Stanford Microdevices

Preliminary

SXA-289

50-2000 MHz Power Amplifier

Product Description

Stanford Microdevices' SXA-289 amplifier is a high efficiency GaAs Heterojunction Bipolar Transistor (HBT) amplifier housed in low-cost surface-mountable plastic package. 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 50-2000 MHz cellular, ISM and narrowband PCS bands.

Its high linearity make it an ideal choice for multi-carrier as well as digital applications.

Product Features

- **Patented High Reliability GaAs HBT Technology**
- **High Linearity Performance : +42dBm Typ. at 1900 MHz**
- **Surface-Mountable Plastic Package**

Applications

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

Electrical Specifications at Ta = 25C

Symbol	Parameters: Test Conditions: Z_0 = 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		24.0 24.0	
S_{21}	Power Gain	f = 800-900 MHz f = 1800-2000 MHz	dB dB		20.5 15.5	
S_{12}	Reverse Isolation	f = 800-900 MHz f = 1800-2000 MHz	dB dB		30.0 30.0	
VSWR	Input VSWR	f = 800-900 MHz f = 1800-2000 MHz	- -		1.5:1 1.5:1	
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		41.0 42.0	
NF	Noise Figure	f = 800-900 MHz f = 1800-2000 MHz	dB dB		5.0 5.0	
I_d	Device Current	Vc=+5V	mA		115.0	

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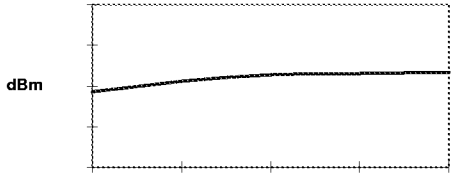
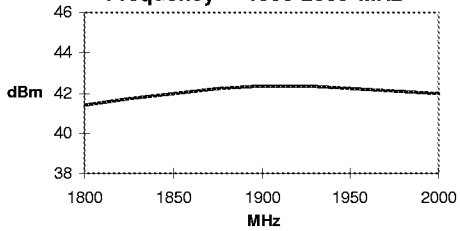
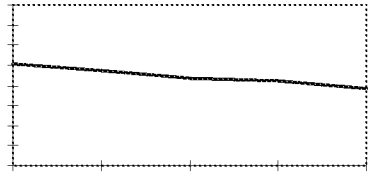
SXA-289 50-2000 MHz Power Amplifier

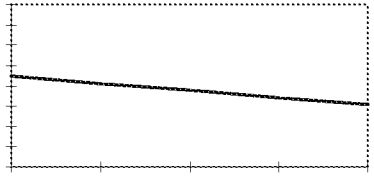
Typical Performance at 25° C (Vc = 5.0V, Ic=115mA)

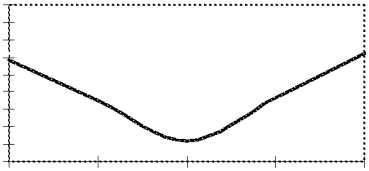


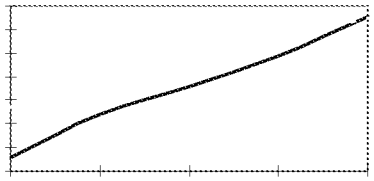
Output Third Order Intercept
Frequency = 1800-2000 MHz



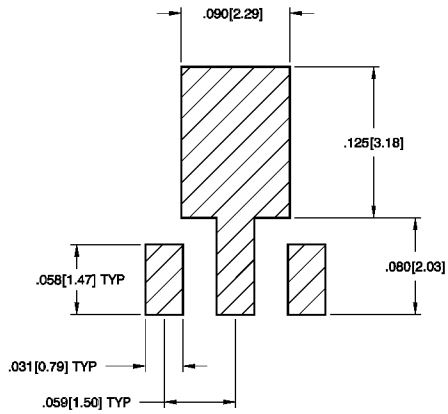


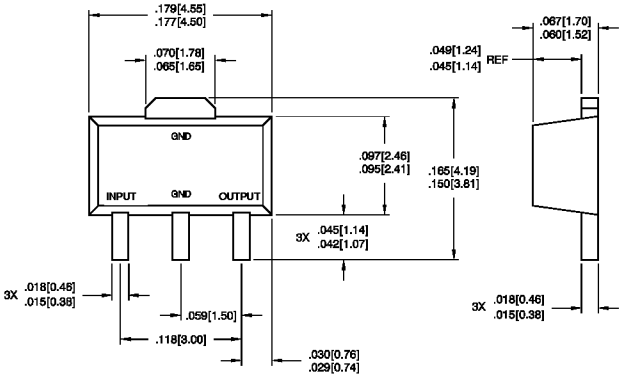






Outline Drawing

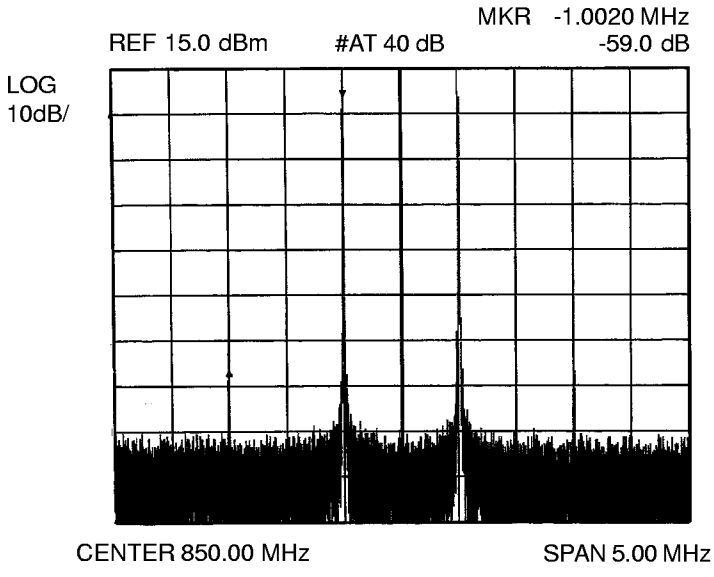




Pin assignments shown for reference only, not marked on part

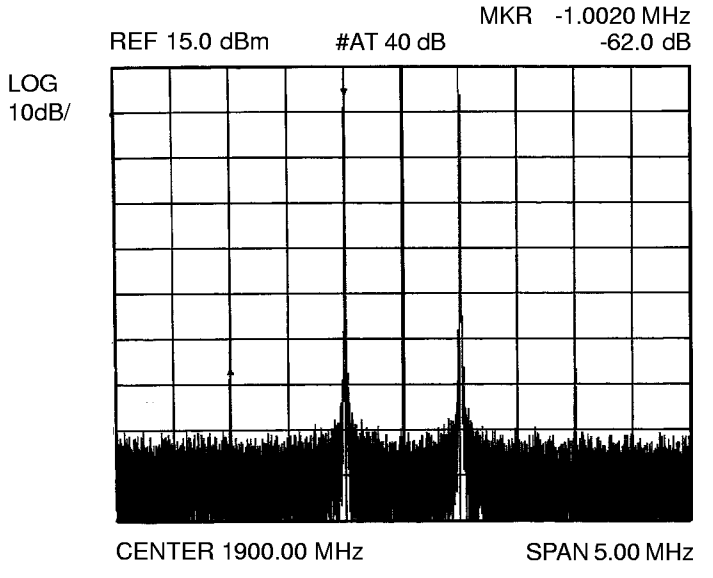
Typical Performance at 25° C (Vc = 5.0V, Ic=115mA)

Third Order Intercept Point Performance at 850 MHz



Tone Power= +11dBm, IP3 = +40.5dBm

Third Order Intercept Point Performance at 1900 MHz



Tone Power= +11dBm, IP3 = +42.0dBm

SXA-289 50-2000 MHz Power Amplifier

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 = 115mA typ.

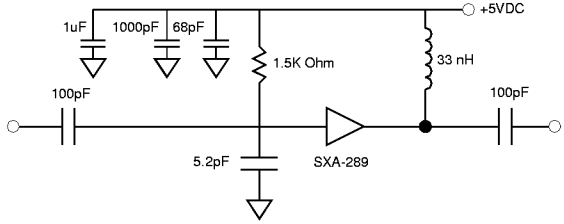
Lead Temperature	Junction Temperature	MTTF (hrs)
+25C	+90C	>10,000,000
+60C	+125C	>5,000,000
+85C	+150C	1,000,000

Thermal Resistance (Lead-Junction):
108°C/W at Tj= 150°C

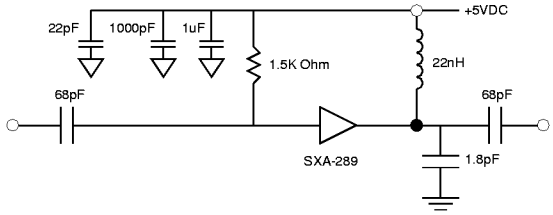
Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
SXA-289-TR1	500	7"
SXA-289-TR2	1000	13"
SXA-289-EB-9	Eval Board for 900 MHz	-
SXA-289-EB-19	Eval Board for 1900 MHz	-
SXA-289-EV-5	5 pc. Evaluation Development Kit	-

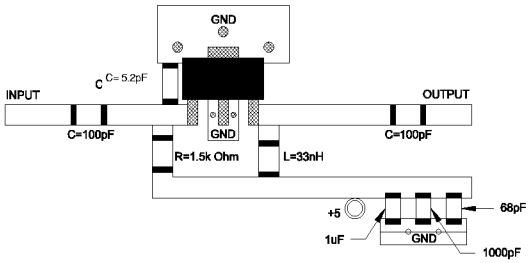
Application Schematic and Bias Circuit for 900 MHz Operation



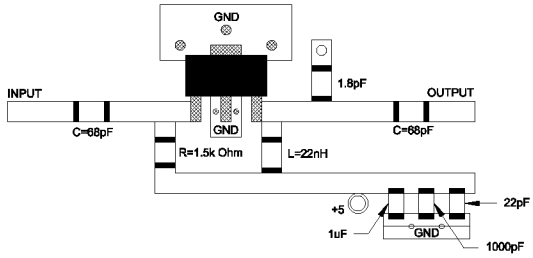
Application Schematic and Bias Circuit for 1900 MHz Operation



Board Layout and Matching Circuit at 900 MHz



Board Layout and Matching Circuit at 1900 MHz



Typical S-Parameters Vc = 5.0V, Ic = 115mA

Freq GHz	|S11|	S11 Ang	|S21|	S21 Ang	|S12|	S12 Ang	|S22|	S22 Ang
.050	0.412	-147	25.53	147	0.02	5	0.34	-136
.150	0.461	-166	20.49	138	0.02	2	0.30	-168
0.25	0.515	-173	17.42	124	0.02	1	0.29	-174
0.35	0.550	178	14.83	111	0.03	0	0.29	-178
0.45	0.570	171	12.79	100	0.03	0	0.28	-179
0.55	0.580	163	11.17	91	0.03	-3	0.28	178
0.65	0.580	156	9.95	83	0.03	-4	0.28	178
0.75	0.574	150	9.03	75	0.03	-7	0.28	178
0.85	0.562	143	8.35	68	0.03	-8	0.28	178
0.95	0.546	136	7.78	61	0.03	-10	0.28	178
1.05	0.521	129	7.33	53	0.03	-15	0.28	179
1.15	0.489	121	7.00	46	0.03	-19	0.29	-179
1.25	0.448	112	6.75	38	0.03	-24	0.29	-178
1.35	0.396	103	6.54	30	0.03	-31	0.30	-176
1.45	0.332	91	6.37	21	0.03	-39	0.32	-174
1.55	0.255	76	6.20	12	0.03	-48	0.35	-173
1.65	0.169	52	6.03	2	0.03	-60	0.38	-174
1.75	0.104	0.5	5.80	-10	0.03	-72	0.41	-175
1.85	0.143	-69	5.50	-21	0.03	-88	0.45	-178
1.95	0.250	-102	5.14	-33	0.03	-105	0.49	178
2.05	0.365	-122	4.68	-45	0.02	-125	0.51	173
2.15	0.471	-138	4.19	-57	0.02	-148	0.54	168
2.25	0.561	-152	3.70	-68	0.02	-172	0.55	162
2.35	0.631	-164	3.21	-78	0.02	164	0.55	157
2.45	0.685	-175	2.79	-87	0.02	143	0.55	153
2.55	0.726	174	2.40	-96	0.02	124	0.54	148