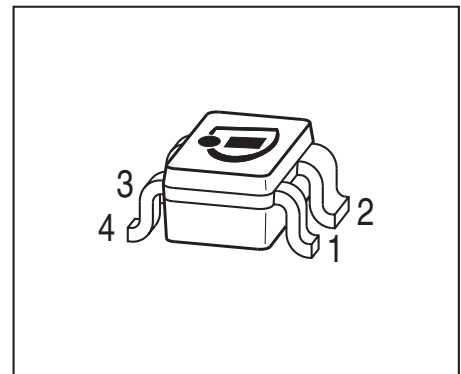


### High Performance Bipolar NPN RF Transistor

- High transducer gain of typ. 14 dB @ 25 mA, 6 GHz
- Low minimum noise figure of typ. 0.85 dB @ 6GHz
- High output compression of typ. 11 dBm @ 25 mA
- Pb-free (RoHS compliant) package
- For a wide range of non-automotive applications
  - 2nd and 3rd LNA stage and mixer stage in LNB
  - 5.8 GHz analog/digital cordless phone
  - Satellite radio SDARS
  - WLAN, WiMAX, UWB



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

| Type  | Marking | Pin Configuration |     |     |     |   |   | Package |
|-------|---------|-------------------|-----|-----|-----|---|---|---------|
| BF888 | RYs     | 1=B               | 2=E | 3=C | 4=E | - | - | SOT343  |

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

| Parameter                             | Symbol    | Value       | Unit             |
|---------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage             | $V_{CEO}$ |             | V                |
| $T_A = 25\text{ }^\circ\text{C}$      |           | 4.0         |                  |
| $T_A = -55\text{ }^\circ\text{C}$     |           | 3.5         |                  |
| Collector-emitter voltage             | $V_{CES}$ | 13          |                  |
| Collector-base voltage                | $V_{CBO}$ | 13          |                  |
| Emitter-base voltage                  | $V_{EBO}$ | 1.2         |                  |
| Collector current                     | $I_C$     | 30          | mA               |
| Base current                          | $I_B$     | 3           |                  |
| Total power dissipation <sup>1)</sup> | $P_{tot}$ | 160         | mW               |
| $T_S \leq 89\text{ }^\circ\text{C}$   |           |             |                  |
| Junction temperature                  | $T_J$     | 150         | $^\circ\text{C}$ |
| Ambient temperature                   | $T_A$     | -55 ... 150 |                  |
| Storage temperature                   | $T_{Std}$ | -55 ... 150 |                  |

<sup>1)</sup>  $T_S$  is measured on the emitter lead at the soldering point to the pcb

### Thermal Resistance

| Parameter                                | Symbol     | Value      | Unit |
|------------------------------------------|------------|------------|------|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | $\leq 380$ | K/W  |

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

| Parameter                                                                          | Symbol        | Values |      |      | Unit |
|------------------------------------------------------------------------------------|---------------|--------|------|------|------|
|                                                                                    |               | min.   | typ. | max. |      |
| <b>DC Characteristics</b>                                                          |               |        |      |      |      |
| Collector-emitter breakdown voltage<br>$I_C = 1\text{ mA}, I_B = 0$                | $V_{(BR)CEO}$ | 4      | 4.7  | -    | V    |
| Collector-emitter cutoff current<br>$V_{CE} = 5\text{ V}, V_{BE} = 0$              | $I_{CES}$     | -      | 1    | -    | nA   |
| Collector-base cutoff current<br>$V_{CB} = 5\text{ V}, I_E = 0$                    | $I_{CBO}$     | -      | 1    | -    |      |
| Emitter-base cutoff current<br>$V_{EB} = 0.5\text{ V}, I_C = 0$                    | $I_{EBO}$     | -      | 10   | -    |      |
| DC current gain<br>$I_C = 25\text{ V}, V_{CE} = 3\text{ V}, \text{pulse measured}$ | $h_{FE}$      | -      | 250  | -    | -    |

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

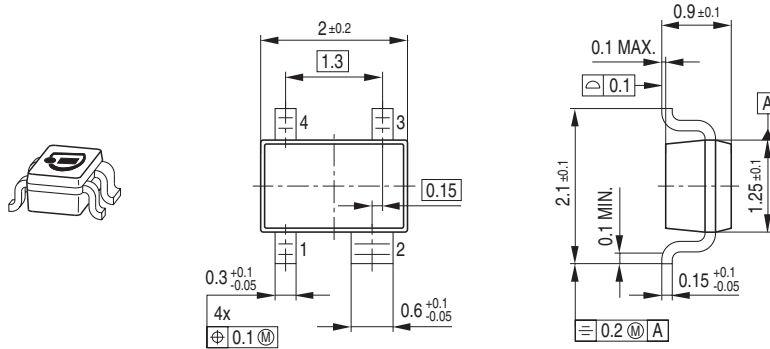
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

| Parameter                                                                                                                                                                                    | Symbol        | Values |             |      | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|-------------|------|------|
|                                                                                                                                                                                              |               | min.   | typ.        | max. |      |
| <b>AC Characteristics (verified by random sampling)</b>                                                                                                                                      |               |        |             |      |      |
| Transition frequency<br>$I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2\text{ GHz}$                                                                                                    | $f_T$         | -      | 47          | -    | GHz  |
| Collector-base capacitance<br>$V_{CB} = 3\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded                                                                                   | $C_{cb}$      | -      | 0.08        | -    | pF   |
| Collector emitter capacitance<br>$V_{CE} = 3\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded                                                                                   | $C_{ce}$      | -      | 0.35        | -    |      |
| Emitter-base capacitance<br>$V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded                                                                                 | $C_{eb}$      | -      | 0.45        | -    |      |
| Noise figure<br>$I_C = 8\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$<br>$I_C = 8\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 6\text{ GHz}$ , $Z_S = Z_{Sopt}$ | $F$           | -      | 0.5<br>0.85 | -    | dB   |
| Power gain<br>$I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 1.8\text{ GHz}$                                                                   | $G_{ms}$      | -      | 27          | -    | dB   |
| Power gain, maximum available <sup>1)</sup><br>$I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ ,<br>$f = 6\text{ GHz}$                                    | $G_{ma}$      | -      | 17          | -    | dB   |
| Transducer gain<br>$I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ ,<br>$f = 1.8\text{ GHz}$<br>$f = 6\text{ GHz}$                                                   | $ S_{21e} ^2$ | -      | 24.5<br>14  | -    | dB   |
| Third order intercept point at output <sup>2)</sup><br>$V_{CE} = 3\text{ V}$ , $I_C = 25\text{ mA}$ , $f = 1.8\text{ GHz}$ ,<br>$Z_S = Z_L = 50\ \Omega$                                     | $IP_3$        | -      | 25          | -    | dBm  |
| 1dB Compression point<br>$I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ ,<br>$f = 1.8\text{ GHz}$                                                                   | $P_{-1dB}$    | -      | 11          | -    |      |

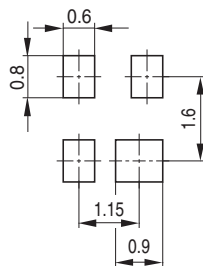
$$^1G_{ma} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$$

<sup>2)</sup>IP3 value depends on termination of all intermodulation frequency components.  
Termination used for this measurement is 50  $\Omega$  from 0.1 MHz to 6 GHz

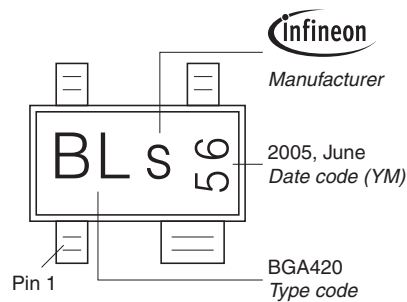
Package Outline



Foot Print

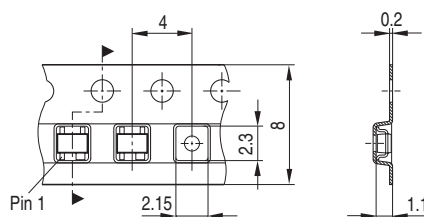


Marking Layout (Example)



Standard Packing

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



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