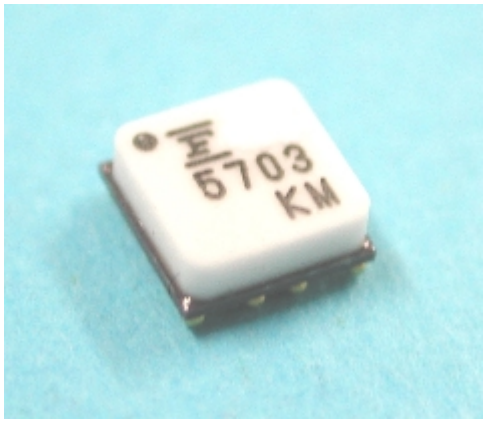
FMM5703VZ

K / Ka Band Low Noise Amplifier MMIC

FEATURES

- Low Noise Figure : NF = 2.5dB (typ.) @ f=32GHz
- High Associated Gain : Gas = 16dB (typ.) @f=32GHz
- Broad Band : 24~32GHz
- High Output Power : P_{1dB} = 8dBm (Typ.) @f=32GHz
- Ball Grid Array SMT Package(VZ-pkg)
- Impedance Matched Zin/Zout = 50Ω



DESCRIPTION

The FMM5703VZ is a LNA MMIC designed for applications in the 24~32 GHz frequency range. This product is well suited for fixed wireless access, radio link, and applications where low noise and high dynamic range are required.

Eudyna's stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Drain Voltage	V_{DD}	4	V
Input Power	Pin	-3	dBm
Storage Temperature	Tstg	-55 to +125	℃

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Condition	Unit
Drain Voltage	V_{DD}	<= 3	V
Operating Case Temperature	Tc	-40 to +85	℃

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25℃)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Noise Figure	NF	f=32GHz	-	2.5	3	dB
Associated Gain	Gas	V_{DD}=3V	14	16	19	dB
Output Power at 1dB G.C.P.	P_{1dB}	I_{DD}=20mA typ.	-	8.0	-	dBm
Input Return Loss (at Pin=-20dBm)	RLin	Z_S=Z_L=50ohm	-	-10	-	dB
Output Return Loss (at Pin=-20dBm)	RLout		-	-10	-	dB

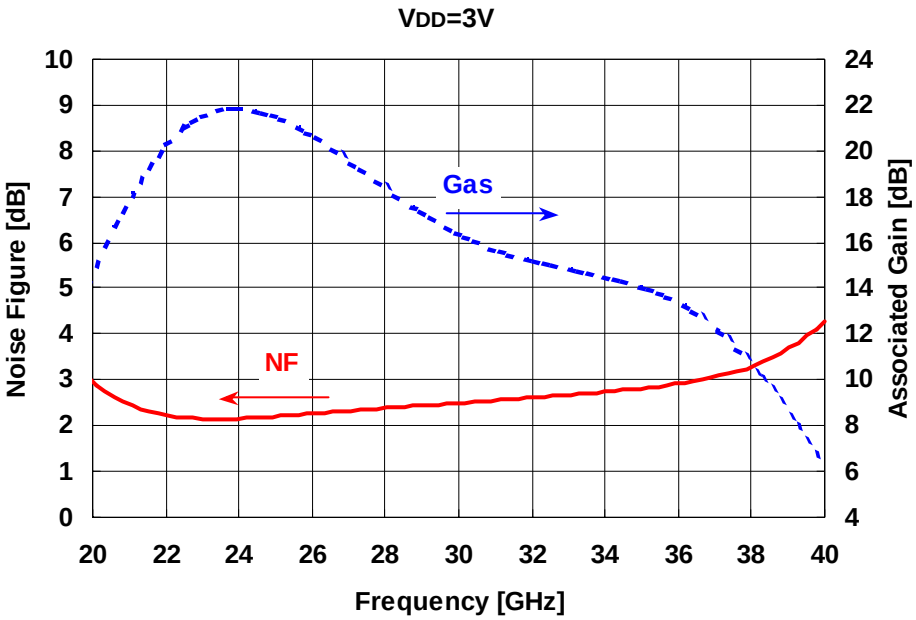
G.C.P. : Gain Compression Point

ESD	Class 0	~ 199V

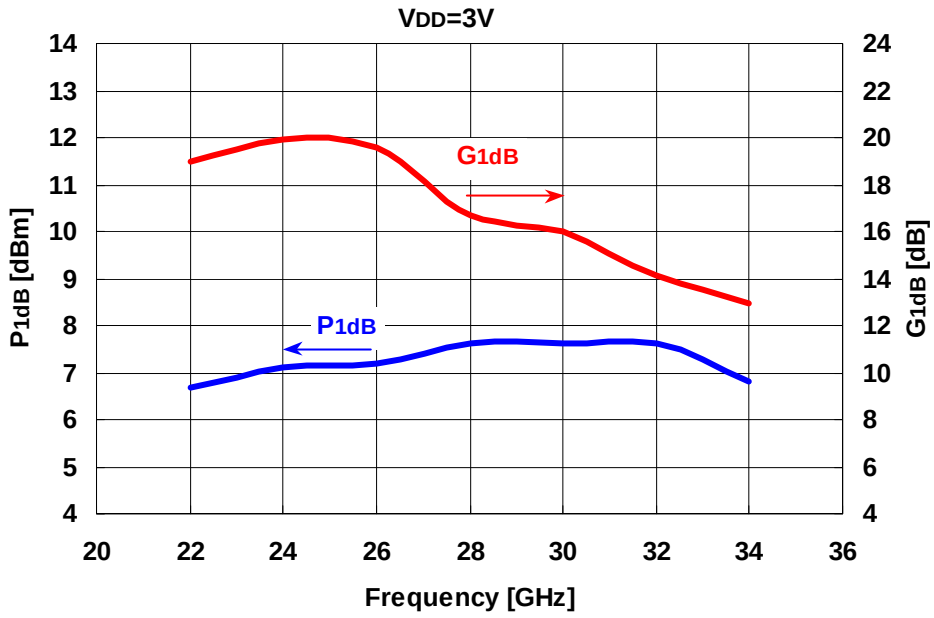
Note : Based on EIAJ ED-4701 C-111A(C=100pF, R=1.5kΩ)

CASE STYLE	VZ

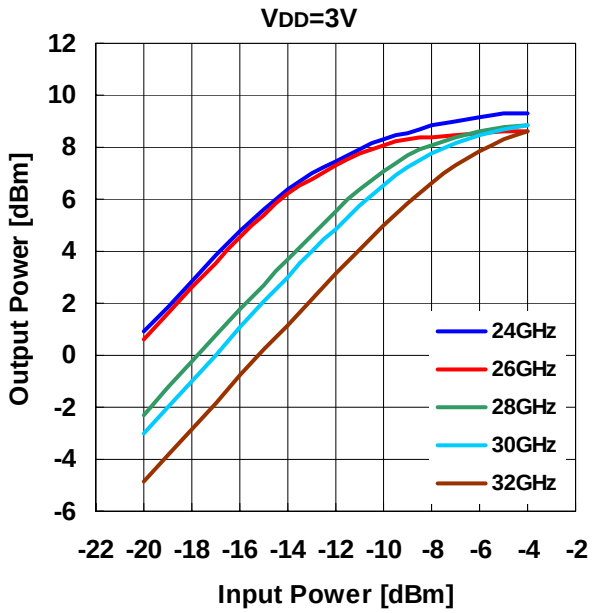
NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



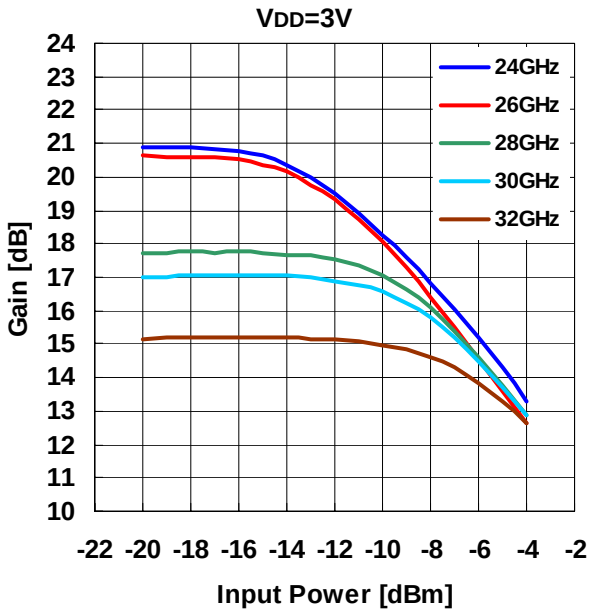
P1dB, G1dB vs. FREQUENCY



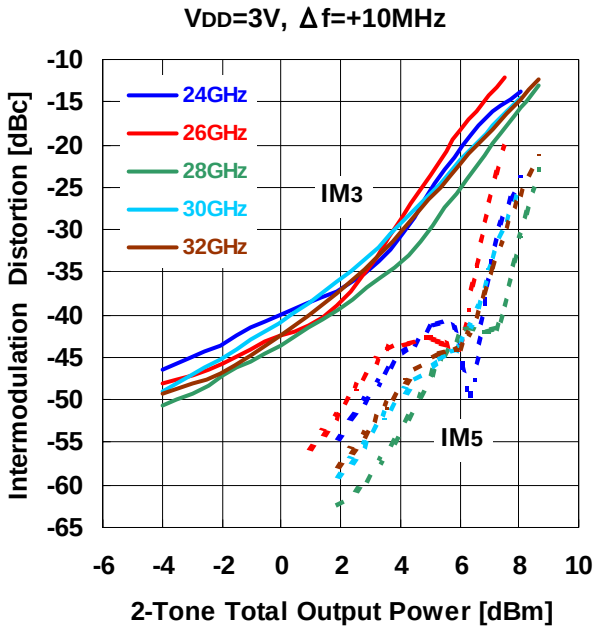
OUTPUT POWER vs. INPUT POWER



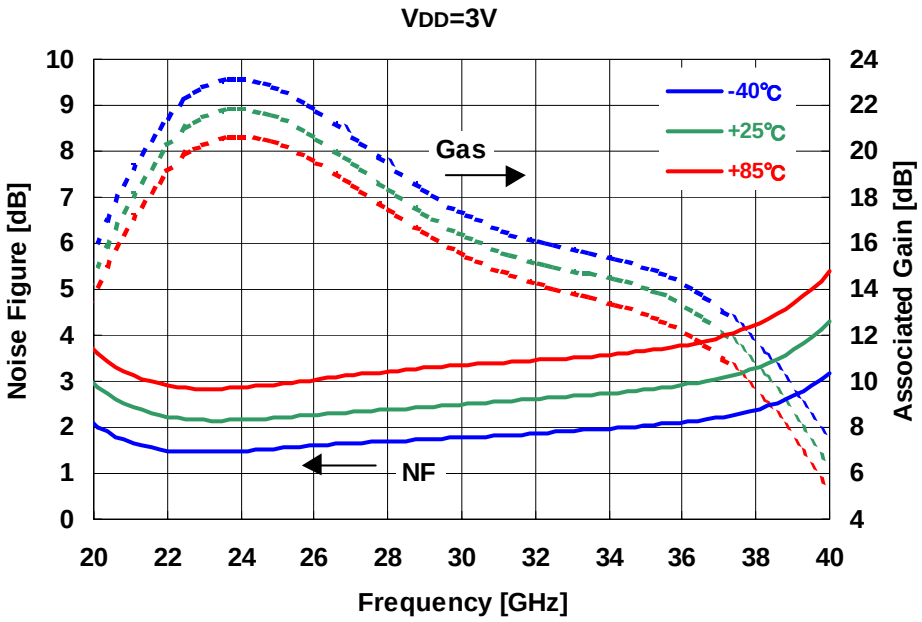
GAIN vs. INPUT POWER



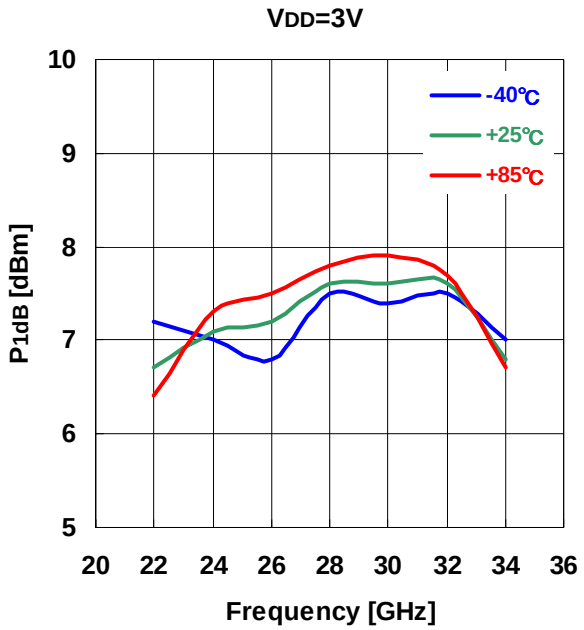
IMD PERFORMANCE vs. TOTAL OUTPUT POWER



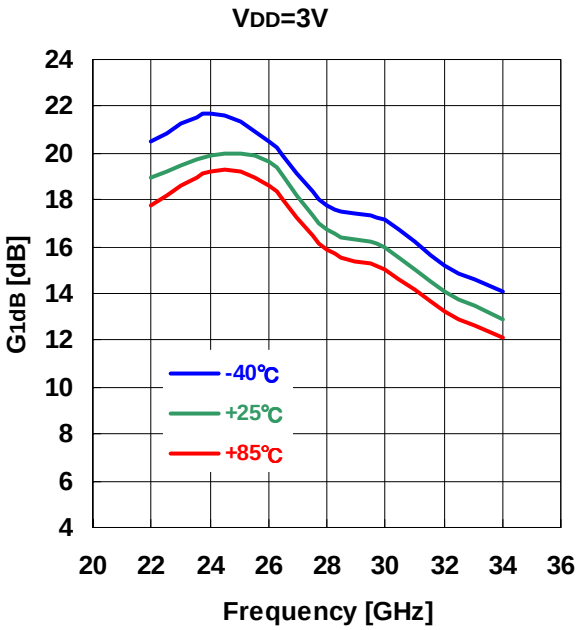
NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY
by Temperature



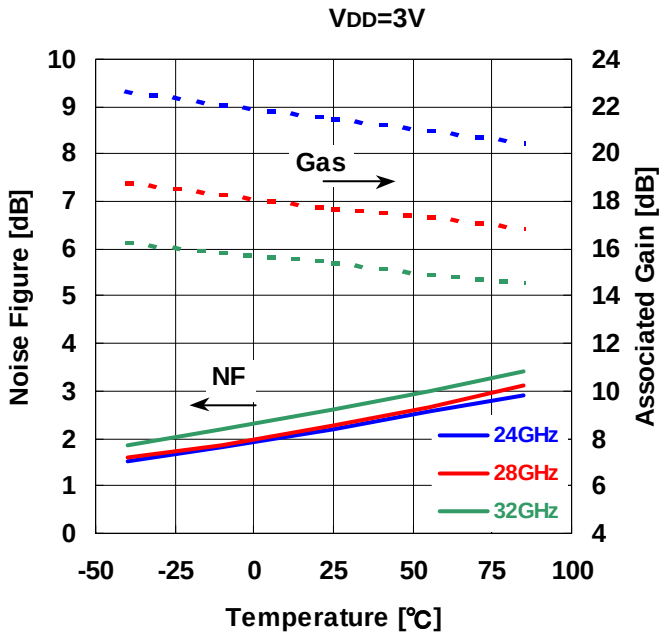
P1dB vs. FREQUENCY
by Temperature



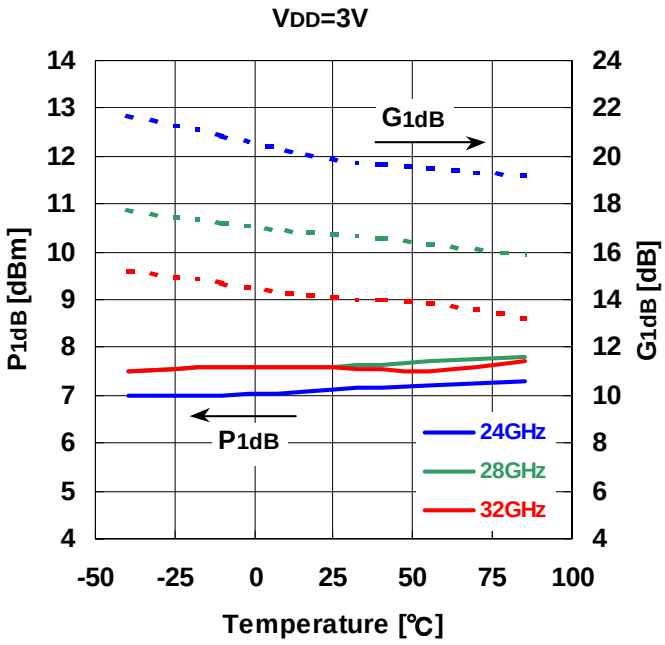
G1dB vs. FREQUENCY
by Temperature



NOISE FIGURE, ASSOCIATED GAIN vs. TEMPERATURE

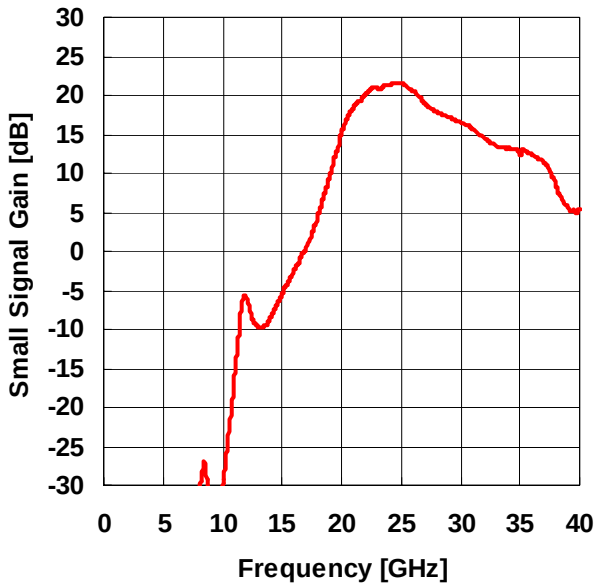


P1dB, G1dB vs. TEMPERATURE



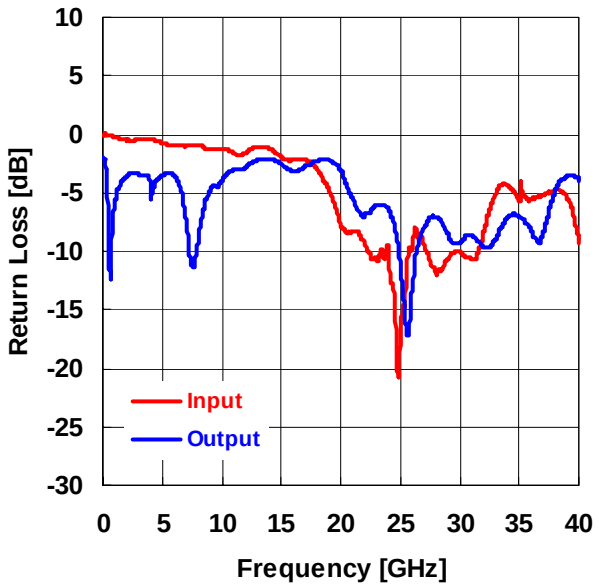
SMALL SIGNAL GAIN vs. FREQUENCY

V_{DD}=3V



RETURN LOSS vs. FREQUENCY

V_{DD}=3V



■ S-PARAMETER

VDD=3V

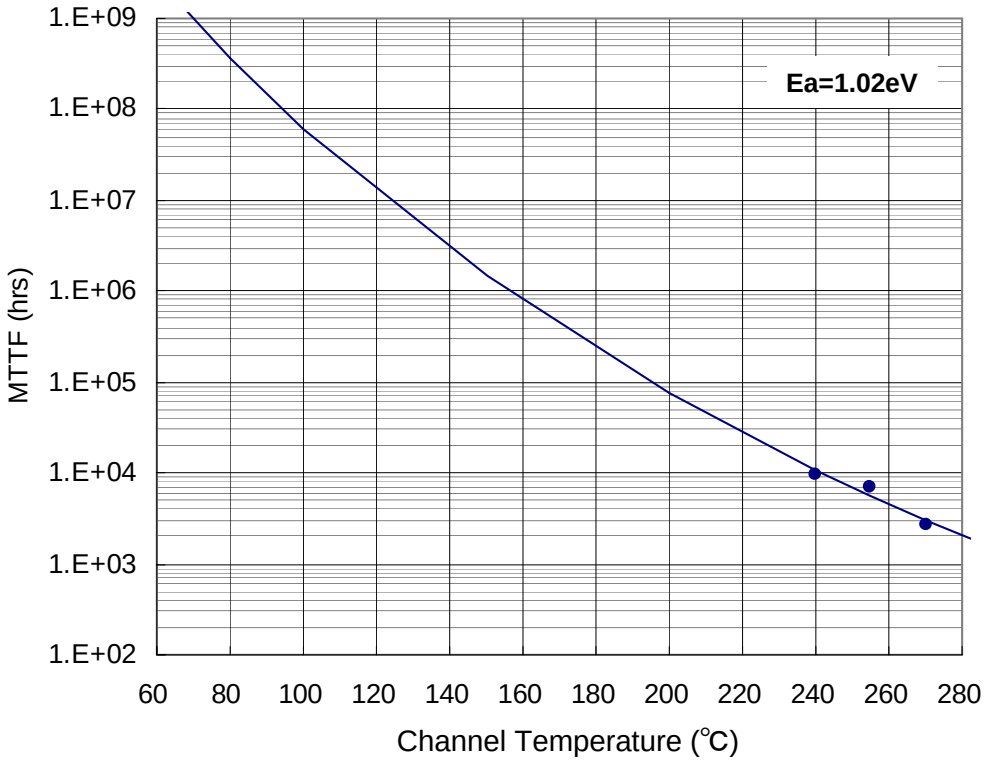
FREQ.	S11		S21		S12		S22	
[MHz]	mag.	ang.	mag.	ang.	mag.	ang.	mag.	ang.
1000	0.975	-64.1	0.001	-149.0	0.000	50.3	0.495	158.8
2000	0.943	-129.4	0.003	124.3	0.001	66.4	0.662	115.3
3000	0.945	179.3	0.004	46.1	0.001	-6.7	0.675	70.8
4000	0.947	131.4	0.008	50.3	0.005	74.4	0.575	1.0
5000	0.918	64.8	0.011	-92.3	0.004	-82.7	0.664	-49.6
6000	0.893	-7.6	0.011	-172.6	0.003	-151.9	0.669	-93.2
7000	0.889	-64.8	0.012	89.7	0.002	-168.7	0.432	-133.9
8000	0.899	-122.3	0.026	-41.0	0.002	170.8	0.343	-121.8
9000	0.861	178.8	0.018	157.0	0.000	108.9	0.573	-173.1
10000	0.868	121.4	0.032	146.1	0.005	37.8	0.636	137.4
11000	0.832	52.3	0.151	91.1	0.002	-58.8	0.702	90.2
12000	0.833	-17.0	0.506	-57.8	0.002	164.8	0.718	43.9
13000	0.883	-64.2	0.329	-151.0	0.004	95.2	0.773	5.5
14000	0.870	-104.8	0.368	150.9	0.004	40.3	0.783	-25.4
15000	0.797	-164.1	0.532	89.3	0.004	-26.2	0.746	-61.3
16000	0.781	131.3	0.750	24.2	0.003	-93.7	0.693	-113.7
17000	0.778	82.6	1.049	-37.5	0.002	22.1	0.728	-163.5
18000	0.710	30.9	1.662	-97.5	0.004	-38.3	0.771	165.2
19000	0.579	-43.0	2.984	-164.2	0.007	-109.4	0.777	140.9
20000	0.415	-149.7	5.653	116.3	0.006	-170.1	0.705	108.3
21000	0.387	75.0	8.317	23.2	0.003	-178.1	0.531	66.0
22000	0.347	-15.9	10.026	-63.7	0.007	157.9	0.449	16.5
23000	0.294	-126.7	11.080	-151.6	0.007	93.5	0.497	-50.6
24000	0.317	158.3	11.601	126.9	0.009	60.4	0.482	-119.8
25000	0.125	174.4	11.872	43.5	0.012	8.5	0.285	168.7
26000	0.321	-163.2	10.631	-37.6	0.014	-65.5	0.212	6.2
27000	0.333	161.6	8.870	-112.9	0.013	-134.4	0.400	-53.3
28000	0.254	110.9	7.785	-179.3	0.013	168.0	0.442	-84.4
29000	0.293	52.5	7.199	113.3	0.016	93.7	0.375	-134.8
30000	0.314	9.0	6.704	45.4	0.016	31.3	0.345	165.4
31000	0.292	-50.1	6.101	-23.3	0.019	-23.7	0.372	123.3
32000	0.374	-112.3	5.303	-89.1	0.027	-91.3	0.332	90.8
33000	0.554	-156.4	4.726	-151.9	0.030	-158.0	0.353	42.9
34000	0.604	160.2	4.587	145.4	0.028	146.8	0.439	-9.3
35000	0.519	106.4	4.271	79.0	0.033	101.9	0.444	-35.8
36000	0.526	29.4	4.163	10.7	0.042	43.3	0.395	-65.2
37000	0.548	-36.6	3.722	-59.5	0.043	-28.2	0.371	-152.5
38000	0.574	-109.2	2.667	-130.3	0.032	-82.8	0.564	148.5
39000	0.541	-157.3	1.937	177.5	0.031	-124.5	0.660	130.9
40000	0.356	166.3	1.855	126.3	0.035	-168.1	0.645	118.1

THERMAL INFORMATION (REFERENCE DATA)

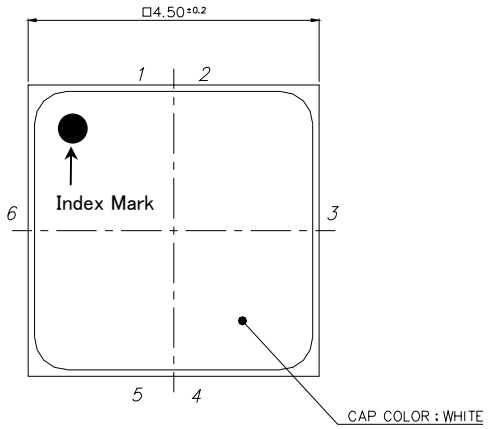
	V_{DD}=3V, I_{DD}=20mA	Unit
ΔTch	7	℃

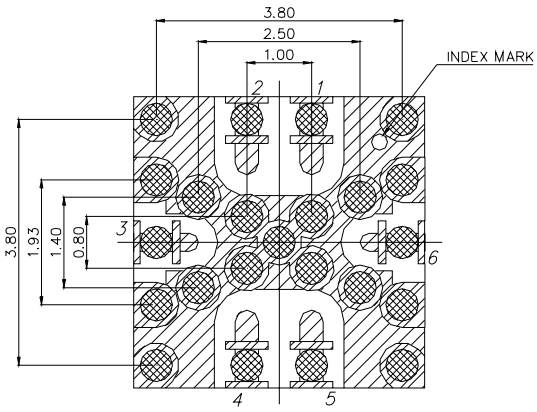
note) ΔTch: BGA Package Balls to channel temperature rise

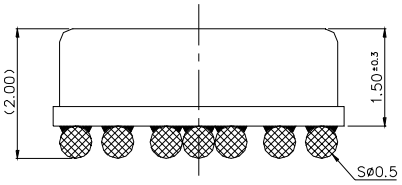
MTTF vs. ΔTch



■ Package Outline and Pin Assignment

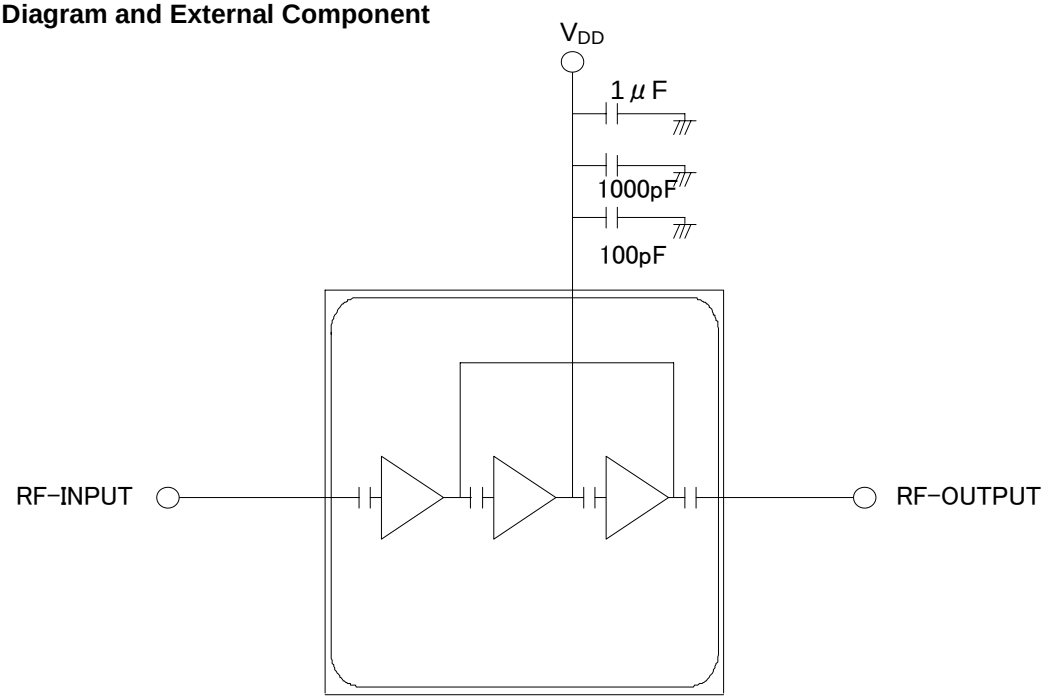




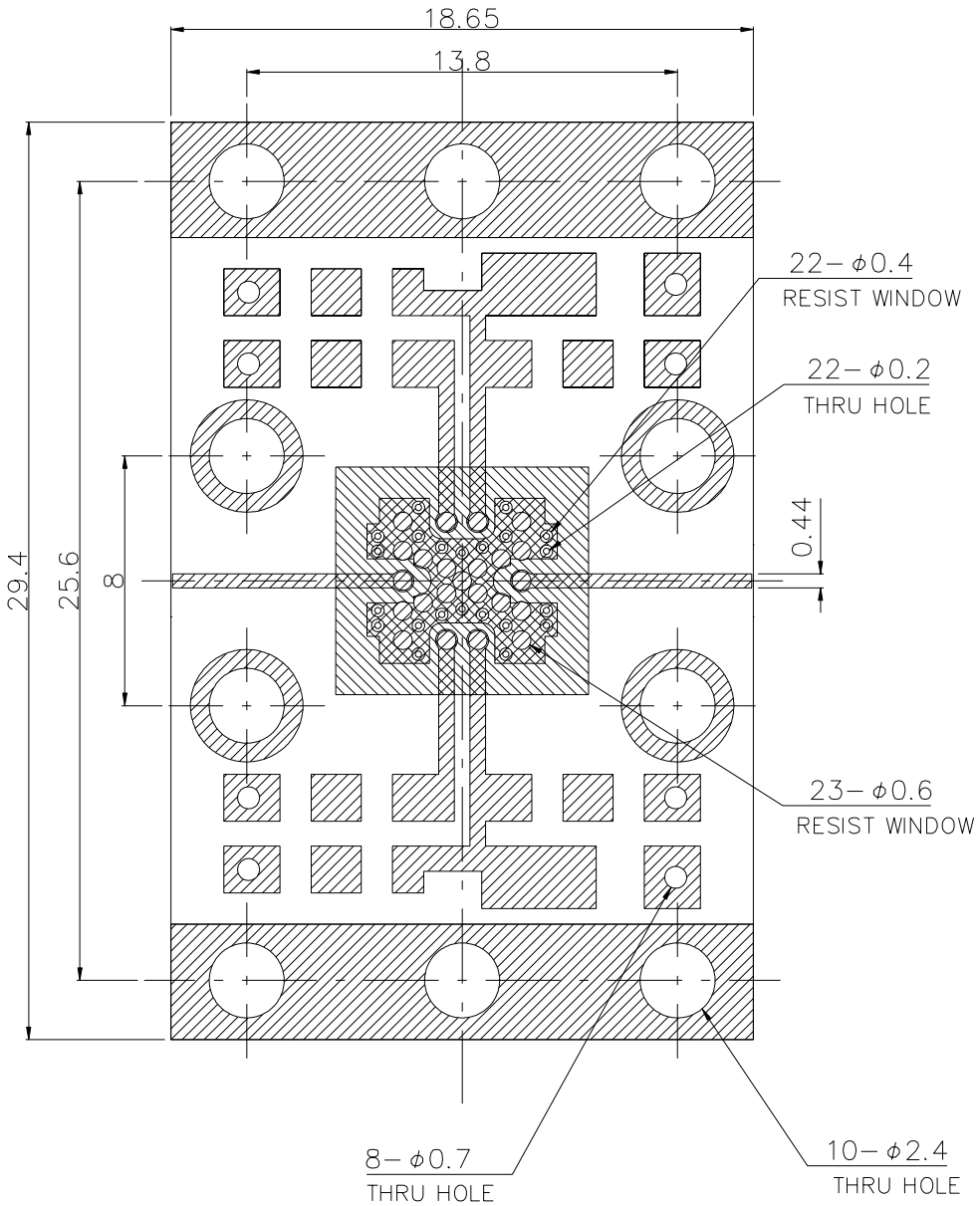


PIN ASSIGNMENT
1: N.C.
2: VDD
3: RFout
4: N.C.
5: N.C.
6: RFin

■ Block Diagram and External Component



■ Recommended Foot Pattern Layout



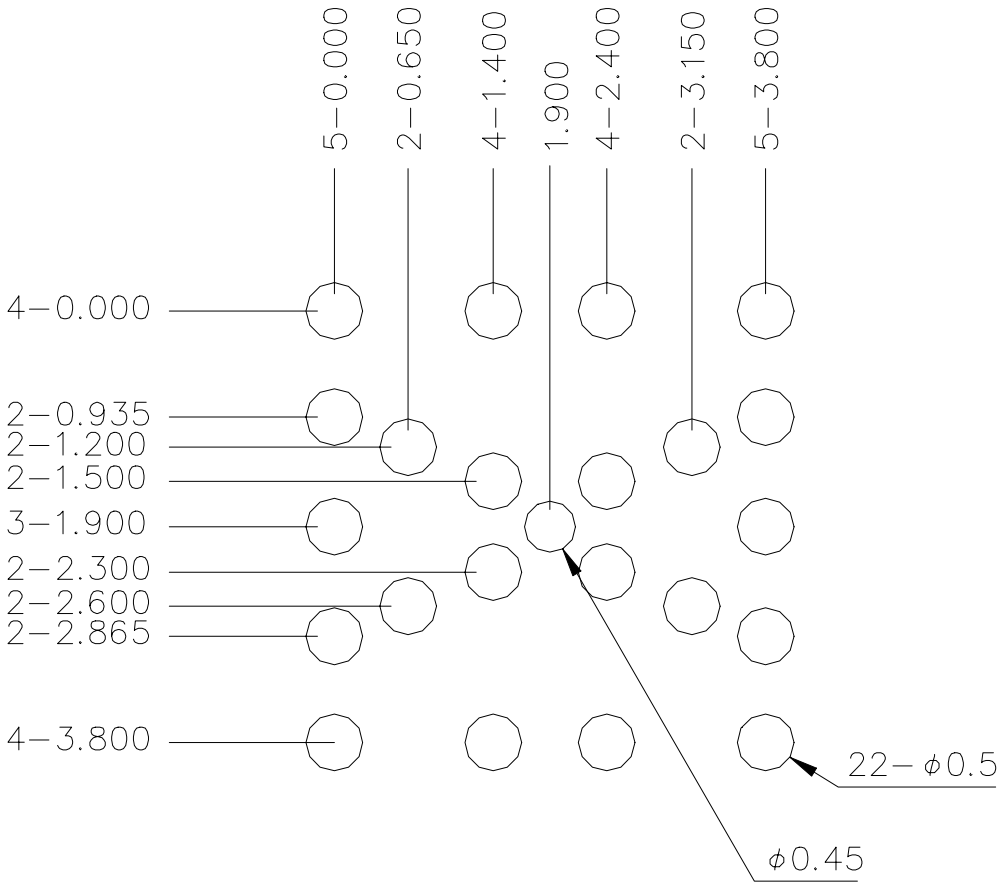
Notes :

1.LAMINATE : Rogers Corporation RO4003
Thickness t=0.2mm, Cu Foil 18 μm

2. ▨ : Finish to copper foil ; Ni 0.1 μm min./Au 0.1±0.08 μm (Both side)

3. ▨ : Resist

■ **Recommended Stencil Pattern**



Thickness : 0.15 μ m

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CAUTION

Eudyna Devices Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not put these products into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.