



BSR43

80 V, 1 A NPN medium power transistor

1 October 2022

Product data sheet

1. General description

NPN general-purpose transistor in a medium power SOT89 (SC-62) Surface-Mounted Device (SMD) plastic package. PNP complement: BSR33.

2. Features and benefits

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

3. Applications

- Linear voltage regulators
- Low-side switches
- Battery-driven devices
- Power management
- MOSFET drivers
- Amplifiers

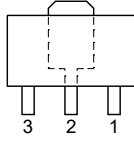
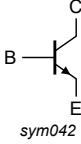
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base	-	-	80	V
I_C	collector current		-	-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	2	A
h_{FE}	DC current gain	$V_{CE} = 5$ V; $I_C = 100$ μ A; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.01$; $T_{amb} = 25$ °C	30	-	-	
		$V_{CE} = 5$ V; $I_C = 100$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.01$; $T_{amb} = 25$ °C	100	-	300	
		$V_{CE} = 5$ V; $I_C = 500$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.01$; $T_{amb} = 25$ °C	50	-	-	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	 SOT89	 sym042
2	C	collector		
3	B	base		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BSR43	SOT89	plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body	SOT89

7. Marking

Table 4. Marking codes

Type number	Marking code
BSR43	AR 4

8. Limiting values

Table 5. 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		-	90	V
V_{CEO}	collector-emitter voltage	open base		-	80	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	2	A
I_{BM}	peak base current			-	0.2	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	1.35	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	93	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	13	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current (emitter open)	$V_{CB} = 60 \text{ V}; I_E = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_{CB} = 60 \text{ V}; I_E = 0 \text{ A}; T_j = 150 \text{ }^{\circ}\text{C}$		-	-	50	μA
I_{EBO}	emitter-base cut-off current (collector open)	$V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}; I_C = 100 \text{ } \mu\text{A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		30	-	-	
		$V_{CE} = 5 \text{ V}; I_C = 100 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		100	-	300	
		$V_{CE} = 5 \text{ V}; I_C = 500 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		50	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	250	mV
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	500	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	1	V
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.01; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	1.2	V
C_c	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	12	pF
C_e	emitter capacitance	$V_{EB} = 0.5 \text{ V}; I_C = 0 \text{ A}; i_c = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	90	pF
f_T	transition frequency	$V_{CE} = 10 \text{ V}; I_C = 50 \text{ mA}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		100	-	-	MHz
Switching times (between 10% and 90% levels)							
t_{on}	turn-on time	$I_C = 100 \text{ mA}; I_{Bon} = 5 \text{ mA}; I_{Boff} = -5 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	250	ns
t_{off}	turn-off time			-	-	1	μs

11. Package outline

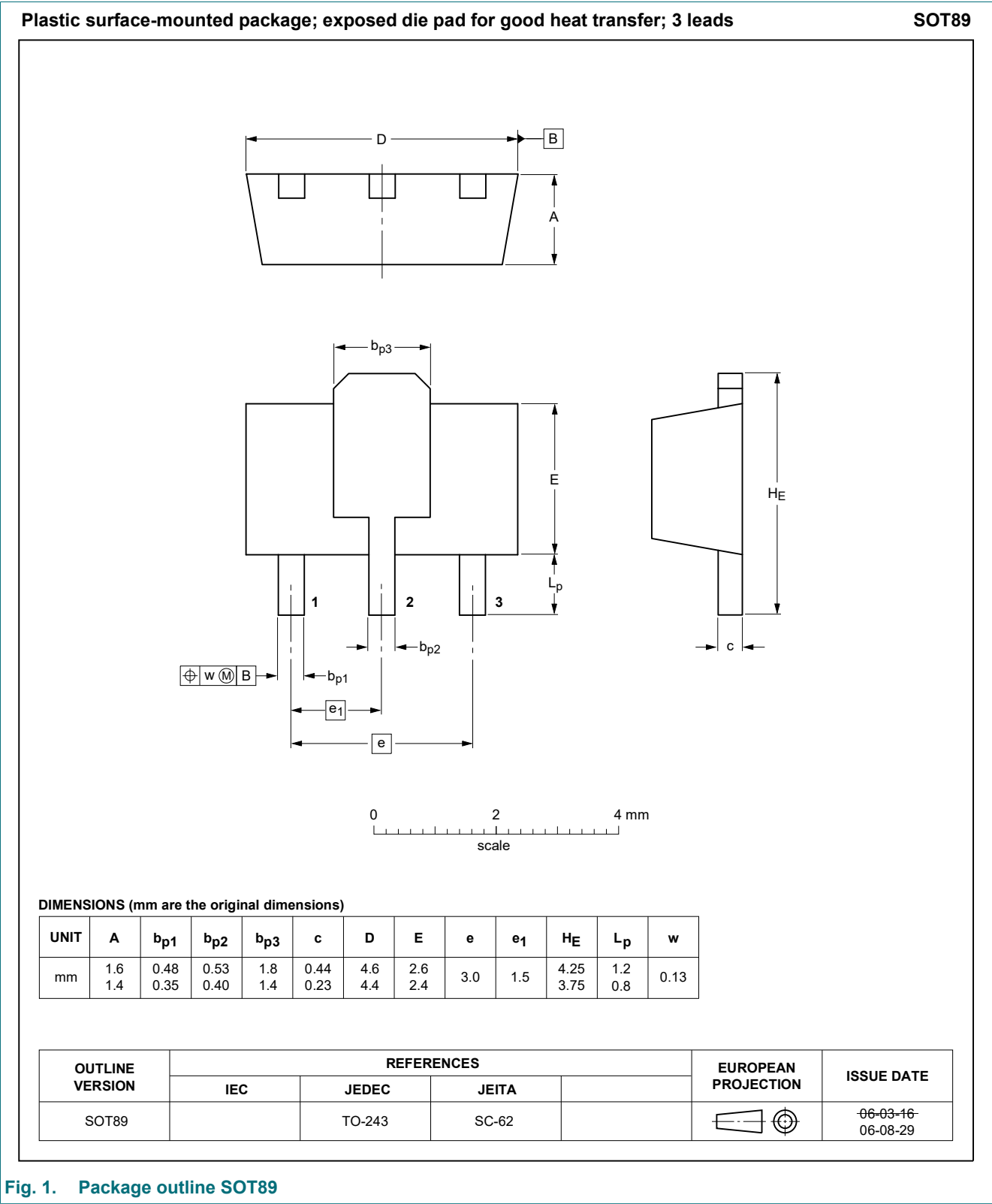


Fig. 1. Package outline SOT89

12. Soldering

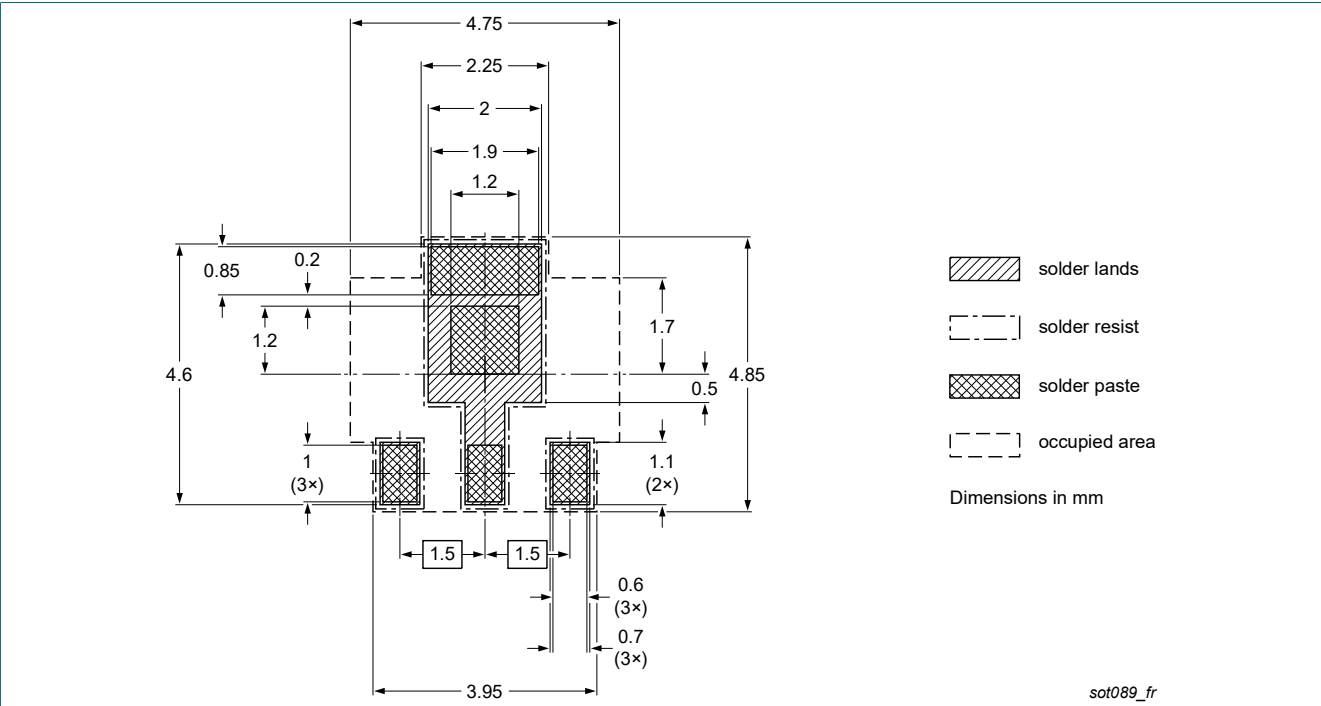


Fig. 2. Reflow soldering footprint for SOT89

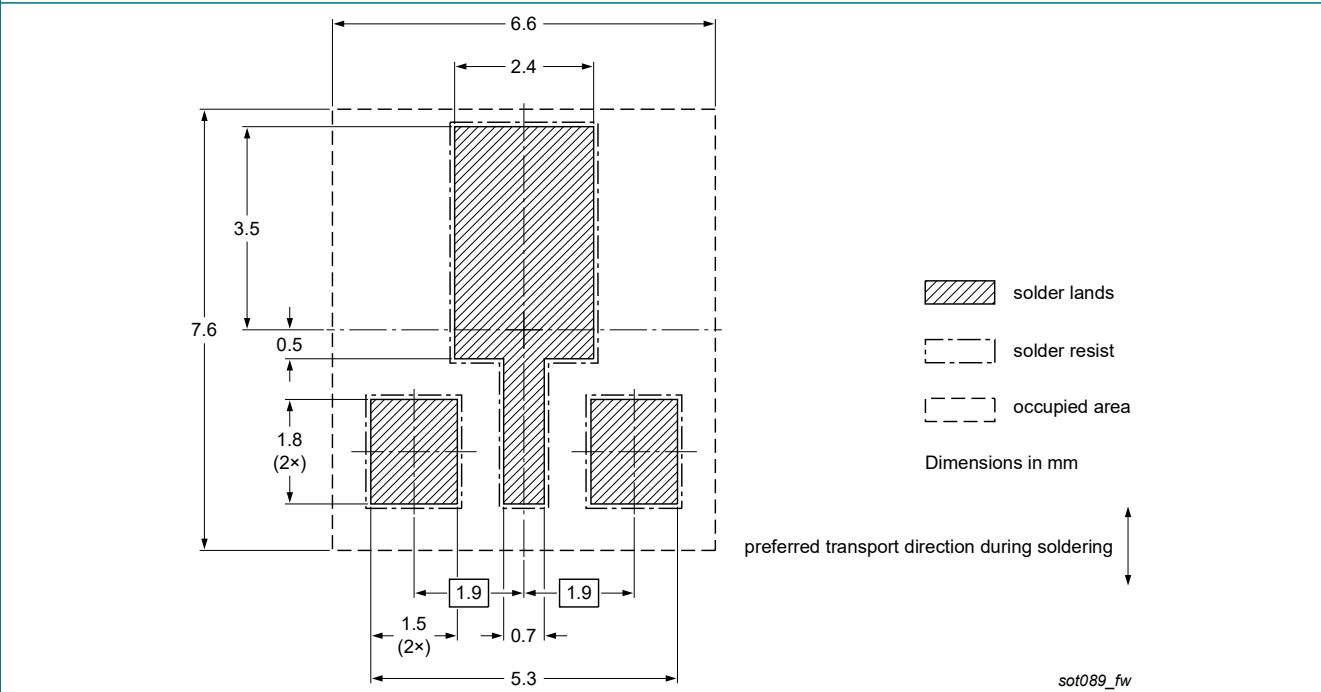


Fig. 3. Wave soldering footprint for SOT89

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BSR43 v.3	20221001	Product data sheet	-	BSR43 v.2
Modifications:	<ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.Legal texts have been adapted to the new company name where appropriate.Product changed to non automotive. Please refer to the automotive product(s) with -Q.			
BSR43 v.2	20041213	Product data sheet	-	BSR43 v.1
BSR43 v.1	19990428	Product specification	-	-

14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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