Low Noise GaAs FETs

July 2006 - Rev 31-Jul-06

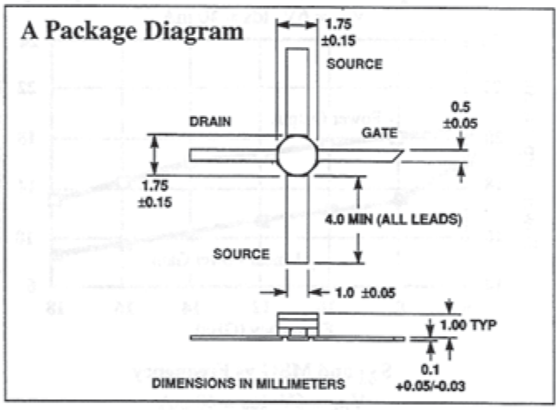
CFA0103

Features

- High Gain
- Super Low Noise
- Pseudomorphic HEMT
- 70 Mil Hermetic Package

Applications

- Satellite Receivers
- Point-to-Point Radio Receivers
- Commercial Communications
- Defense Electronics


A Package Diagram

General Description

The CFA0103-L series is a family of low noise, high-gain FETs intended for satellite and point-to-point radio receiver applications. This family of devices is assembled in an industry standard 70 mil hermetic package. This family of high reliability devices is ideally suited for operation-critical applications where reliability and performance are required.

Typical Noise Parameters

(Vds = 3V, Ids = 15 mA)

Freq (GHz)	NF_{opt}	G_A (dB)	Gamma Opt Mag	Gamma Opt Ang	Rn/50
2.0	0.39	23.6	0.87	36	0.42
4.0	0.47	18.3	0.77	71	0.34
6.0	0.57	15.2	0.69	100	0.27
8.0	0.69	13.0	0.63	124	0.22
10.0	0.84	11.5	0.58	147	0.18
12.0	1.00	10.6	0.53	171	0.16
14.0	1.18	10.1	0.49	-163	0.15
16.0	1.38	9.9	0.46	-132	0.16
18.0	1.60	9.8	0.42	-94	0.18

Absolute Maximum Ratings

Drain-Source Voltage (Vds)	8 V
Gate-Source Voltage (Vgs)	-5 V
Drain Current (Ids)	Idss
Continuous Dissipation (Pt)	800 mW
RF Power In (Pin)	+17 dBm
Channel Temperature (Tch)	175 ºC
Storage Temperature (Tstg)	-65 ºC to +175 ºC

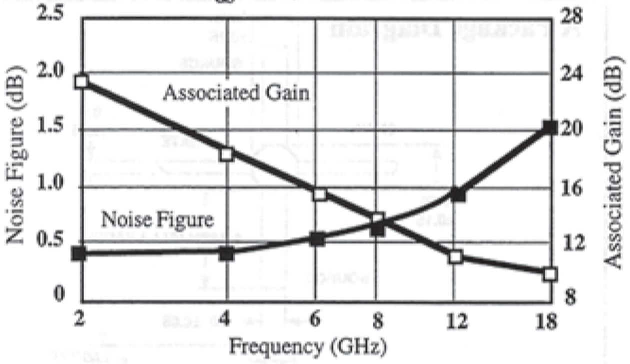
Electrical Characteristics (Ambient Temperature T = 25 ºC)

Parameter	Bias Vds (V)	Bias Ids (mA)	Frequency (GHz)	Units	Grade	Min	Typ	Max
NFopt	3.0	15.0	12.0	dB	L1	-	0.7	0.8
					L2	-	0.9	1.0
					L3	-	0.9	1.2
Ga	3.0	15.0	12.0	dB	L1	10.0	11.0	-
					L2	10.0	11.0	-
					L3	8.0	9.0	-
$\lvert S_{21}\rvert^2$	3.0	15.0	2.0	dB			13.0	
			10.0	dB			9.6	
			18.0	dB			7.2	
P1dB	6.0	40.0	12.0	dBm			19.0	
gm	Vds = 3.0V	Vgs = V		mS			90.0	
Idss	Vds = 3.0V	Vgs = 0V		mA		30.0	60.0	120.0
Vp	Vds = 3.0V	Ids = 1 mA		Volts		-0.5	-1.3	-2.5
BVgd	Igd = 100 uA			Volts		-5.5	-8.0	
Rth				ºC/W			250	

Typical Performance (TA = 25°C)

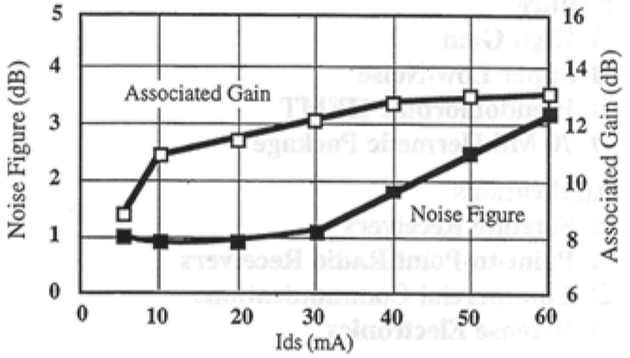
Noise Figure and Associated Gain vs Frequency

V_{ds} = 3V, Ids = 15 mA



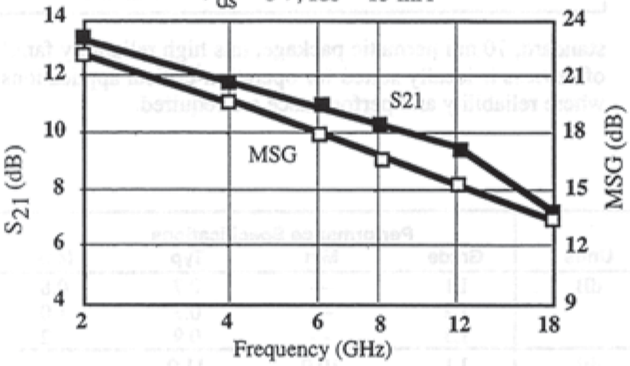
Noise Figure and Associated Gain vs Ids

V_{ds} = 3V, Frequency = 12 GHz



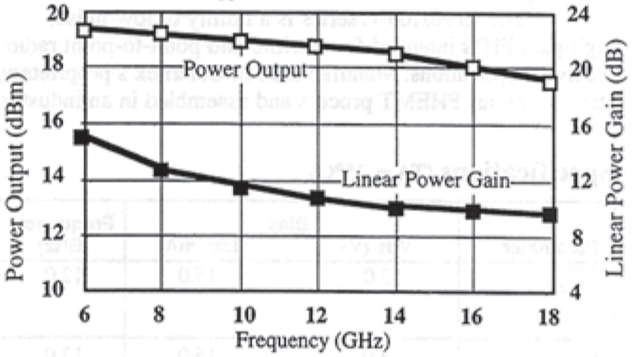
S_{21} and MSG vs Frequency

V_{ds} = 3V, Ids = 15 mA



Power Output and Linear Power Gain vs Frequency

V_{ds} = 6V, Ids = 40 mA



Typical Scattering Parameters (TA = 25°C, Vds = 3V, Ids = 15mA)

Frequency	S11		S21			S12			S22		MSG
(GHz)	(Mag)	(Ang)	(dB)	(Mag)	(Ang)	(dB)	(Mag)	(Ang)	(Mag)	(Ang)	(dB)
2.0	0.97	-32	13.5	4.73	149	-31.1	0.03	69	0.56	-22	22.3
4.0	0.88	-69	11.9	3.94	113	-25.8	0.05	45	0.55	-50	18.9
6.0	0.79	-96	10.7	3.43	84	-23.6	0.07	27	0.54	-70	17.1
8.0	0.66	-129	10.6	3.39	55	-21.4	0.08	10	0.46	-84	16.3
10.0	0.59	-170	9.6	3.02	22	-21.6	0.09	-13	0.36	-121	15.5
12.0	0.57	162	9.0	2.82	-4	-21.0	0.08	-21	0.42	-138	15.3
14.0	0.57	123	8.5	2.66	-35	-21.0	0.09	-40	0.35	-166	14.8
16.0	0.57	104	7.7	2.43	-66	-20.9	0.09	-56	0.47	151	14.3
18.0	0.51	80	7.2	2.29	-100	-21.3	0.09	-79	0.59	128	14.3