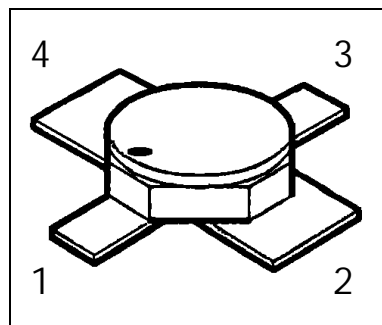


HiRel NPN Silicon RF Transistor

- **HiRel Discrete and Microwave Semiconductor**
- For low power amplifiers at collector currents from 0,2 mA to 2,5 mA.
- Hermetically sealed microwave package
- $f_T = 6,5$ GHz
F = 2.6 dB at 2 GHz
-  **esa Space Qualified**
ESA/SCC Detail Spec. No.: 5611/006
Type Variant No. 01



ESD: Electrostatic discharge sensitive device, observe handling precautions!

| Type | Marking | Ordering Code | Pin Configuration | | | | Package |
|-------------|---------|---------------|-------------------|---|---|---|----------|
| | | | C | E | B | E | |
| BFY180 (ql) | - | see below | C | E | B | E | Micro-X1 |

| | | | |
|---------------------|--------------------------|----------------|------------|
| (ql) Quality Level: | P: Professional Quality, | Ordering Code: | Q97301013 |
| | H: High Rel Quality, | Ordering Code: | on request |
| | S: Space Quality, | Ordering Code: | on request |
| | ES: ESA Space Quality, | Ordering Code: | Q97111419 |

(see order instructions for ordering example)

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|--|-----------|-------------------|------------------|
| Collector-emitter voltage | V_{CEO} | 8 | V |
| Collector-emitter voltage, $V_{BE}=0$ | V_{CES} | 15 | V |
| Collector-base voltage | V_{CBO} | 15 | V |
| Emitter-base voltage | V_{EBO} | 2 | V |
| Collector current | I_C | 4 | mA |
| Base current | I_B | 0.5 ¹⁾ | mA |
| Total power dissipation, $T_S \leq 176^\circ\text{C}$ ^{2), 3)} | P_{tot} | 30 | mW |
| Junction temperature | T_j | 200 | $^\circ\text{C}$ |
| Operating temperature range | T_{op} | -65...+200 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -65...+200 | $^\circ\text{C}$ |

Thermal Resistance

| | | | |
|--|------------|-------|-----|
| Junction-soldering point ³⁾ | R_{thJS} | < 805 | K/W |
|--|------------|-------|-----|

Notes.:

- 1) The maximum permissible base current for V_{FBE} measurements is 3mA (spot-measurement duration < 1s)
- 2) At $T_S = +176^\circ\text{C}$. For $T_S > +176^\circ\text{C}$ derating is required.
- 3) T_S is measured on the collector lead at the soldering point to the pcb.

Electrical Characteristics

 at $T_A=25^\circ\text{C}$; unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

DC Characteristics

| | | | | | |
|---|-----------|---|---|-----|---------------|
| Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$ | I_{CBO} | - | - | 100 | μA |
| Collector-emitter cutoff current $V_{CE} = 8\text{ V}, I_B = 0,05\mu\text{A}$ ^{1.)} | I_{CEX} | - | - | 50 | μA |
| Collector-base cutoff current $V_{CB} = 8\text{ V}, I_E = 0$ | I_{CBO} | - | - | 50 | nA |
| Emitter base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$ | I_{EBO} | - | - | 25 | μA |
| Emitter base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$ | I_{EBO} | - | - | 0.5 | μA |

Notes:

- 1.) This Test assures $V(BR)_{CE0} > 8\text{V}$

Electrical Characteristics (continued)

| Parameter | Symbol | Values | | | Unit |
|---|---------------|--------|------|------|------|
| | | min. | typ. | max. | |
| DC Characteristics | | | | | |
| Base-Emitter forward voltage $I_E = 3 \text{ mA}, I_C = 0$ | V_{FBE} | - | - | 1 | V |
| DC current gain $I_C = 0,25 \text{ mA}, V_{CE} = 1 \text{ V}$ | h_{FE} | 30 | 100 | 175 | - |
| AC Characteristics | | | | | |
| Transition frequency $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 500 \text{ MHz}$ | f_T | 5,5 | 6.5 | - | GHz |
| Collector-base capacitance $V_{CB} = 5 \text{ V}, V_{BE} = v_{be} = 0, f = 1 \text{ MHz}$ | C_{CB} | - | 0.15 | 0.24 | pF |
| Collector-emitter capacitance $V_{CE} = 5 \text{ V}, V_{BE} = v_{be} = 0, f = 1 \text{ MHz}$ | C_{CE} | - | 0.34 | - | pF |
| Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, V_{CB} = v_{cb} = 0, f = 1 \text{ MHz}$ | C_{EB} | - | 0.25 | 0.4 | pF |
| Noise Figure $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz},$ $Z_S = Z_{Sopt}$ | F | - | 2.6 | 3.2 | dB |
| Power gain $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz}$ $Z_S = Z_{Sopt}, Z_L = Z_{Lopt}$ | $G_{ma}^{1)}$ | 12 | 13.5 | - | dB |
| Transducer gain $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz}$ $Z_S = Z_L = 50 \Omega$ | $ S_{21e} ^2$ | 6.5 | 8 | - | dB |

Notes.:

$$1) \quad G_{ma} = \frac{|S_{21}|}{|S_{12}|} (k - \sqrt{k^2 - 1}), \quad G_{ms} = \frac{|S_{21}|}{|S_{12}|}$$

Order Instructions:

Full type variant including quality level must be specified by the orderer. For *HiRel* Discrete and Microwave Semiconductors the ordering code specifies device family and quality level.

Ordering Form:

Ordering Code: Q.....
BFY180 (ql)
(ql): Quality Level

Ordering Example:

Ordering Code: Q97111419
BFY180 ES
For BFY180 in ESA Space Quality Level

Further Informations:

See our WWW-Pages:

- Discrete and RF-Semiconductors (Small Signal Semiconductors)

www.infineon.com/products/discrete/hirel.htm

- *HiRel* Discrete and Microwave Semiconductors

www.infineon.com/products/discrete/hirel.htm

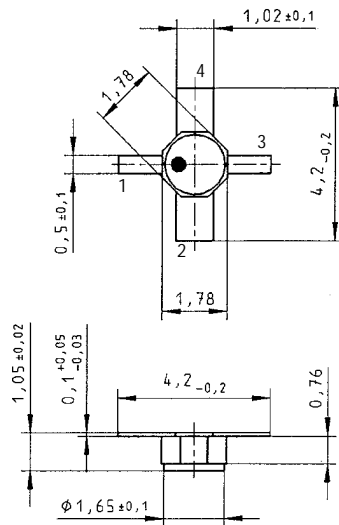
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Micro-X1 Package



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