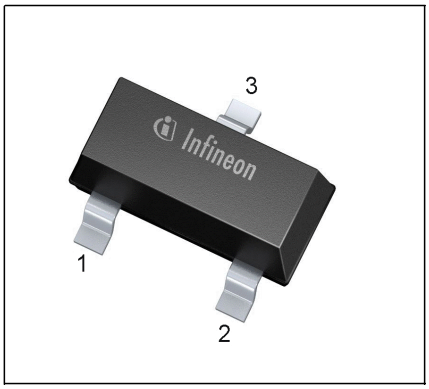
Low Noise Silicon Bipolar RF Transistor



- For low-noise, high gain broadband amplifiers at collector currents from 2 mA to 30 mA
- 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
BFR93A	R2s	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}	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	90	mA
Base current	I_B	9	
Total power dissipation[1)] $T_S \leq 111$ °C	P_{tot}	300	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}	130	K/W

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

[2] For the definition 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	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 2.5 V, I_C = 0	I_{EBO}	-	-	10	µA
DC current gain I_C = 30 mA, V_{CE} = 8 V, pulse measured	h_{FE}	70	100	140	-

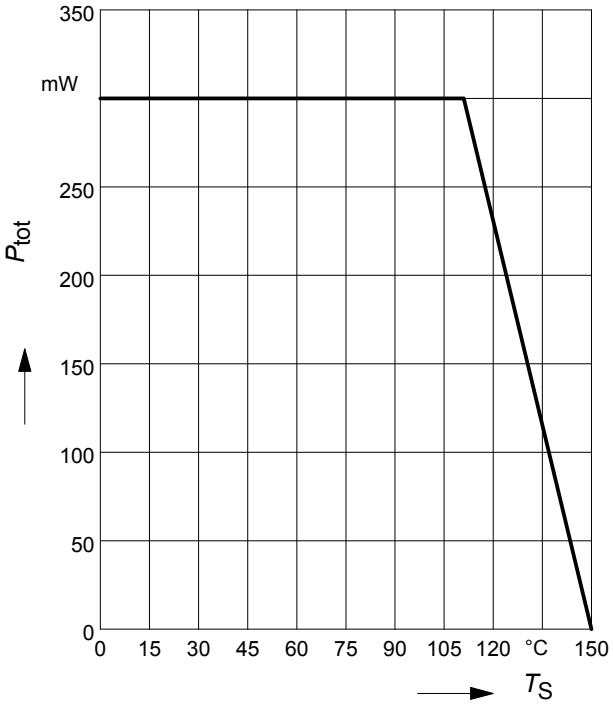
Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 30 mA, V_{CE} = 8 V, f = 500 MHz	f_T	4.5	6	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.54	0.8	pF
Collector emitter capacitance V_{CE} = 10 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.25	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	1.9	-	
Minimum noise figure I_C = 5 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, f = 900 MHz f = 1.8 GHz	NF_{min}	 - -	 1.5 2.6	 - -	dB
Power gain, maximum available[1)] I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 900 MHz f = 1.8 GHz	G_{ma}	 - -	 14.5 9.5	 - -	
Transducer gain I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz f = 1.8 MHz	$\lvert S_{21e}\rvert^2$	 - -	 12.5 7	 - -	dB
Third order intercept point at output[2)] I_C = 30mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz	IP_3	-	15	-	dBm
1dB Compression point I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz	P_{-1dB}	-	6	-	

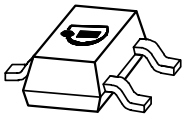
[1] $G_{ma} = |S_{21e} / S_{12e}| (k-(k^2-1)^{1/2})$

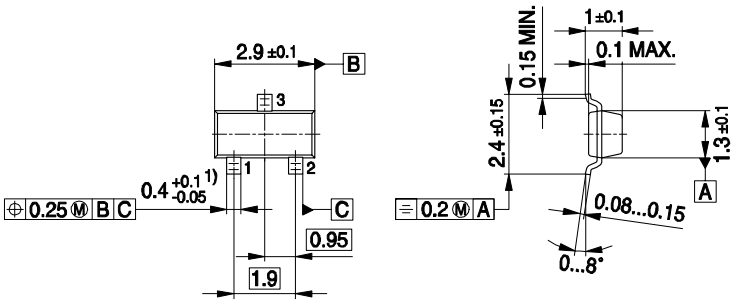
[2] IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.2 MHz to 12 GHz

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



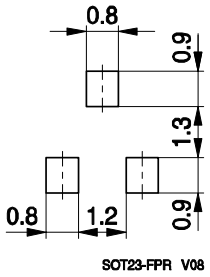
Package Outline



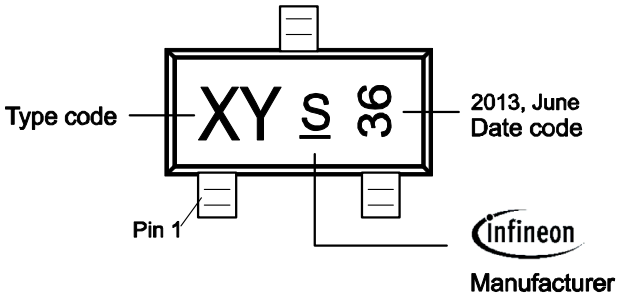


1) Lead width can be 0.6 max. in dambar area

Foot Print

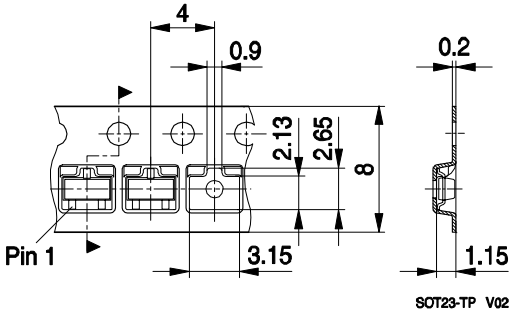


Marking Layout



Standard Packing

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



Edition 2009-11-16

Published by
Infineon Technologies AG
81726 Munich, Germany

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