nexperia

Important notice

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On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of http://www.nxp.com, http://www.philips.com/ or http://www.semiconductors.philips.com/, use **http://www.nexperia.com**

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use **salesaddresses@nexperia.com** (email)

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- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved
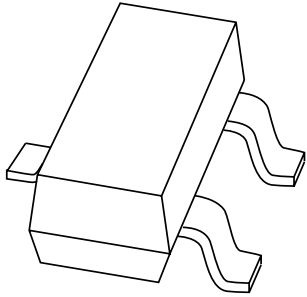Should be replaced with:
- **© Nexperia B.V. (year). All rights reserved**.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

DATA SHEET

BAL99

High-speed diode

Product data sheet

Supersedes data of 1999 May 26

2003 Dec 12

NXP founded by Philips

High-speed diode   BAL99

FEATURES

- Small plastic SMD package
- High switching speed: max. 4 ns
- Continuous reverse voltage: max. 70 V
- Repetitive peak reverse voltage: max. 70 V
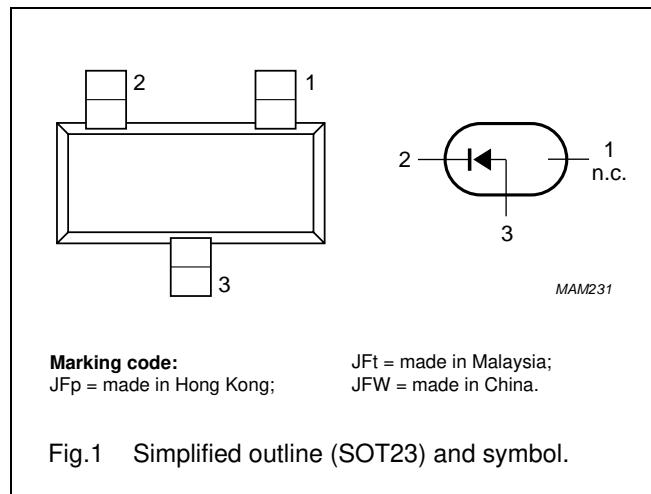- Repetitive peak forward current: max. 500 mA.

APPLICATIONS

- High-speed switching in e.g. surface mounted circuits.

DESCRIPTION

The BAL99 is a high-speed switching diode fabricated in planar technology, and encapsulated in the small SOT23 plastic SMD package.

PINNING

PIN	DESCRIPTION
1	not connected
2	cathode
3	anode

Marking code:
JFp = made in Hong Kong;
JFt = made in Malaysia;
JFW = made in China.

Fig.1   Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BAL99	−	plastic surface mounted package; 3 leads	SOT23

LIMITING VALUES

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

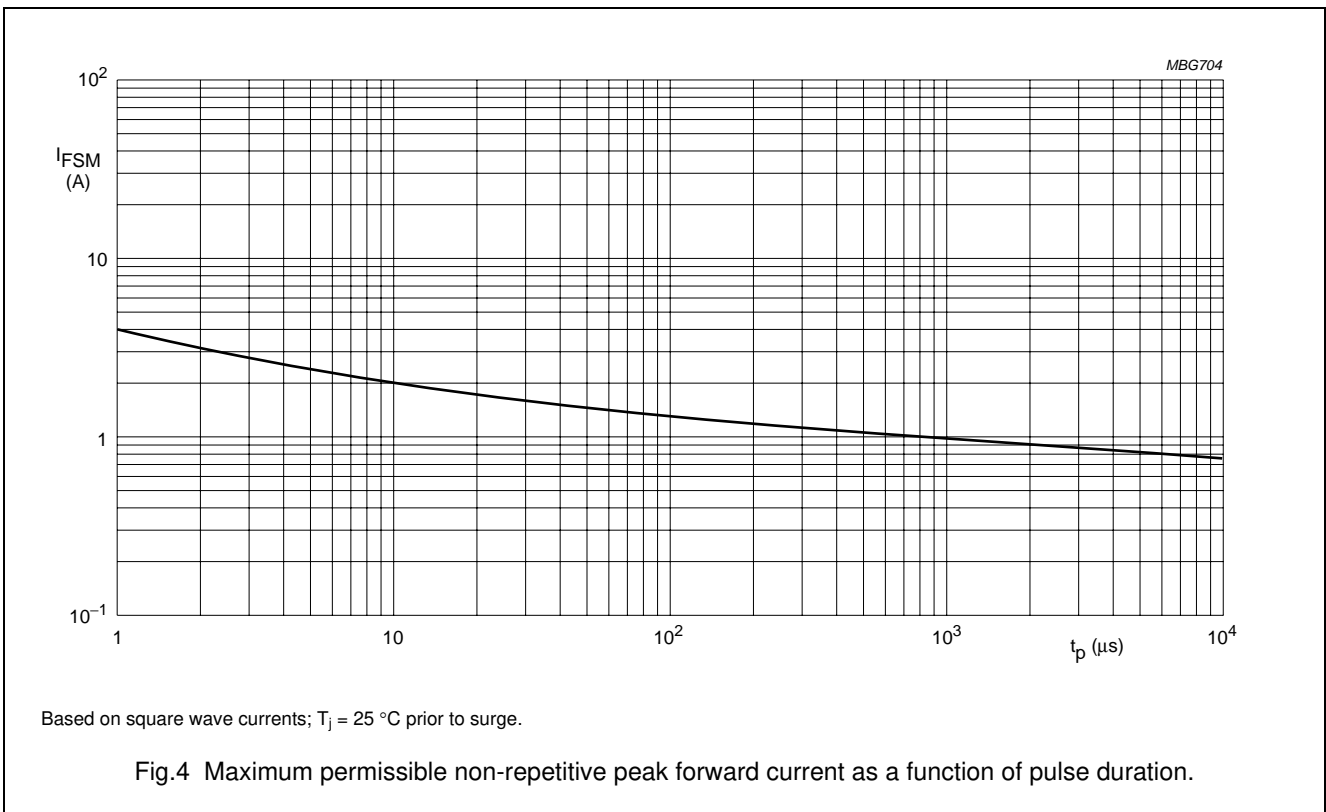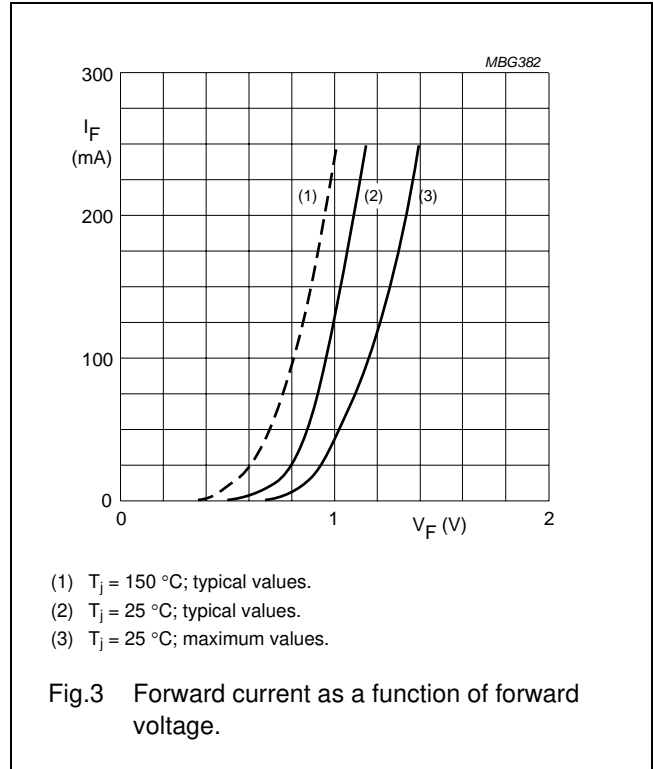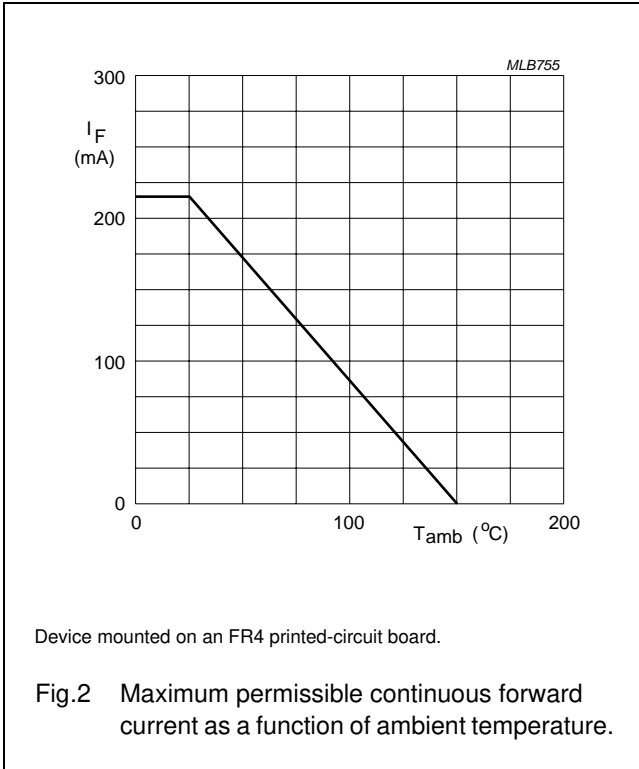| SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		−	70	V
V_R	continuous reverse voltage		−	70	V
I_F	continuous forward current	see Fig.2; note 1	−	215	mA
I_{FRM}	repetitive peak forward current		−	500	mA
I_{FSM}	non-repetitive peak forward current	square wave; T_j = 25 °C prior to surge; see Fig.4			
		t_p = 1 µs	−	4	A
		t_p = 1 ms	−	1	A
		t_p = 1 s	−	0.5	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 1	−	250	mW
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		−	150	°C

Note

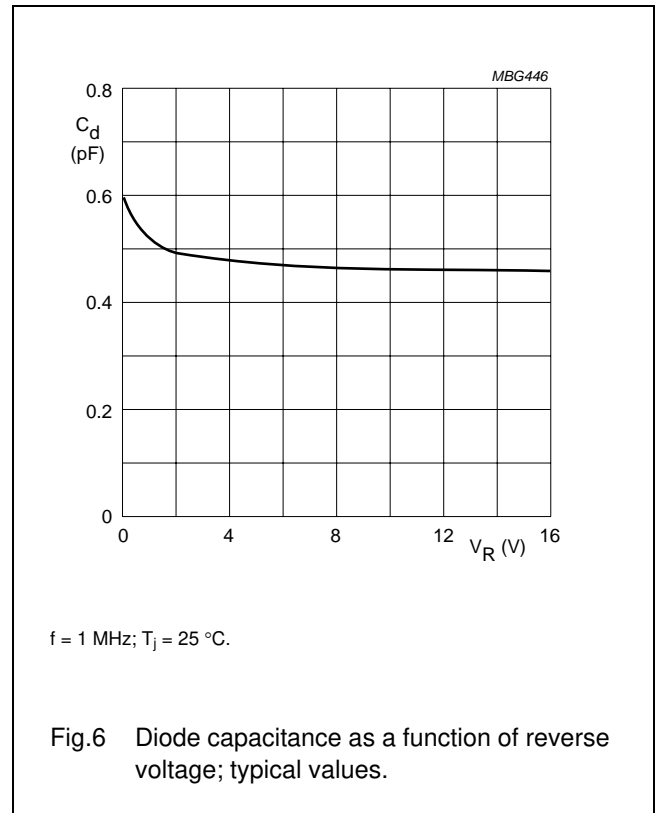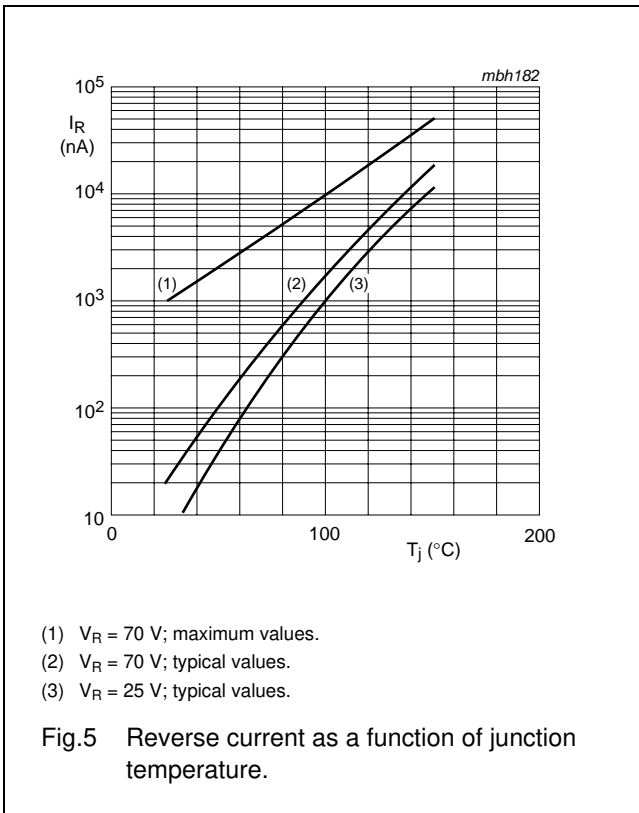1. Device mounted on an FR4 printed-circuit board.

High-speed diode | BAL99

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	see Fig.3		
		I_F = 1 mA	715	mV
		I_F = 10 mA	855	mV
		I_F = 50 mA	1	V
		I_F = 150 mA	1.25	V
I_R	reverse current	see Fig.5		
		V_R = 25 V	30	nA
		V_R = 70 V	1	μA
		V_R = 25 V; T_j = 150 °C	30	μA
		V_R = 70 V; T_j = 150 °C;	50	μA
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.6	1.5	pF
t_{rr}	reverse recovery time	when switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA; see Fig.7	4	ns
V_{fr}	forward recovery voltage	when switched from I_F = 10 mA; t_r = 20 ns; see Fig.8	1.75	V

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-tp)}$	thermal resistance from junction to tie-point		360	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Device mounted on an FR4 printed-circuit board.

High-speed diode

BAL99

GRAPHICAL DATA

Device mounted on an FR4 printed-circuit board.
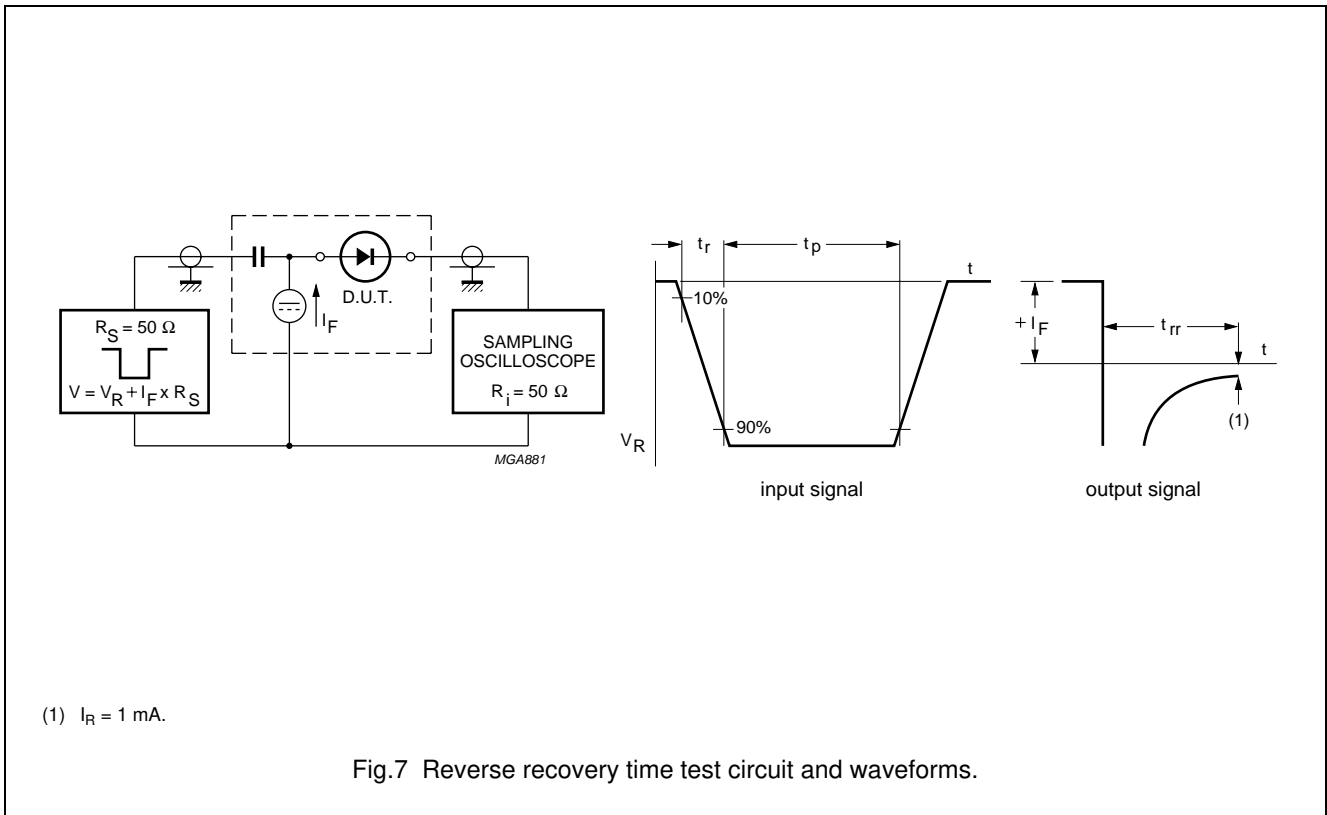
Fig.2   Maximum permissible continuous forward current as a function of ambient temperature.

(1) T_j = 150 °C; typical values.
(2) T_j = 25 °C; typical values.
(3) T_j = 25 °C; maximum values.

Fig.3   Forward current as a function of forward voltage.

Based on square wave currents; T_j = 25 °C prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

High-speed diode

BAL99

(1) V_R = 70 V; maximum values.

(2) V_R = 70 V; typical values.

(3) V_R = 25 V; typical values.

Fig.5 Reverse current as a function of junction temperature.

f = 1 MHz; T_j = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

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(1) $I_R = 1$ mA.

Fig.7 Reverse recovery time test circuit and waveforms.

Fig.8 Forward recovery voltage test circuit and waveforms.

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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads   **SOT23**

0   1   2 mm
scale

DIMENSIONS (mm are the original dimensions)

UNIT	A	A$_1$ max.	b$_p$	c	D	E	e	e$_1$	H$_E$	L$_p$	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16
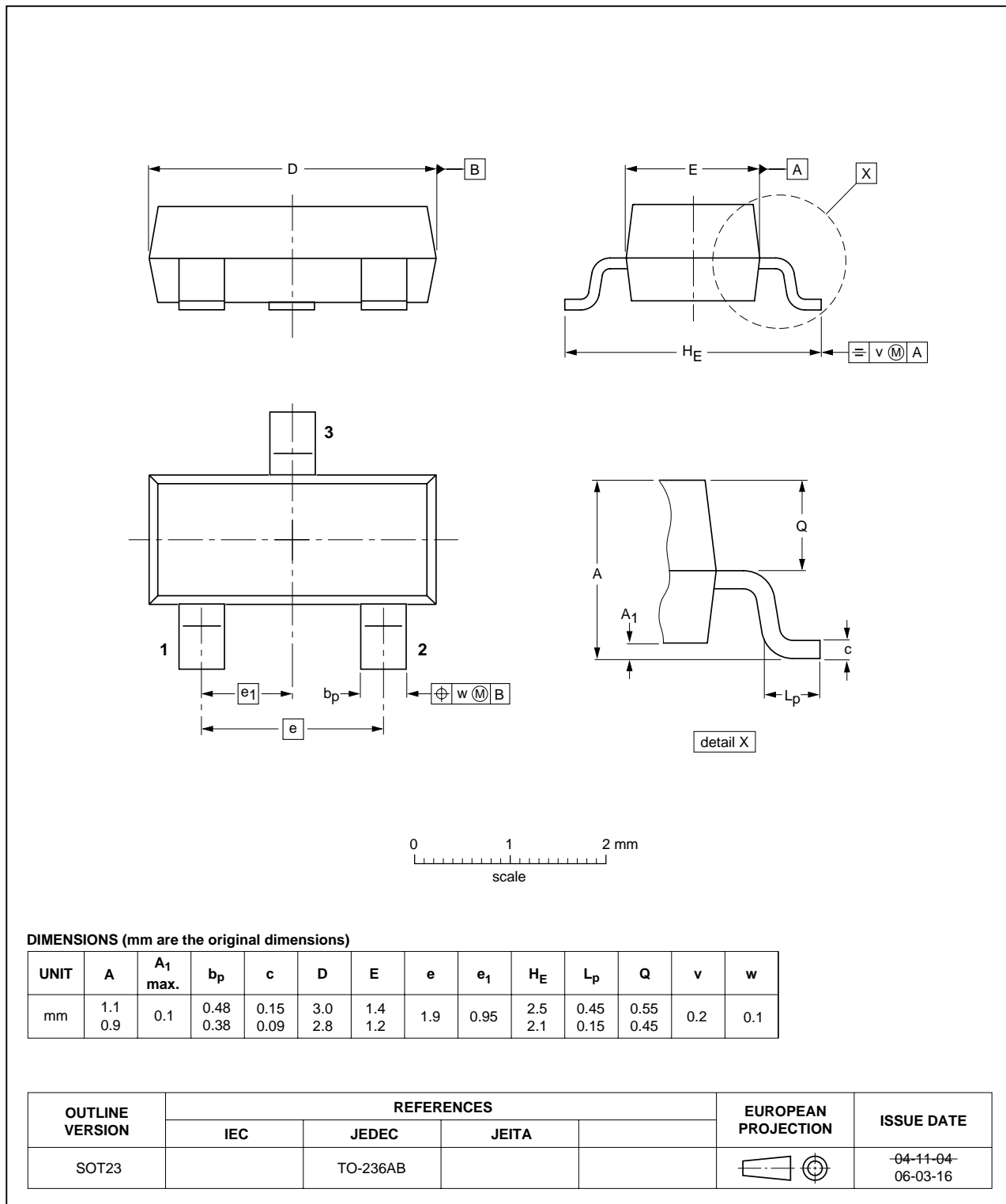
High-speed diode   BAL99

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

Notes

1. Please consult the most recently issued document before initiating or completing a design.

2. 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.nxp.com.

NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

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