**Product data sheet** 

## 1. General description

NPN high-voltage transistor in a small SOT23 plastic package.

PNP complements: BSR20A-Q.

### 2. Features and benefits

- Low current (max. 300 mA)
- High voltage (max. 160 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

# 3. Applications

- General purpose switching and amplification
- · Especially used for telephony applications.

### 4. Quick reference data

#### Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$V_{CBO}$	collector-base voltage	open emitter	-	-	180	V
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	160	V
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	-	-	600	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	-	-	250	mW
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 mA; T <sub>amb</sub> = 25 °C	80	-	-	
f <sub>T</sub>	transition frequency	$V_{CE}$ = 10 V; $I_{C}$ = 10 mA; f = 100 MHz; $T_{amb}$ = 25 °C	100	300	-	MHz



### **NPN** high voltage transistors

# 5. Pinning information

#### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	3	С
2	E	emitter		j
3	С	collector		В —
				 E
			1	sym021

# 6. Ordering information

#### **Table 3. Ordering information**

Type number	Package	Package			
	Name	Description	Version		
BSR19A-Q		plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23		

# 7. Marking

### **Table 4. Marking codes**

Type number	Marking code[1]
BSR19A-Q	57%

[1] % = placeholder for manufacturing site code

**NPN** high voltage transistors

# 8. Limiting values

### **Table 5. Limiting values**

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

Symbol	Parameter	Conditions	l l	Min	Max	Unit
V <sub>CBO</sub>	collector-base voltage	open emitter	-	-	180	V
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	160	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	-	6	V
I <sub>C</sub>	collector current		-	-	300	mA
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	-	-	600	mA
I <sub>Blim</sub>	limiting base current		-	-	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	-	-	250	mW
Tj	junction temperature		-	-	150	°C
T <sub>amb</sub>	ambient temperature		-	-65	150	°C
T <sub>stg</sub>	storage temperature		-	-65	150	°C

## 9. Thermal characteristics

#### **Table 6. Thermal characteristics**

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient		[1]	-	-	500	K/W

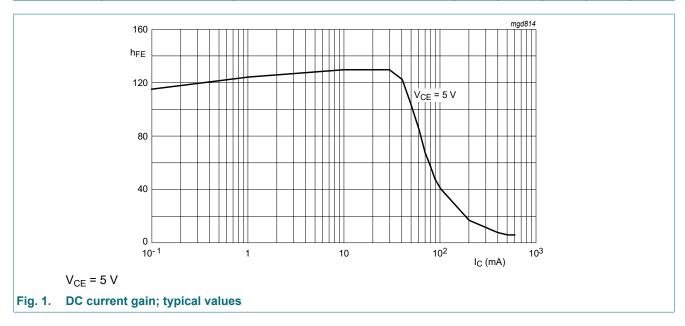
<sup>[1]</sup> Transistor mounted on an FR4 printed-circuit board.

### **NPN** high voltage transistors

## 10. Characteristics

**Table 7. Characteristics** 

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
I <sub>CBO</sub>	collector-base cut-off	V <sub>CB</sub> = 120 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C	-	-	50	nA
	current	V <sub>CB</sub> = 120 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 100 °C	-	-	50	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 4 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C	-	-	50	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 mA; T <sub>amb</sub> = 25 °C	80	-	-	
		$V_{CE}$ = 5 V; $I_{C}$ = 10 mA; $T_{amb}$ = 25 °C	80	-	250	
		$V_{CE}$ = 5 V; $I_{C}$ = 50 mA; $T_{amb}$ = 25 °C	30	-	-	
V <sub>CEsat</sub>	collector-emitter	I <sub>C</sub> = 10 mA; I <sub>B</sub> = 1 mA; T <sub>amb</sub> = 25 °C	-	-	150	mV
	saturation voltage	I <sub>C</sub> = 50 mA; I <sub>B</sub> = 5 mA; T <sub>amb</sub> = 25 °C	-	-	200	mV
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C	-	-	6	pF
f <sub>T</sub>	transition frequency	$V_{CE} = 10 \text{ V}; I_{C} = 10 \text{ mA}; f = 100 \text{ MHz}; $ $T_{amb} = 25 \text{ °C}$	100	300	-	MHz



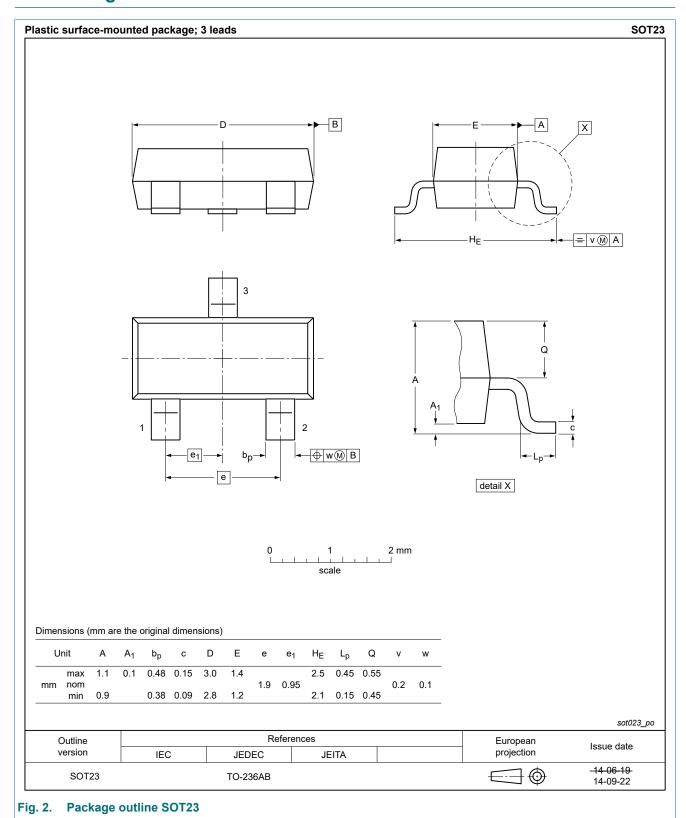
### 11. Test information

### **Quality information**

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

### NPN high voltage transistors

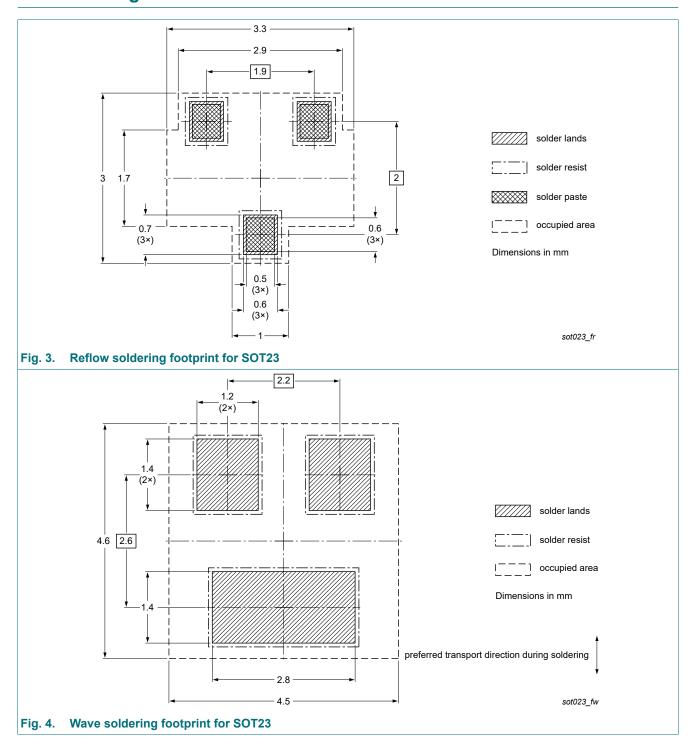
# 12. Package outline



5/9

### NPN high voltage transistors

# 13. Soldering



## **NPN** high voltage transistors

# 14. Revision history

#### **Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BSR19A-Q v.1	20211025	Product data sheet	-	-

#### NPN high voltage transistors

### 15. 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.

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### **NPN** high voltage transistors

## **Contents**

1.	General description	1
2.	Features and benefits	. 1
3.	Applications	. 1
4.	Quick reference data	1
5.	Pinning information	2
6.	Ordering information	2
7.	Marking	2
8.	Limiting values	. 3
9.	Thermal characteristics	. 3
10.	Characteristics	4
11.	Test information	4
12.	Package outline	. 5
13.	Soldering	. 6
14.	Revision history	7
15.	Legal information	8

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