



BAV99QC

Dual series high-speed switching diodes

25 May 2020

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
- AEC-Q101 qualified

3. Applications

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

4. Quick reference data

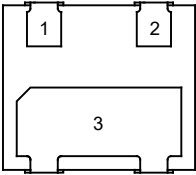
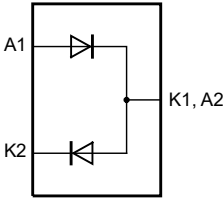
Table 1. Quick reference data

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

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 70 µm 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)	 Bottom view DFN1412D-3 (SOT8009)	 aaa-022858
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
BAV99QC	DFN1412D-3	plastic, leadless extremely thin 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	SOT8009

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
Per diode						
V _R	reverse voltage	T _j = 25 °C		-	100	V
I _F	forward current	T _{amb} = 25 °C; single diode loaded	[1]	-	215	mA
		T _{amb} = 25 °C; double diode loaded	[1]	-	125	mA
I _{FRM}	repetitive peak forward current	t _p ≤ 0.5 ms; δ ≤ 0.25; T _j = 25 °C		-	500	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
Per device; one diode loaded						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °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 μm copper; tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

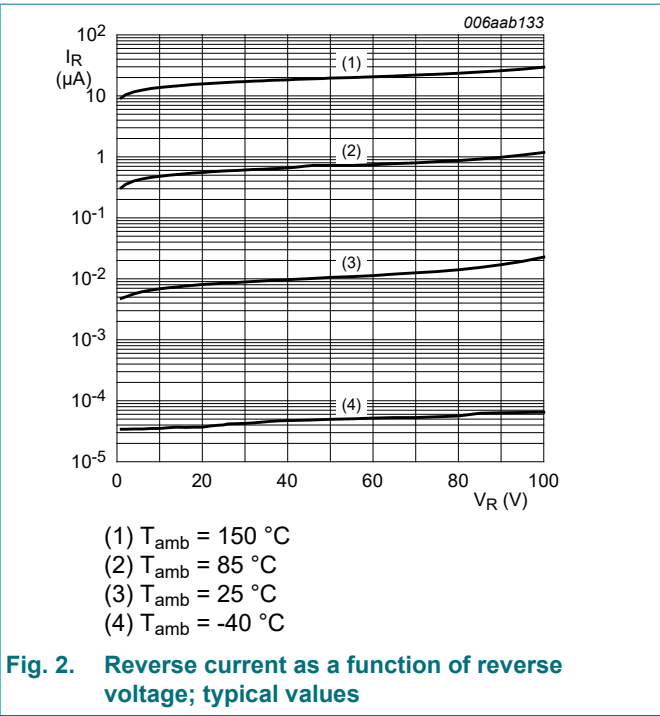
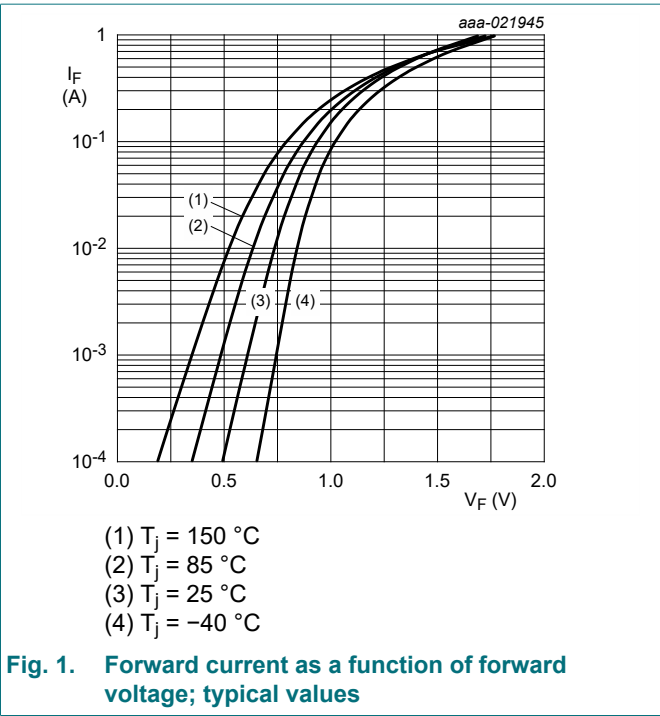
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	375	K/W

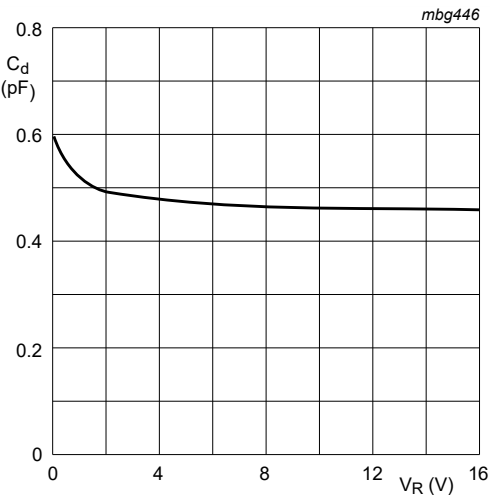
[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 70 μm copper; tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V _F	forward voltage	I _F = 1 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _j = 25 °C	-	-	715	mV
		I _F = 10 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _j = 25 °C	-	-	855	mV
		I _F = 50 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _j = 25 °C	-	-	1	V
		I _F = 150 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _j = 25 °C	-	-	1.25	V
I _R	reverse current	V _R = 80 V; pulsed; T _j = 25 °C	-	-	0.5	μA
		V _R = 25 V; pulsed; T _j = 150 °C	-	-	30	μA
		V _R = 80 V; pulsed; T _j = 150 °C	-	-	150	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; I _{R(meas)} = 1 mA; R _L = 100 Ω; T _{amb} = 25 °C	-	-	4	ns
V _{FRM}	peak forward recovery voltage	I _F = 10 mA; T _j = 25 °C; t _r = 20 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

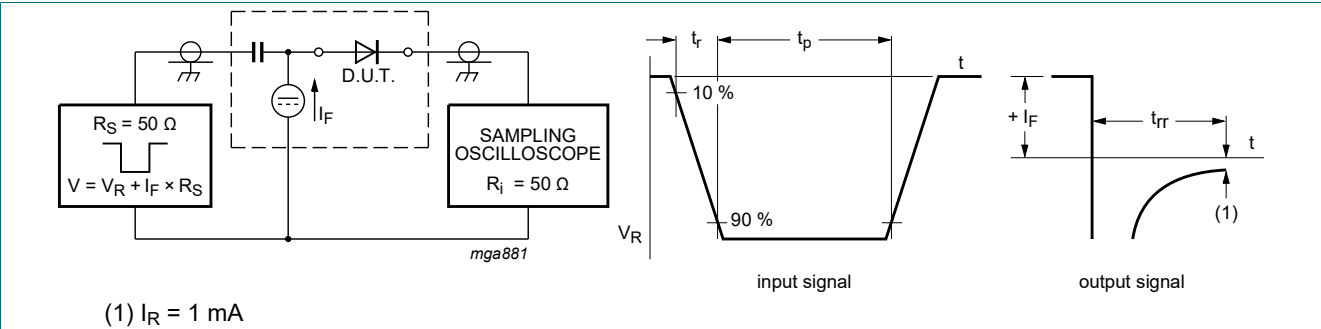


Fig. 4. Reverse recovery time test circuit and waveforms

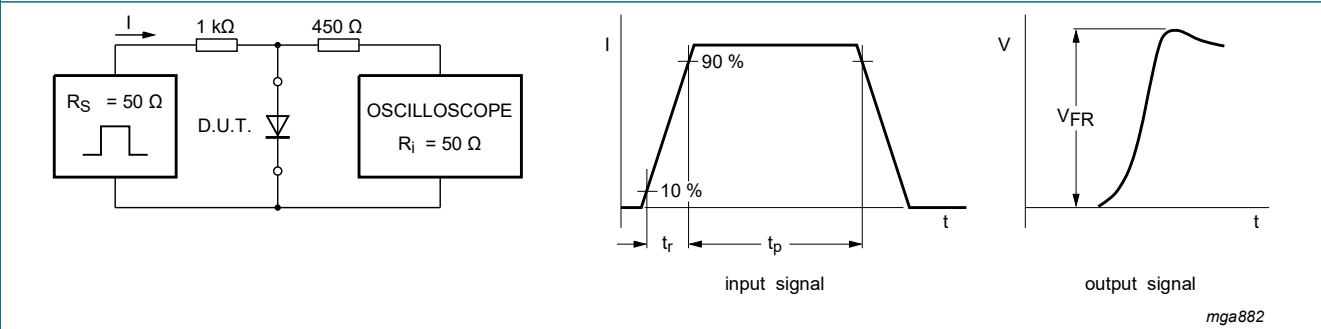
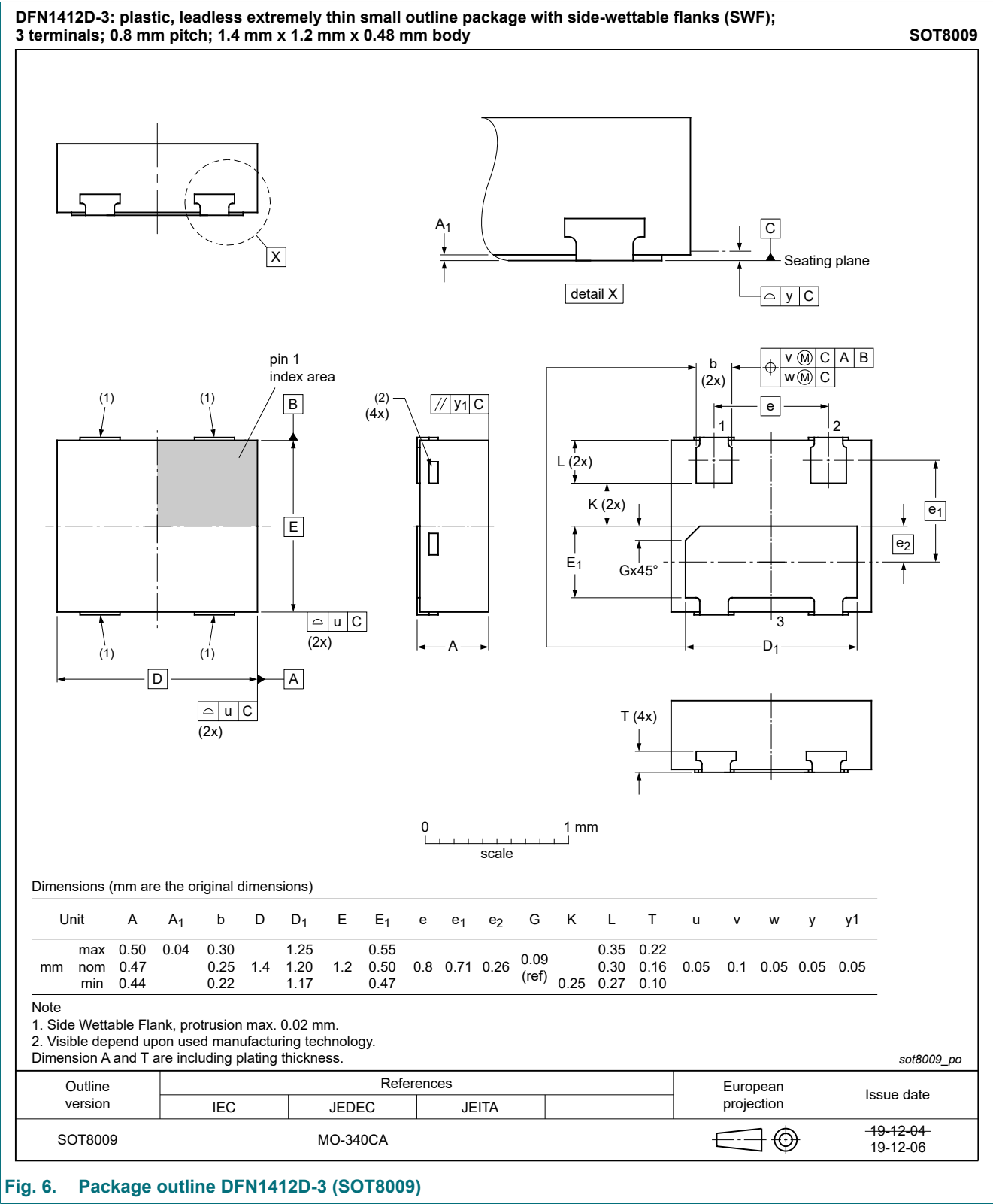


Fig. 5. Forward recovery voltage test circuit and waveforms

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

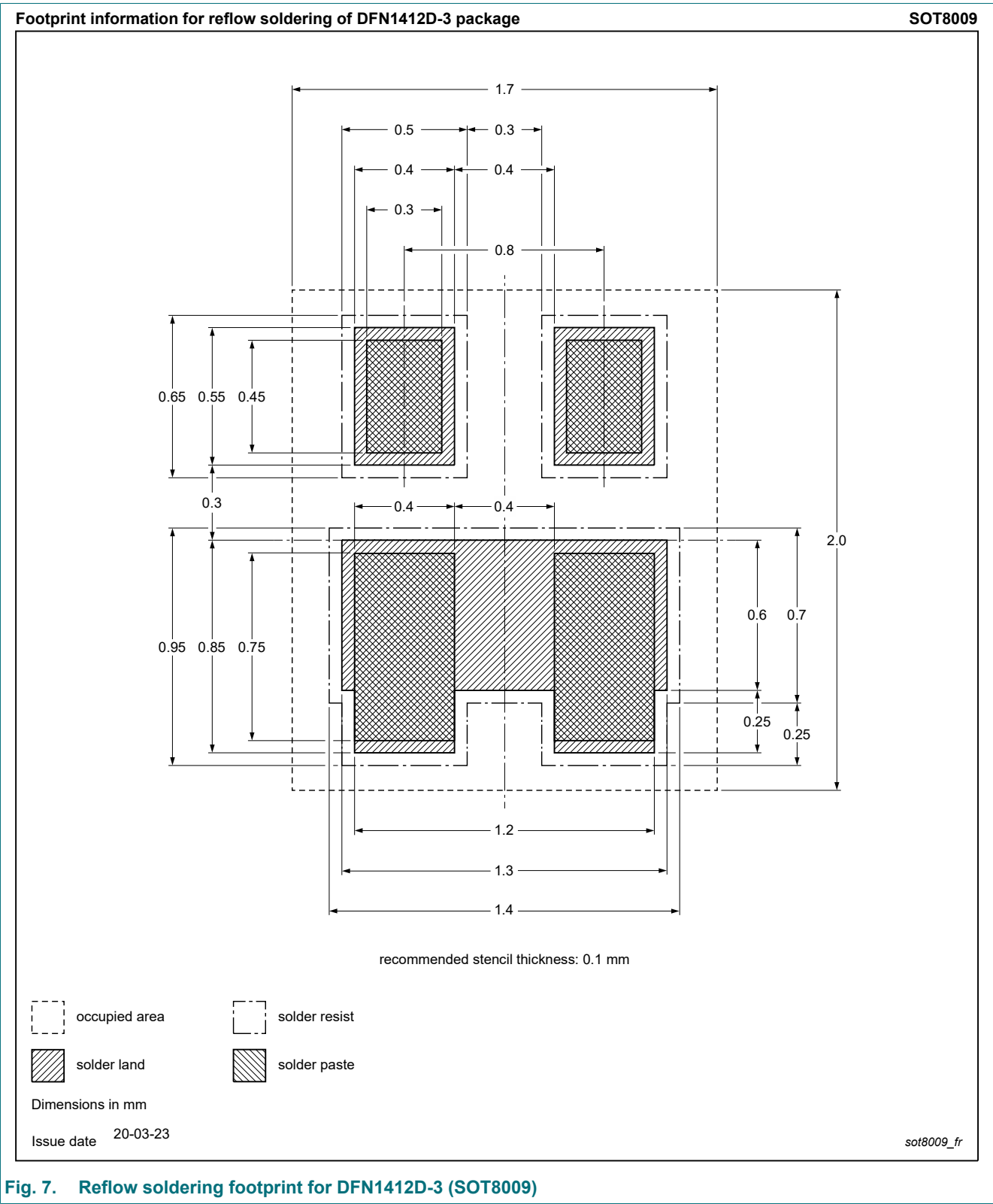


Fig. 7. Reflow soldering footprint for DFN1412D-3 (SOT8009)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV99QC v.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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