

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

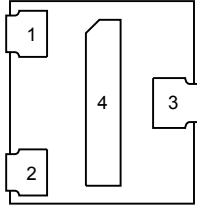
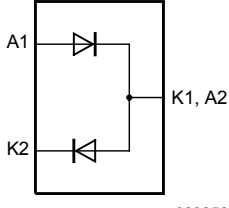
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
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	μ A
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		-	-	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 DFN1010D-3 (SOT1215)</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

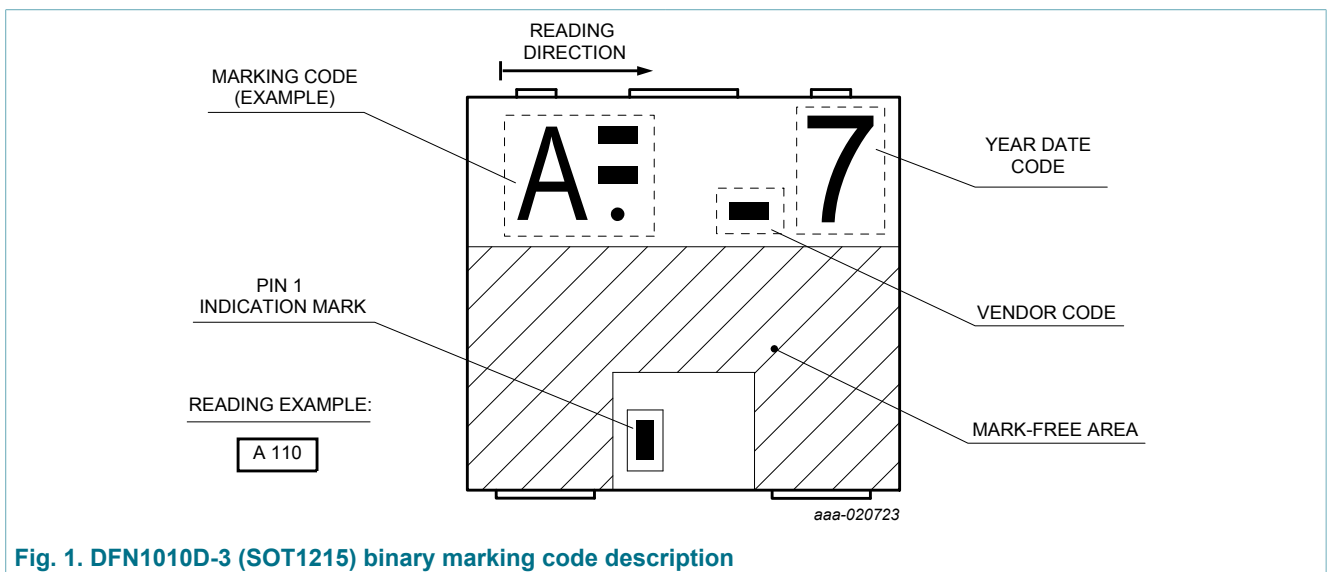


Fig. 1. DFN1010D-3 (SOT1215) binary marking code description

8. Limiting values

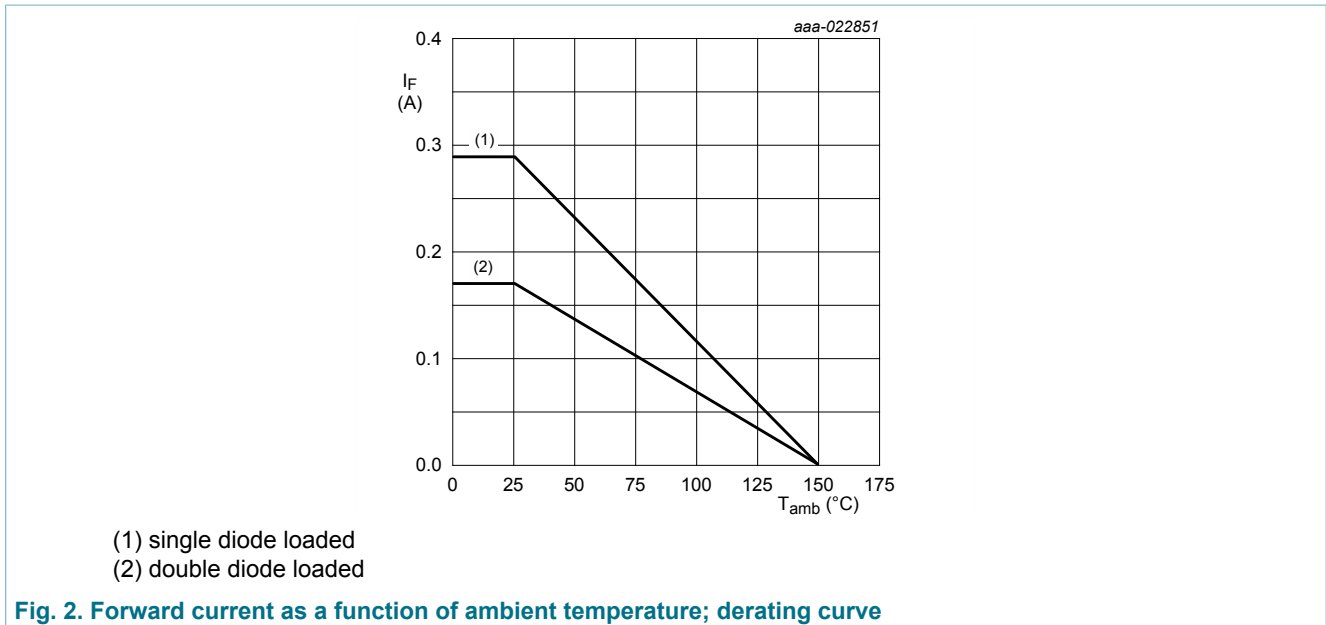
Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
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
Per device; one diode loaded						
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 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	[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 cm².
- [3] Soldering point of cathode tab.

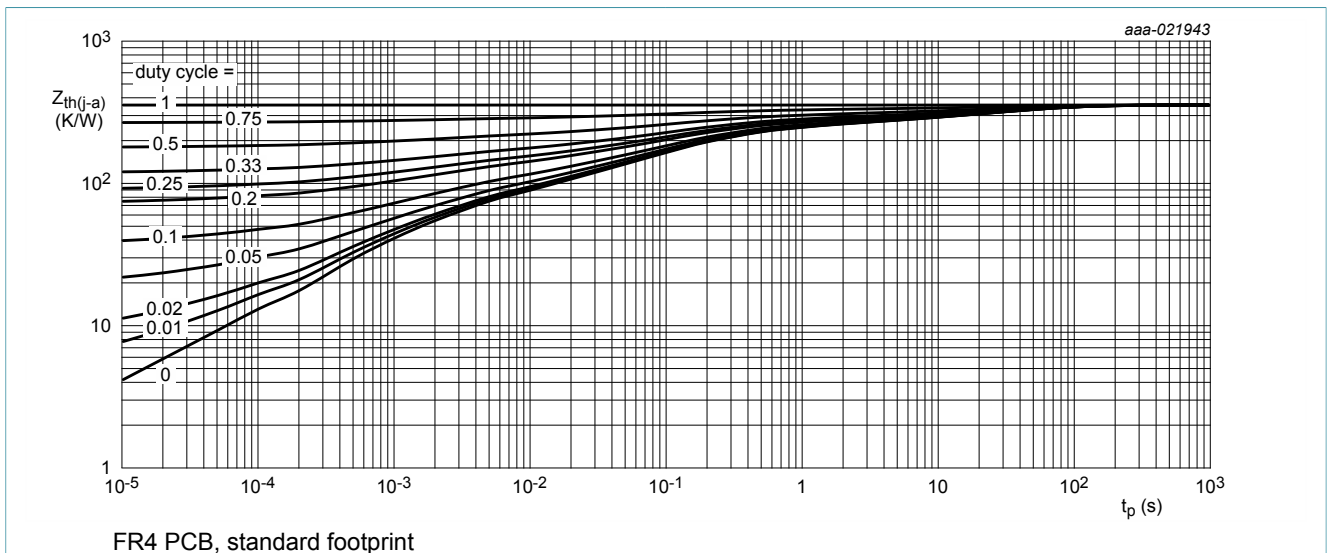


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

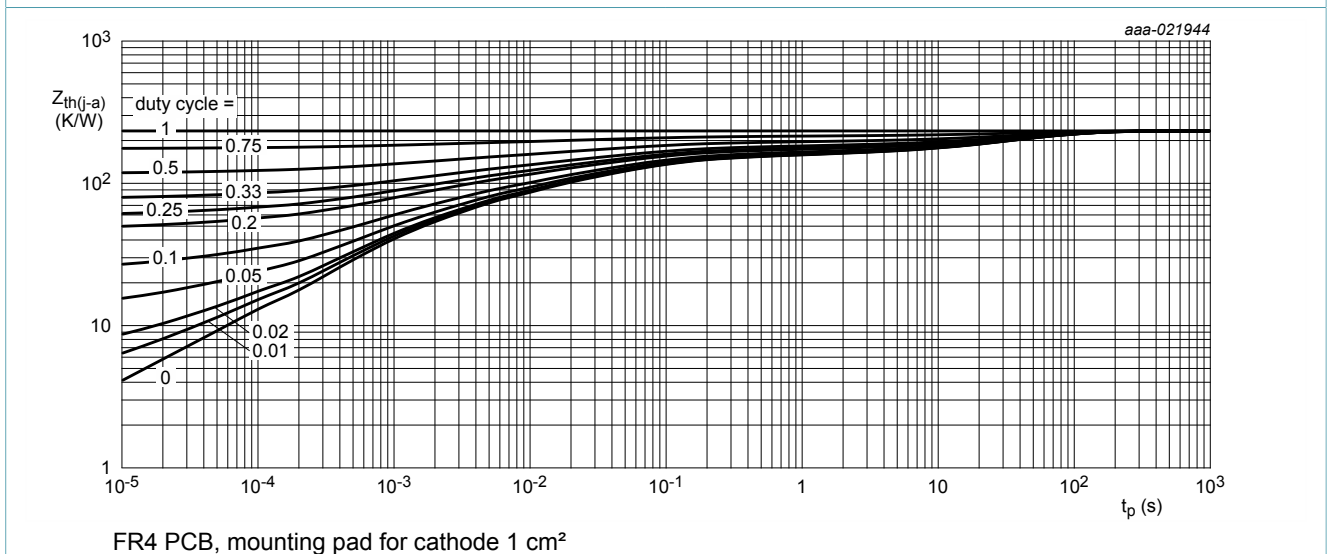


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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	-	-	715	mV
		I _F = 10 mA; T _j = 25 °C	-	-	855	mV
		I _F = 50 mA; T _j = 25 °C	-	-	1	V
		I _F = 150 mA; T _j = 25 °C	-	-	1.25	V
I _R	reverse current	V _R = 25 V; T _j = 25 °C	-	-	30	nA
		V _R = 80 V; T _j = 25 °C	-	-	0.5	μA
		V _R = 25 V; T _j = 150 °C	-	-	30	μA
		V _R = 80 V; T _j = 150 °C	-	-	150	μA
C _d	diode capacitance	V _R = 0 V; f = 1 MHz; T _{amb} = 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	-	-	4	ns
V _{FR}	forward recovery voltage	I _F = 10 mA; t _r = 20 ns; T _{amb} = 25 °C	-	-	1.75	V

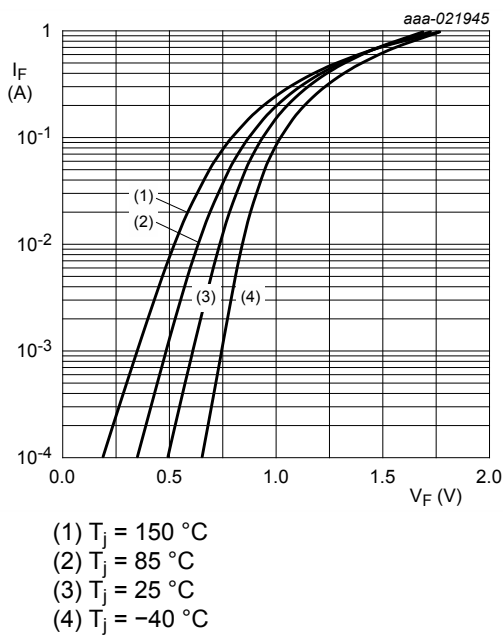


Fig. 5. Forward current as a function of forward voltage; typical values

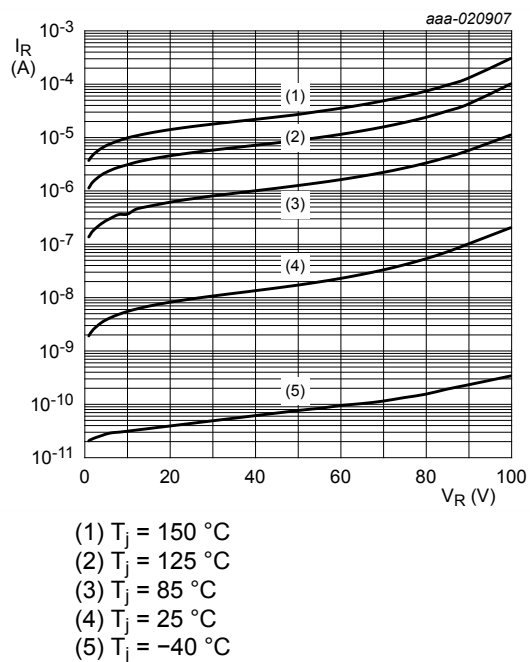
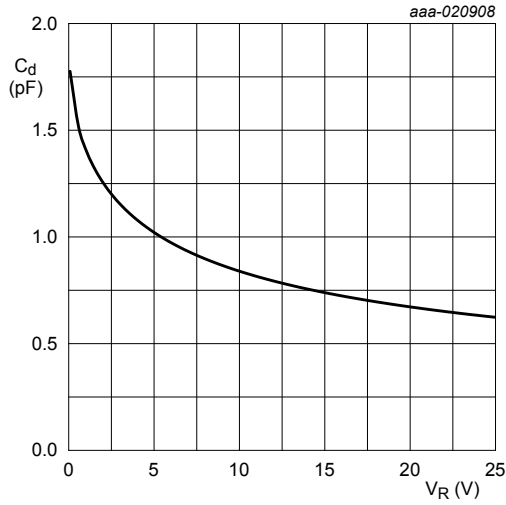
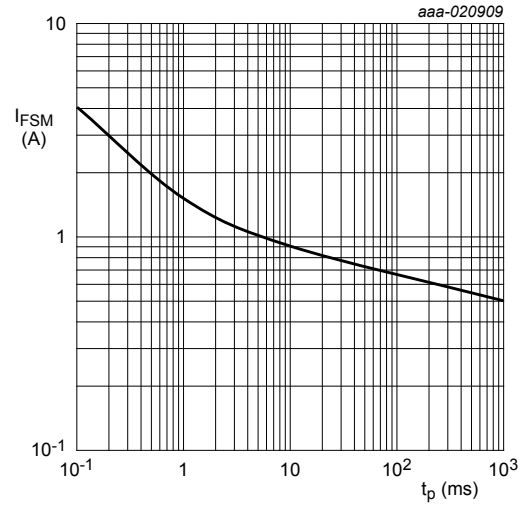


Fig. 6. Reverse current as a function of reverse voltage; typical values



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

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

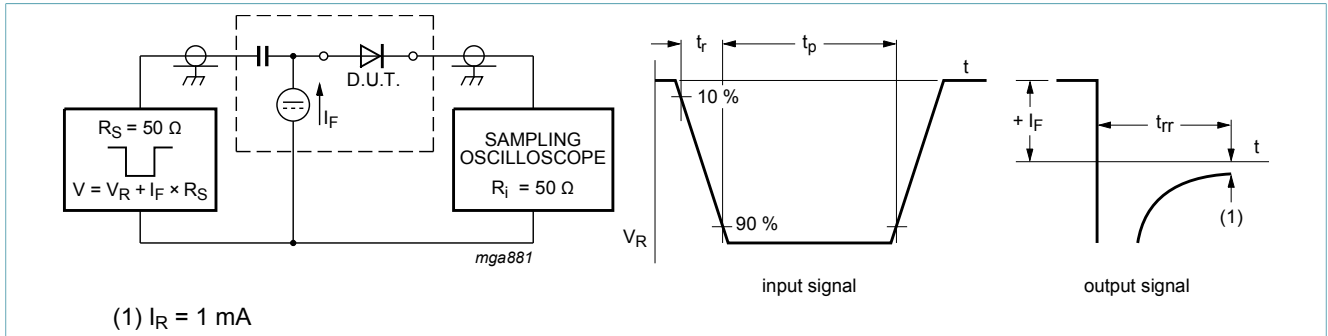


Fig. 9. Reverse recovery time test circuit and waveforms

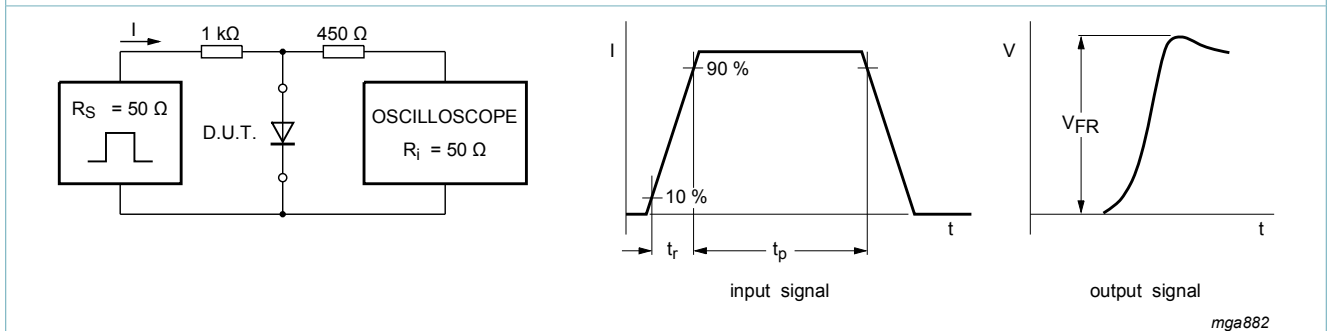


Fig. 10. Forward recovery voltage test circuit and waveforms

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

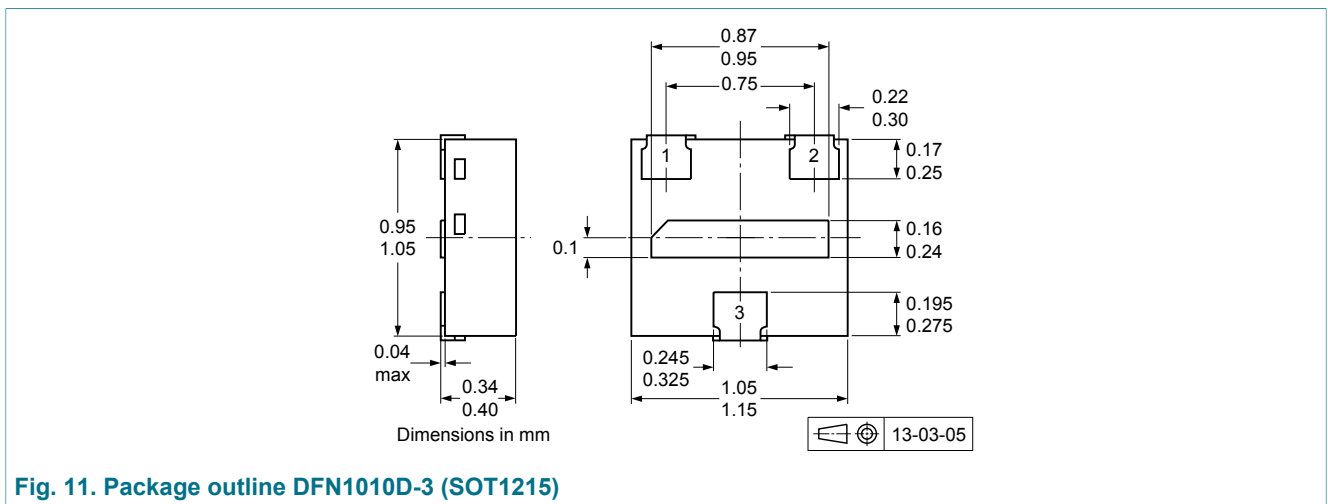
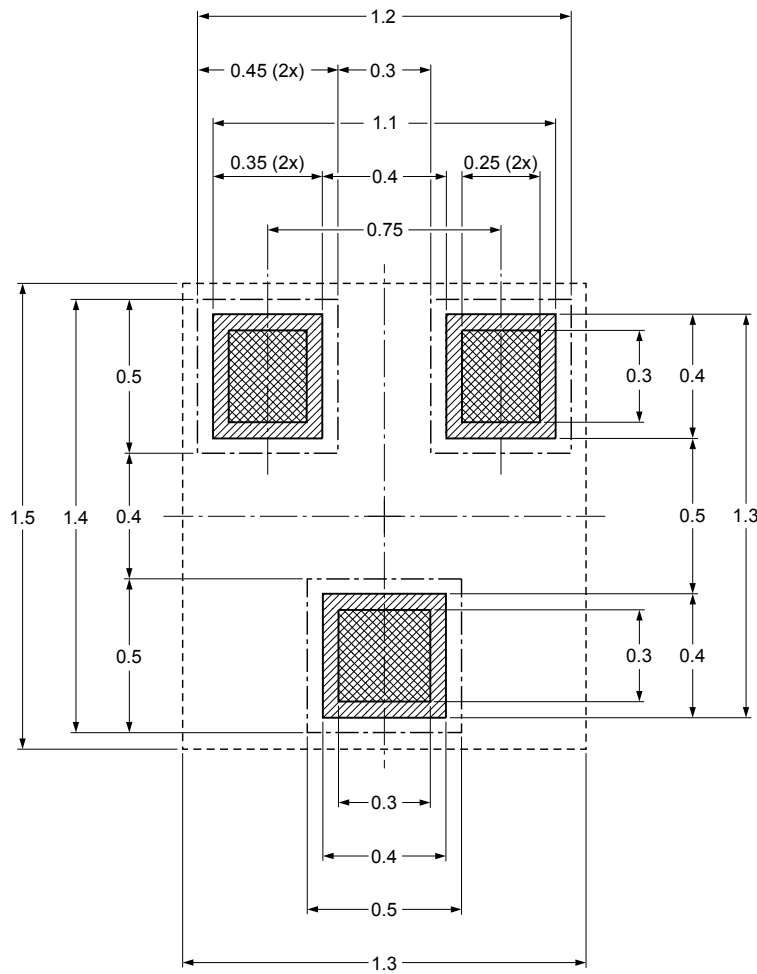






Fig. 11. Package outline DFN1010D-3 (SOT1215)

13. Soldering

Footprint information for reflow soldering of DFN1010D-3 package

SOT1215



-  solder land
-  solder land plus solder paste
-  occupied area
-  solder resist

Dimensions in mm

Issue date ~~12-11-23~~
13-03-06

sot1215_fr

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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Date of release: 04 May 2016

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