BAS21H-Q

High-voltage switching diode

17 April 2024 Product data sheet

1. General description

High-voltage switching diode, encapsulated in a SOD123F small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Small and flat lead SMD plastic package
- Reverse voltage: $V_R \leq 200$ V
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching

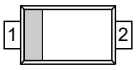
4. Quick reference data

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		-	-	200	mA
V_R	reverse voltage			-	-	200	V
I_R	reverse current	V_R = 200 V; T_{amb} = 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_{amb} = 25 °C		-	-	50	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 SOD123F	 aaa-028035
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21H-Q	SOD123F	plastic, surface-mounted package; 2 leads; 2.6 mm x 1.6 mm x 1.1 mm body	SOD123F

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21H-Q	B2

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			-	250	V
V_R	reverse voltage			-	200	V
I_F	forward current	pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$		-	200	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 µs; square wave; $T_{j(init)}$ = 25 °C		-	9	A
		t_p = 100 µs; square wave; $T_{j(init)}$ = 25 °C		-	3	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		-	625	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	375	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 and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

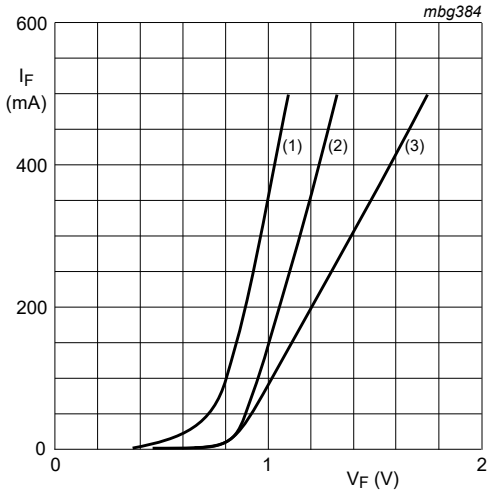
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	330	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	70	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Reflow soldering is the only recommended soldering method.
[3] Soldering point of cathode tab.

10. Characteristics

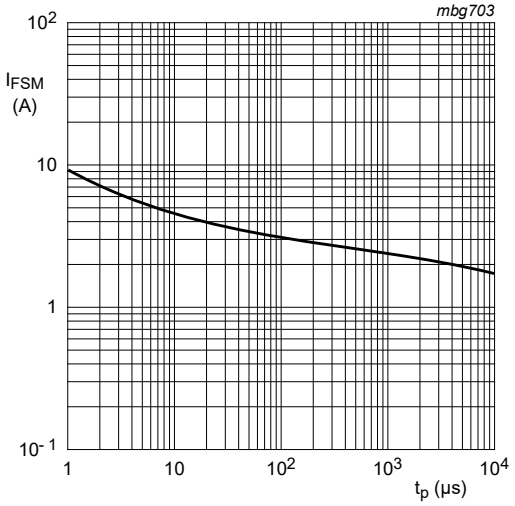
Table 7. Characteristics

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	V
		I_F = 200 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 200 V; T_{amb} = 25 °C		-	-	100	nA
		V_R = 200 V; T_j = 150 °C		-	-	100	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_{amb} = 25 °C		-	-	5	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



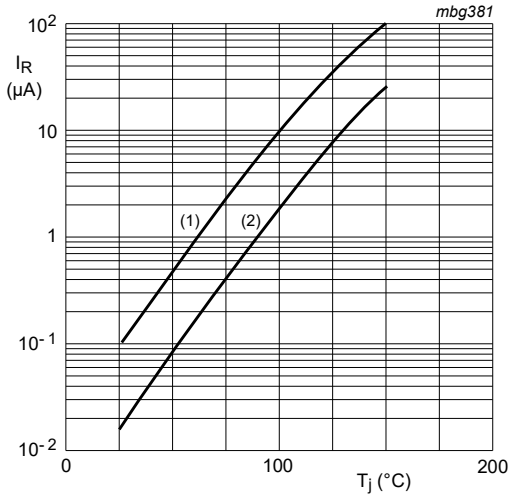
(1) T_{amb} = 150 °C; typical values
(2) T_{amb} = 25 °C; typical values
(3) T_{amb} = 25 °C; maximum values

Fig. 1. Forward current as a function of forward voltage



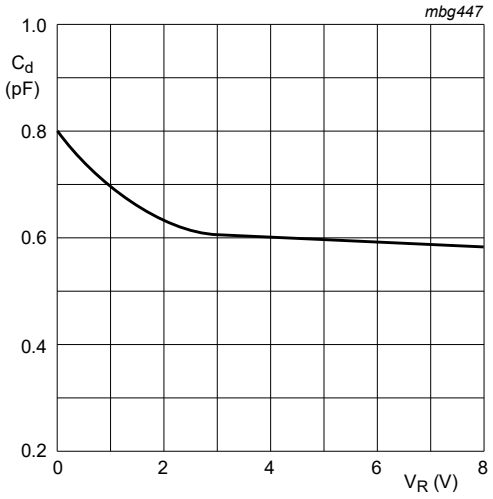
Based on square wave currents
T_j = 25 °C prior to surge

Fig. 2. Maximum permissible non-repetitive peak forward current as a function of pulse duration



(1) $V_R = V_{Rmax}$; maximum values
(2) $V_R = V_{Rmax}$; typical values

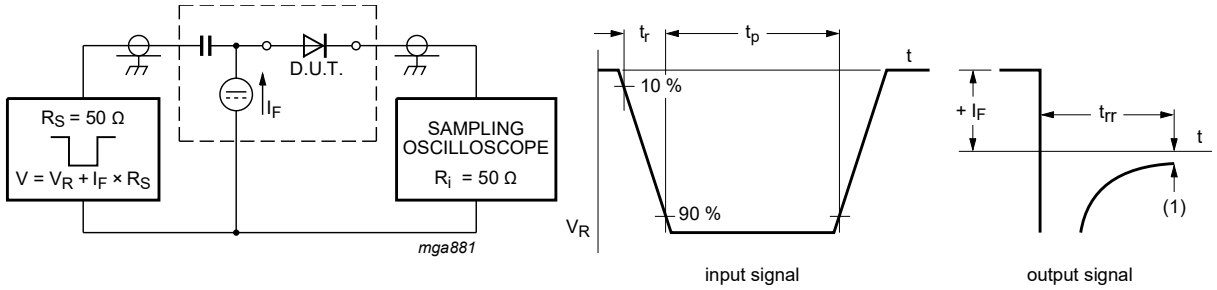
Fig. 3. Reverse current as a function of junction temperature



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 = 3 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

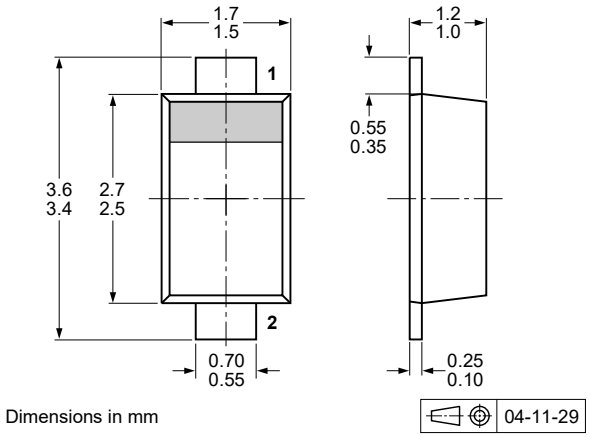


Fig. 6. Package outline SOD123F

13. Soldering

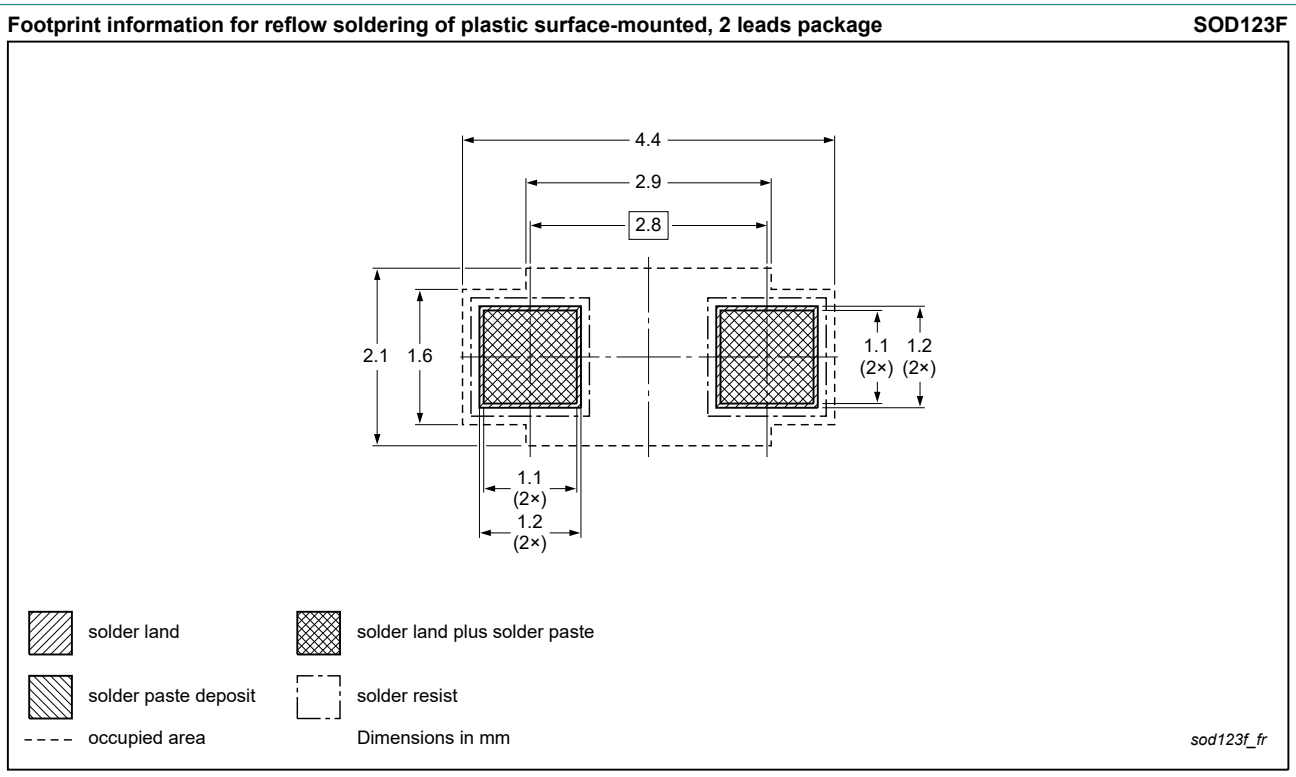
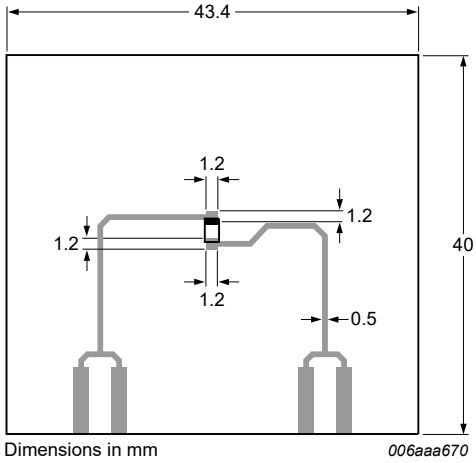


Fig. 7. Reflow soldering footprint for SOD123F

14. Mounting



PCB thickness = 1.6 mm

Fig. 8. FR4 PCB, standard footprint SOD123F

15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21H-Q v.1	20240417	Product data sheet	-	-

16. 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.
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