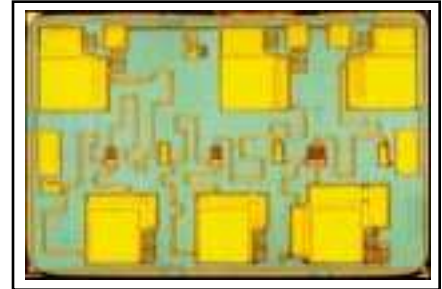


### FEATURES

- Low Noise Figure:  $NF = 2.0\text{dB}$  (Typ.) @  $f=40\text{ GHz}$
- High Associated Gain:  $G_{as} = 18\text{dB}$  (Typ.) @  $f=40\text{ GHz}$
- Wide Frequency Band: 36-40 GHz
- High Output Power:  $9\text{dBm}$  (Typ.) @  $f=40\text{ GHz}$
- Impedance Matched  $Z_{in}/Z_{out} = 50\Omega$



### DESCRIPTION

The FMM5704X is a LNA MMIC designed for applications in the 36-40 GHz frequency range. This product is well suited for satellite communications, radio link, and applications where low noise and high dynamic range are required.

### ABSOLUTE MAXIMUM RATING (Ambient Temperature $T_a=25^\circ\text{C}$ )

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	$V_{DD}$		4	V
Input Power	$P_{in}$		-3	dBm
Storage Temperature	$T_{stg}$		-65 to +175	$^\circ\text{C}$
Operating Backside Temperature	$T_{op}$		-45 to +125	$^\circ\text{C}$

Eudyna recommends the following conditions for the long term reliable operation of GaAs FETs:

1. The drain-source operating voltage ( $V_{DD}$ ) should not exceed 3 volts.
2. This product should be hermetically packaged.

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

Item	Symbol	Conditions (2)	Limits			Unit
			Min.	Typ.	Max.	
Noise Figure	NF	$V_{DD} = 3\text{V}$ $f = 40\text{GHz}$ $I_{DD} = 20\text{mA}$ (Typ.) $Z_S = Z_L = 50\Omega$	-	2.0	2.5	dB
Associated Gain	$G_{as}$		15	18	20	dB
Output Power at 1dB G.C.P.	$P_{1\text{dB}}$		-	9	-	dBm
Input Return Loss	$RL_{in}$		-	-10	-	dB
Output Return Loss	$RL_{out}$		-	-10	-	dB

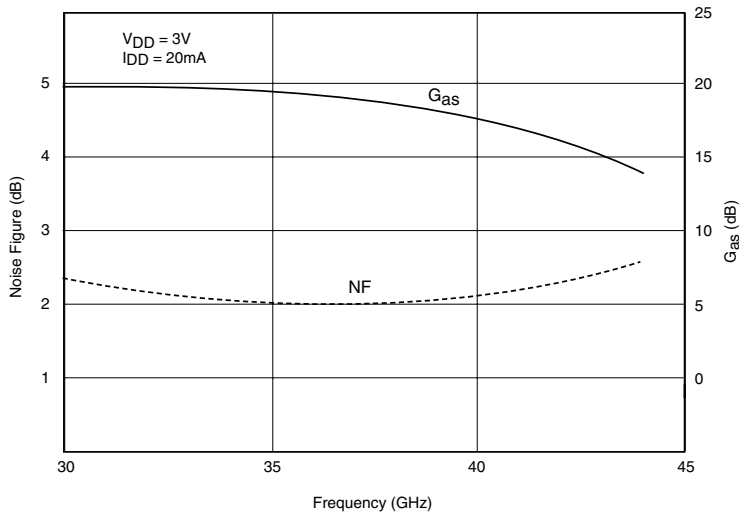
Note 1: RF parameter sample size 10pcs. Criteria (accept/reject)=(0/1)

Note 2: Electrical Characteristics specified with RF-probe measurement.

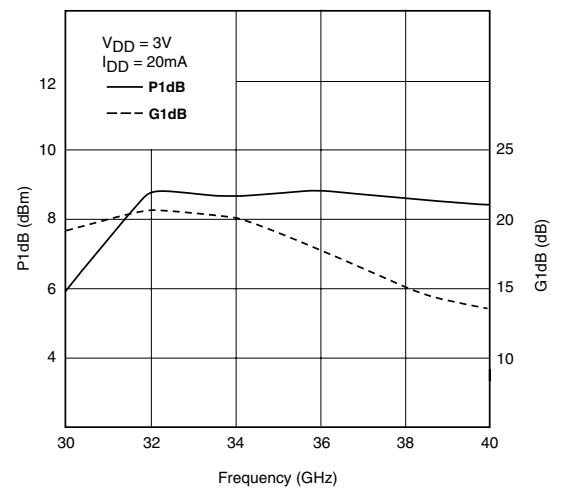
# FMM5704X

36-40GHz LNA MMIC

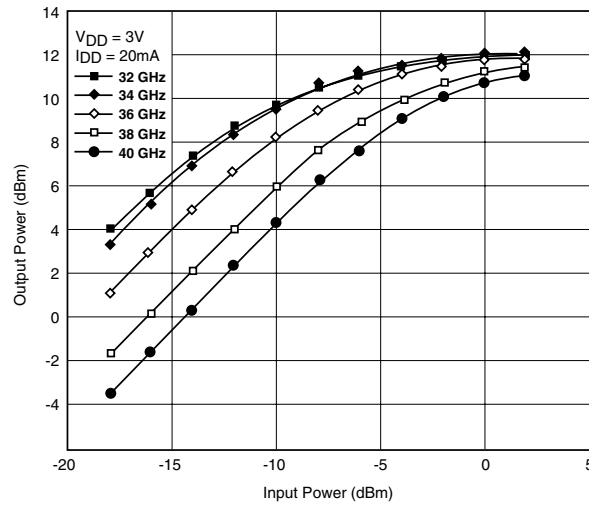
NOISE FIGURE &  $G_{AS}$  vs. FREQUENCY



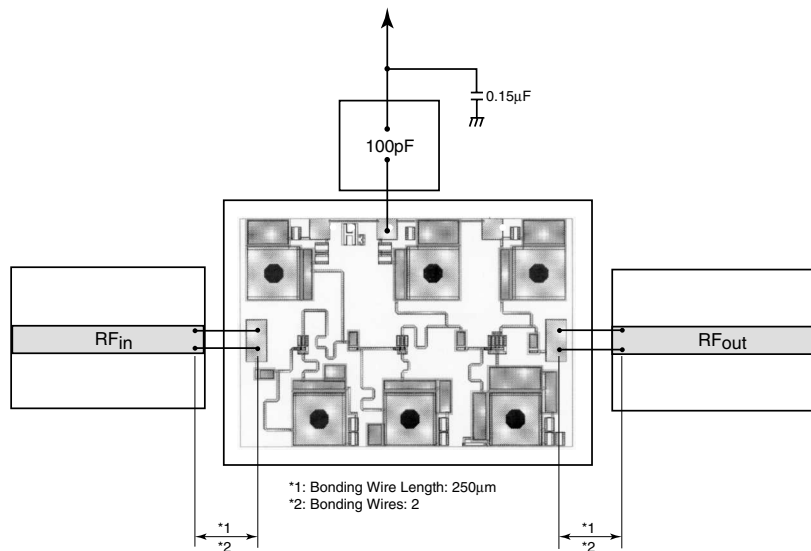
P1dB & G1dB vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER



ASSEMBLY DRAWING



**S-PARAMETERS** $V_{DD} = 3V, I_{DS} = 20mA$ 

FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
16000	.920	133.9	.067	41.5	.004	62.1	.831	-166.6
16500	.926	128.0	.084	35.3	.002	24.5	.828	-169.9
17000	.936	122.0	.097	26.4	.001	-62.6	.826	-173.2
17500	.945	115.7	.118	20.1	.000	-174.7	.824	-176.5
18000	.957	109.4	.138	8.9	.002	101.1	.823	-179.7
18500	.968	102.7	.161	3.4	.002	82.9	.821	176.8
19000	.977	96.1	.204	-6.5	.004	56.0	.815	173.5
19500	.990	89.0	.256	-15.3	.004	37.8	.814	170.4
20000	1.000	82.2	.299	-23.2	.005	19.7	.810	167.2
20500	1.012	75.0	.369	-34.0	.006	5.3	.809	163.9
21000	1.023	67.4	.446	-43.4	.005	-12.1	.808	160.7
21500	1.039	59.7	.551	-54.3	.006	-15.5	.808	157.5
22000	1.052	51.7	.635	-64.0	.007	-24.4	.809	154.1
22500	1.054	43.1	.757	-75.1	.006	-28.5	.808	150.5
23000	1.063	34.8	.925	-86.0	.008	-34.6	.809	147.4
23500	1.065	25.8	1.117	-98.2	.008	-52.7	.814	143.7
24000	1.061	16.5	1.340	-108.5	.007	-66.0	.815	139.5
24500	1.048	7.4	1.546	-122.4	.008	-66.7	.815	135.7
25000	1.042	-2.2	1.786	-133.5	.007	-72.4	.815	131.1
25500	1.022	-12.0	2.093	-144.8	.006	-87.8	.816	126.1
26000	1.002	-21.9	2.560	-155.7	.004	-88.2	.814	121.7
26500	.976	-32.2	3.037	-168.2	.004	-65.8	.813	116.7
27000	.932	-43.0	3.736	-175.5	.004	-71.0	.816	111.4
27500	.882	-53.5	4.235	-158.4	.003	-70.8	.816	105.3
28000	.832	-64.9	4.917	-143.9	.004	-20.4	.801	98.4
28500	.773	-75.0	5.691	-131.5	.003	-15.5	.795	89.7
29000	.722	-85.4	6.558	-117.1	.006	0.7	.752	81.0
29500	.659	-98.6	7.712	-100.0	.010	-16.3	.705	74.3
30000	.557	-109.6	8.807	-79.4	.012	-16.5	.670	64.5
30500	.487	-121.1	9.847	-61.7	.016	-34.9	.619	54.6
31000	.385	-136.5	10.915	-42.3	.018	-47.2	.554	45.6
31500	.287	-140.5	11.425	-24.0	.018	-58.4	.487	34.5
32000	.227	-142.4	12.051	-4.7	.019	-63.5	.406	23.6
32500	.157	-147.4	12.664	-14.5	.020	-71.3	.323	14.8
33000	.122	-139.5	12.612	-33.4	.022	-76.7	.264	3.5
33500	.088	-134.7	12.479	-51.5	.023	-86.7	.217	-12.7
34000	.107	-119.7	11.885	-69.8	.024	-96.3	.174	-37.2
34500	.116	-113.0	11.451	-86.2	.024	-105.6	.138	-71.8
35000	.090	-122.0	10.651	-102.1	.024	-113.1	.111	-114.6
35500	.071	-116.2	9.866	-116.0	.023	-115.1	.107	-155.2
36000	.049	-97.4	9.103	-128.4	.024	-120.8	.123	-174.6
36500	.076	-90.5	8.559	-141.1	.027	-127.8	.138	-179.0
37000	.096	-97.5	8.196	-151.7	.029	-137.6	.176	177.3
37500	.076	-111.1	7.751	-164.8	.031	-153.1	.225	165.9
38000	.063	-85.5	7.109	-174.9	.029	-168.7	.248	153.5
38500	.071	-68.8	6.467	-175.0	.025	178.9	.263	144.4
39000	.076	-71.8	6.302	-166.3	.022	171.6	.283	135.7
39500	.096	-69.3	6.072	-158.0	.019	167.2	.291	127.7
40000	.115	-65.9	5.836	-149.4	.016	165.6	.282	119.0

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