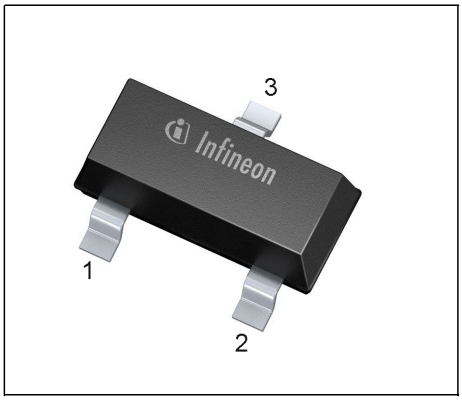
Low Noise Silicon Bipolar RF Transistor



- 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

RoHS

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage,	V_{CEO}		V
T_A = 25°C		16	
T_A = -55°C		15	
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[1)] $T_S \leq 76$ °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[2)]	R_{thJS}	105	K/W

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

[2] For calculation of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	15	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0 V_{CE} = 10 V, V_{BE} = 0	I_{CES}	 - -	 - 0.001	 1 0.03	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	1	30	nA
Emitter-base cutoff current V_{EB} = 2 V, I_C = 0	I_{EBO}	-	1	30	
DC current gain I_C = 70 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 I_C = 70 mA, V_{CE} = 8 V, f = 500 MHz	f_T	3.5	5	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.85	1.2	pF
Collector emitter capacitance V_{CE} = 10 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.27	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	3.9	-	
Minimum noise figure I_C = 20 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, f = 900 MHz I_C = 20 mA, V_{CE} = 8 V, Z_S = Z_{Sopt} , f = 1.8 GHz	NF_{min}	 - -	 1.8 3	 - -	dB

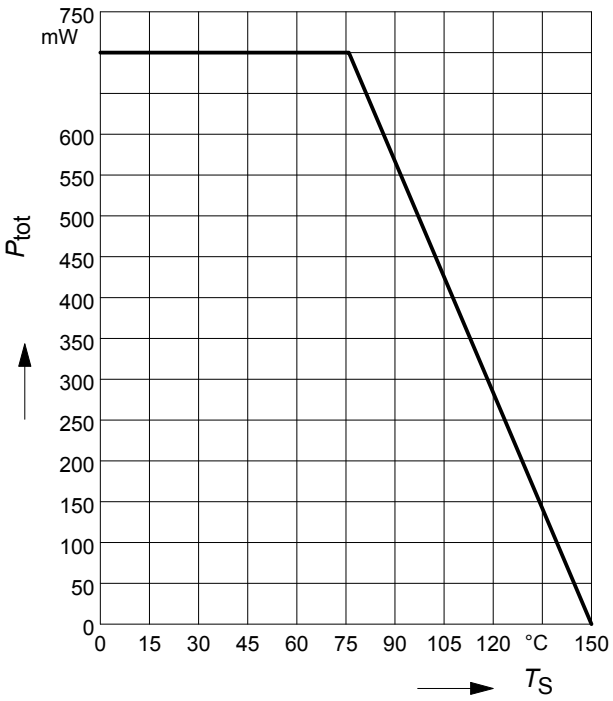
Electrical Characteristics at T_A = 25 °C, unless otherwise specified

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

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

[2] IP_3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

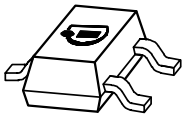
Total power dissipation $P_{tot} = f(T_S)$

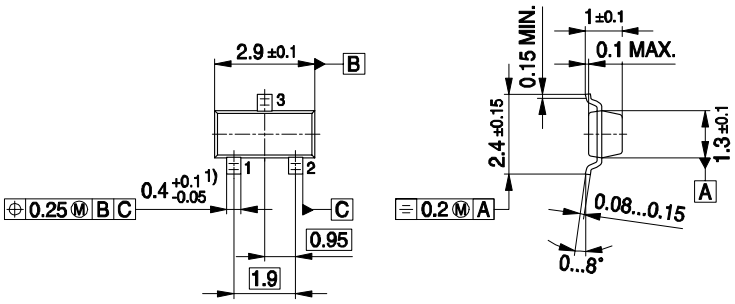


SPICE GP Model

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

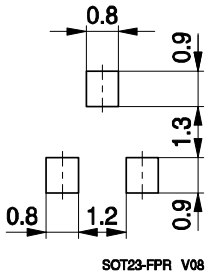
Package Outline



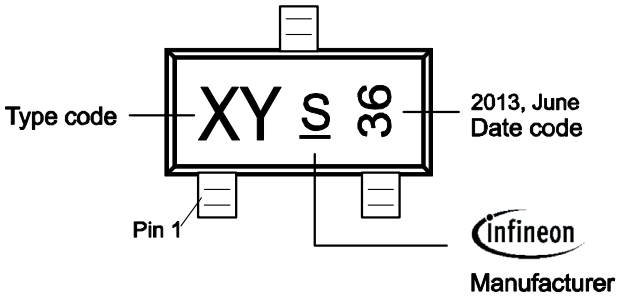


1) Lead width can be 0.6 max. in dambar area

Foot Print



Marking Layout



Standard Packing

Reel o 180 mm: 3.000 Pieces / Reel
Reel o 330 mm = 10.000 Pieces / Reel