

TMD1414-02 **TMD1414-02B** **TMD1414-02C**

FEATURES

- Suitable for Ku-band VSAT
- High Gain $G_{1dB}=36dB(TYP.)$
- Broadband Operation $f=13.75 - 14.5GHz.$

ABSOLUTE MAXIMUM RATINGS($T_a=25^{\circ}C$)

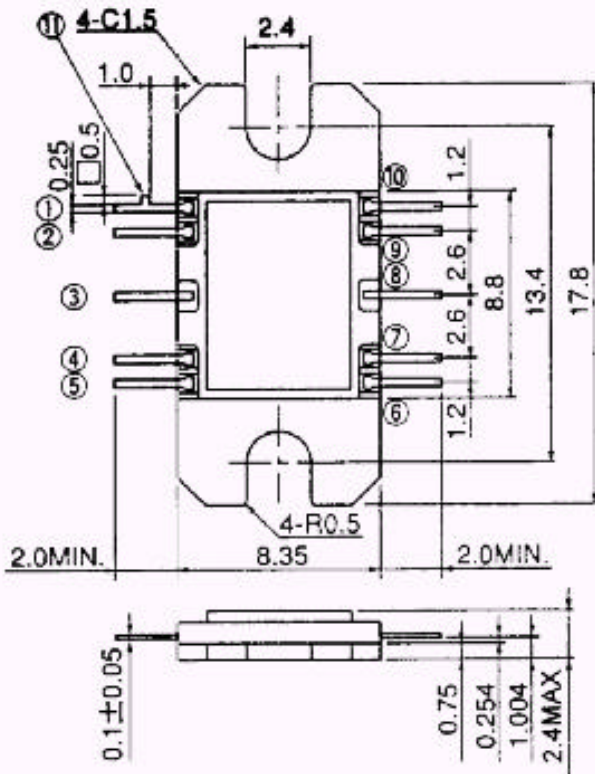
CHARACTERISTICS	SYMBOL	UNIT	RATINGS
DRAIN SUPPLY VOLTAGE	VDD	V	10
GATE SUPPLY VOLTAGE	VGG	V	-10
INPUT POWER	Pin	dBm	0
FLANGE TEMPERATURE	Tf	°C	-40 - +90
STORAGE TEMPERATURE	Tstg	°C	-65 - +175

RF PERFORMANCE SPECIFICATIONS ($T_a=25^{\circ}C$)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Operating Frequency	f		GHz	13.75	—	14.5
Output Power at 1dB Gain Compression Point	P1dB	VDD=7V VGG=-5V	dBm	19.0	22.0	—
Power Gain at 1dB Gain Compression Point	G1dB		dB	30.0	36.0	—
Gain Flatness	G		dB	—	—	±1.0
Drain Current	IDD		A	—	0.17	0.3
VSWRin (small signal)	VSWRin		—	—	2.0:1	2.5:1
VSWRout (small signal)	VSWRout		—	—	2.0:1	3.0:1

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- ◆ The information contained herein may be changed without prior notice. It is therefore advisable to contact TOSHIBA before proceeding with design of equipment incorporating this product.

Package Outline (TMD1414-02)



②④⑦⑨ : No Connection

③: RF Input

⑤⑥ : VGG

⑩⑪ : VDD

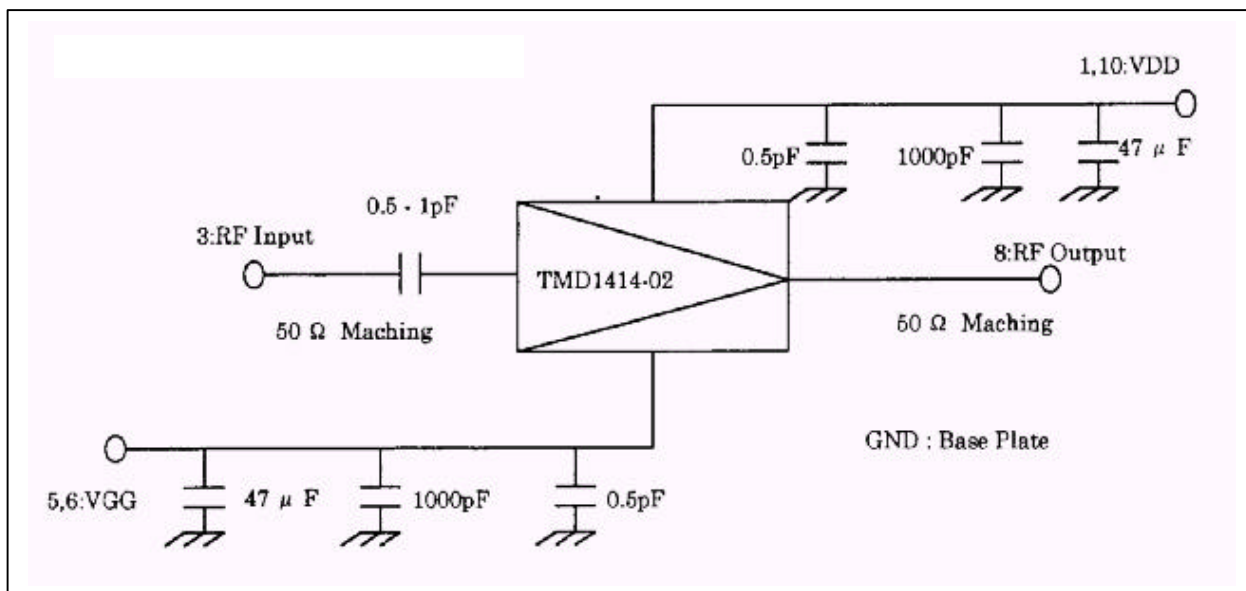
⑧ : RF Output

⑪ : Orientation Tab

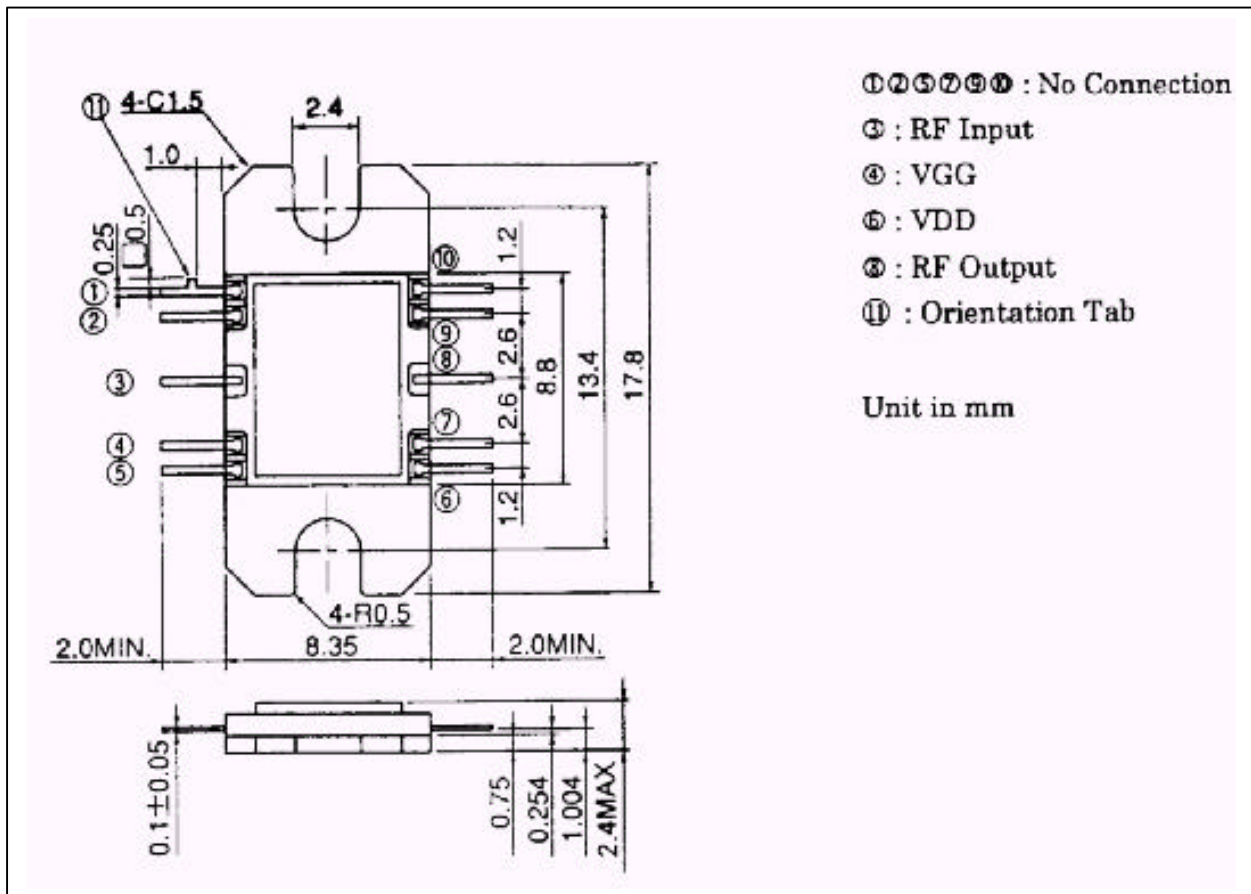
Unit in mm

There are two pins for both VDD(⑩⑪) and VGG(⑤⑥). These two pins do not have to be biased at the same time, but at least one of the pins has to be biased. In case only one pin is biased, the other pin has to be opened.

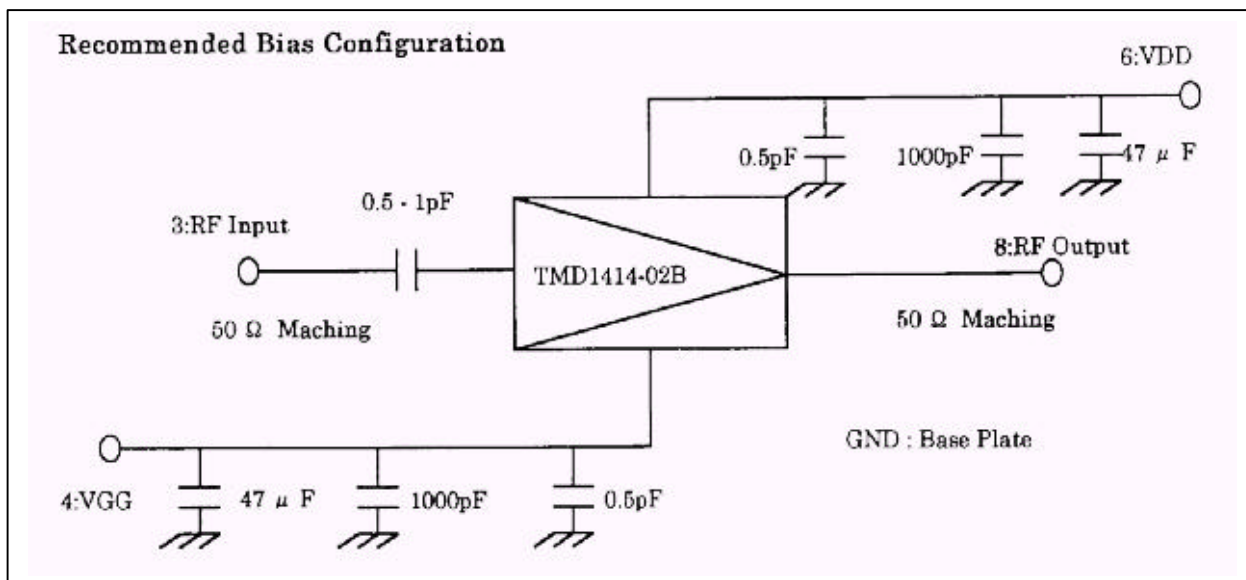
Recommended Bias Configuration (TMD1414-02)



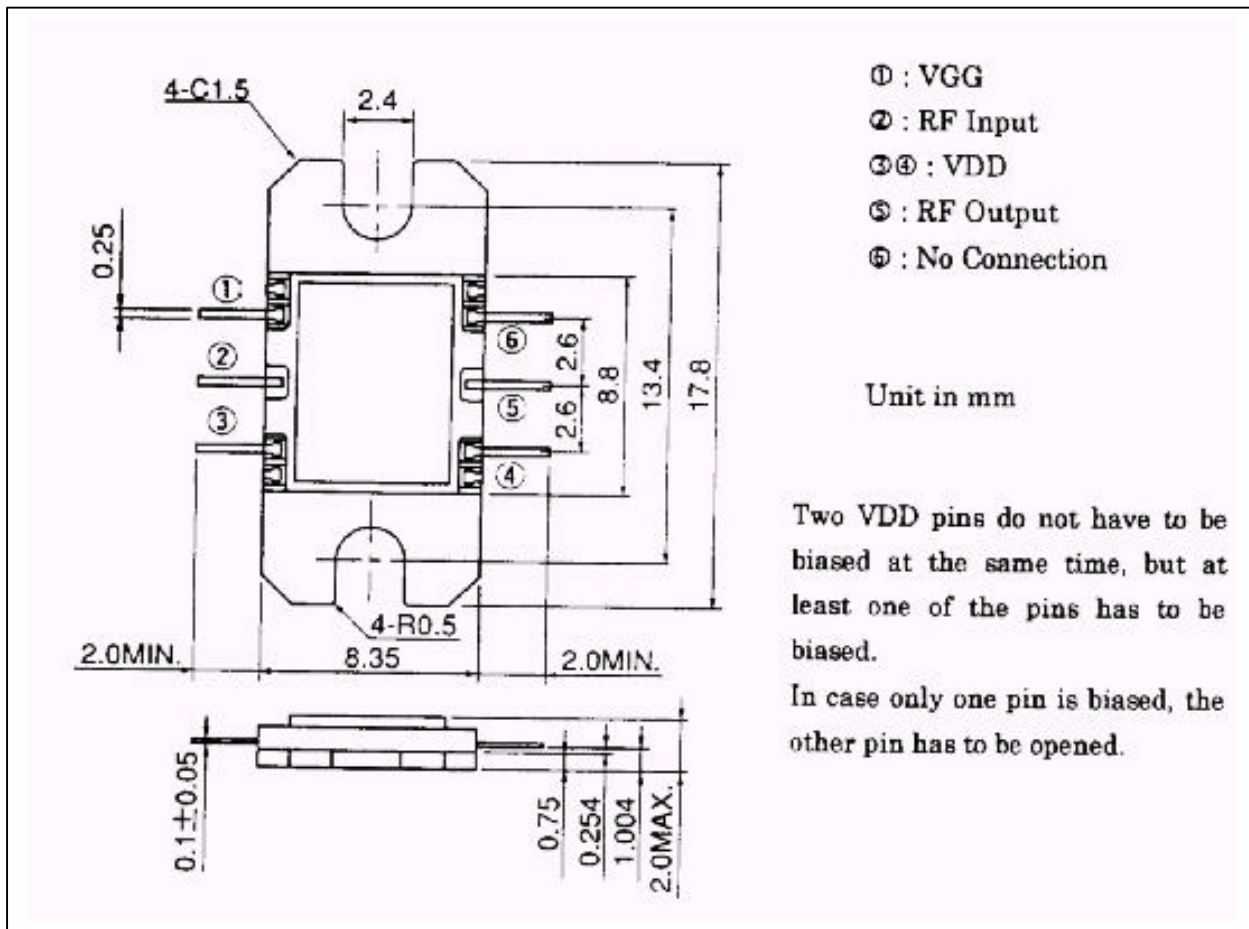
Package Outline (TMD1414-02B)



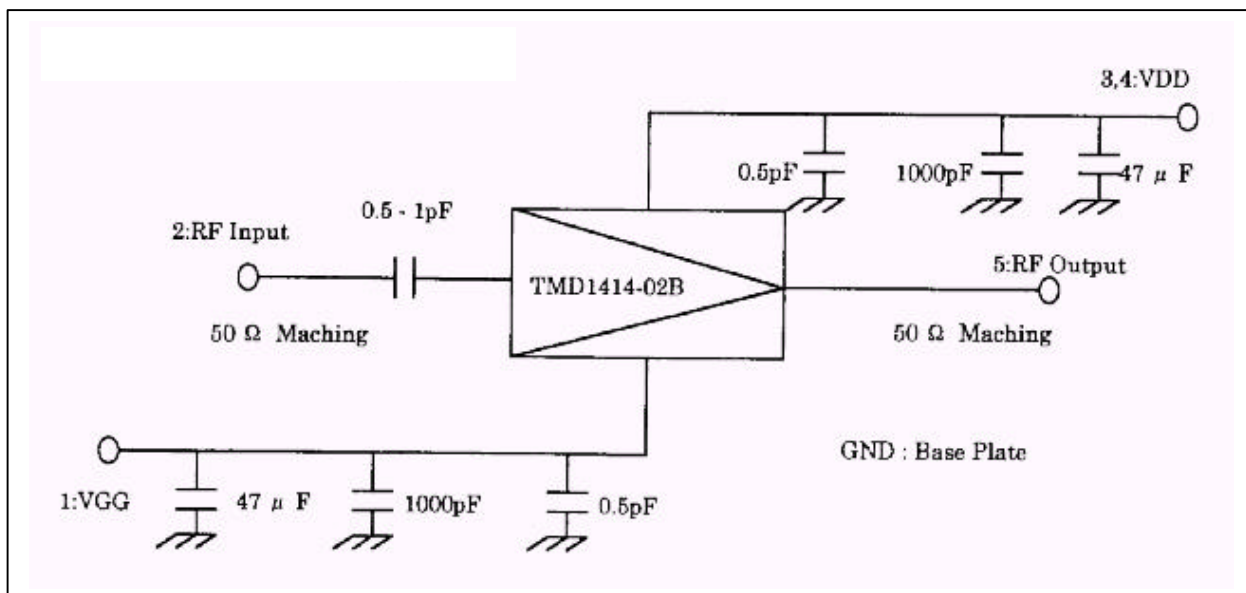
Recommended Bias Configuration (TMD1414-02B)



Package Outline (TMD1414-02C)



Recommended Bias Configuration (TMD1414-02C)

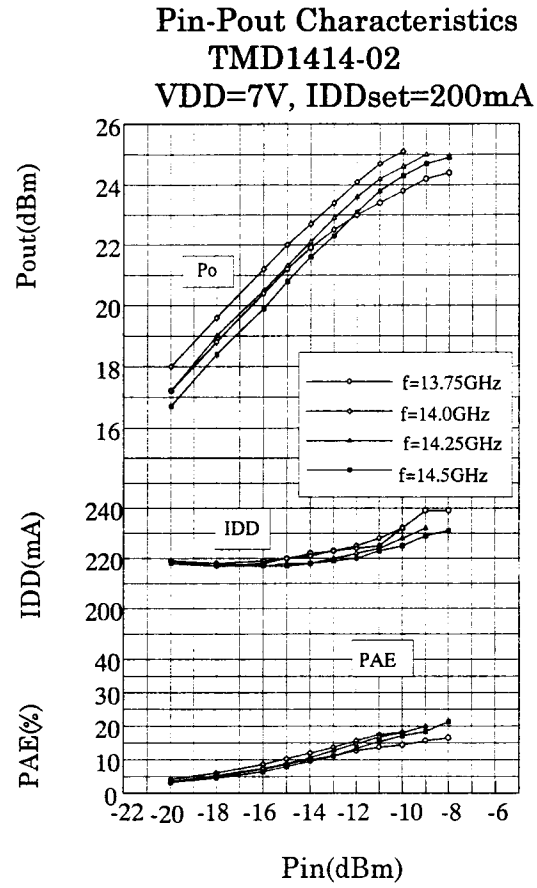


S-Parameters (TMD1414-02/02B/02C)

! S-PARAMETERS FOR TMD1414-02 VDD=7 V, VGG=-5V

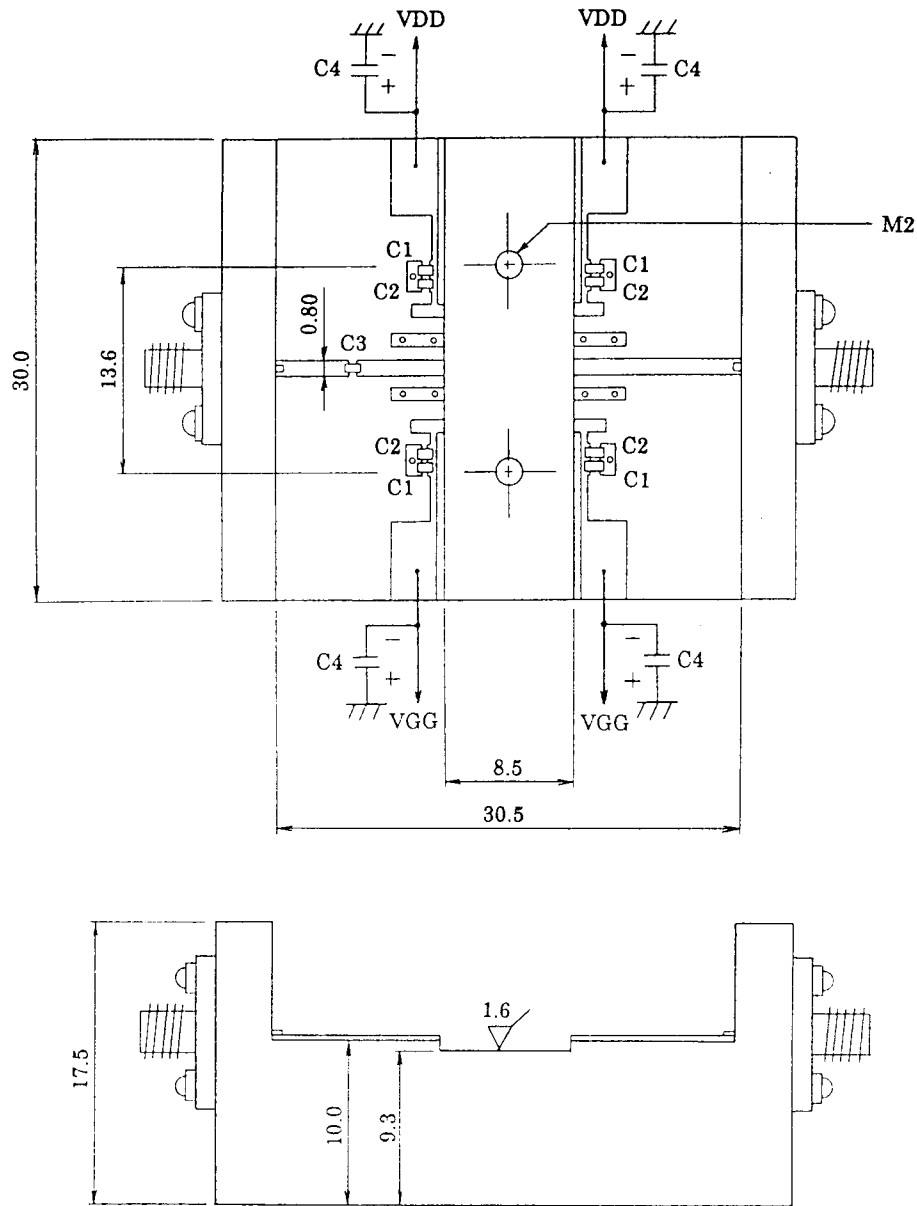
GHZ S MA R 50

! FREQ	S11		S21		S12		S22	
!	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
13.475	0.612	-147.4	49.998	-137.5	0.005	146.7	0.617	-145.2
13.500	0.597	-150.2	51.276	-142.1	0.006	145.5	0.596	-148.7
13.525	0.576	-152.9	52.558	-146.9	0.005	138.6	0.576	-152.1
13.550	0.556	-155.6	53.645	-151.8	0.005	137.4	0.552	-155.6
13.575	0.535	-158.0	54.757	-156.5	0.005	134.0	0.529	-158.9
13.600	0.512	-160.2	55.579	-161.4	0.005	128.0	0.505	-162.3
13.625	0.490	-162.4	56.291	-166.1	0.005	127.9	0.481	-165.7
13.650	0.468	-164.5	57.024	-170.8	0.005	121.7	0.457	-168.7
13.675	0.445	-166.3	57.632	-175.6	0.005	128.1	0.435	-172.3
13.700	0.418	-167.9	57.979	179.8	0.005	112.6	0.407	-174.7
13.725	0.399	-169.3	58.618	175.2	0.005	115.3	0.385	-177.7
13.750	0.377	-170.2	58.774	170.6	0.004	112.9	0.362	179.7
13.775	0.358	-171.2	59.181	166.2	0.004	116.5	0.342	176.8
13.800	0.336	-171.9	59.347	161.7	0.004	117.1	0.318	174.1
13.825	0.318	-172.3	59.489	157.3	0.004	112.6	0.298	172.4
13.850	0.300	-172.6	59.581	153.0	0.004	113.4	0.284	169.6
13.875	0.283	-172.5	59.500	148.7	0.004	110.4	0.266	168.1
13.900	0.268	-172.2	59.468	144.6	0.003	107.5	0.251	166.0
13.925	0.256	-171.6	59.439	140.5	0.003	97.7	0.237	164.5
13.950	0.240	-171.1	59.337	136.4	0.003	108.8	0.224	162.4
13.975	0.230	-169.8	59.222	132.4	0.003	100.6	0.213	161.5
14.000	0.219	-169.4	59.046	128.5	0.003	96.2	0.206	159.8
14.025	0.208	-167.6	58.805	124.7	0.003	104.0	0.194	157.7
14.050	0.199	-165.9	58.785	121.0	0.003	111.6	0.182	156.3
14.075	0.191	-164.1	58.547	117.4	0.003	94.7	0.177	154.4
14.100	0.183	-161.2	58.429	113.8	0.003	103.3	0.167	153.5
14.125	0.180	-158.6	58.445	110.4	0.003	100.9	0.159	152.3
14.150	0.175	-155.7	58.458	106.9	0.003	101.3	0.150	152.0
14.175	0.174	-153.0	58.622	103.6	0.002	100.4	0.145	151.3
14.200	0.174	-150.5	58.721	100.0	0.002	105.8	0.139	149.8
14.225	0.177	-148.6	58.930	96.7	0.002	97.7	0.137	150.3
14.250	0.179	-147.3	59.101	93.1	0.002	92.7	0.134	149.3
14.275	0.183	-146.1	59.375	89.6	0.003	98.0	0.134	150.5
14.300	0.183	-144.8	59.616	86.1	0.002	96.2	0.129	148.8
14.325	0.184	-144.5	59.912	82.5	0.002	90.5	0.129	147.7
14.350	0.186	-143.3	60.022	79.0	0.002	91.2	0.126	147.2
14.375	0.188	-142.8	60.265	75.5	0.002	95.7	0.125	145.5
14.400	0.190	-141.8	60.583	72.0	0.002	97.7	0.123	145.2
14.425	0.192	-142.3	60.749	68.3	0.002	104.8	0.125	144.3
14.450	0.196	-141.1	61.085	64.9	0.002	103.6	0.123	143.4
14.475	0.200	-141.7	61.362	61.3	0.002	124.5	0.121	143.0
14.500	0.198	-141.5	61.483	57.8	0.002	103.1	0.126	139.8
14.525	0.205	-142.5	61.868	54.3	0.003	117.8	0.128	140.9
14.550	0.203	-141.9	62.070	50.7	0.002	117.0	0.129	138.1
14.575	0.206	-142.0	62.372	47.2	0.002	119.0	0.130	136.4
14.600	0.204	-141.5	62.646	43.6	0.002	100.4	0.128	133.9
14.625	0.207	-141.5	63.026	40.1	0.002	96.2	0.128	132.2
14.650	0.211	-142.2	63.246	36.4	0.002	119.7	0.129	131.8
14.675	0.214	-142.4	63.676	32.9	0.002	114.6	0.129	130.2
14.700	0.216	-142.1	63.928	29.3	0.001	111.8	0.130	126.8
14.725	0.220	-142.8	64.342	25.6	0.001	108.1	0.128	125.7

TYPICAL RF PERFORMANCE

H. OUTLINE OF TEST JIG AND BIAS CIRCUIT FOR TMD1414-02 / -1 / -2

Unit in mm



Substrate : Thickness = 0.25 mm, $\epsilon_r = 2.2$

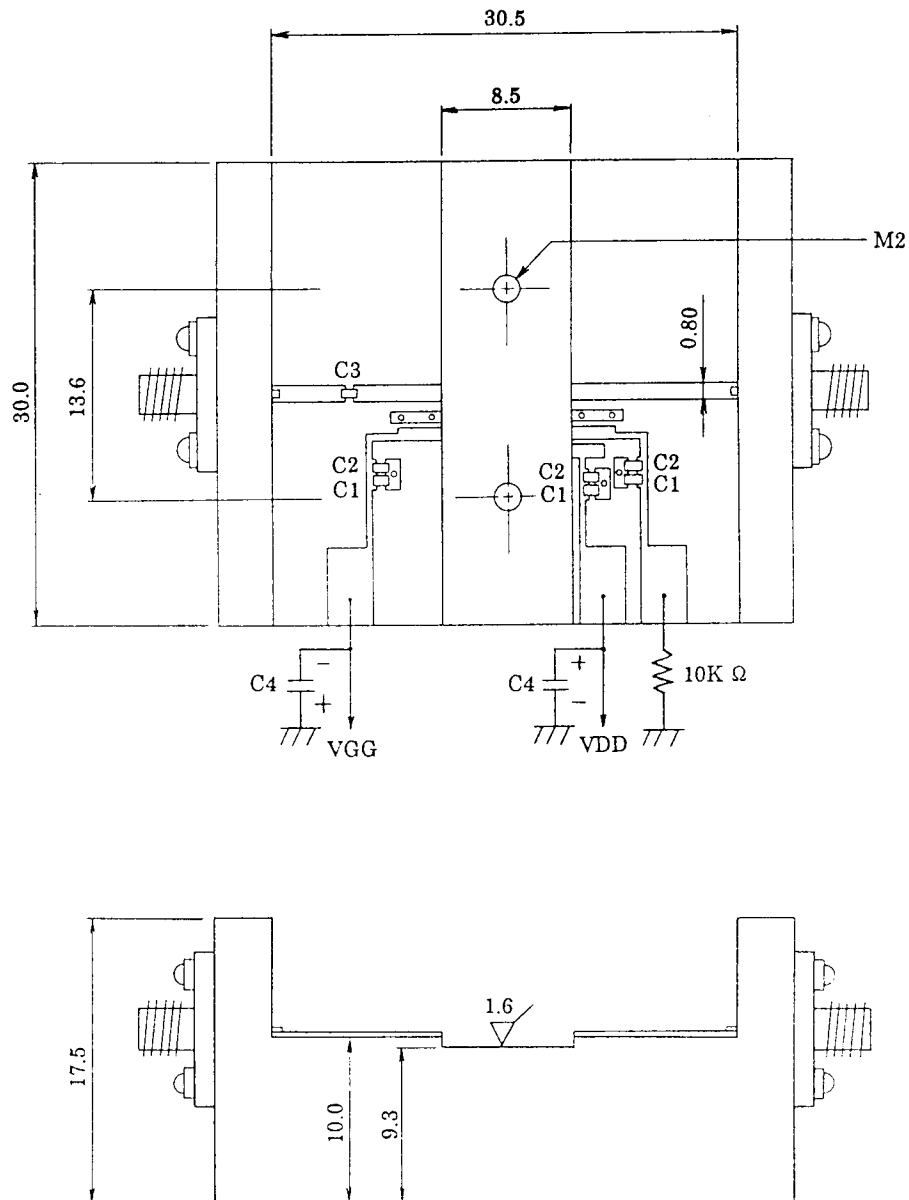
Microstripline : $t = 35 \mu\text{m}$

$C1 = 1,000 \text{ pF}$, $C2 = 0.5 \text{ pF}$, $C3 = 0.5 - 1.0 \text{ pF}$, $C4 = 47 \mu\text{F}$

- * There are two pins for both VDD and VGG. These two pins do not have to be biased at the same time, but at least one of the pins has to be biased. In case only one pin is biased, the other pin has to be opened.

I. OUTLINE OF TEST JIG AND BIAS CIRCUIT FOR TMD1414-02B / -1B / -2B

Unit in mm



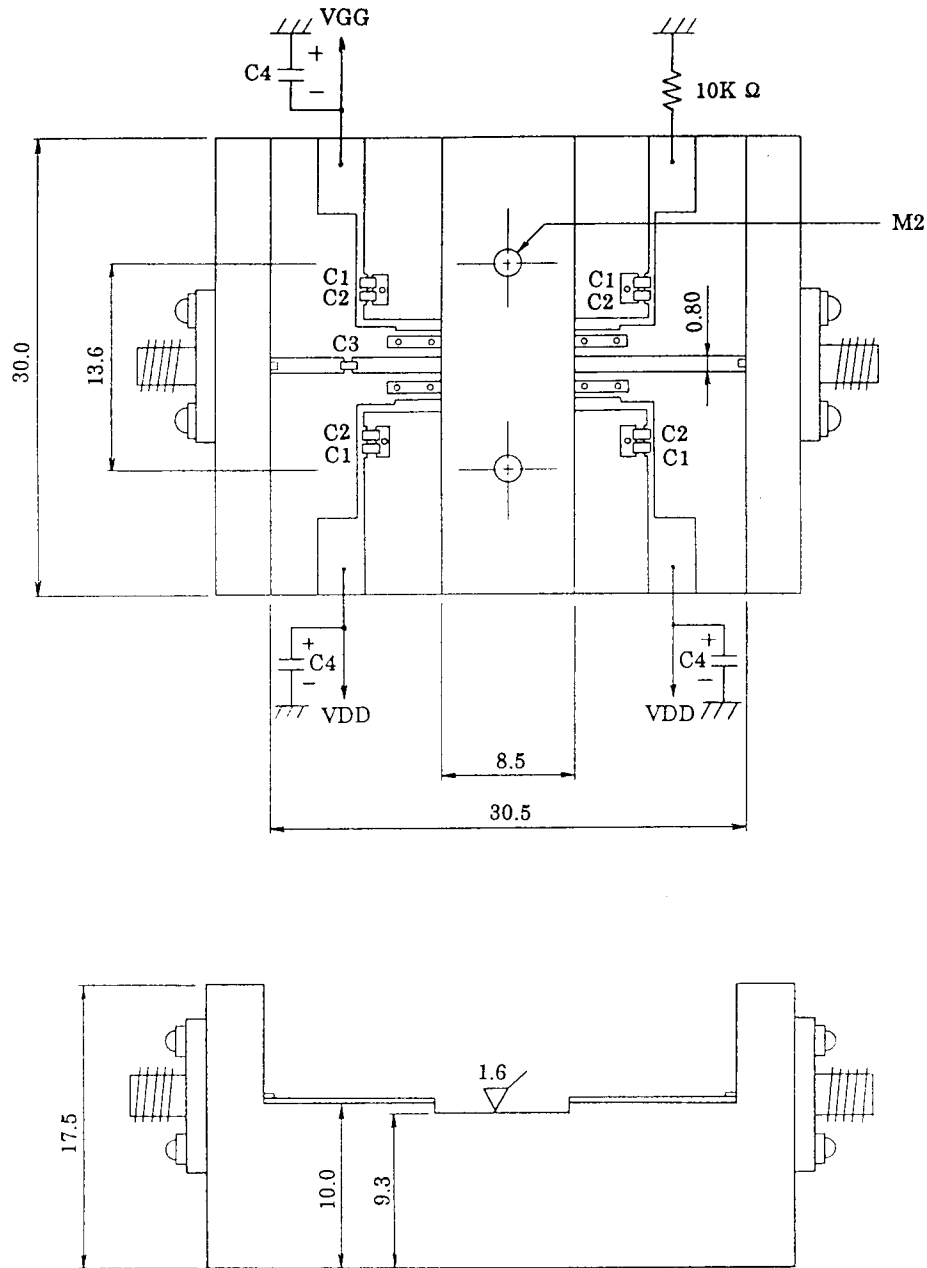
Substrate : Thickness = 0.25 mm, $\epsilon_r = 2.2$

Microstripline : $t = 35 \mu\text{m}$

C1 = 1,000 pF , C2 = 0.5 pF , C3 = 0.5 - 1.0 pF , C4 = 47 μF

J. OUTLINE OF TEST JIG AND BIAS CIRCUIT FOR TMD1414-02C / -1C / -2C

Unit in mm



Substrate : Thickness = 0.25 mm, $\epsilon_r = 2.2$

Microstripline : $t = 35 \mu\text{m}$

C1 = 1,000 pF , C2 = 0.5 pF , C3 = 0.5 - 1.0 pF , C4 = 47 μF

* Two VDD pins do not have to be biased at the same time, but at least one of the pins has to be biased. In case only one pin is biased, the other pin has to be opened.