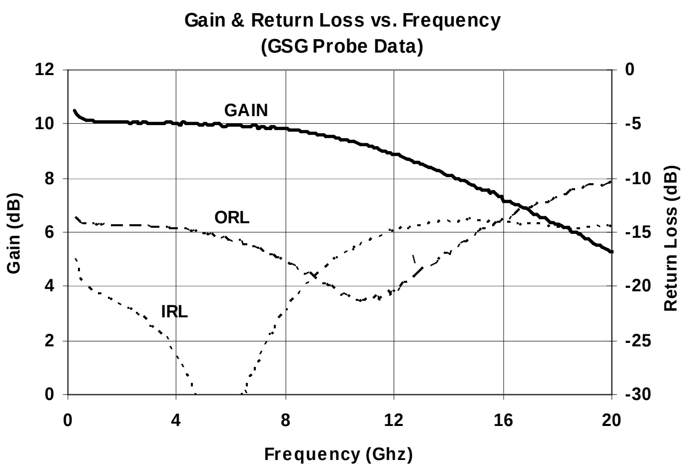
SUF-3000

0.25-16 GHz, Cascadable pHEMT MMIC Amplifier

Product Description

Sirenza Microdevices' SUF-3000 is a monolithically matched broadband high IP3 gain block covering 0.25-16 GHz. This pHEMT FET-based amplifier uses a patented self-bias Darlington topology featuring a gain and temperature compensating active bias network that operates from a single 5V supply. It offers efficient, cascadable performance in a compact 0.88 x 0.80 mm^2 die. It is well-suited for RF, LO, and IF driver applications.



Product Features

- Broadband Performance
- Gain = 10 dB @ 6 GHz
- P1dB = 15.5 dBm @ 6 GHz
- Low-noise, Efficient Gain Block
- 5V Operation, No Dropping Resistor
- Low Gain Variation vs. Temperature
- Patented Thermal Design
- Patented Self-Bias Darlington Circuit

Applications

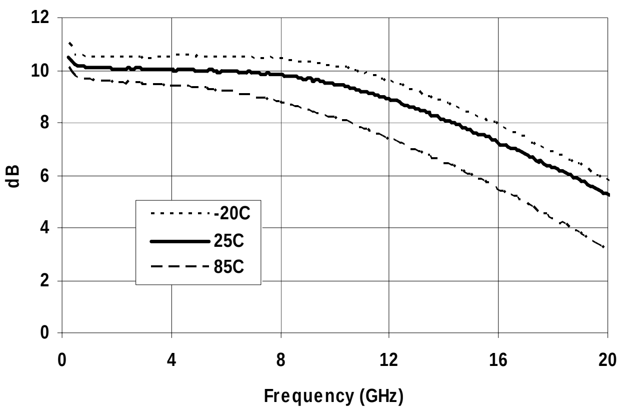
- Broadband Communications
- Test Instrumentation
- Military & Space
- LO and IF Mixer Applications
- High IP3 RF Driver Applications

Symbol	Parameters	Units	Frequency	Min.	Typ.	Max.
G_p	Small Signal Power Gain	dB	2 GHz 6 GHz 14 GHz		10.0 10.0 8.0	
P1dB	Output Power at 1dB Compression	dBm	2 GHz 6 GHz 14 GHz		16.0 15.5 13.5	
OIP3	Output Third Order Intercept Point	dBm	2 GHz 6 GHz 14 GHz		27.0 26.5 19.5	
NF	Noise Figure	dB	2 GHz 6 GHz 14 GHz		4.2 4.8 5.0	
IRL	Input Return Loss	dB	2 GHz 6 GHz 14 GHz		-22.5 -32.5 14.0	
ORL	Output Return Loss	dB	2 GHz 6 GHz 14 GHz		-15.0 -16.5 -17.0	
Isol	Reverse Isolation	dB	2 GHz 6 GHz 14 GHz		-15.5 -15.0 -15.0	
V_D	Device Operating Voltage	V			5.0	
I_D	Device Operating Current	mA			51	
$\Delta G/\Delta T$	Device Gain Temperature Coefficient	dB/°C			-0.01	
Rth, j-l	Thermal Resistance (junction-to-backside)	°C/W			224	

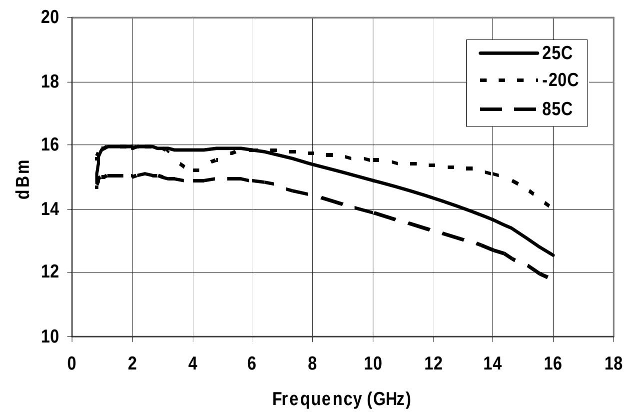
Test Conditions: V_D = 5.0V, I_D = 51mA, OIP3 Tone Spacing = 1MHz, Pout per tone = 0 dBm
$Z_S = Z_L$ = 50 Ohms, 25C, GSG Probe Data With Bias Tees

Typical Performance (GSG Probe Data)

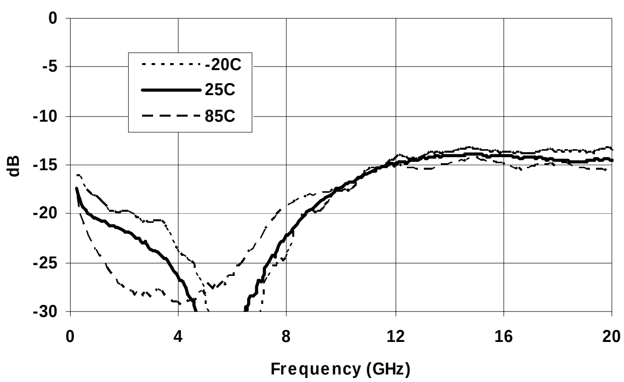
S21 vs. Frequency



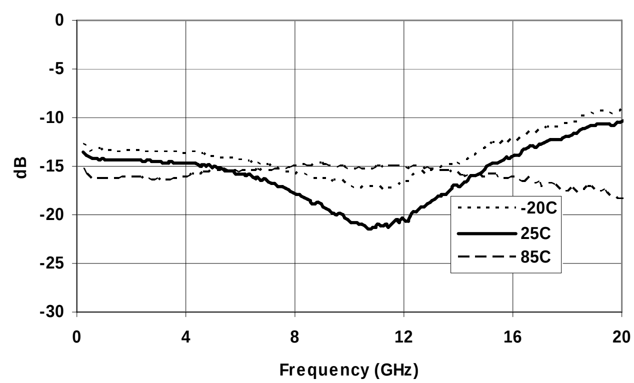
P1dB vs. Frequency



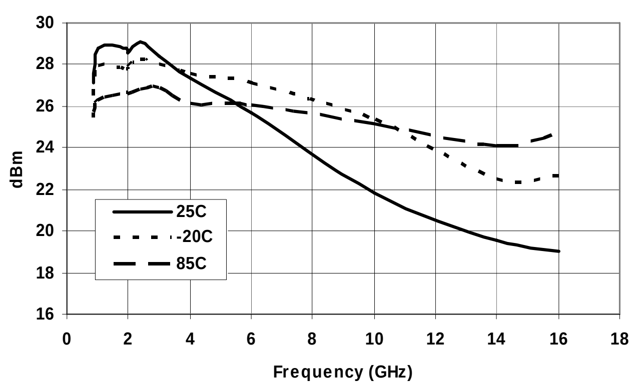
S11 vs. Frequency



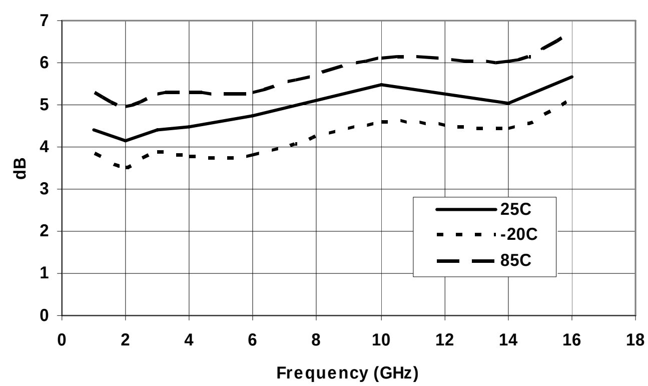
S22 vs. Frequency



OIP3 vs. Frequency



Noise Figure vs. Frequency



Typical Performance (GSG Probe Data)

Freq (GHz)	V_D (V)	Current (mA)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	S11 (dB)	S22 (dB)	NF (dB)
0.25	5	51	10.5			-17.5	-13.5	
0.5	5	51	10.0			-19.0	-14.0	
0.85	5	51	10.0	15.5	25.5	-21.0	-15.0	4.4
2	5	51	10.0	16.0	27.0	-22.0	-15.0	4.2
4	5	51	10.0	16.0	27.5	-27.0	-15.0	4.5
6	5	51	10.0	15.5	26.5	-32.0	-16.0	4.8
10	5	51	9.5	15.0	24.5	-17.0	-21.0	5.5
14	5	51	8.0	13.5	22.5	-14.0	-17.0	5.0
16	5	51	7.0	13.0	22.0	-14.5	-13.5	5.7
Test Conditions:	GSG Probe Data With Bias Tees, OIP_3 Tone Spacing = 1MHz, Pout per tone = 0 dBm, 25°C							

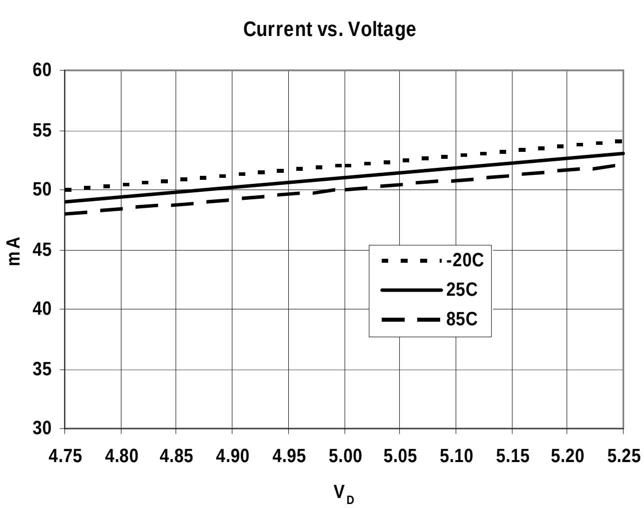
Parameter	Absolute Limit
Max Device Current (I_D)	60mA
Max Device Voltage (V_D)	5.5V
Max RF Input Power	10dBm
Max Dissipated Power	330mW
Max Junction Temperature (T_J)	150C
Operating Temperature Range (T_L)	-40 to +85C
Max Storage Temp.	-65 to +150C

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

Bias Conditions should also satisfy the following expression:

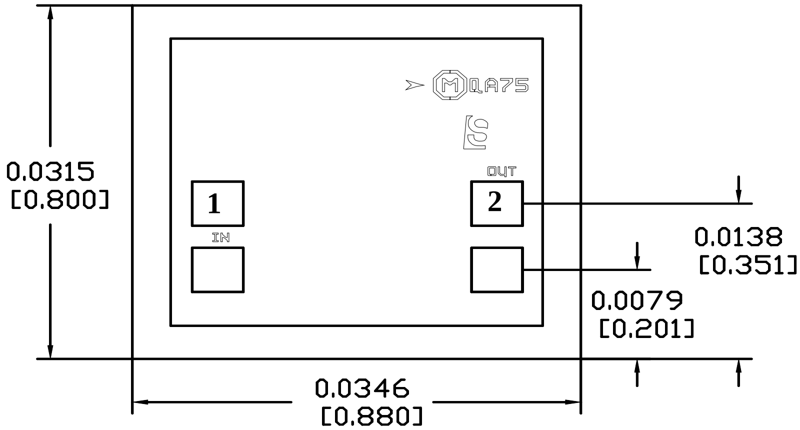
$I_D V_D < (T_J - T_L) / R_{TH}$, j-l T_L=Backside of die

Current Variation vs. Temperature



ELECTROSTATIC SENSITIVE DEVICE
Appropriate precautions in handling, packaging and testing devices must be observed.

Pad Description



Pad #	Function	Description
1	RF_{IN}	This pad is DC coupled and matched to 50 Ohms. An external DC block is required.
2	RF_{OUT} / Bias	This pad is DC coupled and matched to 50 Ohms. Bias is applied through this pad.
Die Bottom	GND	Die bottom must be connected to RF/DC ground using silver-filled conductive epoxy.

Notes:
1. All Dimensions in Inches [Millimeters].
2. No connection required for unlabeled bond pads.
3. Die Thickness is 0.004 (0.100).
4. Typical bond pad is 0.004 (0.100) square.
5. Backside metalization: Gold.
6. Backside is Ground.
7. Bond pad metalization: Gold.

Device Assembly