



# EMA112-SOT89

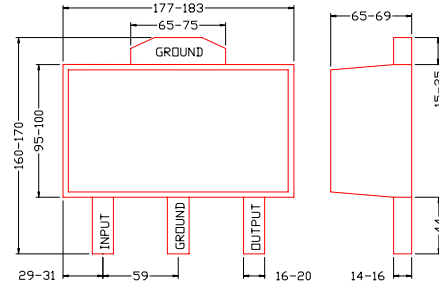
## PRELIMINARY DATA SHEET

ISSUED DATE: 02-09-04

### 0.5-3.0 GHz High Linearity Power MMIC

#### FEATURES

- LOW COST SURFACE-MOUNT PLASTIC PACKAGE
- 0.5-3.0 GHz BANDWIDTH
- +28.0dBm TYPICAL OUTPUT POWER
- 41dBm OIP3
- 15.0dB TYPICAL POWER GAIN
- SINGLE BIAS SUPPLY
- 100% DC Tested



All Dimensions in Mils



Caution! ESD sensitive device.

#### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
F	Operating Frequency Range	0.5		3	GHz
$P_{1dB}$	Power at 1dB Compression $V_{DD} = 8.0V, F=2.4G$	27.0	28.0		dBm
$G_{SS}$	Small Signal Gain $V_{DD} = 8.0V, F=2.4G$	13.0	15.0		dB
OIMD3	Output 3 <sup>rd</sup> Order Intermodulation Distortion @ $\Delta f=10\text{MHz}$ , Each Tone Pout 18dBm $V_{DD} = 8.0V, F=2.4G$		-46	-43	dBc
NF	Noise Figure $V_{DD} = 8.0V, F=2.4G$		2.7	3.2	dB
$RL_{IN}$	Input Return Loss $V_{DD} = 8.0V, F=2.4G$	8	10		dB
$RL_{OUT}$	Output Return Loss $V_{DD} = 8.0V, F=2.4G$	8	10		dB
$I_{DD}$	Power Supply Current	170	210	250	mA
$R_{TH}$	Thermal Resistance <sup>1</sup>		35		$^\circ\text{C/W}$

Note: 1. Overall Rth depends on die attach.

#### ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION<sup>1,2</sup>

SYMBOL	CHARACTERISTIC	VALUE
$V_{DD}$	Power Supply Voltage	8 V
$I_{DD}$	Drain Current	IDSS
$I_{GSF}$	Forward Gate Current	10 mA
$P_{IN}$	Input Power	@ 3dB compression
$P_T$	Total Power Dissipation	2.8 W
$T_{CH}$	Channel Temperature	150 $^\circ\text{C}$
$T_{STG}$	Storage Temperature	-65/+150 $^\circ\text{C}$

Notes: 1. Operating the device beyond any of the above ratings may result in permanent damage or reduction of MTTF.

2. Bias conditions must also satisfy the following equation  $P_T < (T_{CH} - T_{HS})/R_{TH}$ ; where  $T_{HS}$  = temperature of heatsink, and  $P_T = (V_{DD} * I_{DD}) - (P_{OUT} - P_{IN})$ .

Specifications are subject to change without notice.

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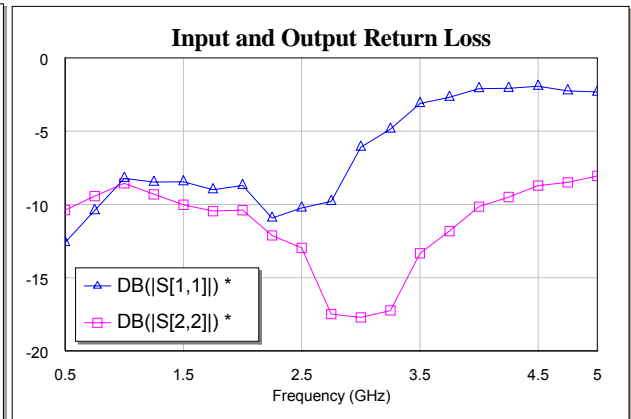
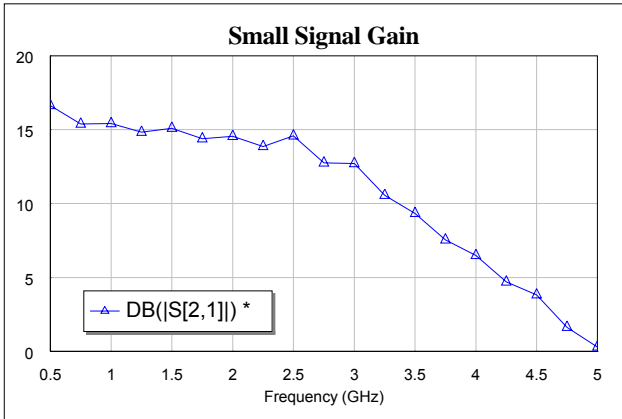
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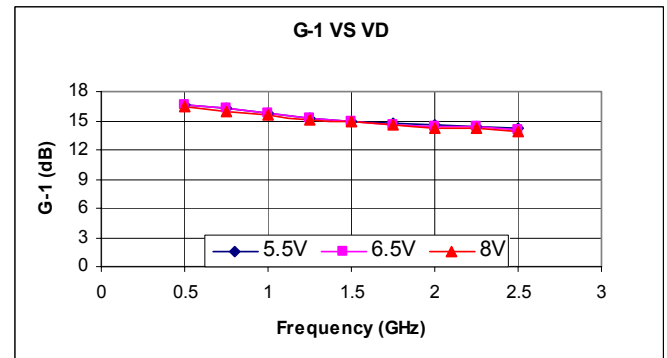
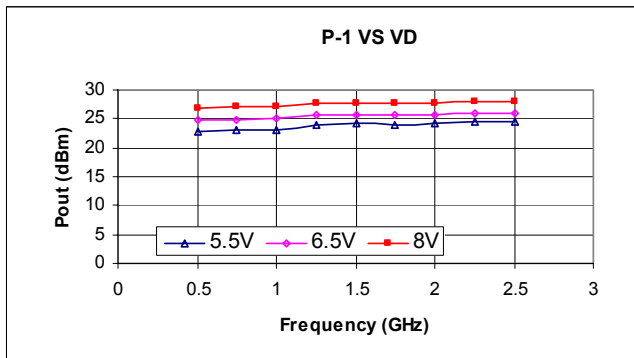
### PERFORMANCE DATA

#### Small Signal Performance

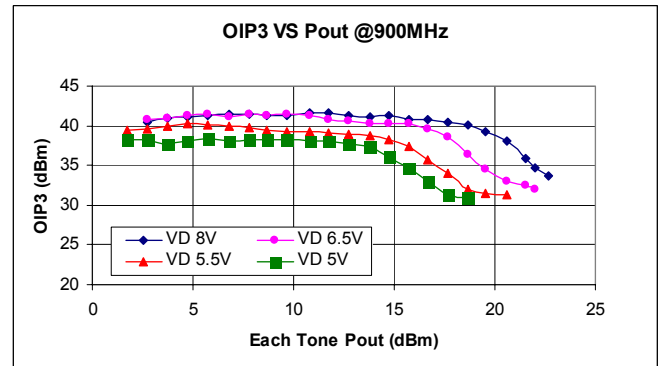
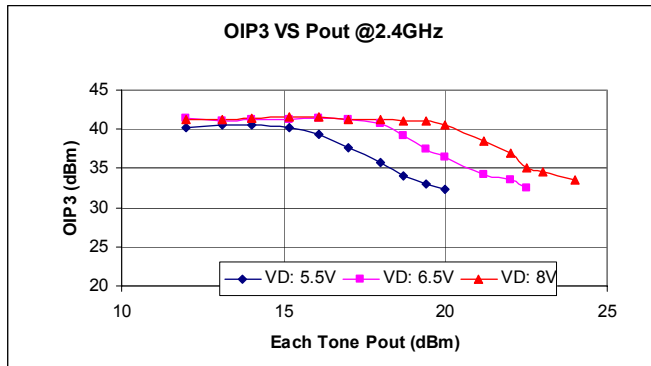
$V_{DD} = 6.5V$   $I_{ds} = 210mA$



#### Power and Gain Performance



#### OIP3 VS Pout ( $\Delta f=10MHz$ )



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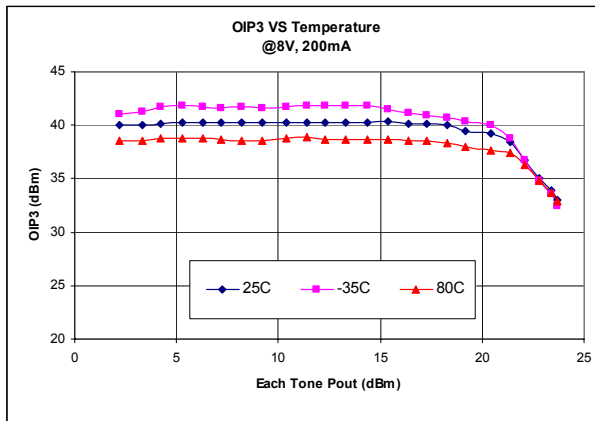
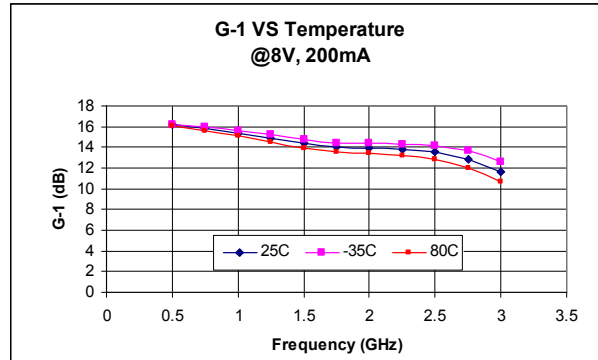
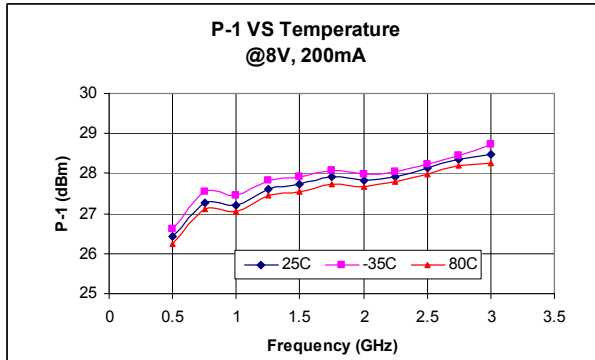


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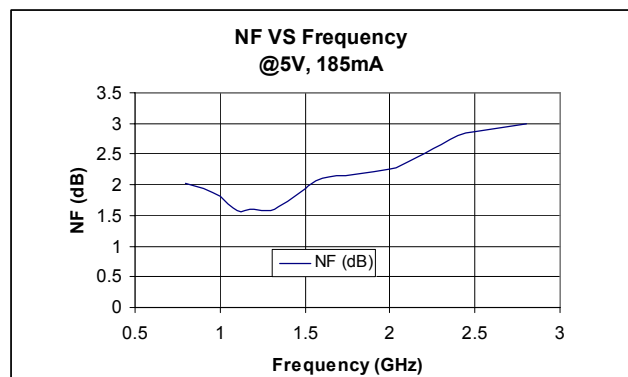
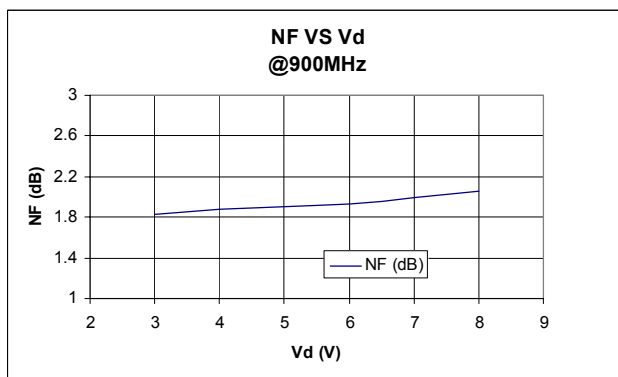
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### Power, Gain and OIP3 VS Temperature



(Temperature is test fixture temperature; OIP3 is measured @2GHz,  $\Delta f=10\text{MHz}$ )

### Noise Figure Performance



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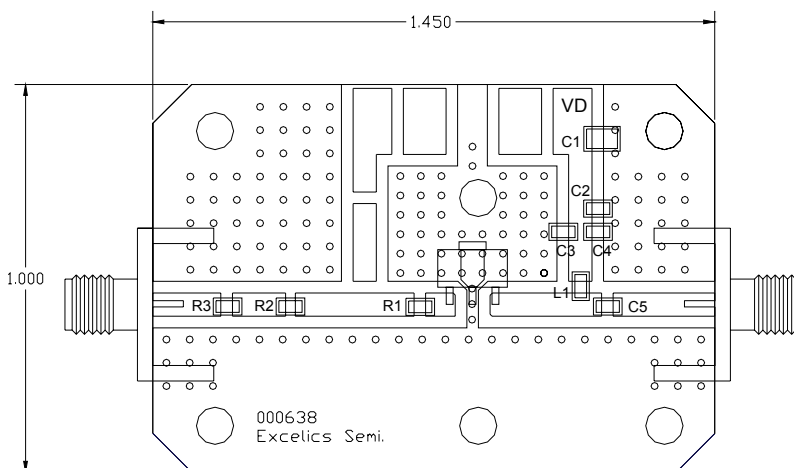
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### S-Parameters

 $V_{DD} = 6.5V, I_{DD} = 210mA$ 

FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.1	0.13	-85.75	6.83	163.81	0.07	4.70	0.24	-150.57
0.2	0.13	-96.17	6.64	158.26	0.07	-7.02	0.24	-157.69
0.3	0.17	-104.25	6.52	150.62	0.07	-10.25	0.26	-155.71
0.4	0.20	-113.03	6.38	142.83	0.07	-13.66	0.28	-154.76
0.5	0.23	-121.74	6.21	134.81	0.07	-19.58	0.30	-154.56
1	0.39	-151.85	5.33	97.37	0.07	-41.89	0.37	-160.40
1.5	0.38	-172.92	5.18	67.78	0.07	-63.83	0.32	-172.10
2	0.37	151.69	4.90	34.12	0.07	-93.92	0.30	160.63
2.5	0.31	86.02	4.65	-4.11	0.06	-133.85	0.22	120.36
3	0.50	10.90	3.85	-46.38	0.05	-178.92	0.13	34.23
3.5	0.70	-23.51	2.77	-82.13	0.04	139.37	0.22	-43.18
4	0.79	-40.23	2.04	-109.72	0.03	112.88	0.31	-69.34
4.5	0.80	-53.26	1.63	-134.29	0.03	96.20	0.37	-85.95
5	0.77	-72.14	1.42	-161.88	0.04	82.14	0.40	-104.95
5.5	0.69	-104.59	1.22	164.08	0.05	63.14	0.44	-129.90
6	0.69	-144.66	0.94	127.04	0.05	46.48	0.50	-159.41
6.5	0.78	-177.27	0.66	95.16	0.05	48.04	0.55	179.89
7	0.82	179.62	0.48	70.18	0.06	46.29	0.62	146.25
7.5	0.78	-179.81	0.39	49.13	0.09	41.72	0.69	116.45
8	0.66	171.50	0.37	17.89	0.16	6.74	0.69	93.44
8.5	0.67	148.42	0.24	-10.25	0.08	-38.85	0.76	78.17
9	0.69	92.72	0.23	-36.22	0.11	-34.89	0.78	58.76
9.5	0.69	54.41	0.19	-75.39	0.13	-80.02	0.76	47.15
10	0.71	40.74	0.13	-126.59	0.11	-140.75	0.76	43.81

### Evaluation Board:



Comp.	Value	Size
C1	0.1uF	0508
C2	1000pF	0306
C3	100pF	0306
C4	22pF	0306
C5	100pF	0306
L1	33nH	0306
R1	0ohm	0508
R2	0ohm	0508
R3	0ohm	0508

1. MATERIAL: FR4, 0.031 INCH THICK  
2. ALL DIMENSIONS ARE IN INCHES

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