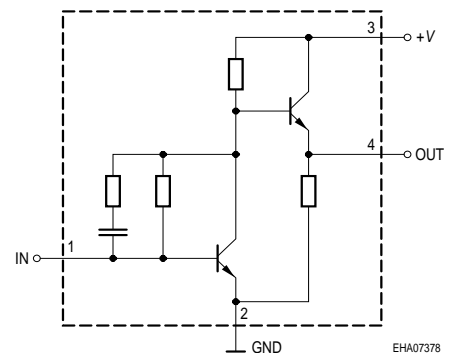
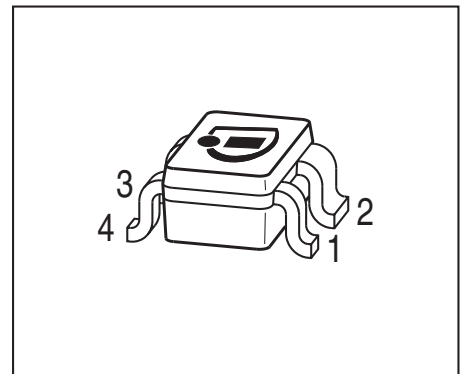


**Si-MMIC-Amplifier in SIEGET® 25-Technologie**

- Cascadable 50 Ω-gain block
- Unconditionally stable
- Gain  $|S_{21}|^2 = 18.5$  dB at 1.8 GHz (Appl.1)  
gain  $|S_{21}|^2 = 22$  dB at 1.8 GHz (Appl.2)  
 $IP_{3out} = +7$  dBm at 1.8 GHz ( $V_D=3V, I_D=9.4mA$ )
- Noise figure  $NF = 2.2$  dB at 1.8 GHz
- Typical device voltage  $V_D = 2$  V to 5 V
- Reverse isolation  $> 35$  dB (Appl.2)
- Pb-free (RoHS compliant) package


**Circuit Diagram**

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

| Type   | Marking | Pin Configuration |        |       |        | Package |
|--------|---------|-------------------|--------|-------|--------|---------|
| BGA427 | BMs     | 1, IN             | 2, GND | 3, +V | 4, Out | SOT343  |

**Maximum Ratings**

| Parameter                                 | Symbol     | Value       | Unit |
|---|------------|-------------|------|
| Device current                            | $I_D$      | 25          | mA   |
| Device voltage                            | $V_{D,+V}$ | 6           | V    |
| Total power dissipation<br>$T_S = 120$ °C | $P_{tot}$  | 150         | mW   |
| RF input power                            | $P_{RFIn}$ | -10         | dBm  |
| Junction temperature                      | $T_j$      | 150         | °C   |
| Ambient temperature range                 | $T_A$      | -65 ... 150 |      |
| Storage temperature range                 | $T_{stg}$  | -65 ... 150 |      |

**Thermal Resistance**

|  |            |            |     |
|--|------------|------------|-----|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | $\leq 295$ | K/W |
|--|------------|------------|-----|

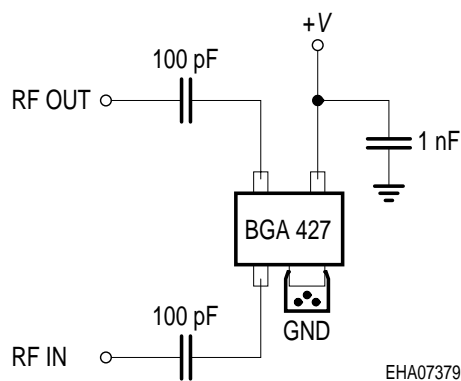
<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

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

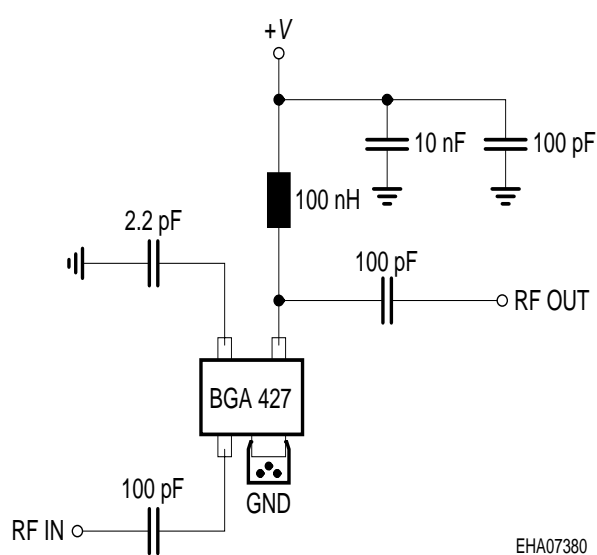
| Parameter  | Symbol       | Values |      |      | Unit |
|--|--------------|--------|------|------|------|
|  |              | min.   | typ. | max. |      |
| <b>AC characteristics</b> $V_D = 3\text{ V}$ , $Z_0 = 50\Omega$ , Testfixture Appl.1       |              |        |      |      |      |
| Insertion power gain<br>$f = 0.1\text{ GHz}$<br>$f = 1\text{ GHz}$<br>$f = 1.8\text{ GHz}$ | $ S_{21} ^2$ | -      | 27   | -    | dB   |
| Reverse isolation<br>$f = 1.8\text{ GHz}$  | S12          | -      | 22   | -    |      |
| Noise figure<br>$f = 0.1\text{ GHz}$<br>$f = 1\text{ GHz}$<br>$f = 1.8\text{ GHz}$         | NF           | -      | 1.9  | -    |      |
| Intercept point at the output<br>$f = 1.8\text{ GHz}$                                      | $IP_{3out}$  | -      | + 7  | -    | dBm  |
| Return loss input<br>$f = 1.8\text{ GHz}$  | $RL_{in}$    | -      | >12  | -    | dB   |
| Return loss output<br>$f = 1.8\text{ GHz}$   | $RL_{out}$   | -      | >9   | -    |      |

### Typical configuration

**Appl.1**



**Appl.2**



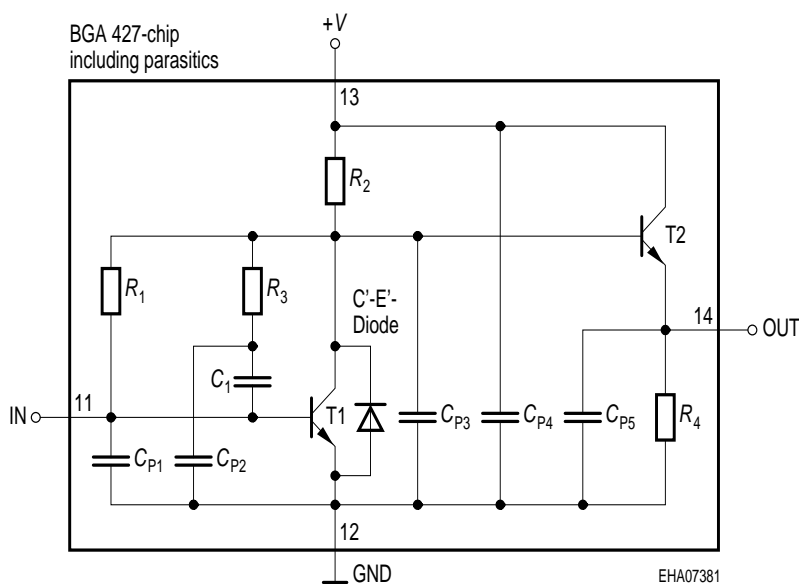
- Note: 1) Large-value capacitors should be connected from pin 3 to ground right at the device to provide a low impedance path (appl.1).  
 2) The use of plated through holes right at pin 2 is essential for pc-board-applications. Thin boards are recommended to minimize the parasitic inductance to ground.

**S-Parameters at  $T_A = 25\text{ }^\circ\text{C}$ , (Testfixture, Appl.1)**

| $f$ | $S_{11}$ |     | $S_{21}$ |     | $S_{12}$ |     | $S_{22}$ |     |
|-----|----------|-----|----------|-----|----------|-----|----------|-----|
|     | MAG      | ANG | MAG      | ANG | MAG      | ANG | MAG      | ANG |

 $V_D = 3V, Z_0 = 50\Omega$ 

|     |        |        |        |       |        |      |        |       |
|-----|--------|--------|--------|-------|--------|------|--------|-------|
| 0.1 | 0.1382 | -38.3  | 24.821 | 164.9 | 0.0022 | 50.7 | 0.6435 | 174.8 |
| 0.2 | 0.1179 | -16    | 24.606 | 158.9 | 0.0046 | 71.8 | 0.6278 | 166.9 |
| 0.5 | 0.1697 | -20.8  | 22.236 | 135.2 | 0.0104 | 83.8 | 0.54   | 147.3 |
| 0.8 | 0.1824 | -56.9  | 18.258 | 115.4 | 0.0169 | 94.8 | 0.4453 | 140.2 |
| 0.9 | 0.1782 | -69.1  | 17.152 | 109.4 | 0.0194 | 97.3 | 0.4326 | 139.4 |
| 1   | 0.176  | -80.6  | 15.786 | 104   | 0.0225 | 98.3 | 0.4129 | 138.1 |
| 1.5 | 0.1827 | -133.5 | 10.923 | 84.9  | 0.0385 | 99.7 | 0.3852 | 139.6 |
| 1.8 | 0.1969 | -156.1 | 9.029  | 77    | 0.0479 | 99.3 | 0.3917 | 139.3 |
| 1.9 | 0.2021 | -162.8 | 8.486  | 74.7  | 0.0517 | 98.9 | 0.3946 | 138.8 |
| 2   | 0.2116 | -167.7 | 8.015  | 72.3  | 0.0549 | 98.8 | 0.3991 | 138.3 |
| 2.5 | 0.2437 | 172.8  | 6.259  | 63    | 0.0709 | 97.1 | 0.4202 | 134.6 |
| 3   | 0.258  | 153.3  | 5.103  | 55    | 0.0892 | 96.9 | 0.4477 | 131   |

**Spice-model BGA 427**


|             |                |
|-------------|----------------|
| T1          | T501           |
| T2          | T501           |
| $R_1$       | 14.5k $\Omega$ |
| $R_2$       | 280 $\Omega$   |
| $R_3$       | 2.4k $\Omega$  |
| $R_4$       | 170 $\Omega$   |
| $C_1$       | 2.3pF          |
| $C_{P1}$    | 0.2pF          |
| $C_{P2}$    | 0.2pF          |
| $C_{P3}$    | 0.6pF          |
| $C_{P4}$    | 0.1pF          |
| $C_{P5}$    | 0.1pF          |
| C'-E'-diode | T1             |

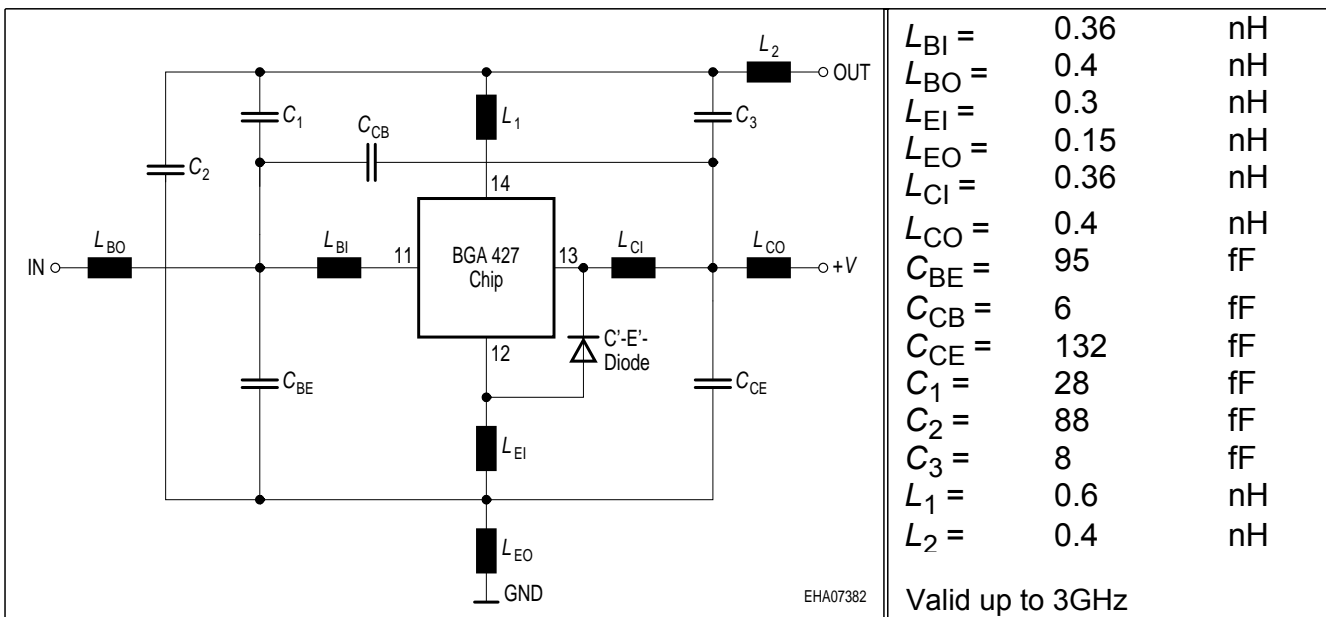
**Transistor Chip Data T1 (Berkley-SPICE 2G.6 Syntax) :**

|       |         |          |       |         |          |        |          |          |
|-------|---------|----------|-------|---------|----------|--------|----------|----------|
| IS =  | 0.21024 | fA       | BF =  | 83.23   | -        | NF =   | 1.0405   | -        |
| VAF = | 39.251  | V        | IKF = | 0.16493 | A        | ISE =  | 15.761   | fA       |
| NE =  | 1.7763  | -        | BR =  | 10.526  | -        | NR =   | 0.96647  | -        |
| VAR = | 34.368  | V        | IKR = | 0.25052 | A        | ISC =  | 0.037223 | fA       |
| NC =  | 1.3152  | -        | RB =  | 15      | $\Omega$ | IRB =  | 0.21215  | A        |
| RBM = | 1.3491  | $\Omega$ | RE =  | 1.9289  |          | RC =   | 0.12691  | $\Omega$ |
| CJE = | 3.7265  | fF       | VJE = | 0.70367 | V        | MJE =  | 0.37747  | -        |
| TF =  | 4.5899  | ps       | XTF = | 0.3641  | -        | VTF =  | 0.19762  | V        |
| ITF = | 1.3364  | mA       | PTF = | 0       | deg      | CJC =  | 96.941   | fF       |
| VJC = | 0.99532 | V        | MJC = | 0.48652 | -        | XCJC = | 0.08161  | -        |
| TR =  | 1.4935  | ns       | CJS = | 0       | fF       | VJS =  | 0.75     | V        |
| MJS = | 0       | -        | XTB = | 0       | -        | EG =   | 1.11     | eV       |
| XTI = | 3       | -        | FC =  | 0.99469 | -        | TNOM   | 300      | K        |

**C'-E'-Diode Data (Berkley-SPICE 2G.6 Syntax) :**

|      |   |    |     |      |   |      |    |          |
|------|---|----|-----|------|---|------|----|----------|
| IS = | 2 | fA | N = | 1.02 | - | RS = | 20 | $\Omega$ |
|------|---|----|-----|------|---|------|----|----------|

All parameters are ready to use, no scaling is necessary

**Package Equivalent Circuit:**


Extracted on behalf of Infineon Technologies AG by:  
 Institut für Mobil-und Satellitentechnik (IMST)

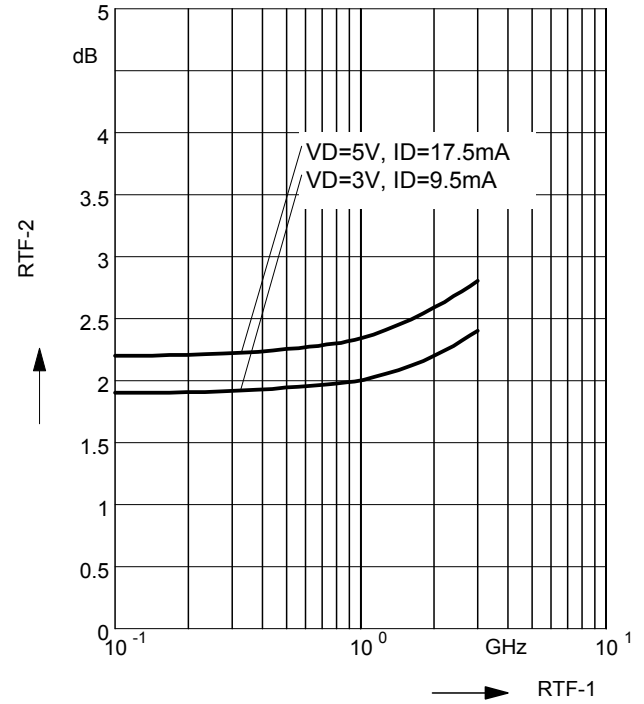
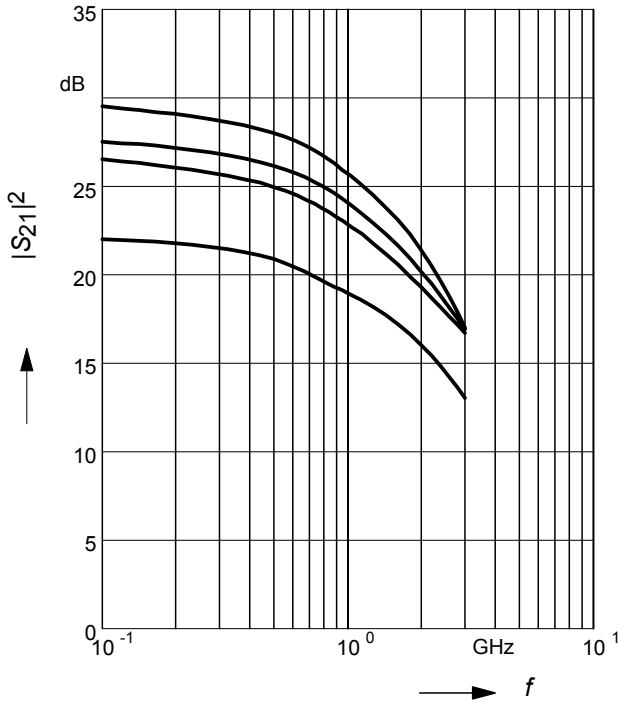
For examples and ready to use parameters please contact your local Infineon Technologies distributor or sales office to obtain a Infineon Technologies CD-ROM or see Internet:  
<http://www.infineon.com/silicondiscretres>

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

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

$V_D, I_D = \text{parameter}$

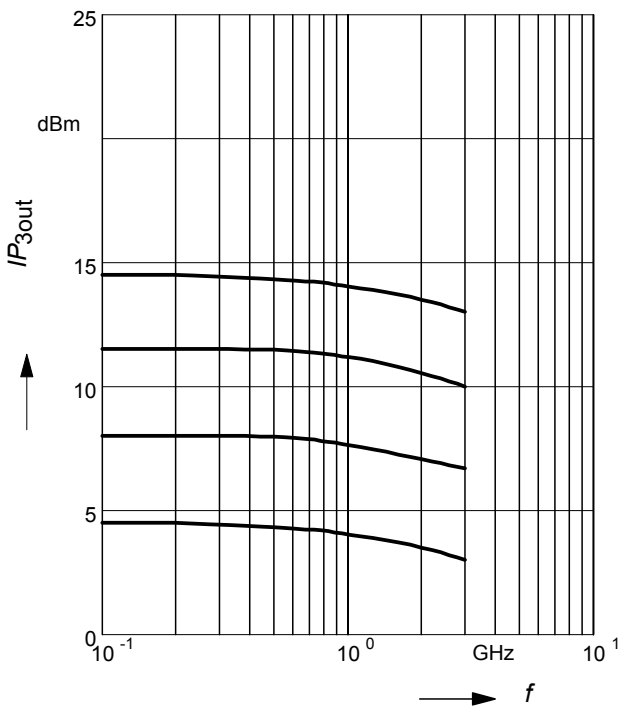
$V_D, I_D = \text{parameter}$



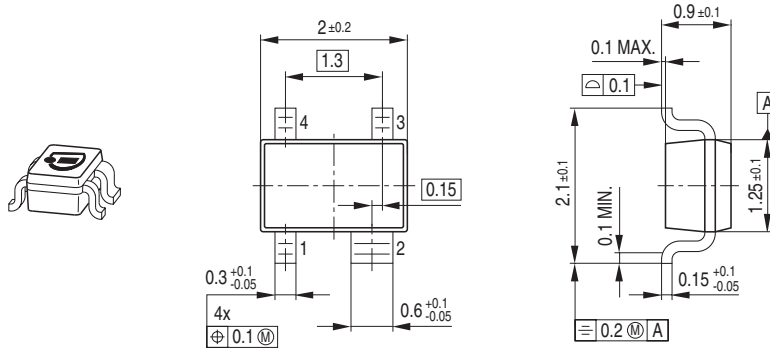
**Intercept point at the output**

$IP_{3out} = f(f)$

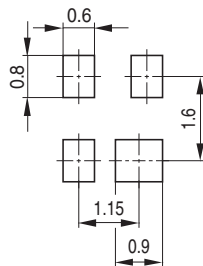
$V_D, I_D = \text{parameter}$



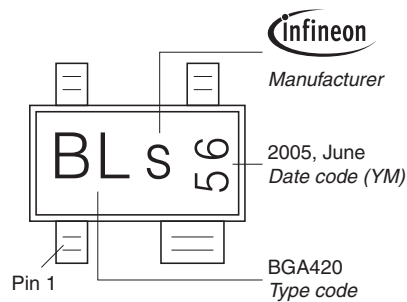
Package Outline



Foot Print

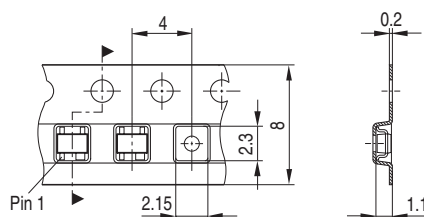


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel  
 Reel ø330 mm = 10.000 Pieces/Reel



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