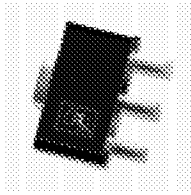
Stanford Microdevices

Preliminary

SXH-1

50-2000 MHz Power Amplifier



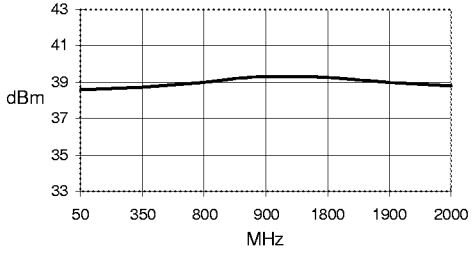
Product Description

Stanford Microdevices' SXH-1 amplifier is a high linear GaAs Heterojunction Bipolar Transistor (HBT) amplifier housed in low-cost surface-mountable plastic package. The SXH-1 offers significant advantages with higher gain and higher linearity than existing competitive MESFET technology.

These HBT amplifiers are fabricated using molecular beam epitaxial growth technology which produces reliable and consistent performance from wafer to wafer and lot to lot.

These amplifiers are specially designed for use as driver devices for infrastructure equipment in the cellular, ISM and narrowband PCS bands.

Output Third Order Intercept Point vs. Frequency



Product Features

- **Patented, High Reliability GaAs HBT Technology**
- **High Linearity Performance : +39dBm Typ. at 900/1900 MHz**
- **Surface-Mountable Plastic Package**

Applications

- **PCS, Cellular Systems**
- **Multi-Carrier Applications**

Electrical Specifications at Ta = 25C

Symbol	Parameters: Test Conditions: Z_o = 50 Ohms, f = 50-2000 MHz		Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	f = 800-900 MHz f = 1800-2000 MHz	dBm dBm		22.0 22.0	
S_{21}	Power Gain	f = 800-900 MHz f = 1800-2000 MHz	dB dB		20.0 14.5	
S_{12}	Reverse Isolation	f = 800-900 MHz f = 1800-2000 MHz	dB dB		29.0 28.0	
VSWR	Input VSWR	f = 800-900 MHz f = 1800-2000 MHz	-		1.5:1 1.7:1	
VSWR	Output VSWR	f = 800-900 MHz f = 1800-2000 MHz	-		2.0:1 2.0:1	
IP_3	Third Order Intercept Point	f = 800-900 MHz f = 1800-2000 MHz	dBm dBm		39.0 39.0	
NF	Noise Figure	f = 800-900 MHz f = 1800-2000 MHz	dB dB		3.5 4.2	
I_d	Device Current	Vc=+5V	mA		95.0	

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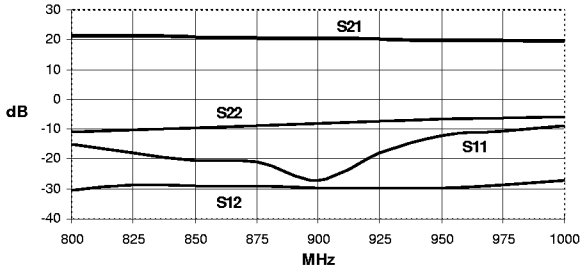
Typical Performance at 25°C (Vc = 5.0V)

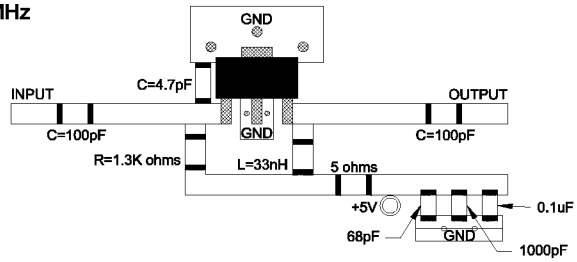
800-960 MHz Application Circuit

S-Parameters



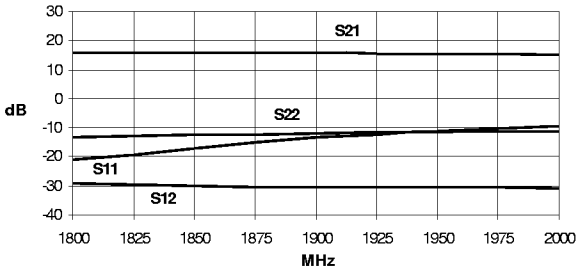
Frequency	800 MHz	960 MHz
Small Signal Gain (dB)	21.3	19.5
Input Return Loss (dB)	-15.2	-11.7
Output Return Loss (dB)	-11.0	-9.6
Output IP3 (dBm)	39.0	39.0
Noise Figure (dB)	3.5	3.5
Bias Current (mA)	95.0	95.0

Board Layout and Matching Circuit at 850 MHz



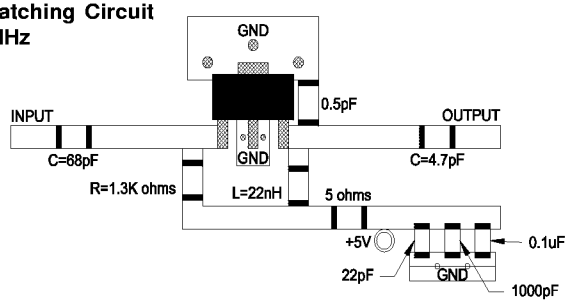
1800-2000 MHz Application Circuit

S-Parameters



Frequency	1800 MHz	2000 MHz
Small Signal Gain (dB)	15.0	14.0
Input Return Loss (dB)	-17.0	-9.5
Output Return Loss (dB)	-13.3	-11.1
Output IP3 (dBm)	39.0	39.0
Noise Figure (dB)	4.2	4.2
Bias Current (mA)	95.0	95.0

Board Layout and Matching Circuit at 1850 MHz



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Absolute Maximum Ratings

Parameter	Absolute Maximum
Device Voltage	7V
Device Current	200mA
Power Dissipation	1500mW
RF Input Power	100mW
Junction Temperature	+150C
Operating Temperature	-45C to +85C
Storage Temperature	-65C to +150C

Notes:

1. Operation of this device above any one of these parameters may cause permanent damage.

MTTF vs. Temperature @ Id = 95mA typ.

Lead Temperature	Junction Temperature	MTTF (hrs)
+85C	+150C	1,000,000

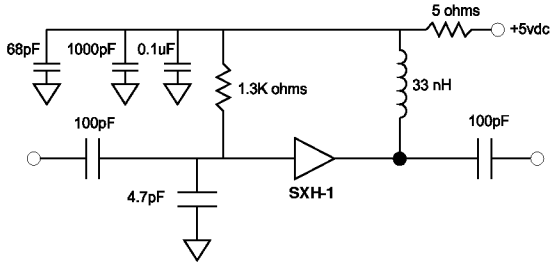
Thermal Resistance (Lead-Junction):
166° C/W at Tj= 150°C

Function	Pin No.
Input	1
GND	2
Output & Bias	3
GND	4

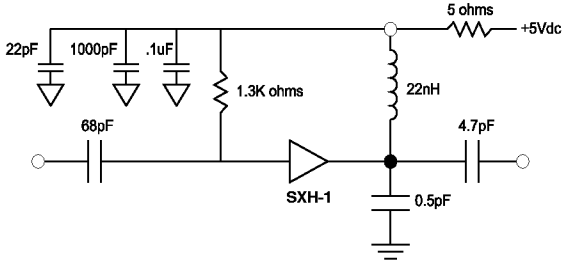
Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
SXH-1-TR1	500	7"
SXH-1-TR2	1000	13"
SXH-1-EB-9	Eval Board for 900 MHz	-
SXH-1-EB-19	Eval Board for 1900 MHz	-
SXH-1-EV-5	5 pc. Evaluation Development Kit	-

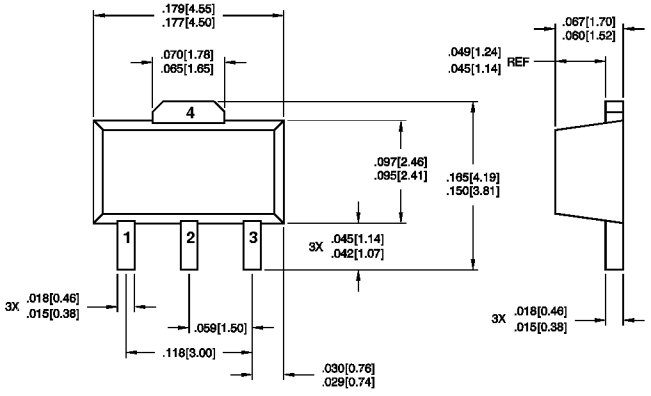
Application Schematic and Bias Circuit for 900 MHz Operation



Application Schematic and Bias Circuit for 1900 MHz Operation

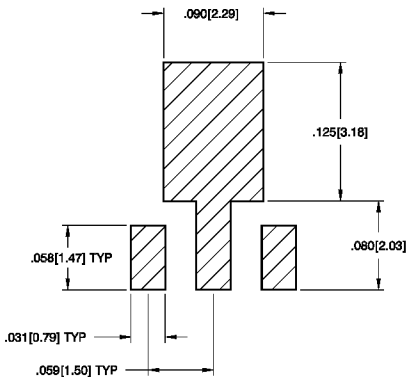


Outline Drawing



Pin assignments shown for reference only, not marked on part

Land Pattern



SXH-1 50-2000 MHz Power Amplifier

Typical S-Parameters Vc = 4.5V, Ic = 95mA

Freq GHz	|S11|	S11 Ang	|S21|	S21 Ang	|S12|	S12 Ang	|S22|	S22 Ang
.500	0.61	171	12.65	98	0.02	-5	0.30	-171
.600	0.62	165	11.25	89	0.03	-7	0.30	-173
.700	0.62	157	10.15	81	0.03	-10	0.30	-174
.800	0.61	151	9.30	73	0.03	-13	0.30	-175
.900	0.59	144	8.62	66	0.03	-16	0.31	-175
1.00	0.57	137	8.09	58	0.03	-20	0.31	-176
1.10	0.54	129	7.67	51	0.04	-24	0.31	-176
1.20	0.51	121	7.34	43	0.04	-29	0.32	-175
1.30	0.46	113	7.07	35	0.04	-35	0.33	-175
1.40	0.40	103	6.86	27	0.04	-42	0.34	-175
1.50	0.33	92	6.67	18	0.04	-49	0.36	-175
1.60	0.25	79	6.48	8	0.04	-58	0.39	-175
1.70	0.15	59	6.27	-2	0.04	-68	0.42	-177
1.80	0.05	-4	6.01	-14	0.04	-80	0.46	-179
1.90	0.12	-103	5.64	-26	0.04	-93	0.50	179
2.00	0.26	-128	5.19	-38	0.03	-106	0.54	175
2.10	0.40	-143	4.66	-51	0.03	-122	0.57	169
2.20	0.53	-156	4.08	-62	0.03	-138	0.60	164
2.30	0.63	-168	3.52	-73	0.02	-154	0.62	158
2.40	0.71	-178	3.00	-83	0.02	-172	0.62	153
2.50	0.77	172	2.54	-92	0.02	170	0.62	149
2.60	0.81	164	2.15	-100	0.01	152	0.62	145
2.70	0.85	157	1.82	-107	0.01	134	0.61	142
2.80	0.87	151	1.54	-114	0.01	117	0.61	139
2.90	0.89	145	1.31	-119	0.01	103	0.60	136
3.00	0.91	140	1.13	-125	0.01	91	0.59	133

Device reference plane is at input/output pins 1 and 3 with no external matching.