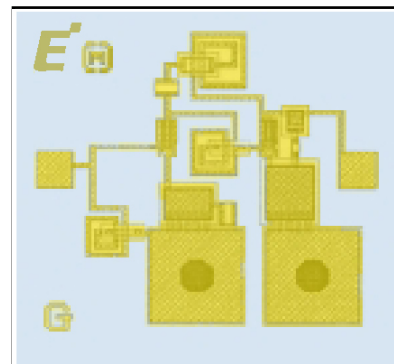


FEATURES

- Low Noise Figure: NF = 1.6dB (Typ.) @ f=30 GHz
- High Associated Gain: G_{as} = 13dB (Typ.) @ f=30 GHz
- Wide Frequency Band: 27-32 GHz
- Impedance Matched Z_{in}/Z_{out} = 50 Ω

DESCRIPTION

The FMM5702X is a LNA MMIC designed for applications in the 27-32 GHz frequency range. This product is well suited for satellite communications and radio link applications where low noise and high gain is required.



ABSOLUTE MAXIMUM RATING (Ambient Temperature Ta=25°C)

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V_{DD}		5	V
Input Power	P_{in}		-4	dBm
Storage Temperature	T_{stg}		-65 to +175	°C
Operating Backside Temperature	T_{op}		-45 to +125	°C

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

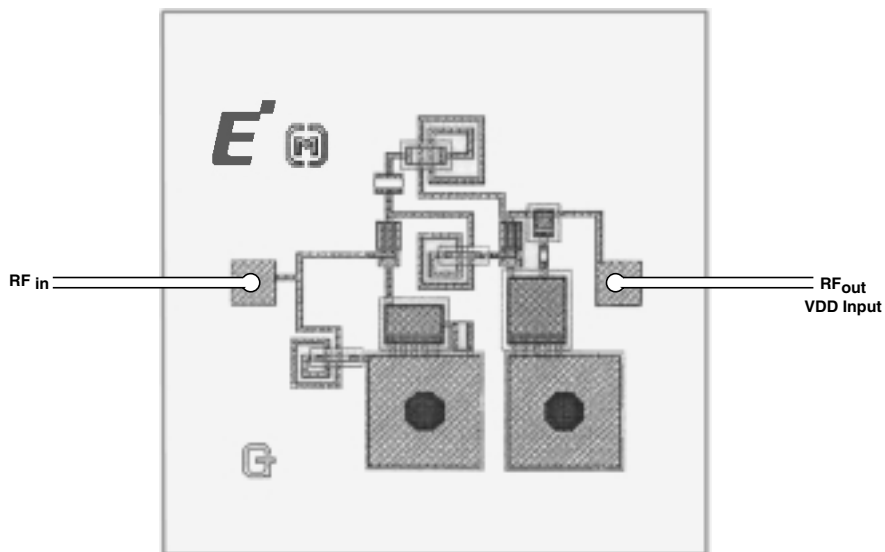
1. The drain-source operating voltage (V_{DD}) should not exceed 4 volts.
2. This product should be hermetically packaged.

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25°C)

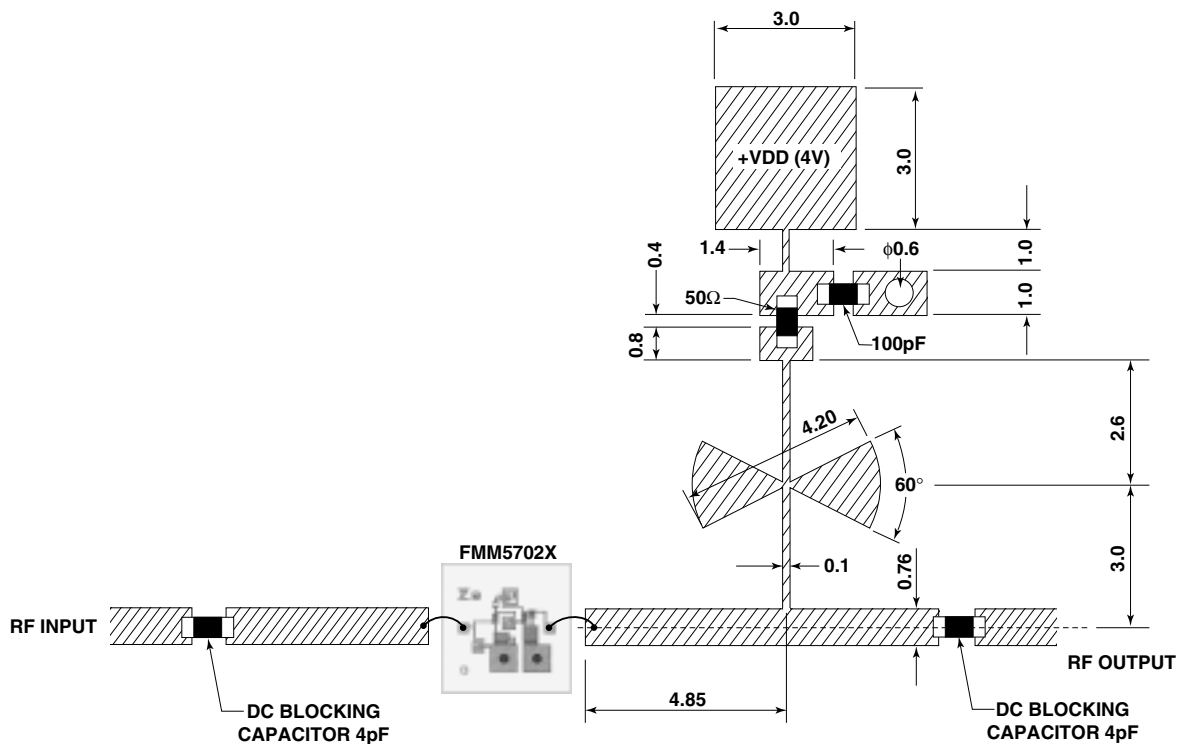
Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Noise Figure	NF	$V_{DD} = 4V$ $f = 30.0 \text{ GHz}$ $I_{DD} = 5mA \text{ (Typ.)}$ $Z_S = Z_L = 50\Omega$	-	1.6	2.0	dB
Associated Gain	G_{as}		11.0	13.0	-	dB
Input Return Loss	RL_{in}		-	-12	-	dB
Output Return Loss	RL_{out}		-	-9	-	dB

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

BONDING LAYOUT



RF MEASUREMENT CIRCUIT



Unit: mm
Thickness: 0.254mm
 ϵ_r : 2.17

S-PARAMETERS

$V_{DD} = 4V$, $I_{DS} = 5mA$

FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
500	.924	173.6	.064	72.8	.0003	-88.4	.830	-11.1
1000	.921	167.4	.103	76.0	.0001	-139.6	.787	-16.8
1500	.918	161.3	.153	79.2	.0002	-113.6	.749	-22.3
2000	.917	155.2	.215	79.7	.0005	-134.4	.710	-27.2
2500	.916	149.2	.290	78.2	.0007	-107.7	.675	-31.4
3000	.915	143.3	.378	75.2	.0007	-111.3	.645	-35.1
3500	.916	137.3	.481	70.9	.0011	-86.5	.619	-38.5
4000	.917	131.4	.597	66.0	.0006	-87.9	.598	-41.6
4500	.919	125.6	.730	60.4	.0011	-69.8	.582	-44.8
5000	.921	119.8	.880	54.3	.0015	-75.9	.567	-48.0
5500	.924	113.8	1.048	47.6	.0013	-78.0	.555	-51.2
6000	.926	108.1	1.238	40.8	.0014	-69.6	.544	-54.6
6500	.928	102.3	1.450	33.6	.0014	-55.4	.535	-58.3
7000	.932	96.5	1.690	26.1	.0017	-54.7	.526	-62.0
7500	.934	90.7	1.964	18.1	.0015	-59.7	.518	-66.2
8000	.936	84.9	2.267	9.8	.0017	-52.2	.510	-70.7
8500	.936	78.9	2.618	0.9	.0013	-65.2	.498	-75.7
9000	.938	73.1	2.998	-8.3	.0021	-62.6	.487	-81.0
9500	.936	67.2	3.410	-18.0	.0021	-78.3	.472	-86.6
10000	.932	61.4	3.877	-28.5	.0026	-75.6	.454	-93.1
10500	.928	55.3	4.317	-39.5	.0029	-82.1	.430	-99.7
11000	.920	49.7	4.868	-51.4	.0036	-80.4	.401	-107.4
11500	.910	43.8	5.313	-63.7	.0047	-73.8	.366	-115.0
12000	.895	38.2	5.833	-76.8	.0051	-74.8	.320	-123.5
12500	.887	32.7	6.146	-90.0	.0069	-69.4	.270	-130.5
13000	.867	27.3	6.465	-103.4	.0073	-63.2	.217	-137.9
13500	.859	22.6	6.713	-116.8	.0088	-56.1	.166	-141.9
14000	.843	16.8	6.623	-129.2	.0094	-53.5	.113	-141.2
14500	.843	12.6	6.905	-142.5	.0104	-43.1	.074	-134.6
15000	.829	6.9	6.768	-154.0	.0110	-41.4	.052	-101.9
15500	.829	1.7	6.828	-166.1	.0118	-34.1	.060	-69.9
16000	.822	-3.9	6.711	-176.9	.0128	-31.4	.086	-57.7
16500	.809	-10.0	6.557	-172.8	.0134	-27.2	.113	-54.0
17000	.796	-15.6	6.440	-162.9	.0151	-24.2	.132	-58.2
17500	.784	-21.8	6.354	-153.0	.0155	-21.2	.154	-59.9
18000	.771	-27.8	6.317	-143.2	.0162	-16.6	.169	-62.9
18500	.753	-34.3	6.246	-133.8	.0176	-13.2	.185	-67.6
19000	.732	-41.1	6.137	-124.7	.0181	-10.1	.197	-71.4
19500	.711	-47.5	6.031	-115.6	.0196	-8.0	.211	-77.0
20000	.683	-54.6	5.971	-106.9	.0210	-5.0	.218	-81.7
20500	.656	-61.5	5.852	-98.2	.0224	-2.9	.230	-87.5
21000	.625	-69.0	5.774	-89.6	.0238	-0.1	.237	-92.2
21500	.591	-76.3	5.710	-80.9	.0259	-3.8	.242	-98.0
22000	.562	-84.3	5.587	-72.7	.0272	-5.6	.254	-103.9
22500	.519	-92.1	5.597	-63.8	.0298	-10.9	.250	-110.7
23000	.493	-100.1	5.489	-55.0	.0311	-14.1	.256	-115.9
23500	.451	-109.6	5.405	-46.9	.0330	-17.9	.256	-121.5
24000	.422	-118.4	5.298	-38.2	.0350	-20.9	.261	-128.7
24500	.388	-129.0	5.213	-30.0	.0375	-24.5	.265	-135.0
25000	.351	-139.9	5.148	-21.8	.0395	-28.8	.268	-142.3
25500	.319	-150.4	5.095	-13.1	.0416	-32.9	.272	-149.9
26000	.297	-163.3	4.976	-4.9	.0439	-36.8	.274	-156.5
26500	.269	-177.0	4.915	-3.7	.0461	-41.8	.279	-165.2
27000	.256	169.3	4.798	-11.9	.0482	-45.7	.282	-171.5
27500	.244	156.0	4.740	-20.6	.0507	-49.5	.284	-177.2
28000	.237	139.4	4.619	-29.0	.0526	-55.1	.295	-171.1
28500	.242	126.3	4.455	-37.4	.0545	-59.2	.296	-163.6
29000	.244	111.4	4.377	-45.5	.0566	-63.5	.310	-156.6
29500	.259	98.8	4.221	-53.9	.0593	-68.0	.314	-147.2
30000	.261	86.1	4.138	-62.4	.0609	-73.3	.329	-138.6
35000	.275	76.4	3.950	-70.6	.0625	-77.6	.332	-130.5
31000	.286	66.3	3.838	-78.9	.0643	-82.5	.349	-121.8
31500	.301	57.1	3.660	-86.8	.0664	-87.4	.355	-114.2
32000	.310	49.5	3.504	-94.8	.0674	-91.8	.367	-105.8
32500	.320	41.6	3.364	-102.5	.0691	-96.9	.380	-99.2
33000	.327	34.3	3.208	-110.1	.0707	-101.6	.385	-91.1
33500	.331	27.3	3.077	-117.8	.0711	-107.3	.400	-84.2
34000	.331	20.9	2.931	-125.3	.0716	-112.0	.409	-76.8
34500	.329	15.8	2.772	-132.6	.0724	-117.4	.420	-70.3
35000	.327	10.9	2.633	-139.7	.0730	-121.3	.425	-63.7
35500	.328	6.7	2.489	-146.6	.0735	-127.2	.435	-57.3
36000	.322	2.3	2.364	-153.3	.0733	-132.0	.440	-51.6
36500	.324	-1.3	2.228	-159.4	.0739	-137.0	.446	-46.1
37000	.315	-5.0	2.125	-165.8	.0726	-141.4	.454	-40.9
37500	.311	-8.2	2.015	-172.0	.0728	-145.8	.459	-35.4
38000	.306	-11.0	1.915	-177.9	.0725	-150.3	.466	-30.5
38500	.298	-13.3	1.830	-175.9	.0724	-154.7	.474	-25.5
39000	.294	-15.4	1.724	-170.2	.0725	-159.1	.477	-21.0
39500	.290	-17.1	1.646	-164.4	.0724	-162.9	.482	-16.5
40000	.287	-19.2	1.557	-159.1	.0728	-168.1	.487	-11.9

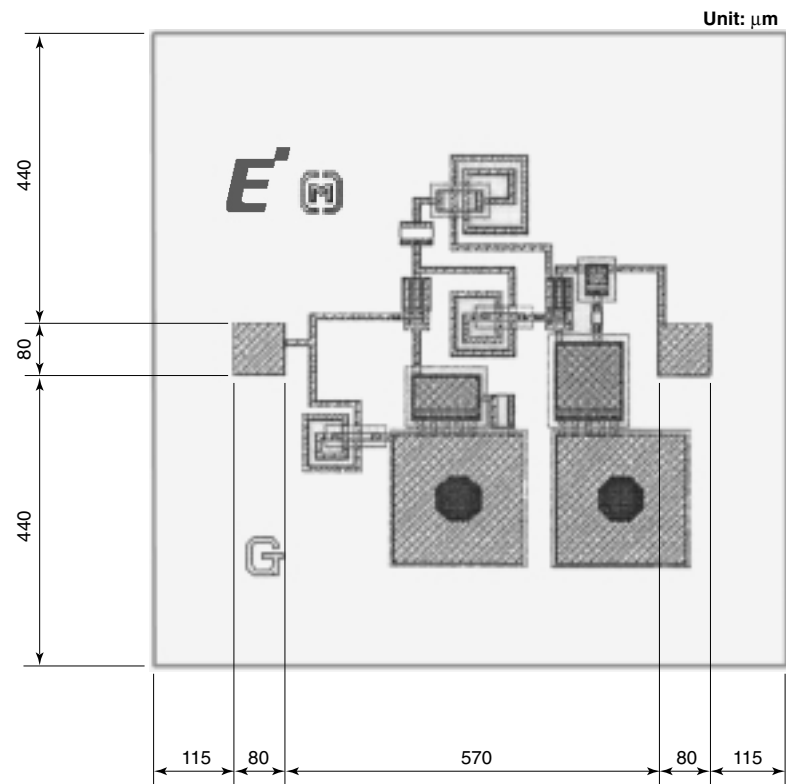
NOTE:* The data includes bonding wires.

n: number of wires RF IN n=1 (0.3mm length, 25µm Dia Au wire)
 RF OUT n=1 (0.3mm length, 25µm Dia Au wire)

FMM5702X

27-32GHz LNA MMIC

CHIP OUTLINE



Die Thickness: 110 μm (Typ.)