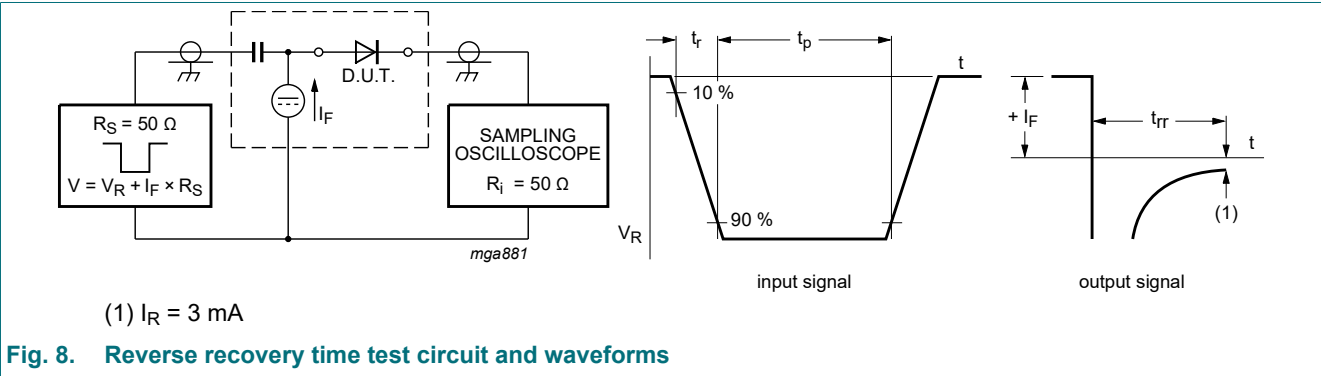
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



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

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

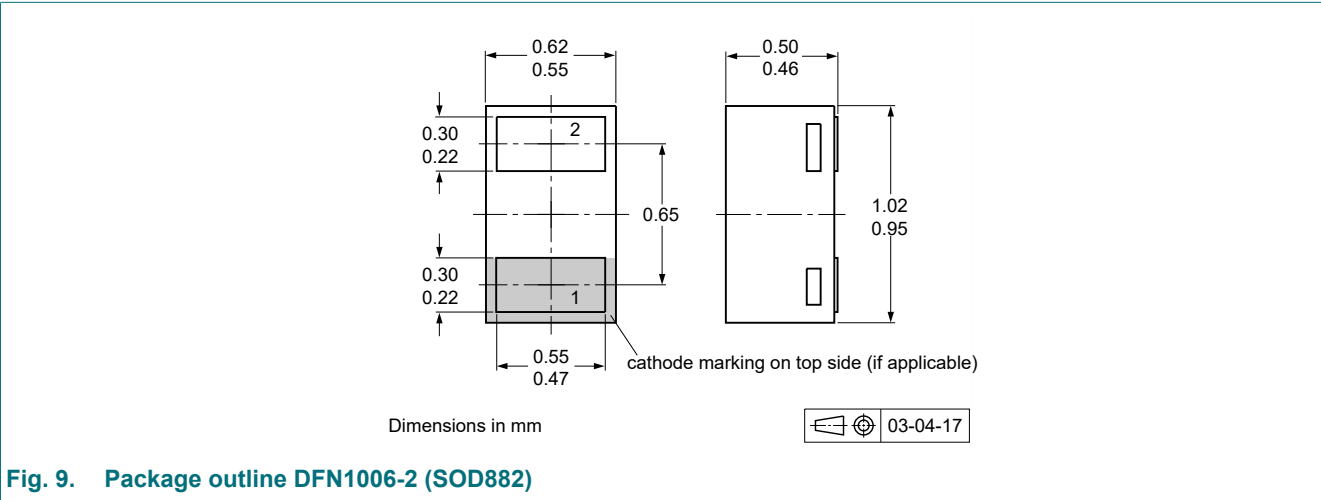
11. Test information



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

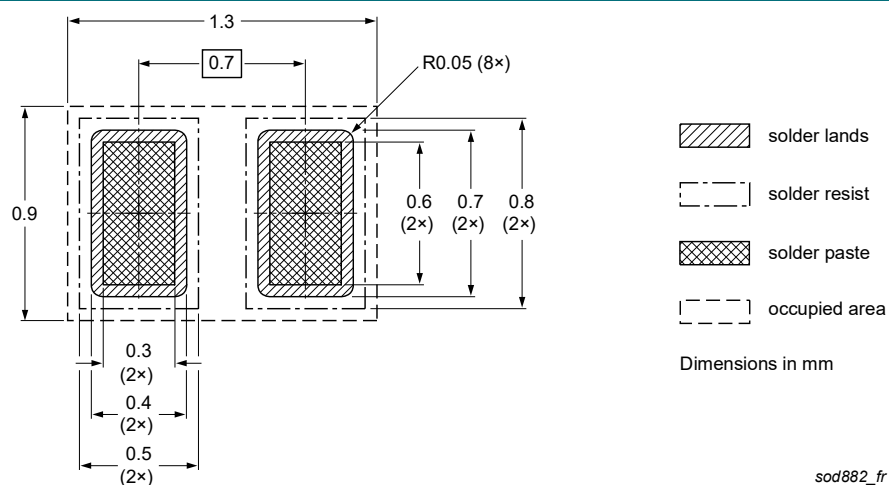


Fig. 10. Reflow soldering footprint for DFN1006-2 (SOD882)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21LL-Q v.2	20250129	Product data sheet	-	BAS21LL-Q v.1
Modifications:	<ul style="list-style-type: none">Limiting values: I_{FSM} values changedCharacteristics: Fig 7. changed			
BAS21LL-Q v.1	20240223	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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- [2] The term 'short data sheet' is explained in section "Definitions".
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