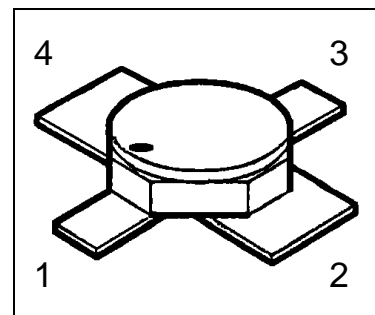


HiRel NPN Silicon RF Transistor

BFY182(ES)

Features

- For low noise, high-gain broadband amplifiers at collector currents from 1 mA to 20 mA
- Hermetically sealed microwave package
- $f_T = 8\text{GHz}$
 $F = 2.4\text{ dB at } 2\text{ GHz}$



Product validation

-  **ESA Space Qualified**
ESCC Detail Spec. No.: 5611/006
Type Variant No. 04

Description

ESD: Electrostatic discharge sensitive device, observe handling precautions!

Table 1 Product information

| Type | Comment | Pin Configuration | | | | Package |
|------------------------|---------------------------------|-------------------|---|---|---|----------|
| | | 1 | 2 | 3 | 4 | |
| BFY182(ES) | For flight use | C | E | B | E | Micro-X1 |
| BFY182(P) ¹ | Not for flight use ¹ | | | | | |

¹ (P) parts have the same fit, form and function as (ES) parts, no screening acc. to Chart F3 in ESCC Generic Specification No. 5010

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Maximum ratings

1 Maximum ratings

Table 2 Maximum ratings

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------------|-----------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Collector-emitter voltage | V_{CEO} | - | - | 12 | V | |
| Collector-emitter voltage | V_{CES} | - | - | 20 | V | $V_{BE}=0$ |
| Collector-base voltage | V_{CBO} | - | - | 20 | V | |
| Emitter-base voltage | V_{EBO} | - | - | 2 | V | |
| Collector current | I_C | - | - | 35 | mA | |
| Base current ¹ | I_B | - | - | 4 | mA | |
| Total power dissipation ² | P_{tot} | - | - | 250 | mW | $T_S \leq 136\text{ °C}$ |
| Junction temperature | T_j | - | - | 200 | °C | |
| Operating temperature | T_{op} | -65 | - | 200 | °C | |
| Storage temperature | T_{stg} | -65 | - | 200 | °C | |

¹ The maximum permissible base current for V_{FBE} measurements is 20mA (spot-measurement duration < 1s)

² For $T_S > 136\text{ °C}$ derating is required. T_S is measured on the collector lead at the soldering point to the PCB

Thermal characteristics

2 Thermal characteristics

Table 3 Thermal characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------------------------------|-------------|--------|------|------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction –soldering point | $R_{th,JS}$ | - | - | 255 | K/W | T_s is measured on the collector lead at the soldering point to the PCB |
| Soldering Temperature | T_{sol} | - | - | 250 | °C | Duration 5 seconds maximum at a distance of not less than 0.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed. |

Electrical characteristics

3 Electrical characteristics

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

Table 4 Static characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------------------------------|-----------|--------|------|------|---------------|---------------------------------------------|
| | | Min. | Typ. | Max. | | |
| Collector-base cutoff current | I_{CBO} | - | - | 100 | μA | $V_{CB} = 20\text{V}, I_E = 0\text{A}$ |
| Collector-emitter cutoff current ¹ | I_{CEX} | - | - | 200 | μA | $V_{CE} = 12\text{V}, I_B = 0.2\mu\text{A}$ |
| Collector-base cutoff current | I_{CBO} | - | - | 50 | nA | $V_{CB} = 10\text{V}, I_E = 0\text{A}$ |
| Emitter base cutoff current | I_{EBO} | - | - | 25 | μA | $V_{EB} = 2\text{V}, I_C = 0\text{A}$ |
| Emitter base cutoff current | I_{EBO} | - | - | 0.5 | μA | $V_{EB} = 1\text{V}, I_C = 0\text{A}$ |
| Base-Emitter forward voltage | V_{FBE} | - | - | 1 | V | $I_E = 20\text{mA}, I_C = 0\text{A}$ |
| DC current gain | h_{FE} | 55 | 100 | 170 | - | $I_C = 5\text{mA}, V_{CE} = 6\text{V}$ |

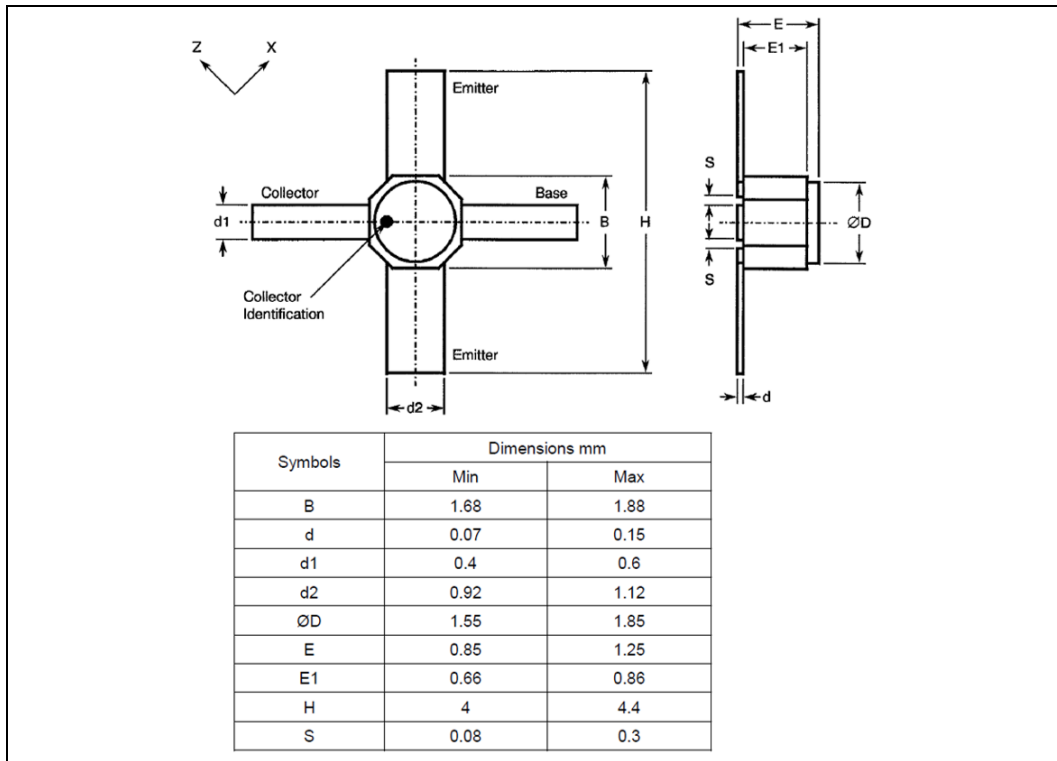
Table 5 Dynamic characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------|---------------|----------|----------|--------|------|--------------------------------------------------------------------------------------------------------------------------|
| | | Min. | Typ. | Max. | | |
| Transition frequency | f_T | 6.5 - | 7.5 8 | - - | GHz | $I_C = 15\text{mA}, V_{CE} = 5\text{V}, f = 500\text{MHz}$ $I_C = 15\text{mA}, V_{CE} = 8\text{V}, f = 500\text{MHz}$ |
| Collector-base capacitance | C_{CB} | - | 0.26 | 0.36 | pF | $V_{CB} = 10\text{V}, V_{BE} = v_{be} = 0, f = 1\text{MHz}$ |
| Collector-emitter capacitance | C_{CE} | - | 0.34 | - | pF | $V_{CE} = 10\text{V}, V_{BE} = v_{be} = 0, f = 1\text{MHz}$ |
| Emitter-base capacitance | C_{EB} | - | 0.8 | 1.1 | pF | $V_{EB} = 0.5\text{V}, V_{CB} = v_{cb} = 0, f = 1\text{MHz}$ |
| Noise Figure | F | - | 2.4 | 2.9 | dB | $I_C = 5\text{mA}, V_{CE} = 5\text{V}, f = 2\text{GHz},$ $Z_S = Z_{Sopt}$ |
| Power Gain ² | G_{ma} | 13.5 | 14.5 | - | dB | $I_C = 15\text{mA}, V_{CE} = 5\text{V}, f = 2\text{GHz},$ $Z_S = Z_{Sopt}, Z_L = Z_{Lopt}$ |
| Transducer gain | $ S_{21e} ^2$ | 10 | 11 | - | dB | $I_C = 15\text{mA}, V_{CE} = 5\text{V}, f = 2\text{GHz},$ $Z_S = Z_L = 50\Omega$ |

¹ This test assures $V_{(BR)CE0} > 12\text{V}$

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

4 Package outlines



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