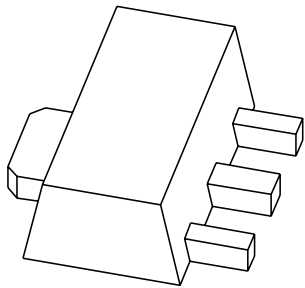


DATA SHEET



BSR40; BSR41; BSR42; BSR43 NPN medium power transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Apr 07

NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V).

APPLICATIONS

- Thick and thin-film circuits
- Telephony and general industrial applications.

DESCRIPTION

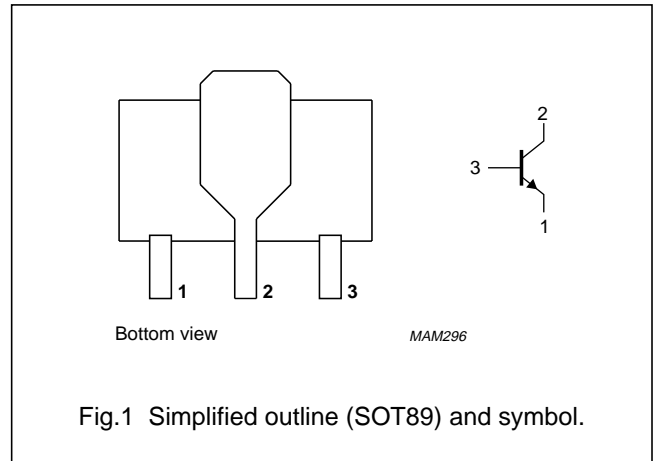
NPN medium power transistor in a SOT89 plastic package. PNP complements: BSR30; BSR31; BSR32 and BSR33.

MARKING

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BSR40	AR1	BSR42	AR3
BSR41	AR2	BSR43	AR4

PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BSR40; BSR41		–	70	V
	BSR42; BSR43		–	90	V
V_{CEO}	collector-emitter voltage	open base			
	BSR40; BSR41		–	60	V
	BSR42; BSR43		–	80	V
I_{CM}	peak collector current		–	2	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	1.4	W
h_{FE}	DC current gain	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}$			
	BSR40; BSR42		40	120	
	BSR41; BSR43		100	300	
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	100	–	MHz

NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter			
	BSR40; BSR41		–	70	V
	BSR42; BSR43		–	90	V
V _{CEO}	collector-emitter voltage	open base			
	BSR40; BSR41		–	60	V
	BSR42; BSR43		–	80	V
V _{EBO}	emitter-base voltage	open collector	–	5	V
I _C	collector current (DC)		–	1	A
I _{CM}	peak collector current		–	2	A
I _{BM}	peak base current		–	0.2	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C; note 1	–	1	W
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C

Note

- Device mounted on a printed-circuit board, single sided copper, tinned, mounting pad for collector 1 cm².
For other mounting conditions, see "*Thermal considerations for SOT89 in the General part of handbook SC04*".

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	note 1	89	K/W
R _{th j-s}	thermal resistance from junction to soldering point		8	K/W

Note

- Device mounted on a printed-circuit board, single sided copper, tinned, mounting pad for collector 1 cm².
For other mounting conditions, see "*Thermal considerations for SOT89 in the General part of handbook SC04*".

NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = 60\text{ V}$	–	100	nA
		$I_E = 0; V_{CB} = 60\text{ V}; T_j = 150\text{ °C}$	–	50	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	100	nA
h_{FE}	DC current gain BSR40; BSR42 BSR41; BSR43	$I_C = 100\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; \text{note 1}$	10	–	
			30	–	
h_{FE}	DC current gain BSR40; BSR42 BSR41; BSR43	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}; \text{note 1}$	40	120	
			100	300	
h_{FE}	DC current gain BSR40; BSR42 BSR41; BSR43	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; \text{note 1}$	30	–	
			50	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$	–	250	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	–	500	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$	–	1	V
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	–	1.2	V
C_c	collector capacitance	$I_E = I_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	12	pF
C_e	emitter capacitance	$I_C = I_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	90	pF
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	100	–	MHz
Switching times (between 10% and 90% levels)					
t_{on}	turn-on time	$I_{Con} = 100\text{ mA}; I_{Bon} = 5\text{ mA};$	–	250	ns
t_{off}	turn-off time	$I_{Boff} = -5\text{ mA}$	–	1	μs

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.01$.

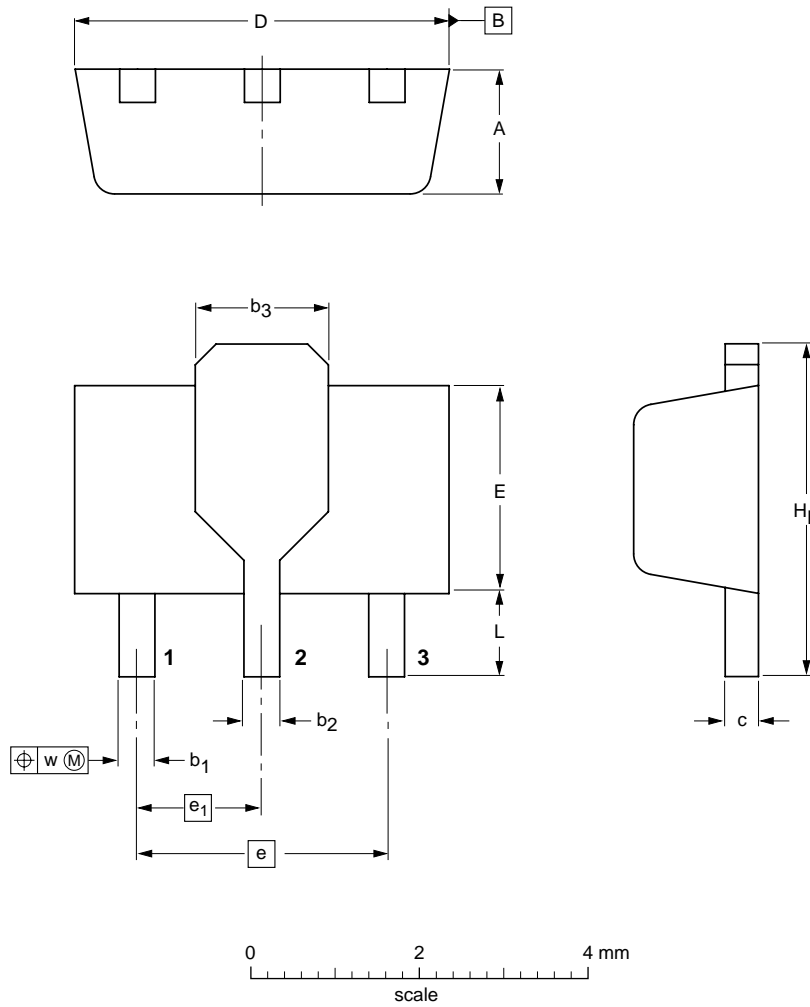
NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b ₁	b ₂	b ₃	c	D	E	e	e ₁	H _E	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT89						97-02-28

NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

DEFINITIONS

Data Sheet Status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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NPN medium power transistors

BSR40; BSR41; BSR42; BSR43

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