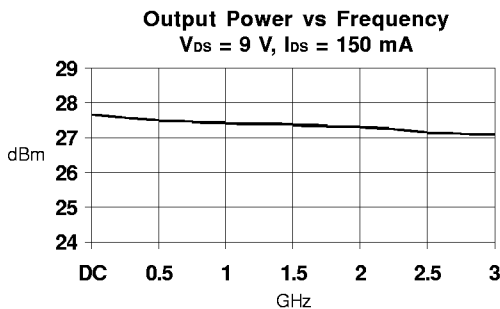


Product Description

Stanford Microdevices' SHF-0189 is a high performance AlGaAs/GaAs Heterostructure FET housed in a low-cost surface-mount SOT-89 plastic package. HFET technology improves breakdown voltage while minimizing Schottky leakage current for higher power-added efficiency and improved linearity.

Output power at 1dB compression for the SHF-0189 is +27dBm when biased for Class A operation at 9V and 150mA. This HFET is also characterized at 5V for lower voltage applications. This device can be used in both analog and digital wireless communication infrastructure and subscriber equipment including cellular PCS, CDPD, wireless data and pagers.

These SOT-89 packages are available on tape and reel for high-volume, automated assembly formats.



Electrical Specifications at Ta = 25C

Symbol	Parameters & Test Conditions: Z _o = 50 ohms, V _{ds} = +9V at 150 mA	Units	Min.	Typ.	Max.	
G _p	Power Gain	f = 0.9 GHz	dB	15	17	
		f = 1.9 GHz	dB	12	14	
		f = 2.5 GHz	dB		12	
P _{1dB}	Output Power at 1dB Compression	f = 0.9 GHz	dBm	26.5	27.5	
		f = 1.9 GHz	dBm	26.3	27.3	
		f = 2.5 GHz	dBm		27.0	
IP ₃	Output Third Order Intercept Point	f = 0.9 GHz	dBm		38	
		f = 1.9 GHz	dBm		38	
		f = 2.5 GHz	dBm		37	
NF _{opt}	Noise Figure	f = 0.9 GHz	dB		1.8	
		f = 1.9 GHz	dB		2.2	
		f = 2.5 GHz	dB		2.5	
I _{DSS}	Saturated Drain Current: V _{ds} = 3V, V _{gs} = 0V	mA		300		
G _m	Transconductance: V _{ds} = 3V, V _{gs} = 0V	mS		175		
V _p	Pinch-off Voltage: V _{ds} = 3V, I _{ds} = 1 mA	V		-2.2		
V _{BGS}	Gate-to-Source Breakdown Voltage	V		-2.0	-1.2	
V _{BGD}	Gate-to-Drain Breakdown Voltage	V		-2.0	-1.2	

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SHF-0189

DC-3 GHz, 0.5 Watt AlGaAs/GaAs HFET



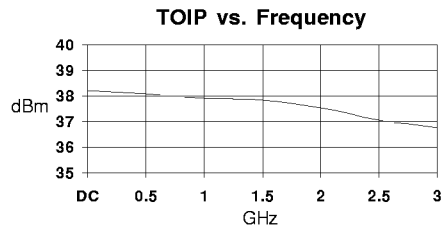
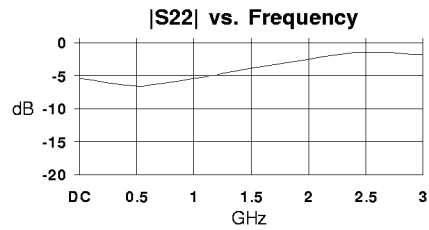
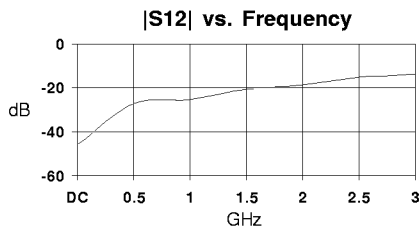
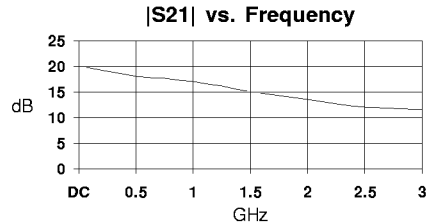
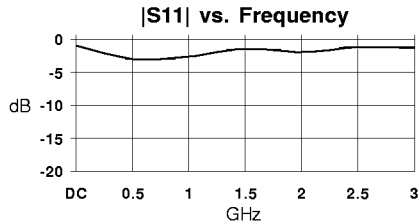
Product Features

- Patented AlGaAs/GaAs Heterostructure FET Technology
- +27dBm Output Power at 1dB Compression
- +38dBm Output IP3
- High Power Added Efficiency - up to 40% at Class A
- 17dB Gain @ 900 MHz, 14dB Gain @ 1.9GHz

Applications

- Analog/Digital Wireless Communications
- PCS, Pagers and CDPD Equipment

HIGH POWER GaAs FETs

SHF-0189 DC-3 GHz 0.5 Watt HFET
Typical Performance at 25°C ($V_{ds} = 9V, I_{ds} = 150mA$)

High Power GaAs FETs
Typical S-Parameters $V_{ds} = 9.0V, I_{ds} = 150mA$

Freq GHz	S11	S11 Ang	S21	S21 Ang	S12	S12 Ang	S22	S22 Ang
.100	0.893	-11	11.81	177	.004	88	.538	-4
.500	0.926	-66	10.84	151	.023	70	.527	-24
1.00	0.885	-99	9.45	123	.036	62	.476	-49
2.00	0.809	-135	7.93	96	.042	47	.465	-71
3.00	0.812	-169	5.68	72	.050	45	.491	-106

(S-Parameters include the effects of two 1.0 mil diameter bond wires, each 30 mils long, connected to the gate and drain pads on the die)

SHF-0189 DC-3 GHz 0.5 Watt HFET

Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum
Drain-to-Source Voltage	V_{DS}	+12V
Gate-to-Source Voltage	V_{GS}	-12V
Drain Current	I_{DSs}	IDSS
Operating Temperature	T_{OP}	-45C to +85C
RF Input Power	P_{IN}	200mW
Channel Temperature	T_{CH}	+175C
Storage Temperature	T_{STG}	-65C to +175C
Thermal Resistance, Junction-Ground Lead	R_{th}	66 Deg C/W

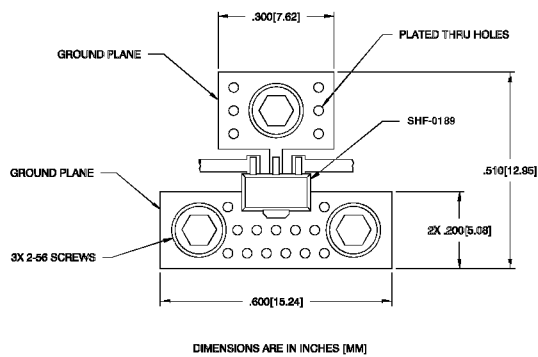
Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- Mounting Surface Temperature = 25° C

Mounting Instructions

The data shown was taken on a 31 mil thick FR-4 board with 1 ounce of copper on both sides. The board was mounted to a baseplate with 3 screws as shown. The screws bring the top side copper temperature to the same value as the baseplate.

- Use 1 or 2 ounce copper, if possible.
- Solder the copper pad on the backside of the device package to the ground plane.
- Use a large ground pad area with many plated through-holes as shown.
- If possible, use at least one screw no more than 0.2 inch from the device package to provide a low thermal resistance path to the baseplate of the package.
- Thermal resistance from ground lead to screws is 2 deg. C/W.



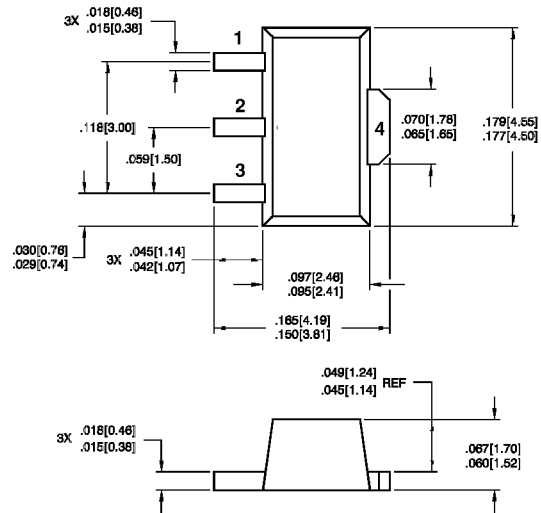
Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
SHF-0189-TR1	1000	13"
SHF-0189-TR2	2500	13"

Pin Designation

1	Gate
2	Source
3	Drain
4	Source

Outline Drawing



DIMENSIONS ARE IN INCHES [MM]

Pin assignments shown for reference only, not marked on part

HIGH POWER GaAs FETs