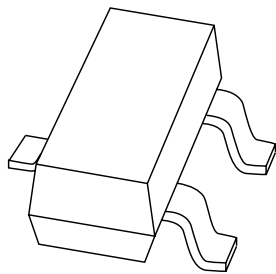


DATA SHEET



BSR15; BSR16 PNP switching transistors

Product data sheet
Supersedes data of 1999 Apr 15

2004 Jan 13

PNP switching transistors

BSR15; BSR16

FEATURES

- High current (max. 600 mA)
- Low voltage (max. 60 V).

APPLICATIONS

- Medium power switching.

DESCRIPTION

PNP switching transistor in a SOT23 plastic package.
 NPN complements: BSR13 and BSR14.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
BSR15	T7*
BSR16	T8*

Note

- * = p : Made in Hong Kong.
 * = t : Made in Malaysia.
 * = W : Made in China.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

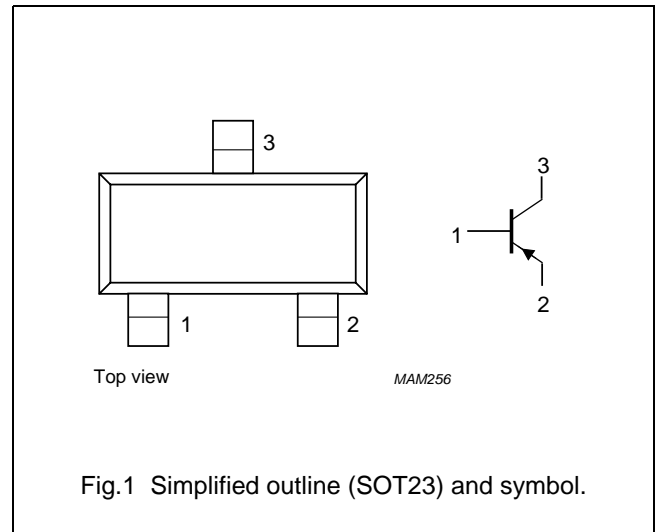


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR15	-	plastic surface mounted package; 3 leads	SOT23
BSR16			

PNP switching transistors

BSR15; BSR16

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	–60	V
V_{CEO}	collector-emitter voltage BSR15 BSR16	open base	–	–40	V
			–	–60	V
V_{EBO}	emitter-base voltage	open collector	–	–5	V
I_C	collector current (DC)		–	–600	mA
I_{CM}	peak collector current		–	–800	mA
I_{BM}	peak base current		–	–200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

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

Note

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

PNP switching transistors

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CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise specified.

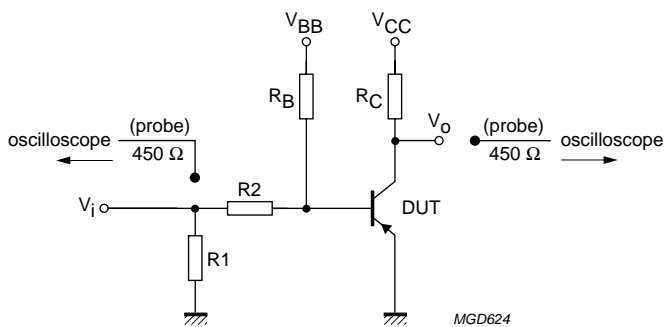
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current BSR15	$I_E = 0; V_{CB} = -50\text{ V}$ $I_E = 0; V_{CB} = -50\text{ V}; T_j = 150\text{ °C}$	– –	–20 –20	nA μA
	collector cut-off current BSR16	$I_E = 0; V_{CB} = -50\text{ V}$ $I_E = 0; V_{CB} = -50\text{ V}; T_j = 150\text{ °C}$	– –	–10 –10	nA μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = -5\text{ V}$	–	–50	nA
h_{FE}	DC current gain BSR15 BSR16	$I_C = -0.1\text{ mA}; V_{CE} = -10\text{ V}$	35 75	– –	
	DC current gain BSR15 BSR16	$I_C = -1\text{ mA}; V_{CE} = -10\text{ V}$	50 100	– –	
	DC current gain BSR15 BSR16	$I_C = -10\text{ mA}; V_{CE} = -10\text{ V}$	75 100	– –	
	DC current gain	$I_C = -150\text{ mA}; V_{CE} = -10\text{ V}; \text{note 1}$	100	300	
	DC current gain BSR15 BSR16	$I_C = -500\text{ mA}; V_{CE} = -10\text{ V}; \text{note 1}$	30 50	– –	
	V_{CEsat}	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}$	–	–400
$I_C = -500\text{ mA}; I_B = -50\text{ mA}$			–	–1.6	V
V_{BEsat}	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}$	–	–1.3	V
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}$	–	–2.6	V
C_c	collector capacitance	$I_E = I_E = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	8	pF
C_e	emitter capacitance	$I_C = I_C = 0; V_{EB} = -2\text{ V}; f = 1\text{ MHz}$	–	30	pF
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -20\text{ V}; f = 100\text{ MHz}$	200	–	MHz
Switching times (between 10% and 90% levels); (see Fig.2)					
t_{on}	turn-on time	$I_{Con} = -150\text{ mA}; I_{Bon} = -15\text{ mA};$ $I_{Boff} = 15\text{ mA}$	–	40	ns
t_d	delay time		–	12	ns
t_r	rise time		–	30	ns
t_{off}	turn-off time		–	365	ns
t_s	storage time		–	300	ns
t_f	fall time		–	65	ns

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

PNP switching transistors

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$V_i = -9.5 \text{ V}$; $T = 500 \mu\text{s}$; $t_p = 10 \mu\text{s}$; $t_r = t_f \leq 3 \text{ ns}$.
 $R_1 = 68 \Omega$; $R_2 = 325 \Omega$; $R_B = 325 \Omega$; $R_C = 160 \Omega$.
 $V_{BB} = 3.5 \text{ V}$; $V_{CC} = -29.5 \text{ V}$.
 Oscilloscope: input impedance $Z_i = 50 \Omega$.

Fig.2 Test circuit for switching times.

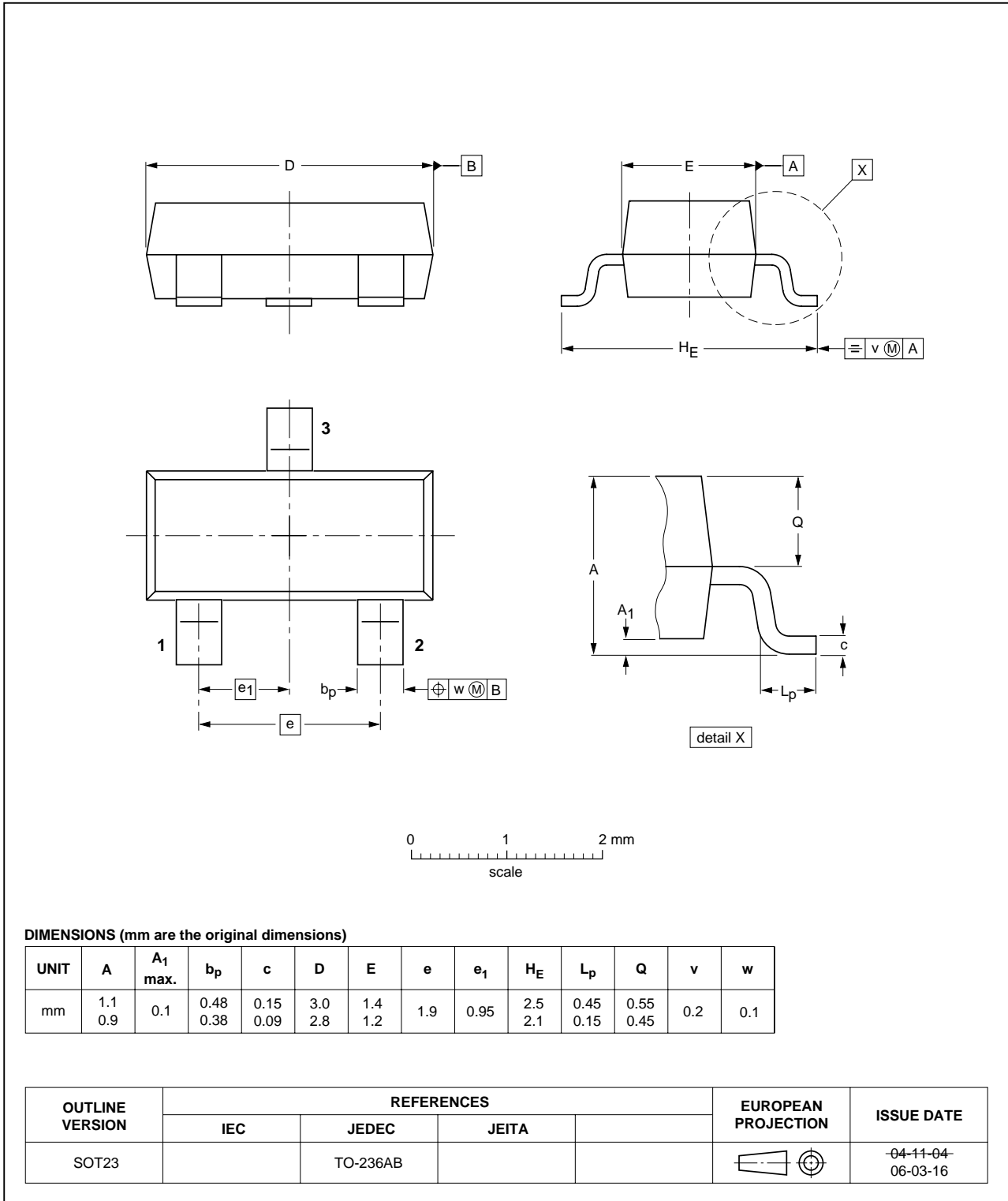
PNP switching transistors

BSR15; BSR16

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



PNP switching transistors

BSR15; BSR16

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.

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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>.

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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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Printed in The Netherlands

R75/04/pp8

Date of release: 2004 Jan 13

Document order number: 9397 750 12421

