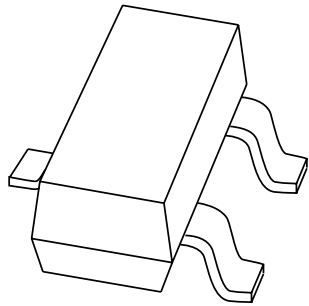


# DATA SHEET



## **BSR15; BSR16** PNP switching transistors

Product specification  
Supersedes data of 1997 May 14

1999 Apr 15

# 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

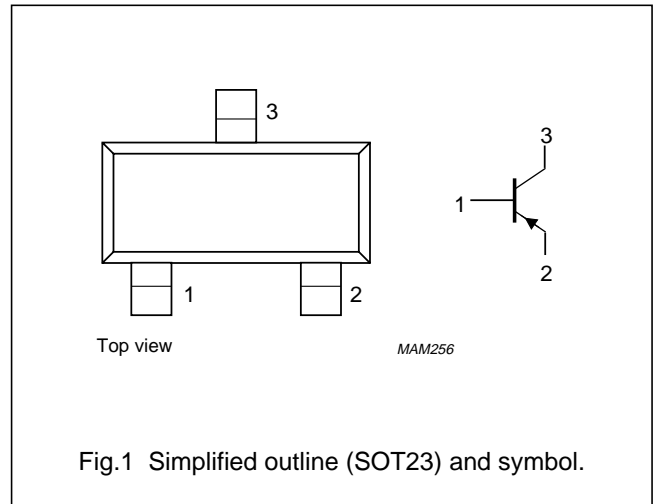
TYPE NUMBER	MARKING CODE <sup>(1)</sup>
BSR15	T7*
BSR16	T8*

### Note

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

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter	–	–60	V
V <sub>CEO</sub>	collector-emitter voltage	open base	–	–40	V
	BSR15			–60	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	–5	V
I <sub>C</sub>	collector current (DC)		–	–600	mA
I <sub>CM</sub>	peak collector current		–	–800	mA
I <sub>BM</sub>	peak base current		–	–200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	250	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

## PNP switching transistors

## BSR15; BSR16

## 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.

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current BSR15	$I_E = 0; V_{CB} = -50\text{ V}$	–	–20	nA
		$I_E = 0; V_{CB} = -50\text{ V}; T_j = 150\text{ °C}$	–	–20	$\mu\text{A}$
$I_{CBO}$	collector cut-off current BSR16	$I_E = 0; V_{CB} = -50\text{ V}$	–	–10	nA
		$I_E = 0; V_{CB} = -50\text{ V}; T_j = 150\text{ °C}$	–	–10	$\mu\text{A}$
$I_{EBO}$	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 BSR15 BSR16	$I_C = -150\text{ mA}; V_{CE} = -10\text{ V}; \text{note 1}$	100	300		
	$I_C = -500\text{ mA}; V_{CE} = -10\text{ V}; \text{note 1}$	30	–		
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}$	–	–400	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}$	–	–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

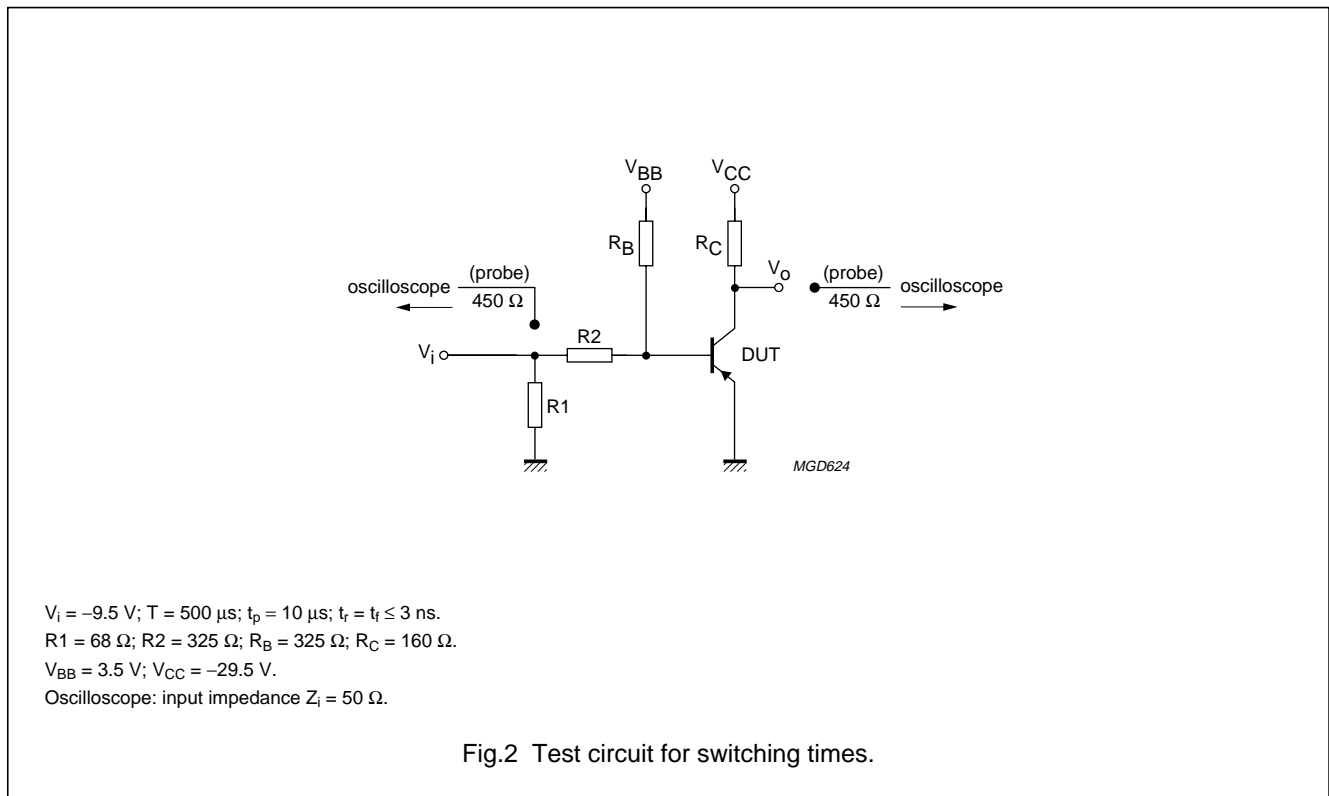
PNP switching transistors

BSR15; BSR16

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Switching times (between 10% and 90% levels); (see Fig.2)</b>					
$t_{on}$	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:  $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$ .



PNP switching transistors

BSR15; BSR16

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



## PNP switching transistors

## BSR15; BSR16

**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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PNP switching transistors

BSR15; BSR16

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