

**NPN Silicon RF Transistor**

- High linearity low noise RF transistor
- 22 dBm OP1dB and 31 dBm OIP3  
@ 900 MHz, 8 V, 70 mA
- For UHF / VHF applications
- Driver for multistage amplifiers
- For linear broadband and antenna amplifiers
- Collector design supports 5 V supply voltage
- Pb-free (RoHS compliant) package
- Qualification report according to AEC-Q101 available



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

Type	Marking	Pin Configuration			Package
BFR106	R7s	1=B	2=E	3=C	SOT23

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_A = 25\text{ °C}$ $T_A = -55\text{ °C}$	$V_{CEO}$	16 15	V
Collector-emitter voltage	$V_{CES}$	20	
Collector-base voltage	$V_{CBO}$	20	
Emitter-base voltage	$V_{EBO}$	3	
Collector current	$I_C$	210	mA
Base current	$I_B$	21	
Total power dissipation <sup>1)</sup> $T_S \leq 73\text{ °C}$	$P_{tot}$	700	mW
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{Stg}$	-55 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{thJS}$	110	K/W

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

<sup>2)</sup> For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

**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 $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	15	-	-	V
Collector-emitter cutoff current $V_{CE} = 20\text{ V}, V_{BE} = 0$ $V_{CE} = 10\text{ V}, V_{BE} = 0$	$I_{CES}$	-	-	1	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	$I_{CBO}$	-	1	30	nA
Emitter-base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$	$I_{EBO}$	-	1	30	
DC current gain $I_C = 70\text{ mA}, V_{CE} = 8\text{ V}$ , 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.	
<b>AC Characteristics</b> (verified by random sampling)					
Transition frequency $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 500\text{ MHz}$	$f_T$	3.5	5	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.85	1.2	pF
Collector emitter capacitance $V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.27	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	3.9	-	
Minimum noise figure $I_C = 20\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $f = 900\text{ MHz}$ $I_C = 20\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $f = 1.8\text{ GHz}$	$NF_{\text{min}}$	-	1.8	-	dB
		-	3	-	

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

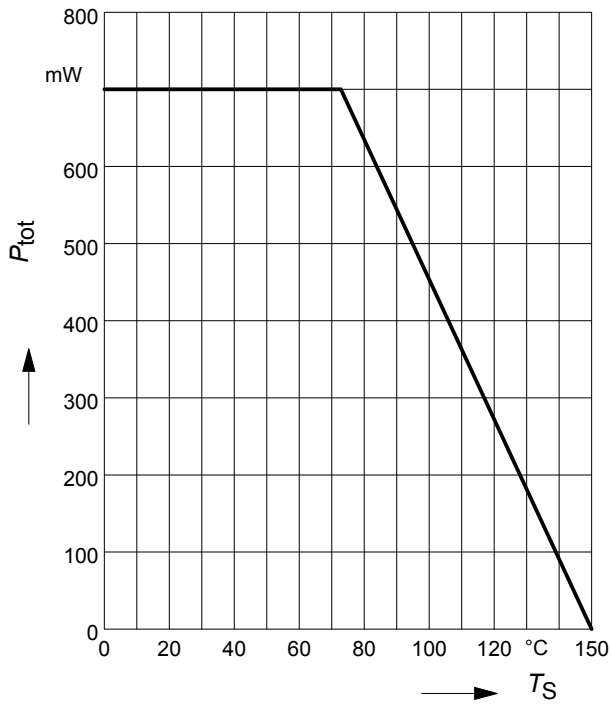
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Power gain, maximum available <sup>1)</sup> $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 900\text{ MHz}$ $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$G_{ma}$	-	13	-	dB
		-	8.5	-	
Transducer gain $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 900\text{ MHz}$ $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	-	10.5	-	dB
		-	5	-	
Third order intercept point at output <sup>2)</sup> $V_{CE} = 8\text{ V}$ , $I_C = 70\text{ mA}$ , $f = 0.9\text{ GHz}$ , $Z_S = Z_L = 50\ \Omega$	$IP_3$	-	31	-	dBm
1dB compression point $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 0.9\text{ GHz}$	$P_{-1dB}$	-	22	-	

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

<sup>2)</sup> $IP_3$  value depends on termination of all intermodulation frequency components.

Termination used for this measurement is  $50\ \Omega$  from 0.1 MHz to 6 GHz

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

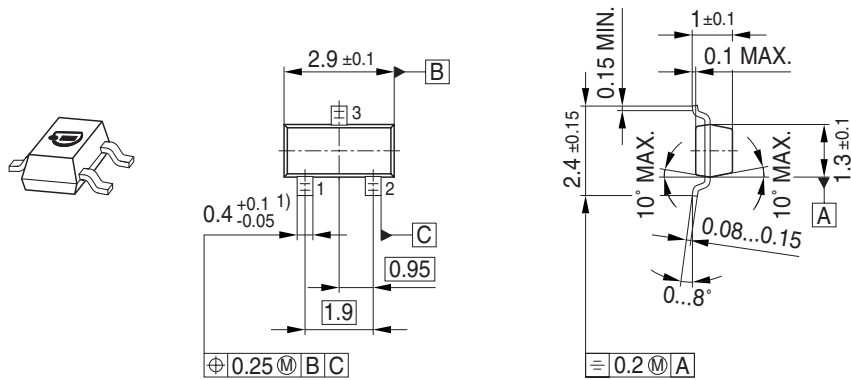


**SPICE GP Model**

For the SPICE Gummel Poon (GP) model as well as for the S-parameters (including noise parameters) please refer to our internet website [www.infineon.com/rf.models](http://www.infineon.com/rf.models).

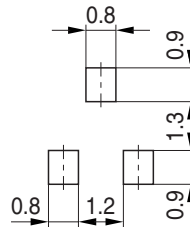
Please consult our website and download the latest versions before actually starting your design.

Package Outline

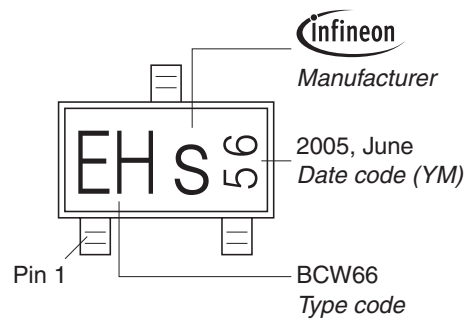


1) Lead width can be 0.6 max. in dambar area

Foot Print

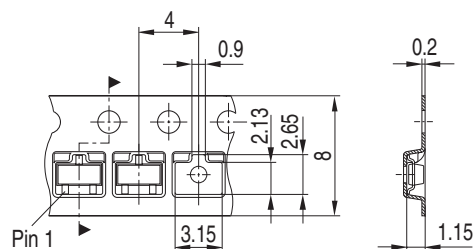


Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



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