CF007-01

Dual Gate GaAs FET Chip

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Preliminary Product Information
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Dual-Gate GaAs FET Chip

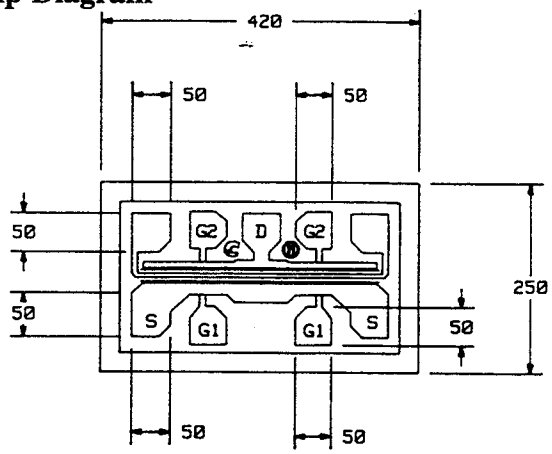
Features

- ❑ **Implanted Active Layer for Uniformity**
- ❑ **High Insertion Gain Useful to 20 GHz**
- ❑ **+16 dBm P1dB at 12 GHz**
- ❑ **Ti/Pt/Au Recessed Gates**
- ❑ **Silicon Nitride Passivation**
- ❑ **All Gold Metal System**

Description

The CF007-01 is a 300 micron gate width dual-gate GaAs FET with sub 0.5 micron recessed gates. It has high $|S_{21}|^2$ and moderate output power which makes it suitable for gain and driver stages for wideband amplifiers in the 2 to 20 GHz frequency range. It is also useful for AGC and mixer applications. The accessibility of the intermediate electrode is useful in some applications. Silicon nitride passivation provides surface stabilization.

Chip Diagram



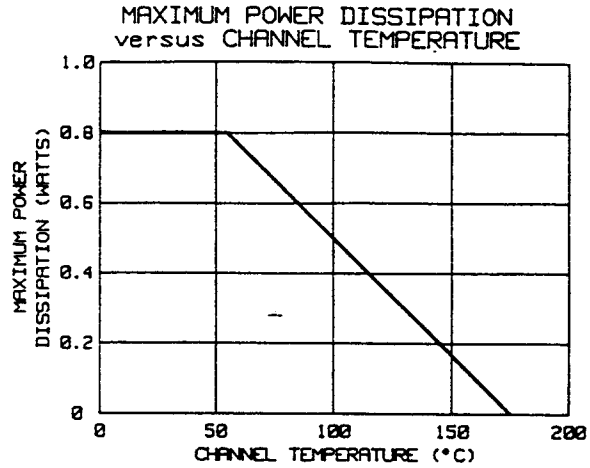
CF007 CHIP (Units in microns)
Thickness: 110 microns

ELECTRICAL SPECIFICATIONS, T_A = 25°C, V_{G2S} = 0V

SYMBOL	PARAMETERS AND CONDITIONS	FREQ	UNITS	MIN	TYP	MAX
NF_{opt}	Optimum Noise Figure at V_{DS}=4V, I_{DS}=25mA	12 GHz	dB		2.2	
G_a	Gain at NF_{opt} at V_{DS}=4V, I_{DS}=25mA	12 GHz	dB		12.0	
$\|S_{21}\|^2$	50 Ohm Insertion Gain at V_{DS}=5.5V, I_{DS}=40 mA	2 GHz	dB		11.5	
		10 GHz	dB		7.4	
		18 GHz	dB		8.8	
P_{1dB}	Power Output @ 1 dB Gain Compression at V_{DS}=5.5V, I_{DS}=40 mA	12 GHz	dBm		16.0	
g_m	Transconductance at V_{DS}=3V, V_{GS}=0V		mS		60	
I_{DSS}	Drain Current at V_{DS} = 3V, V_{GS} = 0V		mA	40	60	120
V_P	Pinchoff Voltage at V_{DS}=3V, I_{DS}=1 mA		V	-0.7	-1.3	-2.5
BV_{GD}	Breakdown Voltage, Gate-to-Drain at I_{GD} = 100 μA		V	-5.5	-8.0	
R_{th}	Thermal Resistance		°C/W		150	

Absolute Maximum Ratings

Parameter	Rating
Drain-Source Voltage, V_{dss}	8V
Gate-Source Voltage, V_{gs}	-5V
Drain Current, I_{ds}	I_{dss}
Continuous Power Dissipation, P_t	800 mW
Channel Temperature, T_{ch}	+175°C
Storage Temperature, T_{stg}	-65°C to +175°C



Typical Scattering Parameters, Common Source (S-Parameters including bonding wire parasitics)

Bias = 4.0 Volts, 25.0 mA, V_{G2S} = 0V

	S_{11}		S_{21}			S_{12}			S_{22}			MAG
GHz	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang	K	dB
2	0.960	-14	11.8	3.890	161	-43.0	0.007	86	0.836	-2	0.51	-
4	0.899	-34	11.9	3.936	139	-38.0	0.013	82	0.802	-12	0.74	-
6	0.847	-53	10.6	3.388	116	-37.6	0.013	84	0.795	-27	1.05	22.8
8	0.810	-59	8.9	2.786	102	-37.8	0.013	99	0.829	-35	1.23	20.5
10	0.768	-60	7.8	2.455	94	-36.9	0.014	120	0.842	-35	1.29	19.1
12	0.727	-61	7.6	2.399	87	-33.9	0.020	141	0.888	-30	0.55	-
14	0.659	-67	8.7	2.723	77	-31.0	0.028	142	0.872	-35	0.46	-
16	0.576	-89	9.5	2.985	54	-29.8	0.032	129	0.770	-55	1.08	17.9
18	0.613	-112	9.1	2.851	30	-27.8	0.040	123	0.903	-75	0.03	-
20	0.643	-117	8.3	2.600	11	-27.6	0.042	108	0.953	-99	-0.22	-
22	0.605	-128	7.7	2.427	-13	-24.8	0.058	78	0.866	-129	0.22	-
24	0.639	-139	5.3	1.841	-38	-21.5	0.084	53	0.901	-155	0.08	-
26	0.624	-129	2.1	1.274	-47	-21.8	0.081	15	0.765	-161	1.36	8.3

Bias = 5.5 Volts, 40.0 mA, V_{G2S} = 0V

	S_{11}		S_{21}			S_{12}			S_{22}			MAG
GHz	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang	K	dB
2	0.957	-16	11.5	3.758	159	-44.1	0.006	90	0.820	-2	0.62	-
4	0.896	-38	11.5	3.758	136	-38.8	0.011	89	0.790	-11	0.82	-
6	0.846	-58	10.2	3.236	113	-38.7	0.112	91	0.787	-25	1.25	21.4
8	0.810	-64	8.4	2.630	98	-37.9	0.013	111	0.825	-33	1.24	20.2
10	0.767	-66	7.4	2.344	89	-35.7	0.016	131	0.844	-33	1.07	19.9
12	0.729	-68	7.2	2.291	82	-32.8	0.023	148	0.896	-28	0.36	-
14	0.664	-76	8.3	2.600	71	-29.4	0.034	148	0.896	-31	0.19	-
16	0.602	-100	9.1	2.851	48	-28.5	0.038	135	0.797	-49	0.72	-
18	0.653	-121	8.8	2.754	24	-26.3	0.048	126	0.930	-69	-0.22	-
20	0.683	-125	8.2	2.570	5	-25.6	0.052	103	1.015	-92	-0.57	-
22	0.645	-135	7.8	2.455	-21	-23.1	0.070	77	0.937	-122	-0.13	-
24	0.669	-145	5.5	1.884	-48	-20.5	0.094	53	0.967	-149	-0.13	-
26	0.638	-133	2.1	1.274	-58	-20.7	0.092	17	0.802	-157	1.13	9.2

Specifications subject to change.

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