



# 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:  $t_{rr} = 0.8 \mu s$
- 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

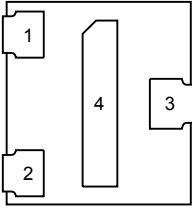
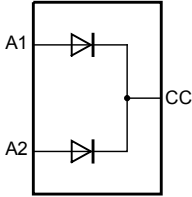
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$I_F$	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
<b>Per diode</b>							
$I_R$	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	$\mu s$

[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

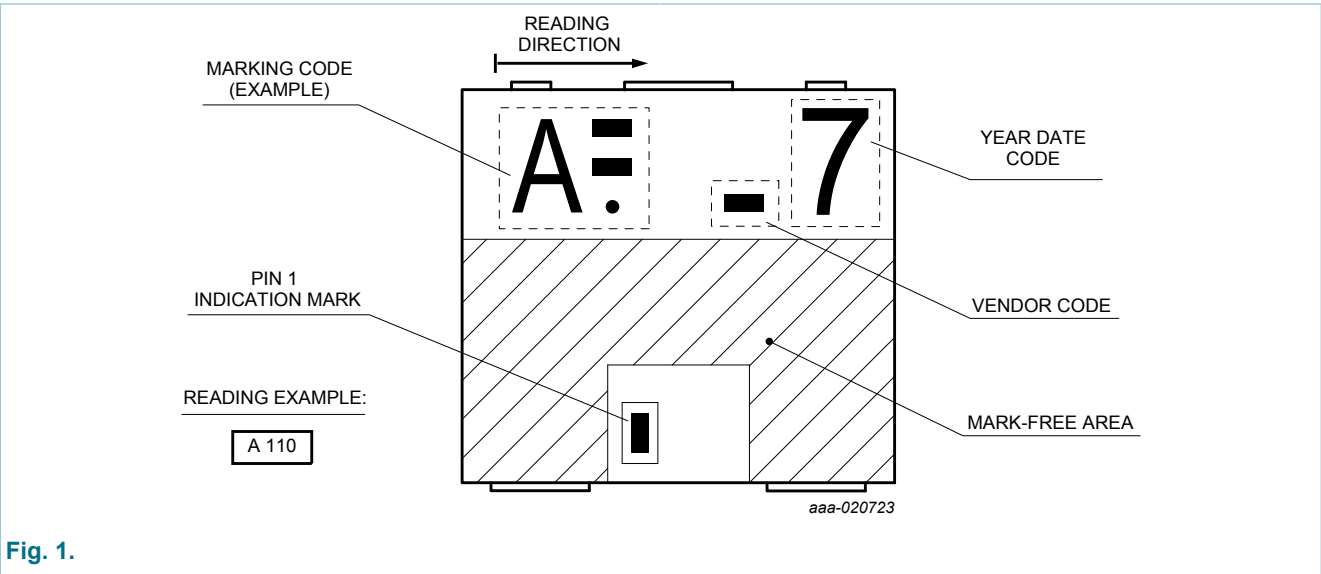
Table 3. Ordering information

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

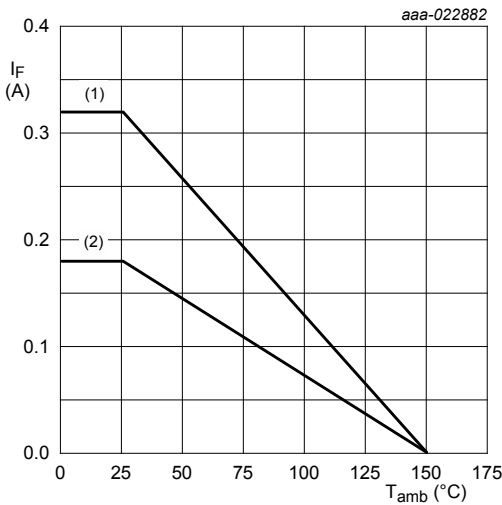


8. Limiting values

Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	75	V
V <sub>RRM</sub>	repetitive peak reverse voltage			-	85	V
I <sub>F</sub>	forward current	T <sub>amb</sub> = 25 °C; single diode loaded	[1]	-	320	mA
		T <sub>amb</sub> = 25 °C; double diode loaded	[1]	-	180	mA
I <sub>FRM</sub>	repetitive peak forward current	t <sub>p</sub> ≤ 0.5 ms; δ ≤ 0.25 ; T <sub>j</sub> = 25 °C		-	1	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 100 μs; T <sub>j(init)</sub> = 25 °C; square wave		-	4	A
		t <sub>p</sub> = 1 ms; T <sub>j(init)</sub> = 25 °C; square wave		-	1.5	A
		t <sub>p</sub> = 1 s; T <sub>j(init)</sub> = 25 °C; square wave		-	0.5	A
Per device; one diode loaded						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	325	mW
			[2]	-	540	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	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.



(1) single diode loaded  
(2) double diode loaded

Fig. 2. Forward current as a function of ambient temperature; derating curve

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.

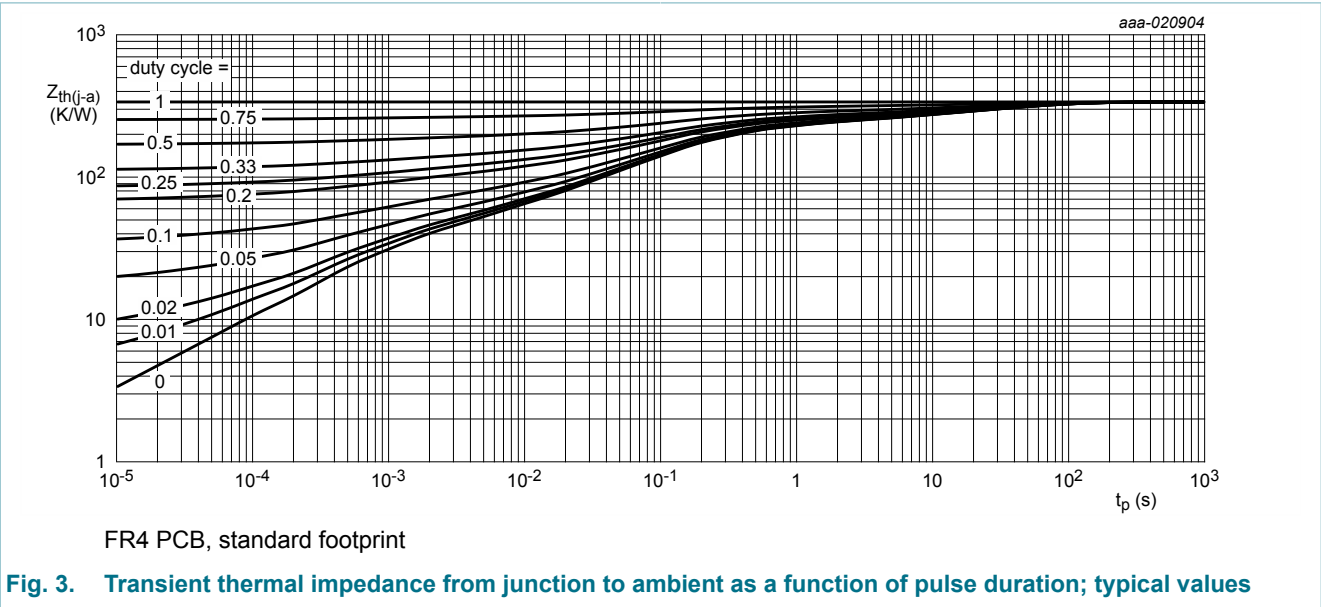
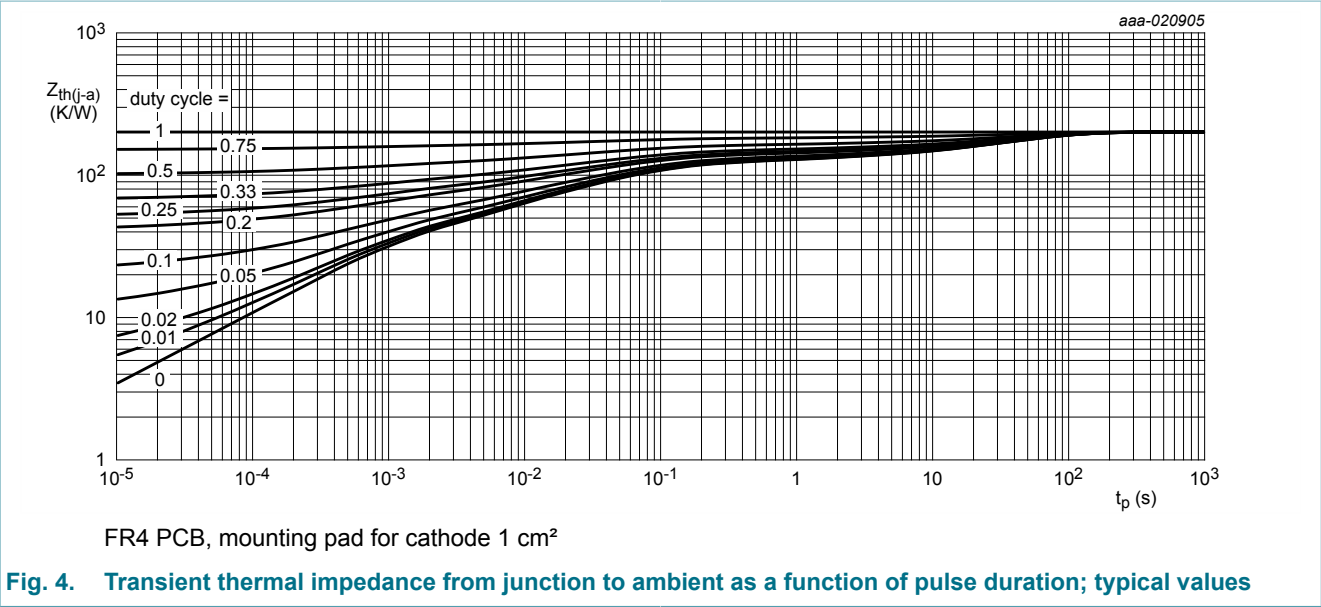


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; T <sub>j</sub> = 25 °C	-	-	0.9	V
		I <sub>F</sub> = 10 mA; T <sub>j</sub> = 25 °C	-	-	1	V
		I <sub>F</sub> = 50 mA; T <sub>j</sub> = 25 °C	-	-	1.1	V
		I <sub>F</sub> = 150 mA; T <sub>j</sub> = 25 °C	-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 75 V; T <sub>j</sub> = 25 °C	-	0.003	5	nA
		V <sub>R</sub> = 75 V; T <sub>j</sub> = 150 °C	-	3	80	nA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>j</sub> = 25 °C	-	2	-	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; I <sub>R(meas)</sub> = 1 mA; R <sub>L</sub> = 100 Ω; T <sub>amb</sub> = 25 °C	-	0.8	3	μs

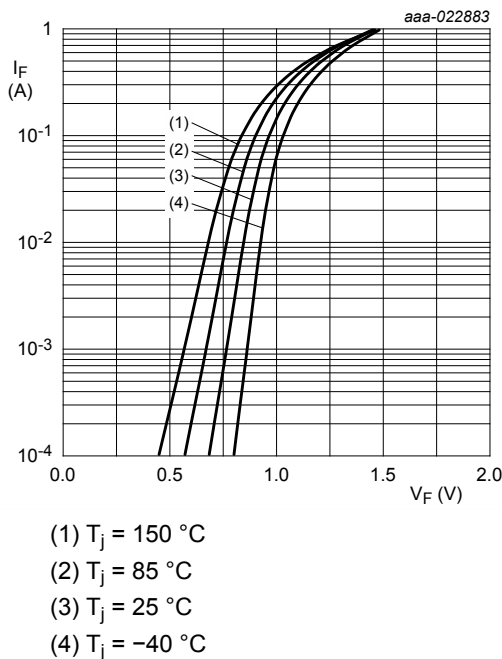


Fig. 5. Forward current as a function of forward voltage; typical values

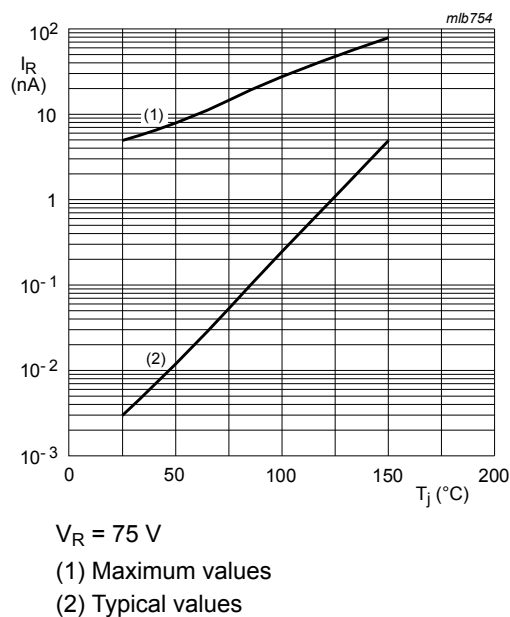


Fig. 6. Reverse current as a function of junction temperature

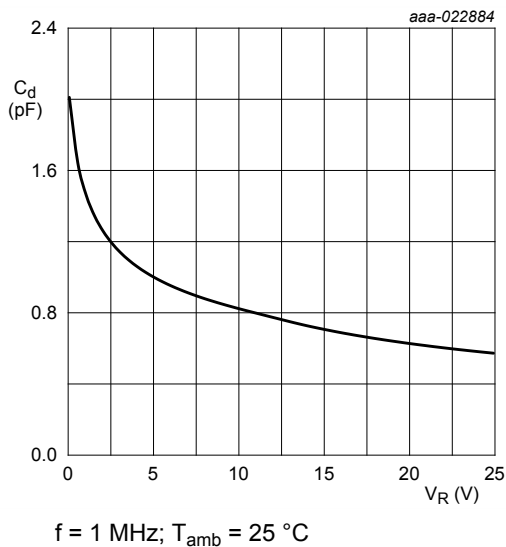


Fig. 7. Diode capacitance as a function of reverse voltage; typical values

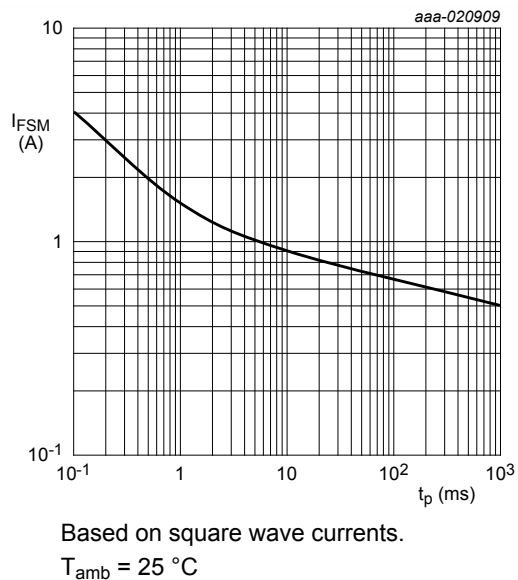
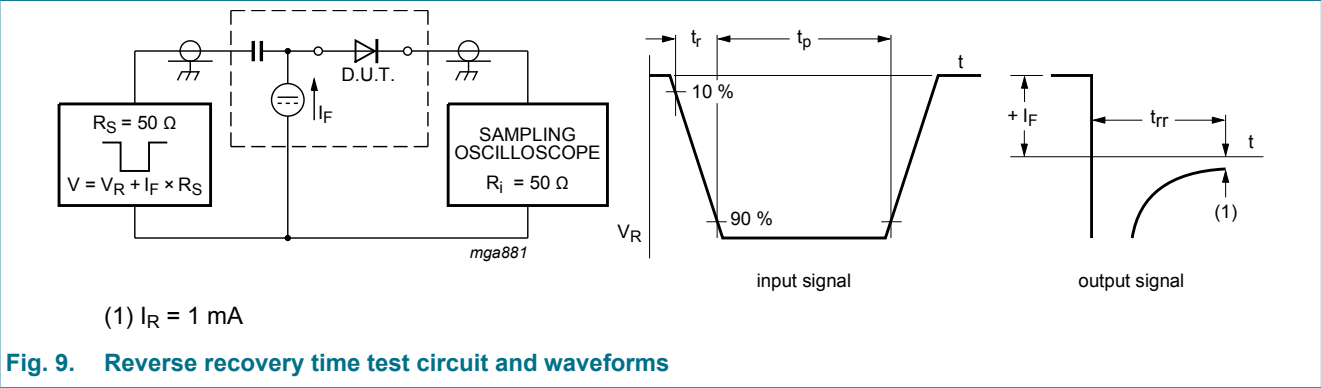


Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

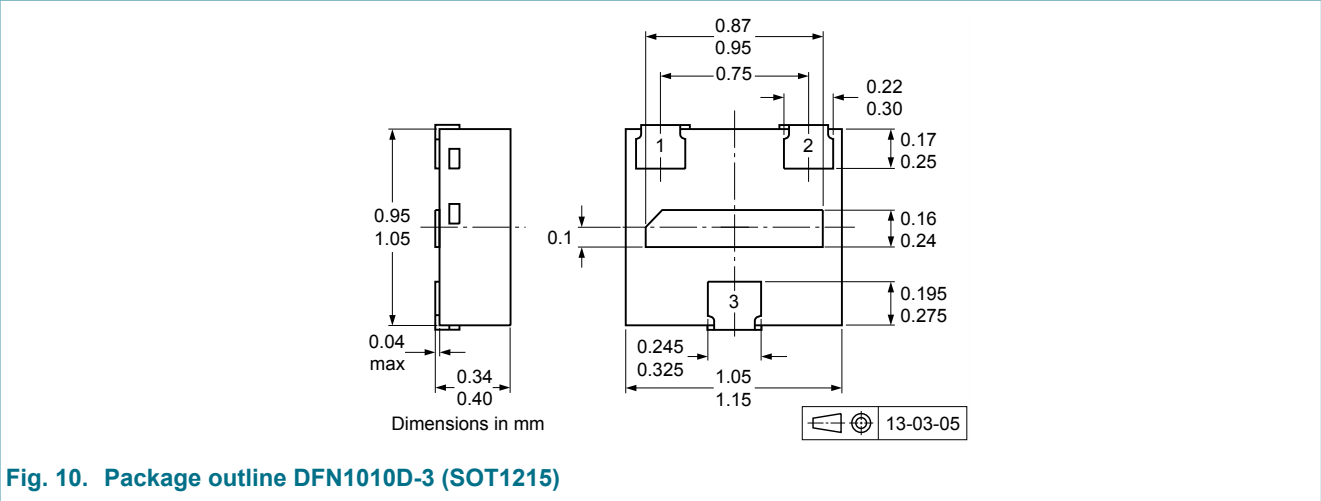
11. Test information



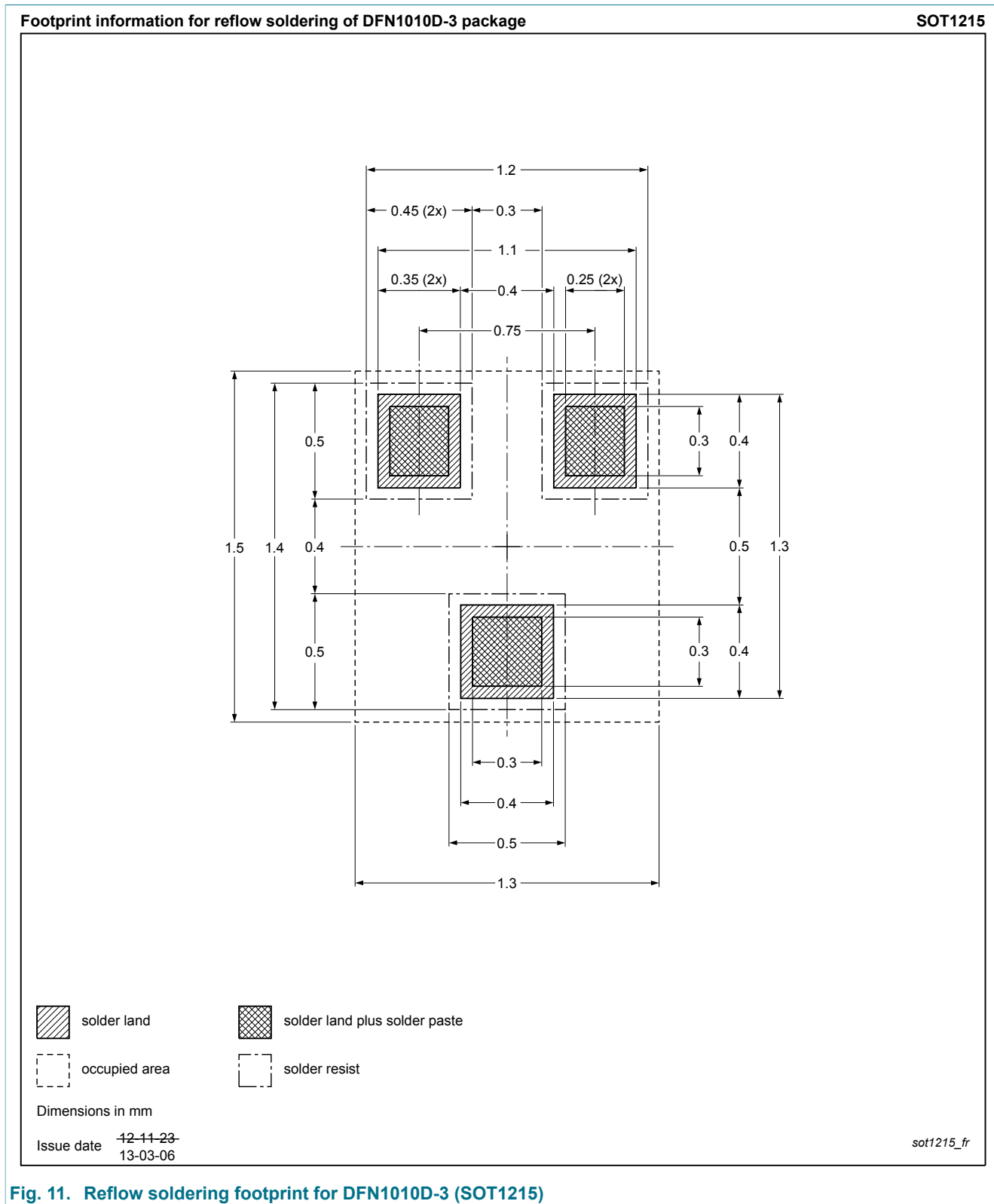
11.1 Quality information

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.
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16. Contents

1 General description ..... 1

2 Features and benefits ..... 1

3 Applications ..... 1

4 Quick reference data ..... 1

5 Pinning information ..... 2

6 Ordering information ..... 2

7 Marking ..... 2

8 Limiting values ..... 3

9 Thermal characteristics ..... 4

10 Characteristics ..... 5

11 Test information ..... 7

11.1 Quality information ..... 7

12 Package outline ..... 7

13 Soldering ..... 8

14 Revision history ..... 9

15 Legal information ..... 10

15.1 Data sheet status ..... 10

15.2 Definitions ..... 10

15.3 Disclaimers ..... 10

15.4 Trademarks ..... 11

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