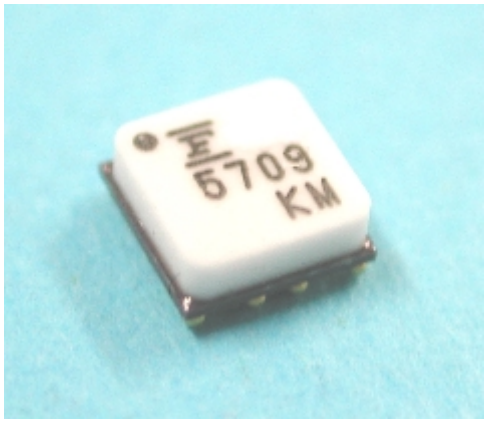
FMM5709VZ

K / Ka Band Low Noise Amplifier MMIC



FEATURES

- Low Noise Figure : NF = 3.5dB (Typ.) @ f=26GHz
- High Associated Gain : Gas = 21dB (Typ.) @f=26GHz
- Broad Band : 17.5~32GHz
- High Output Power : P1dB = 12dBm (Typ.) @f=26GHz
- Ball Grid Array SMT Package(VZ-pkg)
- Impedance Matched Zin/Zout = 50Ω

DESCRIPTION

The FMM5709VZ is a LNA MMIC designed for applications in the 17.5~32 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	P_{in}	-3	dBm
Storage Temperature	T_{stg}	-55 to +125	℃

RECOMMENDED OPERATING CONDITIONS

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

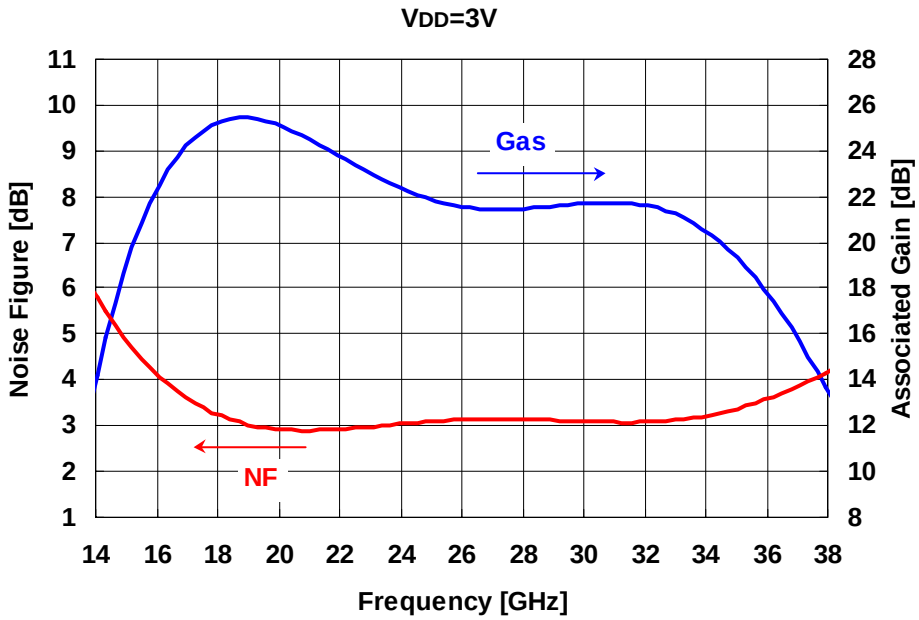
ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25℃)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Noise Figure	NF	Freq.=26GHz	-	3.5	4	dB
Associated Gain	Gas	V_{DD}=3V	19	21	24	dB
Drain Current	I_{DD}	I_{DD}=60mA typ.	-	60	75	mA
Output Power at 1dB G.C.P.	P_{1dB}	Z_S=Z_L=50Ω	-	12.0	-	dBm
Output 3rd order intercept point	OIP3		-	22.5	-	dBm
Input Return Loss (at P_{in}=-20dBm)	RLin		-	-10	-	dB
Output Return Loss (at P_{in}=-20dBm)	RLout		-	-10	-	dB

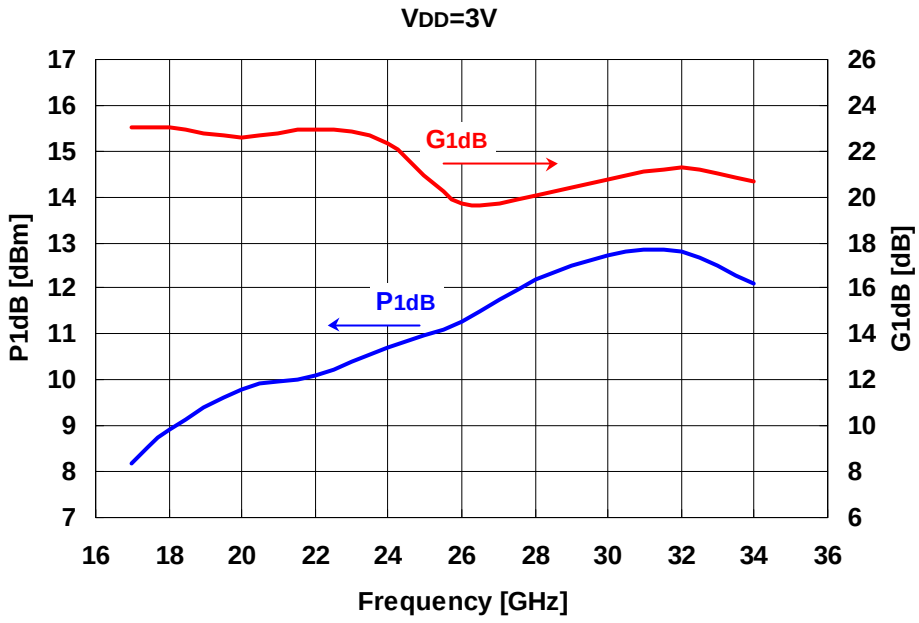
G.C.P. : Gain Compression Point

ESD	Class 0	~ 199V
Note : Based on EIAJ ED-4701 C-111A(C=100pF, R=1.5kΩ)		
CASE STYLE	VZ	

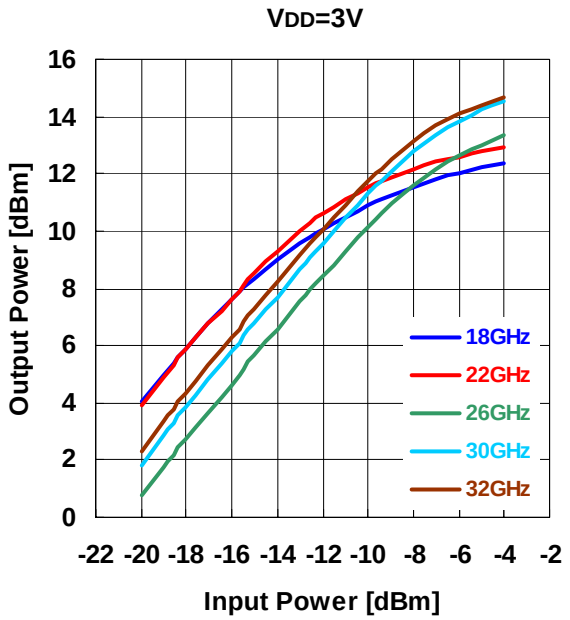
NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



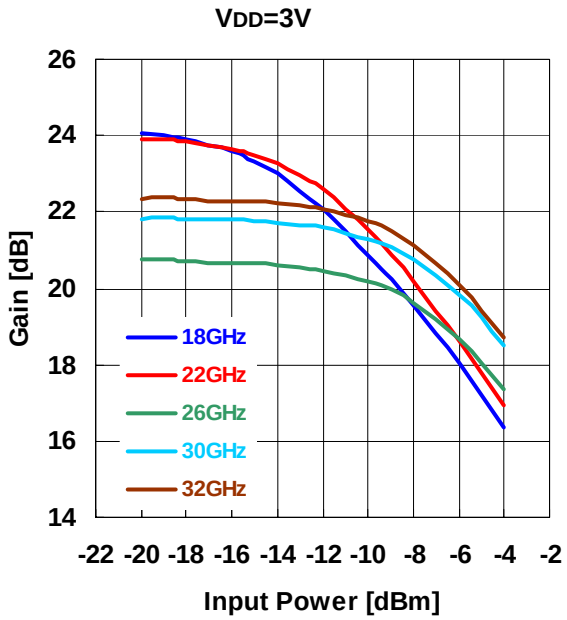
P1dB, G1dB vs. FREQUENCY



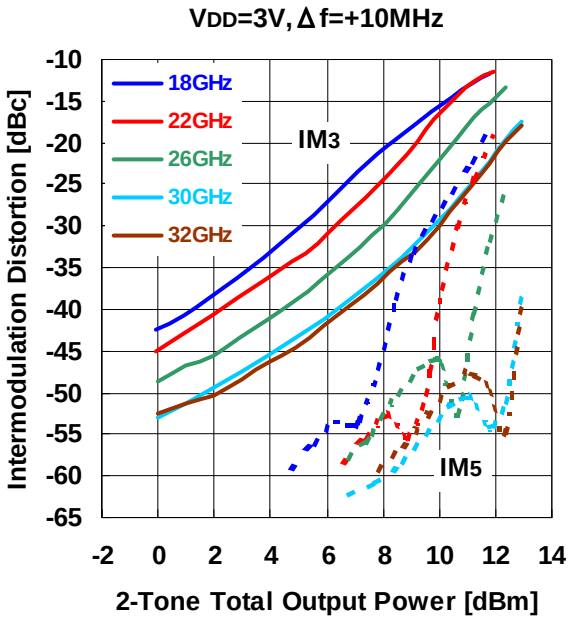
OUTPUT POWER vs. INPUT POWER



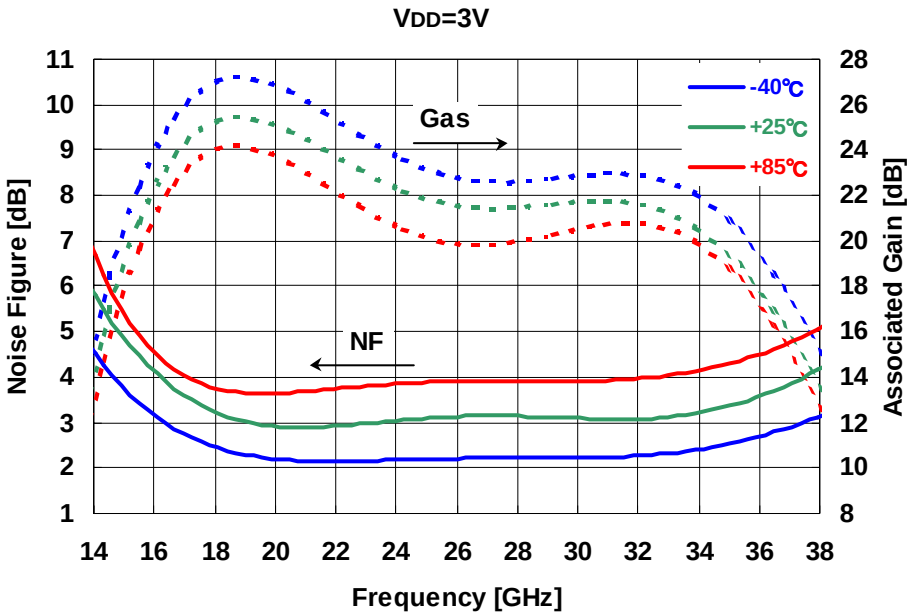
GAIN vs. INPUT POWER



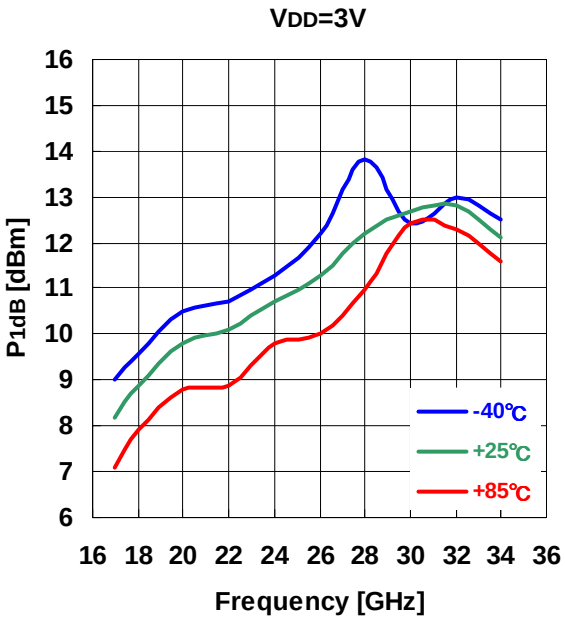
IMD PERFORMANCE vs. TOTAL OUTPUT POWER



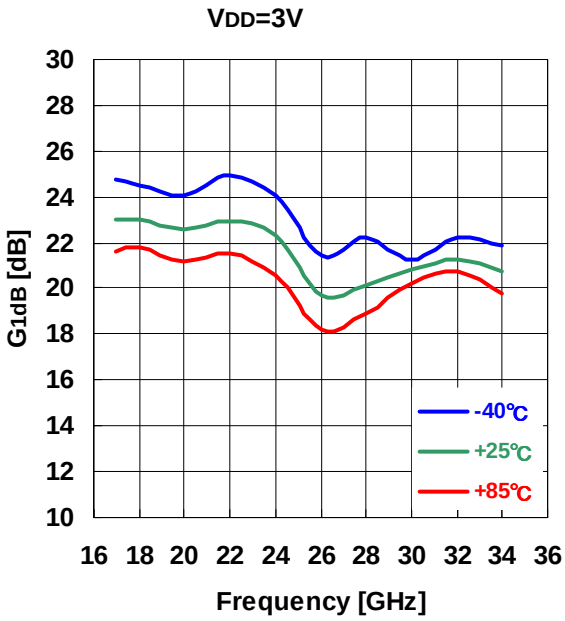
NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY
by Temperature



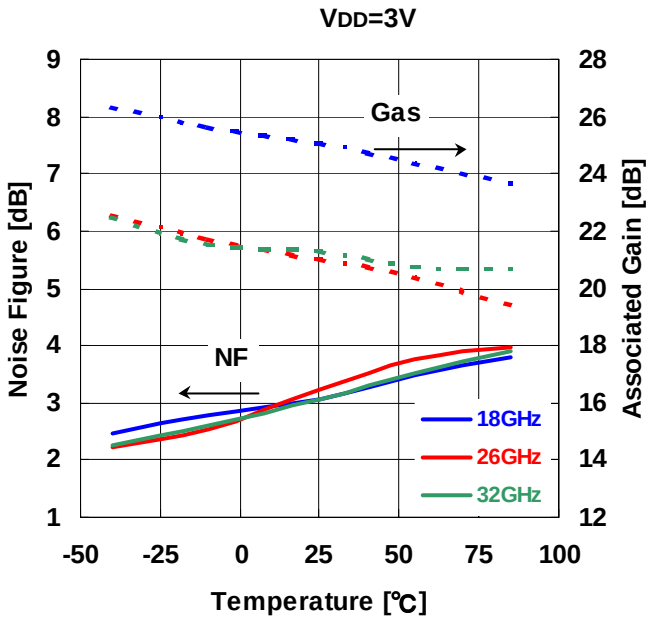
P1dB vs. FREQUENCY
by Temperature



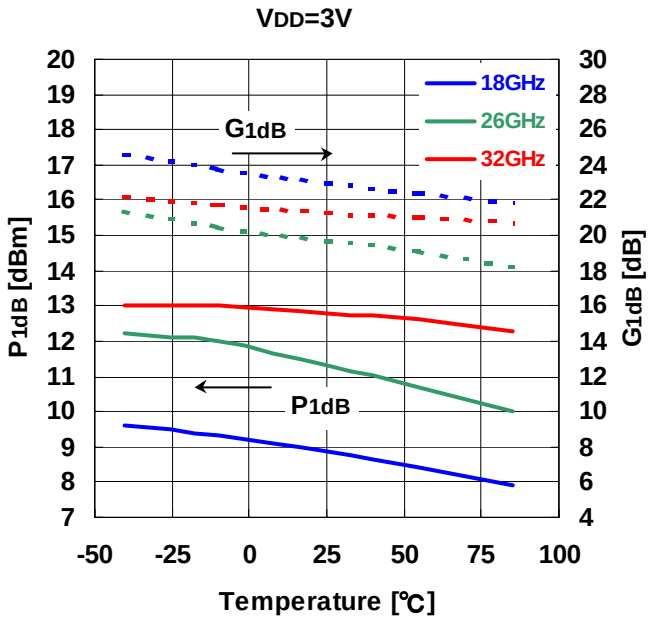
G1dB vs. FREQUENCY
by Temperature



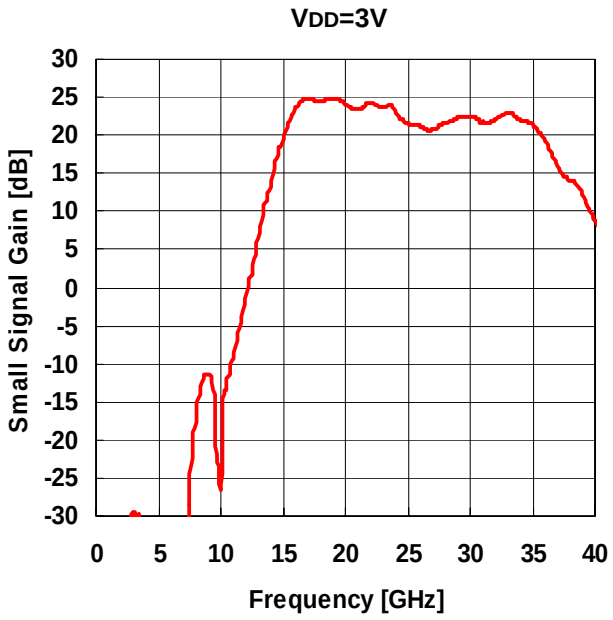
NOISE FIGURE, ASSOCIATED GAIN vs. TEMPERATURE



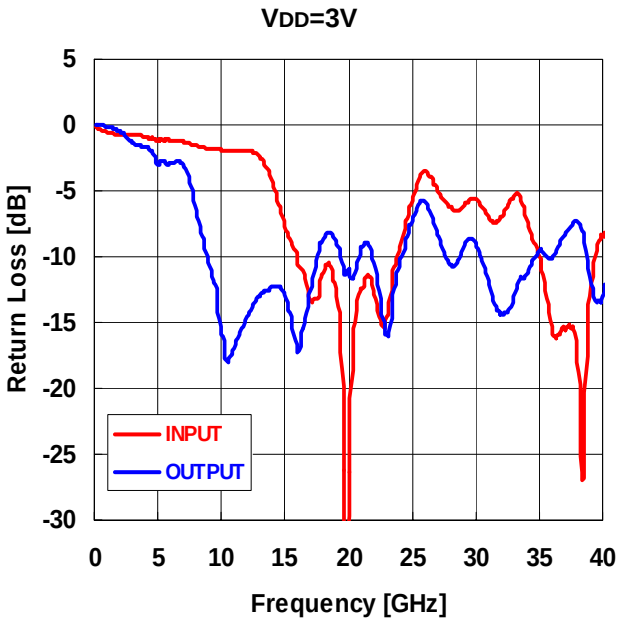
P1dB, G1dB vs. TEMPERATURE



SMALL SIGNAL GAIN vs. FREQUENCY



RETURN LOSS vs. FREQUENCY



■ S-Parameters

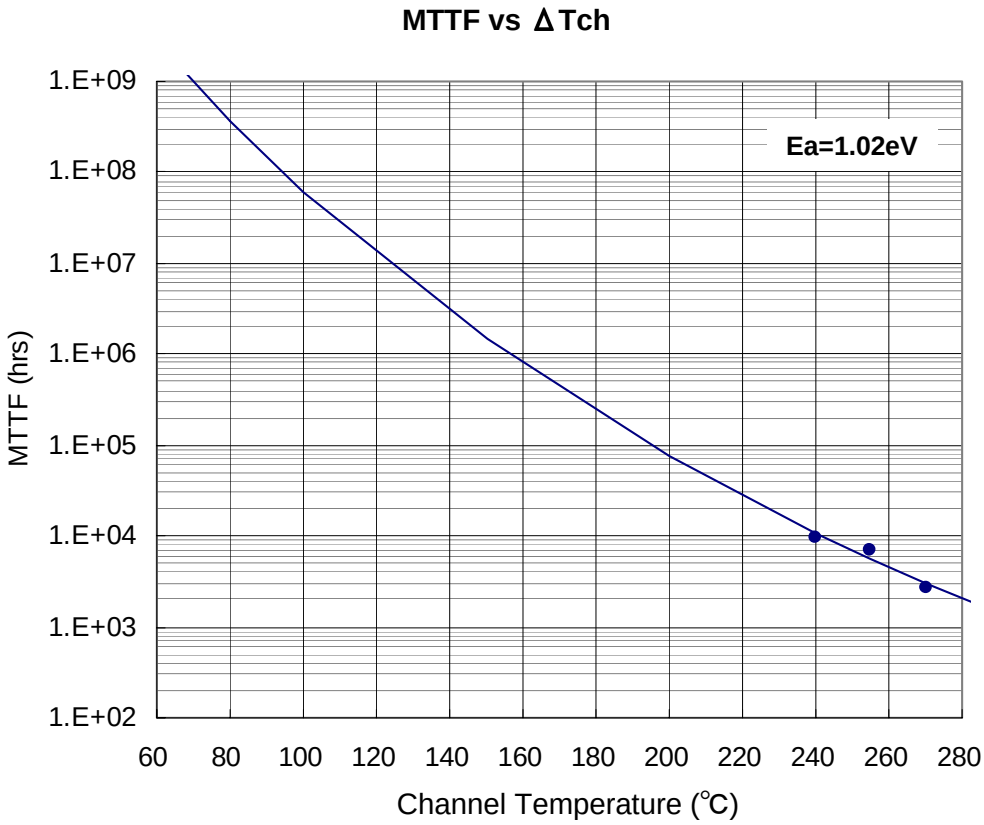
V_{DD}=3V

FREQ.	S11		S21		S12		S22	
[MHz]	mag	ang	mag	ang	mag	ang	mag	ang
1000	0.939	-71.9	0.008	163.0	0.001	11.1	0.989	-58.3
2000	0.916	-138.9	0.026	75.7	0.001	-96.9	0.940	-114.7
3000	0.918	159.1	0.033	-55.1	0.001	115.1	0.858	-165.5
4000	0.903	95.8	0.027	178.7	0.001	6.5	0.823	144.5
5000	0.872	24.9	0.021	50.1	0.004	21.2	0.708	87.0
6000	0.868	-46.9	0.011	15.7	0.004	-100.6	0.714	28.4
7000	0.863	-111.1	0.007	55.9	0.004	-170.9	0.703	-37.1
8000	0.836	-172.2	0.142	-52.3	0.003	139.5	0.476	-99.6
9000	0.813	120.0	0.273	156.4	0.003	89.4	0.303	-154.0
10000	0.799	42.0	0.047	120.3	0.001	-9.8	0.164	118.4
11000	0.794	-31.3	0.341	65.8	0.000	-25.4	0.142	51.2
12000	0.802	-90.3	0.842	-5.0	0.002	84.2	0.187	7.7
13000	0.760	-144.6	2.079	-85.3	0.002	26.0	0.225	-21.8
14000	0.602	151.8	4.618	-177.9	0.001	9.0	0.244	-48.0
15000	0.412	76.5	9.451	78.2	0.001	19.6	0.226	-84.7
16000	0.303	12.9	15.110	-33.6	0.004	-3.4	0.138	-121.9
17000	0.216	-13.1	17.320	-144.2	0.004	-63.5	0.234	-174.2
18000	0.277	-18.8	16.560	120.7	0.006	-101.2	0.372	126.5
19000	0.241	-69.3	17.420	27.9	0.008	-147.4	0.363	85.6
20000	0.048	71.5	16.020	-62.2	0.008	159.1	0.286	77.8
21000	0.241	-1.5	14.740	-141.0	0.010	107.9	0.337	72.3
22000	0.234	-48.6	16.410	136.6	0.010	58.8	0.302	9.9
23000	0.186	-91.1	15.330	53.1	0.010	-5.0	0.159	-49.1
24000	0.335	178.2	14.290	-33.5	0.008	-32.4	0.290	-75.1
25000	0.517	130.1	11.730	-106.4	0.009	-99.7	0.433	-99.6
26000	0.669	86.3	11.370	-179.0	0.008	173.1	0.512	-132.0
27000	0.568	39.8	10.940	111.8	0.004	95.8	0.386	-168.5
28000	0.487	-14.7	12.060	39.4	0.003	30.7	0.295	137.6
29000	0.486	-77.3	12.970	-36.9	0.005	-32.2	0.338	73.5
30000	0.524	-134.7	13.290	-118.2	0.008	-102.1	0.356	28.9
31000	0.447	177.3	12.240	163.9	0.010	-173.2	0.256	6.4
32000	0.446	135.3	12.620	92.1	0.011	125.7	0.193	-10.3
33000	0.538	76.5	13.900	8.3	0.013	66.1	0.223	-81.6
34000	0.439	5.9	12.590	-77.2	0.009	-6.4	0.270	-152.1
35000	0.315	-49.0	11.610	-162.1	0.009	-41.4	0.333	156.3
36000	0.171	-129.8	9.169	111.2	0.007	-108.4	0.312	63.1
37000	0.166	125.9	6.178	32.3	0.004	-116.7	0.383	-22.6
38000	0.137	75.9	5.045	-34.9	0.015	-121.2	0.430	-79.8
39000	0.223	149.4	4.033	-117.0	0.028	137.4	0.264	-164.1
40000	0.377	112.1	2.768	174.1	0.029	59.0	0.224	115.4

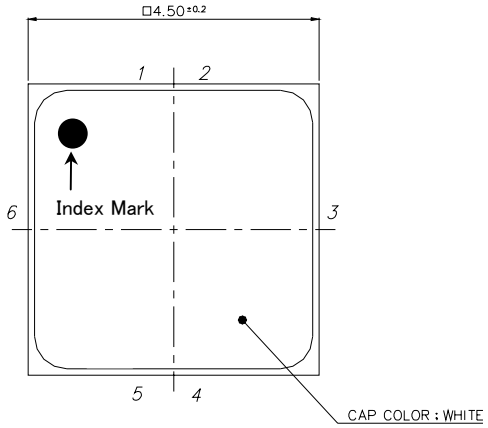
THERMAL INFORMATION (REFERENCE DATA)

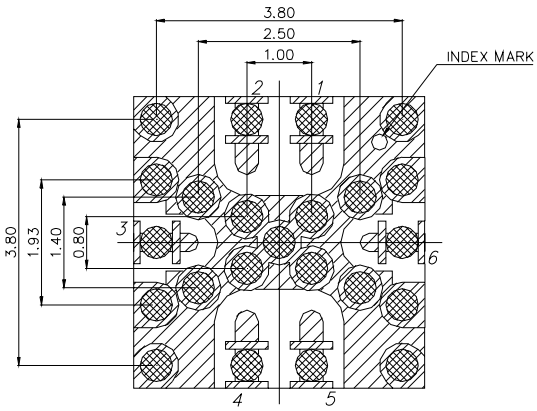
	V_{DD}=3V, I_{DD}=60mA	Unit
ΔTch	22	℃

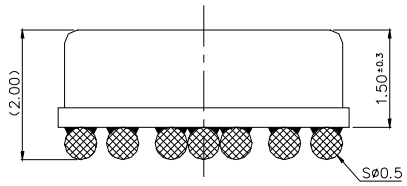
note) ΔTch: BGA Package Balls to channel temperature rise



■ Package Outline and Pin Assignment

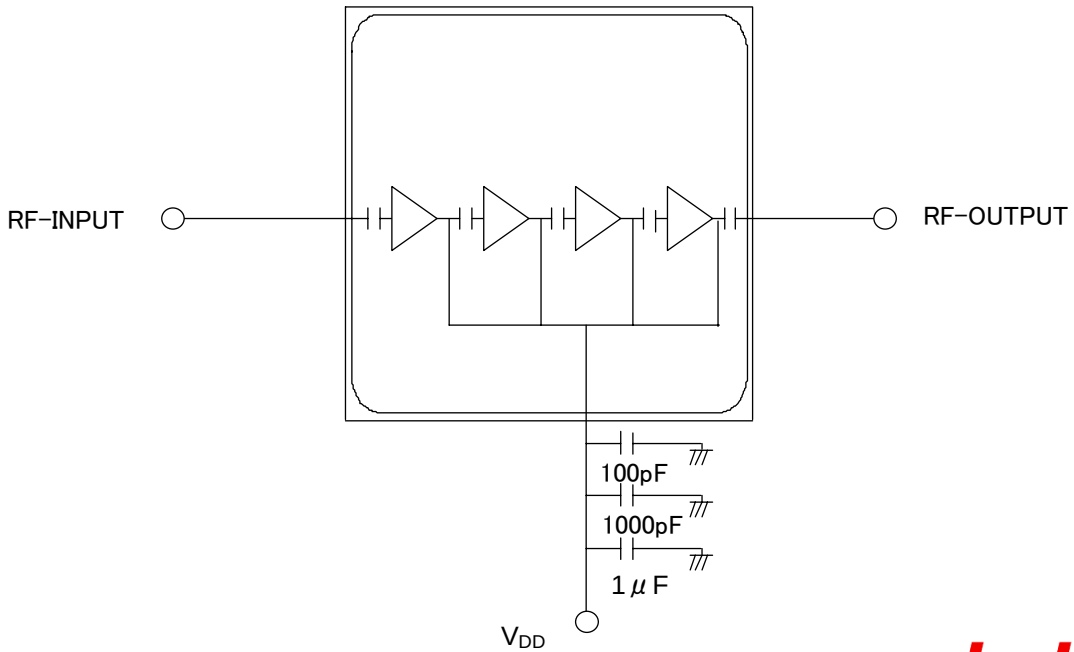




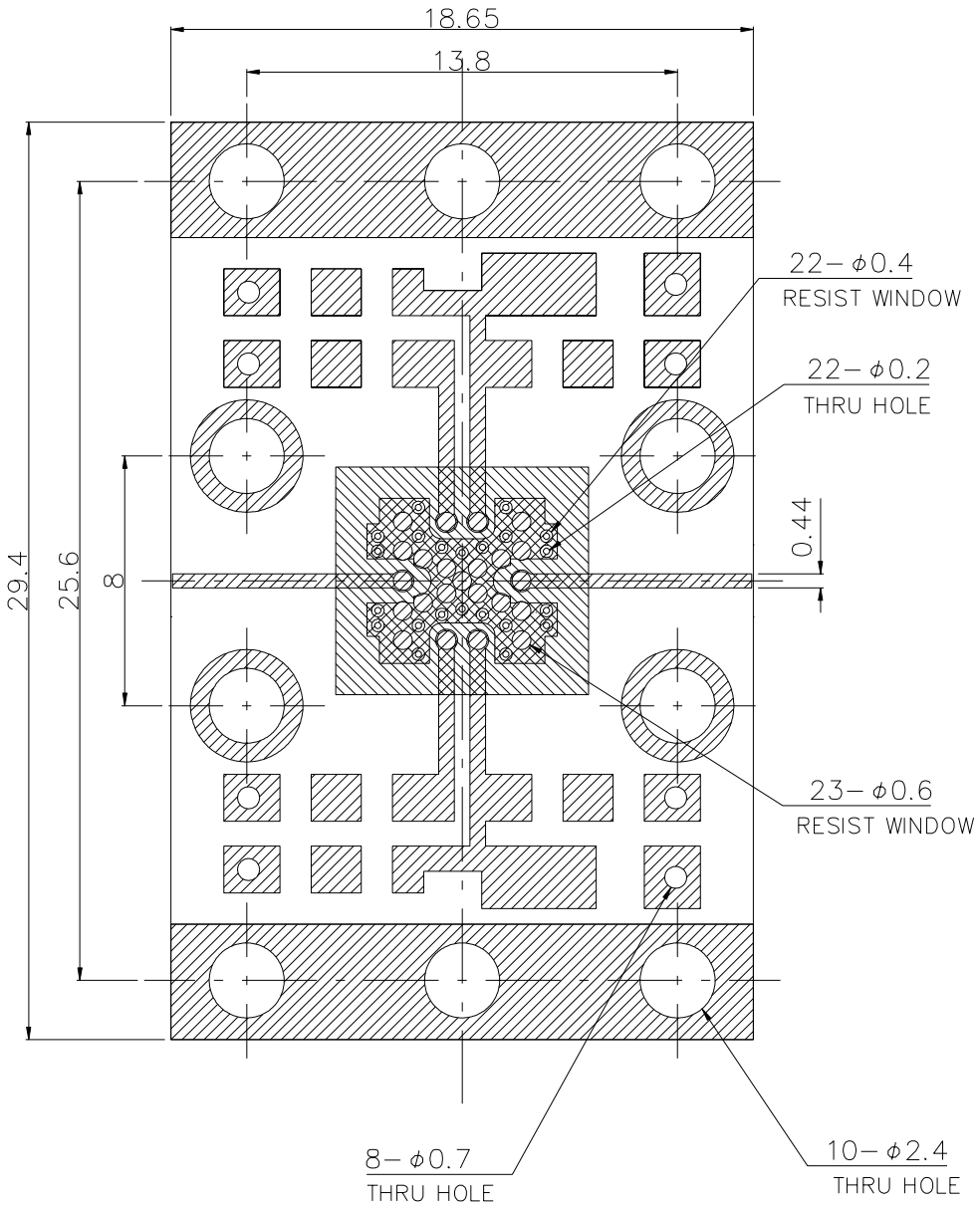


PIN ASSIGNMENT
1: N.C.
2: N.C.
3: RF-out
4: VDD
5: N.C.
6: RF-in

■ Block Diagram and External Component



■ Recommended Foot Pattern Layout



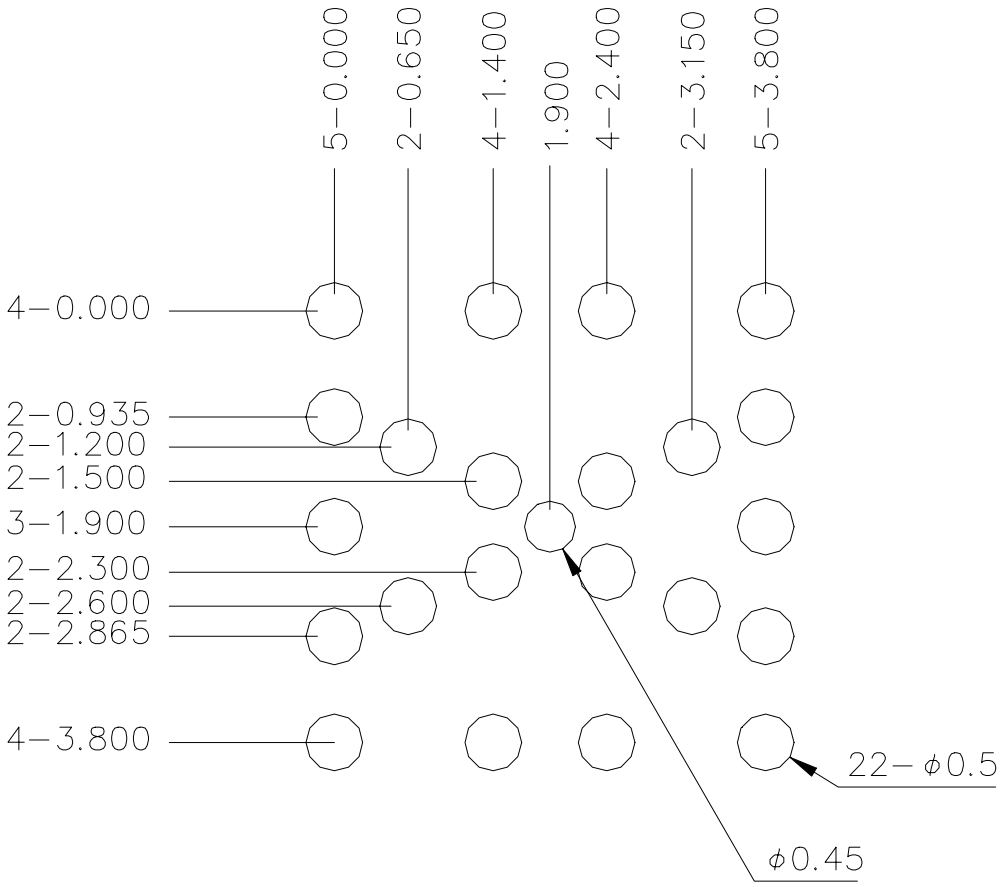
Notes :

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 μm

For further information please contact :

Eudyna Devices USA Inc.
2355 Zanker Rd.
San Jose, CA 95131-1138, U.S.A.
TEL: (408) 232-9500
FAX: (408) 428-9111
www.us.eudyna.com

Eudyna Devices Europe Ltd.
Network House
Norreys Drive
Maidenhead, Berkshire SL6 4FJ
United Kingdom
TEL: +44 (0) 1628 504800
FAX: +44 (0) 1628 504888

Eudyna Devices Asia Pte. Ltd.
Hong Kong Branch
Rm.1101,Ocean Centre, 5 Canton Road
Tsim Sha Tsui, Kowloon, Hong Kong
TEL: +852-2377-0227
FAX: +852-2377-3921

Eudyna Devices Inc.
1000 Kamisukiahara, showa-cho
Nakakomagun, Yamanashi
409-3883, Japan
(Kokubo Industrial Park)
TEL +81-55-275-4411
FAX +81-55-275-9461
Sales Division
1, Kanai-cho, Sakae-ku
Yokohama, 244-0845, Japan
TEL +81-45-853-8156
FAX +81-45-853-8170

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.