



BAS21AVD-Q

High-voltage switching diodes

17 May 2024

Product data sheet

1. General description

Triple high-voltage switching diodes, encapsulated in a SOT457 (SC-74/TSOP6) small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Reverse voltage: $V_R \leq 200$ V
- Repetitive peak reverse voltage: $V_{RRM} \leq 250$ V
- Small SMD plastic package
- Low capacitance: $C_d \leq 5$ pF
- Repetitive peak forward current: $I_{FRM} \leq 1$ A
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-voltage switching in surface-mounted circuits
- Automotive
- Communication

4. Quick reference data

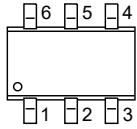
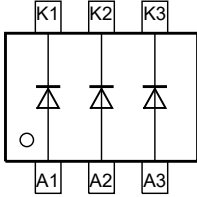
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current	pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$	[1]	-	-	200	mA
V_R	reverse voltage			-	-	200	V
I_R	reverse current	$V_R = 200$ V; $t_p \leq 300$ μ s; $\delta \leq 0.02$; pulsed; $T_{amb} = 25$ °C		-	25	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		-	16	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	A1	anode (diode 1)	 <p>TSOP6 (SOT457)</p>	 <p>006aab106</p>
2	A2	anode (diode 2)		
3	A3	anode (diode 3)		
4	K3	cathode (diode 3)		
5	K2	cathode (diode 2)		
6	K1	cathode (diode 1)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21AVD-Q	TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	SOT457

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21AVD-Q	E6

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			-	250	V
V_R	reverse voltage			-	200	V
I_F	forward current	pulsed; $t_p \leq 300 \mu\text{s}$; $\delta \leq 0.02$	[1]	-	200	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 10 \mu\text{s}$; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		-	16	A
		$t_p = 100 \mu\text{s}$; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		-	8	A
		$t_p = 10 \text{ ms}$; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		-	2	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1 \text{ ms}$; $\delta \leq 25 \%$		-	1	A
Per device; one diode loaded						
P_{tot}	total power dissipation	$T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$	[1]	-	250	mW
			[2]	-	295	mW
T_j	junction temperature			-	150	$^\circ\text{C}$
T_{amb}	ambient temperature			-65	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^2 .

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per device; one diode loaded							
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
			[2]	-	-	425	K/W
$R_{\text{th}(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	140	K/W

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

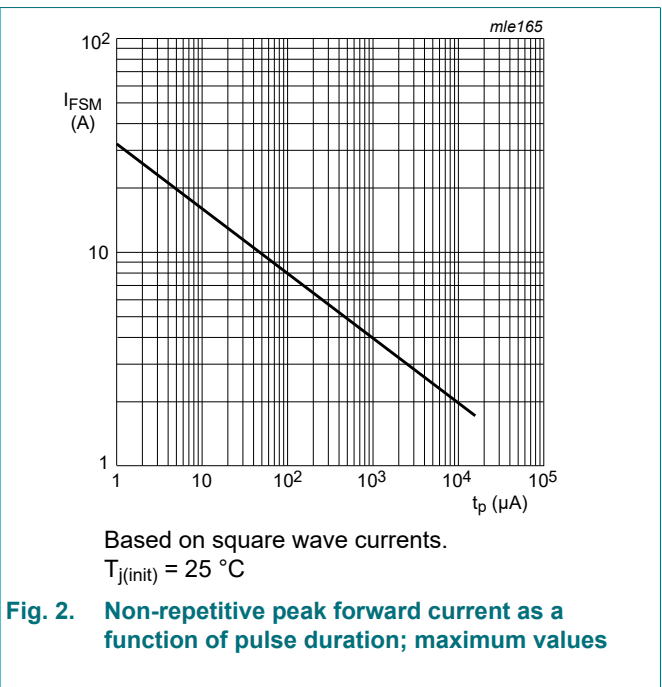
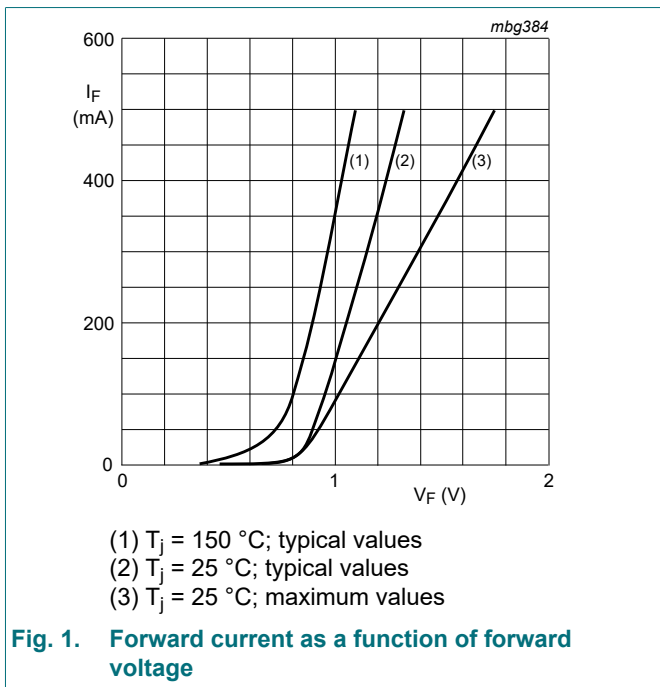
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

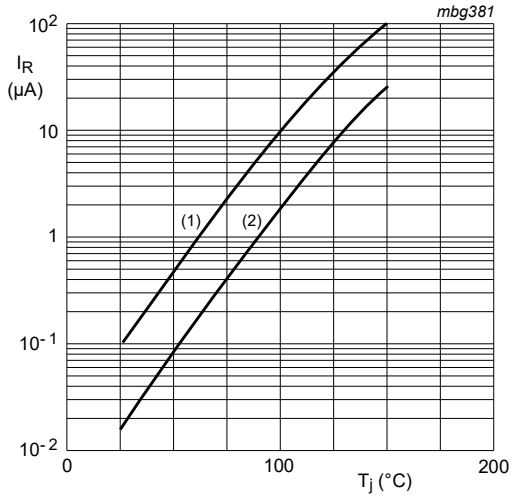
[3] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

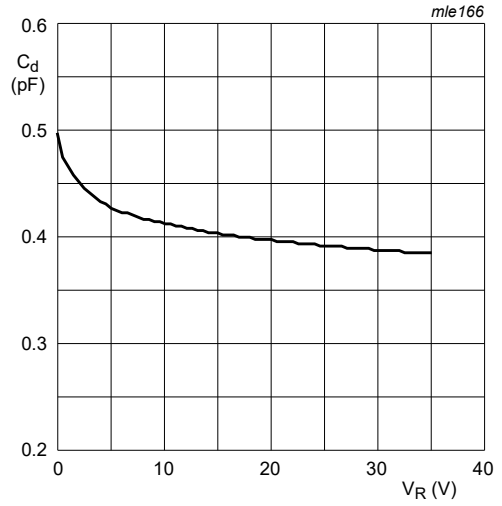
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 100 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	1	V
		$I_F = 200 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
I_R	reverse current	$V_R = 200 \text{ V}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ pulsed; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	25	100	nA
		$V_R = 200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	100	μA
C_d	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	0.6	5	pF
t_{rr}	reverse recovery time	$I_F = 30 \text{ mA}; I_R = 30 \text{ mA}; R_L = 100 \text{ } \Omega;$ $I_{R(\text{meas})} = 3 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	16	50	ns





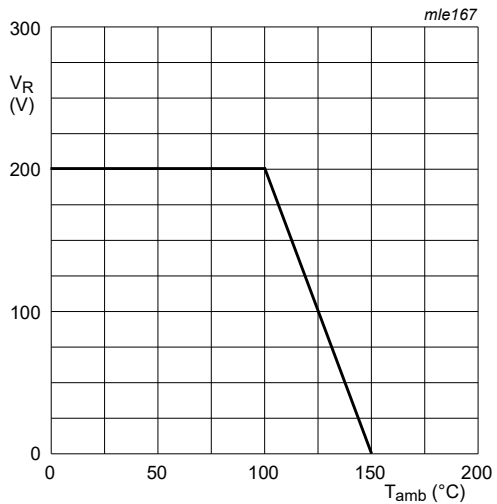
(1) $V_R = V_{Rmax}$; maximum values
 (2) $V_R = V_{Rmax}$; typical values

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



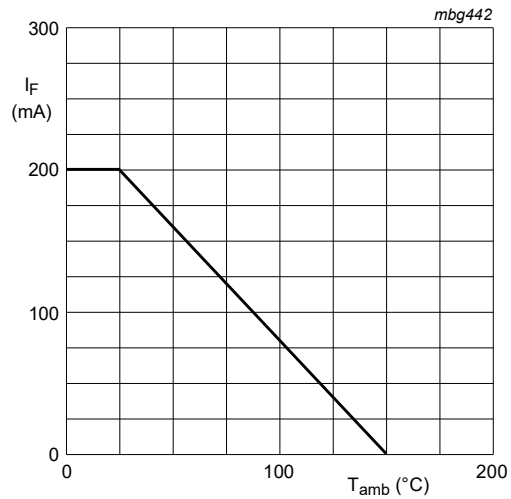
$f = 1 \text{ MHz}; T_J = 25 \text{ }^\circ\text{C}$

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



FR4 PCB, standard footprint

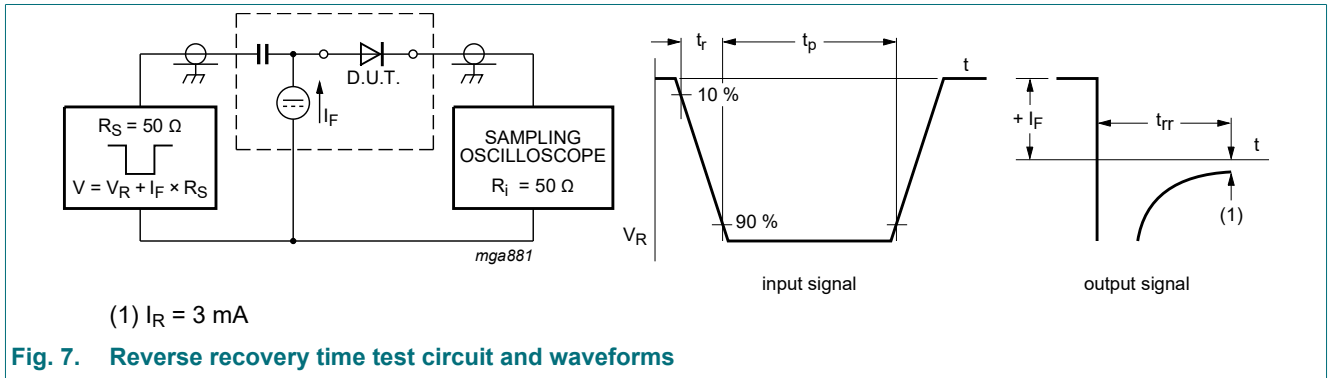
Fig. 5. Reverse voltage as a function of ambient temperature; derating curve



FR4 PCB, standard footprint

Fig. 6. Maximum forward current as a function of ambient temperature; derating curve

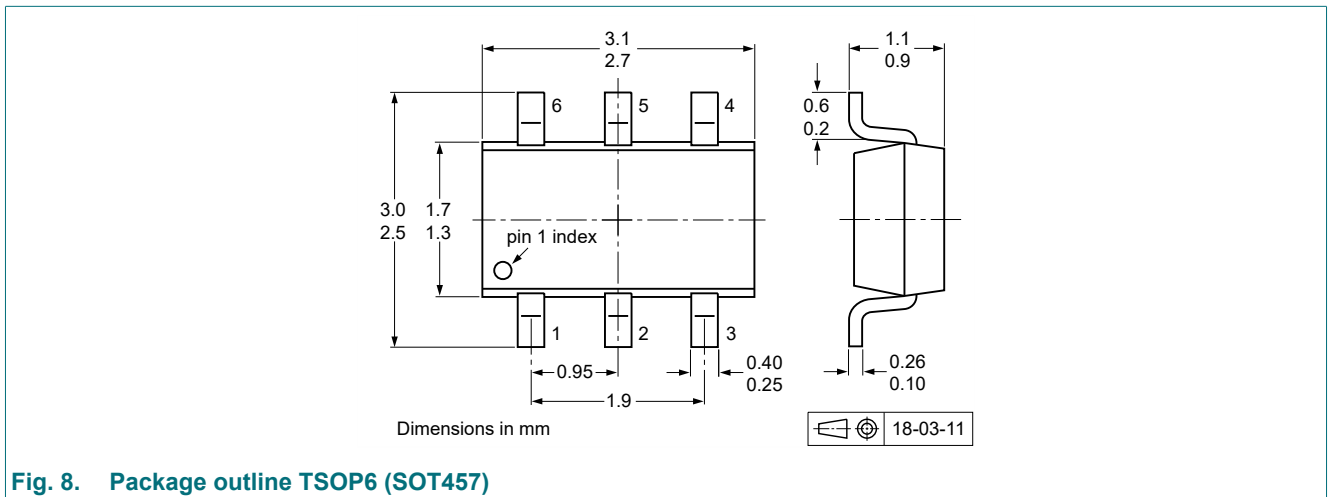
11. Test information



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

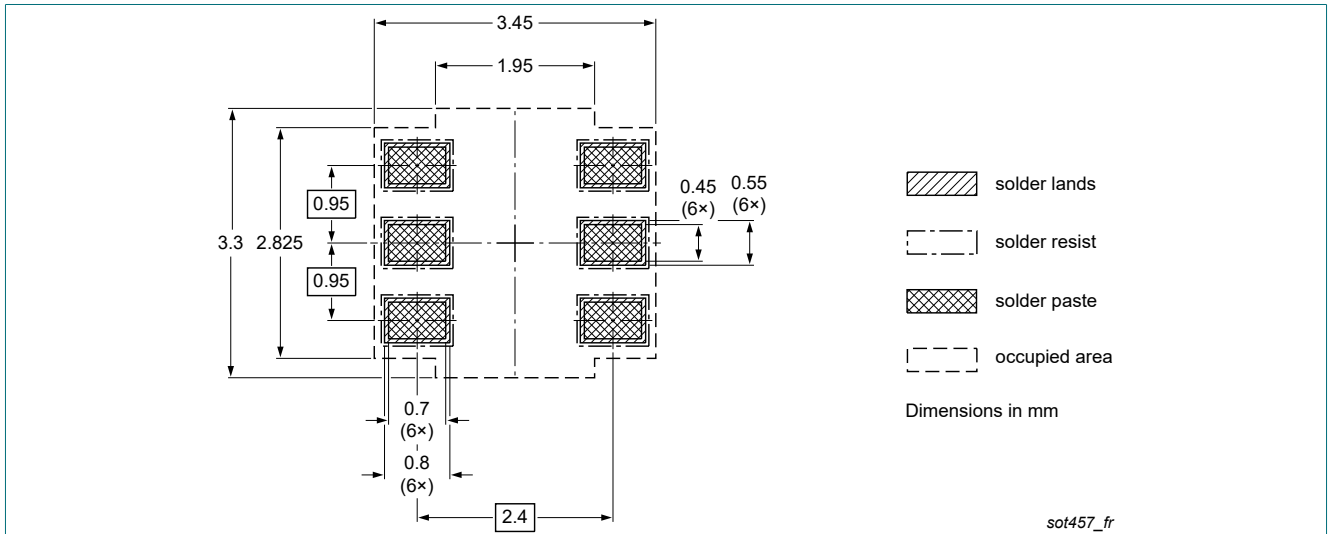


Fig. 9. Reflow soldering footprint for TSOP6 (SOT457)

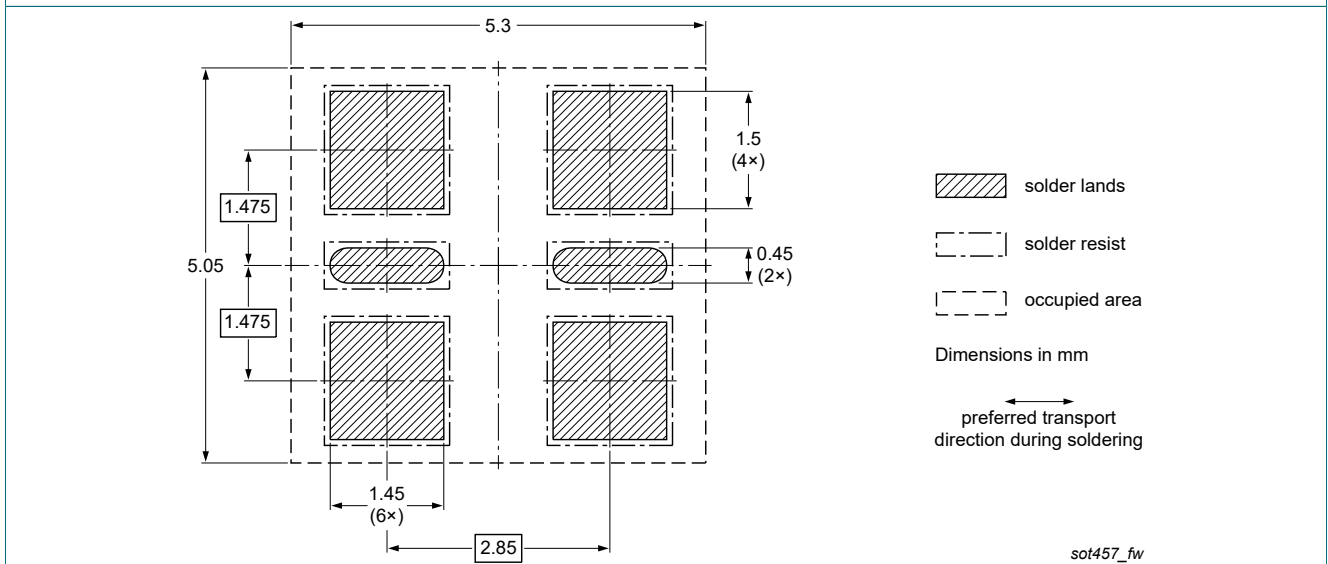


Fig. 10. Wave soldering footprint for TSOP6 (SOT457)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21AVD-Q v.1	20240517	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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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	3
9. Thermal characteristics.....	3
10. Characteristics.....	4
11. Test information.....	6
12. Package outline.....	6
13. Soldering.....	7
14. Revision history.....	8
15. Legal information.....	9

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