

# APPLICATION NOTE

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**SUBJECT:** RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

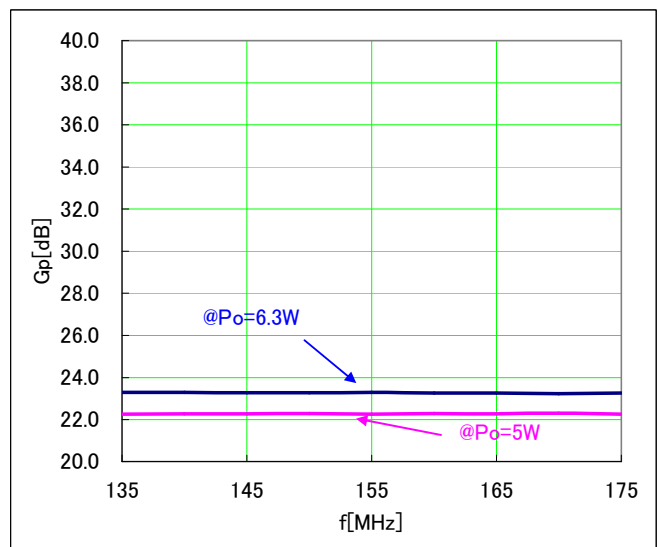
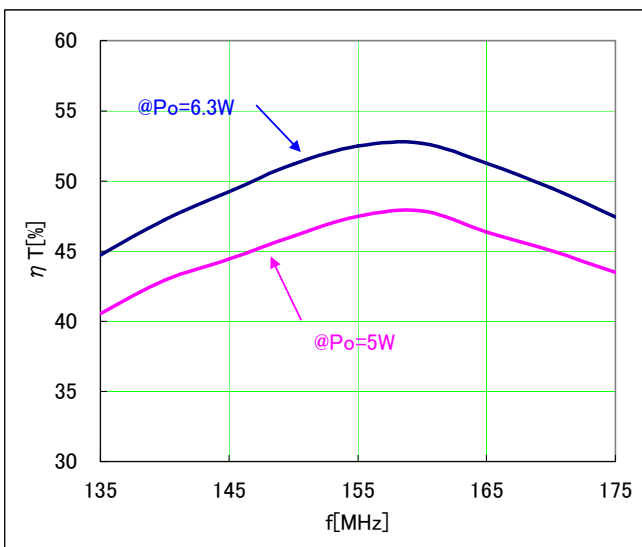
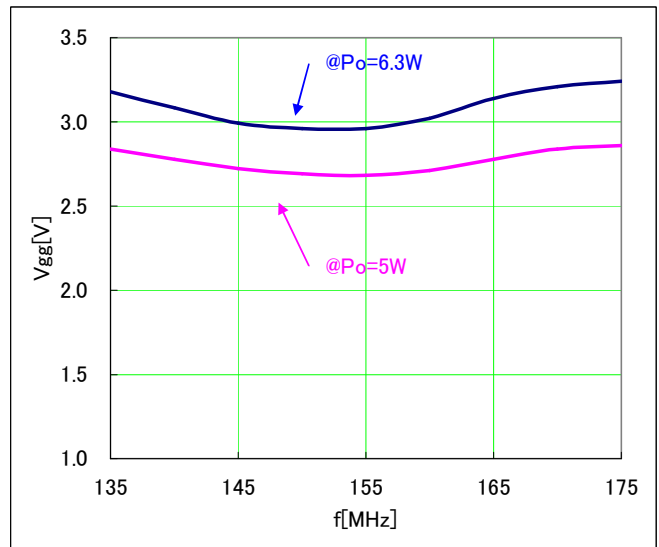
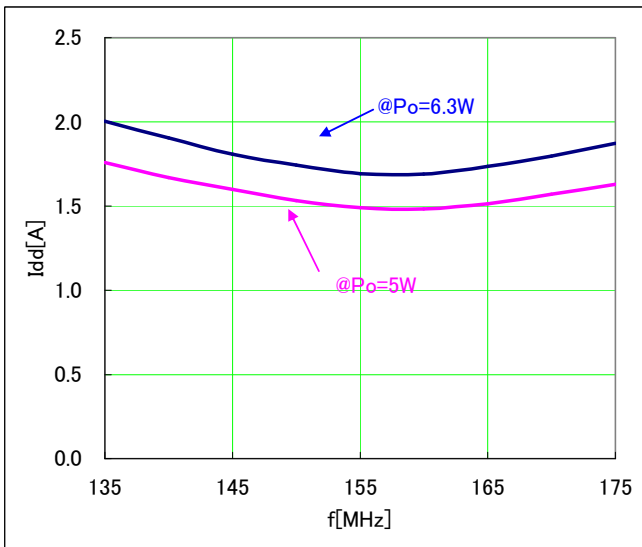
## **SUMMARY:**

This application note shows the RF wide band characteristics data  
(Frequency, Pout vs. Pin, Pout vs. Vgg characteristics) at 135 to 175 MHz band.

- Sample history :
  - RD01MUS2 : Lot number "571"
  - RD07MUS2B : Lot number "105AB-G"
  
- Evaluate conditions :
  - @f=135 to 175MHz : Vdd=7.2V, Vgg=3.5V
  
- Results :
  - Page 2-7. shows the typical Frequency characteristics data.
  - Page 8-11. shows the typical Pout vs. Pin characteristics data.
  - Page 12-14. shows the typical Pout vs. Vgg characteristics data.
  - Page 15-17. shows the typical Pout vs. Vdd characteristics data.
  - Page 18-19. shows the equivalent circuit.

### Frequency characteristics 1

@ **V<sub>gg</sub> Control** (@P<sub>o</sub>=6.3W, 5W), V<sub>dd</sub>=7.2V, P<sub>i</sub>=30mW (14.77dBm)



## Frequency characteristics 1 data

**@ Po=6.3W**, Vdd=7.2V, Pi=30mW (14.77dBm)

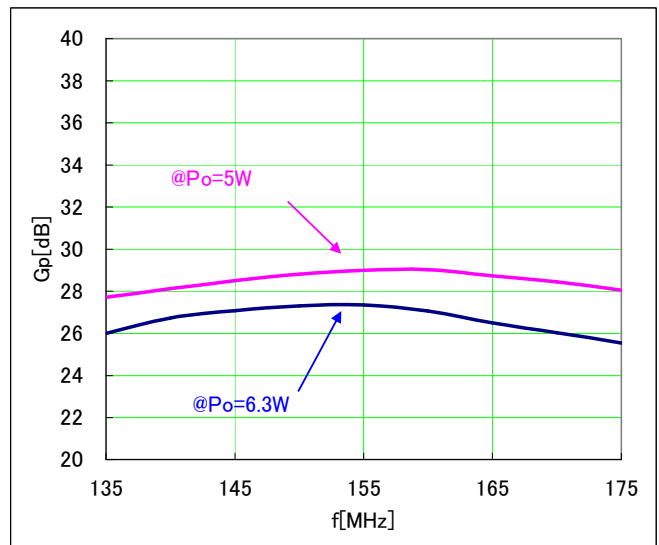
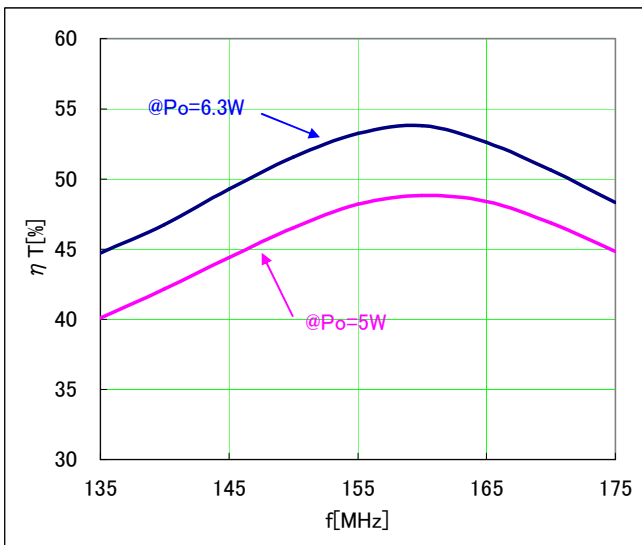
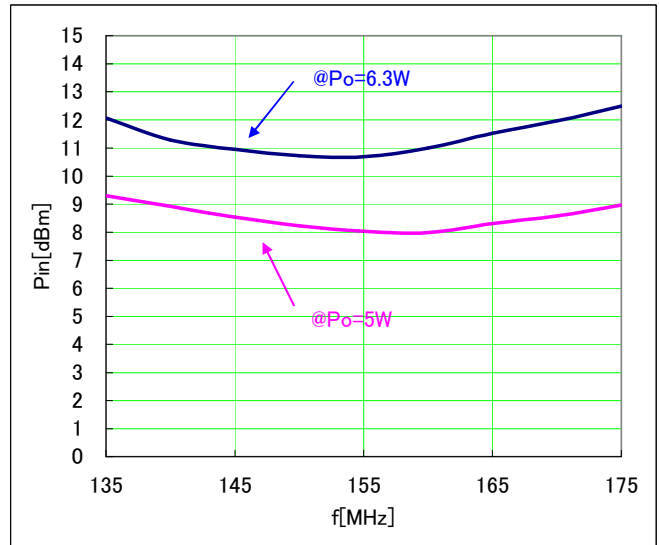
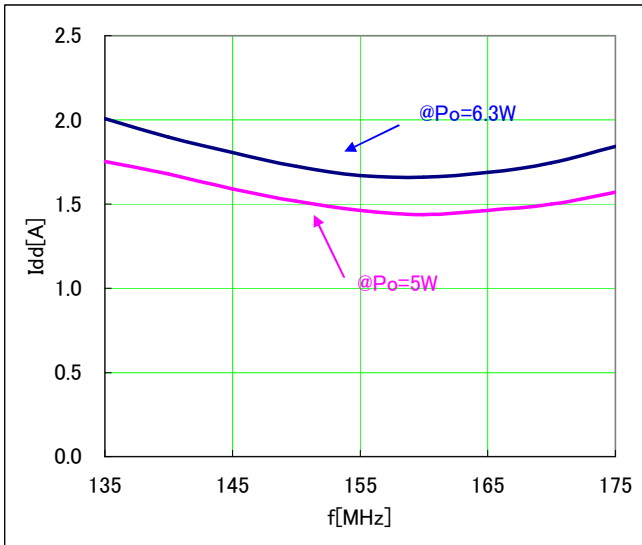
f [MHz]	Vgg [V]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	2fo [dBc]	3fo [dBc]
135	3.18	23.29	-5	2.00	44.73	-40.78	-55.22
140	3.08	23.29	-5	1.91	47.23	-37.95	-58.24
145	2.99	23.26	-5	1.81	49.24	-38.56	-61.86
150	2.96	23.27	-6	1.74	51.21	-41.53	-65.19
155	2.96	23.29	-6	1.69	52.49	-44.74	-64.75
160	3.02	23.25	-7	1.69	52.69	-48.17	-63.10
165	3.14	23.26	-7	1.74	51.26	-50.95	-65.08
170	3.21	23.24	-8	1.80	49.50	-52.47	-65.53
175	3.24	23.26	-9	1.87	47.44	-53.92	-64.92

**@ Po=5W**, Vdd=7.2V, Pi=30mW (14.77dBm)

f [MHz]	Vgg [V]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	2fo [dBc]	3fo [dBc]
135	2.84	22.27	-5	1.76	40.54	-34.03	-52.75
140	2.78	22.28	-5	1.67	42.94	-34.93	-56.83
145	2.72	22.28	-5	1.60	44.44	-36.96	-62.42
150	2.69	22.28	-6	1.53	46.07	-40.31	-64.62
155	2.68	22.27	-7	1.49	47.50	-45.29	-63.13
160	2.71	22.28	-7	1.48	47.87	-52.77	-61.91
165	2.78	22.27	-8	1.52	46.37	-60.40	-63.31
170	2.84	22.31	-9	1.57	45.04	-60.80	-65.57
175	2.86	22.26	-10	1.63	43.49	-62.13	-63.79

## Frequency characteristics 2

@ **Pin Control** (@Po=6.3W, 5W), Vdd=7.2V, Vgg=3.5V (Idq=405mA)



## Frequency characteristics 2 data

**@ Po=6.3W**, Vdd=7.2V, Vgg=3.5V (Idq=405mA)

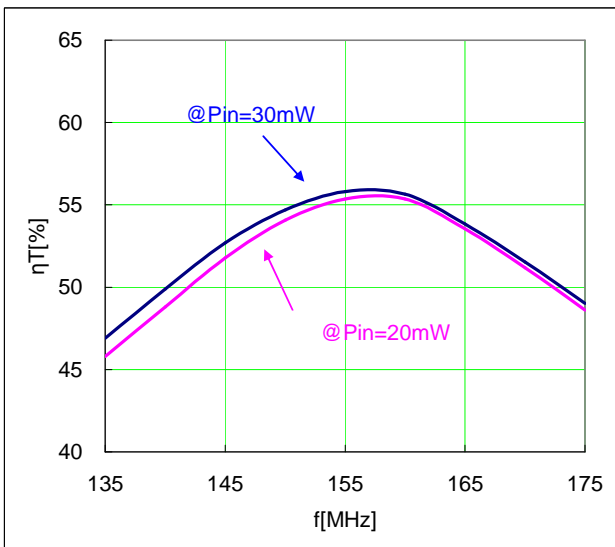
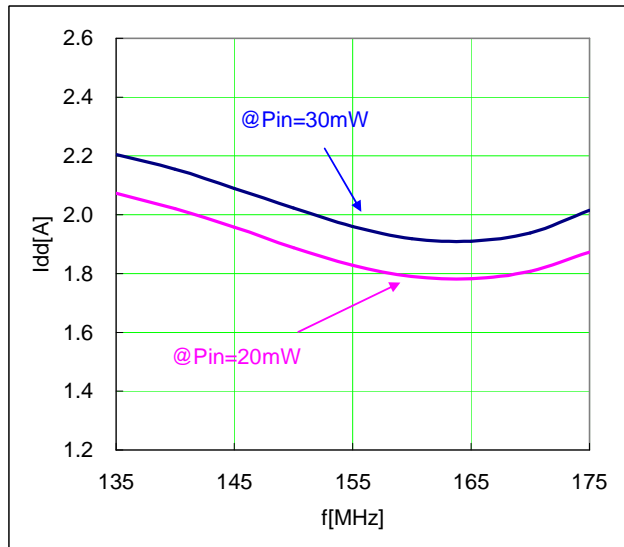
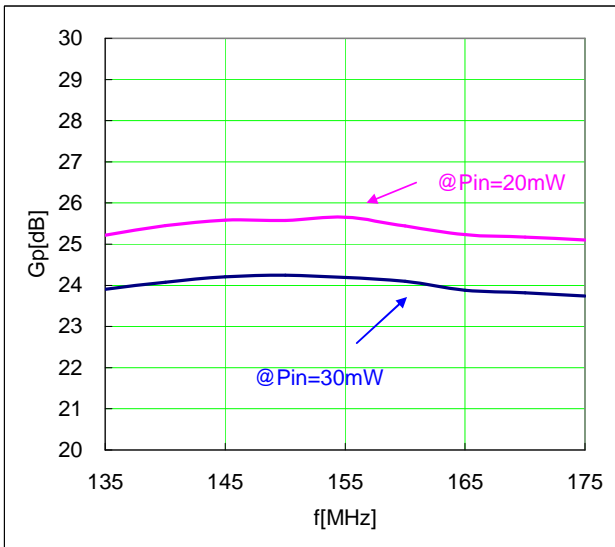
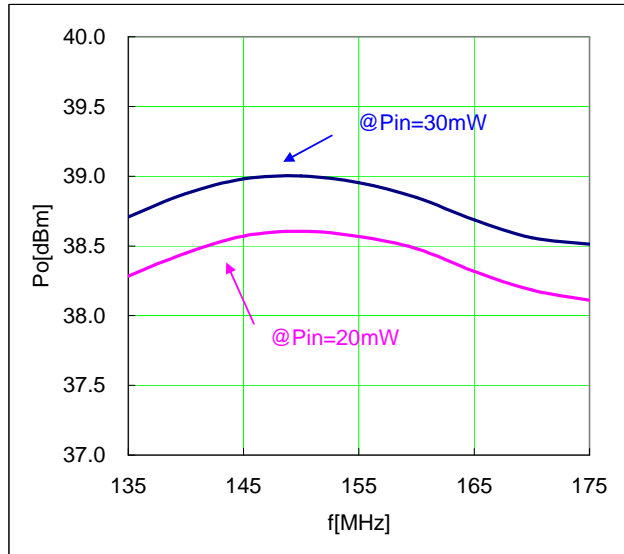
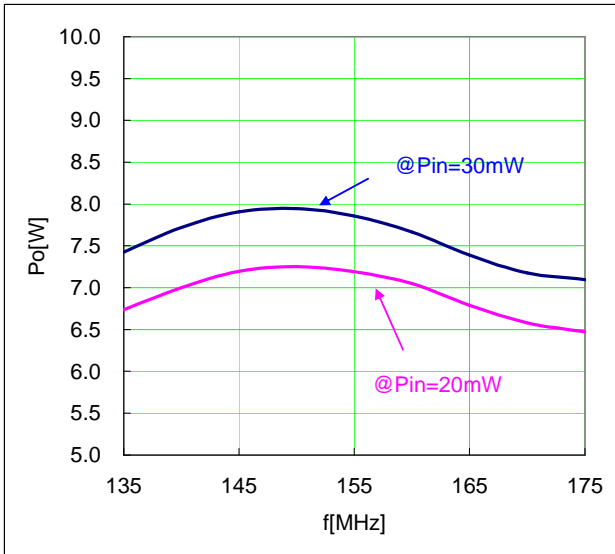
f [MHz]	Pin [dBm]	Pin [mW]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	2fo [dBc]	3fo [dBc]
135	12.07	16.09	26.0	-4.5	2.008	44.72	-45.66	-56.22
140	11.29	13.47	26.7	-4.6	1.898	46.76	-40.38	-59.67
145	10.95	12.43	27.1	-4.8	1.805	49.28	-40.76	-65.91
150	10.72	11.82	27.3	-5.2	1.725	51.57	-42.02	-68.21
155	10.68	11.70	27.3	-5.6	1.67	53.24	-44.78	-66.33
160	11.00	12.58	27.1	-6.2	1.66	53.80	-46.64	-64.93
165	11.53	14.21	26.5	-6.7	1.688	52.62	-49.30	-65.53
170	11.96	15.72	26.0	-7.4	1.745	50.63	-50.48	-64.83
175	12.49	17.76	25.5	-8.1	1.843	48.33	-52.48	-63.90

**@ Po=5W**, Vdd=7.2V, Vgg=3.5V (Idq=405mA)

f [MHz]	Pin [dBm]	Pin [mW]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	2fo [dBc]	3fo [dBc]
135	9.30	8.51	27.7	-4.4	1.753	40.10	-40.35	-56.94
140	8.92	7.80	28.1	-4.5	1.678	42.17	-39.55	-60.36
145	8.54	7.14	28.5	-4.8	1.59	44.41	-40.42	-64.63
150	8.22	6.64	28.8	-5.1	1.518	46.53	-42.58	-67.66
155	8.04	6.36	29.0	-5.6	1.463	48.20	-45.96	-65.16
160	7.98	6.28	29.0	-6.2	1.438	48.82	-49.58	-65.67
165	8.31	6.77	28.7	-6.7	1.463	48.40	-53.92	-64.01
170	8.57	7.20	28.4	-7.5	1.5	46.86	-57.48	-65.68
175	8.96	7.88	28.1	-8.1	1.57	44.84	-60.52	-64.88

### Frequency characteristics 3

@ **Pin Control** (@Pi=30mW, 20mW), Vdd=7.2V, Vgg=3.5V (Idq=405mA)



### Frequency characteristics 3 data

@ **Pi=30mW**, Vdd=7.2V, Vgg=3.5V (Idq=405mA)

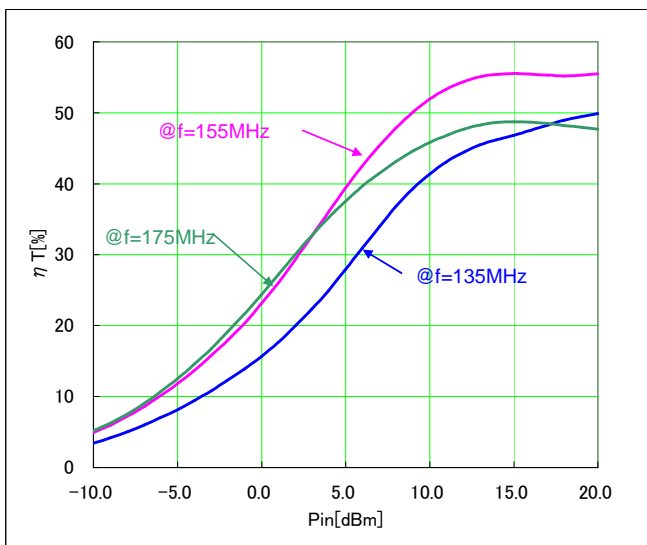
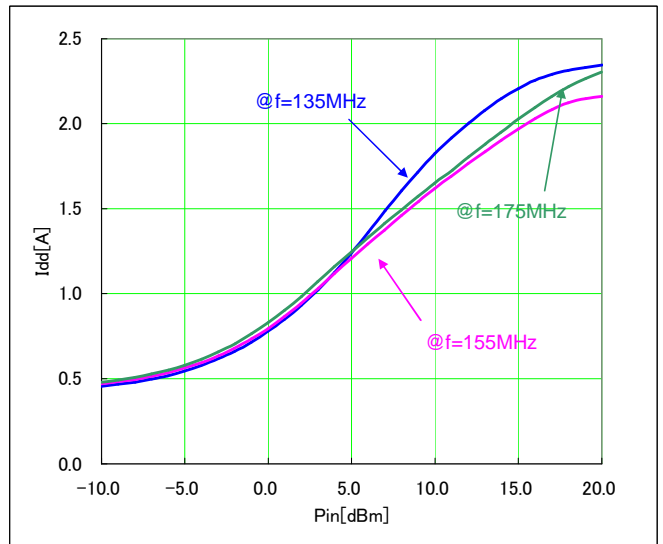
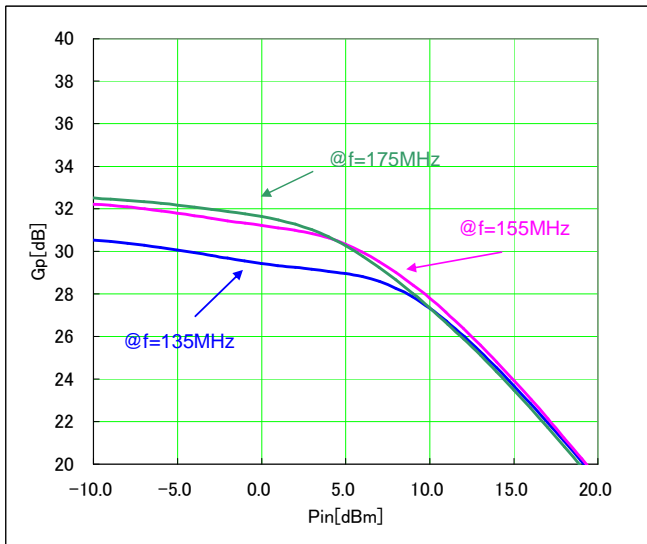
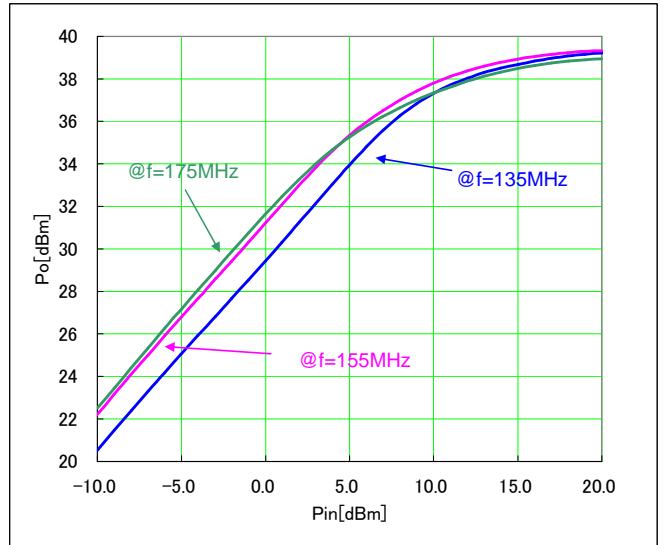
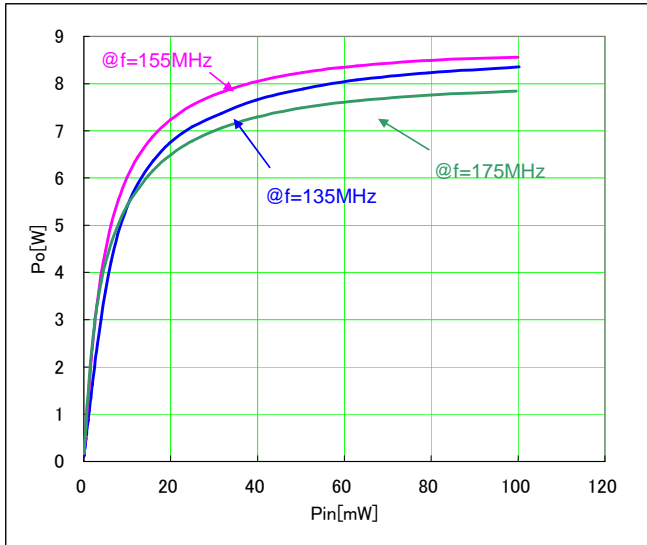
f [MHz]	Po [dBm]	Po [W]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
135	38.7	7.4	23.9	-4.8	2.21	47.1	46.9	-47.8	-56.4
140	38.9	7.7	24.1	-4.8	2.16	50.1	49.9	-40.5	-61.2
145	39.0	7.9	24.2	-4.9	2.09	52.9	52.7	-39.3	-66.0
150	39.0	7.9	24.2	-5.2	2.02	54.9	54.7	-40.7	-66.2
155	39.0	7.9	24.2	-5.6	1.96	56.0	55.8	-43.0	-67.2
160	38.8	7.7	24.1	-6.2	1.92	55.9	55.6	-44.1	-65.9
165	38.7	7.4	23.9	-6.7	1.91	54.1	53.8	-46.4	-64.4
170	38.6	7.2	23.8	-7.5	1.94	51.7	51.5	-48.3	-65.1
175	38.5	7.1	23.7	-8.2	2.02	49.2	49.0	-50.3	-64.1

@ **Pi=20mW**, Vdd=7.2V, Vgg=3.5V (Idq=405mA)

f [MHz]	Po [dBm]	Po [W]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
135	38.3	6.7	25.2	-4.5	2.07	45.9	45.8	-46.9	-57.0
140	38.4	7.0	25.4	-4.6	2.02	49.0	48.8	-40.4	-60.5
145	38.6	7.2	25.6	-4.8	1.96	51.9	51.8	-39.7	-66.1
150	38.6	7.3	25.6	-5.2	1.89	54.2	54.1	-41.4	-68.1
155	38.6	7.2	25.7	-5.5	1.83	55.5	55.4	-43.1	-66.5
160	38.5	7.0	25.4	-6.2	1.79	55.5	55.4	-45.1	-64.2
165	38.3	6.8	25.2	-6.7	1.78	53.7	53.6	-47.8	-64.0
170	38.2	6.6	25.2	-7.4	1.81	51.3	51.2	-49.7	-63.9
175	38.1	6.5	25.1	-8.1	1.87	48.8	48.6	-51.2	-63.7

**Pout vs. Pin characteristics**

@ Vdd=7.2V, Vgg=3.5V (Idq=405mA), f=135MHz, 155MHz, 175MHz





**Pout vs. Pin characteristics data**@ **f=135MHz**, V<sub>gg</sub>=3.5V (I<sub>dq</sub>=405mA)

Pin [dBm]	Pin [mW]	Po [dBm]	Po [W]	Gp [dB]	R.L. [dB]	I <sub>dd</sub> [A]	η <sub>T</sub> [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
-10.03	0.10	20.51	0.11	30.5	-3.5	0.46	3.4	3.4	-40.1	-
-8.99	0.13	21.48	0.14	30.5	-4.6	0.47	4.2	4.2	-38.8	-
-7.97	0.16	22.40	0.17	30.4	-5.4	0.48	5.0	5.0	-37.8	-
-6.97	0.20	23.32	0.21	30.3	-3.4	0.50	6.0	6.0	-37.1	-
-6.02	0.25	24.16	0.26	30.2	-4.0	0.52	7.0	7.0	-36.0	-
-5.03	0.31	25.04	0.32	30.1	-3.7	0.55	8.1	8.1	-35.1	-
-4.01	0.40	25.93	0.39	29.9	-4.1	0.58	9.4	9.4	-34.1	-
-2.99	0.50	26.82	0.48	29.8	-3.8	0.62	10.8	10.8	-33.6	-
-2.02	0.63	27.66	0.58	29.7	-3.8	0.66	12.3	12.3	-32.9	-
-1.01	0.79	28.54	0.71	29.6	-4.0	0.72	13.9	13.9	-32.2	-
-0.03	0.99	29.41	0.87	29.4	-4.0	0.78	15.6	15.6	-32.0	-
0.96	1.25	30.30	1.07	29.3	-4.1	0.85	17.6	17.6	-32.0	-57.9
2.01	1.59	31.26	1.34	29.3	-4.2	0.93	20.0	20.0	-31.9	-59.8
2.99	1.99	32.14	1.64	29.2	-4.2	1.02	22.3	22.3	-32.1	-57.7
3.98	2.50	33.04	2.01	29.1	-4.3	1.13	25.0	24.9	-33.1	-58.6
4.96	3.13	33.91	2.46	29.0	-4.2	1.24	27.8	27.8	-33.8	-57.0
5.99	3.97	34.80	3.02	28.8	-4.3	1.36	31.0	30.9	-35.1	-56.4
7.00	5.02	35.58	3.62	28.6	-4.3	1.49	34.0	33.9	-36.4	-56.3
7.99	6.30	36.26	4.23	28.3	-4.3	1.61	36.8	36.8	-38.2	-57.7
8.96	7.87	36.83	4.82	27.9	-4.4	1.72	39.3	39.2	-40.0	-57.0
9.99	9.98	37.32	5.39	27.3	-4.4	1.82	41.4	41.3	-42.1	-57.3
10.98	12.53	37.71	5.90	26.7	-4.4	1.92	43.1	43.0	-43.8	-56.6
12.05	16.02	38.04	6.37	26.0	-4.5	2.00	44.5	44.4	-45.2	-56.7
12.98	19.86	38.29	6.75	25.3	-4.5	2.08	45.5	45.3	-46.8	-57.0
13.98	25.00	38.50	7.09	24.5	-4.6	2.15	46.2	46.0	-47.4	-56.3
15.00	31.65	38.67	7.36	23.7	-4.9	2.21	46.8	46.6	-48.2	-56.6
15.98	39.64	38.84	7.65	22.9	-5.4	2.26	47.5	47.3	-48.1	-57.2
17.03	50.52	38.97	7.89	21.9	-6.3	2.29	48.3	48.0	-45.7	-58.0
17.97	62.71	39.07	8.08	21.1	-7.2	2.31	48.9	48.5	-43.1	-58.3
18.99	79.30	39.15	8.23	20.2	-8.2	2.33	49.5	49.0	-41.1	-59.5
20.01	100.23	39.22	8.35	19.2	-9.1	2.35	49.9	49.3	-39.6	-60.5

RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

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@ **f=155MHz**, Vgg=3.5V (Idq=405mA)

Pin [dBm]	Pin [mW]	Po [dBm]	Po [W]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
-10.03	0.10	22.2	0.17	32.2	-7.1	0.47	4.9	4.9	-47.5	-
-9.01	0.13	23.2	0.21	32.2	-6.6	0.48	6.0	6.0	-47.3	-
-8.00	0.16	24.1	0.26	32.1	-6.5	0.50	7.2	7.2	-46.7	-
-6.97	0.20	25.0	0.32	32.0	-5.6	0.52	8.6	8.6	-45.7	-
-5.98	0.25	25.9	0.39	31.9	-4.7	0.54	10.2	10.2	-44.3	-
-5.01	0.32	26.8	0.48	31.8	-5.3	0.56	11.8	11.8	-43.8	-
-4.01	0.40	27.7	0.58	31.7	-4.8	0.60	13.7	13.7	-43.3	-
-2.97	0.50	28.6	0.72	31.6	-5.4	0.64	15.8	15.8	-42.6	-
-2.02	0.63	29.4	0.87	31.4	-5.2	0.68	17.9	17.9	-41.7	-
-0.99	0.80	30.3	1.08	31.3	-5.2	0.74	20.4	20.4	-41.5	-
-0.01	1.00	31.2	1.32	31.2	-5.2	0.80	23.1	23.1	-40.7	-
0.97	1.25	32.1	1.61	31.1	-5.3	0.87	26.0	26.0	-41.3	-
1.96	1.57	33.0	1.98	31.0	-5.4	0.94	29.2	29.2	-41.8	-
3.02	2.00	33.9	2.43	30.8	-5.5	1.03	32.8	32.7	-42.1	-
3.99	2.50	34.6	2.90	30.6	-5.5	1.12	36.0	36.0	-43.3	-
4.99	3.16	35.3	3.41	30.3	-5.6	1.21	39.4	39.4	-44.3	-
5.98	3.96	35.9	3.94	30.0	-5.6	1.29	42.5	42.4	-45.6	-
6.98	4.99	36.5	4.47	29.5	-5.6	1.38	45.3	45.3	-46.0	-65.9
7.99	6.29	37.0	5.01	29.0	-5.6	1.46	47.9	47.8	-45.9	-68.2
9.02	7.97	37.4	5.54	28.4	-5.6	1.54	50.1	50.0	-45.8	-66.1
9.98	9.96	37.8	6.02	27.8	-5.6	1.62	52.0	51.9	-44.6	-67.3
10.95	12.46	38.1	6.45	27.1	-5.6	1.69	53.3	53.2	-44.6	-66.3
11.99	15.81	38.4	6.87	26.4	-5.6	1.77	54.4	54.3	-44.1	-65.5
13.00	19.97	38.6	7.23	25.6	-5.6	1.84	55.1	54.9	-43.6	-67.9
13.97	24.95	38.8	7.54	24.8	-5.7	1.90	55.4	55.2	-43.1	-66.2
15.00	31.62	38.9	7.81	23.9	-5.7	1.97	55.5	55.3	-42.9	-66.5
16.01	39.87	39.1	8.05	23.0	-5.9	2.03	55.4	55.2	-42.7	-66.4
17.02	50.36	39.2	8.24	22.1	-6.2	2.08	55.3	55.0	-42.4	-67.2
17.99	62.90	39.2	8.37	21.2	-6.7	2.12	55.2	54.8	-42.3	-67.3
19.03	80.07	39.3	8.49	20.3	-7.4	2.15	55.3	54.8	-42.5	-66.1
20.00	100.00	39.3	8.56	19.3	-8.1	2.16	55.5	54.8	-42.4	-68.1

RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

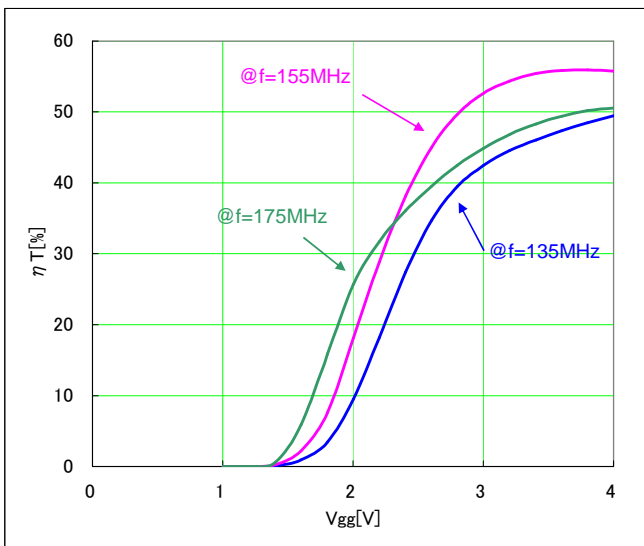
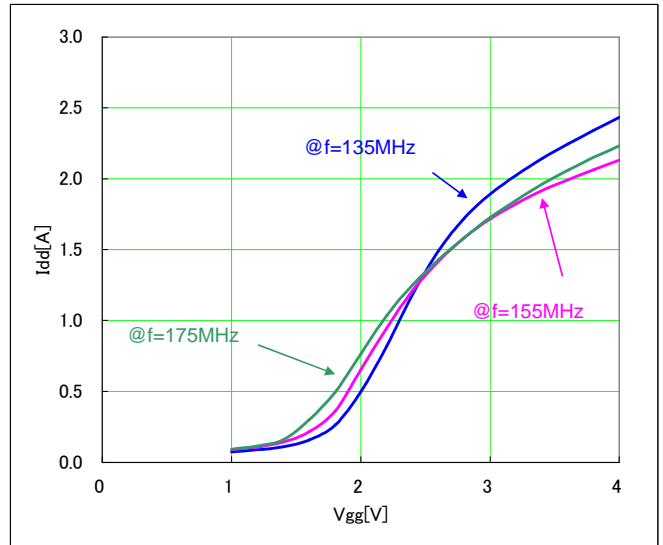
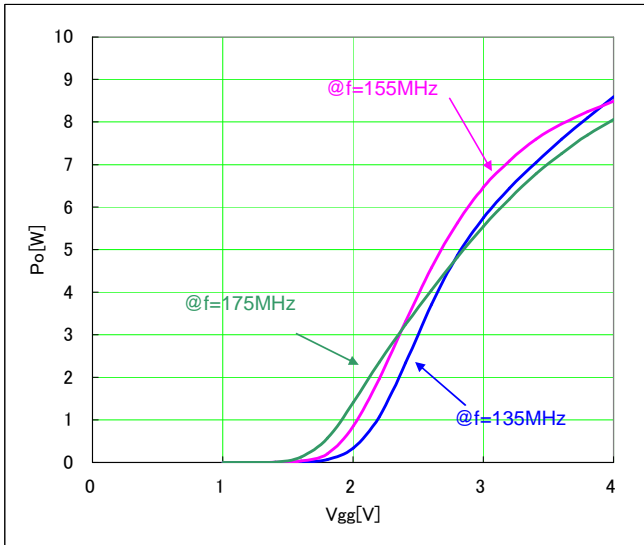
- AN-VHF-053-A-

@ **f=175MHz**, Vgg=3.5V (Idq=405mA)

Pin [dBm]	Pin [mW]	Po [dBm]	Po [W]	Gp [dB]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
-10.00	0.10	22.5	0.18	32.5	-7.9	0.48	5.2	5.2	-51.3	-
-8.99	0.13	23.5	0.22	32.4	-7.7	0.49	6.3	6.3	-53.2	-
-8.00	0.16	24.4	0.28	32.4	-7.9	0.51	7.5	7.5	-51.3	-
-7.00	0.20	25.3	0.34	32.3	-8.5	0.53	9.0	9.0	-52.2	-
-5.98	0.25	26.3	0.42	32.3	-8.9	0.55	10.7	10.7	-51.4	-
-5.00	0.32	27.2	0.52	32.2	-9.4	0.58	12.5	12.5	-51.0	-
-3.98	0.40	28.1	0.65	32.1	-7.1	0.62	14.6	14.6	-50.8	-
-2.99	0.50	29.0	0.79	32.0	-7.3	0.66	16.8	16.8	-49.2	-
-2.00	0.63	29.9	0.97	31.9	-8.1	0.71	19.2	19.2	-49.6	-
-1.00	0.79	30.8	1.19	31.8	-7.7	0.77	21.7	21.7	-49.7	-
-0.01	1.00	31.6	1.45	31.6	-7.6	0.83	24.4	24.4	-48.6	-
0.98	1.25	32.5	1.76	31.5	-7.8	0.90	27.2	27.2	-49.1	-
2.00	1.58	33.3	2.12	31.3	-8.2	0.99	30.0	30.0	-50.1	-
2.97	1.98	34.0	2.51	31.0	-8.2	1.07	32.7	32.7	-51.9	-
3.96	2.49	34.7	2.92	30.7	-8.0	1.16	35.2	35.1	-53.6	-
5.01	3.17	35.3	3.36	30.3	-8.1	1.25	37.6	37.6	-55.5	-66.0
6.02	4.00	35.8	3.80	29.8	-8.1	1.33	39.7	39.7	-60.6	-64.9
6.97	4.98	36.2	4.19	29.3	-8.2	1.41	41.4	41.4	-64.7	-65.3
7.98	6.29	36.6	4.61	28.7	-8.1	1.49	43.1	43.1	-64.5	-66.4
8.99	7.93	37.0	5.02	28.0	-8.2	1.57	44.6	44.5	-59.9	-64.3
9.98	9.94	37.3	5.41	27.4	-8.2	1.65	45.8	45.7	-56.3	-65.1
11.06	12.78	37.6	5.80	26.6	-8.2	1.73	46.9	46.8	-54.8	-64.9
12.01	15.89	37.9	6.16	25.9	-8.2	1.81	47.7	47.6	-52.4	-63.6
13.02	20.03	38.1	6.49	25.1	-8.2	1.88	48.3	48.2	-51.3	-63.2
13.97	24.92	38.3	6.78	24.3	-8.2	1.95	48.6	48.5	-50.4	-63.0
15.01	31.68	38.5	7.06	23.5	-8.3	2.03	48.7	48.5	-50.0	-64.4
16.00	39.77	38.6	7.29	22.6	-8.5	2.10	48.7	48.4	-49.6	-63.9
17.01	50.26	38.7	7.49	21.7	-8.7	2.16	48.5	48.2	-49.4	-64.0
18.02	63.32	38.8	7.64	20.8	-9.0	2.22	48.2	47.8	-49.3	-63.6
19.03	80.03	38.9	7.76	19.9	-9.5	2.27	47.9	47.5	-48.9	-64.2
19.98	99.60	38.9	7.84	19.0	-9.9	2.30	47.7	47.1	-49.3	-63.3

### Pout vs. Vgg characteristics

@ Vdd=7.2V, Pi=30mW (14.77dBm), **f=135MHz, 155MHz, 175MHz**



## Pout vs. Vgg characteristics data

@  $f=135\text{MHz}$ ,  $P_i=30\text{mW}$  (14.77dBm)

Vgg [V]	Idq [A]	Po [dBm]	Po [W]	Idd [A]	R.L. [dB]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.00	0.003	-22.0	0.0	0.08	-6.1	0.0	-5.5	-0.3	-
1.20	0.003	-19.7	0.0	0.09	-5.9	0.0	-4.7	-1.9	-
1.40	0.003	-1.2	0.0	0.11	-5.7	0.1	-3.7	-2.4	-
1.60	0.003	10.3	0.0	0.16	-5.5	0.9	-1.7	-6.0	-
1.80	0.003	18.2	0.1	0.27	-5.4	3.4	1.9	-11.6	-
2.00	0.003	25.3	0.3	0.50	-5.3	9.5	8.6	-17.4	-
2.20	0.003	30.3	1.1	0.82	-5.2	18.1	17.6	-21.8	-50.1
2.40	0.003	33.7	2.3	1.19	-5.1	27.4	27.0	-26.2	-50.9
2.60	0.005	35.7	3.7	1.49	-5.0	34.7	34.4	-29.5	-51.8
2.80	0.018	36.9	4.9	1.72	-4.9	39.5	39.2	-33.1	-52.3
3.00	0.050	37.6	5.7	1.89	-4.8	42.5	42.3	-36.9	-53.6
3.20	0.130	38.1	6.4	2.03	-4.7	44.5	44.3	-41.1	-55.2
3.40	0.303	38.5	7.0	2.14	-4.7	46.1	45.9	-46.5	-55.9
3.60	0.585	38.8	7.6	2.25	-4.8	47.4	47.2	-46.9	-57.6
3.80	0.968	39.1	8.1	2.34	-5.0	48.5	48.3	-42.1	-59.7
4.00	1.420	39.3	8.6	2.44	-5.2	49.5	49.3	-37.9	-62.0

@  $f=155\text{MHz}$ ,  $P_i=30\text{mW}$  (14.77dBm)

Vgg [V]	Idq [A]	Po [dBm]	Po [W]	Idd [A]	R.L. [dB]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.00	0.003	-20.2	0.0	0.09	-9.8	0.0	-4.6	-10.4	-
1.20	0.003	-15.8	0.0	0.11	-9.3	0.0	-3.8	-14.7	-
1.40	0.003	4.1	0.0	0.14	-8.8	0.2	-2.7	-18.2	-
1.60	0.003	15.3	0.0	0.22	-8.4	2.2	0.3	-19.4	-
1.80	0.003	23.0	0.2	0.37	-8.0	7.6	6.5	-23.0	-
2.00	0.003	29.3	0.9	0.66	-7.6	18.1	17.5	-28.2	-
2.20	0.003	32.9	2.0	0.95	-7.3	28.8	28.4	-33.9	-
2.40	0.003	35.2	3.3	1.21	-7.0	38.1	37.8	-39.5	-65.5
2.60	0.005	36.6	4.6	1.42	-6.7	45.0	44.7	-44.4	-64.2
2.80	0.018	37.5	5.6	1.58	-6.4	49.7	49.4	-45.8	-65.5
3.00	0.050	38.1	6.5	1.72	-6.2	52.7	52.4	-44.5	-63.9
3.20	0.130	38.5	7.1	1.82	-6.0	54.4	54.1	-43.8	-65.9
3.40	0.303	38.8	7.6	1.92	-5.8	55.4	55.2	-43.2	-66.9
3.60	0.585	39.0	8.0	1.99	-5.6	55.8	55.6	-42.8	-66.9
3.80	0.965	39.2	8.2	2.06	-5.5	55.9	55.7	-42.2	-67.3
4.00	1.418	39.3	8.5	2.13	-5.4	55.7	55.6	-42.2	-67.8

RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

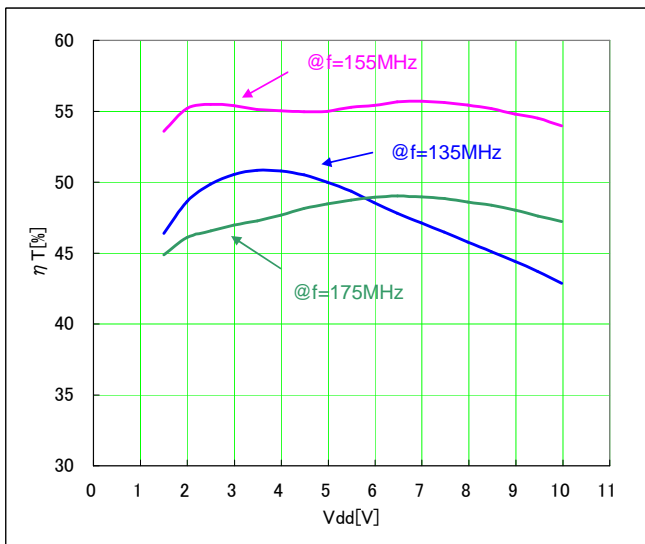
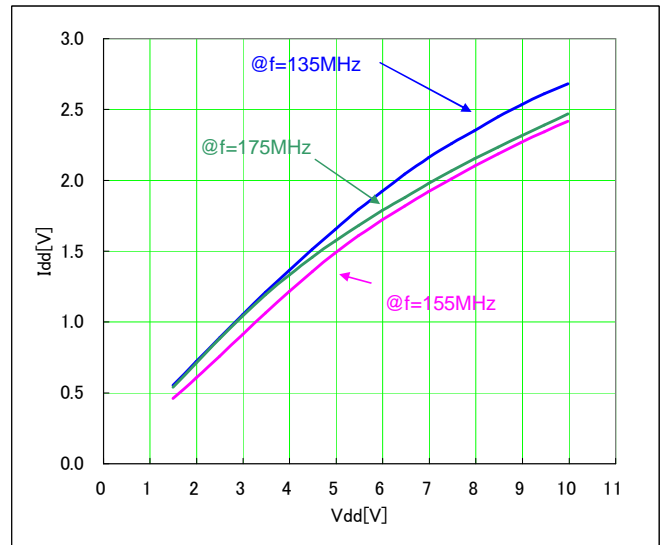
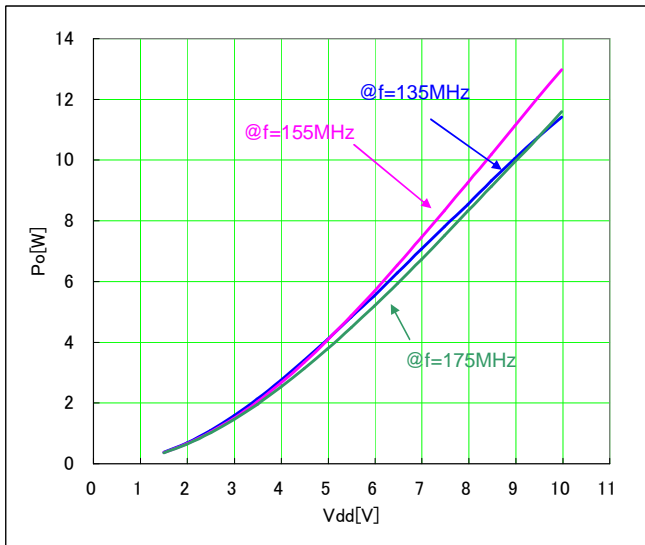
- AN-VHF-053-A-

@ **f=175MHz**, Pi=30mW (14.77dBm)

Vgg [V]	Idq [A]	Po [dBm]	Po [W]	Idd [A]	R.L. [dB]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.00	0.003	-19.3	0.0	0.09	-17.2	0.0	-4.5	-11.4	-
1.20	0.003	-12.0	0.0	0.12	-16.2	0.0	-3.6	-19.8	-
1.40	0.003	8.1	0.0	0.16	-15.2	0.6	-2.0	-32.2	-
1.60	0.003	21.1	0.1	0.30	-14.3	5.9	4.5	-33.4	-
1.80	0.003	27.5	0.6	0.50	-13.4	15.8	15.0	-34.5	-
2.00	0.003	31.5	1.4	0.77	-12.6	25.7	25.1	-36.7	-
2.20	0.003	33.7	2.4	1.04	-11.8	31.7	31.3	-40.7	-
2.40	0.003	35.1	3.2	1.25	-11.1	36.1	35.7	-45.5	-
2.60	0.005	36.1	4.0	1.43	-10.5	39.5	39.2	-50.5	-62.5
2.80	0.018	36.8	4.8	1.59	-9.9	42.5	42.2	-60.1	-65.0
3.00	0.050	37.4	5.6	1.73	-9.4	44.9	44.7	-62.3	-65.4
3.20	0.130	37.9	6.2	1.85	-8.9	46.8	46.6	-54.8	-65.2
3.40	0.303	38.3	6.8	1.96	-8.4	48.3	48.1	-51.4	-64.8
3.60	0.585	38.6	7.3	2.06	-8.1	49.4	49.2	-49.3	-64.5
3.80	0.968	38.9	7.7	2.15	-7.8	50.2	50.0	-48.0	-63.8
4.00	1.420	39.1	8.1	2.23	-7.5	50.6	50.4	-46.8	-63.0

**Pout vs. Vdd characteristics data**

@ V<sub>gg</sub>=3.5V (I<sub>dq</sub>=405mA), P<sub>i</sub>=30mW (14.77dBm), f=135MHz, 155MHz, 175MHz



RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

- AN-VHF-053-A-

@ **f=135MHz**, Pi=30mW (14.77dBm)

Vdd [V]	Idq [A]	Po [dBm]	Po [W]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.5	0.340	25.8	0.4	-10.6	0.55	46.4	42.8	-29.2	-
2.0	0.348	28.4	0.7	-10.9	0.72	48.6	46.5	-30.2	-
2.5	0.353	30.4	1.1	-10.9	0.89	49.9	48.5	-31.5	-
3.0	0.358	32.0	1.6	-10.4	1.05	50.6	49.6	-32.0	-
3.5	0.365	33.3	2.1	-9.8	1.21	50.8	50.1	-33.3	-
4.0	0.370	34.4	2.7	-8.9	1.37	50.8	50.2	-34.9	-62.6
4.5	0.378	35.3	3.4	-8.0	1.51	50.5	50.1	-36.6	-61.8
5.0	0.383	36.1	4.1	-7.2	1.65	50.0	49.6	-38.2	-61.1
5.5	0.390	36.8	4.8	-6.4	1.80	49.4	49.1	-40.7	-59.6
6.0	0.398	37.4	5.5	-5.7	1.92	48.6	48.3	-44.0	-58.0
6.5	0.405	38.0	6.3	-5.3	2.04	47.8	47.6	-46.9	-57.2
7.0	0.415	38.5	7.1	-4.9	2.16	47.1	46.9	-47.9	-55.7
7.5	0.423	38.9	7.8	-4.7	2.26	46.5	46.3	-47.7	-56.7
8.0	0.433	39.3	8.5	-4.5	2.35	45.8	45.6	-47.1	-56.2
8.5	0.443	39.7	9.3	-4.5	2.45	45.1	45.0	-46.3	-56.4
9.0	0.453	40.0	10.0	-4.5	2.53	44.4	44.3	-45.2	-56.3
9.5	0.463	40.3	10.7	-4.4	2.61	43.7	43.6	-44.7	-56.4
10.0	0.475	40.6	11.4	-4.4	2.68	42.9	42.8	-43.8	-56.6

@ **f=155MHz**, Pi=30mW (14.77dBm)

Vdd [V]	Idq [A]	Po [dBm]	Po [W]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.5	0.350	25.7	0.4	-15.6	0.46	53.6	49.2	-41.2	-
2.0	0.355	28.2	0.7	-13.3	0.61	55.2	52.7	-41.1	-
2.5	0.363	30.2	1.0	-11.3	0.76	55.5	53.9	-42.0	-
3.0	0.368	31.8	1.5	-9.8	0.91	55.4	54.3	-41.7	-
3.5	0.373	33.1	2.0	-8.6	1.07	55.1	54.3	-42.1	-
4.0	0.378	34.2	2.7	-7.6	1.22	55.0	54.4	-42.2	-
4.5	0.385	35.2	3.3	-6.9	1.36	55.0	54.5	-42.4	-
5.0	0.390	36.1	4.1	-6.5	1.49	55.0	54.6	-42.5	-65.4
5.5	0.398	36.9	4.9	-6.1	1.61	55.3	54.9	-43.0	-67.3
6.0	0.405	37.5	5.7	-5.9	1.72	55.4	55.1	-42.7	-66.9
6.5	0.410	38.2	6.5	-5.8	1.82	55.7	55.4	-42.9	-66.5
7.0	0.418	38.7	7.4	-5.7	1.92	55.7	55.5	-42.7	-66.3
7.5	0.428	39.2	8.3	-5.7	2.01	55.6	55.4	-42.9	-66.9
8.0	0.435	39.7	9.2	-5.6	2.10	55.4	55.3	-43.2	-65.7
8.5	0.445	40.1	10.2	-5.6	2.19	55.2	55.0	-43.2	-64.8
9.0	0.455	40.5	11.1	-5.6	2.27	54.8	54.7	-43.0	-65.3
9.5	0.465	40.8	12.1	-5.6	2.34	54.5	54.4	-43.2	-66.1
10.0	0.475	41.1	13.0	-5.6	2.42	54.0	53.8	-43.5	-65.1



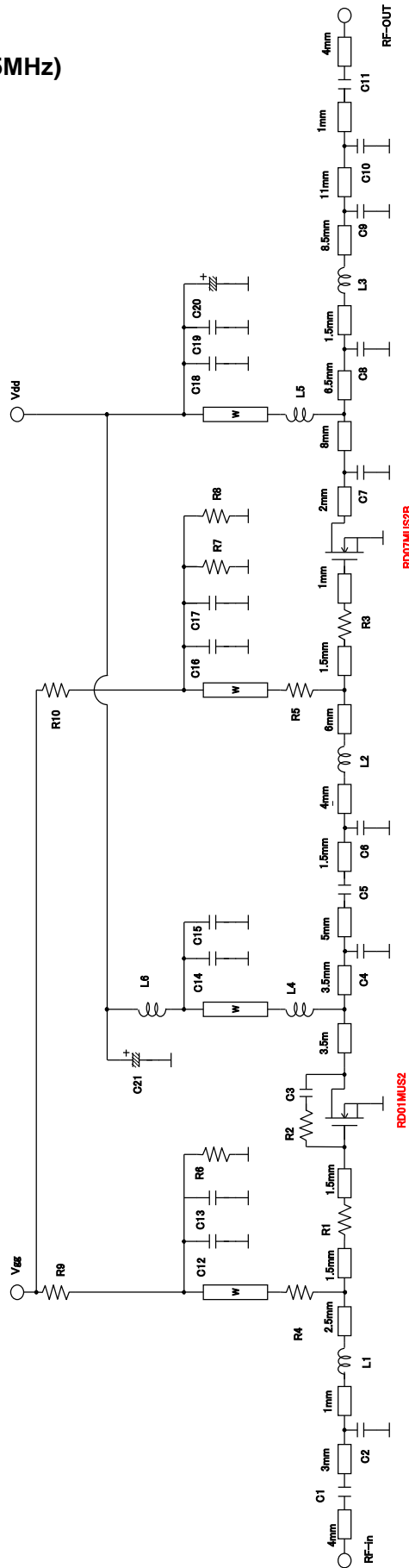
RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

- AN-VHF-053-A-

@ **f=175MHz**, Pi=30mW (14.77dBm)

Vdd [V]	Idq [A]	Po [dBm]	Po [W]	R.L. [dB]	Idd [A]	$\eta_T$ [%]	P.A.E. [%]	2fo [dBc]	3fo [dBc]
1.5	0.350	25.6	0.4	-11.5	0.54	44.9	41.1	-45.5	-
2.0	0.355	28.1	0.6	-10.6	0.71	46.1	44.0	-46.8	-
2.5	0.360	30.1	1.0	-9.9	0.88	46.6	45.2	-46.5	-
3.0	0.368	31.6	1.5	-9.4	1.04	47.0	46.0	-47.2	-
3.5	0.373	32.9	2.0	-9.1	1.19	47.3	46.6	-47.4	-
4.0	0.378	34.0	2.5	-8.8	1.33	47.7	47.1	-48.1	-63.6
4.5	0.385	35.0	3.1	-8.7	1.46	48.1	47.7	-48.2	-61.1
5.0	0.390	35.8	3.8	-8.5	1.57	48.5	48.1	-48.8	-63.5
5.5	0.398	36.5	4.5	-8.4	1.68	48.7	48.4	-49.1	-62.5
6.0	0.405	37.2	5.2	-8.3	1.79	48.9	48.7	-49.5	-64.6
6.5	0.413	37.7	5.9	-8.3	1.88	49.0	48.8	-49.7	-63.1
7.0	0.420	38.3	6.7	-8.3	1.98	49.0	48.7	-50.1	-65.0
7.5	0.428	38.8	7.5	-8.2	2.07	48.8	48.6	-50.3	-63.6
8.0	0.438	39.2	8.3	-8.2	2.15	48.6	48.4	-50.9	-64.2
8.5	0.445	39.6	9.1	-8.2	2.24	48.4	48.2	-50.9	-64.9
9.0	0.455	40.0	9.9	-8.2	2.31	48.0	47.9	-51.4	-65.0
9.5	0.465	40.3	10.7	-8.3	2.39	47.6	47.5	-51.9	-64.7
10.0	0.478	40.6	11.6	-8.3	2.47	47.2	47.1	-52.2	-65.4

Equivalent circuit (@f=135 to 175MHz)



<Note>  
 Board material: Glass-Epoxy substrate ( $\epsilon_r=4.8$ ,  $h=0.8$ mm)  
 Microstrip line width=1.3mm  
 W line width=1.0mm

RD01MUS2 & RD07MUS2B RF characteristics data at 135 to 175MHz. (Vdd=7.2V)

- AN-VHF-053-A-

Parts Type	Symbol	Value	Type name	Vender
Capasitor	C1	100pF	GRM1882C1H101JA01D	Murata Manufacturing Co.,Ltd.
	C2	20pF	GRM1882C1H200JA01D	Murata Manufacturing Co.,Ltd.
	C3	47pF	GRM1882C1H470JA01D	Murata Manufacturing Co.,Ltd.
	C4	62pF	GRM1882C1H620JA01D	Murata Manufacturing Co.,Ltd.
	C5	39pF	GRM1882C1H390JA01D	Murata Manufacturing Co.,Ltd.
	C6	82pF	GRM1882C1H820JA01D	Murata Manufacturing Co.,Ltd.
	C7	47pF	GRM1882C1H470JA01D	Murata Manufacturing Co.,Ltd.
	C8	150pF	GRM1882C1H151JA01D	Murata Manufacturing Co.,Ltd.
	C9	22pF	GRM1882C1H220JA01D	Murata Manufacturing Co.,Ltd.
	C10	22pF	GRM1882C1H220JA01D	Murata Manufacturing Co.,Ltd.
	C11	100pF	GRM1882C1H101JA01D	Murata Manufacturing Co.,Ltd.
	C12	1000pF	GRM1882C1H102JA01D	Murata Manufacturing Co.,Ltd.
	C13	10000pF	GRM1882C1H103JA01D	Murata Manufacturing Co.,Ltd.
	C14	1000pF	GRM1882C1H102JA01D	Murata Manufacturing Co.,Ltd.
	C15	10000pF	GRM1882C1H103JA01D	Murata Manufacturing Co.,Ltd.
	C16	1000pF	GRM1882C1H102JA01D	Murata Manufacturing Co.,Ltd.
	C17	10000pF	GRM1882C1H103JA01D	Murata Manufacturing Co.,Ltd.
	C18	1000pF	GRM1882C1H102JA01D	Murata Manufacturing Co.,Ltd.
	C19	10000pF	GRM1882C1H103JA01D	Murata Manufacturing Co.,Ltd.
	C20	22nF	UVZ1H220MDD	NICHICON COPORATION
	C21	22uF	UVZ1H220MDD	NICHICON COPORATION
Resistance	R1	10Ω	RPC10-100J	TAIYOSHA ELECTRIC CO.,Ltd.
	R2	300Ω	RPC10-301J	TAIYOSHA ELECTRIC CO.,Ltd.
	R3	3.3Ω	RPC05-3R3J	TAIYOSHA ELECTRIC CO.,Ltd.
	R4	1KΩ	RPC10-102J	TAIYOSHA ELECTRIC CO.,Ltd.
	R5	4.7KΩ	RPC10-472J	TAIYOSHA ELECTRIC CO.,Ltd.
	R6	56KΩ	RPC05-563J	TAIYOSHA ELECTRIC CO.,Ltd.
	R7	36KΩ	RPC05-363J	TAIYOSHA ELECTRIC CO.,Ltd.
	R8	30KΩ	RPC05-303J	TAIYOSHA ELECTRIC CO.,Ltd.
	R9	20KΩ	RPC10-203J	TAIYOSHA ELECTRIC CO.,Ltd.
	R10	20KΩ	RPC10-203J	TAIYOSHA ELECTRIC CO.,Ltd.
Inductance	L1	72nH	LLQ1608-A72N	TOKO Co.,Ltd.
	L2	9nH Enameled wire 4Turns, Diameter:0.40mm, ϕ 1.66mm(the out side diameter)	4804A	yc corporation
	L3	16nH Enameled wire 4Turns, Diameter:0.40mm, ϕ 2.46mm(the out side diameter)	4004C	yc corporation
	L4	28nH Enameled wire 6Turns, Diameter:0.23mm, ϕ 1.66mm(the out side diameter)	2306C	yc corporation
	L5	25nH Enameled wire 5Turns, Diameter:0.40mm, ϕ 2.46mm(the out side diameter)	4005A	yc corporation
	L6	8nH Enameled wire 2Turns, Diameter:0.23mm, ϕ 1.66mm(the out side diameter)	2302S	yc corporation

