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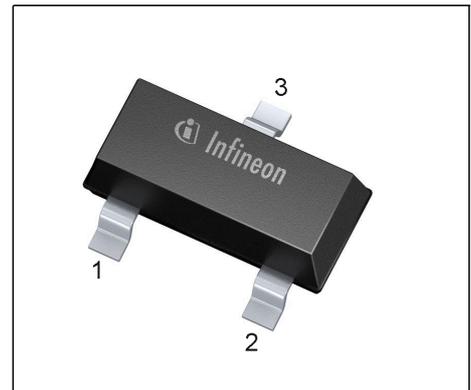
ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

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]	P_{tot}	700	mW
$T_S \leq$ 76 °C			
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)

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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 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	-

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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

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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	G_{ma}	-	13	-	dB
I_C = 70 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 1.8 GHz		-	8.5	-	
Transducer gain I_C = 70 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz	$|S_{21e}|^2$	-	10.5	-	dB
I_C = 70 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 1.8 GHz		-	5	-	
Third order intercept point at output[2] V_{CE} = 8 V, I_C = 70 mA, f = 0.9 GHz , $Z_S=Z_L=50\Omega$	IP_3	-	31	-	dBm
1dB compression point I_C = 70 mA, V_{CE} = 8 V, $Z_S=Z_L=50\Omega$, f = 0.9 GHz	P_{-1dB}	-	22	-	

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

[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

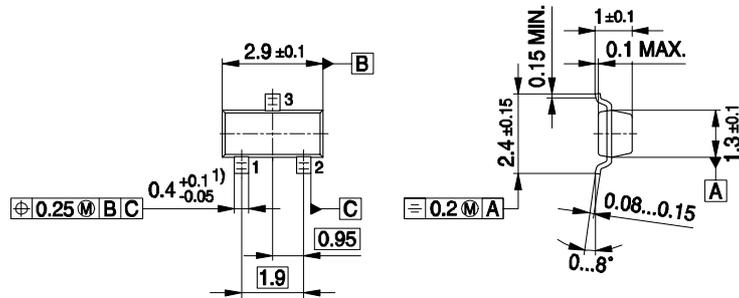**Total power dissipation** $P_{tot} = f(T_S)$

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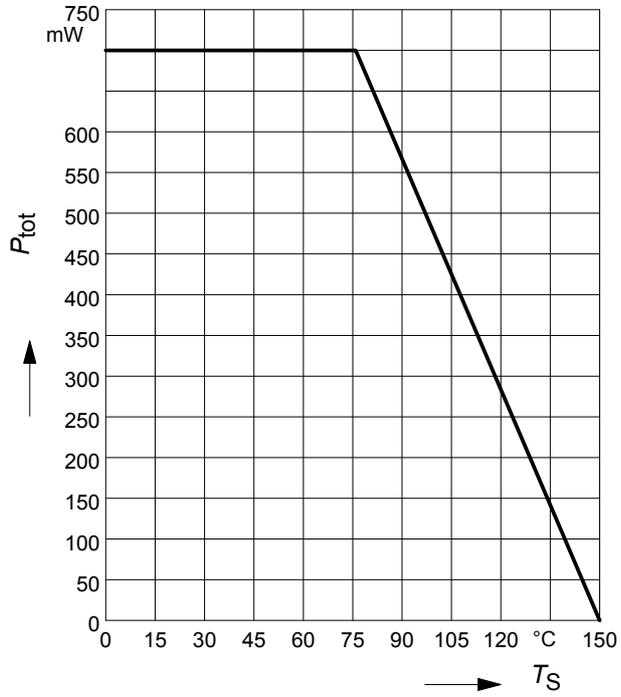
SPICE GP Model

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
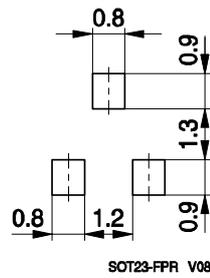actually starting your design.

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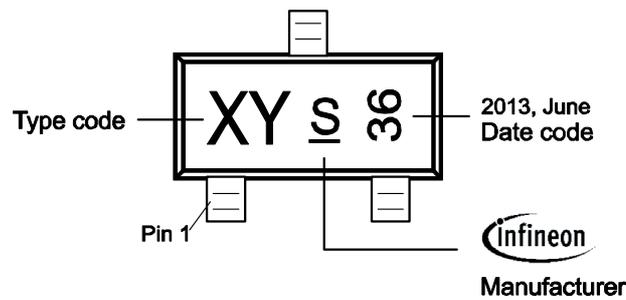## Package Outline

2.9 ±0.1 B

3

0.4 +0.1/-0.05 1)

⊕ 0.25 Ⓜ B C

C

0.95

1.9

1 ±0.1

0.15 MIN.

0.1 MAX.

2.4 ±0.15

1.3 ±0.1

A

0.08...0.15

0...8°

▯ 0.2 Ⓜ A

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

SOT23-PO V08

Foot Print

0.8

0.9

1.3

0.8   1.2

0.9

SOT23-FPR V08

Marking Layout

Type code ⟶ XY S 36 ⟵ 2013, June Date code

Pin 1

Infineon

Manufacturer

Standard Packing

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

4

0.9

0.2

2.13

2.65

8

Pin 1

3.15

1.15

SOT23-TP V02

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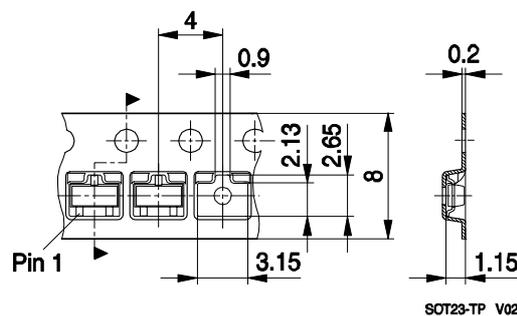
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