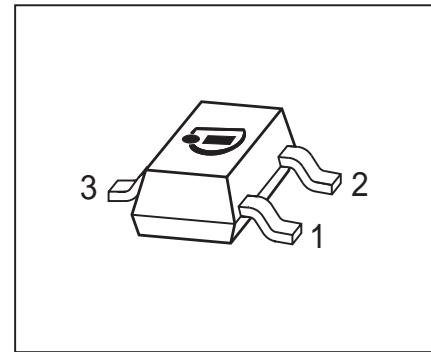


NPN Silicon RF Transistor*

- For broadband amplifiers up to 2 GHz and fast non-saturated switches at collector currents from 0.5 mA to 20 mA
- Complementary type: BFT91 (PNP)
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101



* Short term description



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

| Type | Marking | Pin Configuration | | | Package |
|--------|---------|-------------------|-----|-----|---------|
| BFR92P | GFs | 1=B | 2=E | 3=C | SOT23 |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------|-------------|------------------|
| Collector-emitter voltage | V_{CEO} | 15 | V |
| Collector-emitter voltage | V_{CES} | 20 | |
| Collector-base voltage | V_{CBO} | 20 | |
| Emitter-base voltage | V_{EBO} | 2.5 | |
| Collector current | I_C | 45 | mA |
| Base current | I_B | 4 | |
| Total power dissipation- $T_S \leq 48 \text{ }^\circ\text{C}$ | P_{tot} | 280 | mW |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Ambient temperature | T_A | -65 ... 150 | |
| Storage temperature | T_{stg} | -65 ... 150 | |

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|------------|------------|------|
| Junction - soldering point ²⁾ | R_{thJS} | ≤ 365 | K/W |

¹Pb-containing package may be available upon special request

²For 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. | |
| DC Characteristics | | | | | |
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$ | $V_{(BR)CEO}$ | 15 | - | - | V |
| Collector-emitter cutoff current $V_{CE} = 20\text{ V}, V_{BE} = 0$ | I_{CES} | - | - | 10 | μA |
| Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$ | I_{CBO} | - | - | 100 | nA |
| Emitter-base cutoff current $V_{EB} = 2.5\text{ V}, I_C = 0$ | I_{EBO} | - | - | 100 | μA |
| DC current gain- $I_C = 15\text{ mA}, V_{CE} = 8\text{ V}$, pulse measured | h_{FE} | 70 | 100 | 140 | - |

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

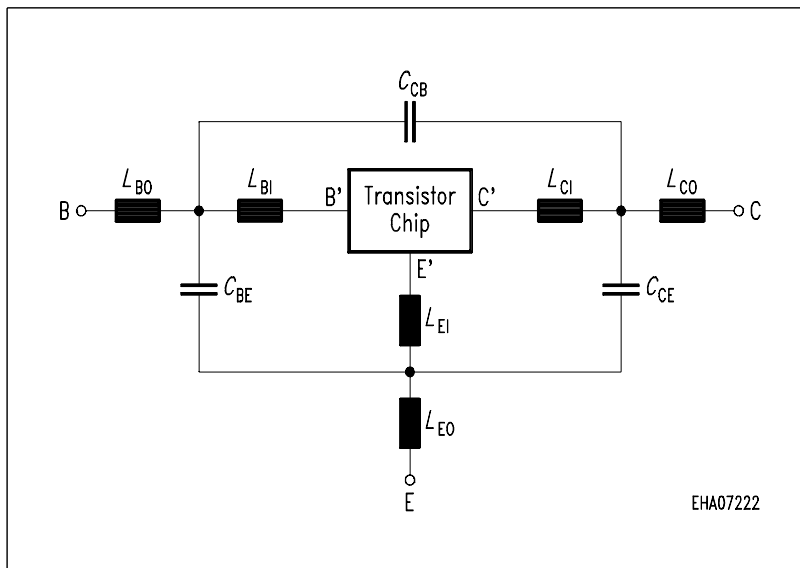
| Parameter | Symbol | Values | | | Unit |
|---|---------------|--------|------|------|------|
| | | min. | typ. | max. | |
| AC Characteristics (verified by random sampling) | | | | | |
| Transition frequency $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 500\text{ MHz}$ | f_T | 3.5 | 5 | - | GHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded | C_{cb} | - | 0.39 | 0.55 | pF |
| Collector emitter capacitance $V_{CE} = 10\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, base grounded | C_{ce} | - | 0.23 | - | |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$, $V_{CB} = 0$, collector grounded | C_{eb} | - | 0.64 | - | |
| Noise figure $I_C = 2\text{ mA}$, $V_{CE} = 6\text{ V}$, $Z_S = Z_{Sopt}$, $f = 900\text{ MHz}$ $I_C = 2\text{ mA}$, $V_{CE} = 6\text{ V}$, $Z_S = Z_{Sopt}$, $f = 1.8\text{ GHz}$ | F | - | 1.4 | - | dB |
| | | - | 2 | - | |
| Power gain, maximum available ¹⁾ $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900\text{ MHz}$ $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$ | G_{ma} | - | 16 | - | |
| | | - | 10.5 | - | |
| Transducer gain $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 900\text{ MHz}$ $I_C = 15\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 1.8\text{ MHz}$ | $ S_{21e} ^2$ | - | 13 | - | dB |
| | | - | 7.5 | - | |

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

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

| | | | | | | | | |
|-------|---------|----------|-------|---------|----------|--------|---------|----------|
| IS = | 0.1213 | fA | BF = | 94.733 | - | NF = | 1.0947 | - |
| VAF = | 30 | V | IKF = | 0.46227 | A | ISE = | 129.55 | fA |
| NE = | 1.9052 | - | BR = | 10.729 | - | NR = | 0.8983 | - |
| VAR = | 14.599 | V | IKR = | 0.01 | A | ISC = | 0.75557 | fA |
| NC = | 1.371 | - | RB = | 14.998 | Ω | IRB = | 0.01652 | mA |
| RBM = | 7.8145 | Ω | RE = | 0.29088 | - | RC = | 0.13793 | Ω |
| CJE = | 10.416 | fF | VJE = | 0.70618 | V | MJE = | 0.34686 | - |
| TF = | 26.796 | ps | XTF = | 0.3817 | - | VTF = | 0.32861 | V |
| ITF = | 4.4601 | mA | PTF = | 0 | deg | CJC = | 946.47 | fF |
| VJC = | 0.84079 | V | MJC = | 0.4085 | - | XCJC = | 0.13464 | - |
| TR = | 1.2744 | ns | CJS = | 0 | fF | VJS = | 0.75 | V |
| MJS = | 0 | - | XTB = | 0 | - | EG = | 1.11 | eV |
| XTI = | 3 | - | FC = | 0.99545 | - | TNOM | 300 | K |

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

Package Equivalent Circuit:


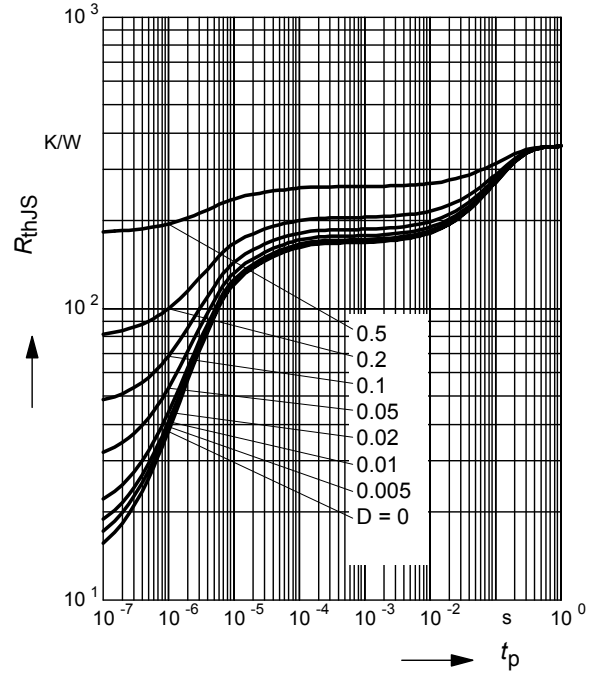
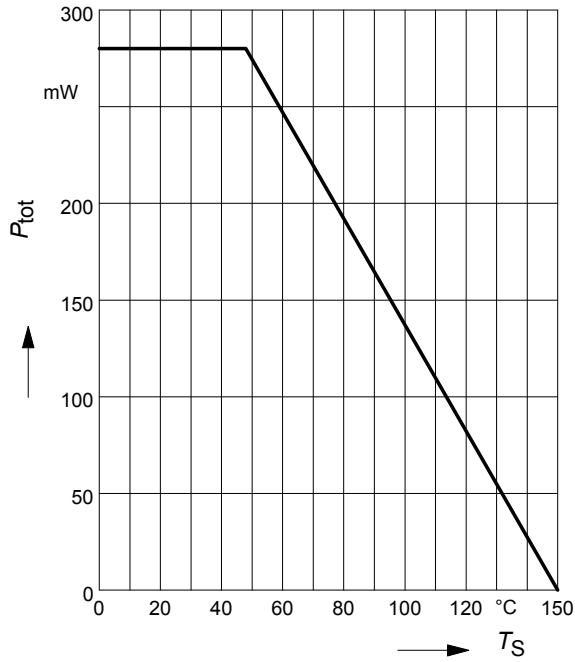
| | | |
|------------|------|----|
| $L_{BI} =$ | 0.85 | nH |
| $L_{BO} =$ | 0.51 | nH |
| $L_{EI} =$ | 0.69 | nH |
| $L_{EO} =$ | 0.61 | nH |
| $L_{CI} =$ | 0 | nH |
| $L_{CO} =$ | 0.49 | nH |
| $C_{BE} =$ | 73 | fF |
| $C_{CB} =$ | 84 | fF |
| $C_{CE} =$ | 165 | fF |

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>

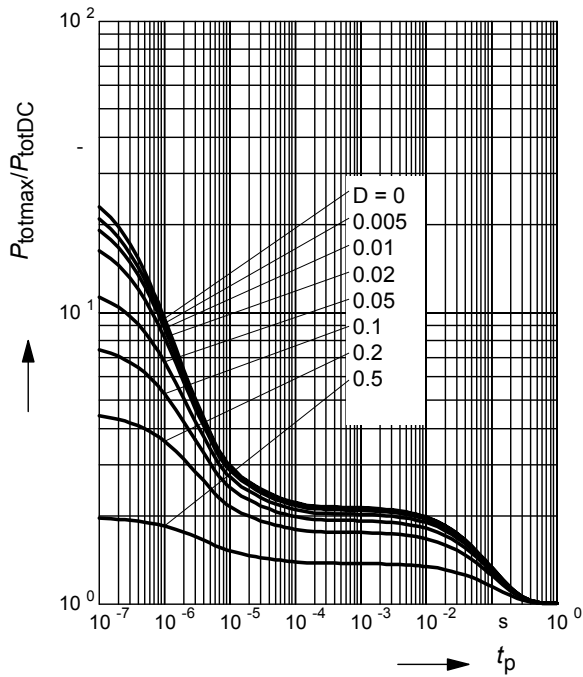
Total power dissipation $P_{tot} = f(T_S)$

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

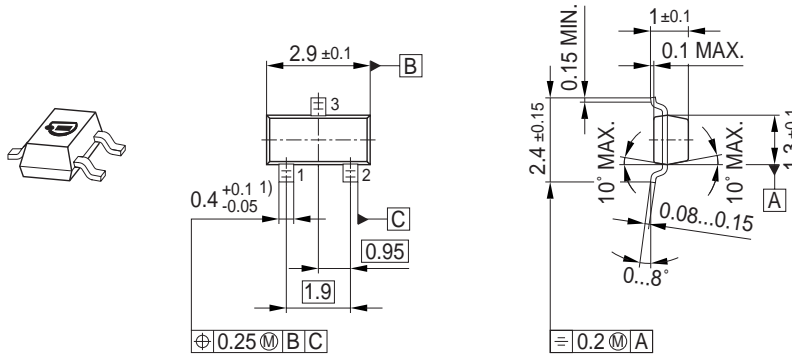


Permissible Pulse Load

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

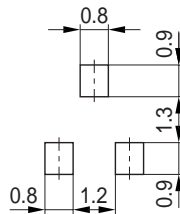


Package Outline

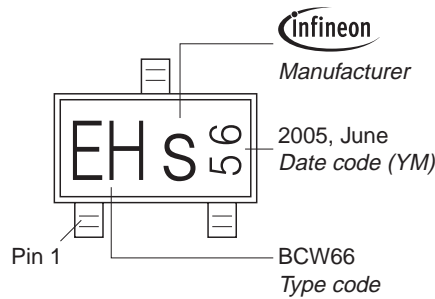


1) Lead width can be 0.6 max. in dambar area

Foot Print

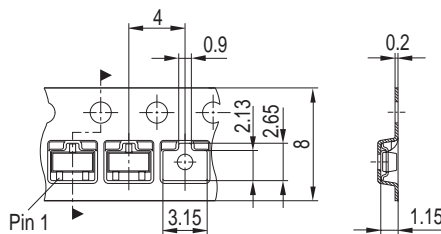


Marking Layout (Example)



Standard Packing

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



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