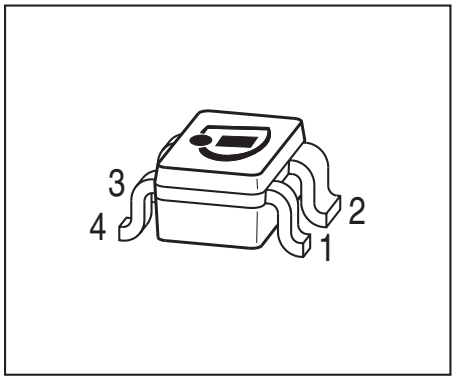
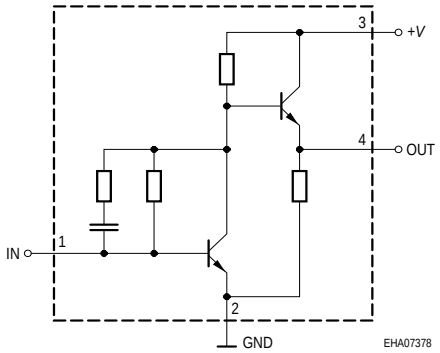
**Si-MMIC-Amplifier in SIEGET® 25-Technologie**




- 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

RoHS

**Circuit Diagram**




**ESD** (**E**lectro**s**tatic **d**ischarge) 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[1)] | $R_{thJS}$ | ≤ 295 | K/W |

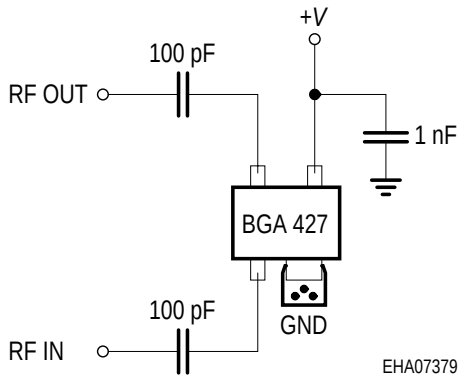
[1]For calculation of $R_{thJA}$ please refer to Application Note Thermal Resistance

**Electrical Characteristics** at $T_A$ = 25 °C, unless otherwise specified.

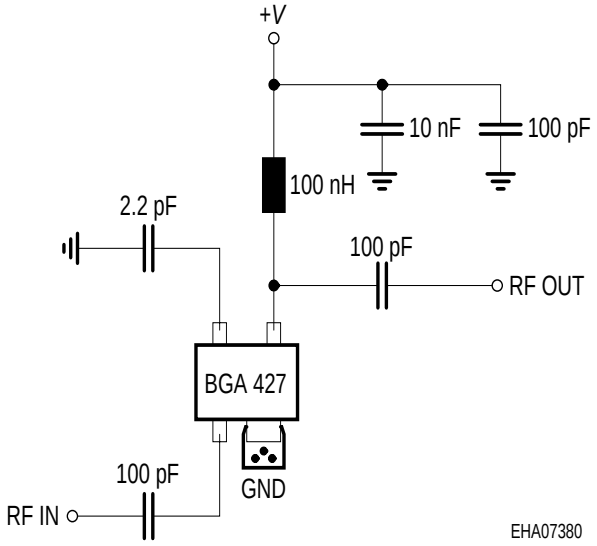
| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **AC characteristics** $V_D$ = 3 V, $Z_o$ = 50Ω, Testfixture Appl.1 | | | | | |
| Insertion power gain | $\|S_{21}\|^2$ | | | | dB |
| $f$ = 0.1 GHz | | - | 27 | - | |
| $f$ = 1 GHz | | - | 22 | - | |
| $f$ = 1.8 GHz | | - | 18.5 | - | |
| Reverse isolation | S12 | - | 22 | - | |
| $f$ = 1.8 GHz | | | | | |
| Noise figure | $NF$ | | | | |
| $f$ = 0.1 GHz | | - | 1.9 | - | |
| $f$ = 1 GHz | | - | 2 | - | |
| $f$ = 1.8 GHz | | - | 2.2 | - | |
| Intercept point at the output | $IP_{3out}$ | - | + 7 | - | dBm |
| $f$ = 1.8 GHz | | | | | |
| Return loss input | $RL_{in}$ | - | >12 | - | dB |
| $f$ = 1.8 GHz | | | | | |
| Return loss output | $RL_{out}$ | - | >9 | - | |
| $f$ = 1.8 GHz | | | | | |

## Typical configuration

### Appl.1




### Appl.2



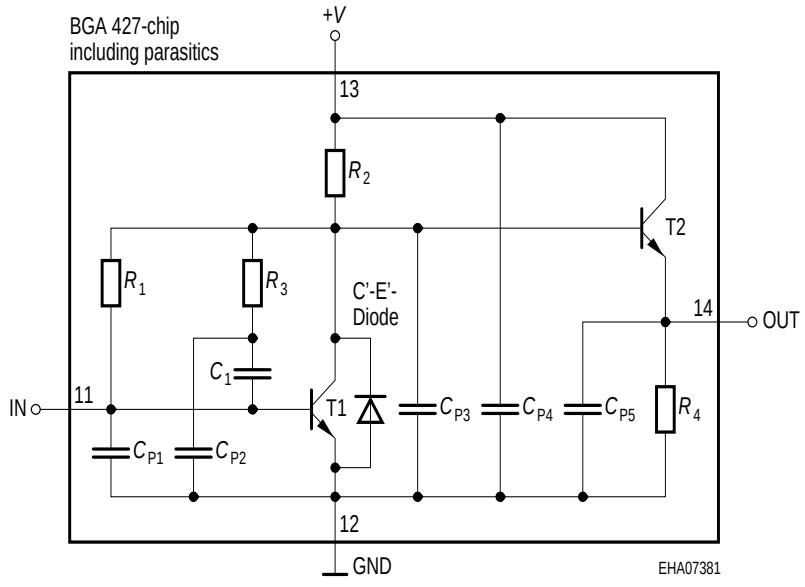

Note: 1) Large-value capacitors should be connected from pin 3 to ground right at the device to provide a low impedance path (appl.1).

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 °C,** (Testfixture, Appl.1)

| $f$ | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| GHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| $V_D$ = 3V, $Z_o$ = 50Ω | | | | | | | | |
| 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 |
| $R_1$ | 14.5kΩ |
| $R_2$ | 280Ω |
| $R_3$ | 2.4kΩ |
| $R_4$ | 170Ω |
| $C_1$ | 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) :

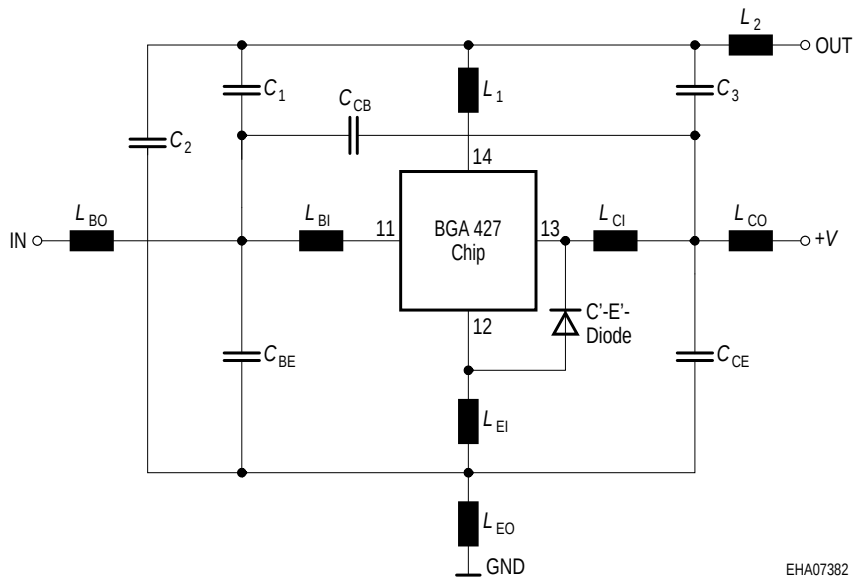
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| IS = | 0.21024 | fA | BF = | 83.23 | - | NF = | 1.0405 | - |
| VAF = | 39.251 | V | IKF = | 0.16493 | A | ISE = | 15.761 | fA |
| NE = | 1.7763 | - | BR = | 10.526 | - | NR = | 0.96647 | - |
| VAR = | 34.368 | V | IKR = | 0.25052 | A | ISC = | 0.037223 | fA |
| NC = | 1.3152 | - | RB = | 15 | Ω | IRB = | 0.21215 | A |
| RBM = | 1.3491 | Ω | RE = | 1.9289 | | RC = | 0.12691 | Ω |
| 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 | Ω |

All parameters are ready to use, no scaling is necessary

### Package Equivalent Circuit:




| | | |
|---|---|---|
| $L_{BI}$ = | 0.36 | nH |
| $L_{BO}$ = | 0.4 | nH |
| $L_{EI}$ = | 0.3 | nH |
| $L_{EO}$ = | 0.15 | nH |
| $L_{CI}$ = | 0.36 | nH |
| $L_{CO}$ = | 0.4 | nH |
| $C_{BE}$ = | 95 | fF |
| $C_{CB}$ = | 6 | fF |
| $C_{CE}$ = | 132 | fF |
| $C_1$ = | 28 | fF |
| $C_2$ = | 88 | fF |
| $C_3$ = | 8 | fF |
| $L_1$ = | 0.6 | nH |
| $L_2$ = | 0.4 | nH |

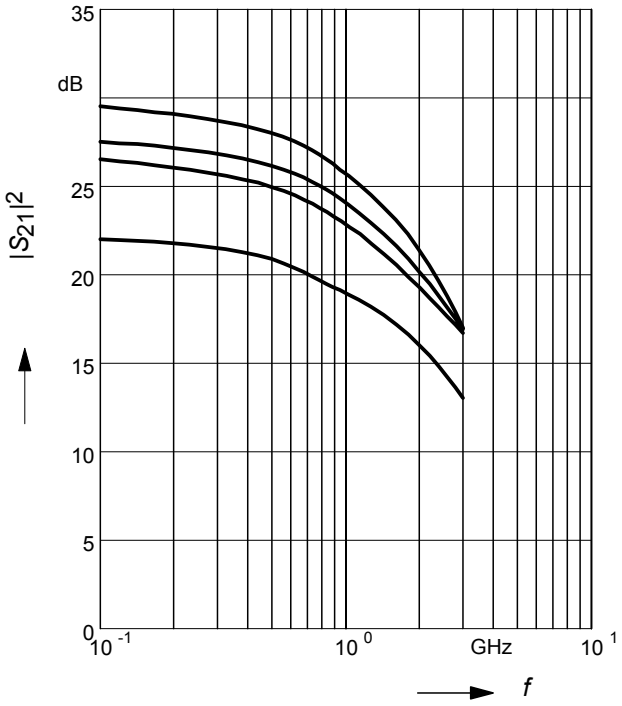
Valid up to 3GHz

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/silicondiscretes

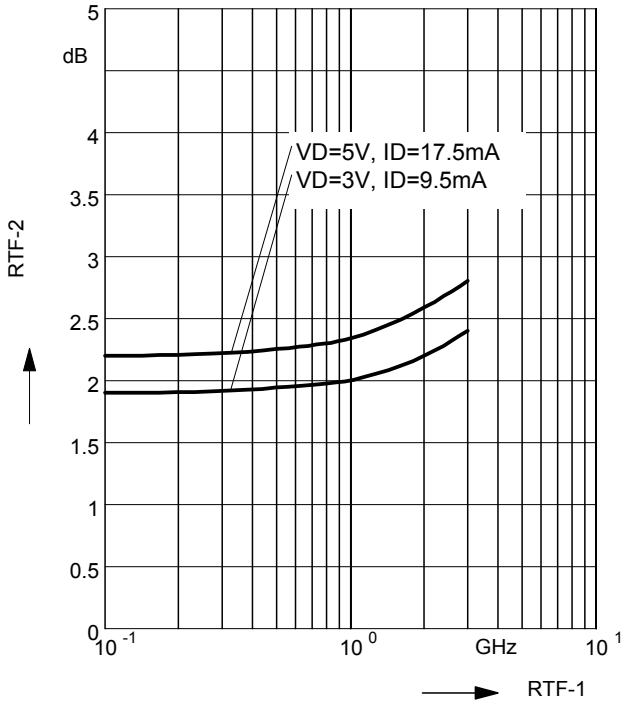
**Insertion power gain** $|S_{21}|^2 = f(f)$

$V_D$, $I_D$ = parameter




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

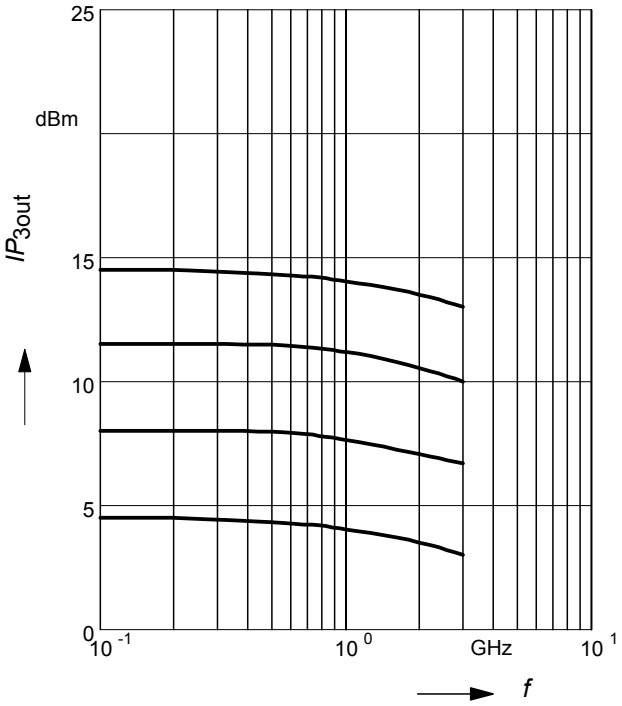
$V_D$,$I_D$ = parameter



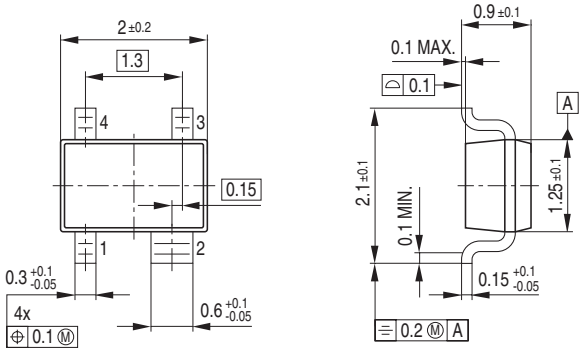

**Intercept point at the output**

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

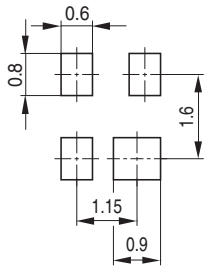
$V_D$,$I_D$ = parameter



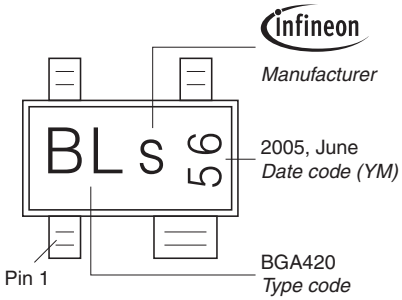
## Package Outline




## Foot Print

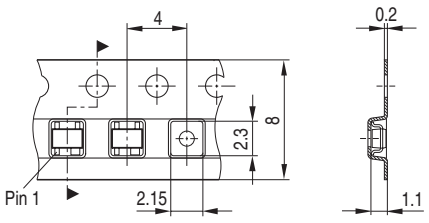



## Marking Layout (Example)




## Standard Packing

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



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