## Silicon Bipolar MMIC-Amplifier

- Cascadable 50 Ω-gain block

- 16 dB typical gain at 1.0 GHz

- 12 dBm typical P_{-1dB} at 1.0 GHz

- 3 dB-bandwidth: DC to 1.2 GHz

VPS05178

Circuit Diagram

EHA07312
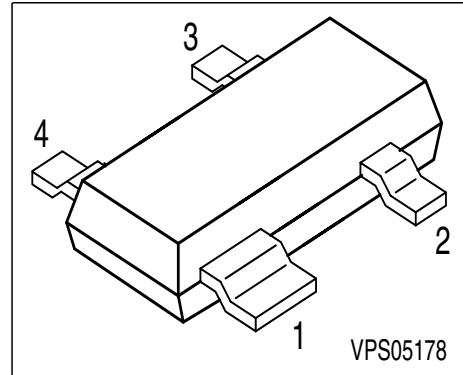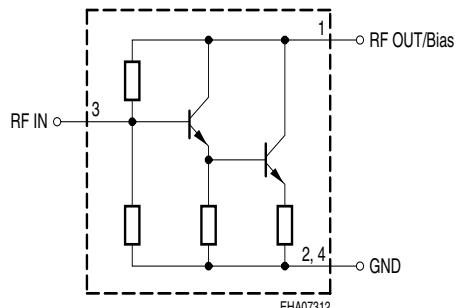
Type	Marking	Pin Configuration				Package
BGA 318	BNs	1 RFout/bias	2 GND	3 RFinput	4 GND	SOT-143

Maximum Ratings

Parameter	Symbol	Value	Unit
Device current	I_D	60	mA
Total power dissipation, $T_S \leq 99\ °C$[1]	P_{tot}	250	mW
RF input power	P_{RFin}	5	dBm
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point	R_{thJS}	≤ 205	K/W

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

Oct-26-1999

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics (V_D = 4.7 V, Z_o = 50 Ω)					
Insertion power gain	$|S_{21}|^2$				dB
f = 0.1 GHz		-	18	-	
f = 1 GHz		-	16	-	
f = 1.8 GHz		-	12	-	
Insertion point gain flatness f = 0.1 GHz to 0.6 GHz	$\Delta |S_{21}|^2$	-	+-0.7	-	dB
Noise figure	NF				dB
f = 0.1 GHz		-	3.5	-	
f = 1 GHz		-	4	-	
f = 2 GHz		-	5	-	
1dB compression point f = 1 GHz	P_{-1dB}	-	12	-	dBm
Return loss input f = 0.1 GHz to 2 GHz	RL_{in}	-	14	-	dB
Return loss output f = 0.1 GHz to 3 GHz	RL_{out}	-	10	-	

Typical biasing configuration

$$R_{Bias} = V_{CC} - V_D / I_D$$

$$V_D = 4.7V$$

Oct-26-1999

S-Parameters at T_A = 25 °C

f	S_{11}		S_{21}		S_{12}		S_{22}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
V_D = 4.7 V, Z_o = 50 Ω								
0.01	0.196	0.2	8.01	178.9	0.077	0.6	0.327	-0.5
0.1	0.193	-4.8	8	171.6	0.078	4.9	0.324	-8.6
0.3	0.194	-14.4	7.75	155.4	0.082	13.8	0.312	-25
0.5	0.191	-25.9	7.28	139.9	0.089	21.1	0.294	-41.2
0.8	0.184	-45	6.43	119.1	0.105	27.9	0.26	-62.9
1	0.175	-60.3	5.83	106.8	0.117	30.2	0.238	-76.2
1.9	0.185	-130.6	3.91	67.6	0.164	30.2	0.184	-113
2.4	0.241	-170.6	2.99	45.5	0.193	26.8	0.173	-124.4
3	0.298	159.6	2.38	27.6	0.218	22.8	0.178	-131.2

Insertion power gain $|S_{21}|^2 = f(f)$

V_D = 4.7V, I_D = 35 mA
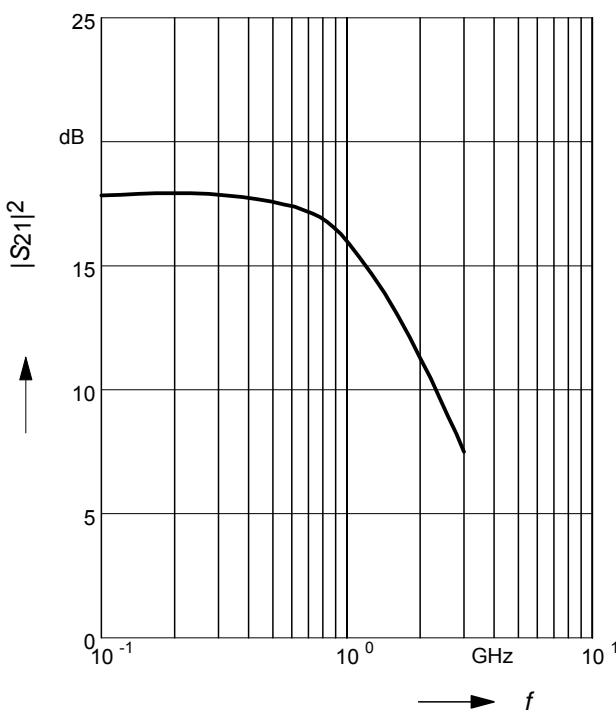
Noise figure $NF = f(f)$

V_D = 4.7V, I_D = 35 mA

3
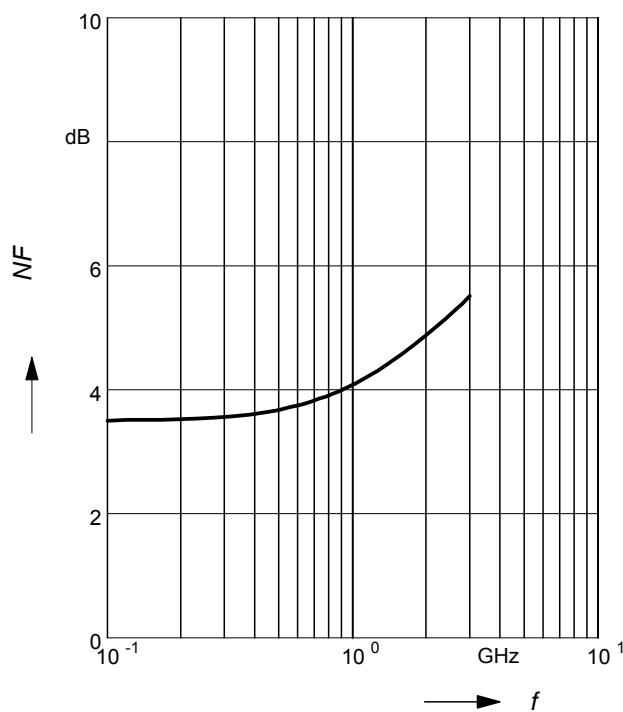
Output power 1-dB-gain compression

$P_{-1dB} = f(f)$

$V_D = 4.7V, I_D = 35$ mA