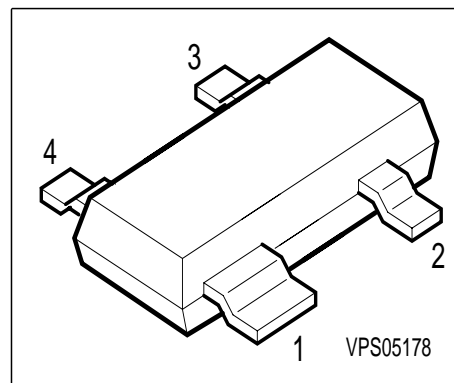
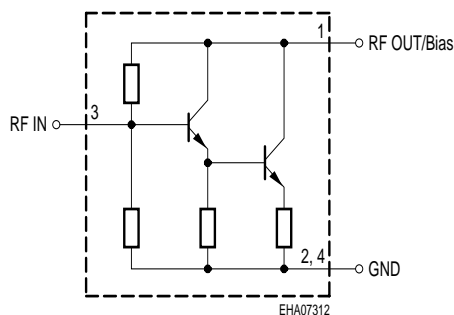


### Silicon Bipolar MMIC-Amplifier

#### Preliminary data

- Cascadable 50  $\Omega$ -gain block
- 9 dB typical gain at 1.0 GHz
- 9 dBm typical  $P_{-1dB}$  at 1.0 GHz
- 3 dB-bandwidth: DC to 2.4 GHz

#### Circuit Diagram



| Type    | Marking | Ordering Code | Pin Configuration |       |            |       | Package |
|---------|---------|---------------|-------------------|-------|------------|-------|---------|
| BGA 310 | BLs     | Q62702-G0041  | 1 RFout/bias      | 2 GND | 3 RF input | 4 GND | SOT-143 |

#### Maximum Ratings

| Parameter  | Symbol     | Value        | Unit             |
|--|------------|--------------|------------------|
| Device current                                       | $I_D$      | 60           | mA               |
| Total power dissipation, $T_S \leq 99^\circ\text{C}$ | $P_{tot}$  | 250          | mW               |
| $R_F$ input power                                    | $P_{RFIn}$ | 10           | dBm              |
| Junction temperature                                 | $T_j$      | 150          | $^\circ\text{C}$ |
| Ambient temperature                                  | $T_A$      | -65 ... +150 |                  |
| Storage temperature                                  | $T_{stg}$  | -65 ... +150 |                  |

#### Thermal Resistance

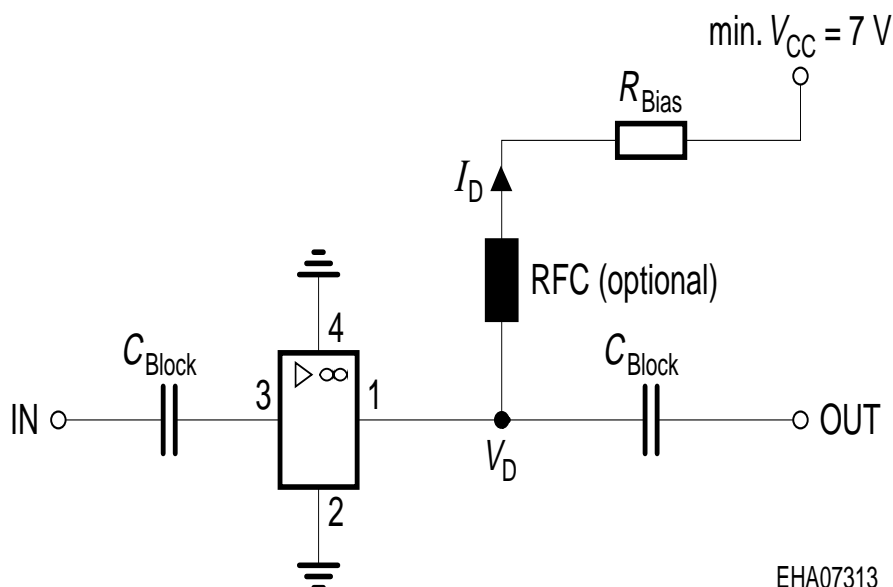
|  |            |            |     |
|--|------------|------------|-----|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | $\leq 205$ | K/W |
|--|------------|------------|-----|

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

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

| Parameter  | Symbol              | Values |               |      | Unit |
|--|---------------------|--------|---------------|------|------|
|  |                     | min.   | typ.          | max. |      |
| <b>AC characteristics</b> ( $V_D = 4.7\text{ V}$ , $Z_0 = 50\text{ }\Omega$ )              |                     |        |               |      |      |
| Insertion power gain<br>$f = 0.1\text{ GHz}$<br>$f = 1\text{ GHz}$<br>$f = 1.8\text{ GHz}$ | $ S_{21} ^2$        | -      | 10<br>9<br>8  | -    | dB   |
| Insertion point gain flatness<br>$f = 0.1\text{ GHz to }0.6\text{ GHz}$                    | $\Delta  S_{21} ^2$ | -      | +0.5          | -    |      |
| Noise figure<br>$f = 0.1\text{ GHz}$<br>$f = 1\text{ GHz}$<br>$f = 2\text{ GHz}$           | $NF$                | -      | 6<br>6.5<br>7 | -    |      |
| 1dB compression point<br>$f = 1\text{ GHz}$  | $P_{-1dB}$          | -      | 9             | -    | dBm  |
| Return loss input<br>$f = 0.1\text{ GHz to }2\text{ GHz}$                                  | $RL_{in}$           | -      | 20            | -    | dB   |
| Return loss output<br>$f = 0.1\text{ GHz to }3\text{ GHz}$                                 | $RL_{out}$          | -      | 15            | -    |      |

### Typical biasing configuration



$$R_{Bias} = V_{CC} - V_D / I_D$$

$$V_D = 4.7\text{ V}$$

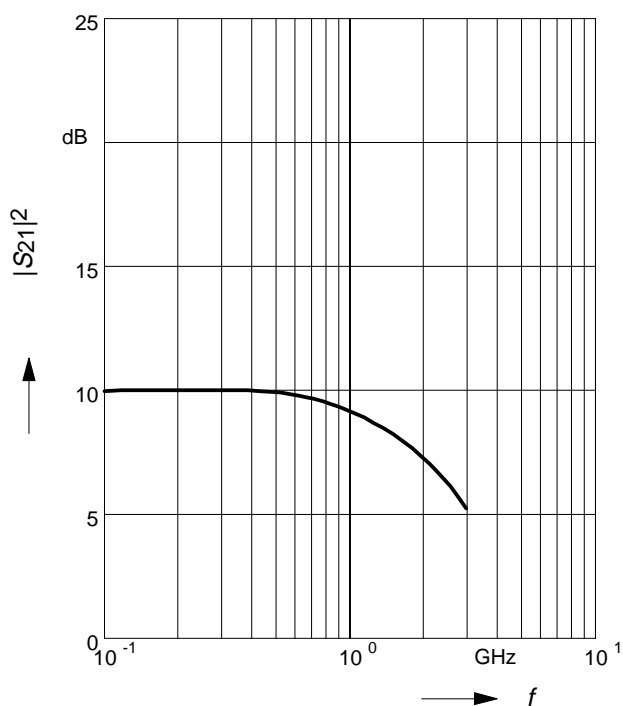
EHA07313

### S-Parameters at $T_A = 25\text{ °C}$

| $f$                                  | $S_{11}$ |        | $S_{21}$ |       | $S_{12}$ |      | $S_{22}$ |        |
|--------------------------------------|----------|--------|----------|-------|----------|------|----------|--------|
|                                      | MAG      | ANG    | MAG      | ANG   | MAG      | ANG  | MAG      | ANG    |
| $V_D = 4.7\text{ V}, Z_0 = 50\Omega$ |          |        |          |       |          |      |          |        |
| 0.01                                 | 0.051    | 176.4  | 3.22     | 179.3 | 0.149    | 0.2  | 0.159    | -0.5   |
| 0.1                                  | 0.053    | 168.1  | 3.23     | 174.9 | 0.149    | 1.2  | 0.158    | -6.1   |
| 0.3                                  | 0.053    | 141.9  | 3.22     | 164.6 | 0.15     | 3.4  | 0.157    | -19    |
| 0.5                                  | 0.058    | 123.9  | 3.2      | 154.2 | 0.152    | 5.4  | 0.155    | -31.7  |
| 0.8                                  | 0.054    | 98.2   | 3.17     | 138.7 | 0.157    | 8.1  | 0.153    | -51.3  |
| 1                                    | 0.049    | 86.1   | 3.12     | 128.4 | 0.162    | 9.7  | 0.153    | -64.3  |
| 1.8                                  | 0.053    | -164.9 | 2.79     | 88    | 0.188    | 12   | 0.16     | -106.6 |
| 2.4                                  | 0.161    | -177.7 | 2.41     | 60.8  | 0.208    | 10.6 | 0.168    | -123.7 |
| 3                                    | 0.257    | 153.9  | 2.03     | 38.2  | 0.225    | 8.2  | 0.178    | -133.1 |

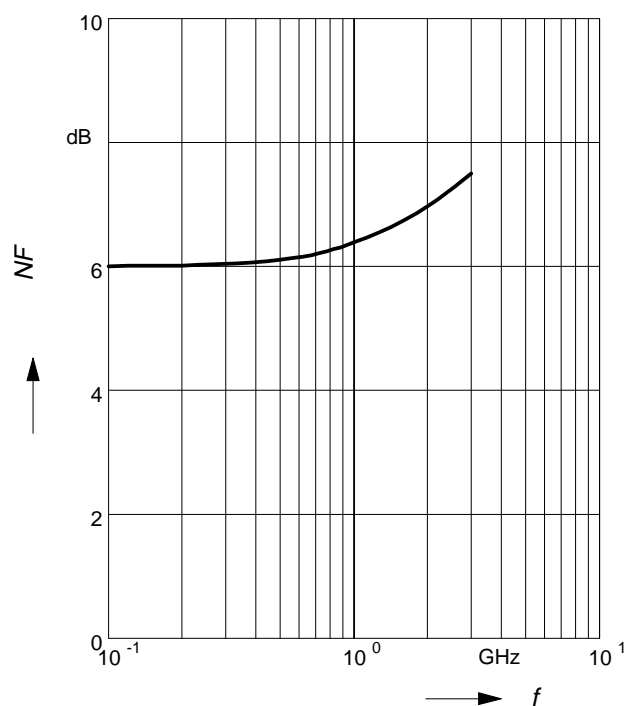
### Insertion power gain $|S_{21}|^2 = f(f)$

$V_D = 4.7\text{ V}, I_D = 42\text{ mA}$



### Noise figure $NF = f(f)$

$V_D = 4.7\text{ V}, I_D = 42\text{ mA}$



## Output power 1-dB-gain compression

$$P_{-1dB} = f(f)$$

$$V_D = 4.7 \text{ V}, I_D = 42 \text{ mA}$$

