



# BAW56QA

## Dual common anode high-speed switching diode

4 May 2016

Product data sheet

## 1. General description

Dual common anode 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
- 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

## 4. Quick reference data

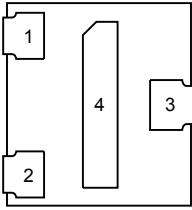
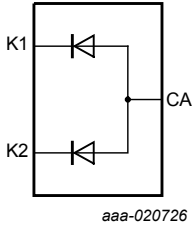
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$I_F$	forward current	$T_{amb} = 25$ °C; single diode loaded	[1]	-	-	310	mA
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	90	V
$V_F$	forward voltage	$I_F = 150$ mA; $T_j = 25$ °C		-	-	1.25	V
$I_R$	reverse current	$V_R = 80$ V; $T_j = 25$ °C		-	-	0.5	µA
$t_{rr}$	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	K1	cathode (diode 1)	 <p>Transparent top view DFN1010D-3 (SOT1215)</p>	
2	K2	cathode (diode 2)		
3	CA	common anode		
4	CA	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAW56QA	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
BAW56QA	Z 001

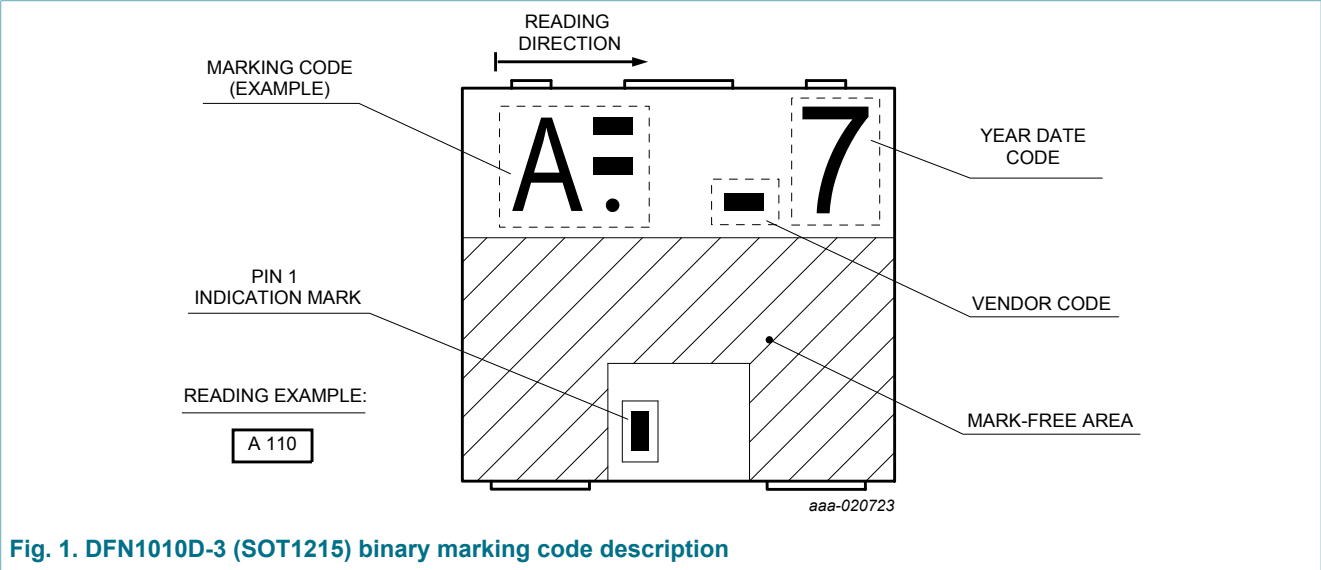


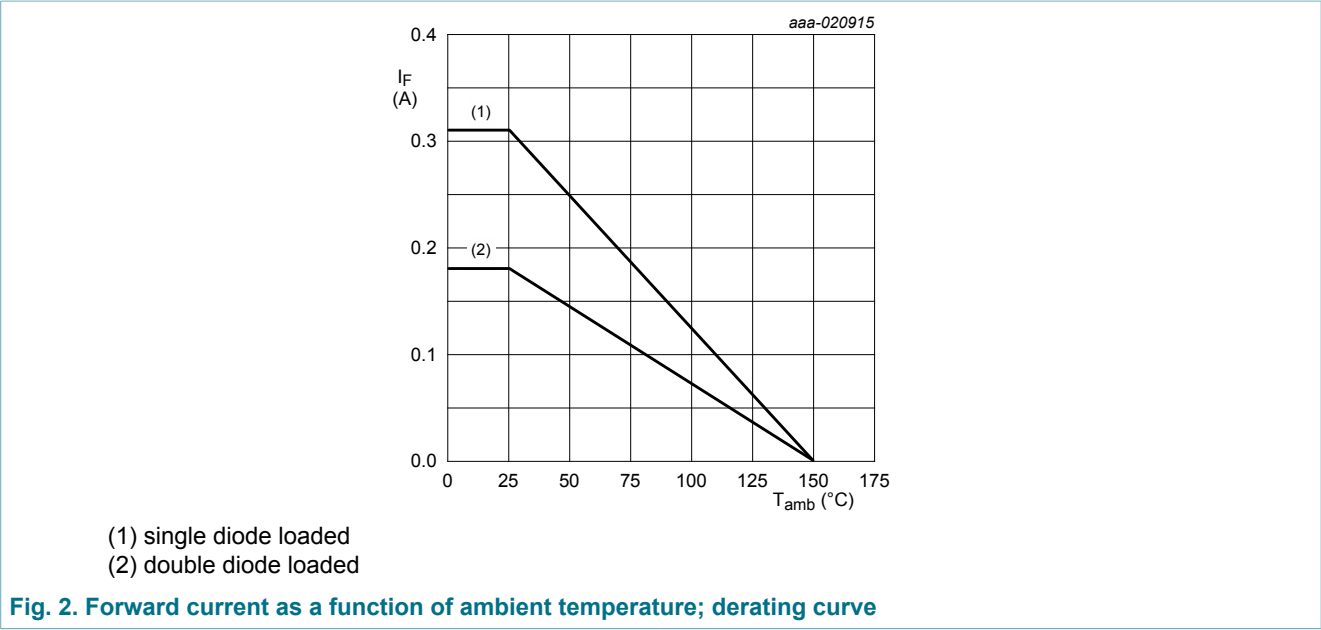
Fig. 1. DFN1010D-3 (SOT1215) binary marking code description

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 <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	90	V
I <sub>F</sub>	forward current	T <sub>amb</sub> = 25 °C; single diode loaded	<a href="#">[1]</a>	-	310	mA
		T <sub>amb</sub> = 25 °C; double diode loaded	<a href="#">[1]</a>	-	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	<a href="#">[1]</a>	-	325	mW
			<a href="#">[2]</a>	-	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.



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]	-	-	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.

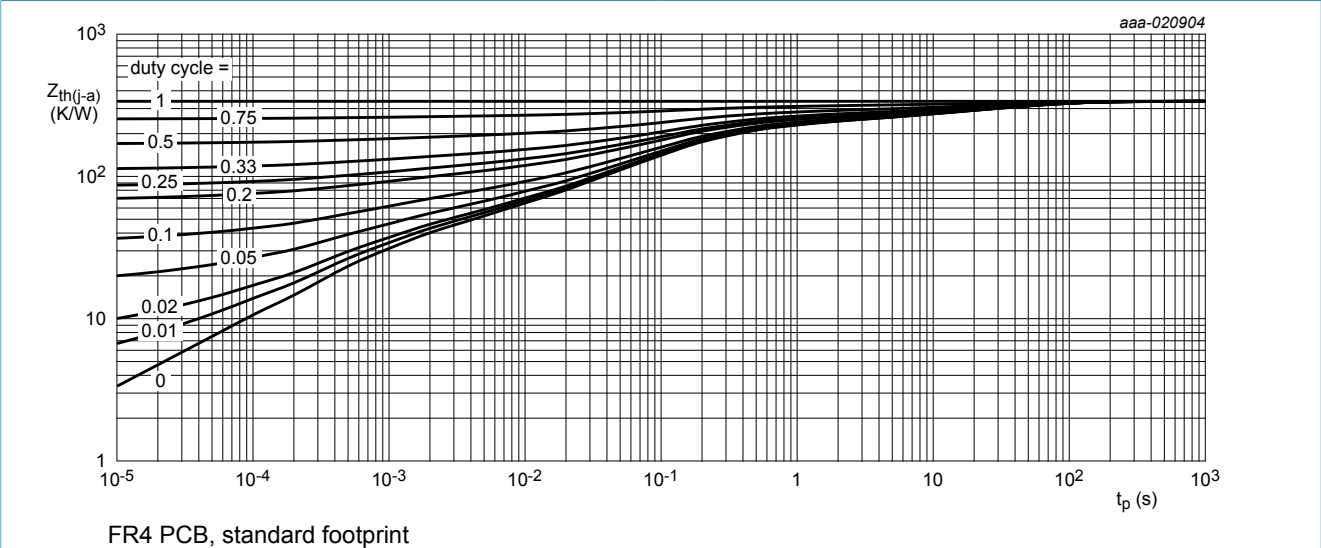


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

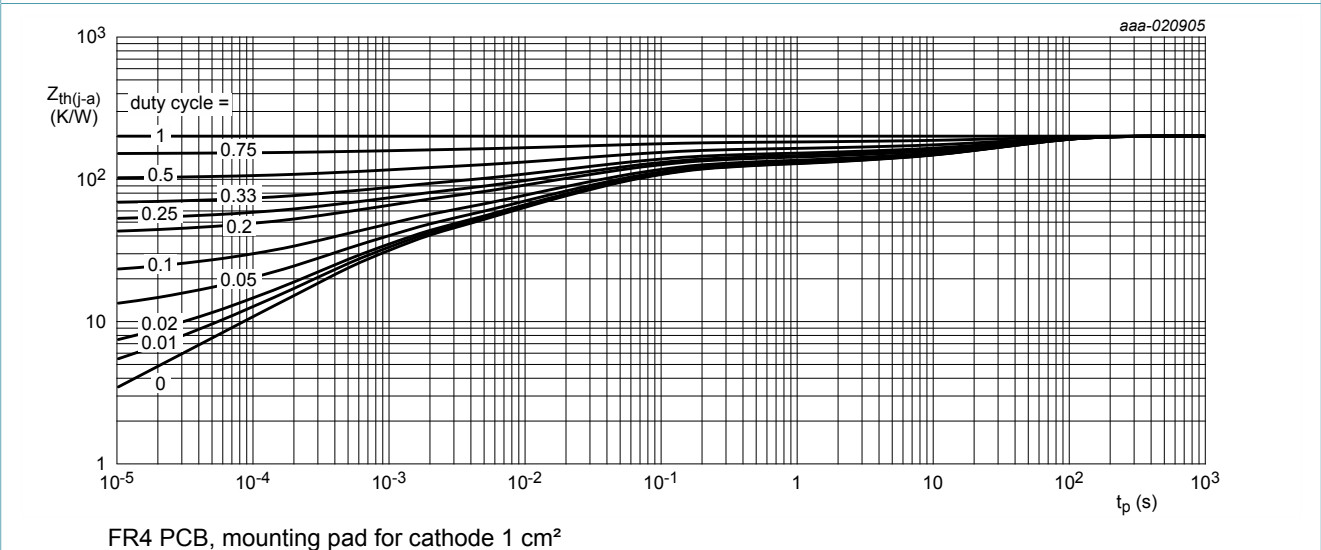
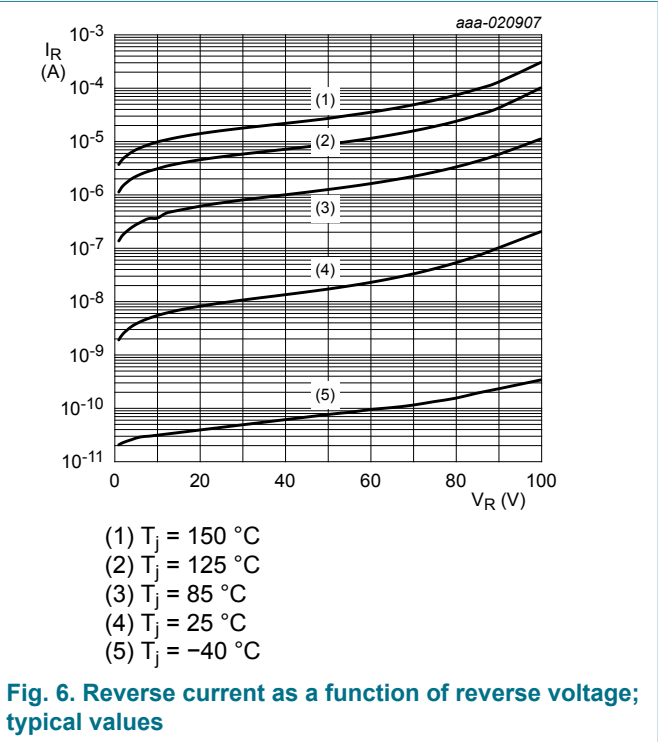
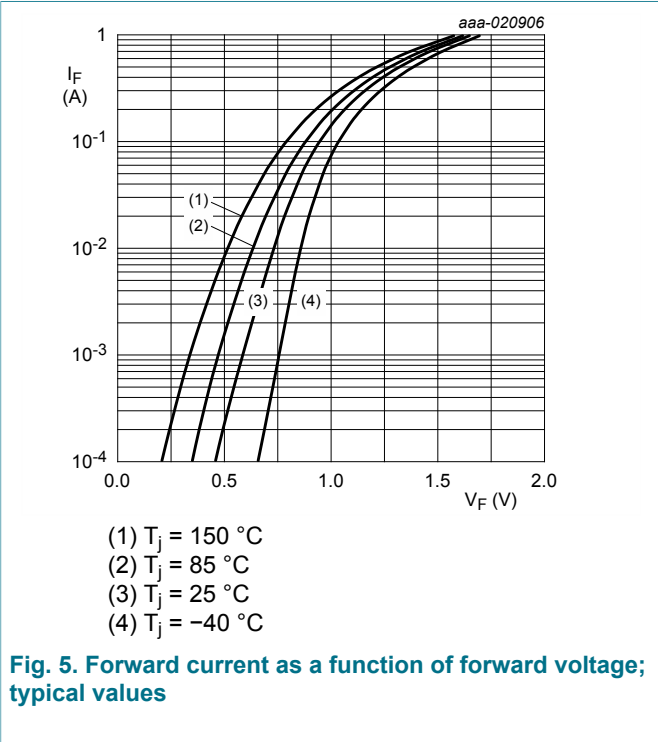


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V <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



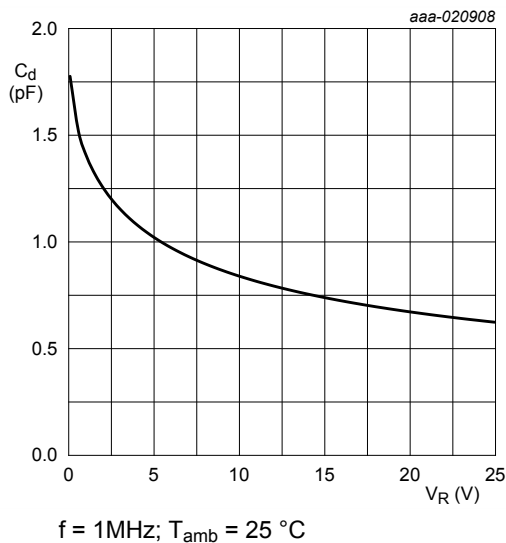


Fig. 7. Diode capacitance as a function of reverse voltage; typical values

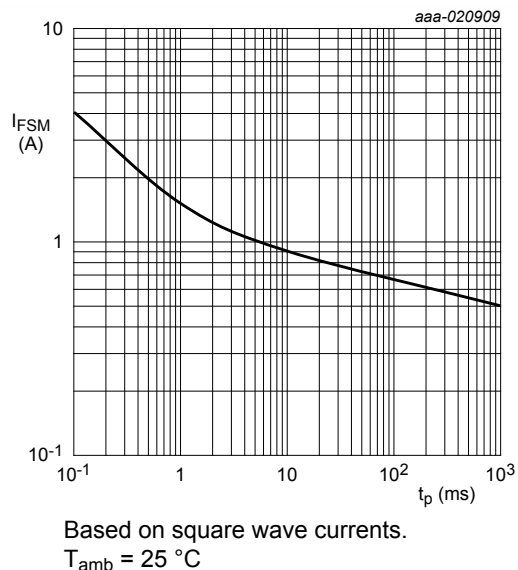


Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

11. Test information

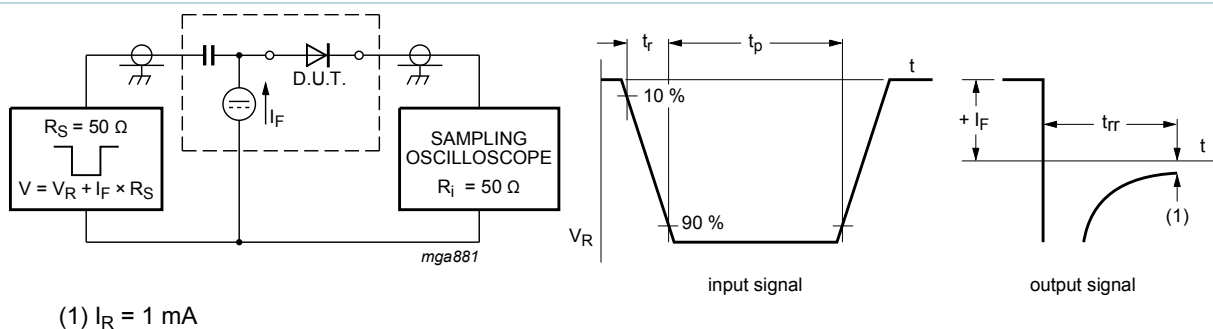


Fig. 9. Reverse recovery time test circuit and waveforms

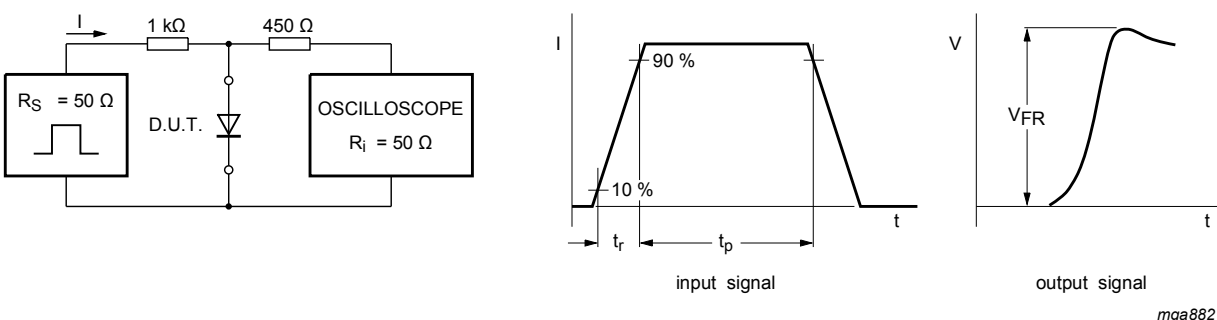


Fig. 10. Forward recovery voltage test circuit and waveforms

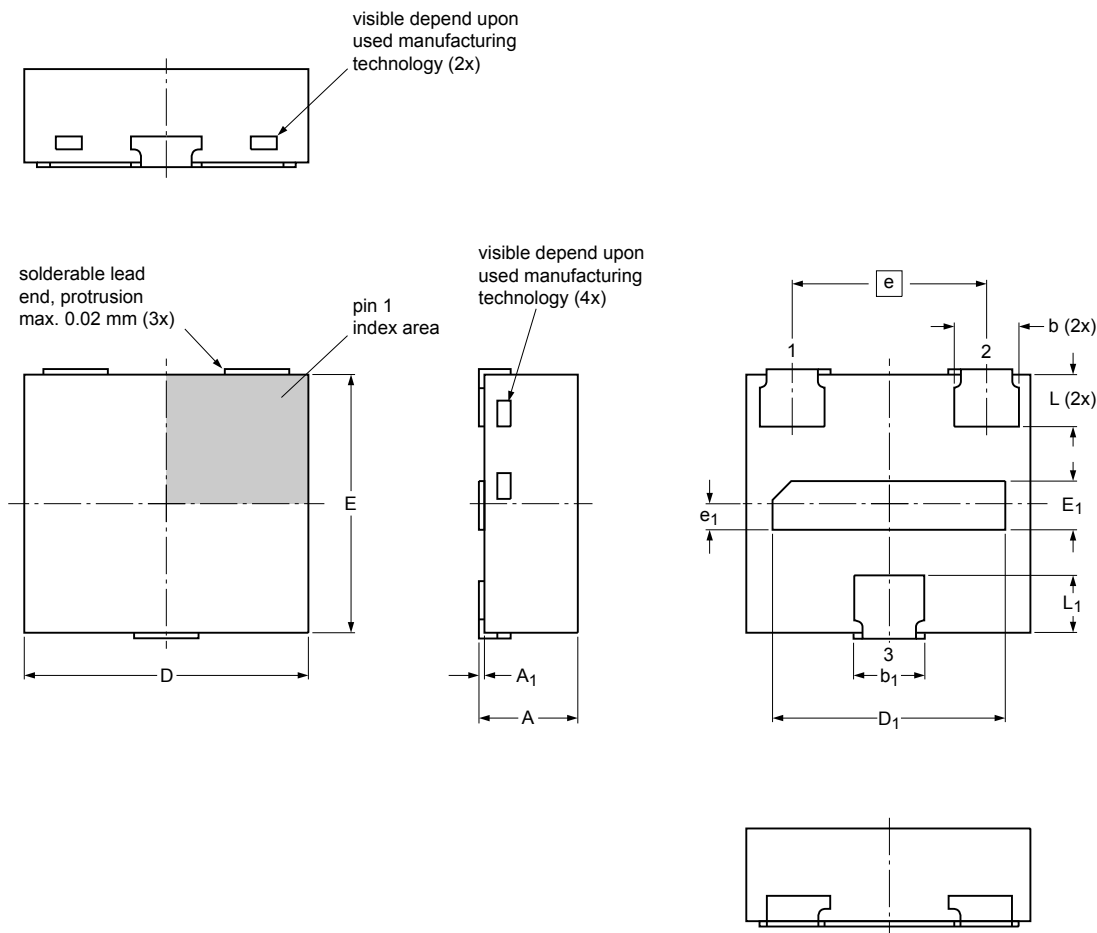
Quality information

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

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



0 1 mm

scale

Dimensions (mm are the original dimensions)

Unit	A	A <sub>1</sub>	b	b <sub>1</sub>	D	D <sub>1</sub>	E	E <sub>1</sub>	e	e <sub>1</sub>	L	L <sub>1</sub>
min	0.34		0.22	0.245	1.05	0.87	0.95	0.16			0.17	0.195
mm	nom		0.25	0.275	1.10	0.90	1.00	0.19	0.75	0.1	0.20	0.225
	max	0.40	0.30	0.325	1.15	0.95	1.05	0.24			0.25	0.275

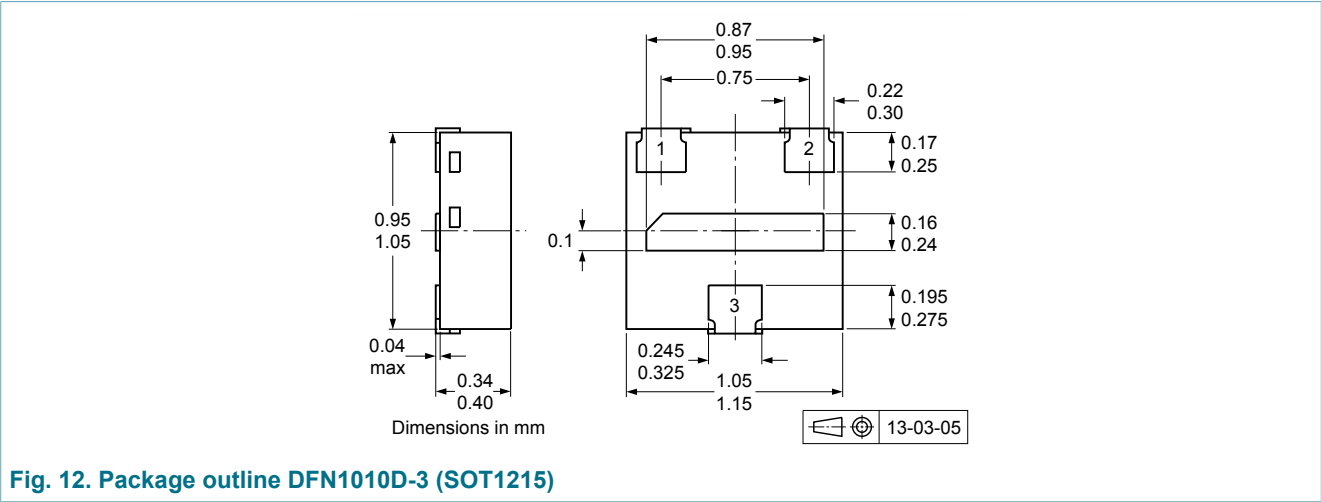
Note  
1. Dimension A is including plating thickness.

sot1215\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1215						-13-03-05- 13-03-06

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

13. Package outline

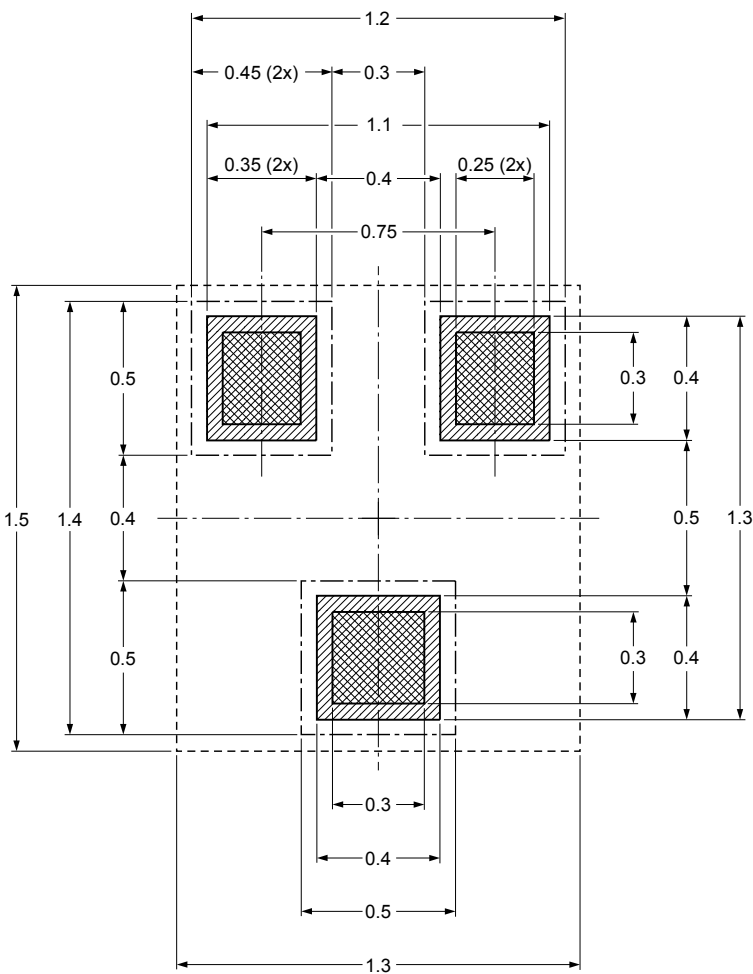








14. Soldering

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. 13. Reflow soldering footprint for DFN1010D-3 (SOT1215)

## 15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAW56QA v.3	20160504	Product data sheet	-	BAW56QA v.2
Modifications:	<ul style="list-style-type: none"><li>Characteristics table: corrected typing error, replaced parameter peak forward recovery voltage <math>V_{FRM}</math> with forward recovery voltage <math>V_{FR}</math></li></ul>			
BAW56QA v.2	20160129	Product data sheet	-	BAW56QA v.1
BAW56QA v.1	20151211	Product data sheet	-	-

## 16. 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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nexperia.com>.

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