BAS16H-Q

High-speed switching diode

17 September 2021 **Product data sheet**

1. General description

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

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low capacitance
- Low leakage current
- Reverse voltage: $V_R \leq 100$ V
- Repetitive peak reverse voltage: $V_{RRM} \leq 100$ V
- Small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching
- General-purpose switching

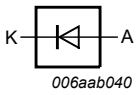
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_R	reverse voltage			-	-	100	V
I_R	reverse current	V_R = 80 V; T_{amb} = 25 °C		-	-	0.5	µA
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; T_{amb} = 25 °C		-	-	4	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SOD123F	
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS16H-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
BAS16H-Q	A1

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_{RRM}	repetitive peak reverse voltage			-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current		[1]	-	215	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 µs; square wave; $T_{j(init)}$ = 25 °C		-	4	A
		t_p = 1 ms; square wave; $T_{j(init)}$ = 25 °C		-	1	A
		t_p = 1 s; square wave; $T_{j(init)}$ = 25 °C		-	0.5	A
I_{FRM}	repetitive peak forward current	$t_p \leq$ 0.5 ms; $\delta \leq$ 0.25		-	500	mA
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	380	mW
			[2]	-	830	mW
Per device						
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 PCB with 60 µm copper strip line.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

9. Thermal characteristics

Table 6. Thermal characteristics

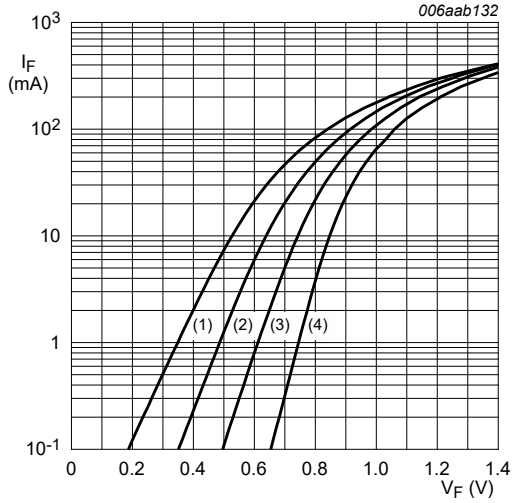
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	330	K/W
			[2]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	70	K/W

[1] Device mounted on an FR4 PCB with 60 µm copper strip line.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1cm^2.
[3] Soldering point of cathode tab.

10. Characteristics

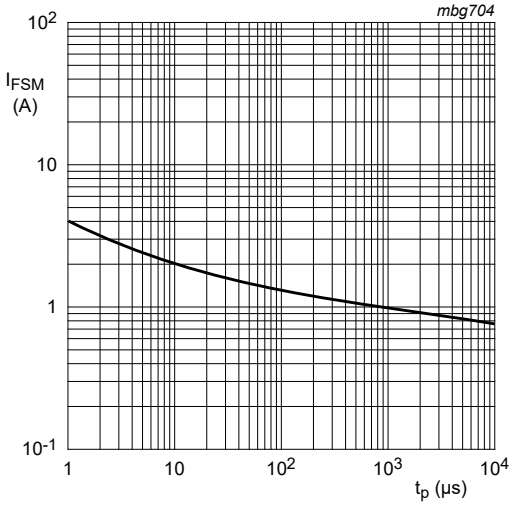
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 1 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	715	mV
		I_F = 10 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	855	mV
		I_F = 50 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	1	V
		I_F = 150 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 25 V; T_{amb} = 25 °C		-	-	30	nA
		V_R = 80 V; T_{amb} = 25 °C		-	-	0.5	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 80 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_{amb} = 25 °C		-	-	1.5	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; T_{amb} = 25 °C		-	-	4	ns
V_{FRM}	peak forward recovery voltage	I_F = 10 mA; t_r = 20 ns; T_{amb} = 25 °C		-	-	1.75	V



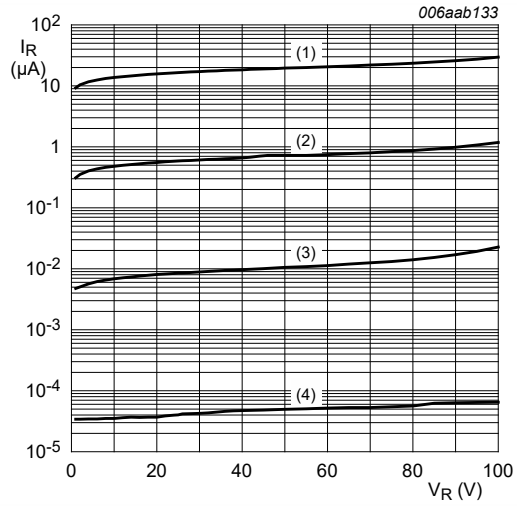
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



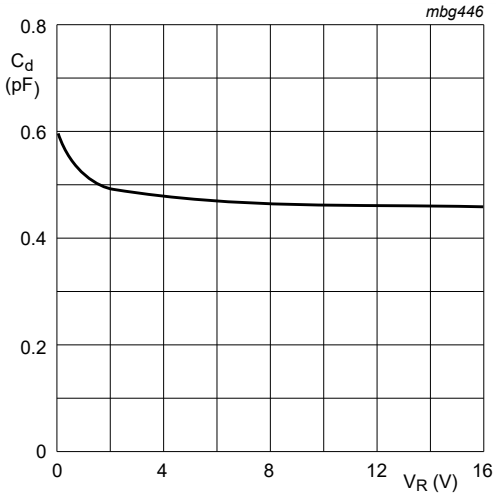
Based on square wave currents.
$T_{j(init)}$ = 25 °C

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



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

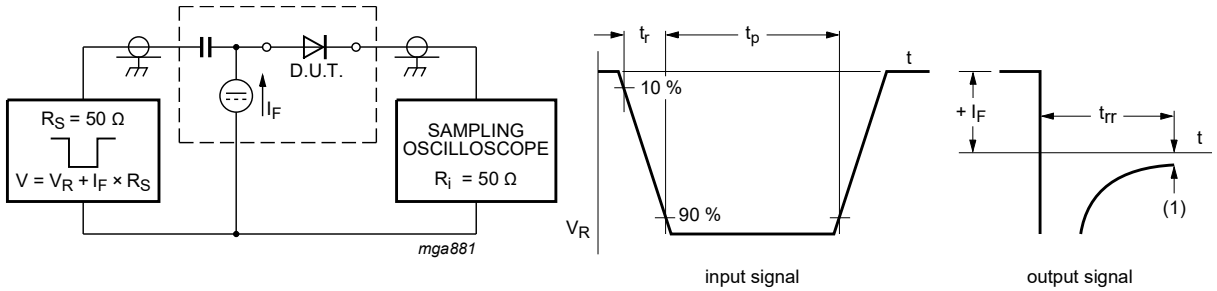
Fig. 3. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

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

11. Test information

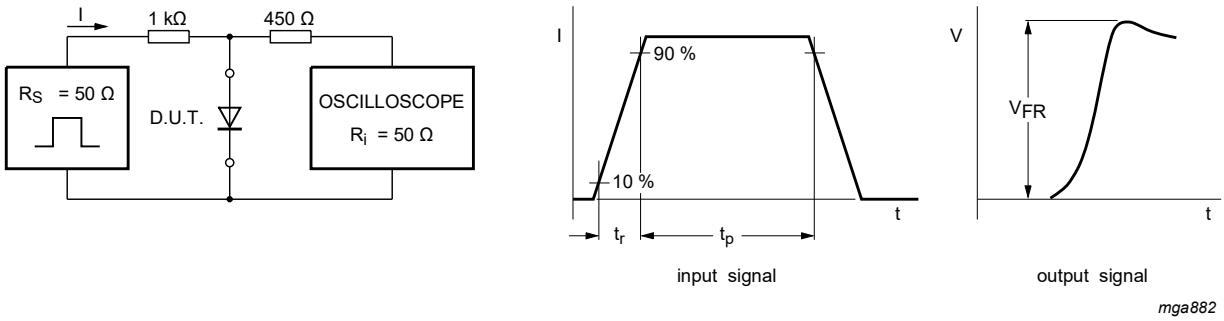


(1) I_R = 1 mA

Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05

Oscilloscope: rise time t_r = 0.35 ns

Fig. 5. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration t_p ≥ 100 ns; duty cycle δ ≤ 0.005

Fig. 6. Forward recovery voltage 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

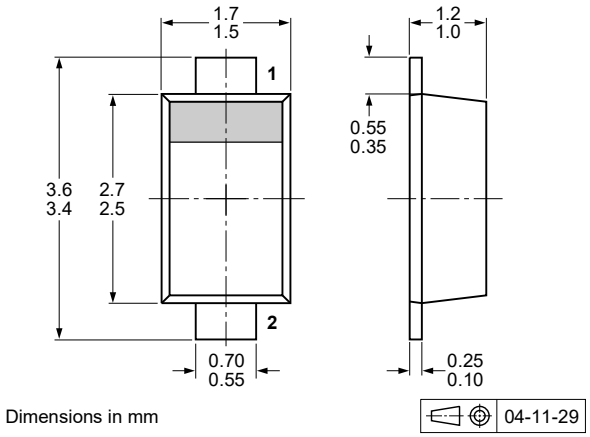


Fig. 7. Package outline SOD123F

13. Soldering

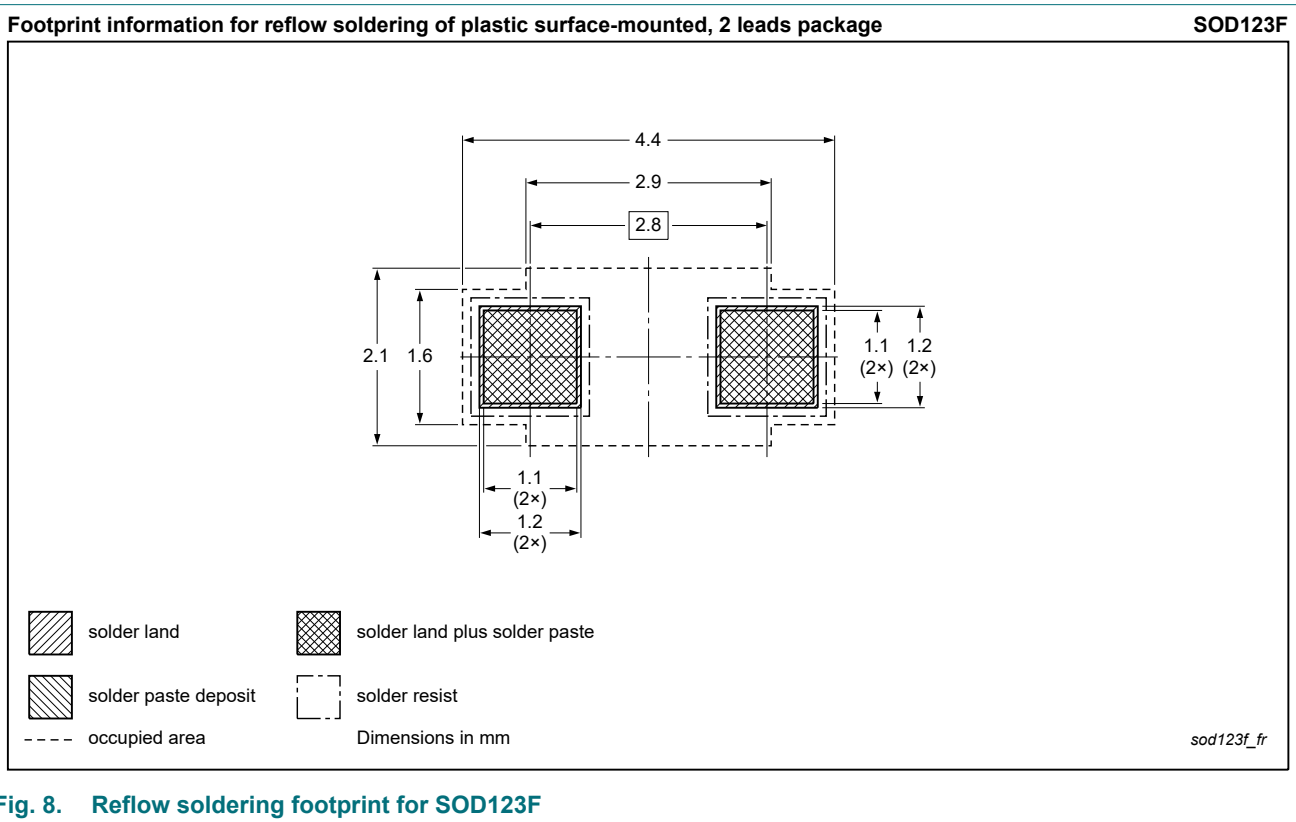


Fig. 8. Reflow soldering footprint for SOD123F

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS16H-Q v.1	20210917	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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