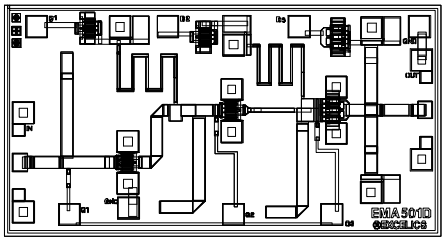
Excelics EMA501D

TENTATIVE DATA SHEET

36 - 40 GHz Medium Power MMIC

FEATURES

- **36 -40 GHz BANDWIDTH**
- **+21 dBm OUTPUT POWER @1dB Gain Compression**
- **23 dB TYPICAL POWER GAIN**
- **DUAL BIAS SUPPLY**
- **0.3 MICRON RECESSED "MUSHROOM" GATE**
- **Si_3N_4 PASSIVATION**
- **ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY**



Chip Size 1060 x 2000 microns
Chip Thickness: 75 ± 13 microns
All Dimensions In Microns

ELECTRICAL CHARACTERISTICS[1] (T_a = 25 ^{O}C)

SYMBOL	PARAMETERS/TEST CONDITIONS	MIN	TYP	MAX	UNIT
F	Operating Frequency Range	36		40	GHz
P_{1dB}	Ouput Power at 1dB Gain Compression @ Vdd=8V		21		dBm
Gss	Small Signal Gain		23		dB
ΔGss	Small Signal Gain Flatness		± 3		dB
NF	Noise Figure @ Vdd=3.5V, Id=100mA		6		dB
VSWR in	Input VSWR		3.0:1		
VSWR out	Output VSWR		3.0:1		
Idd	Power Supply Current		100		mA
Vdd	Power Supply Voltage		6	8	V

MAXIMUM RATINGS AT 25^{O}C

SYMBOLS	PARAMETERS	ABSOLUTE[1]	CONTINUOUS[2]
Vds	Drain-Source Voltage	12V	8V
Vgs	Gate-Source Voltage	-8V	-3V
Ids	Drain Current	Idss	150mA
Igf	Forward Gate Current	36 mA	6mA
Pin	Input Power	15dBm	@3dB Compression
Tch	Channel Temperature	175^{o}C	150^{o}C
Tstg	Storage Temperature	-65/175^{o}C	-65/150^{o}C
Pt	Total Power Dissipation	0.7 W	0.6 W

Note: 1. Exceeding any of the above ratings may result in permanent damage.
2. Exceeding any of the above ratings may reduce MTTF below design goals.

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S-PARAMETERS (On wafer Sij measurements)

6V, 1/2 Idss

FREQ	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
20	0.88	95.78	0.54	-131.62	0.00774	-73.25	0.77	169.14
20.5	0.88	56.78	0.51	179.1	0.01004	-119.89	0.74	116.47
21	0.88	16.47	0.5	129.26	0.0196	-157.56	0.7	64.36
21.5	0.87	-22.14	0.54	81.91	0.00955	138.43	0.68	10.98
22	0.87	-60.86	0.58	29.04	0.0091	19.45	0.66	-43.72
22.5	0.89	-100.53	0.6	-28.44	0.01221	45.26	0.68	-104.2
23	0.9	-141.74	0.55	-79.42	0.01159	-27.16	0.64	-157.52
23.5	0.9	178.2	0.53	-127.32	0.01764	-97.15	0.66	150.18
24	0.89	137.16	0.56	-178.49	0.01938	-157.25	0.7	97.11
24.5	0.88	97.89	0.56	131.81	0.0171	127.52	0.7	44.62
25	0.89	58.37	0.59	82.52	0.00817	169.71	0.82	-7.94
25.5	0.9	18.71	0.61	31.95	0.01686	24.15	0.84	-65.12
26	0.89	-20.57	0.62	-17.95	0.01075	7.41	0.83	-120.08
26.5	0.9	-60.59	0.66	-68.68	0.0053	-61.16	0.85	-175.03
27	0.89	-99.22	0.68	-120.71	0.00661	-115.41	0.84	131.47
27.5	0.9	-138.01	0.71	-168.08	0.01248	128.84	0.82	80.43
28	0.9	-175.23	0.75	140.45	0.01793	146.77	0.82	29.89
28.5	0.91	147.69	0.79	90.11	0.0209	67.84	0.82	-22.13
29	0.92	110.9	0.85	39.36	0.01016	11.78	0.8	-75.59
29.5	0.91	74.51	0.92	-10.36	0.01996	-30.36	0.83	-128.62
30	0.92	38.82	1.04	-62.03	0.01277	-106.17	0.83	178.04
30.5	0.91	2.44	1.18	-111.89	0.00432	-134.92	0.83	125
31	0.93	-33.92	1.38	-162.21	0.01081	-162.42	0.82	75.11
31.5	0.93	-74.1	1.64	143.59	0.02166	102.48	0.79	24.92
32	0.92	-113.7	1.95	90.07	0.01219	41.32	0.74	-28.29
32.5	0.92	-152.54	2.37	36.06	0.03323	3.33	0.7	-85.82
33	0.87	163.71	2.85	-21.9	0.02723	-59.98	0.69	-143.25
33.5	0.86	124	3.5	-79.66	0.02304	-109.88	0.7	160.32
34	0.82	84.44	4.39	-135.98	0.01801	176	0.7	107.12
34.5	0.76	44.2	5.67	162.42	0.02775	126.35	0.68	54.65
35	0.72	8.33	7.38	96.75	0.03777	38.52	0.64	8.22
35.5	0.5	-29.82	9.61	28.53	0.01464	37.61	0.61	-41.38
36	0.47	-57.01	11.63	-46.76	0.01766	-29.11	0.58	-96.55
36.5	0.42	-82.11	12.09	-126.76	0.02014	-71.2	0.52	-160.03
37	0.5	-120.85	10.95	162.06	0.02283	-131.79	0.43	139.76
37.5	0.43	-164.88	11.18	95.73	0.00925	-160.55	0.35	69.42
38	0.35	149.59	11.59	25.16	0.00764	117.19	0.2	1.53
38.5	0.23	103.09	11.75	-48.41	0.01062	156.47	0.04	36.25
39	0.12	24.58	11.32	-119.9	0.01383	128.72	0.23	39.95
39.5	0.15	-135.91	11.23	163.55	0.01914	104.31	0.45	-15.91
40	0.42	128.14	10.4	83.06	0.02972	25.72	0.62	-85.03

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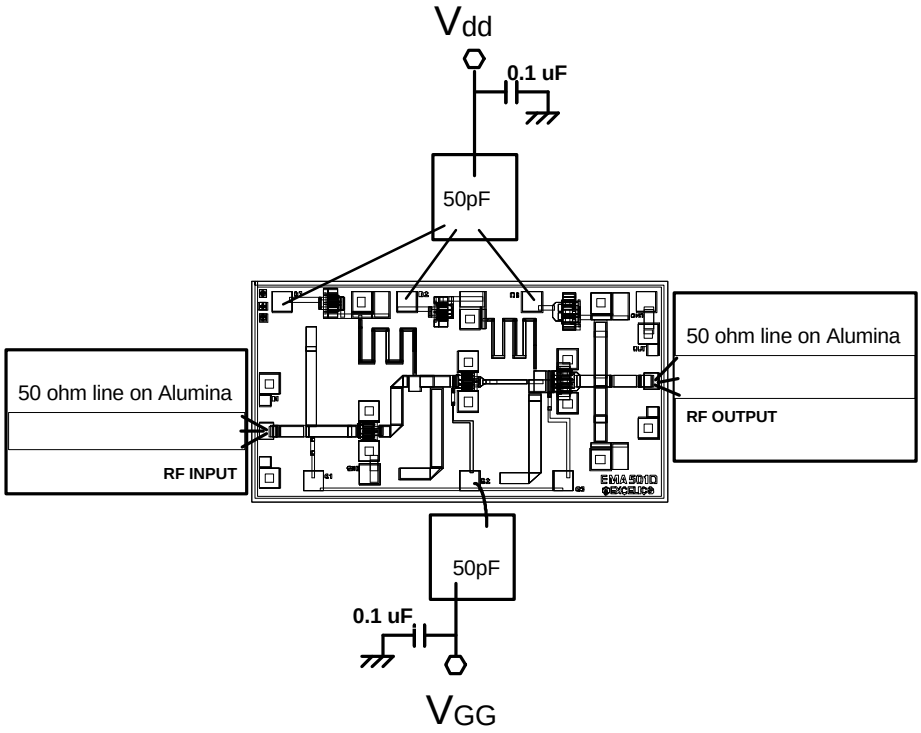
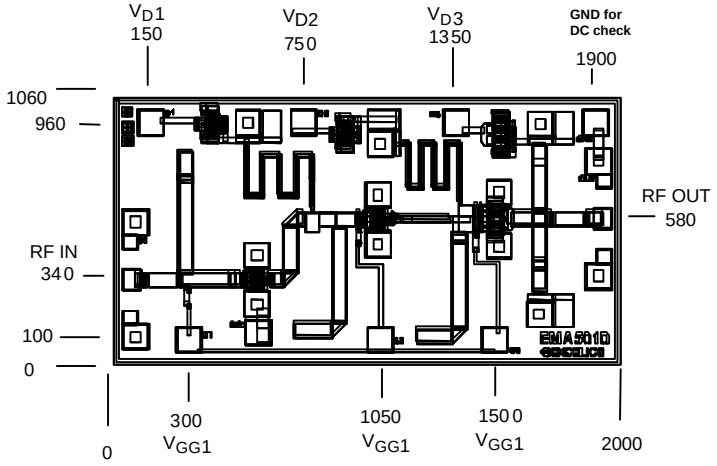
ASSEMBLY DRAWING



The length of RF wires should be as short as possible. Use at least three wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

CHIP OUTLINE



Chip Size 1060 x 2000 microns
Chip Thickness: 75 ± 13 microns
PAD Dimensions: 1. DC 100 x 100 microns
2. RF 80 x 68 microns
All Dimensions In Microns

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TYPICAL APPLICATION PERFORMANCE