

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

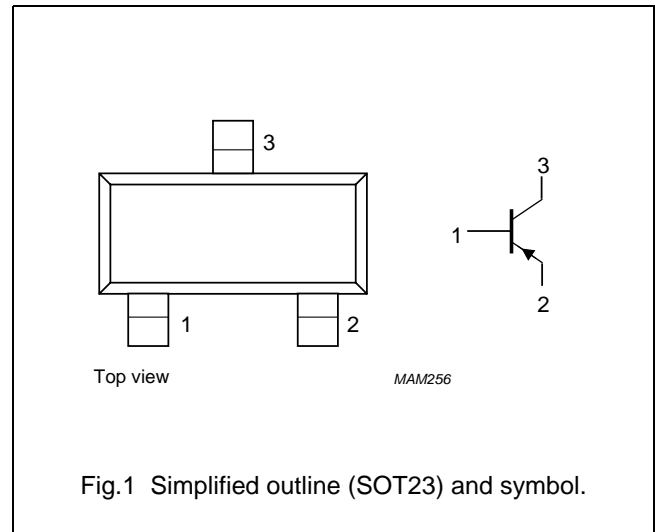
TYPE NUMBER	MARKING CODE ⁽¹⁾
BSR15	T7*
BSR16	T8*

Note

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

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



ORDERING INFORMATION

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

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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} ≤ 25 °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.

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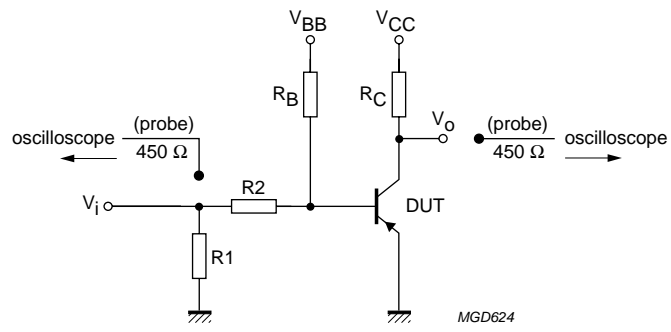
CHARACTERISTICST_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I _{CBO}	collector cut-off current BSR15	I _E = 0; V _{CB} = -50 V I _E = 0; V _{CB} = -50 V; T _j = 150 °C	-	-20	nA μA
	collector cut-off current BSR16	I _E = 0; V _{CB} = -50 V I _E = 0; V _{CB} = -50 V; T _j = 150 °C	-	-10 -10	nA μA
I _{EBO}	emitter cut-off current	I _C = 0; V _{EB} = -5 V	-	-50	nA
h _{FE}	DC current gain BSR15 BSR16	I _C = -0.1 mA; V _{CE} = -10 V	35 75	- -	
	DC current gain BSR15 BSR16	I _C = -1 mA; V _{CE} = -10 V	50 100	- -	
	DC current gain BSR15 BSR16	I _C = -10 mA; V _{CE} = -10 V	75 100	- -	
	DC current gain	I _C = -150 mA; V _{CE} = -10 V; note 1	100	300	
	DC current gain BSR15 BSR16	I _C = -500 mA; V _{CE} = -10 V; note 1	30 50	- -	
	V _{CEsat}	collector-emitter saturation voltage	I _C = -150 mA; I _B = -15 mA	-	-400
I _C = -500 mA; I _B = -50 mA			-	-1.6	V
V _{BEsat}	base-emitter saturation voltage	I _C = -150 mA; I _B = -15 mA	-	-1.3	V
		I _C = -500 mA; I _B = -50 mA	-	-2.6	V
C _c	collector capacitance	I _E = I _e = 0; V _{CB} = -10 V; f = 1 MHz	-	8	pF
C _e	emitter capacitance	I _C = I _c = 0; V _{EB} = -2 V; f = 1 MHz	-	30	pF
f _T	transition frequency	I _C = -50 mA; V _{CE} = -20 V; f = 100 MHz	200	-	MHz
Switching times (between 10% and 90% levels); (see Fig.2)					
t _{on}	turn-on time	I _{Con} = -150 mA; I _{Bon} = -15 mA; I _{Boff} = 15 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

Note1. Pulse test: t_p ≤ 300 μs; δ ≤ 0.02.

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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.

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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



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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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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.

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BSR15_BSR16

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Datasheet



(Product Specification)
v.4.0, 2004-01-13
Pages, 133kB

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General description

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

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Features and benefits

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

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Applications

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Medium power switching.

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Parametrics/similar products

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Type number	Package	h_{FE} [min]	h_{FE} [max]	f_T [min](MHz)	Polarity	Complement	I_C [max](mA)	V_{CEO} [max](V)	P_{tot} [max](mW)	t_{off} (ns)
BSR16	SOT23 (TO-236AB)	50	>50	200	PNP	BSR14	600	60	250	365

Similar products

BSR15_BSR16 links to the similar products page containing an overview of products that are similar in function or related to the type number(s) as listed on this page. The similar products page includes products from the same catalog tree(s), relevant selection guides and products from the same functional category.

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Pricing/ordering/availability

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Type number	Ordering code (12NC)	Orderable part number	Region	Distributor	In stock	Order quantity	Inventory date	Buy online	Samples
BSR16	9335 084 00215	BSR16,215	EU	FUTURE ELECTRONICS UK	84,000		6/30/2011	Buy online	Order samples
			AS	AVNET ELECTRONICS / HONG KONG	48,000		6/24/2011	Buy online	
			NA	AVNET ELECTRONICS MARKETING	8,845		6/30/2011	Buy online	
			NA	MOUSER ELECTRONICS	4,257		6/30/2011	Buy online	
			NA	MOUSER ELECTRONICS	4,257		6/30/2011	Buy online	
			JAPAN	CHIP ONE STOP	yes		6/27/2011	Buy online	

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Products/packages

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Type number	Orderable part number	Ordering code (12NC)	Product status	Package	Packing	Marking	ECCN
BSR16	BSR16,215	9335 084 00215	Volume production	SOT23 (TO-236AB)	Tape reel smd	Standard Marking	

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Quality/reliability/chemical content

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Type number	Orderable part number	Chemical content	RoHS	Leadfree conversion date	RHF	IFR (FIT)	MTBF (hours)	MSL	MSL LF
BSR16	BSR16,215	BSR16	EU/CH RoHS COMPLIANT Pb	week 34, 2003				1	NA

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Design support

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Other type

[Letter Symbols - Transistors; General \(v.1.0, 1999-05-07\)](#)

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