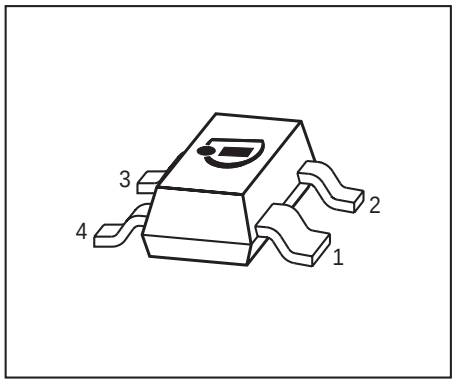
**NPN Silicon RF Transistor***




- For low noise, high-gain broadband amplifiers at collector currents from 2 mA to 30 mA
- $f_T$ = 8 GHz, $F$ = 0.9 dB at 900 MHz
- Pb-free (RoHS compliant) package[1)]
- Qualified according AEC Q101

* Short term description

**ESD** (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

| Type | Marking | Pin Configuration | | | | | | Package |
|---|---|---|---|---|---|---|---|---|
| BFP183 | RHs | 1=C | 2=E | 3=B | 4=E | - | - | SOT143 |

**Maximum Ratings**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-emitter voltage | $V_{CEO}$ | 12 | V |
| Collector-emitter voltage | $V_{CES}$ | 20 | |
| Collector-base voltage | $V_{CBO}$ | 20 | |
| Emitter-base voltage | $V_{EBO}$ | 2 | |
| Collector current | $I_C$ | 65 | mA |
| Base current | $I_B$ | 5 | |
| Total power dissipation[2)] $T_S \leq 76$ °C | $P_{tot}$ | 250 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Ambient temperature | $T_A$ | -65 ... 150 | |
| Storage temperature | $T_{stg}$ | -65 ... 150 | |

**Thermal Resistance**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[3)] | $R_{thJS}$ | ≤ 295 | K/W |

[1]Pb-containing package may be available upon special request

[2]$T_S$ is measured on the collector lead at the soldering point to the pcb

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

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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 | $V_{(BR)CEO}$ | 12 | - | - | V |
| Collector-emitter cutoff current<br>$V_{CE}$ = 20 V, $V_{BE}$ = 0 | $I_{CES}$ | - | - | 100 | µA |
| Collector-base cutoff current<br>$V_{CB}$ = 10 V, $I_E$ = 0 | $I_{CBO}$ | - | - | 100 | nA |
| Emitter-base cutoff current<br>$V_{EB}$ = 1 V, $I_C$ = 0 | $I_{EBO}$ | - | - | 1 | µA |
| DC current gain-<br>$I_C$ = 15 mA, $V_{CE}$ = 8 V, pulse measured | $h_{FE}$ | 70 | 100 | 140 | - |

**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, $V_{CE}$ = 8 V, $f$ = 500 MHz | $f_T$ | 6 | 8 | - | GHz |
| Collector-base capacitance<br>$V_{CB}$ = 10 V, $f$ = 1 MHz, $V_{BE}$ = 0 ,<br>emitter grounded | $C_{cb}$ | - | 0.3 | 0.5 | pF |
| Collector emitter capacitance<br>$V_{CE}$ = 10 V, $f$ = 1 MHz, $V_{BE}$ = 0 ,<br>base grounded | $C_{ce}$ | - | 0.27 | - | |
| Emitter-base capacitance<br>$V_{EB}$ = 0.5 V, $f$ = 1 MHz, $V_{CB}$ = 0 ,<br>collector grounded | $C_{eb}$ | - | 1.1 | - | |
| Noise figure<br>$I_C$ = 5 mA, $V_{CE}$ = 8 V, $Z_S$ = $Z_{Sopt}$,<br>$f$ = 900 MHz<br>$f$ = 1.8 GHz | $F$ | <br><br>-<br>- | <br><br>0.9<br>1.4 | <br><br>-<br>- | dB |
| Power gain, maximum stable[1)]<br>$I_C$ = 15 mA, $V_{CE}$ = 8 V, $Z_S$ = $Z_{Sopt}$, $Z_L$ = $Z_{Lopt}$ ,<br>$f$ = 900 MHz | $G_{ms}$ | - | 22 | - | dB |
| Power gain, maximum available[1)]<br>$I_C$ = 15 mA, $V_{CE}$ = 8 V, $Z_S$ = $Z_{Sopt}$, $Z_L$ = $Z_{Lopt}$ ,<br>$f$ = 1.8 GHz | $G_{ma}$ | - | 15.5 | - | dB |
| Transducer gain<br>$I_C$ = 15 mA, $V_{CE}$ = 8 V, $Z_S$ = $Z_L$ = 50 Ω,<br>$f$ = 900 MHz<br>$f$ = 1.8 GHz | $\lvert S_{21e}\rvert^2$ | <br><br>-<br>- | <br><br>17.5<br>11.5 | <br><br>-<br>- | dB |

[1] $G_{ma} = \lvert S_{21e} / S_{12e}\rvert\,(k-(k^2-1)^{1/2})$, $G_{ms} = \lvert S_{21} / S_{12}\rvert$

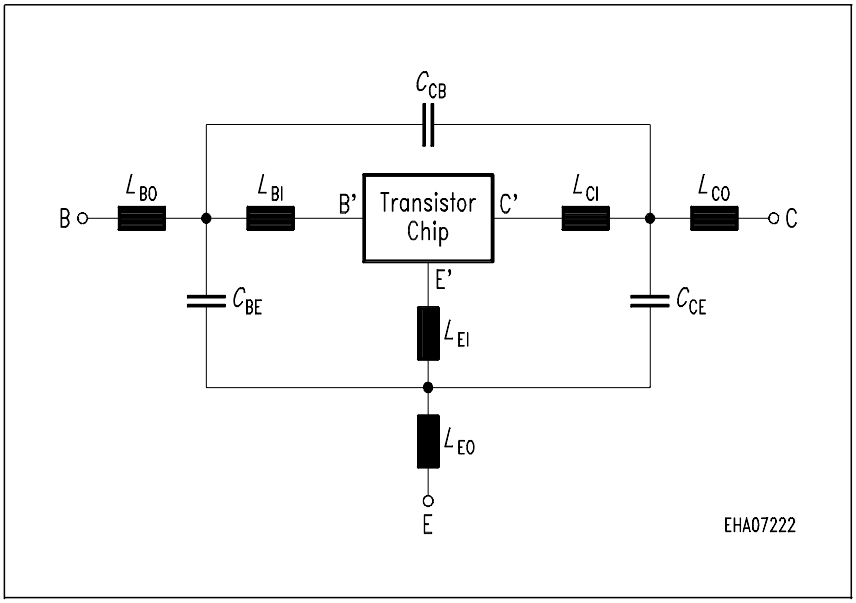
## SPICE Parameter (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax):

### Transistor Chip Data:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| IS = | 1.0345 | fA | BF = | 115.98 | - | NF = | 0.80799 | - |
| VAF = | 14.772 | V | IKF = | 0.14562 | A | ISE = | 16.818 | fA |
| NE = | 1.2149 | - | BR = | 10.016 | - | NR = | 0.99543 | - |
| VAR = | 3.4276 | V | IKR = | 0.013483 | A | ISC = | 1.3559 | fA |
| NC = | 0.85331 | - | RB = | 2.5426 | Ω | IRB = | 0.43801 | mA |
| RBM = | 1.0112 | Ω | RE = | 1.3435 | - | RC = | 0.20486 | Ω |
| CJE = | 23.077 | fF | VJE = | 1.0792 | V | MJE = | 0.45354 | - |
| TF = | 22.746 | ps | XTF = | 0.36823 | - | VTF = | 0.50905 | V |
| ITF = | 1.8773 | mA | PTF = | 0 | deg | CJC = | 460.11 | fF |
| VJC = | 1.1967 | V | MJC = | 0.3 | - | XCJC = | 0.053823 | - |
| TR = | 1.0553 | ns | CJS = | 0 | fF | VJS = | 0.75 | V |
| MJS = | 0 | - | XTB = | 0 | - | EG = | 1.11 | eV |
| XTI = | 3 | - | FC = | 0.54852 | | TNOM | 300 | K |

All parameters are ready to use, no scalling is necessary. Extracted on behalf of Infineon Technologies AG by: Institut für Mobil- und Satellitentechnik (IMST)

### Package Equivalent Circuit:

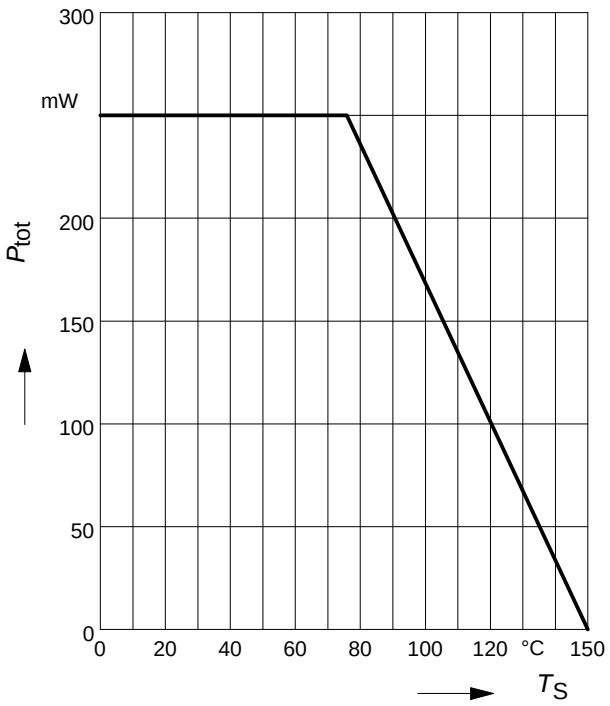



| | | |
|---|---|---|
| $L_{BI}$ = | 0.89 | nH |
| $L_{BO}$ = | 0.73 | nH |
| $L_{EI}$ = | 0.4 | nH |
| $L_{EO}$ = | 0.15 | nH |
| $L_{CI}$ = | 0 | nH |
| $L_{CO}$ = | 0.42 | nH |
| $C_{BE}$ = | 189 | fF |
| $C_{CB}$ = | 15 | fF |
| $C_{CE}$ = | 187 | fF |

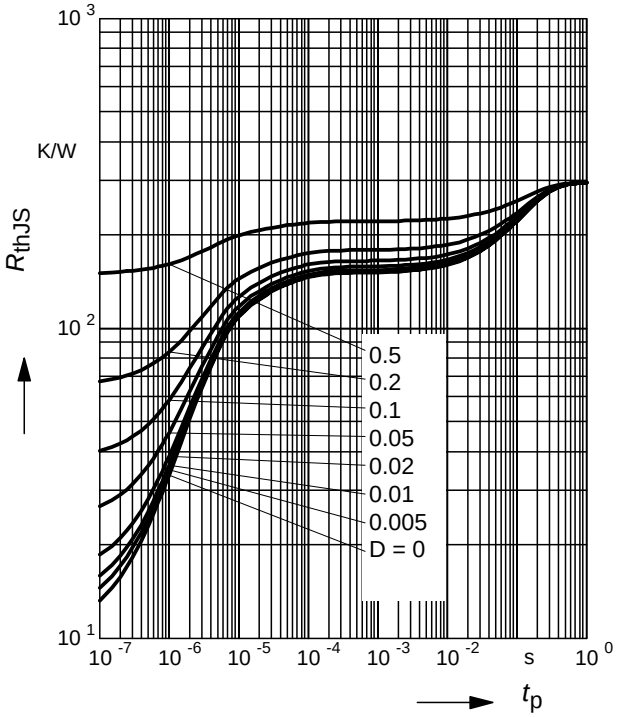
Valid up to 6GHz

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

**Total power dissipation $P_{tot} = f(T_S)$**

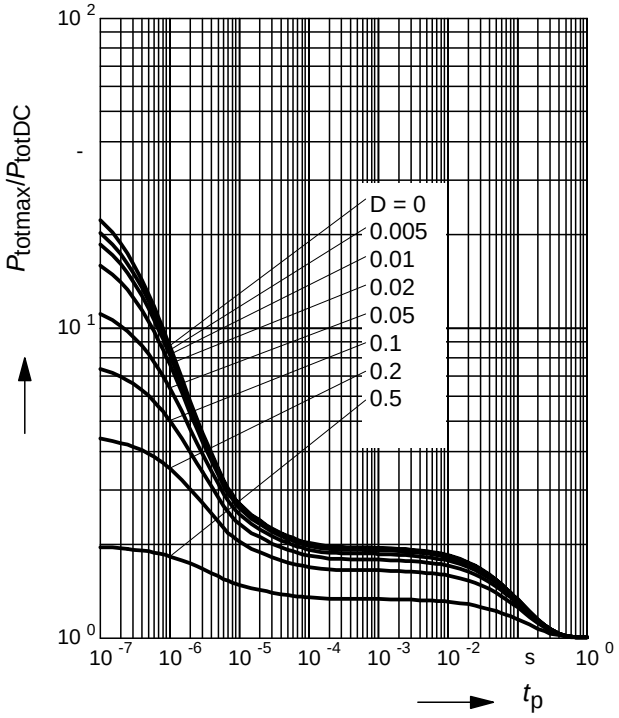



**Permissible Pulse Load $R_{thJS} = f(t_p)$**

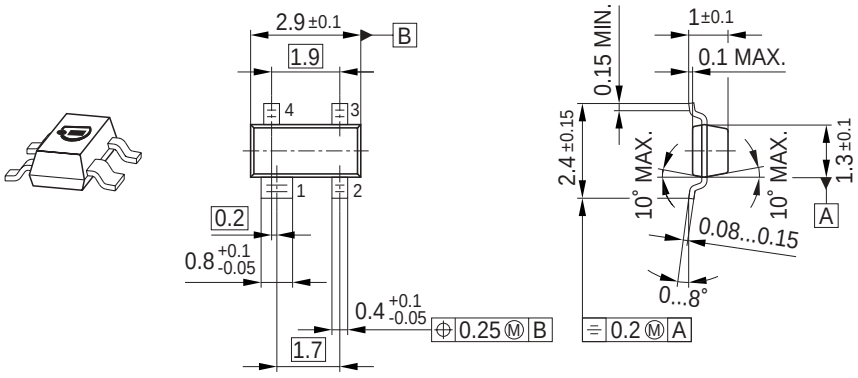



**Permissible Pulse Load**

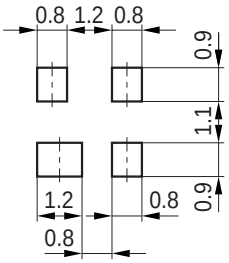
**$P_{totmax}/P_{totDC} = f(t_p)$**



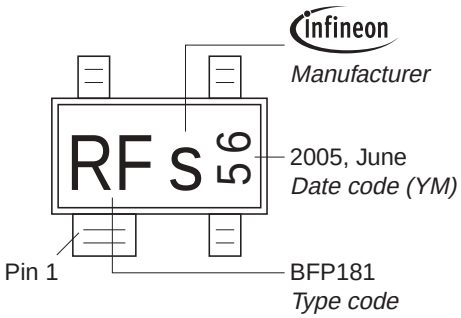
## Package Outline




## Foot Print

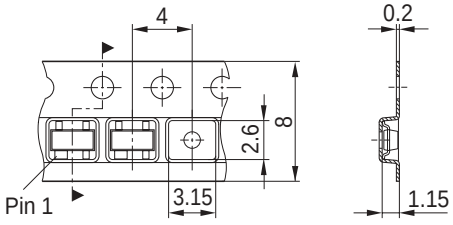



## Marking Layout (Example)




## Standard Packing

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




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