GaAs MESFET Transistor

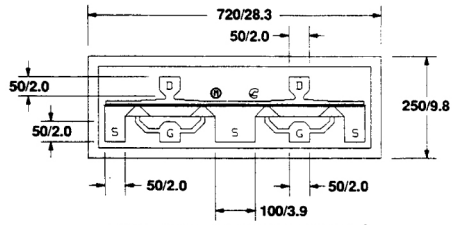
July 2008 - Rev 15-Jul-08

CF003-01

Features

- High Gain: 8 dB at 12 GHz
- P1dB Power: 22 dBm
- Wafer Qualification Procedure
- Customer Wafer Selection Available

Chip Outline Drawing



CF003 CHIP (UNITS IN MICRONS/MILS)
THICKNESS: 110 MICRONS/4.3 MILS

Absolute Maximum Ratings

Parameter	Symbol	Ratings
Drain-Source Voltage	V_{DS}	8V
Gate-Source Voltage	V_{GS}	-5V
Drain Current	I_{DS}	I_{DSS}
Continuous Dissipation	P_T	1600 mW
Channel Temperature	T_{CH}	175°C
Storage Temperature	T_{STG}	-65°C to +175°C

General Description

Mimix CF003-01 GaAs-based transistor is a 600 um gate width, sub-half-micron gate length GaAs device with Silicon Nitride passivation. The CF003-01 provides high gain and medium output power up to 26 GHz. It is suitable for general purpose and driver amplifier applications with up to +22 dBm power from a single FET. The CF003-01 is available in chip form and is suitable for airborne, shipboard and ground-based equipment. The devices are 100% DC tested and every wafer is qualified based on sample RF and reliability testing. Screening includes MIL-STD-750 Class B, Class S and commercial screening. These devices are also available in packaged form. Please consult the CFB0301-B, CFA0301-A datasheets or contact the factory for further information.

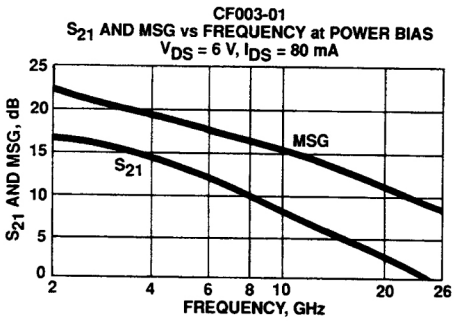
Specifications (T_A = 25°C) — CF003-01

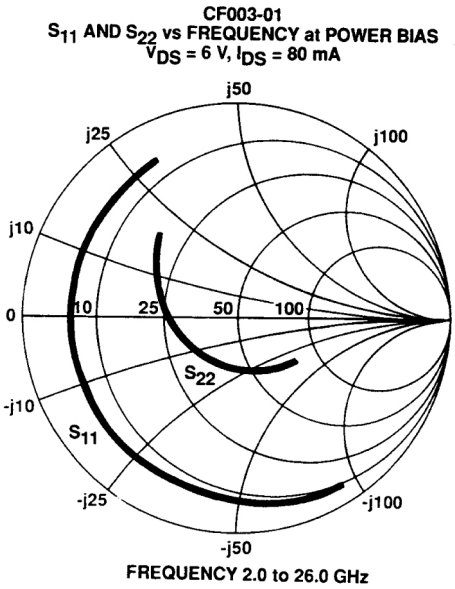
Active Layer				Ion Implanted		
Symbol	Parameters and Conditions	Frequency (GHz)	Units	Min	Typ	Max
NF_{opt}	Optimum Noise Figure V_{DS} = 3.0 V, I_{DS} = 30 mA	12.0	dB		1.8	2.6
Ga	Gain at NF_{opt} V_{DS} = 3.0 V, I_{DS} = 30 mA	12.0	dB	7.0	8.0	
$\|S_{21}\|^2$	50 Ohm Insertion Gain V_{DS} = 6.0 V, I_{DS} = 80 mA	2.0 10.0 18.0	dB dB dB		16.0 7.0 3.0	
P_{1dB}	Power Output @ 1 dB GC V_{DS} = 6.0 V, I_{DS} = 80 mA	12.0	dBm		22.0	
g_m	Transconductance V_{DS} = 3.0 V, V_{GS} = 0 V		mS		120	
I_{DSS}	Drain Current V_{DS} = 3.0 V, V_{GS} = 0 V		mA	120	180	240
V_P	Pinchoff Voltage V_{DS} = 3.0 V, I_{DS} = 1 mA		Volts	-0.7	-1.3	-2.5
BV_{GD}	Breakdown Voltage, Gate-Drain I_{GD} = 100 µA		Volts	-5.5	-8.0	
R_{th}	Thermal Resistance		°C/W		80	

Mimix Broadband, Inc., 10795 Rockley Rd., Houston, Texas 77099
Tel: 281.988.4600 Fax: 281.988.4615 mimixbroadband.com

Characteristic Data and Specifications are subject to change without notice. ©2008 Mimix Broadband, Inc.
Export of this item may require appropriate export licensing from the U.S. Government. In purchasing these parts, U.S. Domestic customers accept their obligation to be compliant with U.S. Export Laws.

CF003-01



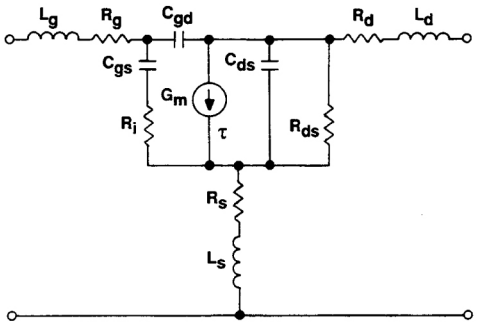


CF003-01 at Power Bias V_{DS} = 6 V, I_{DS} = 80 mA

Frequency	S_{11}		S_{21}			S_{12}			S_{22}		K	MSG
(GHz)	(Mag)	(Ang)	(dB)	(Mag)	(Ang)	(dB)	(Mag)	(Ang)	(Mag)	(Ang)		(dB)
2.0	0.91	-62	16.7	6.86	138	-28.6	0.04	59	0.23	-37	0.38	22.7
4.0	0.83	-108	14.1	5.10	107	-25.1	0.06	41	0.18	-74	0.53	19.6
6.0	0.80	-132	11.8	3.88	88	-24.0	0.06	33	0.17	-90	0.71	17.9
8.0	0.79	-155	9.6	3.01	71	-23.7	0.07	26	0.19	-120	0.88	16.6
10.0	0.78	-172	7.6	2.39	57	-24.1	0.06	24	0.23	-134	1.15	15.8
12.0	0.80	177	6.2	2.03	45	-23.3	0.07	21	0.27	-147	1.10	14.7
14.0	0.80	166	5.0	1.78	33	-23.2	0.07	17	0.31	-156	1.20	14.1
16.0	0.79	150	4.1	1.61	20	-22.1	0.08	14	0.33	-163	1.20	13.1
18.0	0.80	135	3.5	1.49	5	-21.3	0.09	9	0.32	179	1.18	12.4
20.0	0.81	126	2.3	1.31	-10	-20.4	0.10	2	0.36	153	1.19	11.3
22.0	0.87	117	1.1	1.14	-22	-19.6	0.11	-4	0.46	138	0.79	10.3
24.0	0.83	112	-0.7	0.93	-28	-18.9	0.11	-4	0.48	136	1.11	9.1
26.0	0.87	115	-1.4	0.85	-33	-18.1	0.13	-9	0.51	134	0.73	8.3

Device Model

Parameters	CF003-01 VDS = 6V, IDS = 80mA	CF003-03 VDS = 3V, IDS = 30mA	Units
L_g	0.21	0.20	nH
R_g	0.50	0.50	Ω
C_{gs}	0.71	0.55	pF
R_i	1.4	1.4	Ω
C_{gd}	0.053	0.068	pF
G_m	134	158	mS
τ	2.8	2.3	ps
C_{ds}	0.16	0.15	pF
R_{ds}	87	92	Ω
R_d	0.67	0.67	Ω
L_d	0.21	0.22	nH
R_s	0.53	0.80	Ω
L_s	0.4	0.05	nH



Wafer Qualification Procedure

- 100% DC Test, 100% Visual Insp.
- Sample Chip Performance Test — NF, Power, S-Parameters, IP3, Power Blast
- Sample Circuit Performance Tests 6-18 GHz Module — NF, Power, Gain, VSWR
- Reliability Assesment — Power Blast & Burn-In

80% of tested samples must meet specifications for wafer acceptance.

Characteristic Data and Specifications are subject to change without notice. ©2008 Mimix Broadband, Inc.
Export of this item may require appropriate export licensing from the U.S. Government. In purchasing these parts, U.S. Domestic customers accept their obligation to be compliant with U.S. Export Laws.

Handling and Assembly Information

CAUTION! - Mimix Broadband MMIC Products contain gallium arsenide (GaAs) which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- *Do not ingest.*
- *Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.*
- *Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.*

Life Support Policy - Mimix Broadband's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President and General Counsel of Mimix Broadband. As used herein: (1) Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ESD - Gallium Arsenide (GaAs) devices are susceptible to electrostatic and mechanical damage. Die are supplied in antistatic containers, which should be opened in cleanroom conditions at an appropriately grounded antistatic workstation. Devices need careful handling using correctly designed collets, vacuum pickups or, with care, sharp tweezers.

Die Attach: Conductive epoxy or preform die attach is recommended. For preform die attach: Preform: AuSn (80% Au, 20% Sn); Stage Temperature: 290 °C, +/-5 °C; Handling Tool: Tweezers; Time: 1 min or less.

Wire Bonding: Wire Size: 0.7 to 1.0 mil in diameter (pre-stressed); Thermocompression bonding is preferred over thermosonic bonding. For thermocompression bonding: Stage Temperature: 250 °C ; Bond Tip Temperature: 150 °C; Bonding Tip Pressure: 18 to 40 gms depending on size of wire.

RoHS Compliant Parts - All Mimix products are RoHS compliant unless otherwise specified.

Ordering Information

Part Number for Ordering	Description
CF003-01-000X	Where "X" is RoHS compliant die packed in "V" - vacuum release gel packs or W" - waffle trays



Caution: ESD Sensitive
Appropriate precautions in handling, packaging and testing devices must be observed.

Proper ESD procedures should be followed when handling this device.

Characteristic Data and Specifications are subject to change without notice. ©2008 Mimix Broadband, Inc.
Export of this item may require appropriate export licensing from the U.S. Government. In purchasing these parts, U.S. Domestic customers accept their obligation to be compliant with U.S. Export Laws.