



# BAV99QC

## Dual series high-speed switching diodes

1 July 2023

Product data sheet

### 1. General description

Dual series high-speed switching diodes, encapsulated in an ultra small DFN1412D-3 (SOT8009) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

### 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Low leakage current
- Reverse voltage  $V_R \leq 100$  V
- Low capacitance  $C_d \leq 2$  pF
- Ultra small SMD plastic package
- Low package height of 0.5 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Smaller footprint compared to conventional leaded SMD packages

### 3. Applications

- High-speed switching
- General-purpose switching
- Reverse polarity protection
- Space restricted applications

### 4. Quick reference data

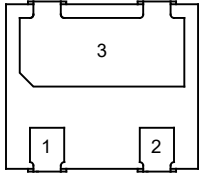
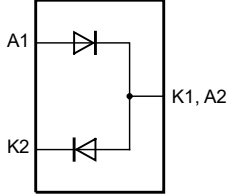
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$I_F$	forward current	single diode loaded; $T_{amb} = 25$ °C	[1]	-	-	215	mA
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	100	V
$I_R$	reverse current	$V_R = 80$ V; pulsed; $T_j = 25$ °C		-	-	0.5	$\mu$ A
$t_{rr}$	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $I_{R(meas)} = 1$ mA; $R_L = 100$ $\Omega$ ; $T_{amb} = 25$ °C		-	-	4	ns

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 70  $\mu$ m 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>Transparent top view <b>DFN1412D-3 (SOT8009)</b></p>	 <p>aaa-022858</p>
2	K2	cathode (diode 2)		
3	K1, A2	cathode (diode 1) and anode (diode 2)		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">BAV99QC</a>	DFN1412D-3	plastic, leadless ultra small outline package with side-wettable flanks (SWF); 3 terminals; 0.8 mm pitch; 1.4 mm x 1.2 mm x 0.48 mm body	<a href="#">SOT8009</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAV99QC	9A

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
<b>Per diode</b>						
$V_R$	reverse voltage	$T_j = 25\text{ °C}$		-	100	V
$I_F$	forward current	single diode loaded; $T_{amb} = 25\text{ °C}$	[1]	-	215	mA
		double diode loaded; $T_{amb} = 25\text{ °C}$	[1]	-	125	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 0.5\text{ ms}$ ; $\delta \leq 0.25$ ; $T_j = 25\text{ °C}$		-	500	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p \leq 1\text{ }\mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	4	A
		$t_p \leq 1\text{ ms}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	1	A
		$t_p \leq 1\text{ s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	0.5	A
<b>Per device; one diode loaded</b>						
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	335	mW
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 70  $\mu\text{m}$  copper; tin-plated and standard footprint.

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

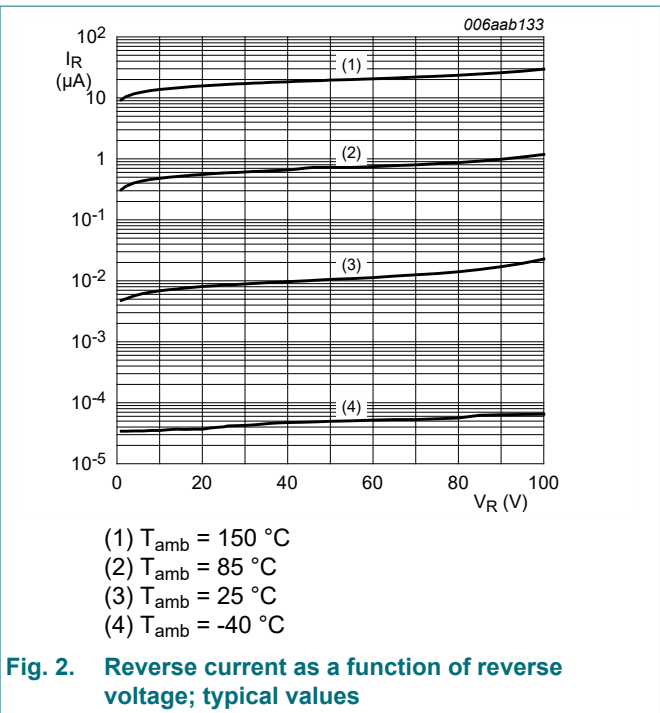
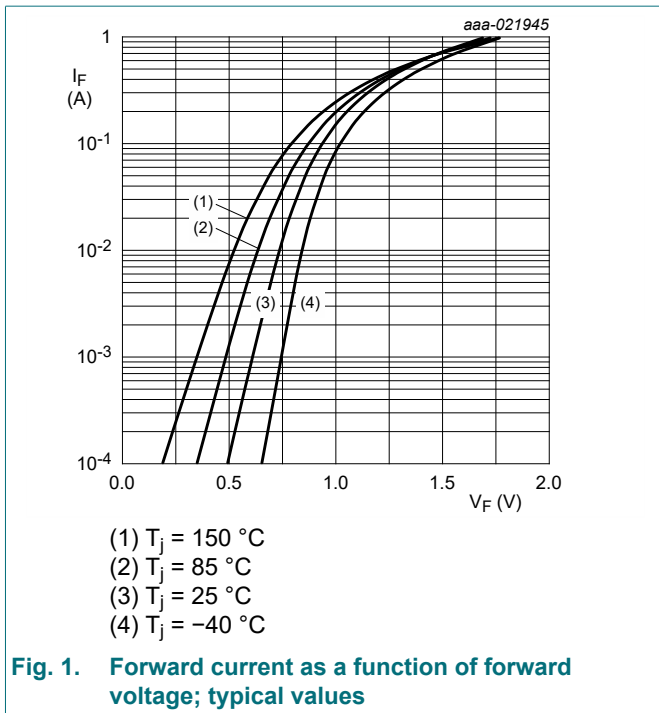
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	375	K/W

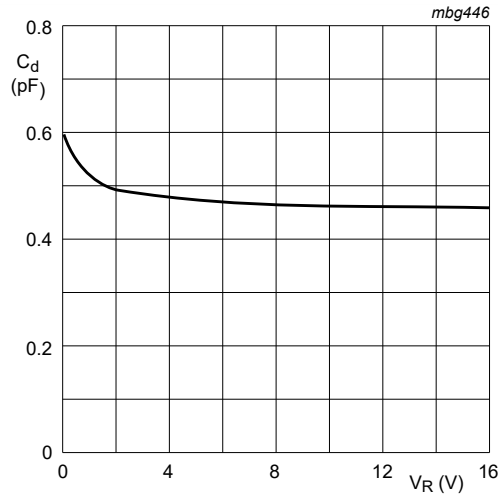
[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 70  $\mu\text{m}$  copper; tin-plated and standard footprint.

## 10. Characteristics

Table 7. Characteristics

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





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

Fig. 3. Diode capacitance as a function of reverse voltage; typical values

### 11. Test information

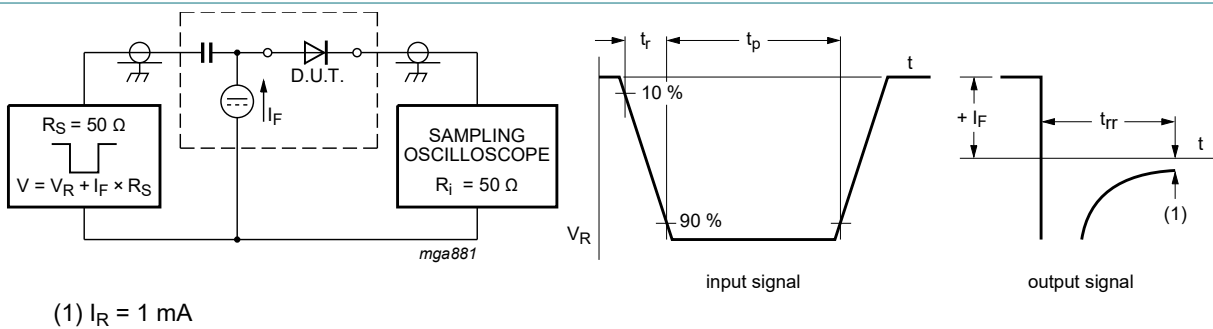


Fig. 4. Reverse recovery time test circuit and waveforms

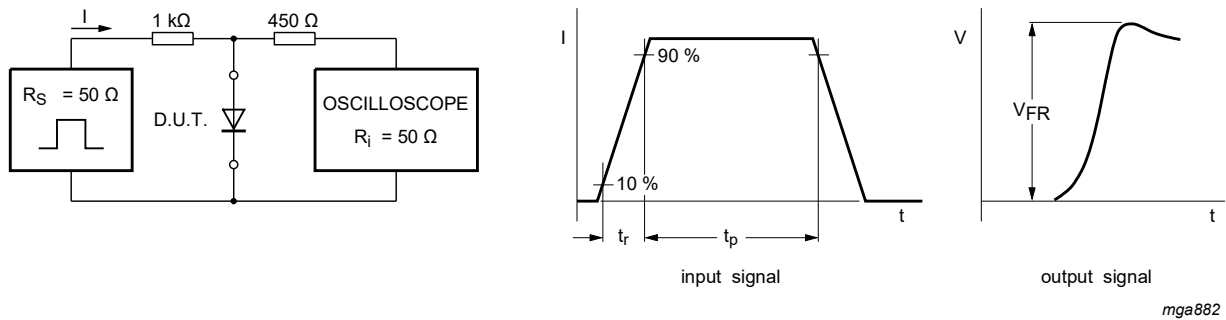


Fig. 5. Forward recovery voltage test circuit and waveforms

## 12. Package outline

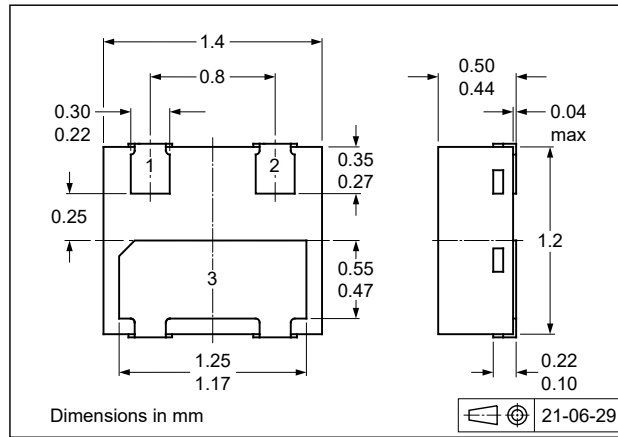
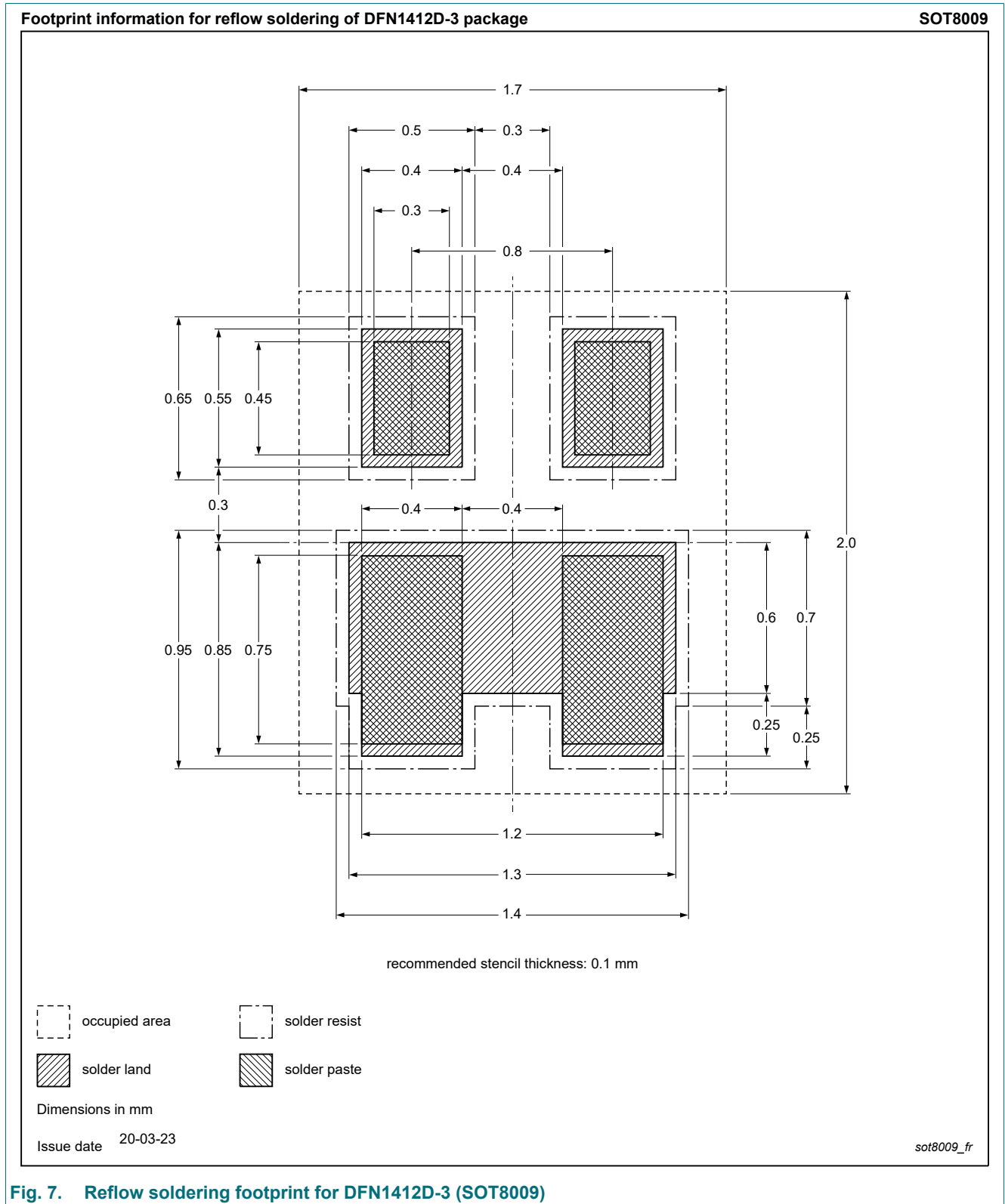


Fig. 6. Package outline DFN1412D-3 (SOT8009)

### 13. Soldering



**Fig. 7. Reflow soldering footprint for DFN1412D-3 (SOT8009)**

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV99QC v.2	20230701	Product data sheet	-	BAV99QC v.1
Modifications:	• Product changed to non automotive. Please refer to the automotive product(s) with -Q.			
BAV99QC v.1	20200525	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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