



BAT54QC-Q

Schottky barrier diode

5 May 2021

Product data sheet

1. General description

Planar Schottky barrier diode encapsulated in an ultra small DFN1412D-3 (SOT8009, JEDEC MO340-CA) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

2. Features and benefits

- Low forward voltage
- Low capacitance
- Leadless ultra small SMD plastic package
- Low package height of 0.5 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Ultra high-speed switching
- Voltage clamping
- Protection circuits

4. Quick reference data

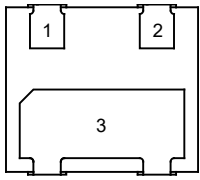
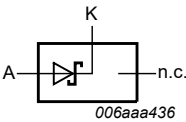
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_R	reverse voltage			-	-	30	V
V_F	forward voltage	$I_F = 100 \text{ mA}$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	-	-	800	mV
I_R	reverse current	$V_R = 25 \text{ V}$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	-	-	2	μA

[1] Pulse test: $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 Bottom view DFN1412D-3 (SOT8009)	
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT54QC-Q	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	SOT8009

7. Marking

Table 4. Marking codes

Type number	Marking code
BAT54QC-Q	9B

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_R	reverse voltage			-	30	V
I_F	forward current	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$		-	200	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ s}$; $\delta \leq 0.5$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	300	mA
I_{FSM}	non-repetitive peak forward current	square-wave pulse; $t_p \leq 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$		-	600	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[1]	-	415	mW
T_j	junction temperature			-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	150	$^{\circ}\text{C}$

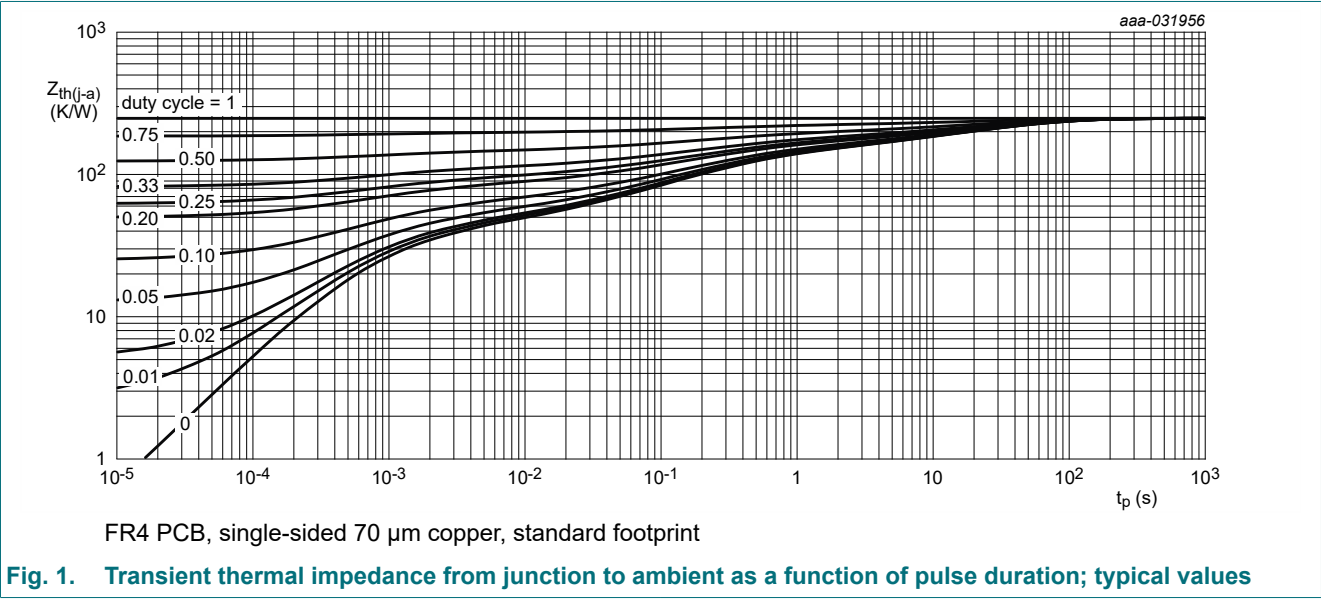
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 μm copper, tin-plated and standard footprint.

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] [2]	-	-	290	K/W

- [1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 μm copper, tin-plated and standard footprint.
- [2] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses PR are a significant part of the total power losses.

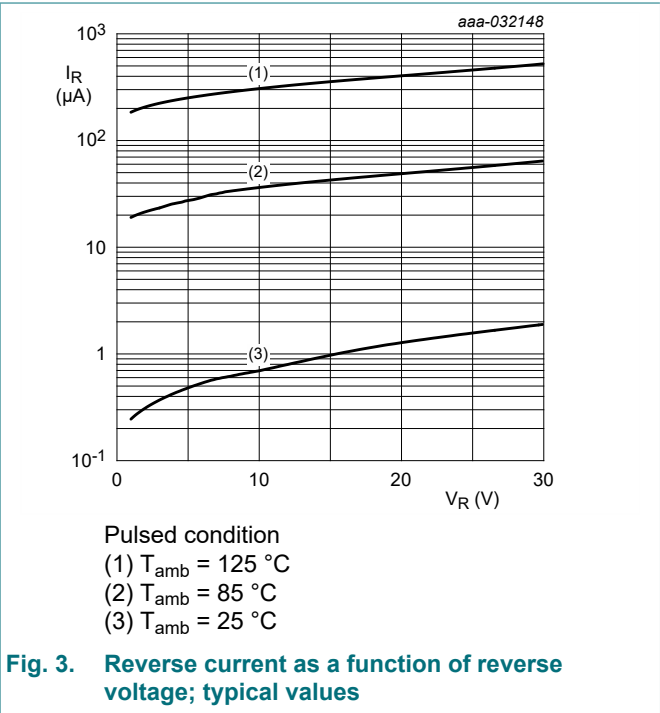
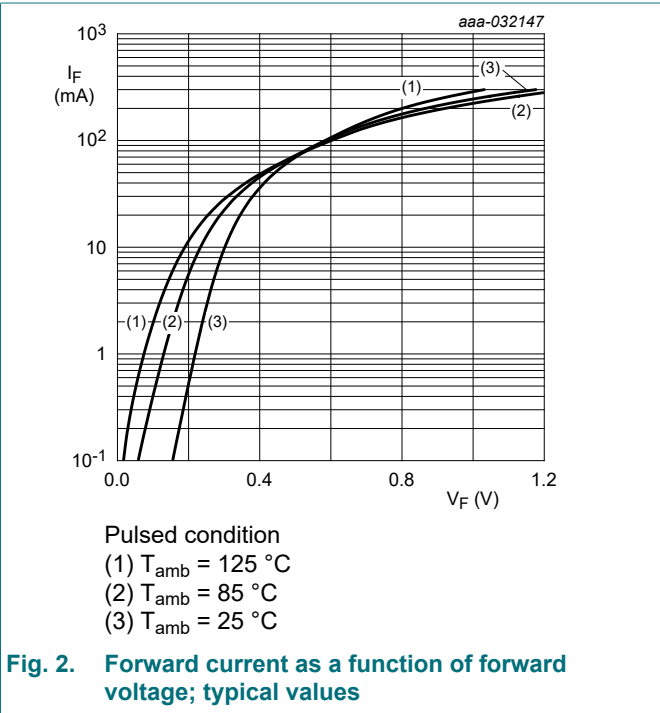


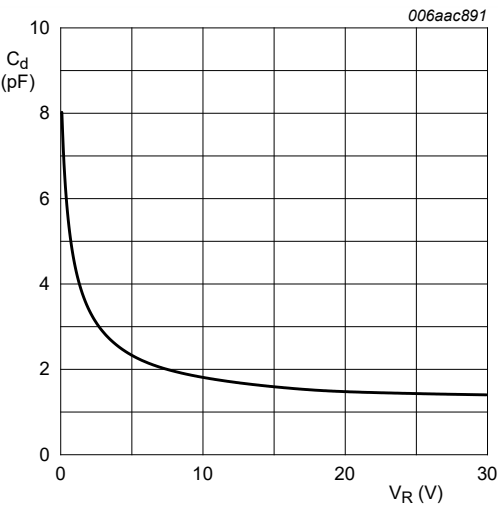
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _F	forward voltage	I _F = 0.1 mA; T _{amb} = 25 °C	[1]	-	-	240	mV
		I _F = 1 mA; T _{amb} = 25 °C	[1]	-	-	320	mV
		I _F = 10 mA; T _{amb} = 25 °C	[1]	-	-	400	mV
		I _F = 30 mA; T _{amb} = 25 °C	[1]	-	-	500	mV
		I _F = 100 mA; T _{amb} = 25 °C	[1]	-	-	800	mV
I _R	reverse current	V _R = 25 V; T _{amb} = 25 °C	[1]	-	-	2	μA
C _d	diode capacitance	V _R = 1 V; f = 1 MHz; T _{amb} = 25 °C		-	-	10	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		-	-	5	ns

[1] Pulse test: t_p ≤ 300 μs; δ ≤ 0.02

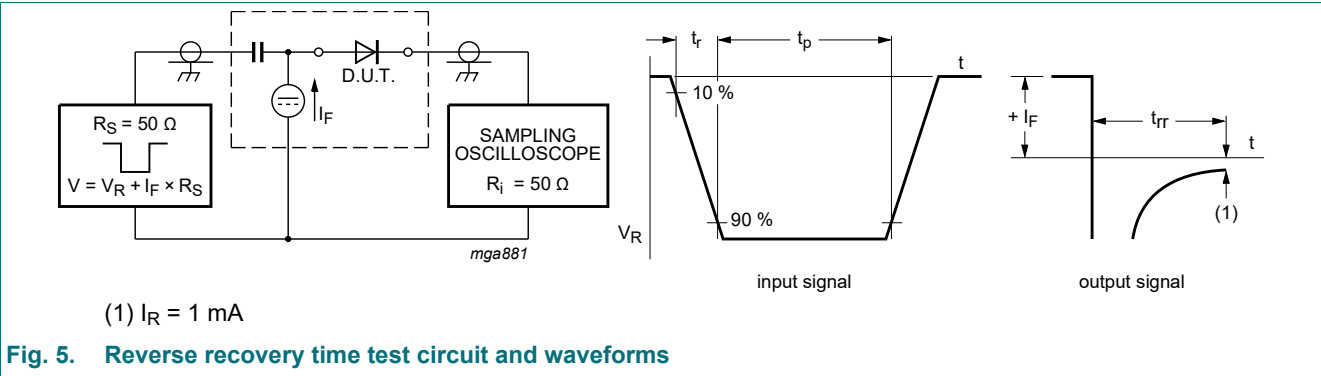




$T_{amb} = 25\text{ }^{\circ}\text{C}; f = 1\text{ MHz}$

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

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

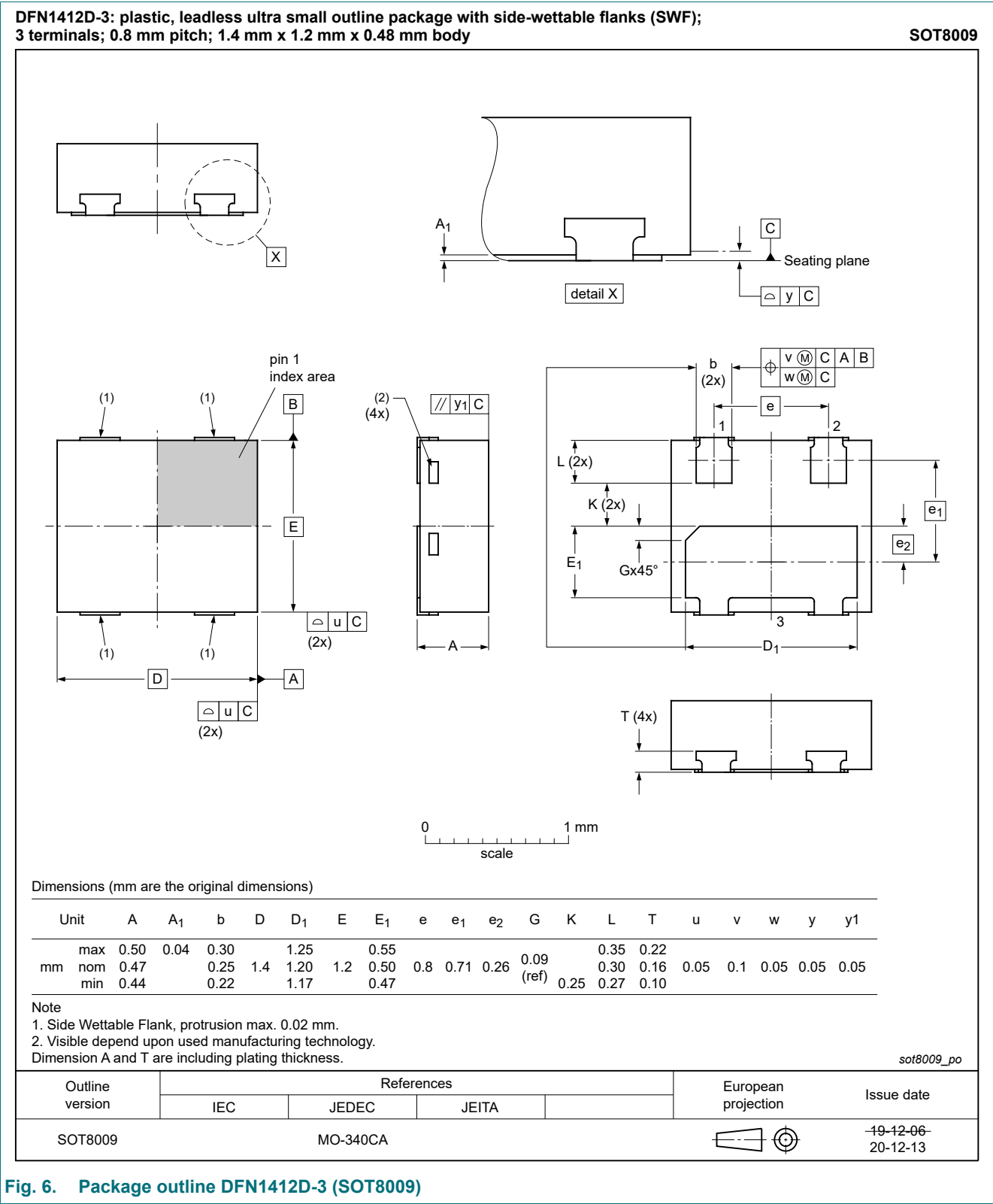


Fig. 6. Package outline DFN1412D-3 (SOT8009)

13. Soldering

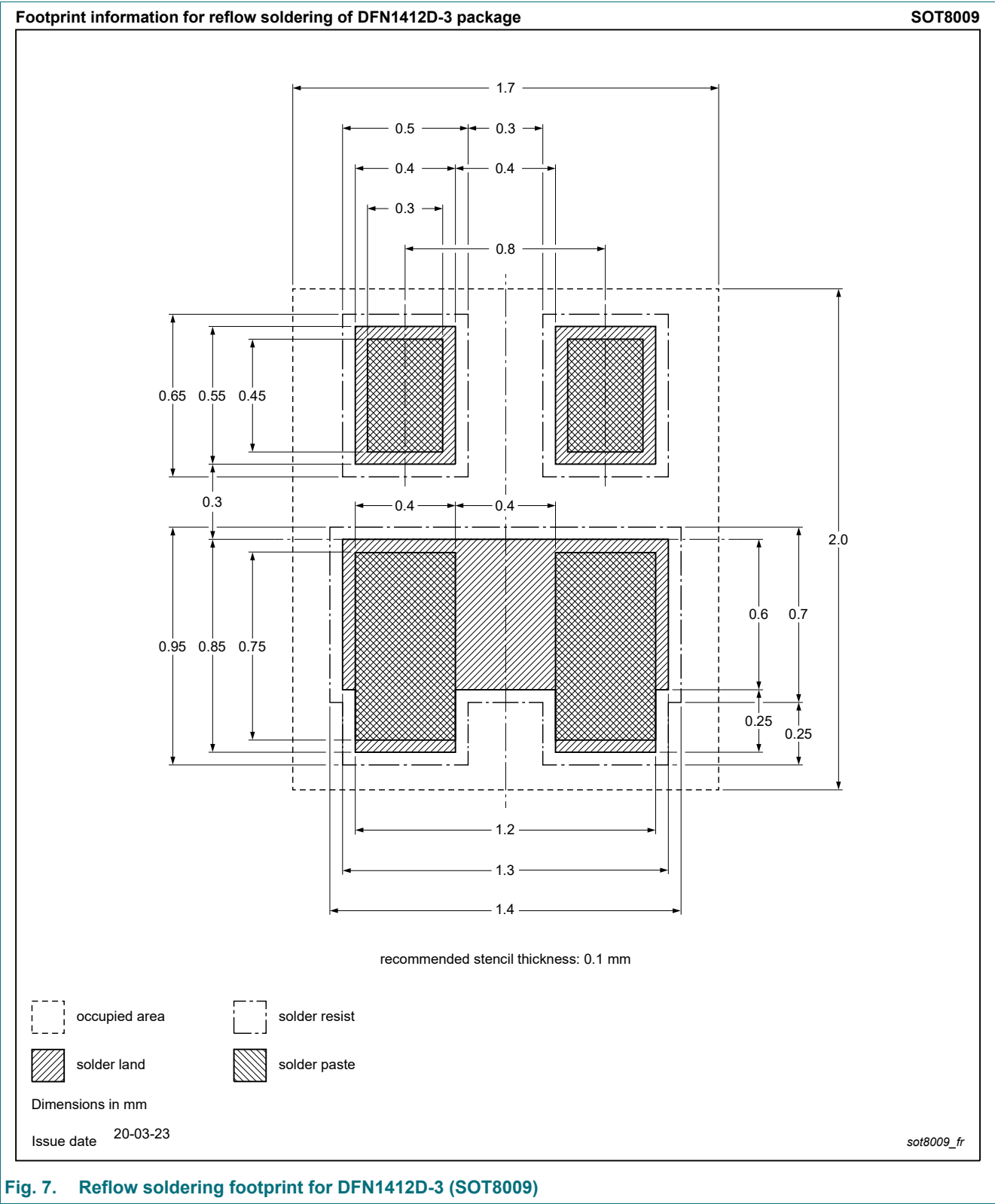


Fig. 7. Reflow soldering footprint for DFN1412D-3 (SOT8009)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT54QC-Q v.2	20210505	Product data sheet	-	BAT54QC-Q v.1
Modifications:	• Features and benefits: added recommendation for automotive applications			
BAT54QC-Q v.1	20210216	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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