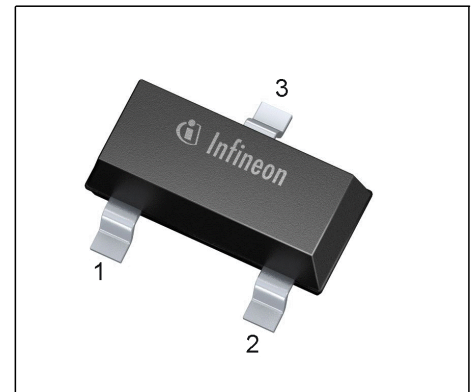


**Low Noise Silicon Bipolar RF Transistor**

- High linearity low noise RF transistor
- 22 dBm OP1dB and 31 dBm OIP3  
@ 900 MHz, 8 V, 70 mA
- For UHF / VHF applications
- Driver for multistage amplifiers
- For linear broadband and antenna amplifiers
- Collector design supports 5 V supply voltage
- Pb-free (RoHS compliant) package
- Qualification report according to AEC-Q101 available



**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

| Type   | Marking | Pin Configuration |     |     | Package |
|--------|---------|-------------------|-----|-----|---------|
| BFR106 | R7s     | 1=B               | 2=E | 3=C | SOT23   |

**Maximum Ratings** at  $T_A = 25\text{ °C}$ , unless otherwise specified

| Parameter   | Symbol    | Value       | Unit |
|---|-----------|-------------|------|
| Collector-emitter voltage,<br>$T_A = 25\text{ °C}$<br>$T_A = -55\text{ °C}$ | $V_{CEO}$ | 16<br>15    | V    |
| Collector-emitter voltage   | $V_{CES}$ | 20          |      |
| Collector-base voltage  | $V_{CBO}$ | 20          |      |
| Emitter-base voltage  | $V_{EBO}$ | 3           |      |
| Collector current   | $I_C$     | 210         | mA   |
| Base current  | $I_B$     | 21          |      |
| Total power dissipation <sup>1)</sup><br>$T_S \leq 76\text{ °C}$            | $P_{tot}$ | 700         | mW   |
| Junction temperature  | $T_J$     | 150         | °C   |
| Storage temperature   | $T_{Stg}$ | -55 ... 150 |      |

**Thermal Resistance**

| Parameter                                | Symbol     | Value | Unit |
|--|------------|-------|------|
| Junction - soldering point <sup>2)</sup> | $R_{thJS}$ | 105   | K/W  |

<sup>1)</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb

<sup>2)</sup> For calculation of  $R_{thJS}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

**Electrical Characteristics** at  $T_A = 25\text{ °C}$ , unless otherwise specified

| Parameter  | Symbol        | Values |      |      | Unit          |
|--|---------------|--------|------|------|---------------|
|  |               | min.   | typ. | max. |               |
| <b>DC Characteristics</b>  |               |        |      |      |               |
| Collector-emitter breakdown voltage<br>$I_C = 1\text{ mA}, I_B = 0$  | $V_{(BR)CEO}$ | 15     | -    | -    | V             |
| Collector-emitter cutoff current<br>$V_{CE} = 20\text{ V}, V_{BE} = 0$<br>$V_{CE} = 10\text{ V}, V_{BE} = 0$ | $I_{CES}$     | -      | -    | 1    | $\mu\text{A}$ |
| Collector-base cutoff current<br>$V_{CB} = 10\text{ V}, I_E = 0$   | $I_{CBO}$     | -      | 1    | 30   | nA            |
| Emitter-base cutoff current<br>$V_{EB} = 2\text{ V}, I_C = 0$  | $I_{EBO}$     | -      | 1    | 30   |               |
| DC current gain<br>$I_C = 70\text{ mA}, V_{CE} = 8\text{ V}$ , pulse measured                                | $h_{FE}$      | 70     | 100  | 140  | -             |

**Electrical Characteristics at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

| Parameter  | Symbol     | Values |      |      | Unit |
|--|------------|--------|------|------|------|
|  |            | min.   | typ. | max. |      |
| <b>AC Characteristics (verified by random sampling)</b>  |            |        |      |      |      |
| Transition frequency<br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 500\text{ MHz}$  | $f_T$      | 3.5    | 5    | -    | GHz  |
| Collector-base capacitance<br>$V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ ,<br>emitter grounded   | $C_{cb}$   | -      | 0.85 | 1.2  | pF   |
| Collector emitter capacitance<br>$V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ ,<br>base grounded   | $C_{ce}$   | -      | 0.27 | -    |      |
| Emitter-base capacitance<br>$V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ ,<br>collector grounded  | $C_{eb}$   | -      | 3.9  | -    |      |
| Minimum noise figure<br>$I_C = 20\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ ,<br>$f = 900\text{ MHz}$<br>$I_C = 20\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ ,<br>$f = 1.8\text{ GHz}$ | $NF_{min}$ | -      | 1.8  | -    | dB   |
|  |            | -      | 3    | -    |      |

**Electrical Characteristics at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

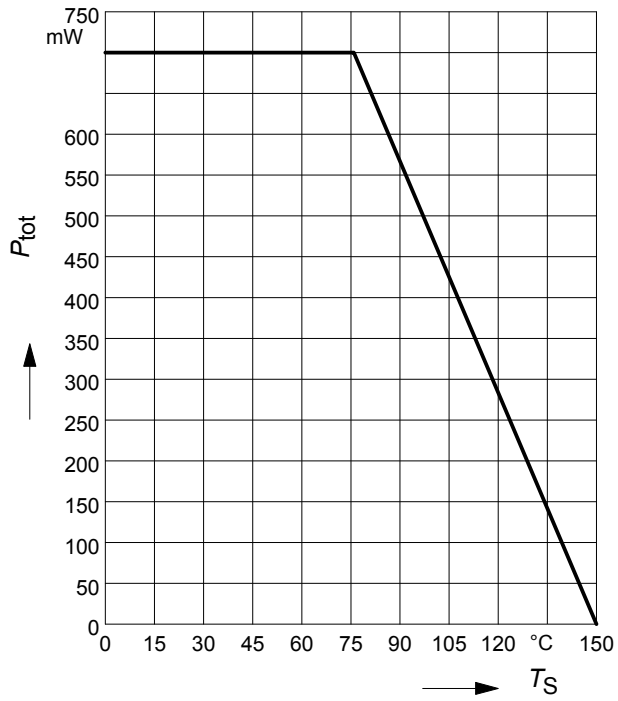
| Parameter   | Symbol        | Values |      |      | Unit |
|---|---------------|--------|------|------|------|
|   |               | min.   | typ. | max. |      |
| <b>AC Characteristics (verified by random sampling)</b>   |               |        |      |      |      |
| Power gain, maximum available <sup>1)</sup><br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 900\text{ MHz}$<br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 1.8\text{ GHz}$ | $G_{ma}$      | -      | 13   | -    | dB   |
| Transducer gain<br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ ,<br>$f = 900\text{ MHz}$<br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ ,<br>$f = 1.8\text{ GHz}$   | $ S_{21e} ^2$ | -      | 10.5 | -    | dB   |
| Third order intercept point at output <sup>2)</sup><br>$V_{CE} = 8\text{ V}$ , $I_C = 70\text{ mA}$ , $f = 0.9\text{ GHz}$ ,<br>$Z_S = Z_L = 50\ \Omega$  | $IP_3$        | -      | 31   | -    | dBm  |
| 1dB compression point<br>$I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ ,<br>$f = 0.9\text{ GHz}$  | $P_{-1dB}$    | -      | 22   | -    |      |

$$^1G_{ma} = |S_{21e}| / |S_{12e}| (k - (k^2 - 1)^{1/2})$$

<sup>2)</sup> $IP_3$  value depends on termination of all intermodulation frequency components.

Termination used for this measurement is  $50\ \Omega$  from 0.1 MHz to 6 GHz

Total power dissipation  $P_{\text{tot}} = f(T_S)$

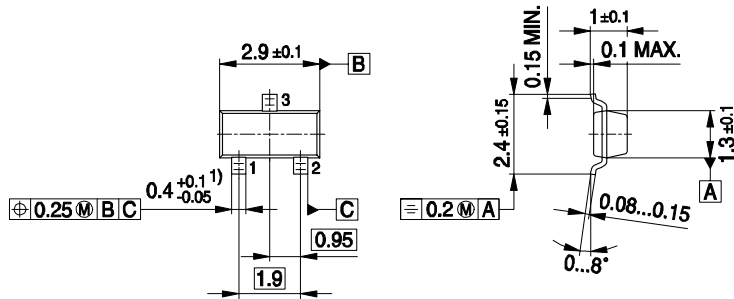
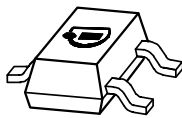


**SPICE GP Model**

For the SPICE Gummel Poon (GP) model as well as for the S-parameters (including noise parameters) please refer to our internet website [www.infineon.com/rf.models](http://www.infineon.com/rf.models).

Please consult our website and download the latest versions before actually starting your design.

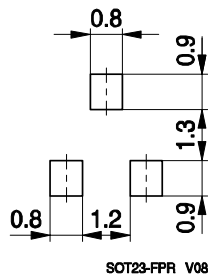
Package Outline



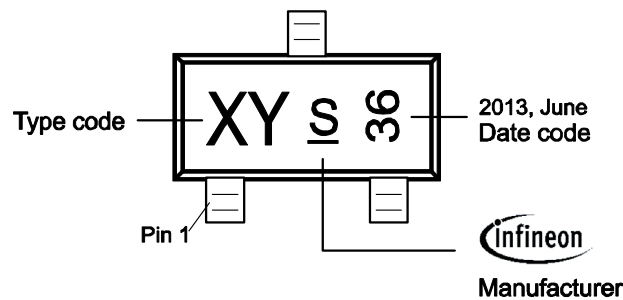
1) Lead width can be 0.6 max. in dambar area

SOT23-PO V08

Foot Print

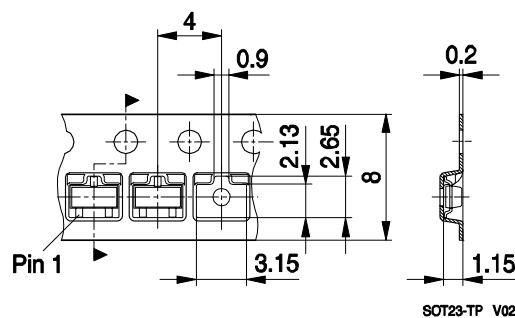


Marking Layout



Standard Packing

Reel o 180 mm: 3.000 Pieces / Reel  
 Reel o 330 mm = 10.000 Pieces / Reel



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### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331