



BAV170QA

Dual common cathode low-leakage diode

3 May 2016

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: $t_{rr} = 0.8 \mu\text{s}$
- 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
- AEC-Q101 qualified

3. Applications

- Low-leakage current applications
- General-purpose switching

4. Quick reference data

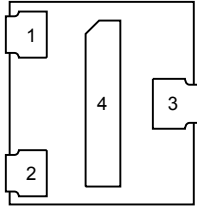
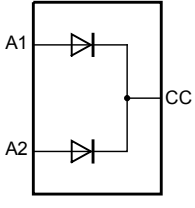
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current	$T_{amb} = 25 \text{ }^\circ\text{C}$; single diode loaded	[1]	-	-	320	mA
V_R	reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$		-	-	75	V
Per diode							
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)	 <p>Transparent top view DFN1010D-3 (SOT1215)</p>	 <p>aaa-021931</p>
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	DFN1010D-3	DFN1010D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body 1.1 x 1.0 x 0.37 mm	SOT1215

7. Marking

Table 4. Marking codes

Type number	Marking code
BAV170QA	Z 011

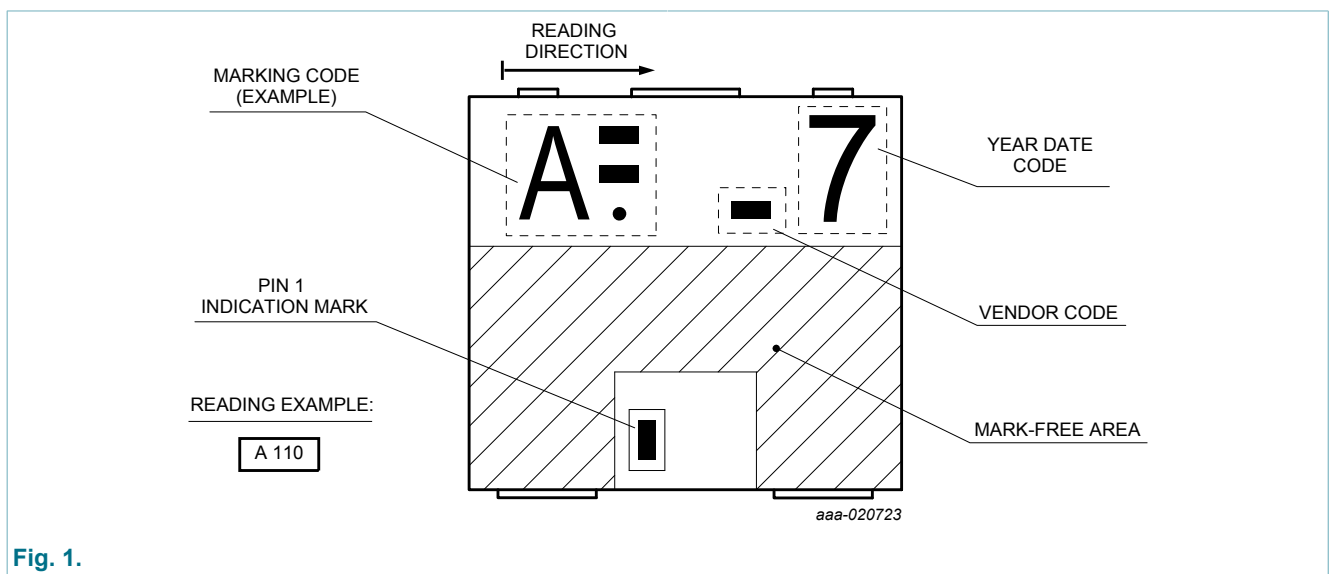


Fig. 1.

8. Limiting values

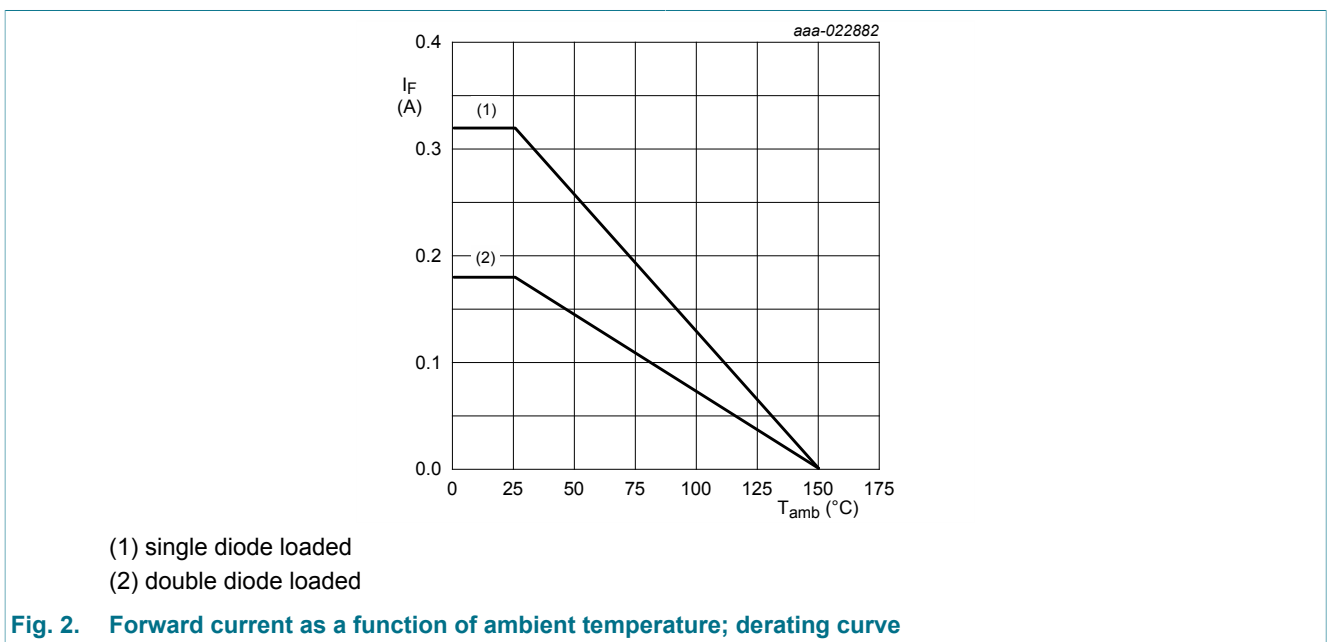
Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_R	reverse voltage	$T_j = 25\text{ °C}$		-	75	V
V_{RRM}	repetitive peak reverse voltage			-	85	V
I_F	forward current	$T_{amb} = 25\text{ °C}$; single diode loaded	[1]	-	320	mA
		$T_{amb} = 25\text{ °C}$; double diode loaded	[1]	-	180	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 0.5\text{ ms}$; $\delta \leq 0.25$; $T_j = 25\text{ °C}$		-	1	A
I_{FSM}	non-repetitive peak forward current	$t_p = 100\text{ }\mu\text{s}$; $T_{j(init)} = 25\text{ °C}$; square wave		-	4	A
		$t_p = 1\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; square wave		-	1.5	A
		$t_p = 1\text{ s}$; $T_{j(init)} = 25\text{ °C}$; square wave		-	0.5	A
Per device; one diode loaded						
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[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

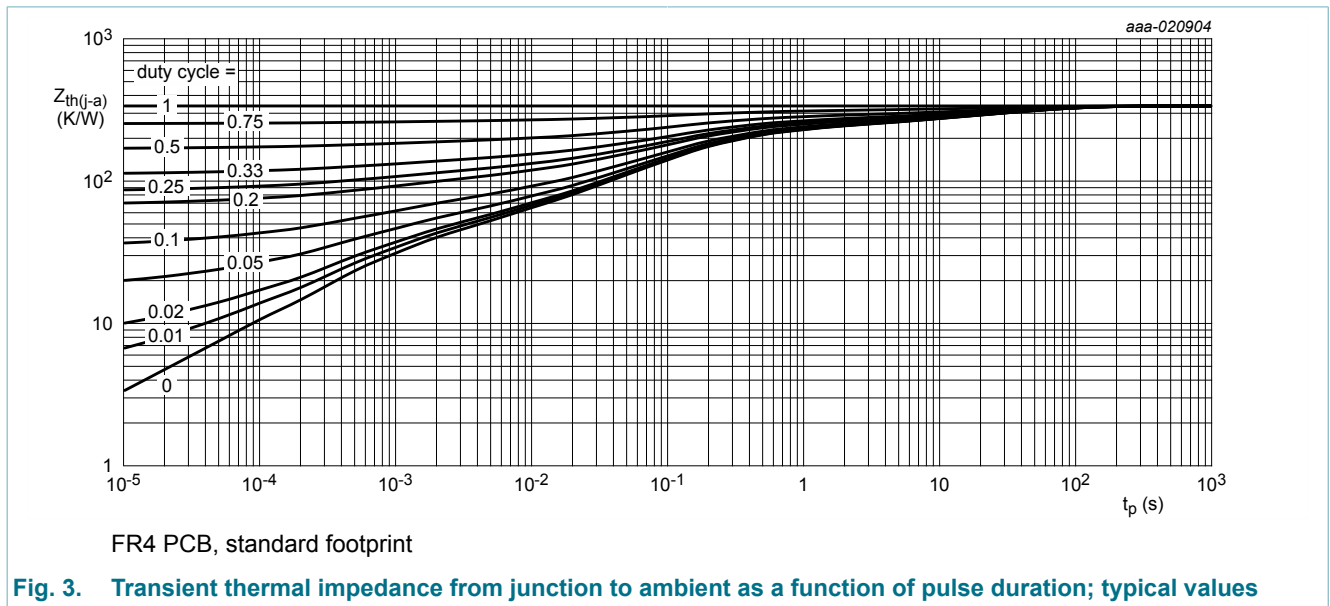
Table 6. Thermal characteristics

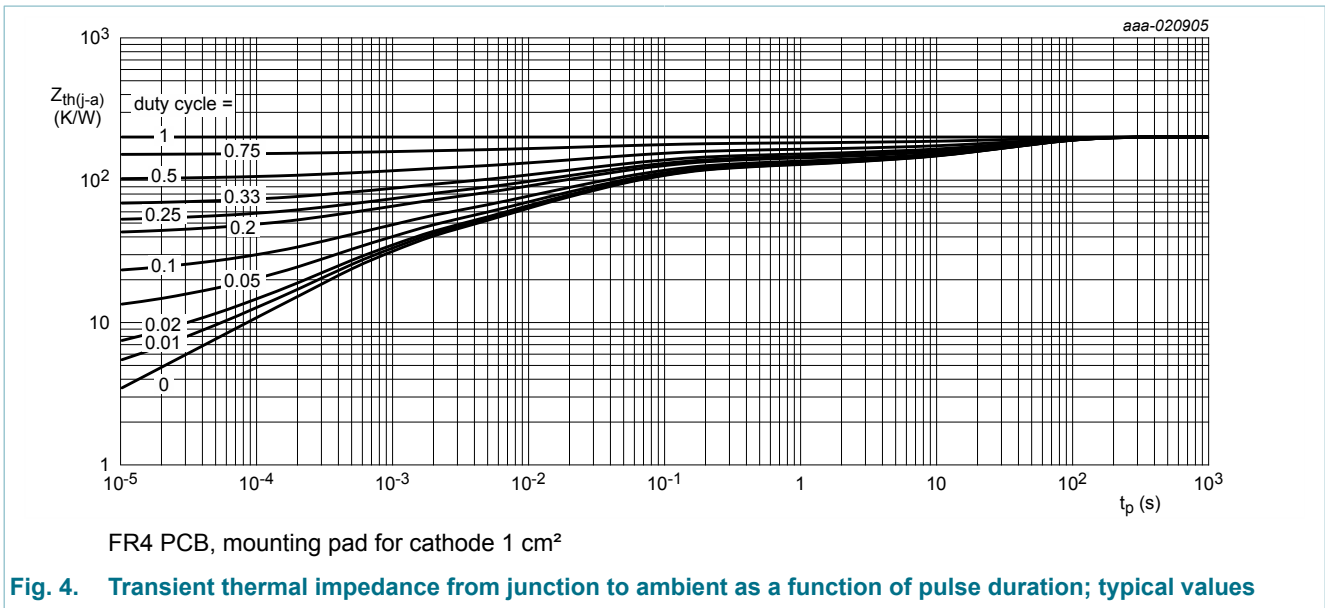
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	385	K/W
			[2]	-	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	50	K/W

[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.

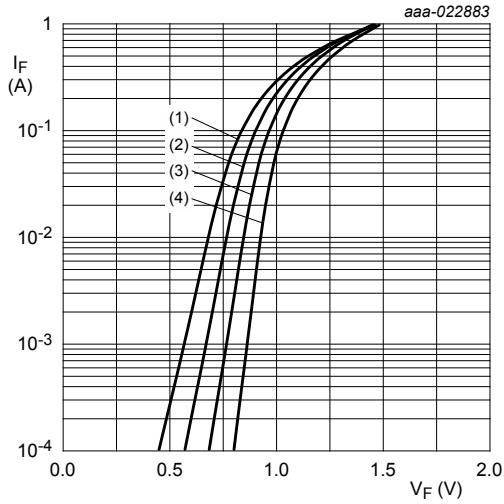




10. Characteristics

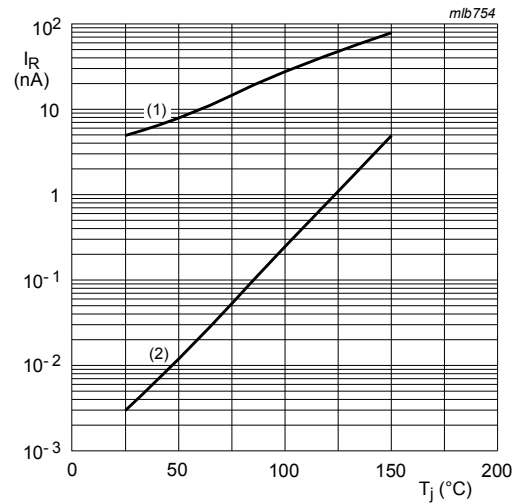
Table 7. Characteristics

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



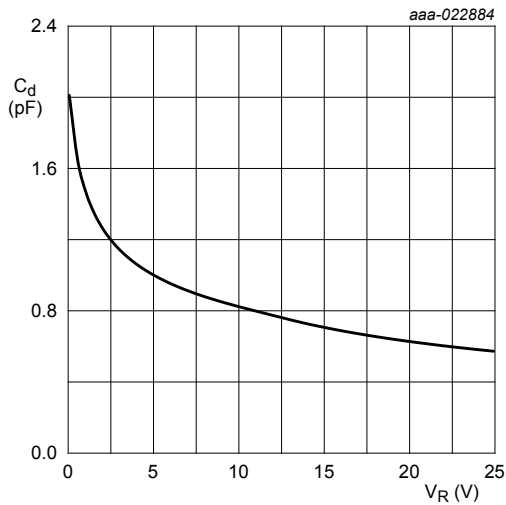
- (1) $T_j = 150^\circ\text{C}$
- (2) $T_j = 85^\circ\text{C}$
- (3) $T_j = 25^\circ\text{C}$
- (4) $T_j = -40^\circ\text{C}$

Fig. 5. Forward current as a function of forward voltage; typical values



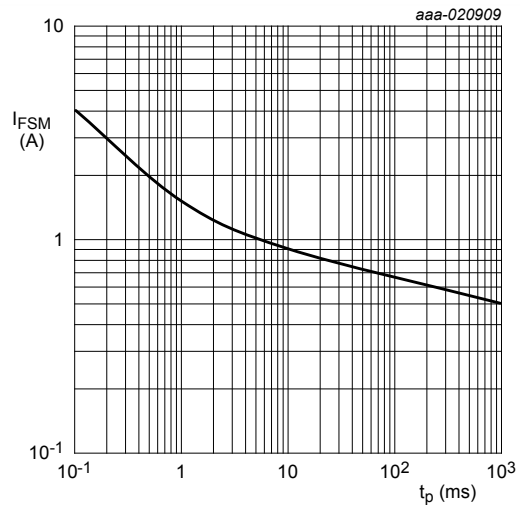
- $V_R = 75\text{ V}$
- (1) Maximum values
 - (2) Typical values

Fig. 6. Reverse current as a function of junction temperature



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

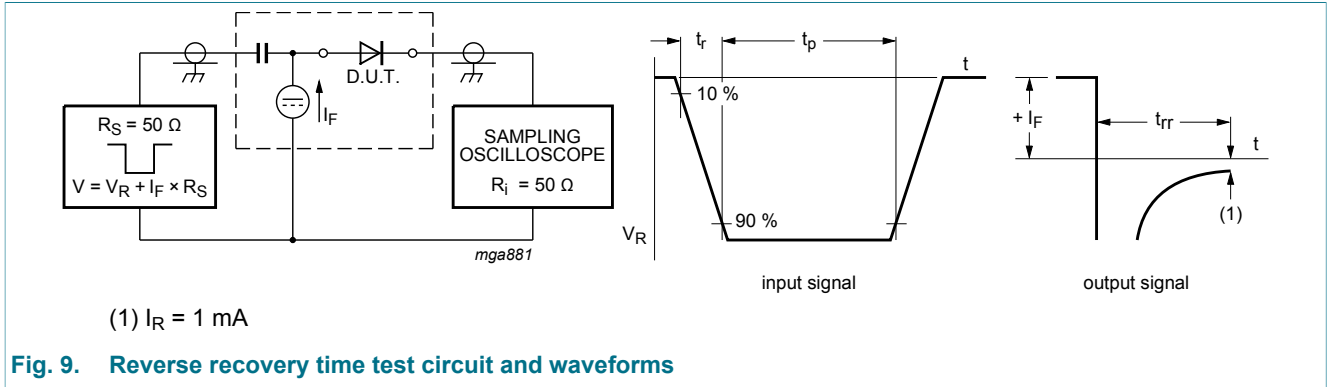
Fig. 7. Diode capacitance as a function of reverse voltage; typical values



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

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

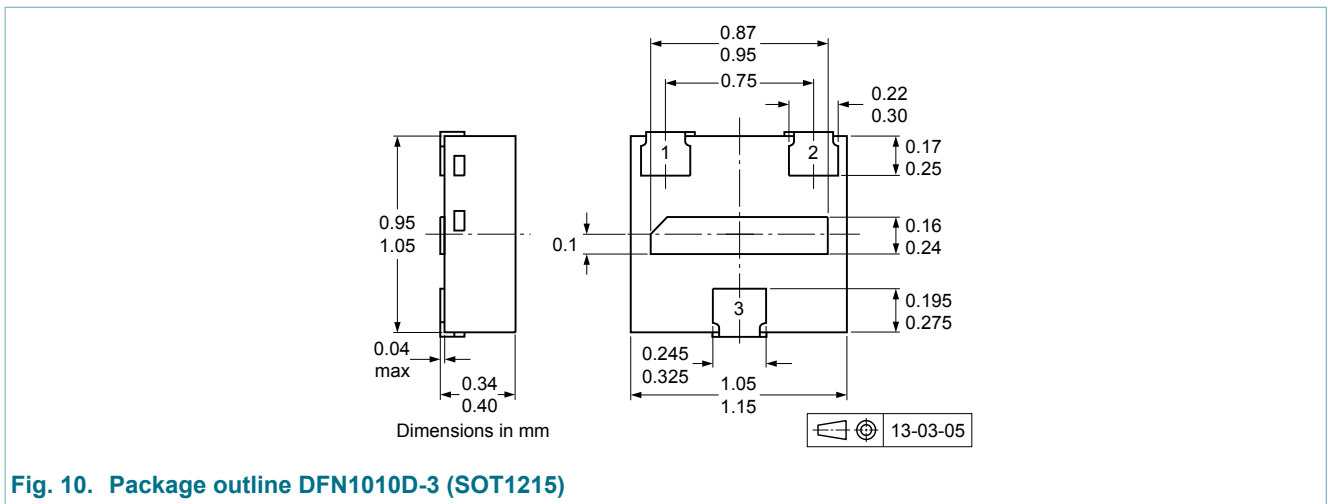
11. Test information



11.1 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

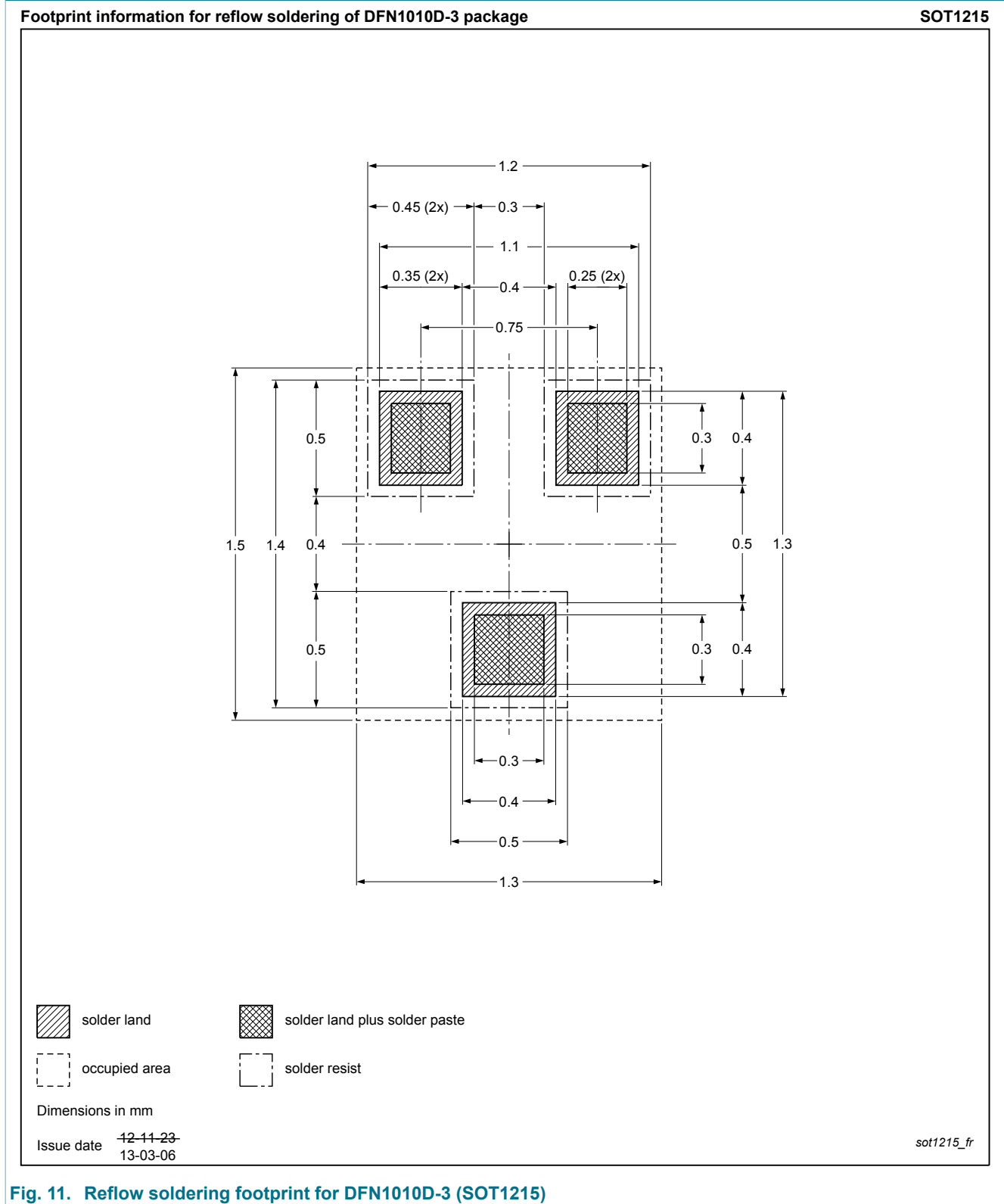


Fig. 11. Reflow soldering footprint for DFN1010D-3 (SOT1215)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV170QA v.1	20160503	Product data sheet	-	-

15. Legal information

15.1 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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