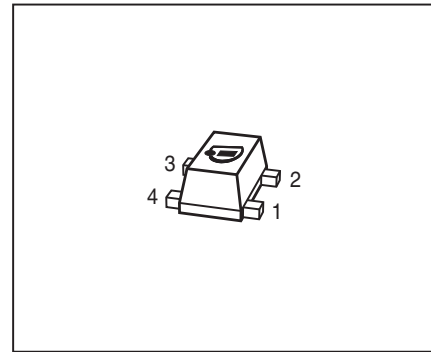


Low Noise Silicon Bipolar RF Transistor

- For low current applications
- Minimum noise figure $NF_{\min} = 1.25$ dB at 1.8 GHz
Outstanding $G_{\text{ms}} = 22.5$ dB at 1.8 GHz
- Transition frequency $f_T = 25$ GHz
- Pb-free (RoHS compliant) and halogen-free thin small flat package (1.4 x 0.8 x 0.59 mm) with visible leads
- Qualification report according to AEC-Q101 available



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

| Type | Marking | Pin Configuration | | | | | | Package |
|---------|---------|-------------------|-----|-----|-----|---|---|---------|
| BFP405F | ALs | 1=B | 2=E | 3=C | 4=E | - | - | TSFP-4 |

Maximum Ratings at $T_A = 25$ °C, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|--------------------------------------------------------------|------------------|-------------|------|
| Collector-emitter voltage $T_A = 25$ °C $T_A = -55$ °C | V_{CEO} | 4.5 4.1 | V |
| Collector-emitter voltage | V_{CES} | 15 | |
| Collector-base voltage | V_{CBO} | 15 | |
| Emitter-base voltage | V_{EBO} | 1.5 | |
| Collector current | I_C | 25 | mA |
| Base current | I_B | 3 | |
| Total power dissipation ¹⁾ $T_S \leq 112$ °C | P_{tot} | 75 | mW |
| Junction temperature | T_J | 150 | °C |
| Storage temperature | T_{Stg} | -55 ... 150 | |

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

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|------------------------------------------|-------------------|-------|------|
| Junction - soldering point ¹⁾ | R_{thJS} | 500 | K/W |

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

| Parameter | Symbol | Values | | | Unit |
|------------------------------------------------------------------------------|---------------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| DC Characteristics | | | | | |
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$ | $V_{(BR)CEO}$ | 4 | 5 | - | V |
| Collector-emitter cutoff current $V_{CE} = 15\text{ V}, V_{BE} = 0$ | I_{CES} | - | - | 10 | μA |
| Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$ | I_{CBO} | - | - | 100 | nA |
| Emitter-base cutoff current $V_{EB} = 0.5\text{ V}, I_C = 0$ | I_{EBO} | - | - | 1 | μA |
| DC current gain $I_C = 5\text{ mA}, V_{CE} = 4\text{ V}$, pulse measured | h_{FE} | 60 | 95 | 130 | - |

¹For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

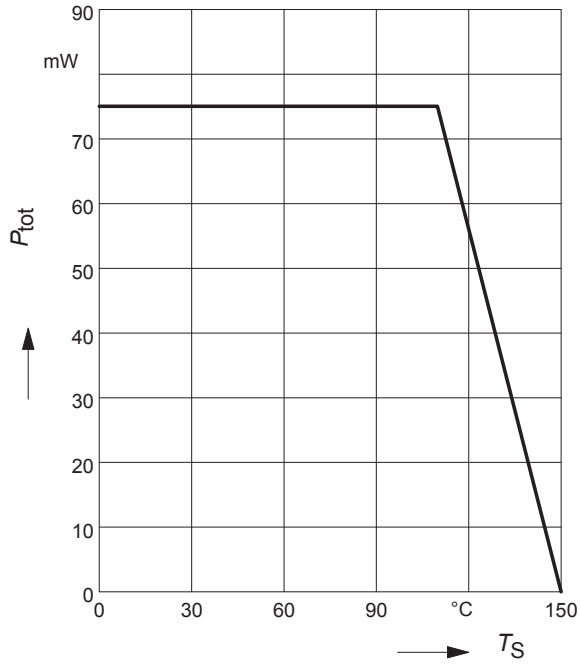
Electrical Characteristics at $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|------|------|------|
| | | min. | typ. | max. | |
| AC Characteristics (verified by random sampling) | | | | | |
| Transition frequency $I_C = 10\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 2\text{ GHz}$ | f_T | 18 | 25 | - | GHz |
| Collector-base capacitance $V_{CB} = 2\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded | C_{cb} | - | 0.05 | 0.1 | pF |
| Collector emitter capacitance $V_{CE} = 2\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, base grounded | C_{ce} | - | 0.2 | - | |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$, $V_{CB} = 0$, collector grounded | C_{eb} | - | 0.25 | - | |
| Minimum noise figure $I_C = 2\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{Sopt}$ | NF_{min} | - | 1.25 | - | dB |
| Power gain, maximum stable ¹⁾ $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$ | G_{ms} | - | 22.5 | - | dB |
| Insertion power gain $V_{CE} = 2\text{ V}$, $I_C = 5\text{ mA}$, $f = 1.8\text{ GHz}$, $Z_S = Z_L = 50\text{ }\Omega$ | $ S_{21} ^2$ | - | 18 | - | |
| Third order intercept point at output ²⁾ $V_{CE} = 2\text{ V}$, $I_C = 5\text{ mA}$, $f = 1.8\text{ GHz}$, $Z_S = Z_L = 50\text{ }\Omega$ | $IP3$ | - | 14 | - | dBm |
| 1dB compression point at output $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$ | P_{-1dB} | - | 0 | - | |

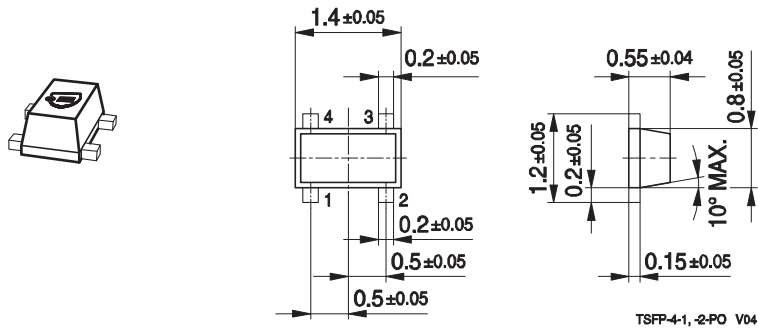
$$^1G_{ms} = |S_{21} / S_{12}|$$

²IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

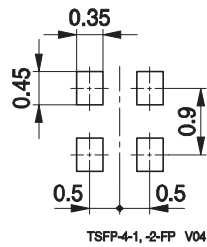
Total power dissipation $P_{\text{tot}} = f(T_S)$



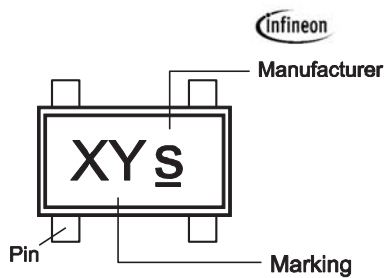
Package Outline



Foot Print

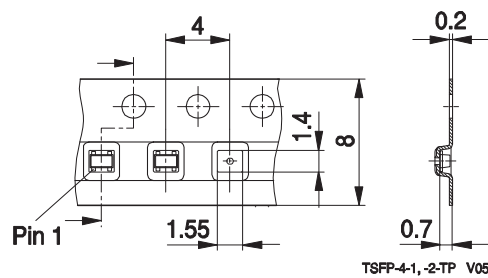


Marking Layout (Example)



Standard Packing

Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



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