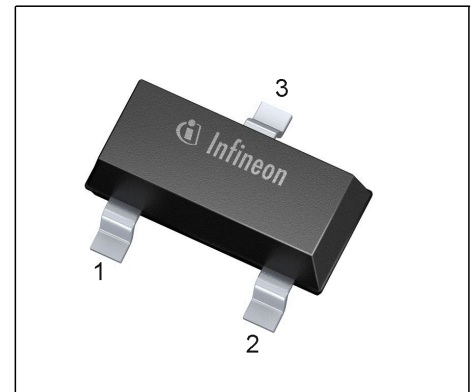


Low Noise Silicon Bipolar RF Transistor

- 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, $T_A = 25\text{ °C}$ $T_A = -55\text{ °C}$ | V_{CEO} | 16 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 ¹⁾ $T_S \leq 76\text{ °C}$ | 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 ²⁾ | R_{thJS} | 105 | K/W |

¹⁾ T_S is measured on the collector lead at the soldering point to the pcb

²⁾ 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. | |
| DC Characteristics | | | | | |
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}$, $I_B = 0$ | $V_{(BR)CEO}$ | 15 | - | - | V |
| Collector-emitter cutoff current $V_{CE} = 20\text{ V}$, $V_{BE} = 0$ $V_{CE} = 10\text{ V}$, $V_{BE} = 0$ | I_{CES} | - | - | 1 | μA |
| Collector-base cutoff current $V_{CB} = 10\text{ V}$, $I_E = 0$ | I_{CBO} | - | 1 | 30 | nA |
| Emitter-base cutoff current $V_{EB} = 2\text{ V}$, $I_C = 0$ | I_{EBO} | - | 1 | 30 | |
| DC current gain $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, pulse measured | h_{FE} | 70 | 100 | 140 | - |

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

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

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

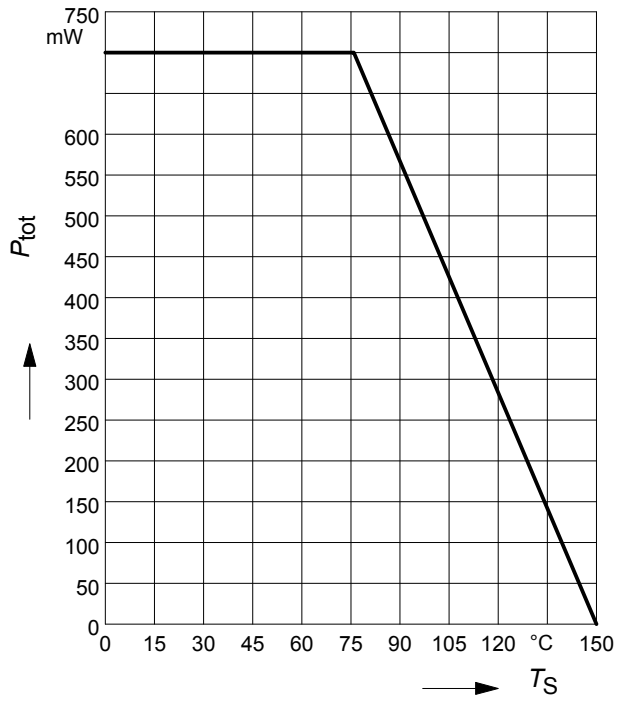
| Parameter | Symbol | Values | | | Unit |
|---|---------------|--------|------|------|------|
| | | min. | typ. | max. | |
| AC Characteristics (verified by random sampling) | | | | | |
| Power gain, maximum available ¹⁾ $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900\text{ MHz}$ $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$ | G_{ma} | - | 13 | - | dB |
| | | - | 8.5 | - | |
| Transducer gain $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 900\text{ MHz}$ $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 1.8\text{ GHz}$ | $ S_{21e} ^2$ | - | 10.5 | - | dB |
| | | - | 5 | - | |
| Third order intercept point at output ²⁾ $V_{CE} = 8\text{ V}$, $I_C = 70\text{ mA}$, $f = 0.9\text{ GHz}$, $Z_S = Z_L = 50\ \Omega$ | IP_3 | - | 31 | - | dBm |
| 1dB compression point $I_C = 70\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 0.9\text{ GHz}$ | P_{-1dB} | - | 22 | - | |

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

²⁾ 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 $P_{\text{tot}} = f(T_S)$

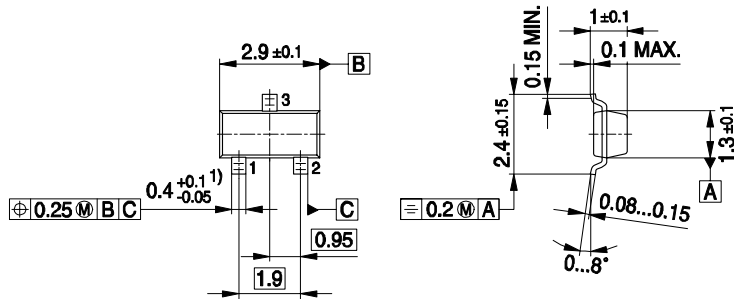
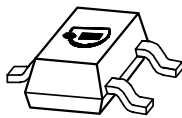


SPICE GP Model

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.

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

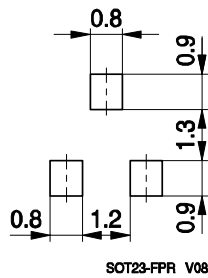
Package Outline



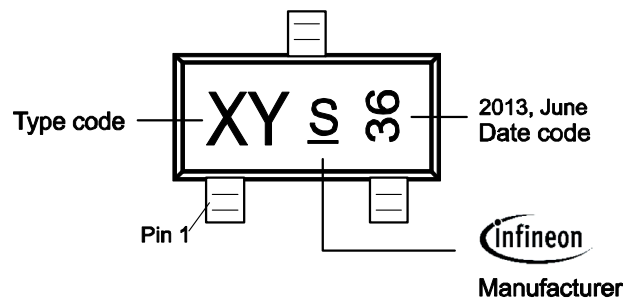
1) Lead width can be 0.6 max. in dambar area

SOT23-PO V08

Foot Print

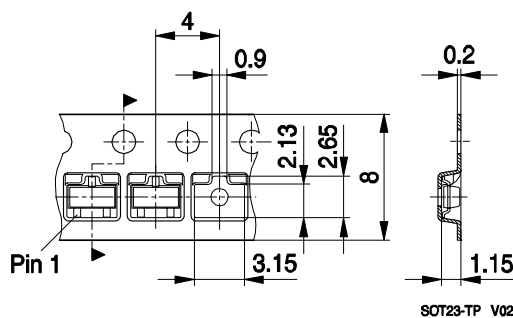


Marking Layout



Standard Packing

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



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