BAS21J-Q

Single high-speed switching diode

11 May 2023 **Product data sheet**

1. General description

High-speed switching diode, encapsulated in a SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Low capacitance: $C_d \leq 2$ pF
- Low leakage current
- Reverse voltage: $V_R \leq 300$ V
- Repetitive peak reverse voltage: $V_{RRM} \leq 300$ V
- Very small and flat lead SMD plastic package
- Excellent coplanarity and improved thermal behavior
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

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

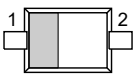
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02		-	-	250	mA
I_R	reverse current	V_R = 250 V; T_{amb} = 25 °C		-	-	150	nA
V_R	reverse voltage			-	-	300	V
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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-90 (SOD323F)	 sym006
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21J-Q	SC-90	plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body	SOD323F

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21J-Q	AN

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			-	300	V
V_R	reverse voltage			-	300	V
I_F	forward current	pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$		-	250	mA
I_{FSM}	non-repetitive peak forward current	t_p = 50 µs; square wave; $T_{j(init)}$ = 25 °C		-	14.1	A
		t_p = 100 ms; square wave; $T_{j(init)}$ = 25 °C		-	1.8	A
I_{FRM}	repetitive peak forward current	$t_p \leq 0.5$ ms; $\delta \leq 0.25$		-	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1] [2]	-	550	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[2] Reflow soldering is the only recommended soldering method.

9. Thermal characteristics

Table 6. Thermal characteristics

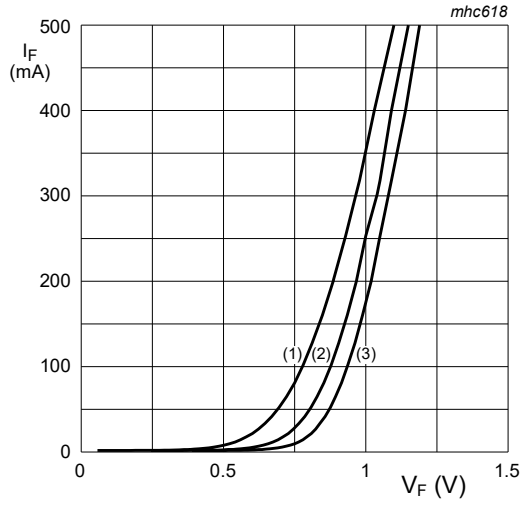
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	55	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[2] Reflow soldering is the only recommended soldering method.
[3] Soldering point of cathode tab.

10. Characteristics

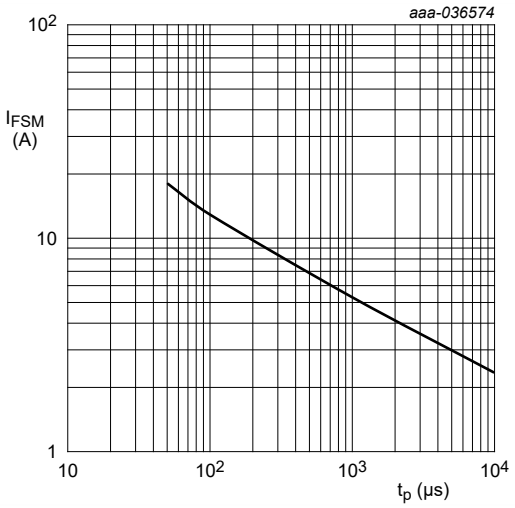
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	1.1	V
I_R	reverse current	V_R = 250 V; T_{amb} = 25 °C		-	-	150	nA
		V_R = 250 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_{amb} = 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_{amb} = 25 °C		-	-	50	ns



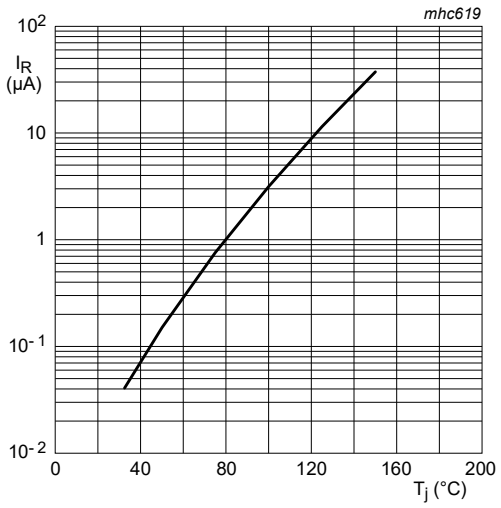
(1) T_{amb} = 150° C
(2) T_{amb} = 75° C
(3) T_{amb} = 25° C

Fig. 1. Forward current as a function of forward voltage; typical values



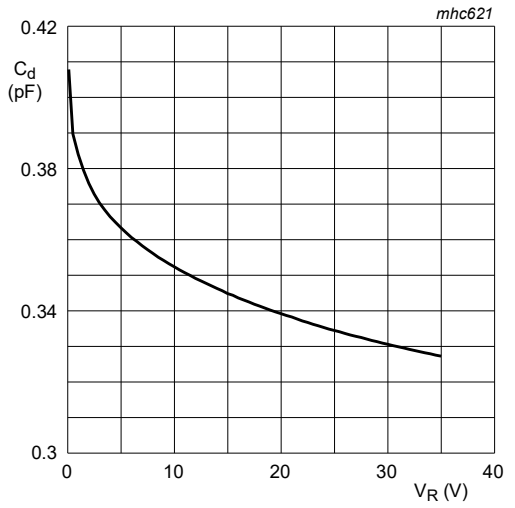
Based on square wave currents.
$T_{j(init)}$ = 25 °C

Fig. 2. Non-repetitive peak forward current as a function of pulse duration; typical values



$V_R = V_{Rmax}$

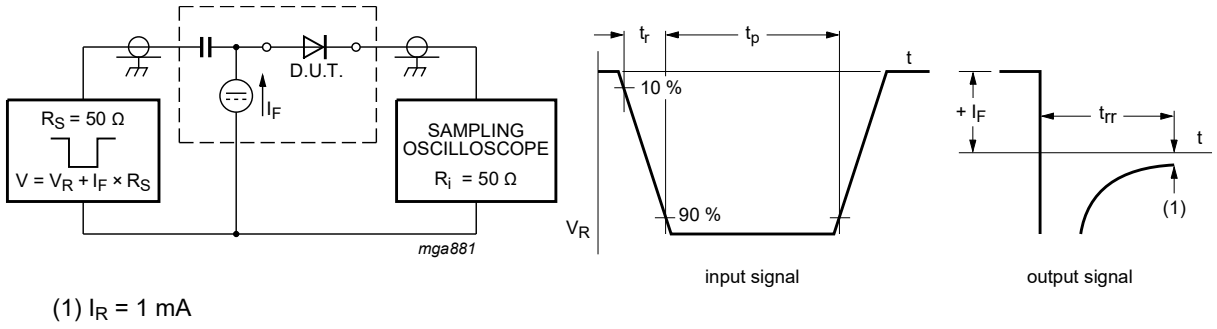
Fig. 3. Reverse current as a function of junction temperature; typical values



f = 1 MHz
T_{amb} = 25 °C

Fig. 4. Diode capacitance as a function of reverse voltage; typical values

11. Test information



(1) I_R = 1 mA

Fig. 5. 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

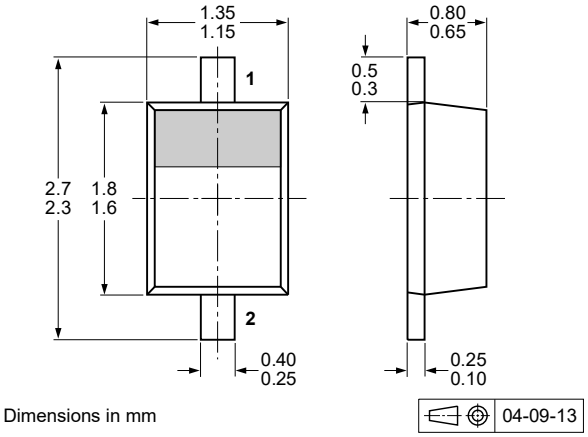


Fig. 6. Package outline SC-90 (SOD323F)

13. Soldering

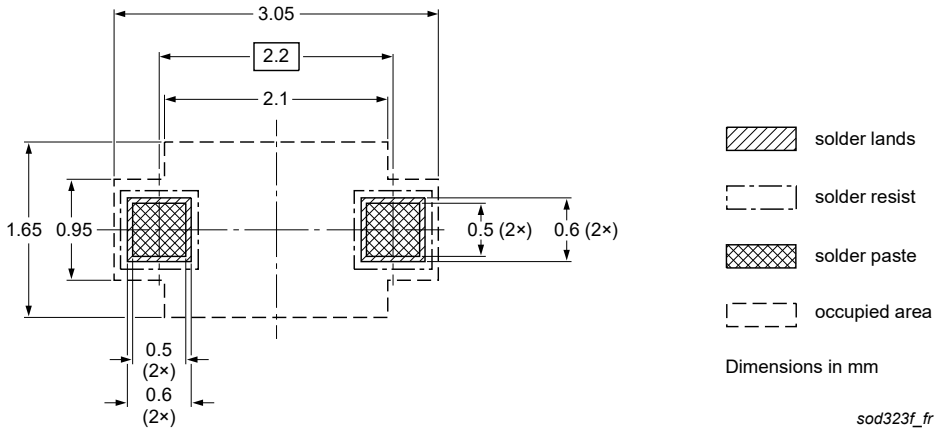


Fig. 7. Reflow soldering footprint for SC-90 (SOD323F)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21J-Q v.1	20230511	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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