



# BAS321J-Q

## High-voltage switching diode

27 June 2023

Product data sheet

### 1. General description

High-voltage switching diode in a very small SOD323F (SC-90) flat lead 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
- Very 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

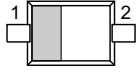

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current		[1]	-	250	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; $\delta \leq 0.02$ ; $T_j = 25$ °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; $R_L = 100$ $\Omega$ ; $I_{R(meas)} = 3$ 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	 SC-90 (SOD323F)	 aaa-028035
2	A	Anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">BAS321J-Q</a>	SC-90	plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body	<a href="#">SOD323F</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAS321J-Q	ED

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC60134).

Symbol	Parameter	Conditions	Min	Max	Unit	
$V_{RRM}$	repetitive peak reverse voltage		-	250	V	
$V_R$	reverse voltage		-	200	V	
$I_F$	forward current		[1]	250	mA	
$I_{FSM}$	non-repetitive peak forward current	$t_p = 50 \mu s$ ; square wave; $T_{j(init)} = 25 \text{ }^\circ\text{C}$	-	13	A	
		$t_p = 100 \mu s$ ; square wave; $T_{j(init)} = 25 \text{ }^\circ\text{C}$	-	9	A	
		$t_p = 10 \text{ ms}$ ; square wave; $T_{j(init)} = 25 \text{ }^\circ\text{C}$	-	3	A	
$I_{FRM}$	repetitive peak forward current	$t_p \leq 0.5 \text{ ms}$ ; $\delta \leq 0.25$	-	625	mA	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	420	mW
			[2]	-	660	mW
$T_j$	junction temperature		-	150	$^\circ\text{C}$	
$T_{amb}$	ambient temperature		-55	150	$^\circ\text{C}$	
$T_{stg}$	storage temperature		-65	150	$^\circ\text{C}$	

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<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	[1]	-	-	300	K/W
		[2]	-	-	190	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[3]	-	-	40	K/W

- [1] Device mounted on an FR4 Printed-Circuit Board (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 cm<sup>2</sup>.
- [3] Soldering point of cathode tab.

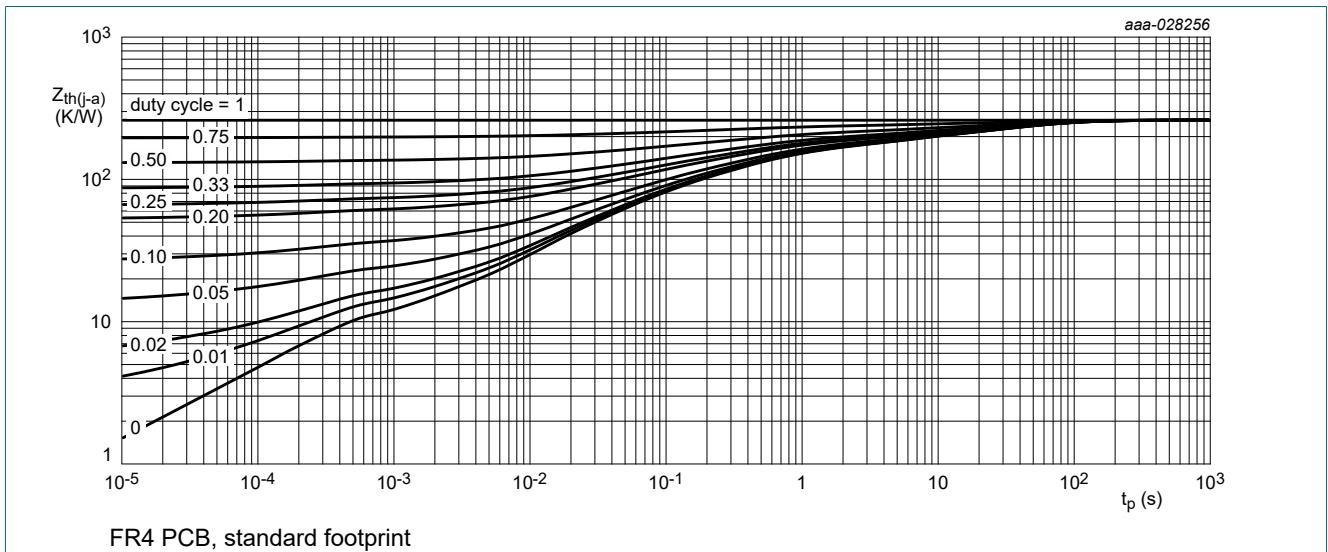


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

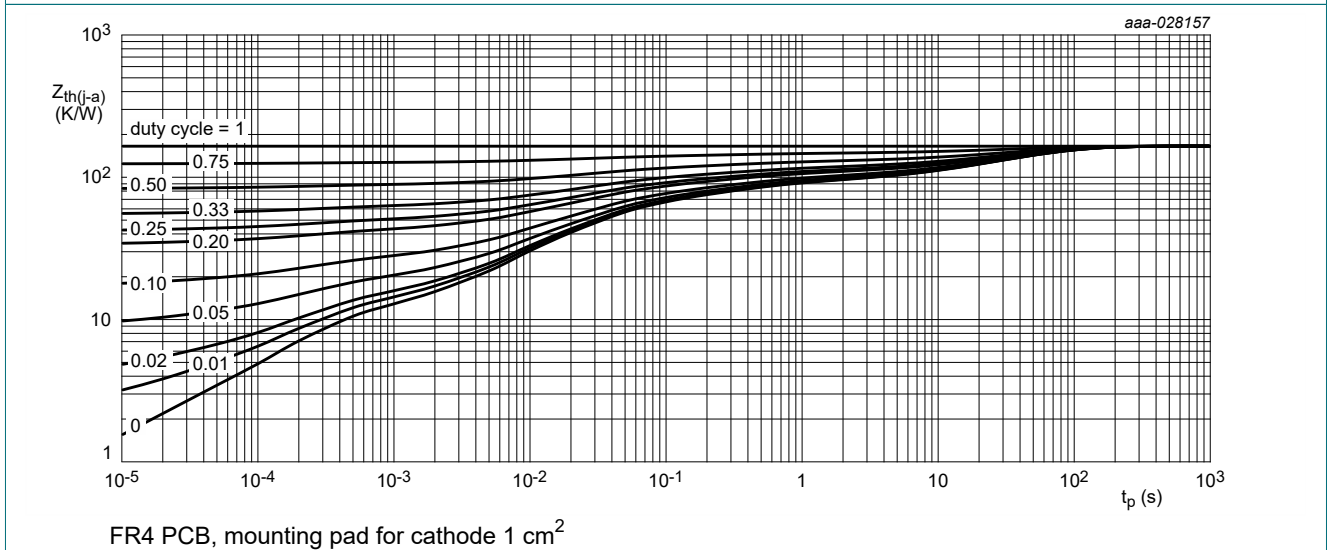
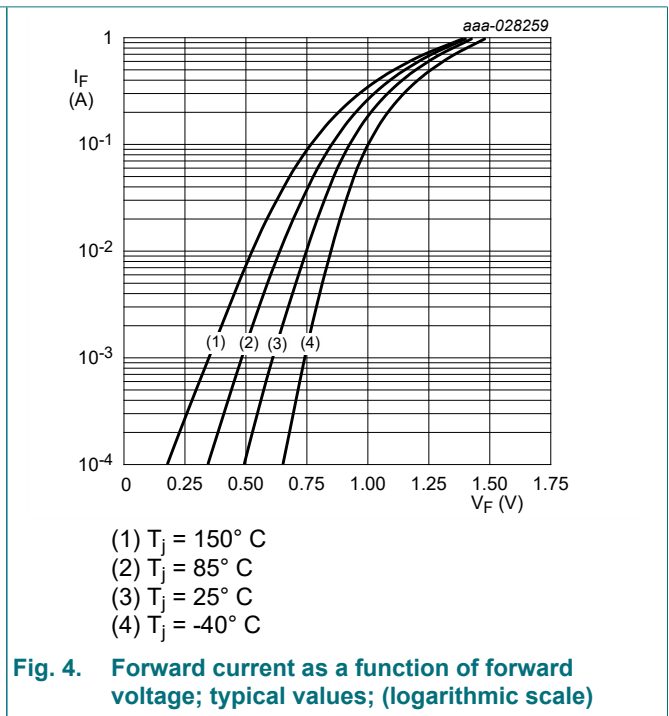
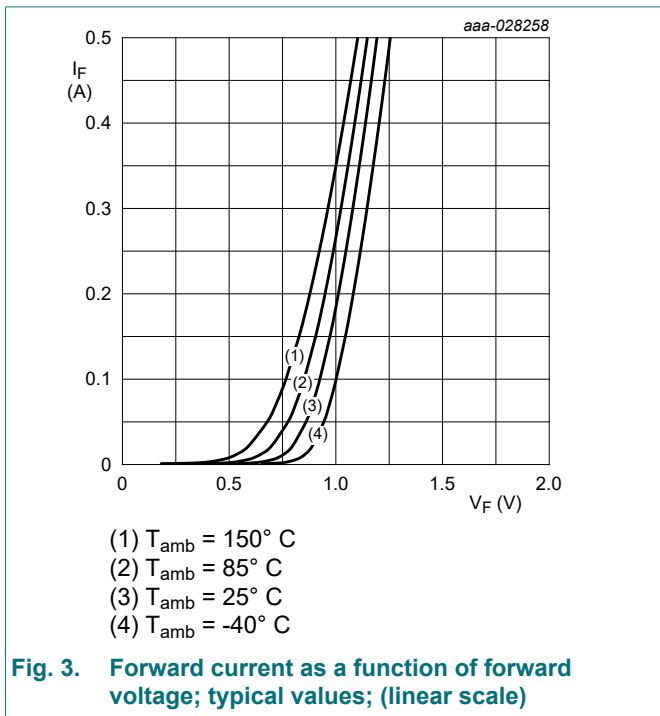


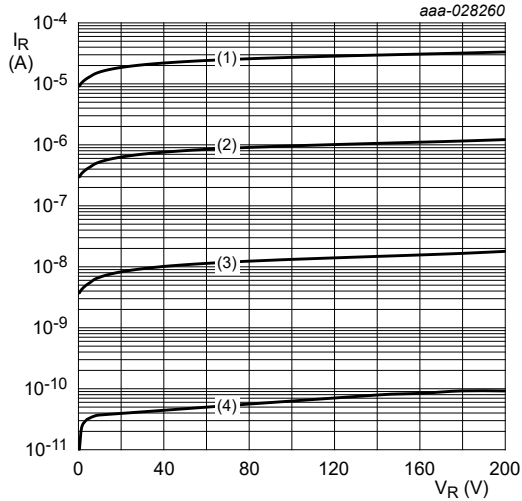
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

### 10. Characteristics

Table 7. Characteristics

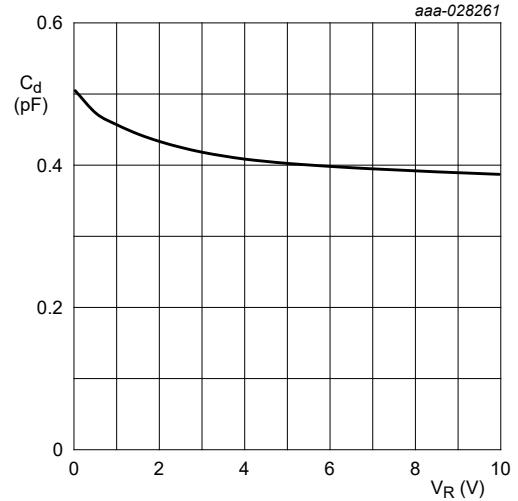
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 100 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	1	V
		I <sub>F</sub> = 200 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 200 V; pulsed; T <sub>j</sub> = 25 °C	-	-	100	nA
		V <sub>R</sub> = 200 V; pulsed; T <sub>j</sub> = 150 °C	-	-	100	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>j</sub> = 25 °C	-	-	2	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 30 mA; I <sub>R</sub> = 30 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 3 mA; T <sub>j</sub> = 25 °C	-	-	50	ns





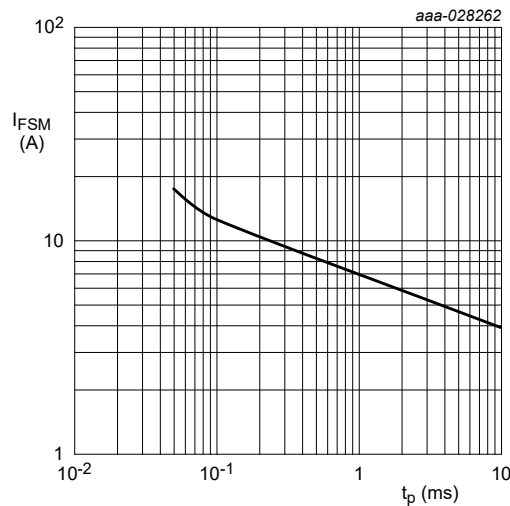
- (1)  $T_{amb} = 150^{\circ}C$
- (2)  $T_{amb} = 85^{\circ}C$
- (3)  $T_{amb} = 25^{\circ}C$
- (4)  $T_{amb} = -40^{\circ}C$

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



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

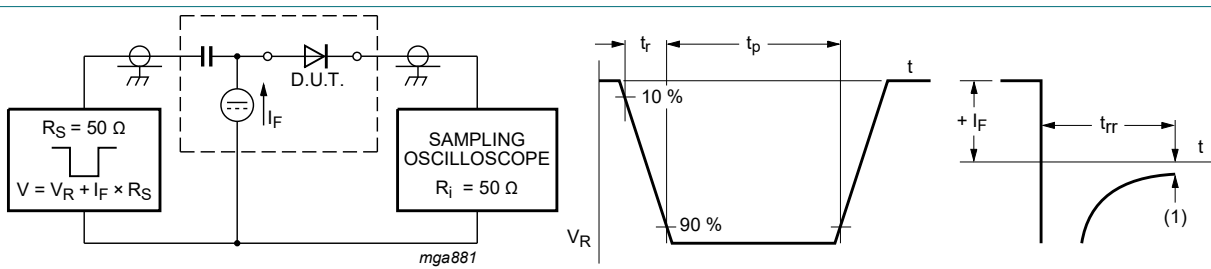
Fig. 6. Diode capacitance as a function of reverse voltage; typical values.



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

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

## 11. Test information



(1)  $I_R = 3\text{ mA}$

Fig. 8. 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**

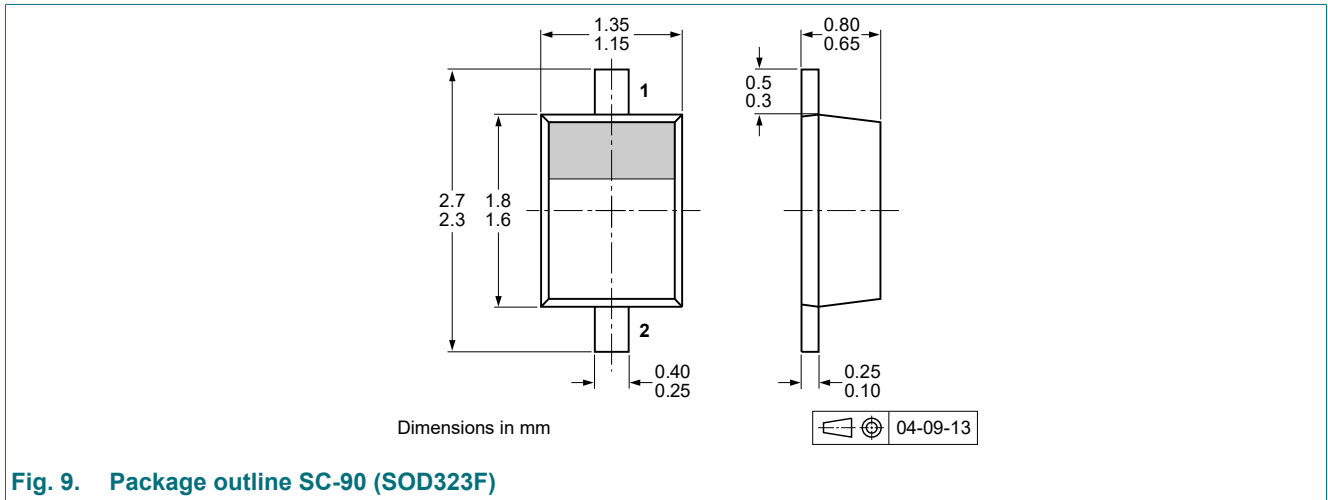


Fig. 9. Package outline SC-90 (SOD323F)

**13. Soldering**

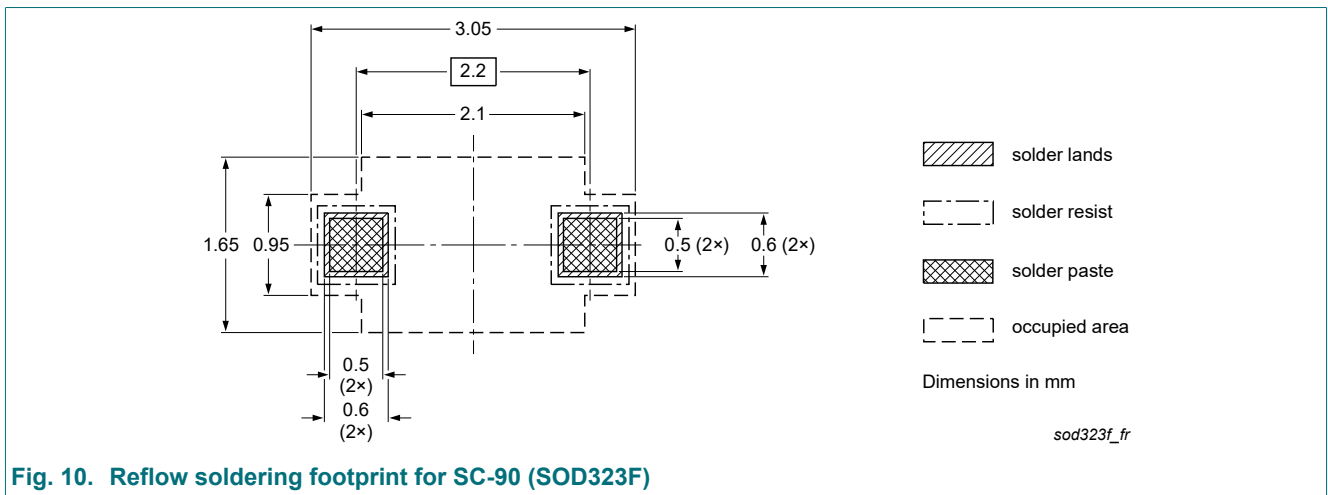


Fig. 10. Reflow soldering footprint for SC-90 (SOD323F)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS321J-Q v.1	20230623	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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