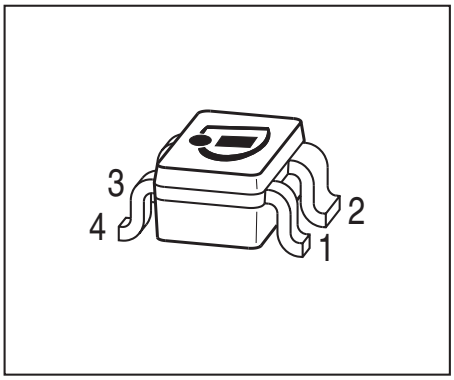
## High Performance Bipolar NPN RF Transistor




- 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

RoHS

**ESD** (**E**lectro**s**tatic **d**ischarge) 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 °C, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-emitter voltage | $V_{CEO}$ | | V |
| $T_A$ = 25 °C | | 4.0 | |
| $T_A$ = – 55 °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[1)] $T_S \leq 89$ °C | $P_{tot}$ | 160 | mW |
| Junction temperature | $T_J$ | 150 | °C |
| Ambient temperature | $T_A$ | -55 ... 150 | |
| Storage temperature | $T_{Stg}$ | -55 ... 150 | |

[1] $T_S$ is measured on the emitter lead at the soldering point to the pcb

**Thermal Resistance**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[1)] | $R_{thJS}$ | ≤ 380 | K/W |

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

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

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

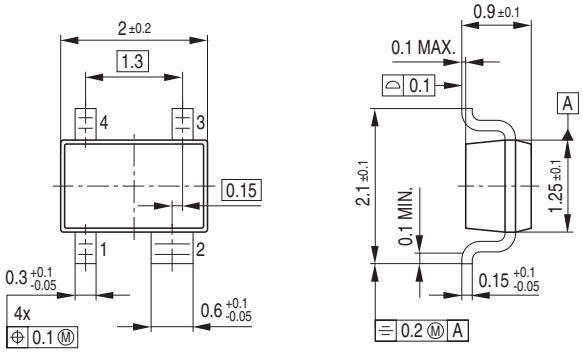
**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

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

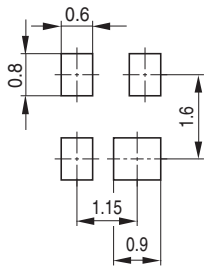
[1] $G_{ma} = |S_{21e} / S_{12e}| (k-(k^2-1)^{1/2})$

[2] IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50 Ω from 0.1 MHz to 6 GHz

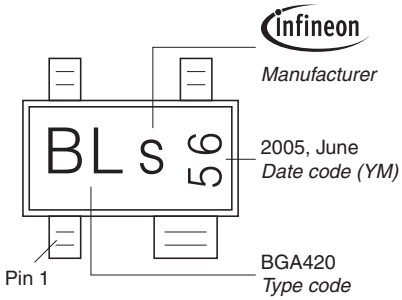
## Package Outline




## Foot Print

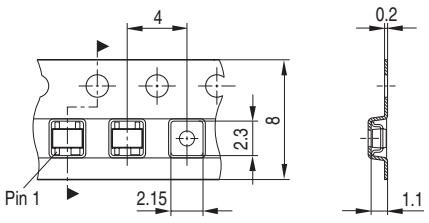



## Marking Layout (Example)




## Standard Packing

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

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