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Should be replaced with:

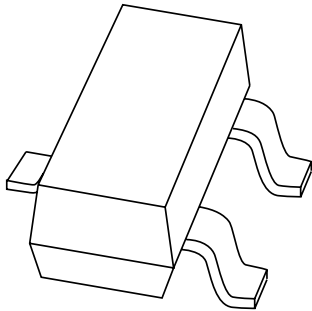
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Kind regards,

Team Nexperia

DATA SHEET



BSR19; BSR19A NPN high voltage transistors

Product data sheet
Supersedes data of 2004 Jan 13

2004 Mar 15

NPN high voltage transistors

BSR19; BSR19A

FEATURES

- Low current (max. 300 mA)
- High voltage (max. 160 V).

APPLICATIONS

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

DESCRIPTION

NPN high-voltage transistor in a SOT23 plastic package.
PNP complements: BSR20 and BSR20A.

MARKING

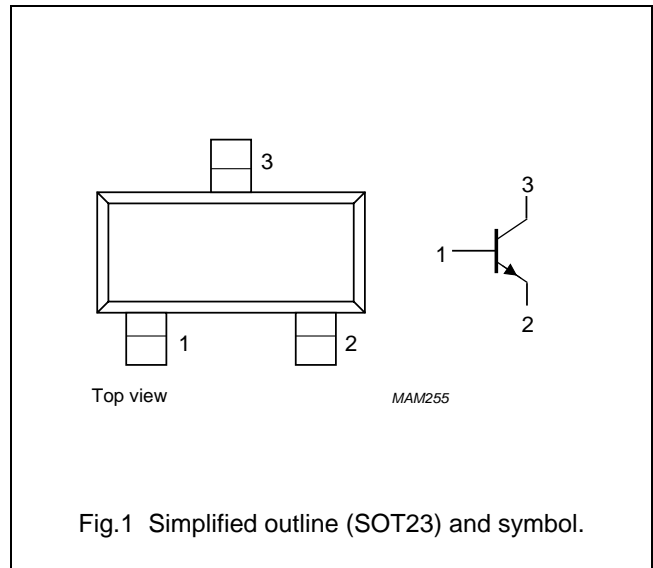
| TYPE NUMBER | MARKING CODE ⁽¹⁾ |
|-------------|-----------------------------|
| BSR19 | 56* or U35 |
| BSR19A | 57* or U36 |

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 |
| BSR19 | – | plastic surface mounted package; 3 leads | SOT23 |
| BSR19A | – | plastic surface mounted package; 3 leads | SOT23 |

NPN high voltage transistors

BSR19; BSR19A

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|---------------------------|-------------------------------------------------------------|------|------|------|
| V _{CBO} | collector-base voltage | open emitter | | | |
| | BSR19 | | – | 160 | V |
| | BSR19A | | – | 180 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | BSR19 | | – | 140 | V |
| | BSR19A | | – | 160 | V |
| I _{CM} | peak collector current | | – | 600 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | – | 250 | mW |
| h _{FE} | DC current gain | I _C = 10 mA; V _{CE} = 5 V | | | |
| | BSR19 | | 60 | – | |
| | BSR19A | | 80 | – | |
| f _T | transition frequency | I _C = 10 mA; V _{CE} = 10 V; f = 100 MHz | 100 | 300 | MHz |

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 | | | |
| | BSR19 | | – | 160 | V |
| | BSR19A | | – | 180 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | BSR19 | | – | 140 | V |
| | BSR19A | | – | 160 | V |
| V _{EBO} | emitter-base voltage | open collector | – | 6 | V |
| I _C | collector current (DC) | | – | 300 | mA |
| I _{CM} | peak collector current | | – | 600 | mA |
| I _B | base current (DC) | | – | 100 | 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.

NPN high voltage transistors

BSR19; BSR19A

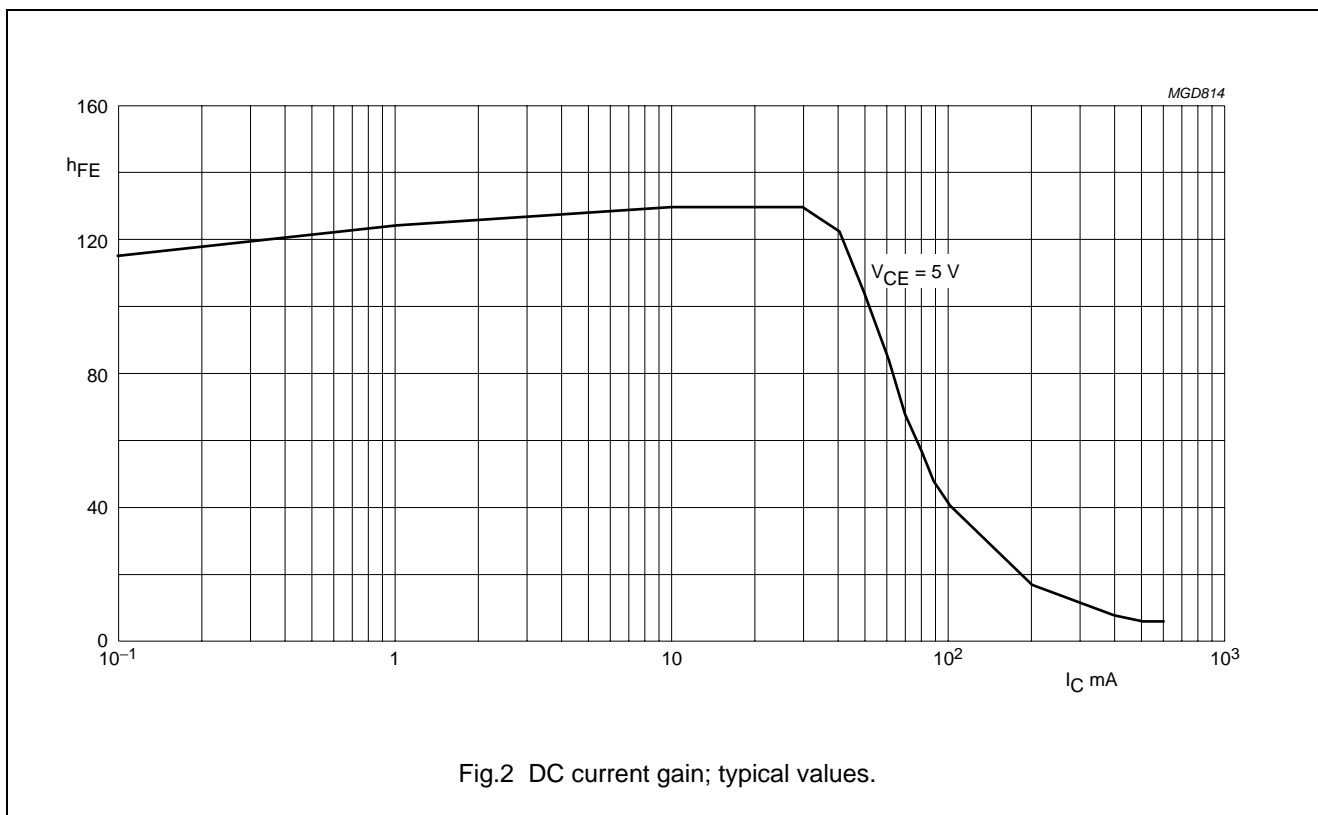
CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|-----------------------------------------------|--------------------------------------------------------------------|------|------|---------------|
| I_{CBO} | collector cut-off current BSR19 | $I_E = 0\text{ A}; V_{CB} = 100\text{ V}$ | – | 100 | nA |
| | | $I_E = 0\text{ A}; V_{CB} = 100\text{ V}; T_{amb} = 100\text{ °C}$ | – | 100 | μA |
| I_{CBO} | collector cut-off current BSR19A | $I_E = 0\text{ A}; V_{CB} = 120\text{ V}$ | – | 50 | nA |
| | | $I_E = 0\text{ A}; V_{CB} = 120\text{ V}; T_{amb} = 100\text{ °C}$ | – | 50 | μA |
| I_{EBO} | emitter cut-off current | $I_C = 0\text{ A}; V_{EB} = 4\text{ V}$ | – | 50 | nA |
| h_{FE} | DC current gain BSR19 | $I_C = 1\text{ mA}; V_{CE} = 5\text{ V}$ | 60 | – | |
| | | | 80 | – | |
| | DC current gain BSR19 | $I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$ | 60 | 250 | |
| | | | 80 | 250 | |
| | DC current gain BSR19A | $I_C = 50\text{ mA}; V_{CE} = 5\text{ V}$ | 20 | – | |
| | | | 30 | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 1\text{ mA}$ | – | 150 | mV |
| V_{CEsat} | collector-emitter saturation voltage BSR19 | $I_C = 50\text{ mA}; I_B = 5\text{ mA}$ | – | 250 | mV |
| | | | – | 200 | mV |
| C_c | collector capacitance | $I_E = 0\text{ A}; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$ | – | 6 | pF |
| f_T | transition frequency | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$ | 100 | 300 | MHz |

NPN high voltage transistors

BSR19; BSR19A



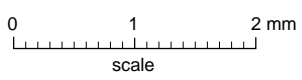
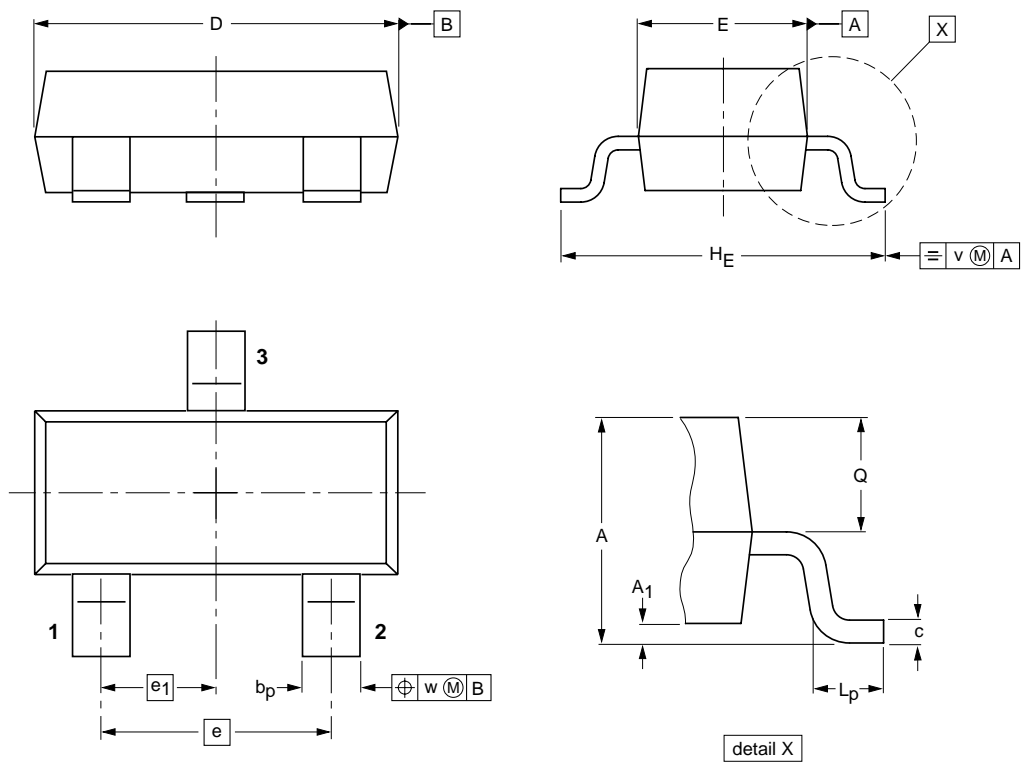
NPN high voltage transistors

BSR19; BSR19A

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max. | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm | 1.1 0.9 | 0.1 | 0.48 0.38 | 0.15 0.09 | 3.0 2.8 | 1.4 1.2 | 1.9 | 0.95 | 2.5 2.1 | 0.45 0.15 | 0.55 0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | 04-11-04 06-03-16 |

NPN high voltage transistors

BSR19; BSR19A

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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NXP Semiconductors

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.

Contact information

For additional information please visit: <http://www.nxp.com>

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