

BAV70QA

Dual common cathode high-speed switching diode

4 May 2016

Product data sheet

1. General description

Dual common cathode high-speed switching 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: $t_{rr} \leq 4$ ns
- Low leakage current: $I_R \leq 0.5$ μ A
- Reverse voltage $V_R \leq 100$ V
- Low capacitance $C_d \leq 1.5$ 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

4. Quick reference data

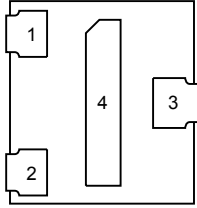
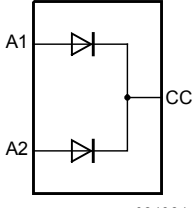
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current	$T_{amb} = 25$ °C; single diode loaded	[1]	-	-	300	mA
V_R	reverse voltage	$T_j = 25$ °C		-	-	100	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-021931</p>
2	A2	anode (diode 2)		
3	CC	common cathode		
4	CC	common cathode		

6. Ordering information

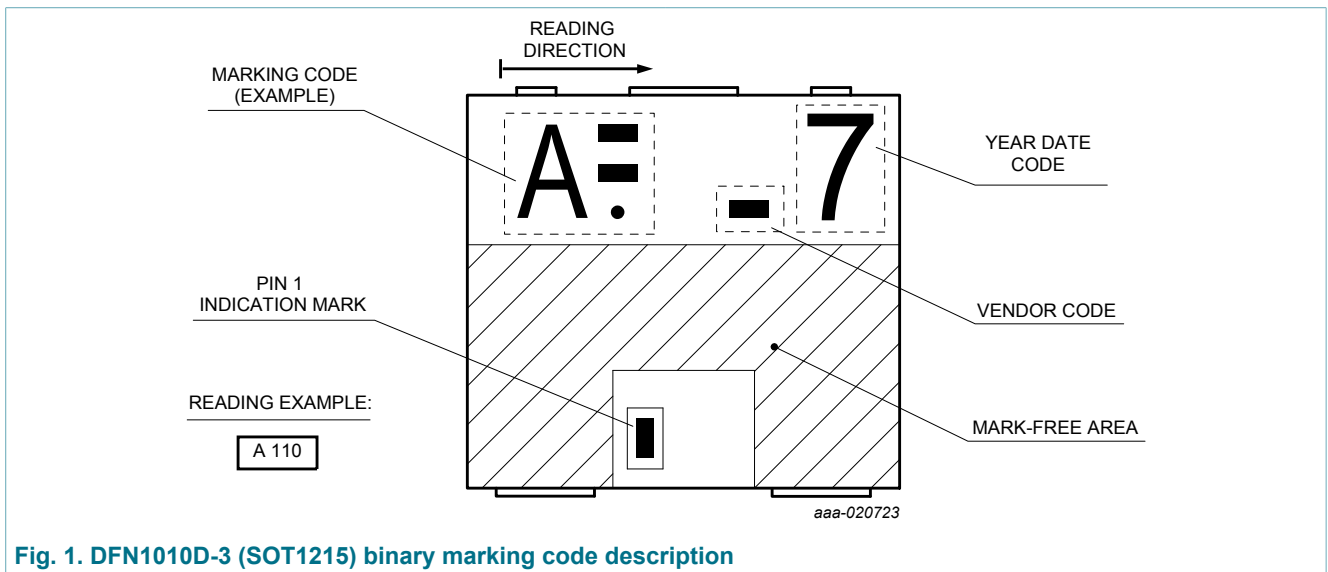
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV70QA	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
BAV70QA	Z 010



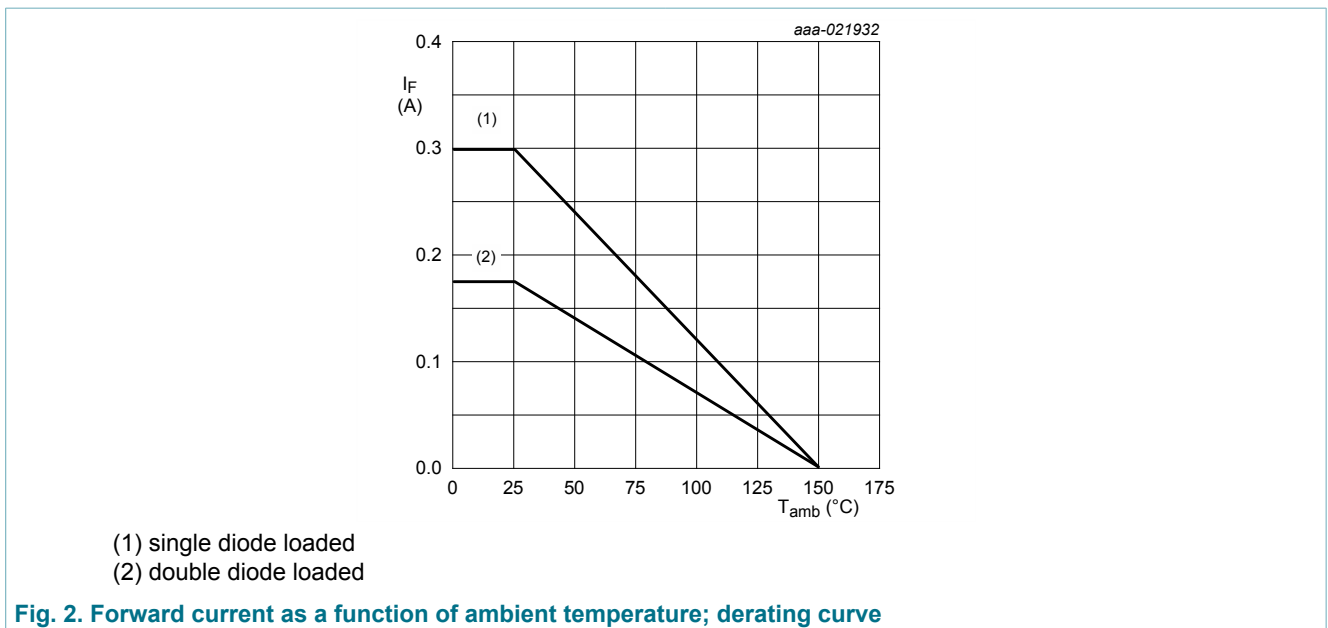
8. Limiting values

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	$T_j = 25\text{ °C}$		-	100	V
V_{RRM}	repetitive peak reverse voltage			-	100	V
I_F	forward current	$T_{amb} = 25\text{ °C}$; single diode loaded	[1]	-	300	mA
		$T_{amb} = 25\text{ °C}$; double diode loaded	[1]	-	175	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	$t_p = 100\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ °C}$; 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]	-	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.

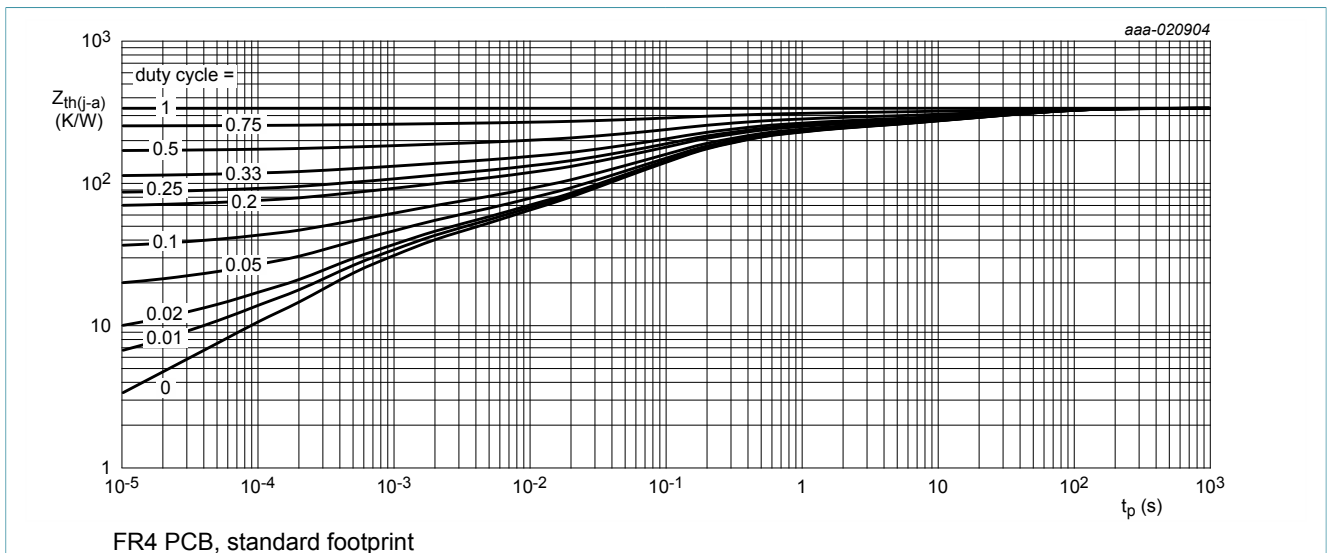


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

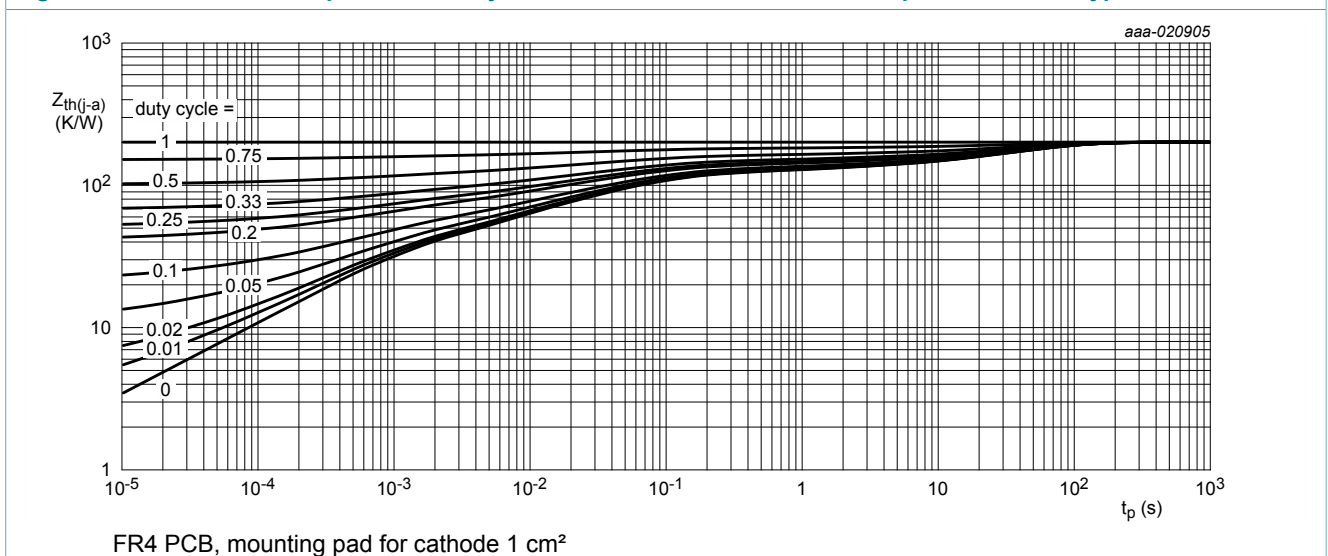
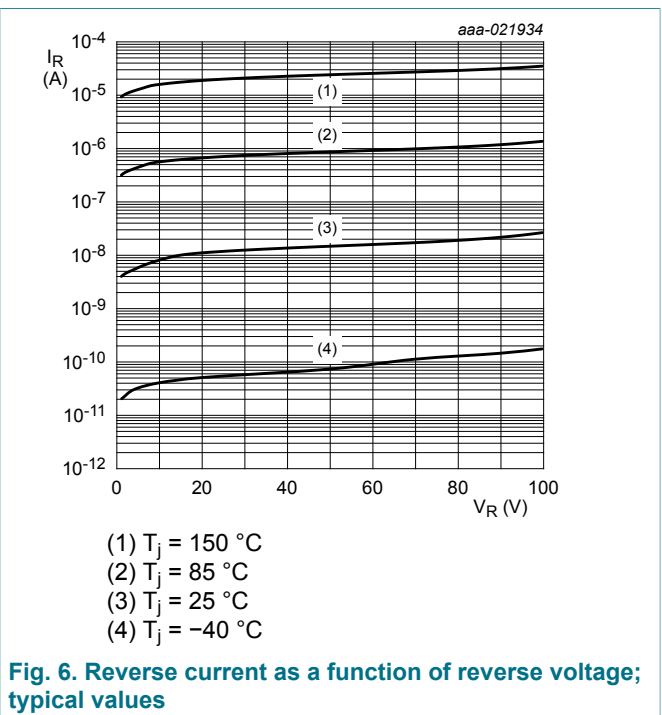
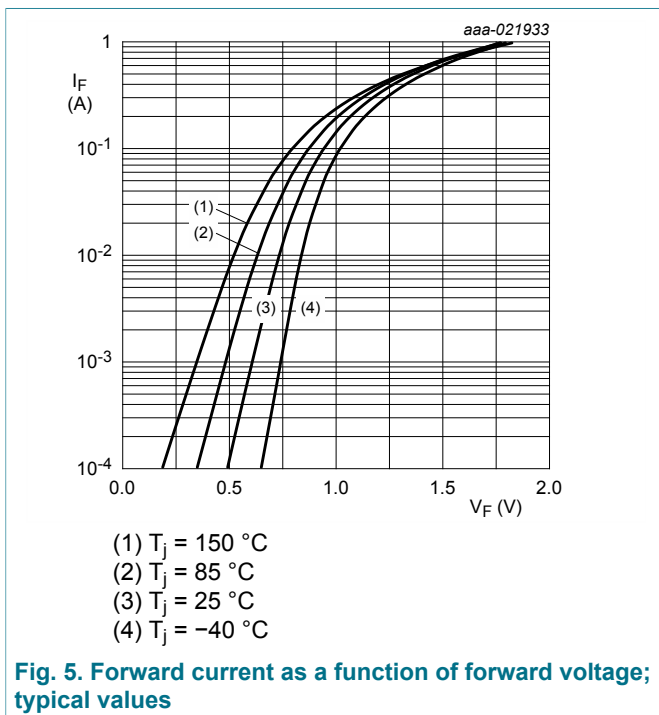


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	715	mV
		$I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	855	mV
		$I_F = 50 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1	V
		$I_F = 150 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
I_R	reverse current	$V_R = 25 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	30	nA
		$V_R = 80 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	0.5	μA
		$V_R = 25 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	30	μA
		$V_R = 80 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	100	μA
C_d	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1.5	pF
t_{rr}	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; I_{R(\text{meas})} = 1 \text{ mA}; R_L = 100 \text{ } \Omega; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	4	ns
V_{FR}	forward recovery voltage	$I_F = 10 \text{ mA}; t_r = 20 \text{ ns}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	1.75	V



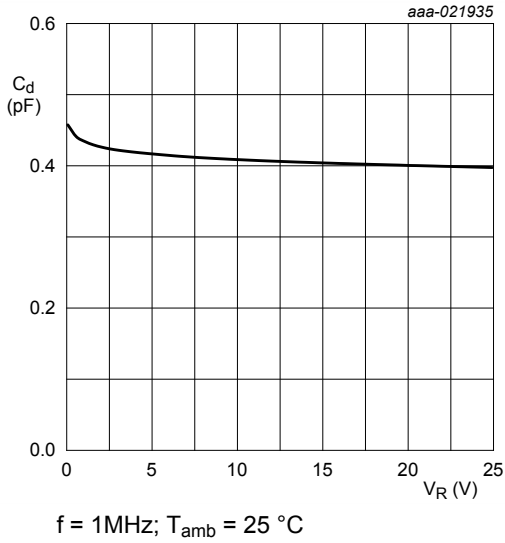


Fig. 7. Diode capacitance as a function of reverse voltage; typical values

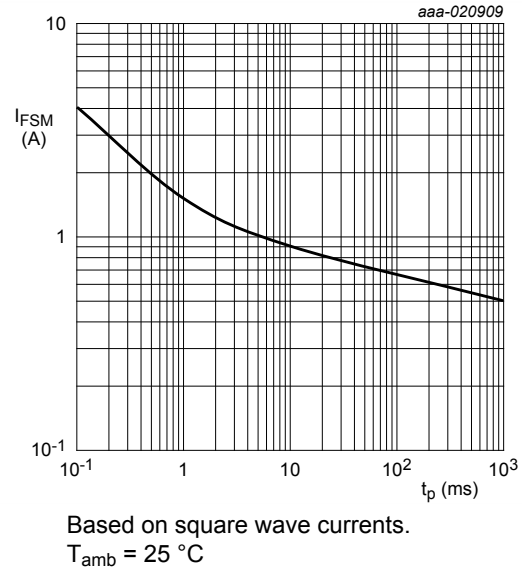


Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

11. Test information

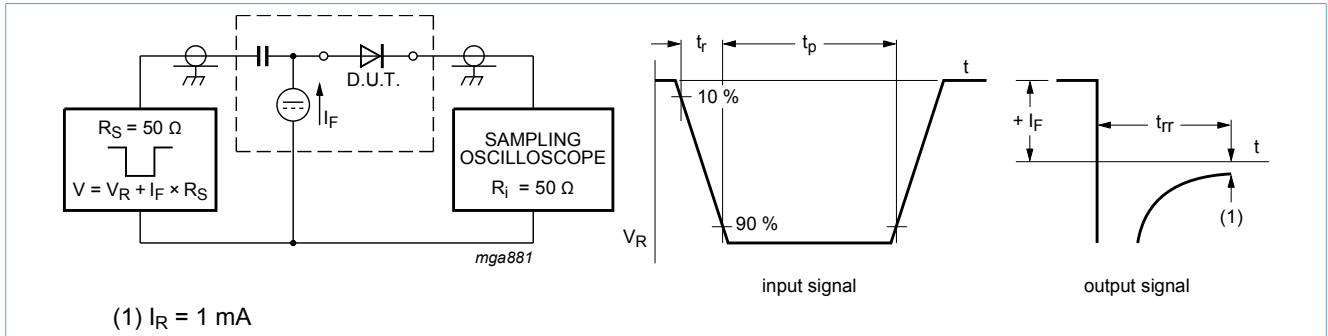


Fig. 9. Reverse recovery time test circuit and waveforms

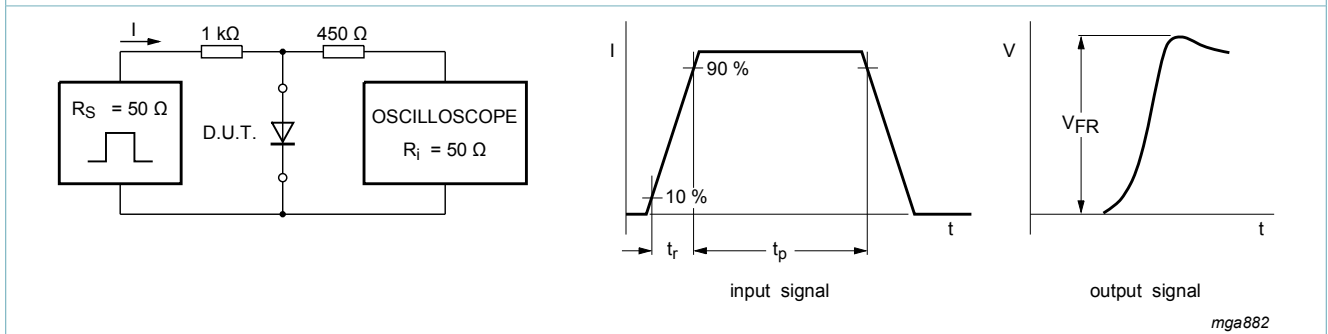


Fig. 10. Forward recovery voltage test circuit and waveforms

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

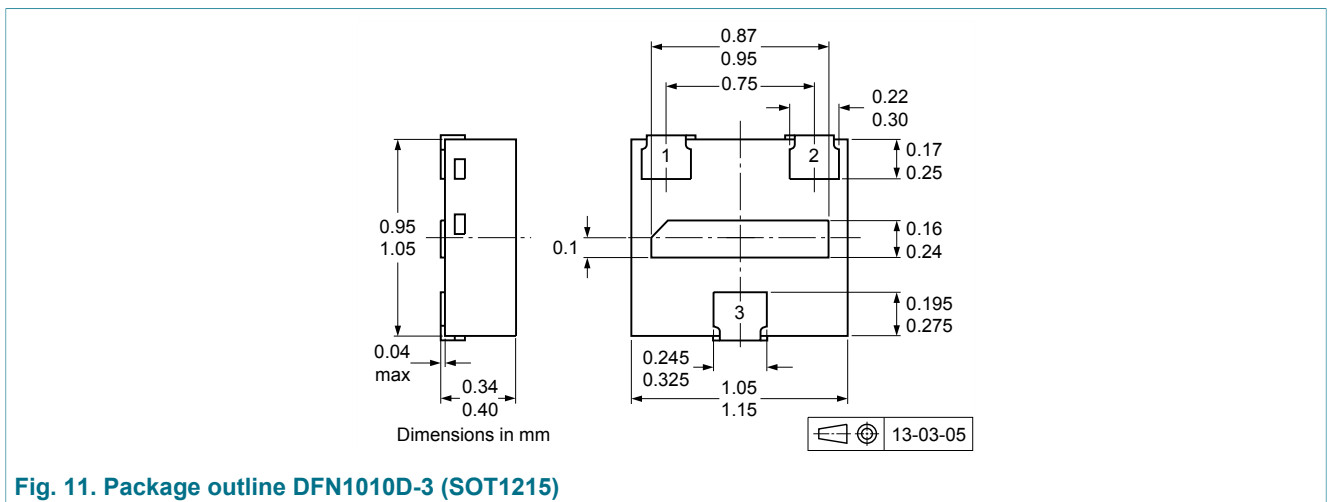


Fig. 11. Package outline DFN1010D-3 (SOT1215)

13. Soldering

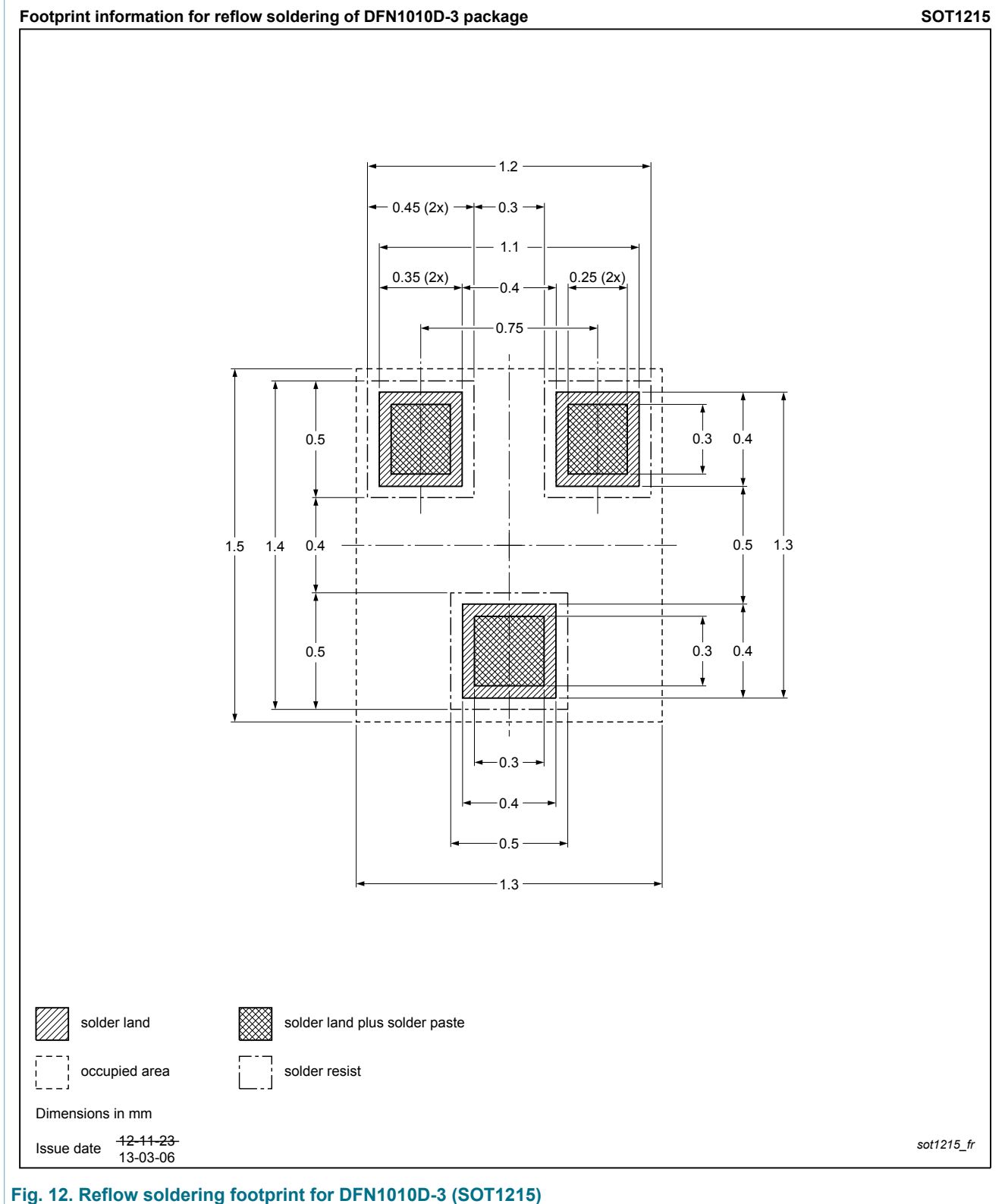


Fig. 12. Reflow soldering footprint for DFN1010D-3 (SOT1215)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV70QA v.2	20160504	Product data sheet	-	BAV70QA v.1
Modification:	<ul style="list-style-type: none">Characteristics table: corrected typing error, replaced parameter peak forward recovery voltage V_{FRM} with forward recovery voltage V_{FR}			
BAV70QA v.1	20160217	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.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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