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<sub>rr</sub> ≤ 4 ns
- Low leakage current
- Reverse voltage V<sub>R</sub> ≤ 90 V
- Low capacitance C<sub>d</sub> ≤ 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	Тур	Max	Unit	
Per diode	Per diode							
I <sub>F</sub>	forward current	T <sub>amb</sub> = 25 °C; single diode loaded	[1]	-	-	310	mA	
$V_R$	reverse voltage	T <sub>j</sub> = 25 °C		-	-	90	V	
V <sub>F</sub>	forward voltage	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> = 80 V; T <sub>j</sub> = 25 °C		-	-	0.5	μA	
t <sub>rr</sub>	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.



#### Dual common anode high-speed switching diode

# 5. Pinning information

**Table 2. Pinning information** 

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)		
2	K2	cathode (diode 2)		K1
3	CA	common anode	4 3	CA
4	CA	common anode	Transparent top view DFN1010D-3 (SOT1215)	K2

# 6. Ordering information

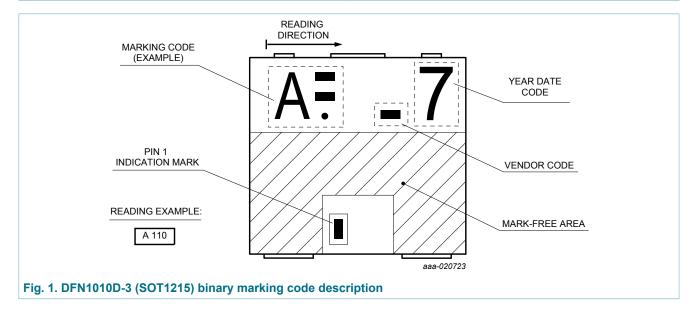
**Table 3. Ordering information** 

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



#### Dual common anode high-speed switching diode

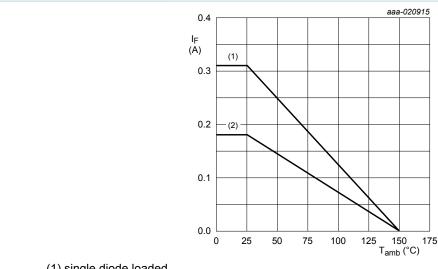
# 8. Limiting values

#### 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 <sub>j</sub> = 25 °C		-	90	V
l <sub>F</sub>	forward current	T <sub>amb</sub> = 25 °C; single diode loaded	[1]	-	310	mA
		T <sub>amb</sub> = 25 °C; double diode loaded	[1]	-	180	mA
I <sub>FRM</sub>	repetitive peak forward current	$t_p \le 0.5 \text{ ms}; \delta \le 0.25 ; T_j = 25 \text{ °C}$		-	1	Α
I <sub>FSM</sub>	non-repetitive peak	$t_p$ = 100 $\mu$ s; $T_{j(init)}$ = 25 °C; square wave		-	4	Α
	forward current	$t_p$ = 1 ms; $T_{j(init)}$ = 25 °C; square wave		-	1.5	Α
		$t_p$ = 1 s; $T_{j(init)}$ = 25 °C; square wave		-	0.5	Α
Per device;	one diode loaded					
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	325	mW
			[2]	-	540	mW
Tj	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

- Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.



- (1) single diode loaded
- (2) double diode loaded

Fig. 2. Forward current as a function of ambient temperature; derating curve

#### Dual common anode high-speed switching diode

#### 9. Thermal characteristics

**Table 6. Thermal characteristics** 

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient		[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

- Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint. [1]
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.
- Soldering point of cathode tab.

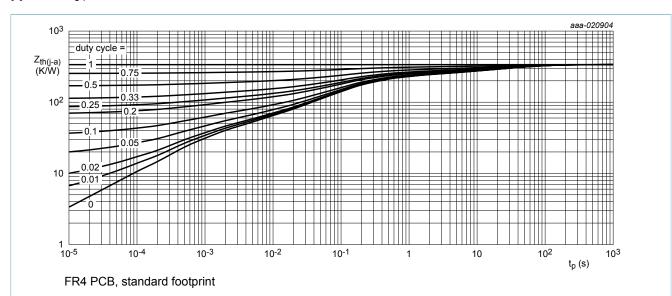


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

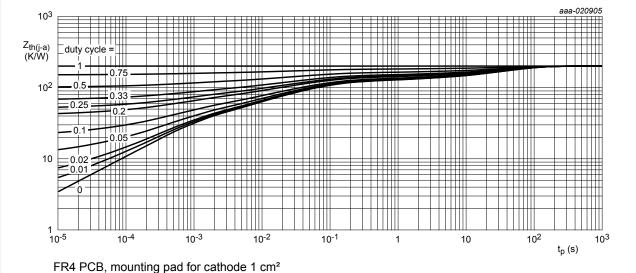


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

#### Dual common anode high-speed switching diode

### 10. Characteristics

**Table 7. Characteristics** 

Symbol	Parameter	Conditions	Min	Тур	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	μΑ
		V <sub>R</sub> = 25 V; T <sub>j</sub> = 150 °C	-	-	30	μΑ
		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	$I_F$ = 10 mA; $I_R$ = 10 mA; $I_{R(meas)}$ = 1 mA; $R_L$ = 100 $\Omega$ ; $T_{amb}$ = 25 °C	-	-	4	ns
$V_{FR}$	forward recovery voltage	$I_F = 10 \text{ mA}; t_r = 20 \text{ ns}; T_{amb} = 25 \text{ °C}$	-	-	1.75	V

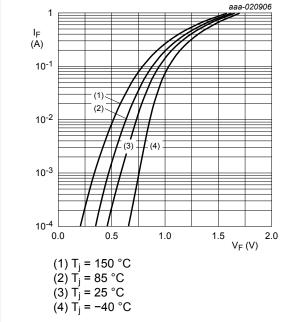


Fig. 5. Forward current as a function of forward voltage; typical values

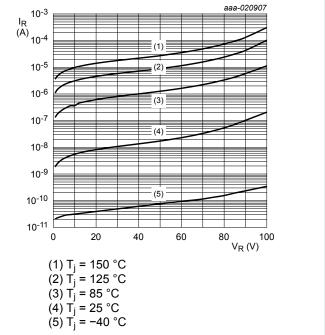


Fig. 6. Reverse current as a function of reverse voltage; typical values

#### Dual common anode high-speed switching diode

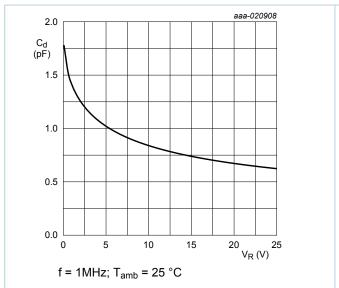


Fig. 7. Diode capacitance as a function of reverse voltage; typical values

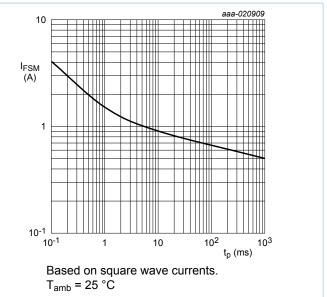
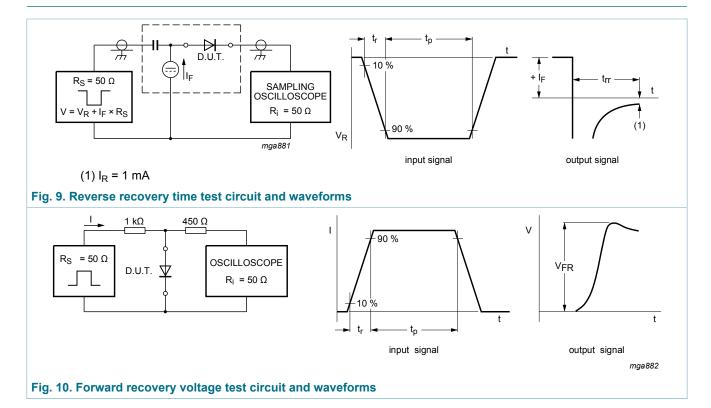


Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

### 11. Test information



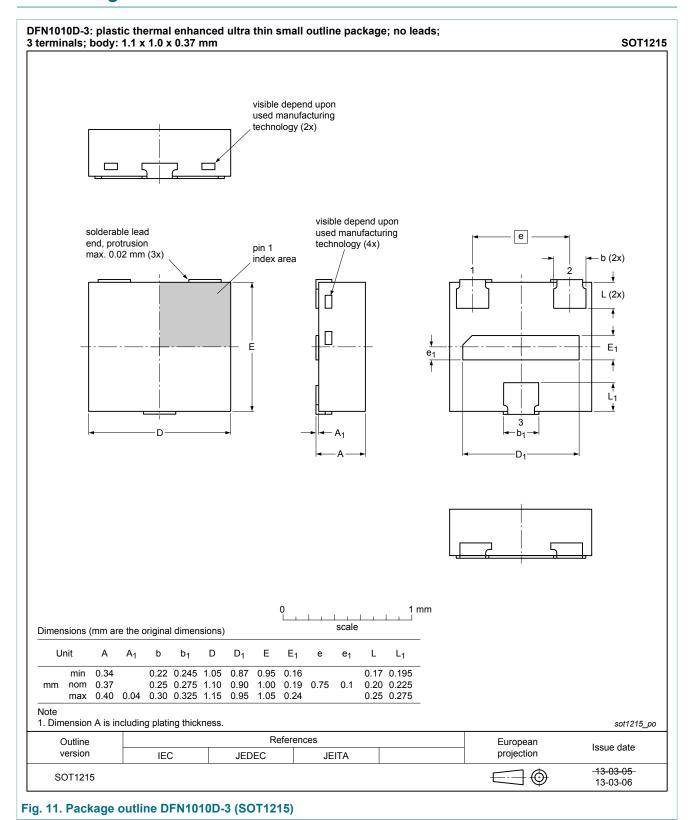
### **Quality information**

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.

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#### Dual common anode high-speed switching diode

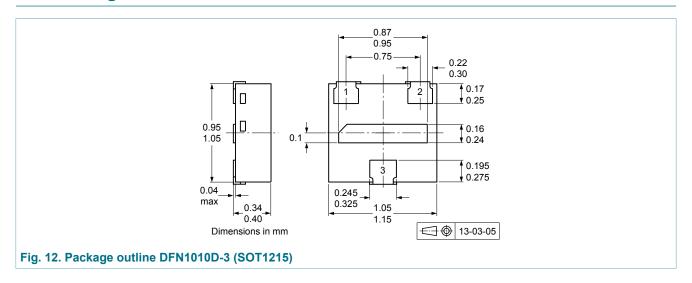
## 12. Package outline



BAW56QA

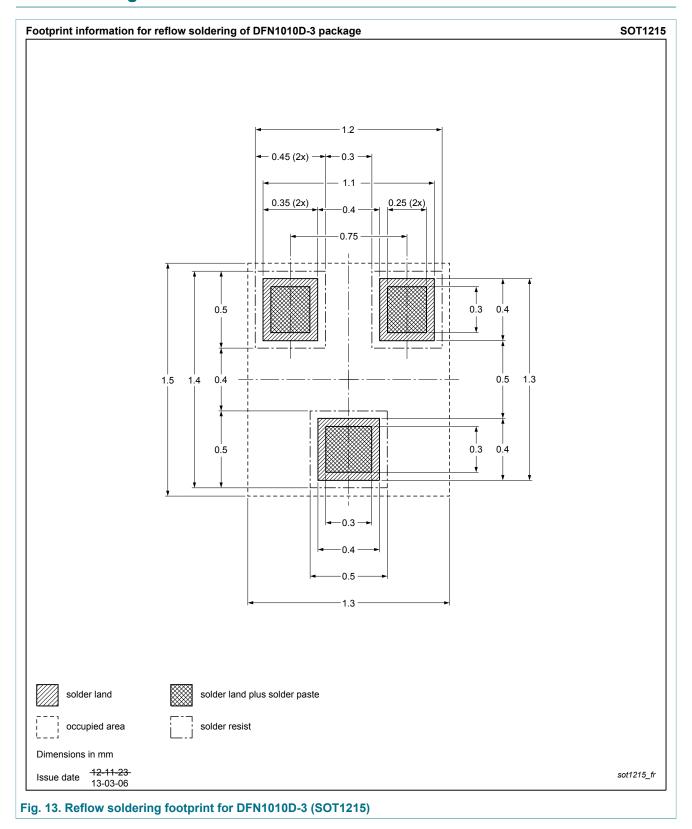
### Dual common anode high-speed switching diode

# 13. Package outline



#### Dual common anode high-speed switching diode

# 14. Soldering



## Dual common anode high-speed switching diode

# 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> <li>Characteristics table: corrected typing error, replaced parameter peak forward recovery voltage V<sub>FRM</sub> with forward recovery voltage V<sub>FR</sub></li> </ul>						
BAW56QA v.2	20160129	Product data sheet	-	BAW56QA v.1				
BAW56QA v.1	20151211	Product data sheet	-	-				

#### Dual common anode high-speed switching diode

# 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.
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BAW56QA

## Dual common anode high-speed switching diode

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### Dual common anode high-speed switching diode

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For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 04 May 2016

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