Product Description

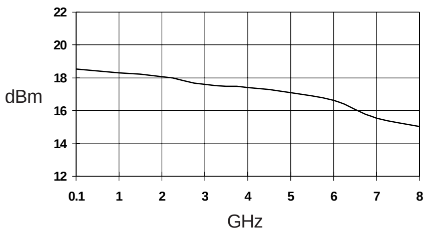
Stanford Microdevices' SNA-600 is a high-performance GaAs Heterojunction Bipolar Transistor (MMIC) in die form. A Darlington configuration is utilized for broadband performance to 6.5 GHz.

These unconditionally stable amplifiers provide 11dB of gain and +18dBm of P1dB when biased at 5.7V and 70mA. P1dB and TOIP may be improved by 2dB by biasing @ 100mA.

This MMIC requires only a single supply voltage. The use of an external resistor allows for bias flexibility and stability. Also available in packaged form (SNA-676, -686 & -687), its small size (0.4mm x 0.4mm) and gold metallization make it an ideal choice for use in hybrid circuits.

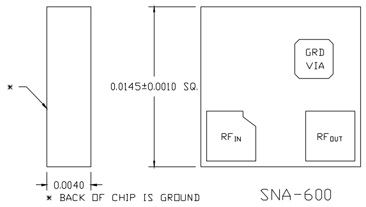
The SNA-600 is available in gel paks at 100 devices per container.

Output Power vs. Frequency



SNA-600

DC-6.5 GHz, Cascadable GaAs MMIC Amplifier



Product Features

- **Cascadable 50 Ohm Gain Block**
- **11dB Gain, +18dBm P1dB**
- **High Linearity, +36dBm TOIP Typ.**
- **1.5:1 Input and Output VSWR**
- **Chip Back Is Ground**

Applications

- **Narrow and Broadband Linear Amplifiers**
- **Commercial and Industrial Applications**

50 Ohm Gain Blocks

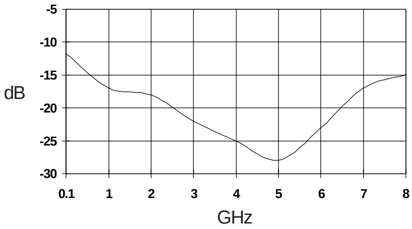
Electrical Specifications at Ta = 25C

Symbol	Parameters: Test Conditions: Id = 70mA, Z_0 = 50 Ohms		Units	Min.	Typ.	Max.
G_P	Small Signal Gain	f = 0.1-4.0 GHz f = 4.0-6.5 GHz	dB dB	9.0	11.0 9.0	
BW3dB	3dB Bandwidth		GHz		6.5	
P_{1dB}	Output Power at 1dB Compression	f = 0.1-2.0 GHz f = 2.0-6.5 GHz	dBm		18.0 16.0	
NF	Noise Figure	f = 0.1-4.0 GHz f = 4.0-6.5 GHz	dB		7.5 8.5	
VSWR	Input / Output	f = 0.1-6.5 GHz			1.5:1	
IP_3	Third Order Intercept Point	f = 0.1-2.0 GHz f = 2.0-6.5 GHz	dBm dBm		36.0 34.0	
T_D	Group Delay	f = 2.0 GHz	psec		120	
ISOL	Reverse Isolation	f = 0.1-6.5 GHz	dB		17.0	
VD	Device Voltage		V	4.8	5.7	6.8
dG/dT	Device Gain Temperature Coefficient		dB/degC		-0.0023	
dV/dT	Device Voltage Temperature Coefficient		mV/degC		-5.0	

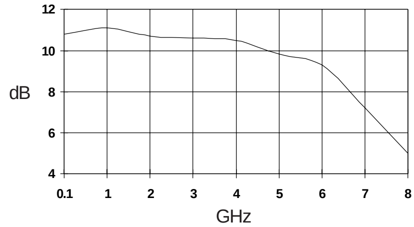
SNA-600 DC-6.5 GHz Cascadable MMIC Amplifier

Typical Performance at 25° C (Vds = 5.7V, Ids = 70mA)

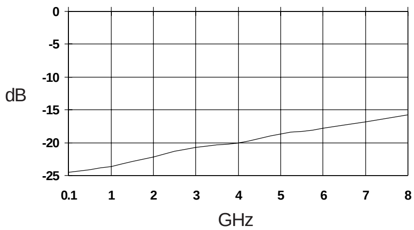
|S11| vs. Frequency



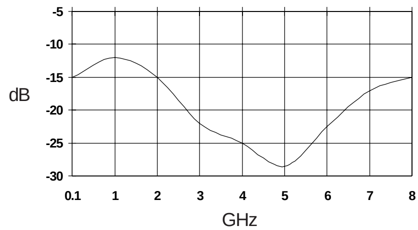
|S21| vs. Frequency



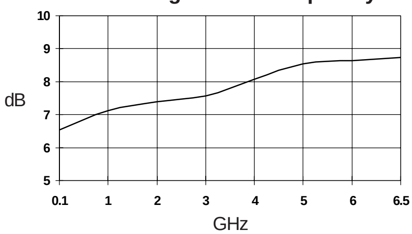
|S12| vs. Frequency



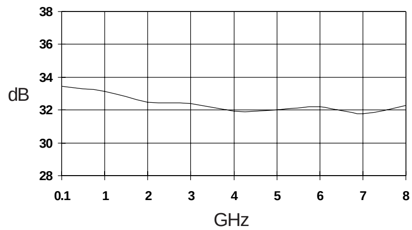
|S22| vs. Frequency



Noise Figure vs. Frequency



TOIP vs. Frequency



STANFORD MICRODEVICES

SNA-600 DC-6.5 GHz Cascadable MMIC Amplifier

Absolute Maximum Ratings

Parameter	Absolute Maximum
Device Current	150mA
Power Dissipation	1000mW
RF Input Power	200mW
Junction Temperature	+200C
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.

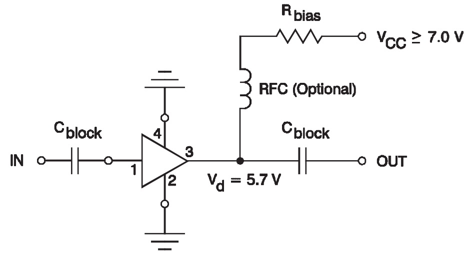
MTTF vs. Temperature @ Id = 70mA

Die Bottom Temperature	Junction Temperature	MTTF (hrs)
+75C	+155C	1000000
+110C	+190C	100000
+140C	+220C	10000

Thermal Resistance (Lead-Junction): 200° C/W

Part Number Ordering Information

Part Number	Devices Per Pak
SNA-600	100



Typical Biasing Configuration

Die Attach

The die attach process mechanically attaches the die to the circuit substrate. In addition, it electrically connects the ground to the trace on which the die is mounted and establishes the thermal path by which heat can leave the die.

Assembly Techniques

Epoxy die attach is recommended. The top and bottom metallization is gold. Conductive silver-filled epoxies are recommended. This method involves the use of epoxy to form a joint between the backside gold of the chip and the metallized area of the substrate. A 150 C cure for 1 hour is necessary. Recommended epoxy is Ablebond 84-1LMIT1 from Ablestik.

Wire Bonding

Electrical connections to the die are through wire bonds. Stanford Microdevices recommends wedge bonding or ball bonding to the pads of these devices.

Recommended Wedge Bonding Procedure

1. Set the heater block temperature to 260C +/- 10C.
2. Use pre-stressed (annealed) gold wire between 0.0005 to 0.001 inches in diameter.
3. Tip bonding pressure should be between 15 and 20 grams and should not exceed 20 grams. The footprint that the wedge leaves on the gold wire should be between 1.5 and 2.5 wire diameters across for a good bond.