

# BAV99QA

## Dual series high-speed switching diodes

4 May 2016

Product data sheet

## 1. General description

Dual series high-speed switching diodes, 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:  $t_{rr} \leq 4$  ns
- Low leakage current
- Reverse voltage  $V_R \leq 90$  V
- Low capacitance  $C_d \leq 2$  pF
- Ultra small SMD plastic package
- Low package height of 0.37 mm
- AEC-Q101 qualified
- Suitable for Automatic Optical Inspection (AOI) of solder joint

## 3. Applications

- High-speed switching
- General-purpose switching
- Reverse polarity protection

## 4. Quick reference data

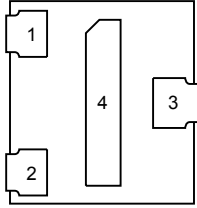
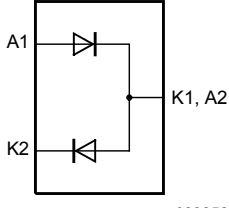
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$I_F$	forward current	$T_{amb} = 25$ °C; single diode loaded	[1]	-	-	290	mA
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	90	V
$I_R$	reverse current	$V_R = 80$ V; $T_j = 25$ °C		-	-	0.5	$\mu$ A
$t_{rr}$	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $I_{R(meas)} = 1$ mA; $R_L = 100$ $\Omega$ ; $T_{amb} = 25$ °C		-	-	4	ns

[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 <b>DFN1010D-3 (SOT1215)</b></p>	 <p>aaa-022858</p>
2	K2	cathode (diode 2)		
3	K1, A2	cathode (diode1) and anode (diode2)		
4	K1, A2	cathode (diode1) and anode (diode2)		

### 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV99QA	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
BAV99QA	Z 100

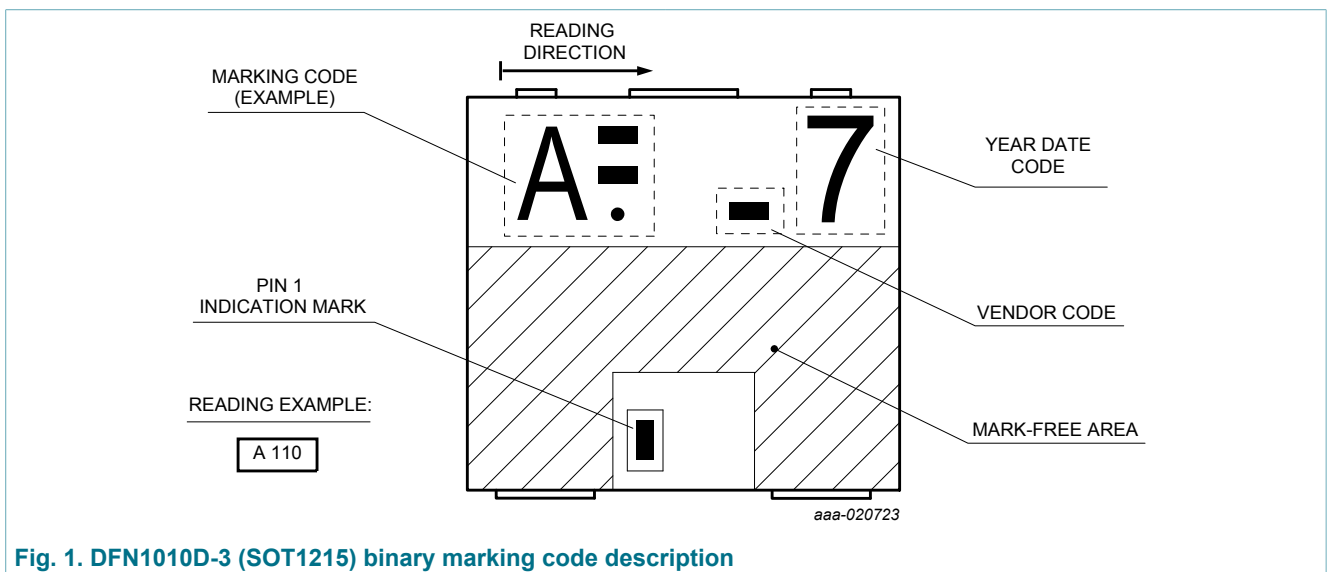


Fig. 1. DFN1010D-3 (SOT1215) binary marking code description

## 8. Limiting values

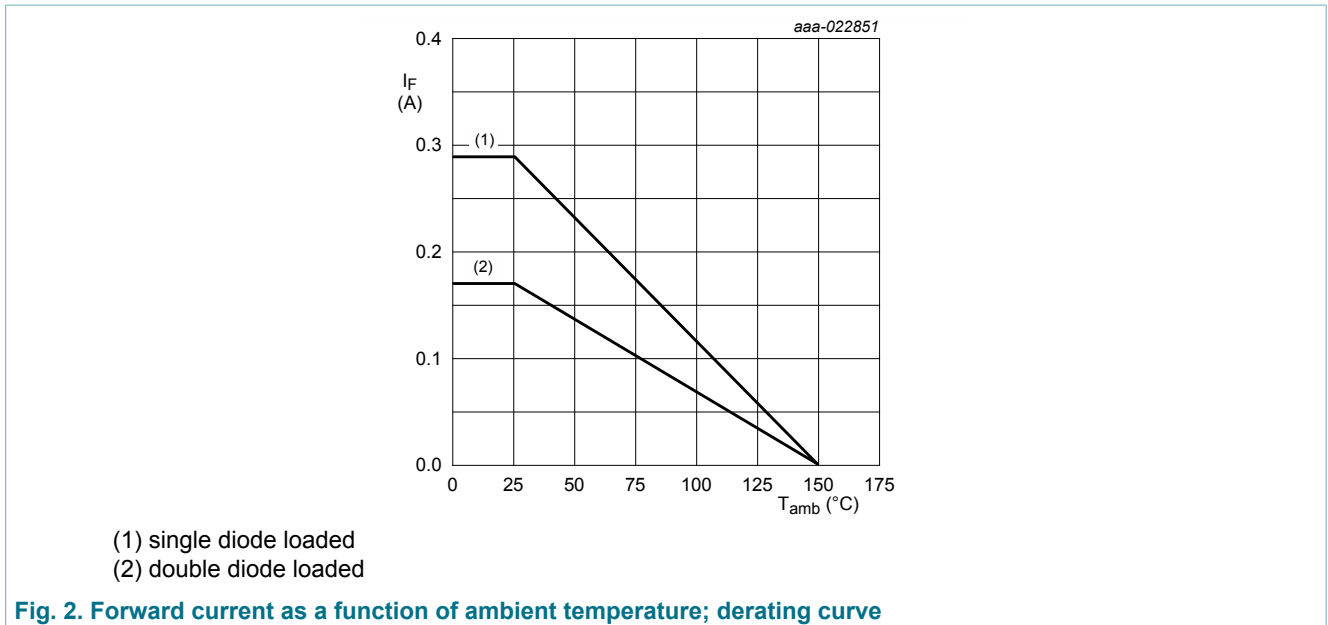
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
<b>Per diode</b>						
$V_R$	reverse voltage	$T_j = 25\text{ °C}$		-	90	V
$I_F$	forward current	$T_{amb} = 25\text{ °C}$ ; single diode loaded	[1]	-	290	mA
		$T_{amb} = 25\text{ °C}$ ; double diode loaded	[1]	-	170	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 0.5\text{ ms}$ ; $\delta \leq 0.25$ ; $T_j = 25\text{ °C}$		-	700	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 100\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	4	A
		$t_p = 1\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	1.5	A
		$t_p = 1\text{ s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	0.5	A
<b>Per device; one diode loaded</b>						
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	305	mW
			[2]	-	470	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>.



## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	[1]	-	-	410	K/W
		[2]	-	-	265	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[3]	-	-	55	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.

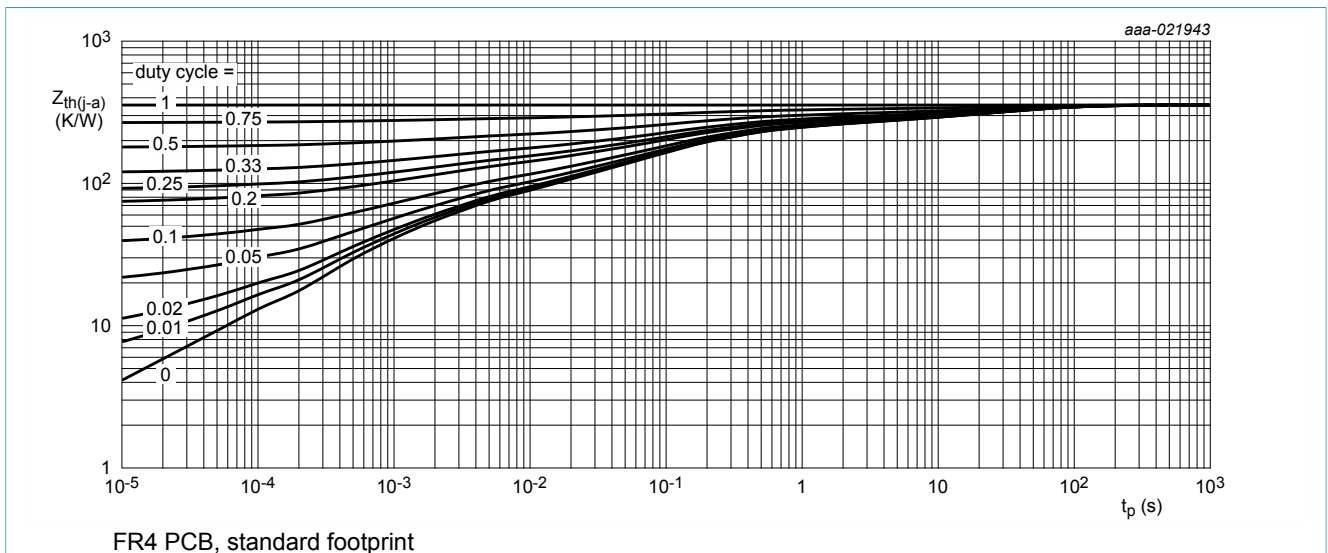


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

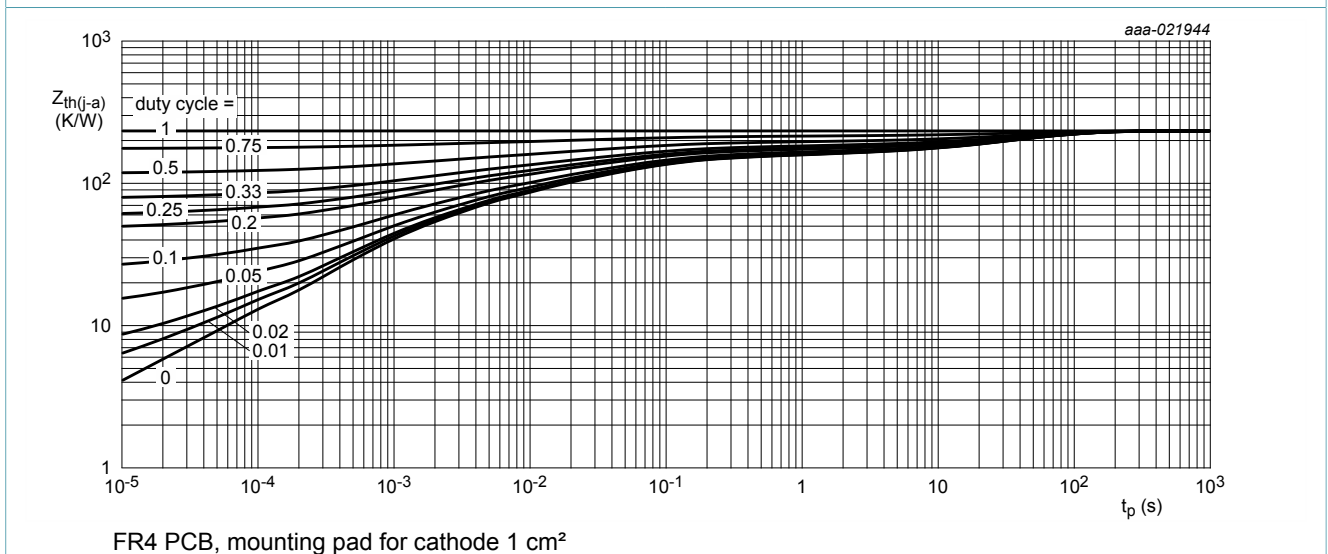


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; T <sub>J</sub> = 25 °C	-	-	715	mV
		I <sub>F</sub> = 10 mA; T <sub>J</sub> = 25 °C	-	-	855	mV
		I <sub>F</sub> = 50 mA; T <sub>J</sub> = 25 °C	-	-	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> = 25 V; T <sub>J</sub> = 25 °C	-	-	30	nA
		V <sub>R</sub> = 80 V; T <sub>J</sub> = 25 °C	-	-	0.5	µA
		V <sub>R</sub> = 25 V; T <sub>J</sub> = 150 °C	-	-	30	µA
		V <sub>R</sub> = 80 V; T <sub>J</sub> = 150 °C	-	-	150	µA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>amb</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	-	-	4	ns
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 mA; t <sub>r</sub> = 20 ns; T <sub>amb</sub> = 25 °C	-	-	1.75	V

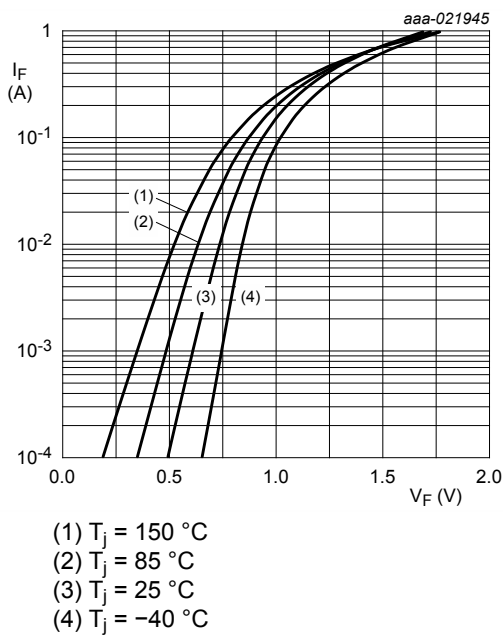


Fig. 5. Forward current as a function of forward voltage; typical values

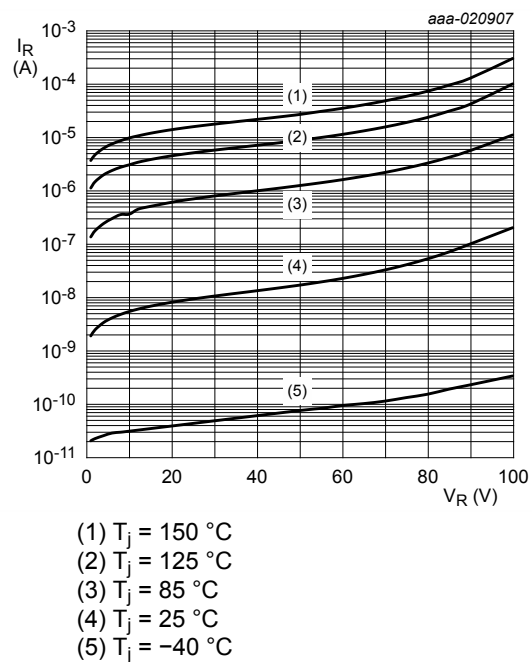
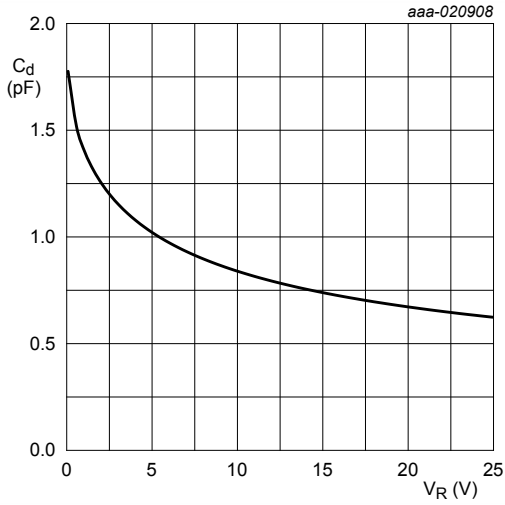
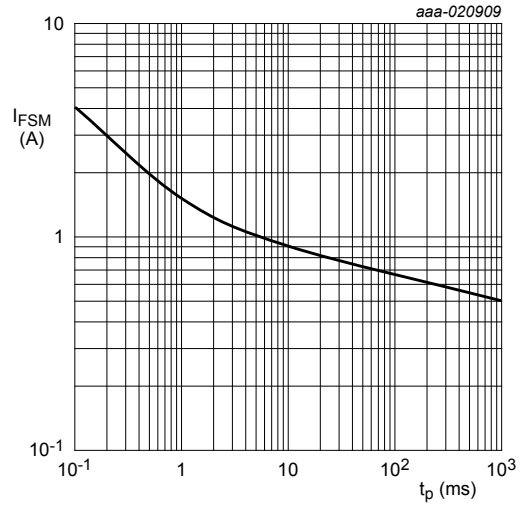


Fig. 6. Reverse current as a function of reverse voltage; typical values



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

**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

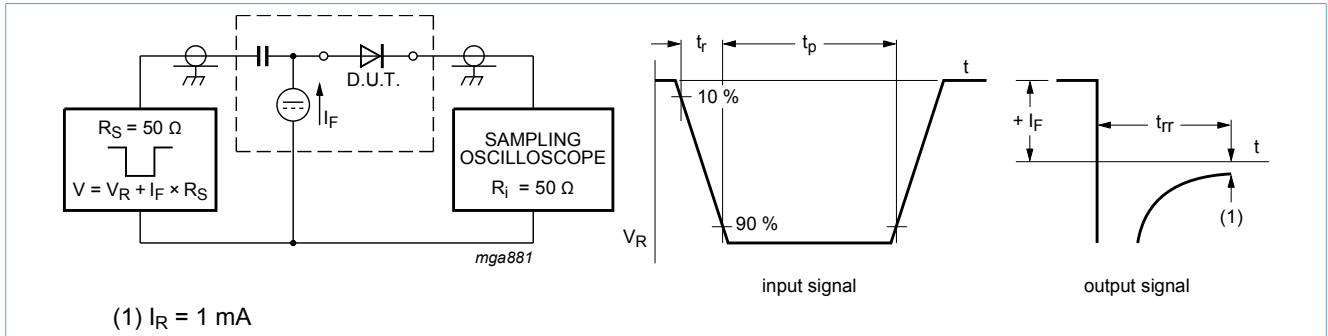


Fig. 9. Reverse recovery time test circuit and waveforms

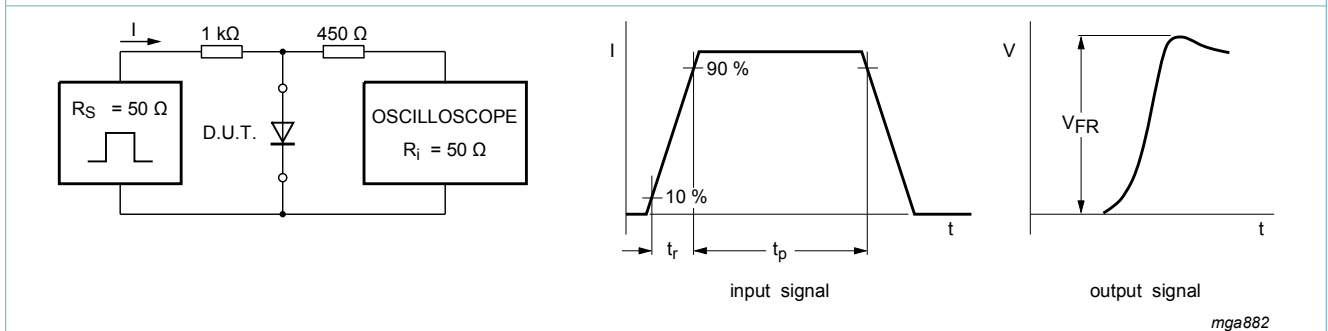


Fig. 10. Forward recovery voltage test circuit and waveforms

### 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

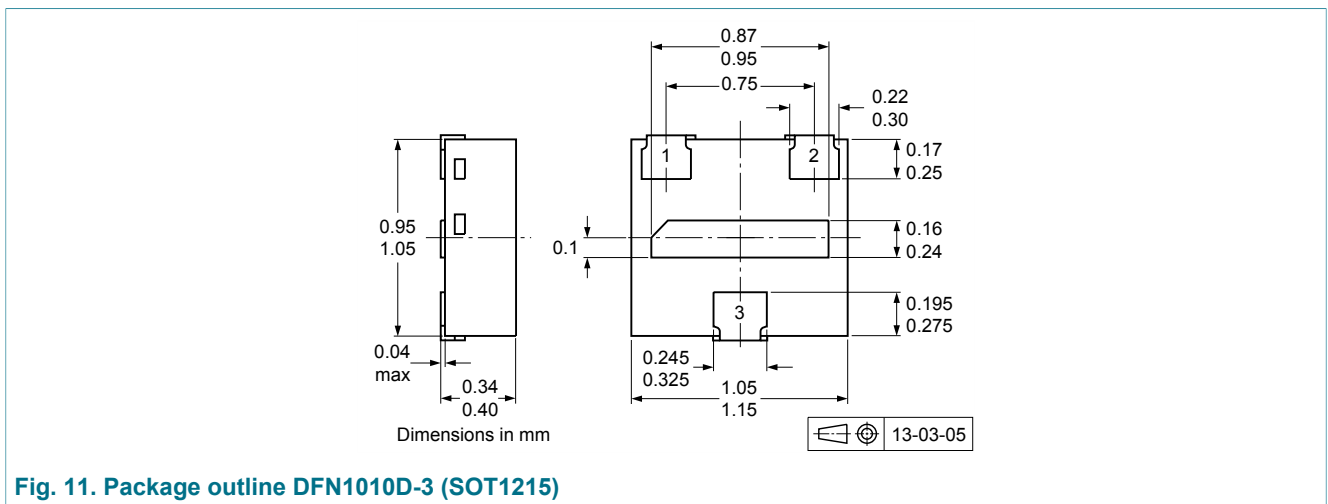


Fig. 11. Package outline DFN1010D-3 (SOT1215)

### 13. Soldering

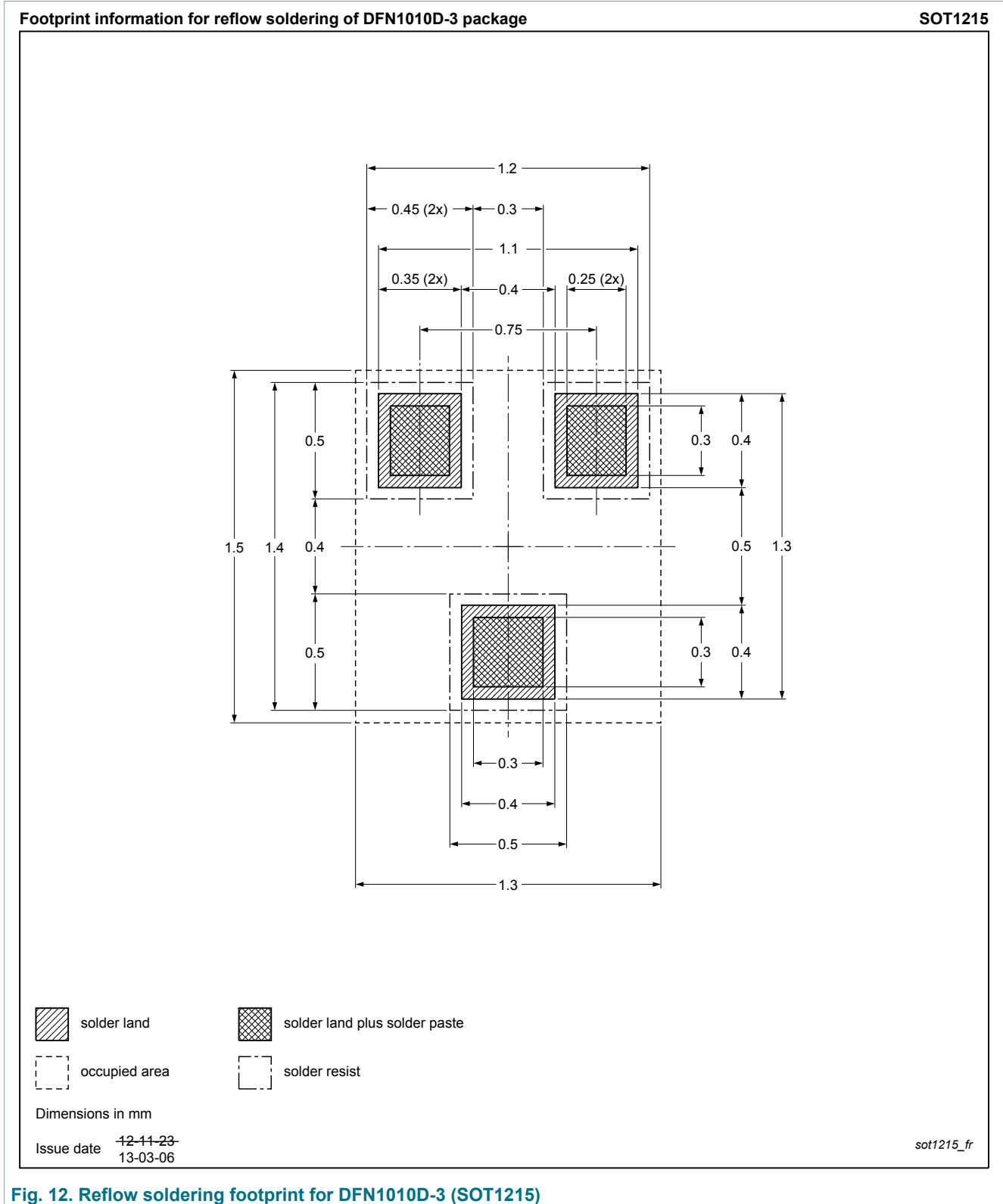


Fig. 12. Reflow soldering footprint for DFN1010D-3 (SOT1215)



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV99QA v.1	20160504	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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- [2] The term 'short data sheet' is explained in section "Definitions".
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