



# 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

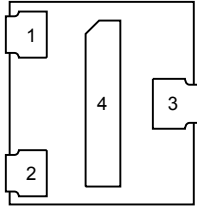
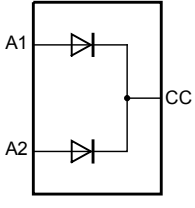
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<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	$\mu\text{s}$

[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

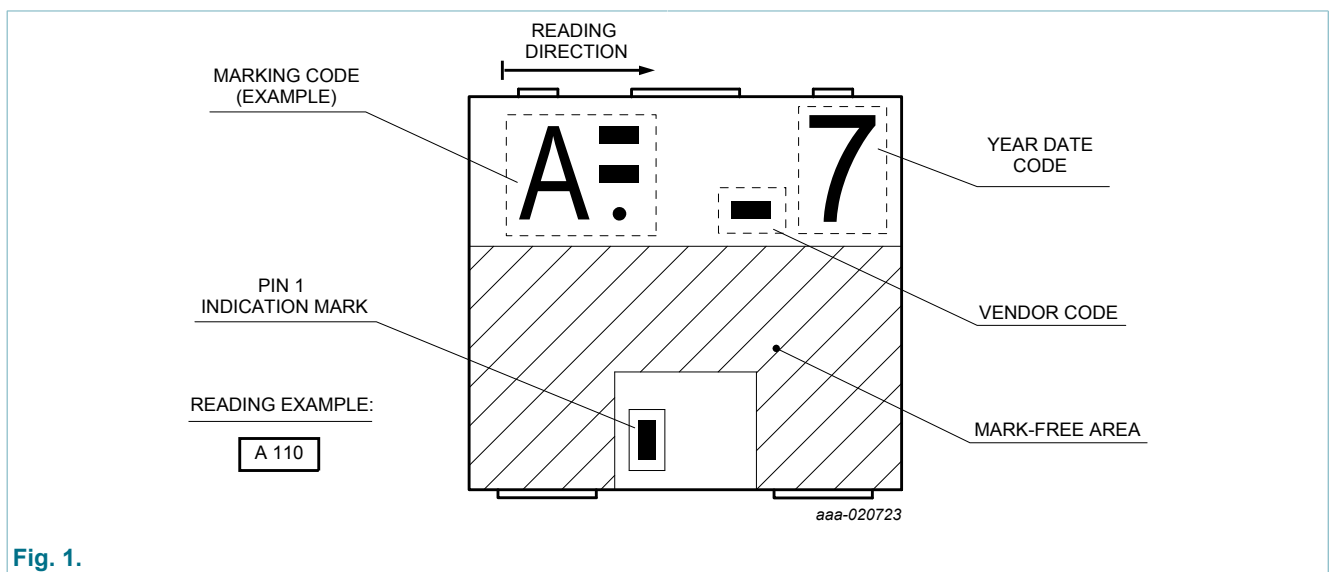


Fig. 1.

## 8. Limiting values

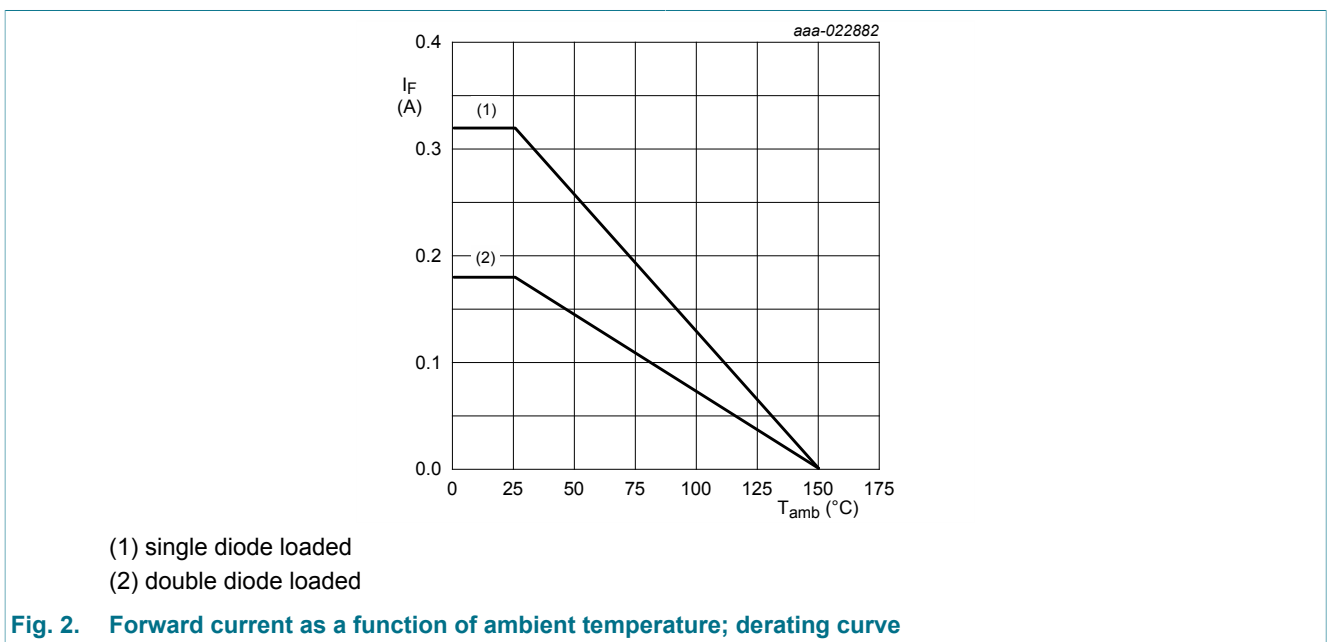
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
<b>Per diode</b>						
$V_R$	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
<b>Per device; one diode loaded</b>						
$P_{tot}$	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 cm<sup>2</sup>.



**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 <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	385	K/W
			[2]	-	-	230	K/W
R <sub>th(j-sp)</sub>	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 cm<sup>2</sup>.
- [3] Soldering point of cathode tab.

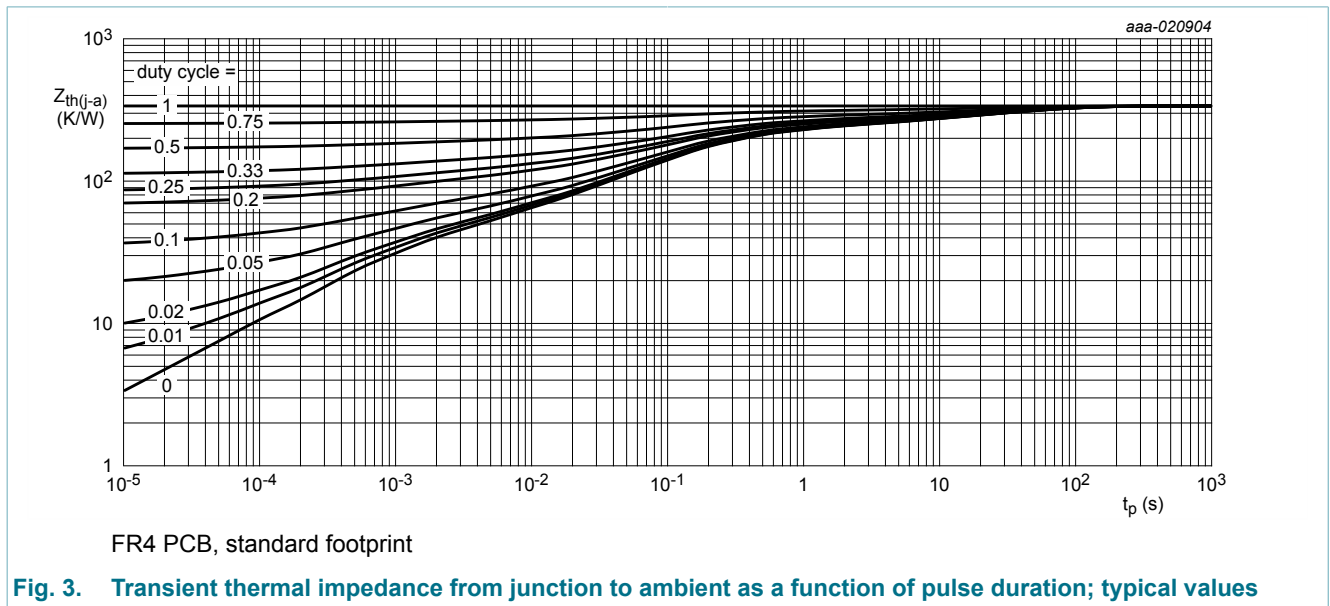


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

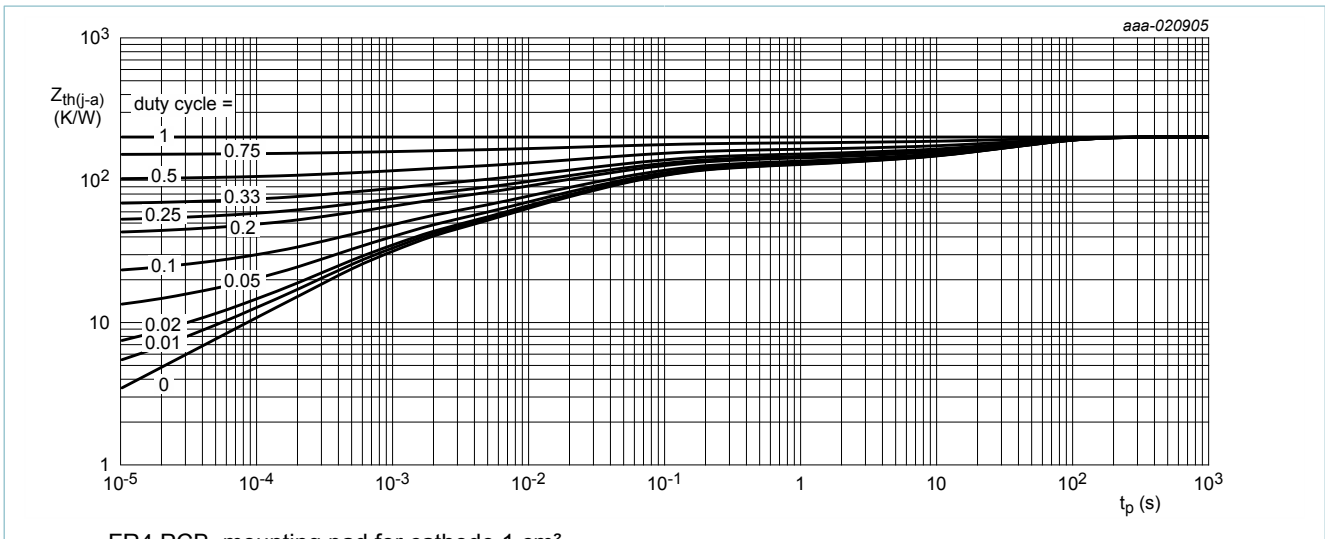
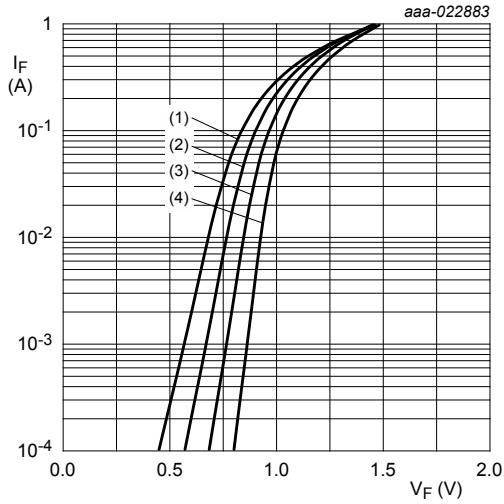


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

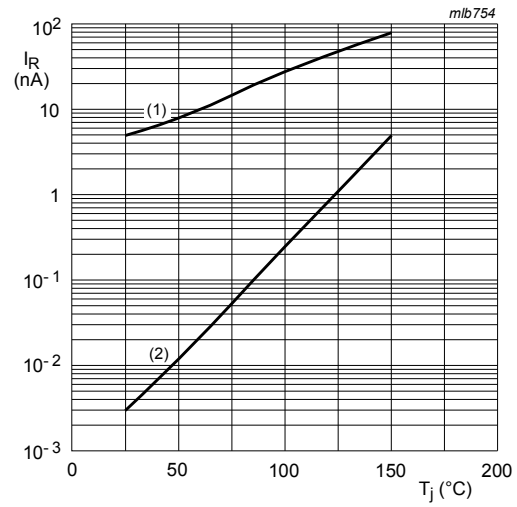
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	0.9	V
		$I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1	V
		$I_F = 50 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1.1	V
		$I_F = 150 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 75 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	0.003	5	nA
		$V_R = 75 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	3	80	nA
$C_d$	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	2	-	pF
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; I_{R(\text{meas})} = 1 \text{ mA}; R_L = 100 \text{ } \Omega; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	0.8	3	$\mu\text{s}$



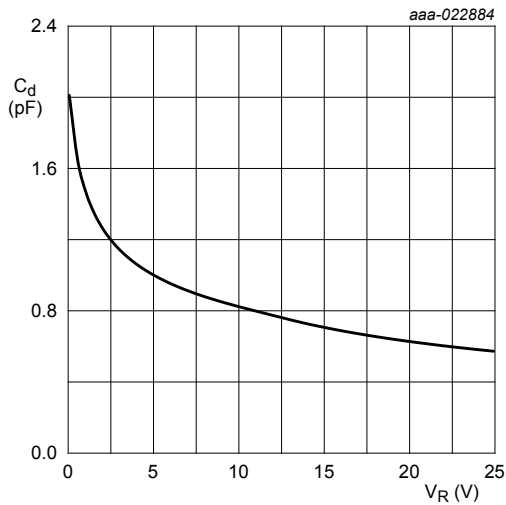
- (1)  $T_j = 150\text{ }^\circ\text{C}$
- (2)  $T_j = 85\text{ }^\circ\text{C}$
- (3)  $T_j = 25\text{ }^\circ\text{C}$
- (4)  $T_j = -40\text{ }^\circ\text{C}$

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



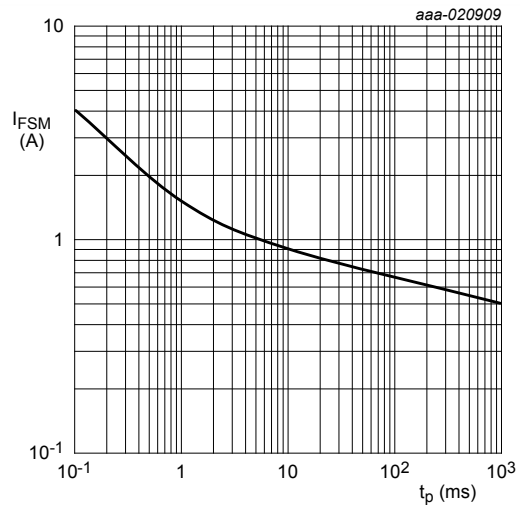
- $V_R = 75\text{ V}$
- (1) Maximum values
  - (2) Typical values

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



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

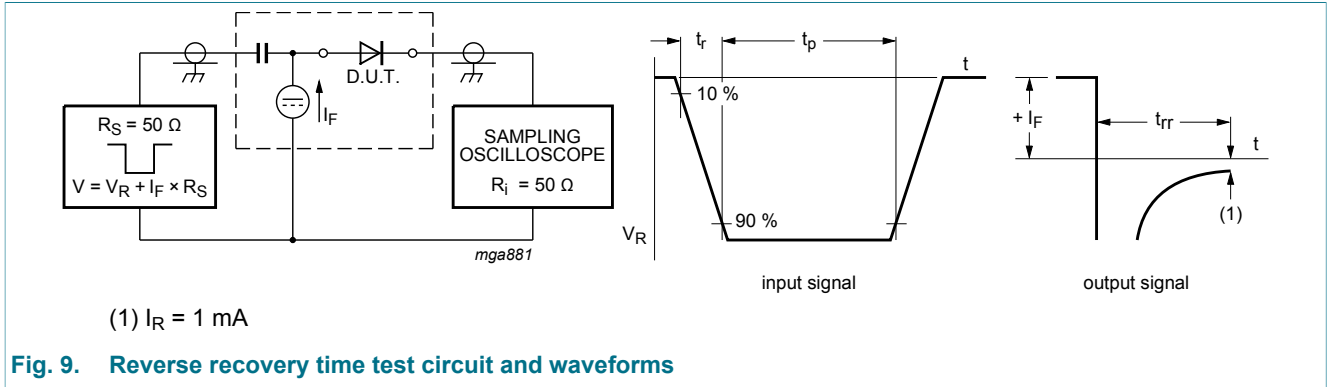
Fig. 7. Diode capacitance as a function of reverse voltage; typical values



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

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

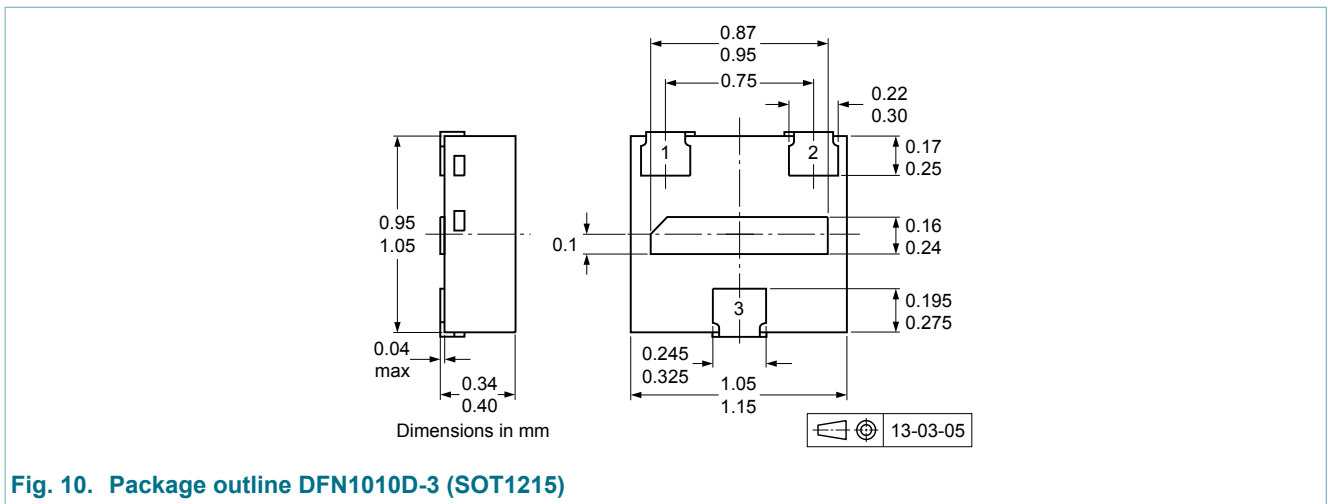
### 11. Test information



#### 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

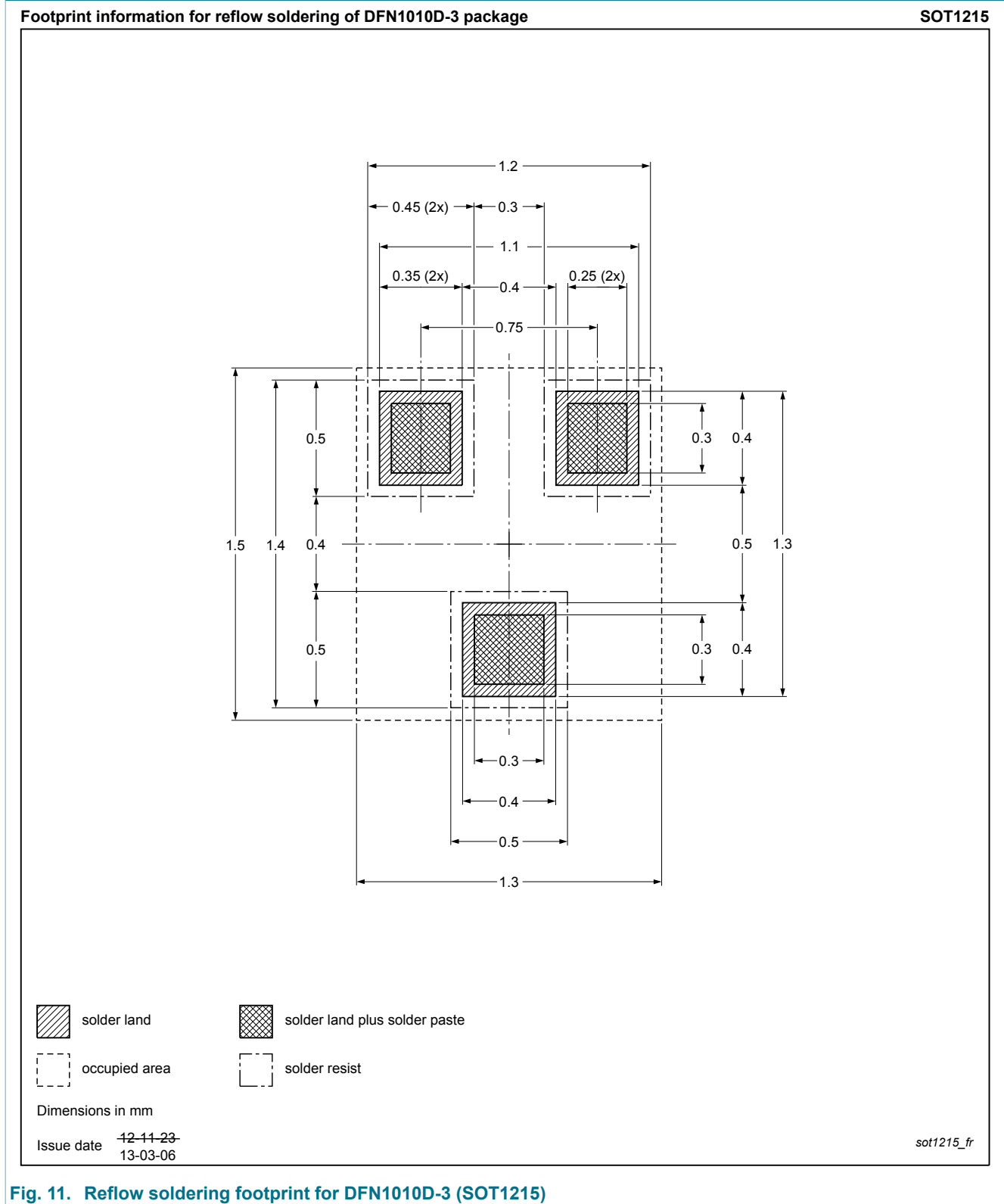


Fig. 11. Reflow soldering footprint for DFN1010D-3 (SOT1215)



## 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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