

BAV170QA-Q

Dual common cathode low-leakage diode

14 December 2023

Product data sheet

1. General description

Dual common cathode low-leakage diode encapsulated in a leadless ultra small DFN1010D-3 (SOT1215) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- High switching speed: $t_{rr} = 0.8 \mu s$
- Low leakage current: $I_R = 3 \text{ pA}$
- Repetitive peak reverse voltage $V_{RRM} \leq 85 \text{ V}$
- Low capacitance $C_d = 2 \text{ pF}$
- Ultra small SMD plastic package
- Low package height of 0.37 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Low-leakage current applications
- General-purpose switching

4. Quick reference data

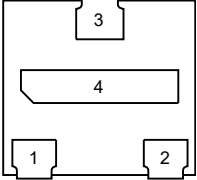
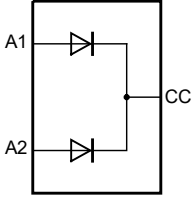
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current	single diode loaded; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	-	-	320	mA
V_R	reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$		-	-	75	V
I_R	reverse current	$V_R = 75 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$		-	0.003	5	nA
t_{rr}	reverse recovery time	$I_F = 10 \text{ mA}$; $I_R = 10 \text{ mA}$; $I_{R(meas)} = 1 \text{ mA}$; $R_L = 100 \text{ } \Omega$; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	0.8	3	μs

[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)	 Transparent top view DFN1010D-3 (SOT1215)	 aaa-021931
2	A2	anode (diode 2)		
3	CC	common cathode		
4	CC	common cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV170QA-Q	DFN1010D-3	plastic, leadless thermal enhanced ultra thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.75 mm pitch; 1.1 mm x 1 mm x 0.37 mm body	SOT1215

7. Marking

Table 4. Marking codes

Type number	Marking code
BAV170QA-Q	Z 011

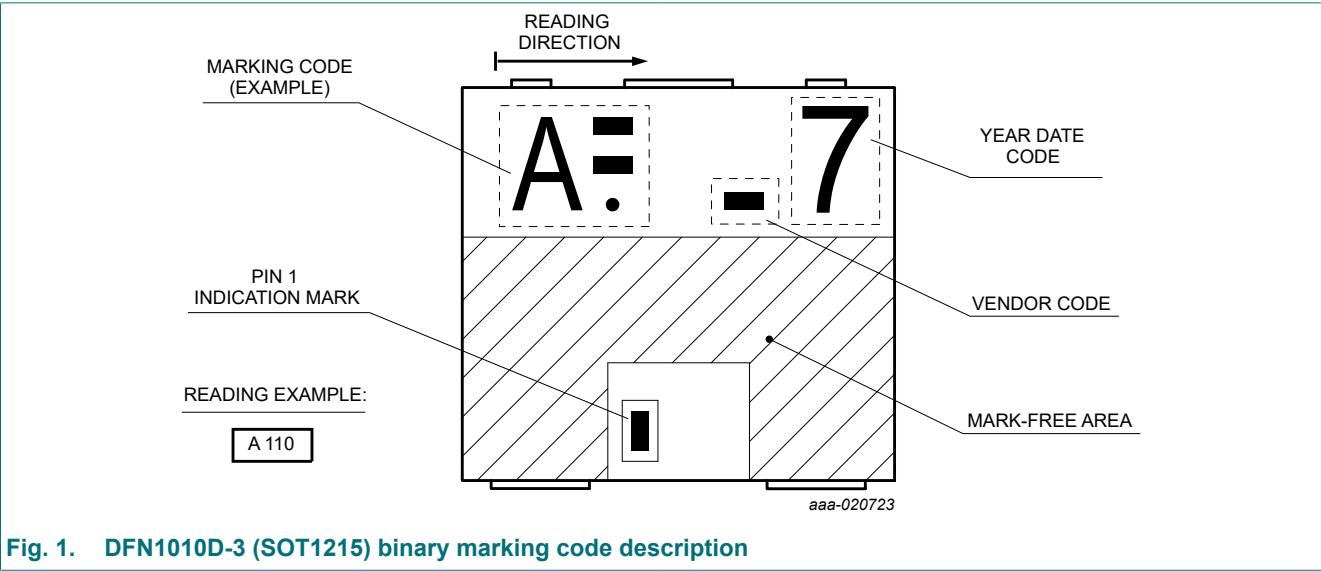


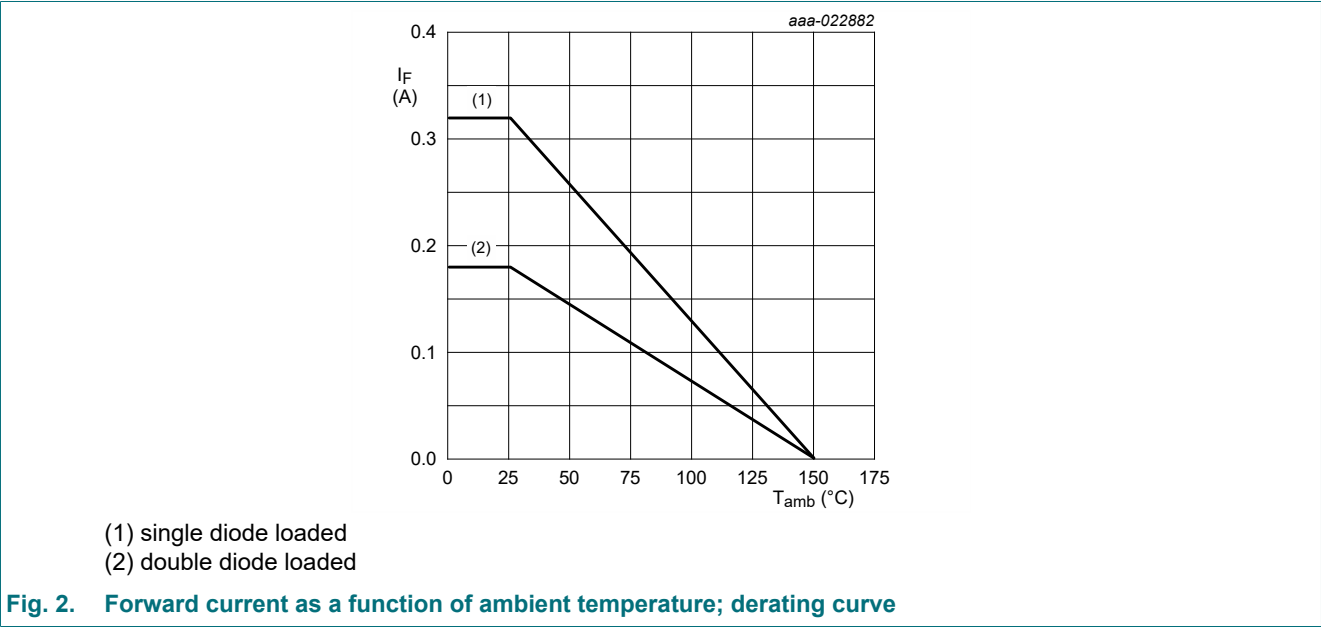
Fig. 1. DFN1010D-3 (SOT1215) binary marking code description

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		-	75	V
V _{RRM}	repetitive peak reverse voltage			-	85	V
I _F	forward current	single diode loaded; T _{amb} = 25 °C	[1]	-	320	mA
		double diode loaded; T _{amb} = 25 °C	[1]	-	180	mA
I _{FRM}	repetitive peak forward current	t _p ≤ 0.5 ms; δ ≤ 0.25; T _j = 25 °C		-	1	A
I _{FSM}	non-repetitive peak forward current	t _p = 100 μs; square wave; T _{j(init)} = 25 °C		-	4	A
		t _p = 1 ms; square wave; T _{j(init)} = 25 °C		-	1.5	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]	-	325	mW
			[2]	-	540	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 copper, tin-plated and standard footprint.
[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]	-	-	385	K/W
			[2]	-	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	50	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 cm².
[3] Soldering point of cathode tab.

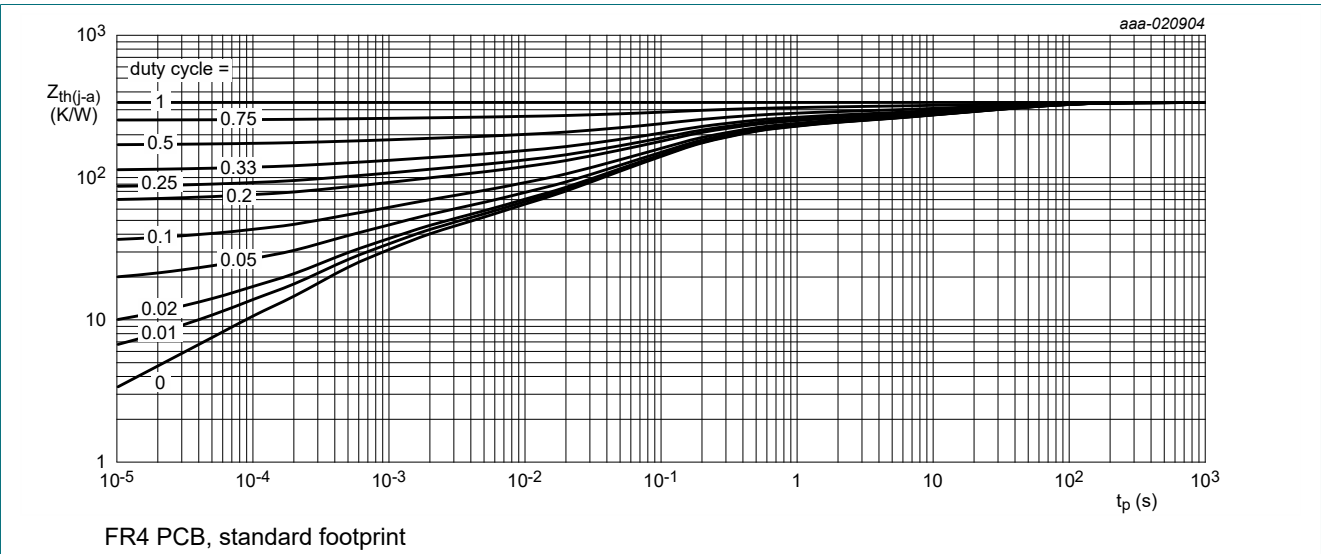


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

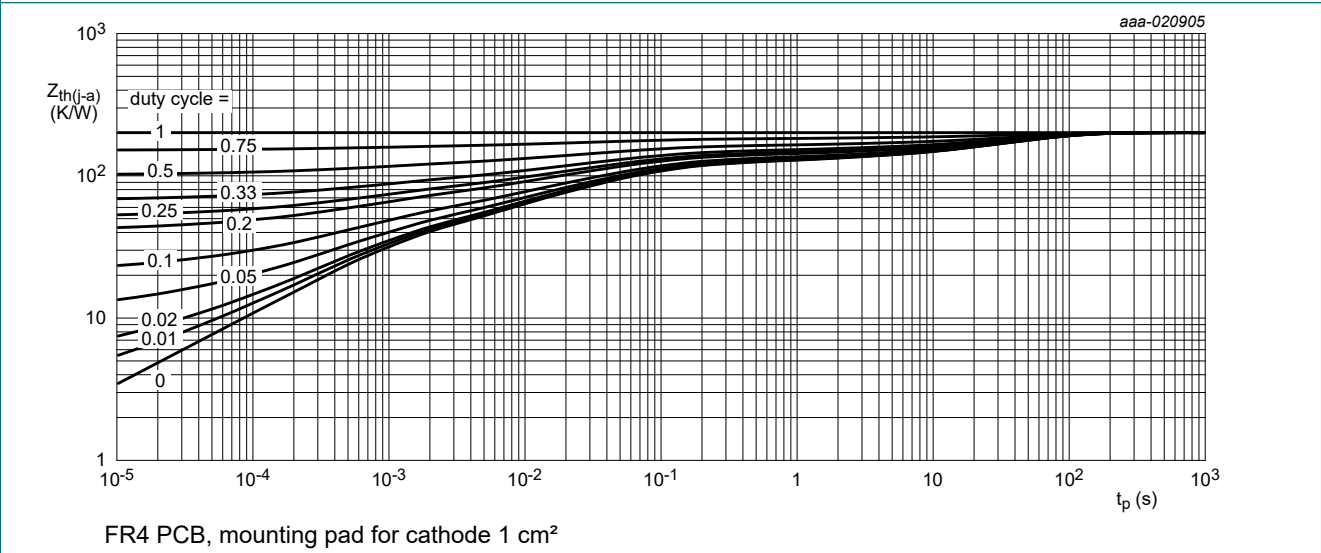
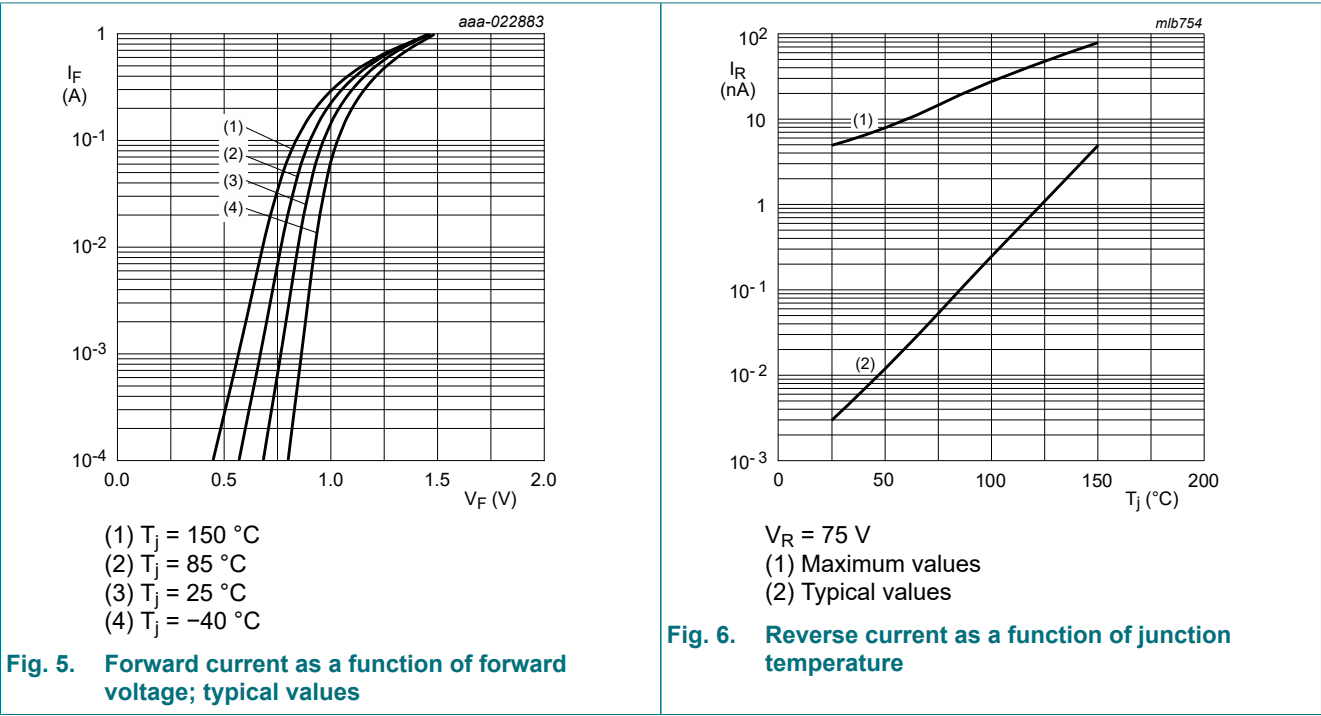


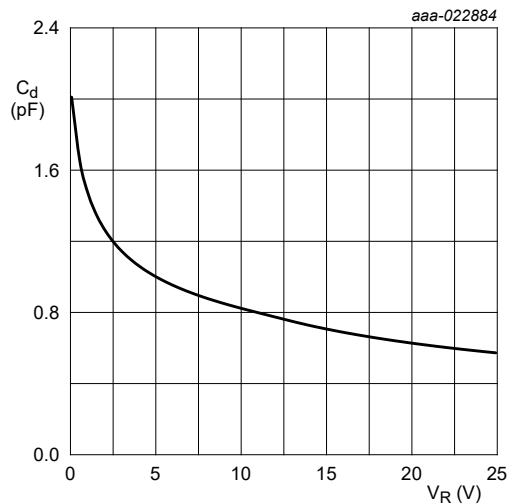
Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

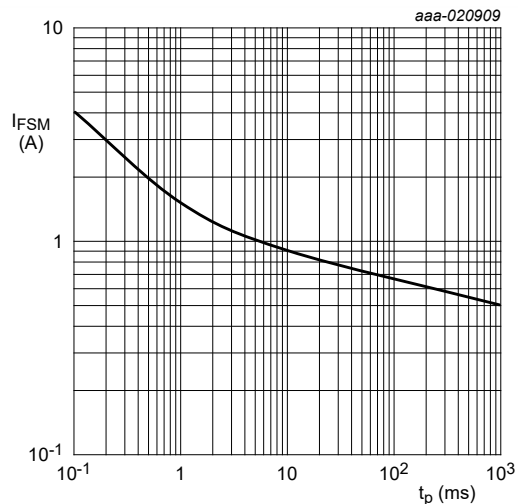
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V _F	forward voltage	I _F = 1 mA; T _j = 25 °C		-	-	0.9	V
		I _F = 10 mA; T _j = 25 °C		-	-	1	V
		I _F = 50 mA; T _j = 25 °C		-	-	1.1	V
		I _F = 150 mA; T _j = 25 °C		-	-	1.25	V
I _R	reverse current	V _R = 75 V; T _j = 25 °C		-	0.003	5	nA
		V _R = 75 V; T _j = 150 °C		-	3	80	nA
C _d	diode capacitance	V _R = 0 V; f = 1 MHz; T _j = 25 °C		-	2	-	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		-	0.8	3	µs





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

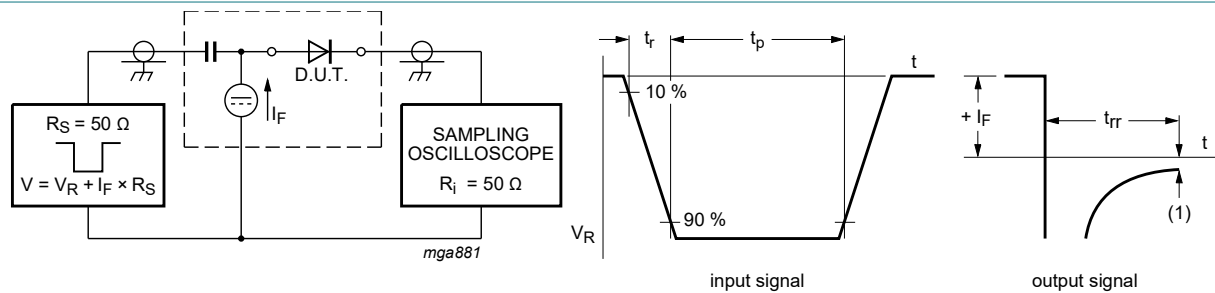
Fig. 7. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
 $T_{\text{amb}} = 25 \text{ }^{\circ}\text{C}$

Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

11. Test information



(1) $I_R = 1 \text{ mA}$

Fig. 9. Reverse recovery time 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

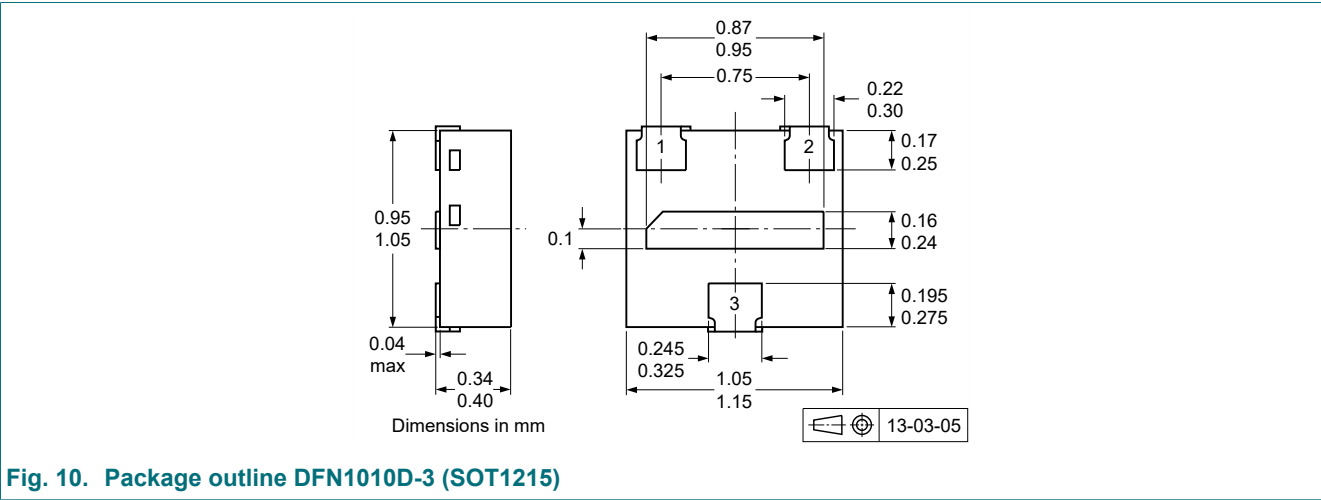
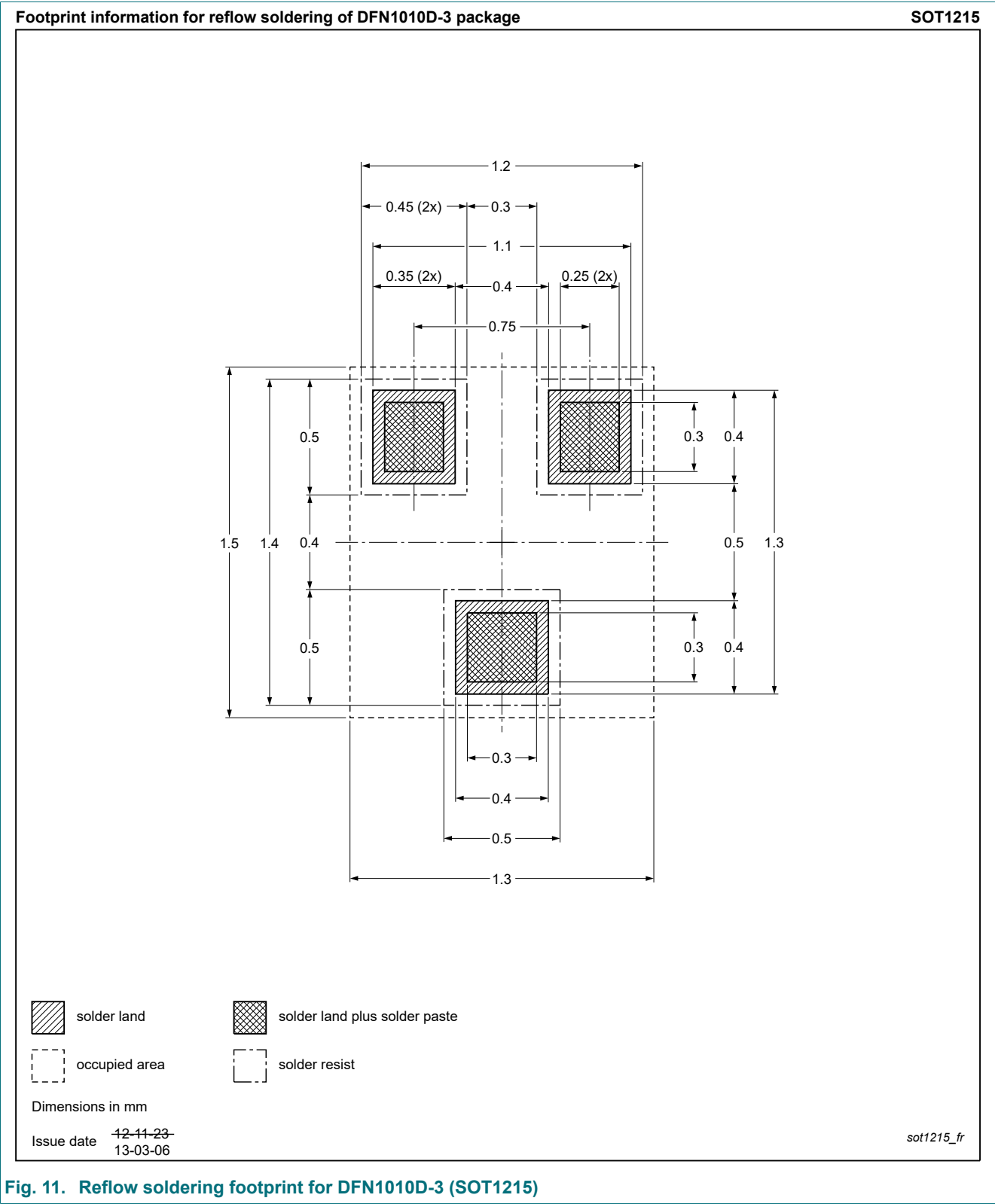


Fig. 10. Package outline DFN1010D-3 (SOT1215)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV170QA-Q v.1	20231214	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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Date of release: 14 December 2023