

SPF-684, -884
2-12 GHz Low Noise
PHEMT GaAs FET
August, 1993

Features

- Pseudomorphic HEMT Technology
- Low Noise Figure: 0.5dB Typical at 4 GHz
- High Associated Gain: 15dB Typical at 4 GHz
- Low Cost Plastic Package
- Tape and Reel Packaging Available

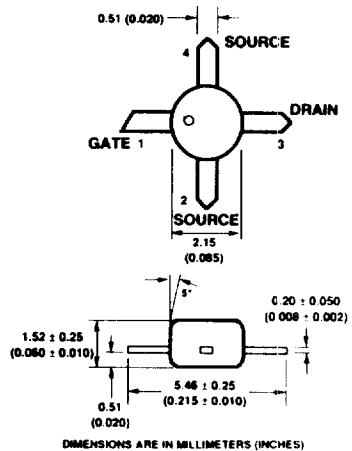
84 Plastic Package

Description

Stanford Microdevices' SPF-684 and -884 are high performance PHEMT gallium arsenide field effect transistors housed in low-cost plastic packages. Differentiated by noise performance, these devices are ideal for use as the first or second stage of low noise cascades operating in the 2-12 GHz frequency range.

This device has a 0.3 micron gate length with a total gate periphery of 200 microns. These rugged devices have gold metallization and nitride passivation. Stanford's proprietary low-loss, low-dielectric constant plastic compound minimizes losses and noise contribution associated with most plastic compounds.

The SPF series of plastic PHEMT FET's are available in tape and reel form and in different package styles.



Electrical Specifications at Ta = 25c

Symbol	Parameters: Test Conditions	Model	Units	Min	Typ	Max
NF Opt	Optimum Noise Figure: Vds = 3.0 V, Ids = 20 mA	f = 4.0 GHz	SPF-684	dB	0.7	1.0
		f = 12.0 GHz		dB	1.5	
NF Opt	Optimum Noise Figure: Vds = 3.0 V, Ids = 20 mA	f = 4.0 GHz	SPF-884	dB	0.5	0.7
		f = 12.0 GHz		dB	1.2	
Ga	Gain at NF Opt : Vds = 3.0 V, Ids = 20 mA	f = 4.0 GHz		dB	13	15
		f = 12.0 GHz		dB	9	
P1dB	Output Power at 1dB Gain Compression: Vds = 3.0 V, Ids = 20 mA	f = 4.0 GHz		dBm	12	
G1dB	1dB Compressed Gain: Vds = 3.0 V, Ids = 20 mA	f = 4.0 GHz		dB	15	
Idss	Saturated Drain Current: Vds=3.0V, Vgs=0V		mA	8	35	70
Gm	Transconductance: Vds=3.0V, Vgs=0V		mmho	25	50	
Vp	Pinch-off Voltage: Vds=3.0V, Ids=1mA		V		-1.5	-4.0
Vbgs	Gate-to-Source Breakdown Voltage		V		-6.0	
Vbgd	Gate-to-Drain Breakdown Voltage		V		-6.0	

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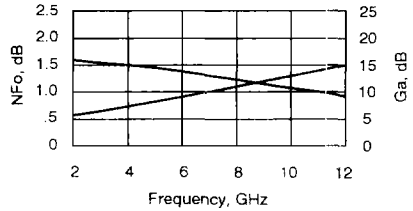
Noise Parameters

(Vds=3.0V, Id=20mA)

Freq GHz	NFo (dB)		Gamma Opt		Rn/50
	-684	-884	Mag	Ang	
2.0	0.5	0.4	0.85	24	1.2
4.0	0.7	0.5	0.75	50	1.0
6.0	0.9	0.6	0.66	76	0.8
8.0	1.1	0.8	0.60	88	0.7
10.0	1.3	1.0	0.55	109	0.6
12.0	1.5	1.2	0.50	130	0.5

Noise Figure and Associated
Gain Vs. Frequency

Vds=3.0V, Ids=20mA

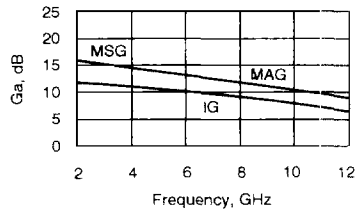


Absolute Maximum Ratings

Parameter	Absolute Max
Drain-Source Voltage (Vds)	+6V
Gate-Source Voltage (Vgs)	-5V
Drain Current (Ids)	Idss
RF Input Power (Pin)	180mW
Channel Temperature (Tch)	175c
Storage Temperature (Tst)	-65c to +175c

Maximum Stable Gain, Maximum Available
Gain and Insertion Gain vs. Frequency

Vds=3.0V, Ids=20mA



S PARAMETERS

(Vds=3.0V, Id=20mA)

Freq GHz	S 11		S 21		S 12		S 22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
2.0	0.99	-40	3.98	150	0.03	57	0.81	-34
3.0	0.98	-58	3.76	132	0.05	46	0.77	-48
4.0	0.97	-74	3.55	116	0.07	37	0.73	-60
5.0	0.92	-88	3.35	102	0.09	28	0.70	-72
6.0	0.91	-102	3.16	88	0.11	20	0.68	-82
7.0	0.89	-117	2.99	74	0.12	11	0.65	-93
8.0	0.86	-132	2.82	59	0.12	2	0.62	-103
9.0	0.83	-147	2.60	44	0.13	-7	0.58	-114
10.0	0.79	-163	2.37	30	0.13	-15	0.55	-130
11.0	0.77	-178	2.18	16	0.14	-23	0.52	-142
12.0	0.75	167	2.00	2	0.14	-31	0.49	-155