

APPLICATION NOTE

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(Taking charge of Silicon RF by
MIYOSHI Electronics)

SUBJECT: RD02MUS1B single-stage amplifier RF performance at f=400 to 470MHz, Vdd=7.2V.

SUMMARY:

This application note shows the RF wide-band characteristics data (Frequency characteristics, Pin vs. Pout characteristics, Pout vs. Vdd characteristics and Pout vs. Idq characteristics) at f=400 to 470MHz.

- Sample history:

RD02MUS1B: Lot number "093AF-G"

- Evaluate conditions:

@f=400MHz : Vdd=7.2V, Pin=50mW, Idq=0.2A (Vgg adj.)

@f=435MHz : Vdd=7.2V, Pin=50mW, Idq=0.2A (Vgg adj.)

@f=470MHz : Vdd=7.2V, Pin=50mW, Idq=0.2A (Vgg adj.)

- Results:

Page 2-4 shows the Output Power, Drain Efficiency vs. Frequency data.

Page 5-7 shows the Output Power, Power Gain, Drain Efficiency vs. Input Power data.

Page 8-10 shows the Output Power, Drain Current, Drain Efficiency vs. Drain Voltage data.

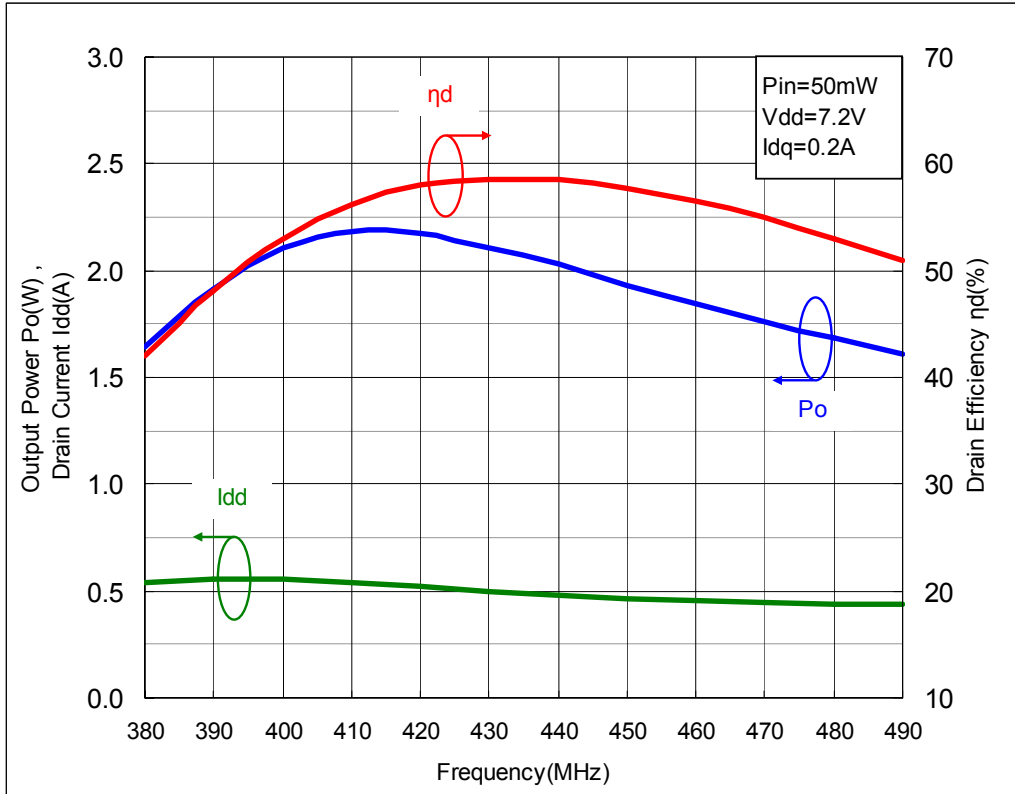
Page 11-13 shows the Output Power, Drain Current, Drain Efficiency vs. Drain Quiet Current data.

Page 14 shows the Input / Output Impedance vs. Frequency characteristics

Page 15 shows the Equivalent Circuit and schematic for test fixture.

RD02MUS1B Output Power, Drain Efficiency vs. Frequency

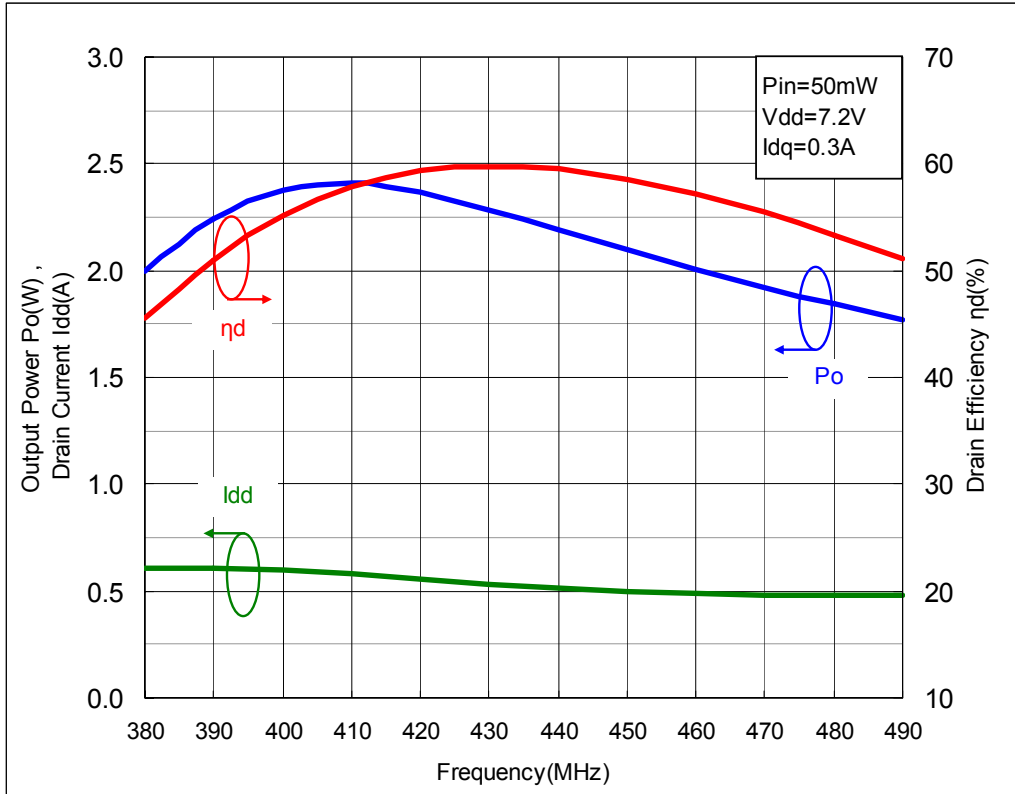
(@ f=400 - 470MHz, Pin=50mW, Vdd=7.2V, Idq=0.2A)



Freq. (MHz)	Vgg (V)	Output Power (dBm)	Output Power (W)	Gp (dB)	Idd (A)	ηd (%)	PAE (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
380	2.88	32.2	1.64	15.2	0.54	42.1	40.8	-4.4	-24.8	<-55
390	2.88	32.8	1.92	15.8	0.55	48.0	46.8	-6.2	-26.4	<-55
400	2.88	33.2	2.11	16.2	0.55	52.9	51.7	-8.9	-27.7	<-55
410	2.88	33.4	2.18	16.4	0.54	56.2	54.9	-13.0	-28.6	<-55
420	2.88	33.4	2.17	16.4	0.52	58.0	56.6	-16.1	-29.6	<-55
430	2.88	33.2	2.11	16.2	0.50	58.6	57.2	-13.6	-32.7	<-55
440	2.88	33.1	2.03	16.1	0.48	58.6	57.1	-10.6	-39.3	<-55
450	2.88	32.9	1.93	15.9	0.47	57.7	56.2	-8.7	-47.1	<-55
460	2.88	32.7	1.84	15.7	0.45	56.5	55.0	-7.6	<-55	<-55
470	2.88	32.5	1.76	15.5	0.45	55.0	53.4	-7.0	<-55	<-55
480	2.88	32.3	1.68	15.3	0.44	52.9	51.4	-6.7	<-55	<-55
490	2.88	32.1	1.61	15.1	0.44	50.9	49.3	-6.5	<-55	<-55

RD02MUS1B Output Power, Drain Efficiency vs. Frequency

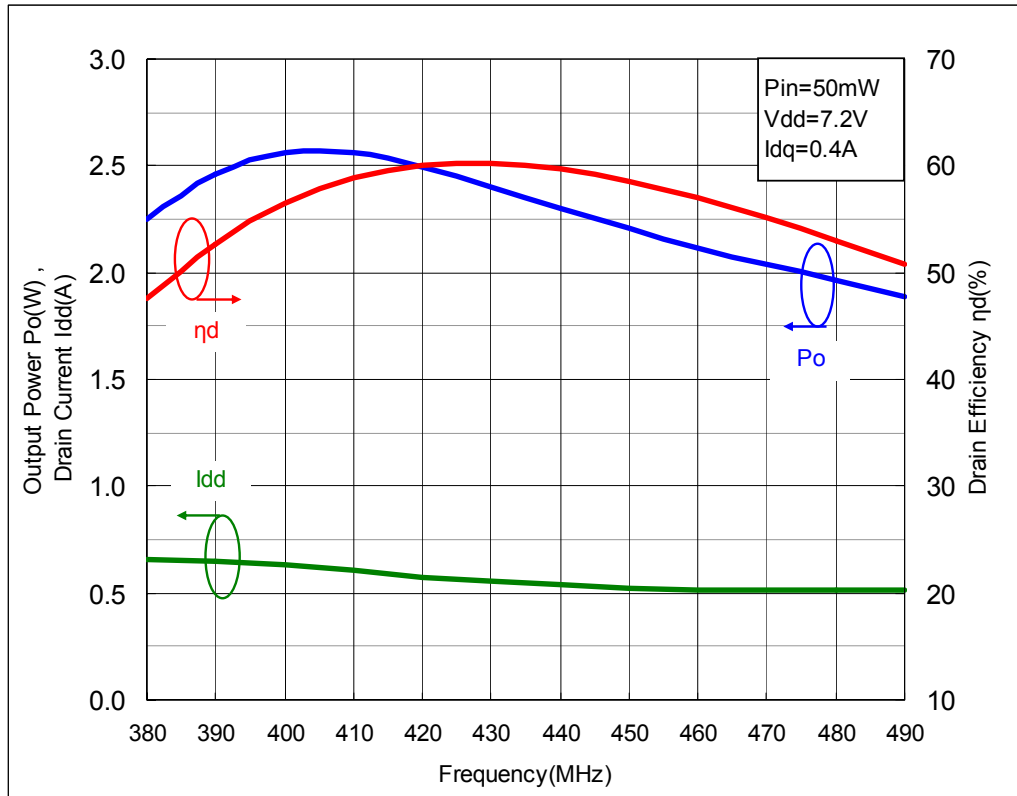
(@ f=400 - 470MHz, Pin=50mW, Vdd=7.2V, Idq=0.3A)



Freq. (MHz)	Vgg (V)	Output Power (dBm)	Output Power (W)	Gp (dB)	Idd (A)	ηd (%)	PAE (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
380	3.07	33.0	1.99	16.0	0.61	45.5	44.4	-4.9	-26.2	<-55
390	3.07	33.5	2.24	16.5	0.61	51.0	49.8	-6.9	-27.3	<-55
400	3.07	33.8	2.38	16.8	0.60	55.2	54.1	-10.0	-28.3	<-55
410	3.07	33.8	2.41	16.8	0.58	57.9	56.7	-14.5	-29.1	<-55
420	3.07	33.7	2.37	16.8	0.55	59.4	58.1	-16.1	-30.0	<-55
430	3.07	33.6	2.28	16.6	0.53	59.7	58.4	-12.5	-33.0	<-55
440	3.07	33.4	2.19	16.4	0.51	59.5	58.1	-9.6	-39.6	<-55
450	3.07	33.2	2.10	16.2	0.50	58.6	57.2	-7.9	-47.4	<-55
460	3.07	33.0	2.01	16.0	0.49	57.2	55.8	-6.9	<-55	<-55
470	3.07	32.8	1.92	15.8	0.48	55.4	54.0	-6.5	<-55	<-55
480	3.07	32.7	1.84	15.7	0.48	53.4	51.9	-6.1	<-55	<-55
490	3.07	32.5	1.77	15.5	0.48	51.2	49.8	-6.0	<-55	<-55

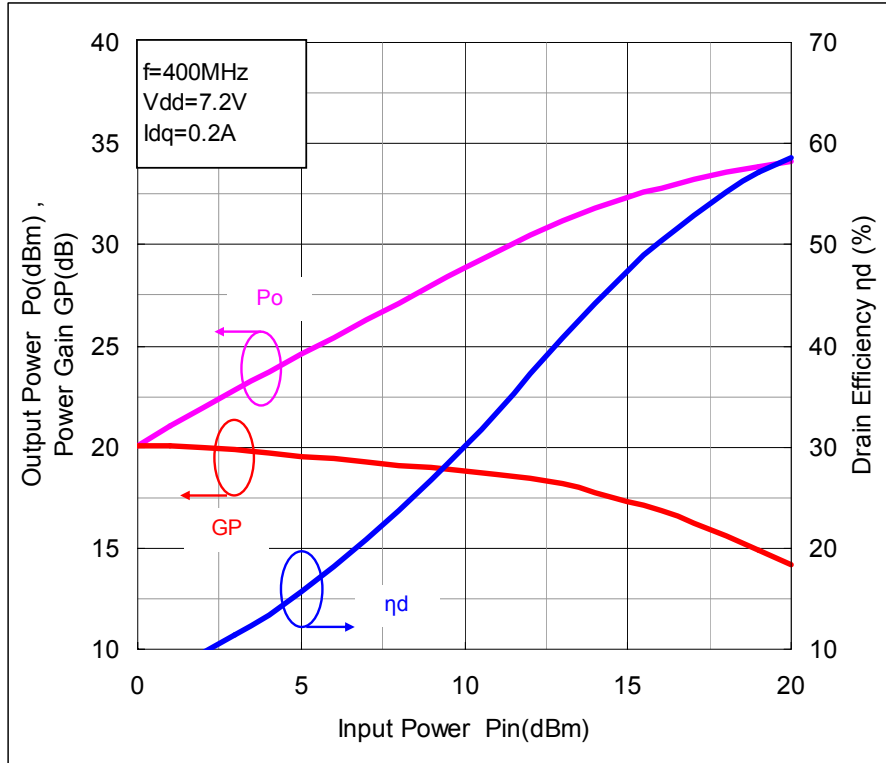
RD02MUS1B Output Power, Drain Efficiency vs. Frequency

(@ f=400 - 470MHz, Pin=50mW, Vdd=7.2V, Idq=0.4A)



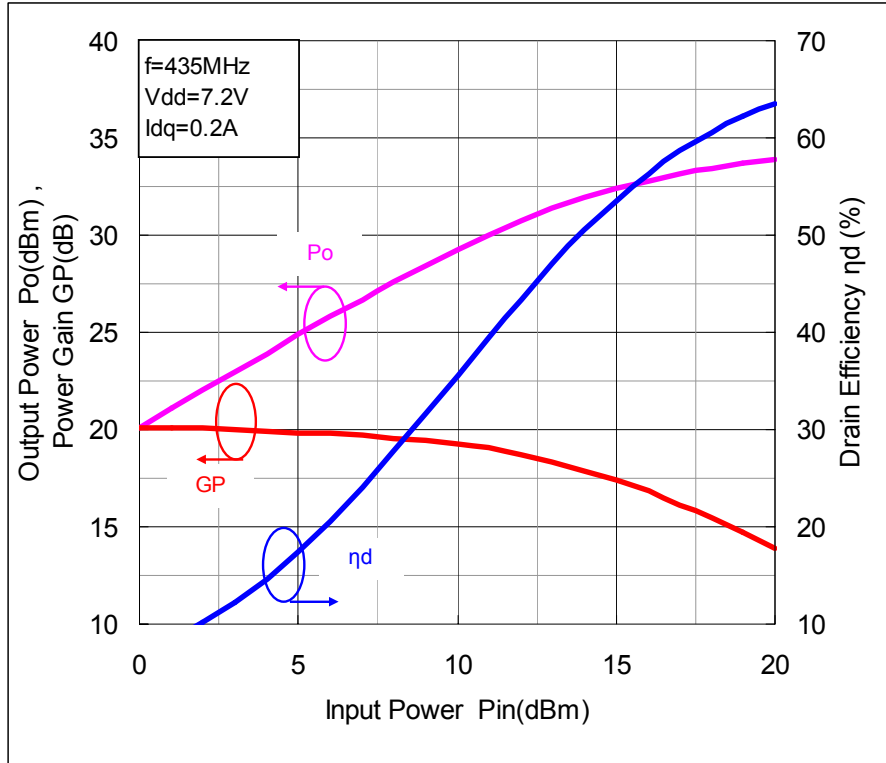
Freq. (MHz)	Vgg (V)	Output Power (dBm)	Output Power (W)	Gp (dB)	Idd (A)	ηd (%)	PAE (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
380	3.21	33.5	2.25	16.5	0.66	47.6	46.6	-5.3	-27.0	<-55
390	3.21	33.9	2.46	16.9	0.65	52.7	51.6	-7.5	-27.8	<-55
400	3.21	34.1	2.56	17.1	0.63	56.5	55.4	-11.0	-28.6	<-55
410	3.21	34.1	2.56	17.1	0.60	58.9	57.7	-15.9	-29.3	<-55
420	3.21	34.0	2.50	17.0	0.58	60.1	58.9	-15.6	-30.1	<-55
430	3.21	33.8	2.40	16.8	0.55	60.1	58.9	-11.5	-33.1	<-55
440	3.21	33.6	2.30	16.6	0.54	59.7	58.4	-8.9	-39.7	<-55
450	3.21	33.4	2.21	16.4	0.52	58.6	57.2	-7.3	-47.3	<-55
460	3.21	33.3	2.12	16.3	0.52	57.1	55.7	-6.5	<-55	<-55
470	3.21	33.1	2.04	16.1	0.51	55.2	53.9	-6.0	<-55	<-55
480	3.21	32.9	1.96	15.9	0.51	53.0	51.7	-5.8	<-55	<-55
490	3.21	32.8	1.89	15.8	0.52	50.7	49.4	-5.7	<-55	<-55

RD02MUS1B Output Power, Power Gain, Drain Efficiency vs. Input Power
 (@ f=400MHz, Vdd=7.2V, Idq=0.2A)



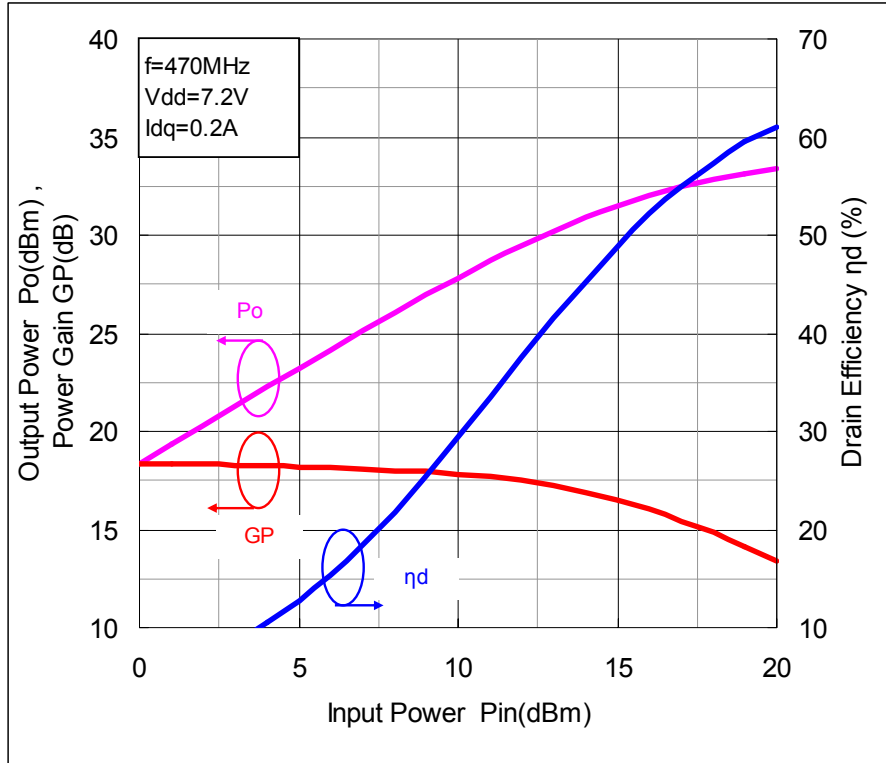
Vgg (V)	Pin (dBm)	Pin (W)	Output Power (dBm)	Output Power (W)	Gp (dB)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
2.88	0.0	0.001	20.1	0.10	20.1	0.22	6.5	6.5	-9.4	-36.1	<-55
2.88	1.0	0.001	21.0	0.13	20.0	0.22	8.0	7.9	-9.3	-35.3	<-55
2.88	2.0	0.002	21.9	0.16	19.9	0.23	9.6	9.5	-9.2	-34.2	<-55
2.88	3.0	0.002	22.8	0.19	19.8	0.23	11.4	11.3	-9.0	-33.6	<-55
2.88	4.0	0.003	23.7	0.23	19.7	0.24	13.4	13.2	-8.9	-32.2	<-55
2.88	5.0	0.003	24.6	0.29	19.6	0.25	15.7	15.6	-8.8	-31.2	<-55
2.88	6.0	0.004	25.4	0.35	19.4	0.27	18.2	18.0	-8.6	-30.4	<-55
2.88	7.0	0.005	26.3	0.42	19.3	0.28	20.8	20.6	-8.5	-29.4	<-55
2.88	8.0	0.006	27.1	0.52	19.1	0.30	23.6	23.3	-8.4	-28.8	<-55
2.88	9.0	0.008	28.0	0.63	19.0	0.33	26.8	26.4	-8.3	-28.5	<-55
2.88	10.0	0.010	28.8	0.76	18.8	0.35	30.1	29.7	-8.3	-28.0	<-55
2.88	11.0	0.013	29.7	0.92	18.7	0.38	33.6	33.1	-8.4	-27.7	<-55
2.88	12.0	0.016	30.4	1.11	18.4	0.41	37.2	36.7	-8.5	-27.7	<-55
2.88	13.0	0.020	31.1	1.30	18.1	0.44	40.8	40.2	-8.7	-27.8	<-55
2.88	14.0	0.025	31.8	1.51	17.8	0.47	44.2	43.5	-8.8	-27.8	<-55
2.88	15.0	0.032	32.3	1.71	17.3	0.50	47.3	46.5	-8.8	-27.6	<-55
2.88	16.0	0.040	32.8	1.91	16.8	0.53	50.4	49.3	-8.9	-27.7	<-55
2.88	17.0	0.050	33.2	2.10	16.2	0.55	52.9	51.6	-8.9	-27.7	<-55
2.88	18.0	0.063	33.6	2.28	15.6	0.58	55.2	53.6	-8.9	-27.6	<-55
2.88	19.0	0.080	33.9	2.45	14.9	0.60	57.1	55.2	-9.0	-27.5	<-55
2.88	20.0	0.100	34.1	2.60	14.1	0.62	58.7	56.4	-9.0	-27.5	<-55

RD02MUS1B Output Power, Power Gain, Drain Efficiency vs. Input Power
 (@ f=435MHz, Vdd=7.2V, Idq=0.2A)



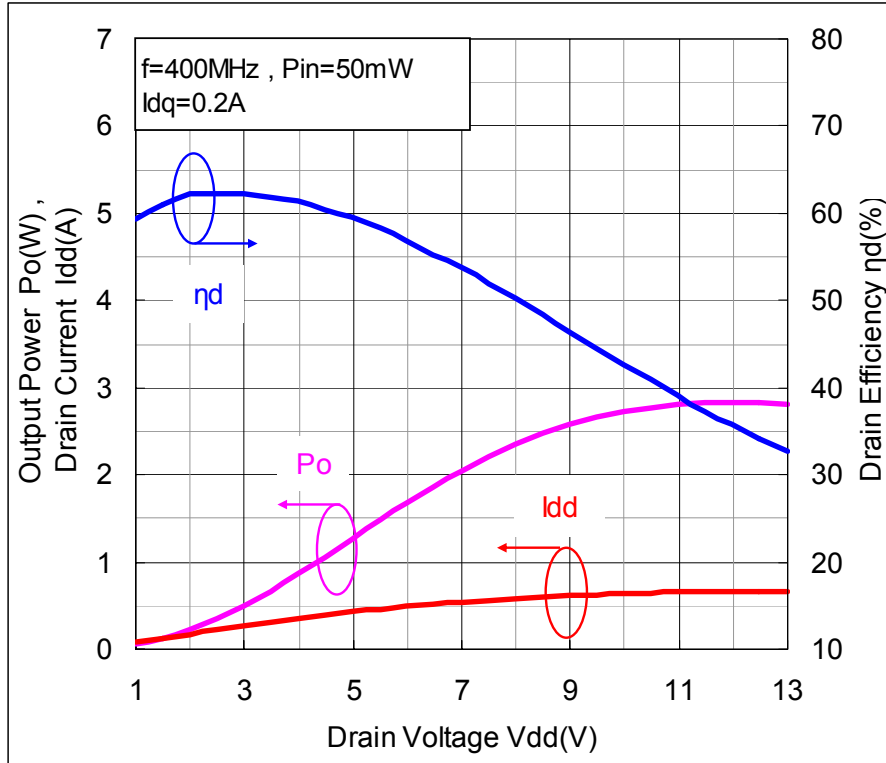
V _{gg} (V)	Pin (dBm)	Pin (W)	Output Power (dBm)	Output Power (W)	G _p (dB)	I _{dd} (A)	η _d (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
2.88	0.0	0.001	20.1	0.10	20.1	0.21	6.7	6.7	-10.2	<-55	<-55
2.88	1.0	0.001	21.1	0.13	20.1	0.22	8.3	8.2	-10.8	<-55	<-55
2.88	2.0	0.002	22.1	0.16	20.1	0.22	10.1	10.0	-10.3	-42.8	<-55
2.88	3.0	0.002	23.0	0.20	20.0	0.23	12.2	12.1	-10.3	-41.7	<-55
2.88	4.0	0.003	23.9	0.25	19.9	0.23	14.7	14.5	-10.4	-40.6	<-55
2.88	5.0	0.003	24.9	0.31	19.9	0.24	17.4	17.3	-10.5	-39.8	<-55
2.88	6.0	0.004	25.8	0.38	19.8	0.26	20.6	20.4	-10.5	-38.9	<-55
2.88	7.0	0.005	26.7	0.47	19.7	0.27	24.1	23.8	-10.6	-38.1	<-55
2.88	8.0	0.006	27.6	0.57	19.6	0.29	27.7	27.4	-10.7	-37.3	<-55
2.88	9.0	0.008	28.5	0.70	19.4	0.31	31.6	31.2	-10.7	-36.8	<-55
2.88	10.0	0.010	29.3	0.84	19.3	0.33	35.5	35.1	-10.6	-36.2	<-55
2.88	11.0	0.013	30.0	1.01	19.0	0.35	39.5	39.0	-10.5	-36.1	<-55
2.88	12.0	0.016	30.7	1.18	18.7	0.38	43.3	42.7	-10.4	-36.1	<-55
2.88	13.0	0.020	31.4	1.37	18.4	0.40	47.0	46.3	-10.5	-36.0	<-55
2.88	14.0	0.025	31.9	1.56	17.9	0.43	50.5	49.7	-10.7	-36.1	<-55
2.88	15.0	0.032	32.4	1.74	17.4	0.45	53.6	52.6	-11.0	-35.8	<-55
2.88	16.0	0.040	32.8	1.91	16.8	0.47	56.3	55.2	-11.4	-35.9	<-55
2.88	17.0	0.050	33.2	2.07	16.2	0.49	58.8	57.3	-11.9	-35.7	<-55
2.88	18.0	0.063	33.4	2.21	15.4	0.51	60.6	58.9	-12.5	-35.5	<-55
2.88	19.0	0.079	33.7	2.33	14.7	0.52	62.2	60.1	-13.1	-35.3	<-55
2.88	20.0	0.100	33.9	2.44	13.9	0.53	63.6	61.0	-13.6	-35.2	<-55

RD02MUS1B Output Power, Power Gain, Drain Efficiency vs. Input Power
 (@ f=470MHz, Vdd=7.2V, Idq=0.2A)



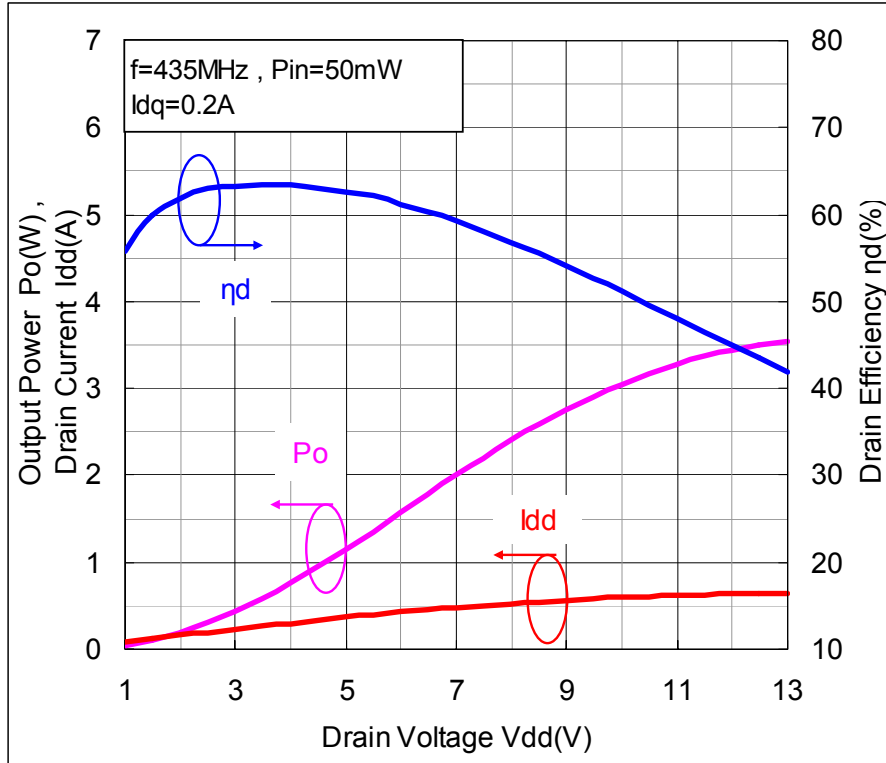
Vgg (V)	Pin (dBm)	Pin (W)	Output Power (dBm)	Output Power (W)	Gp (dB)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
2.88	0.0	0.001	18.3	0.07	18.3	0.21	4.6	4.5	-6.6	<-55	<-55
2.88	1.0	0.001	19.3	0.09	18.3	0.21	5.6	5.6	-6.6	<-55	<-55
2.88	2.0	0.002	20.3	0.11	18.3	0.21	7.0	6.9	-6.6	<-55	<-55
2.88	3.0	0.002	21.3	0.13	18.3	0.22	8.6	8.5	-6.6	<-55	<-55
2.88	4.0	0.003	22.3	0.17	18.2	0.22	10.5	10.4	-6.7	<-55	<-55
2.88	5.0	0.003	23.2	0.21	18.2	0.23	12.8	12.6	-6.7	<-55	<-55
2.88	6.0	0.004	24.1	0.26	18.1	0.24	15.3	15.1	-6.6	<-55	<-55
2.88	7.0	0.005	25.1	0.32	18.1	0.24	18.4	18.1	-6.6	<-55	<-55
2.88	8.0	0.006	26.0	0.40	18.0	0.26	21.8	21.4	-6.7	<-55	<-55
2.88	9.0	0.008	26.9	0.49	17.9	0.27	25.4	25.0	-6.7	<-55	<-55
2.88	10.0	0.010	27.8	0.61	17.8	0.29	29.4	29.0	-6.8	<-55	<-55
2.88	11.0	0.013	28.7	0.74	17.7	0.31	33.5	32.9	-6.7	<-55	<-55
2.88	12.0	0.016	29.5	0.89	17.5	0.33	37.5	36.8	-6.7	<-55	<-55
2.88	13.0	0.020	30.2	1.05	17.2	0.35	41.5	40.7	-6.7	<-55	<-55
2.88	14.0	0.025	30.9	1.23	16.9	0.38	45.2	44.3	-6.7	<-55	<-55
2.88	15.0	0.032	31.5	1.41	16.5	0.40	48.8	47.7	-6.7	<-55	<-55
2.88	16.0	0.040	32.0	1.59	16.0	0.42	52.2	50.9	-6.8	<-55	<-55
2.88	17.0	0.050	32.5	1.76	15.5	0.45	55.0	53.4	-7.0	<-55	<-55
2.88	18.0	0.063	32.8	1.92	14.8	0.47	57.4	55.5	-7.2	<-55	<-55
2.88	19.0	0.080	33.2	2.07	14.1	0.48	59.5	57.2	-7.5	<-55	<-55
2.88	20.0	0.100	33.4	2.19	13.4	0.50	61.1	58.3	-7.7	<-55	<-55

RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Voltage
 (@ f=400MHz, Pin=50mW, Idq=0.2A)



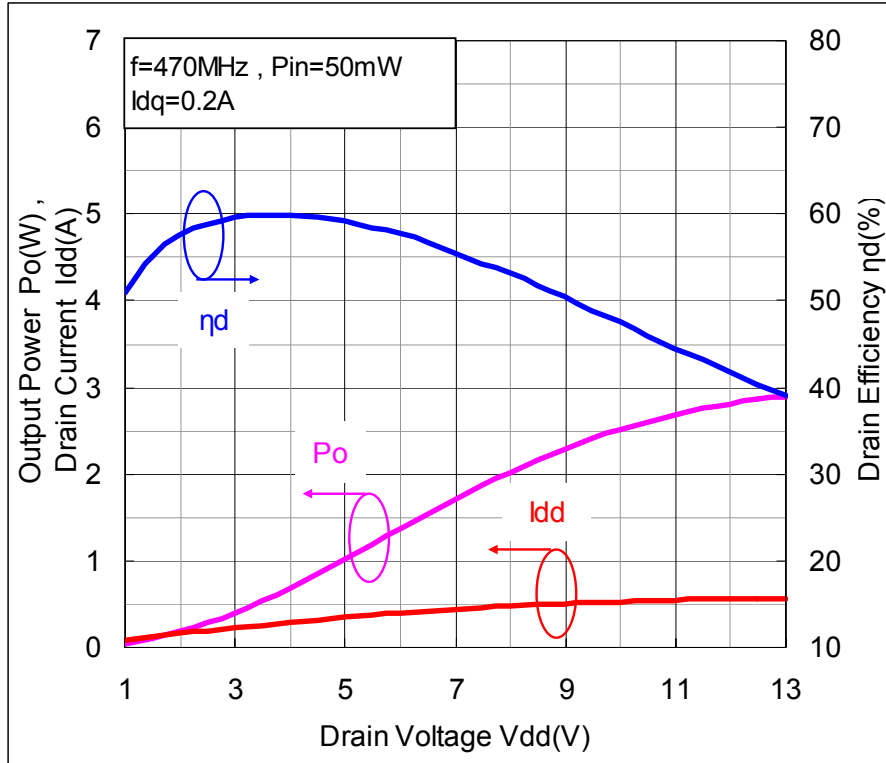
Vdd (V)	Vgg (V)	Output Power (dBm) ; (W)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
1.0	2.88	17.2 ; 0.05	0.09	59.4	4.3	-9.8	-30.3	<-55
1.5	2.88	20.8 ; 0.12	0.13	61.1	36.0	-10.0	-30.2	<-55
2.0	2.88	23.4 ; 0.22	0.18	62.3	48.0	-10.1	-29.8	<-55
2.5	2.88	25.4 ; 0.34	0.22	62.3	53.3	-10.1	-29.6	<-55
3.0	2.88	26.9 ; 0.49	0.27	62.2	55.8	-10.0	-29.4	<-55
3.5	2.88	28.2 ; 0.66	0.31	61.8	57.2	-9.9	-29.5	<-55
4.0	2.88	29.3 ; 0.86	0.35	61.4	57.8	-9.8	-28.8	<-55
4.5	2.88	30.2 ; 1.06	0.39	60.4	57.6	-9.7	-28.8	<-55
5.0	2.88	31.0 ; 1.27	0.43	59.5	57.1	-9.5	-28.7	<-55
5.5	2.88	31.7 ; 1.48	0.46	58.3	56.3	-9.4	-28.5	<-55
6.0	2.88	32.2 ; 1.68	0.49	56.9	55.2	-9.3	-28.3	<-55
6.5	2.88	32.7 ; 1.87	0.52	55.3	53.8	-9.1	-28.0	<-55
7.0	2.88	33.1 ; 2.05	0.55	53.8	52.4	-9.0	-27.7	<-55
7.5	2.88	33.4 ; 2.21	0.57	52.0	50.8	-8.8	-27.5	<-55
8.0	2.88	33.7 ; 2.35	0.59	50.2	49.2	-8.7	-27.1	<-55
8.5	2.88	33.9 ; 2.47	0.60	48.3	47.3	-8.6	-26.9	<-55
9.0	2.88	34.1 ; 2.57	0.62	46.4	45.5	-8.5	-26.5	<-55
9.5	2.88	34.2 ; 2.65	0.63	44.6	43.7	-8.4	-26.3	<-55
10.0	2.88	34.3 ; 2.72	0.64	42.7	41.9	-8.3	-26.1	<-55
10.5	2.88	34.4 ; 2.77	0.65	40.9	40.2	-8.2	-25.9	<-55
11.0	2.88	34.5 ; 2.80	0.65	39.1	38.4	-8.1	-25.6	<-55
11.5	2.88	34.5 ; 2.82	0.66	37.4	36.7	-8.0	-25.5	<-55
12.0	2.88	34.5 ; 2.83	0.66	35.8	35.1	-8.0	-25.3	<-55
12.5	2.88	34.5 ; 2.83	0.66	34.2	33.6	-7.9	-25.0	<-55
13.0	2.88	34.5 ; 2.82	0.66	32.7	32.1	-7.9	-24.8	<-55

RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Voltage
 (@ f=435MHz, Pin=50mW, Idq=0.2A)



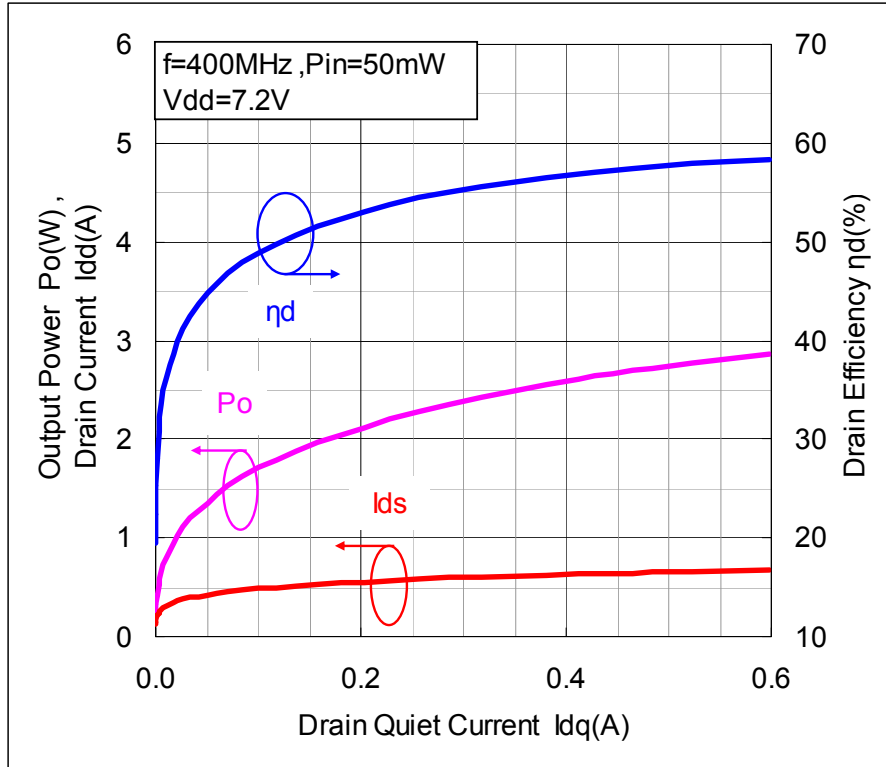
Vdd (V)	Vgg (V)	Output Power (dBm) ; (W)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
1.0	2.88	16.8 ; 0.05	0.09	55.7	-1.6	-17.4	-35.7	<-55
1.5	2.88	20.4 ; 0.11	0.12	59.9	32.4	-16.3	-36.4	<-55
2.0	2.88	22.9 ; 0.19	0.16	61.8	45.7	-15.3	-36.6	<-55
2.5	2.88	24.8 ; 0.30	0.19	62.9	52.5	-14.6	-36.8	<-55
3.0	2.88	26.4 ; 0.43	0.23	63.3	56.0	-14.0	-36.9	<-55
3.5	2.88	27.7 ; 0.58	0.26	63.4	57.9	-13.5	-36.5	<-55
4.0	2.88	28.8 ; 0.76	0.30	63.5	59.3	-13.1	-36.5	<-55
4.5	2.88	29.7 ; 0.94	0.33	63.1	59.7	-12.7	-36.3	<-55
5.0	2.88	30.6 ; 1.14	0.37	62.7	59.9	-12.5	-36.4	<-55
5.5	2.88	31.3 ; 1.36	0.40	62.1	59.8	-12.3	-36.1	<-55
6.0	2.88	31.9 ; 1.57	0.43	61.2	59.3	-12.1	-35.9	<-55
6.5	2.88	32.5 ; 1.78	0.46	60.3	58.6	-12.0	-35.8	<-55
7.0	2.88	33.0 ; 2.00	0.48	59.3	57.8	-12.0	-35.7	<-55
7.5	2.88	33.4 ; 2.20	0.51	58.1	56.8	-11.9	-35.5	<-55
8.0	2.88	33.8 ; 2.40	0.53	56.9	55.7	-11.9	-35.4	<-55
8.5	2.88	34.1 ; 2.59	0.55	55.6	54.5	-11.9	-35.2	<-55
9.0	2.88	34.4 ; 2.75	0.57	54.1	53.2	-12.0	-35.0	<-55
9.5	2.88	34.6 ; 2.91	0.58	52.7	51.8	-12.0	-34.8	<-55
10.0	2.88	34.8 ; 3.05	0.60	51.2	50.3	-12.1	-34.3	<-55
10.5	2.88	35.0 ; 3.18	0.61	49.6	48.9	-12.2	-34.1	<-55
11.0	2.88	35.2 ; 3.28	0.62	48.1	47.4	-12.4	-33.8	<-55
11.5	2.88	35.3 ; 3.37	0.63	46.5	45.8	-12.5	-33.4	<-55
12.0	2.88	35.4 ; 3.45	0.64	45.0	44.3	-12.6	-33.4	<-55
12.5	2.88	35.4 ; 3.50	0.65	43.4	42.8	-12.8	-33.0	<-55
13.0	2.88	35.5 ; 3.55	0.65	41.9	41.3	-13.0	-32.8	<-55

RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Voltage
 (@ f=470MHz, Pin=50mW, Idq=0.2A)



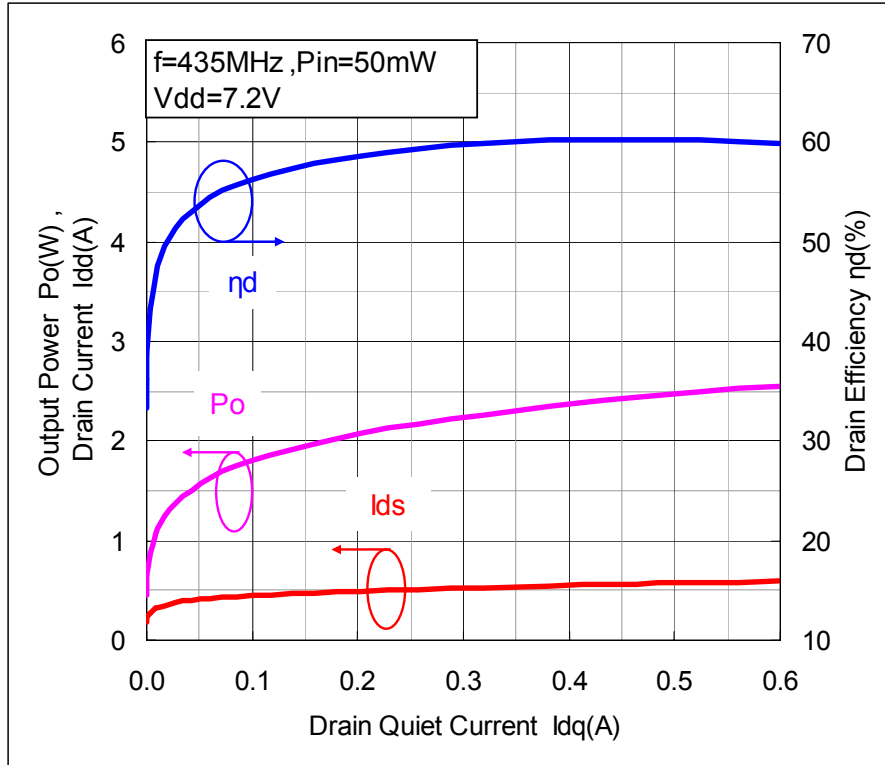
Vdd (V)	Vgg (V)	Output Power (dBm) ; (W)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
1.0	2.88	16.6 ; 0.05	0.09	50.9	-4.0	-8.9	<-55	<-55
1.5	2.88	20.1 ; 0.10	0.13	55.1	28.4	-8.6	<-55	<-55
2.0	2.88	22.6 ; 0.18	0.16	57.5	41.7	-8.2	<-55	<-55
2.5	2.88	24.5 ; 0.28	0.19	58.8	48.4	-8.0	<-55	<-55
3.0	2.88	26.0 ; 0.40	0.23	59.6	52.2	-7.7	<-55	<-55
3.5	2.88	27.3 ; 0.54	0.26	59.9	54.2	-7.5	<-55	<-55
4.0	2.88	28.4 ; 0.69	0.29	59.9	55.5	-7.4	<-55	<-55
4.5	2.88	29.3 ; 0.85	0.32	59.6	56.1	-7.3	<-55	<-55
5.0	2.88	30.1 ; 1.01	0.34	59.2	56.3	-7.2	<-55	<-55
5.5	2.88	30.8 ; 1.19	0.37	58.5	56.0	-7.1	<-55	<-55
6.0	2.88	31.3 ; 1.36	0.39	57.8	55.6	-7.0	<-55	<-55
6.5	2.88	31.9 ; 1.53	0.42	56.7	54.8	-7.0	<-55	<-55
7.0	2.88	32.3 ; 1.70	0.44	55.5	53.9	-7.0	<-55	<-55
7.5	2.88	32.7 ; 1.86	0.46	54.3	52.8	-7.0	<-55	<-55
8.0	2.88	33.0 ; 2.02	0.48	53.2	51.8	-7.1	<-55	<-55
8.5	2.88	33.3 ; 2.16	0.49	51.8	50.6	-7.1	<-55	<-55
9.0	2.88	33.6 ; 2.29	0.51	50.4	49.3	-7.1	<-55	<-55
9.5	2.88	33.8 ; 2.40	0.52	48.9	47.9	-7.2	<-55	<-55
10.0	2.88	34.0 ; 2.51	0.53	47.5	46.5	-7.3	<-55	<-55
10.5	2.88	34.2 ; 2.60	0.54	46.0	45.1	-7.3	<-55	<-55
11.0	2.88	34.3 ; 2.68	0.55	44.6	43.7	-7.4	<-55	<-55
11.5	2.88	34.4 ; 2.75	0.56	43.1	42.4	-7.5	<-55	<-55
12.0	2.88	34.5 ; 2.81	0.56	41.7	41.0	-7.6	<-55	<-55
12.5	2.88	34.6 ; 2.86	0.57	40.4	39.7	-7.7	<-55	<-55
13.0	2.88	34.6 ; 2.89	0.57	39.0	38.3	-7.8	<-55	<-55

RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Quiet Current
 (@ f=400MHz, Pin=50mW, Vdd=7.2V)



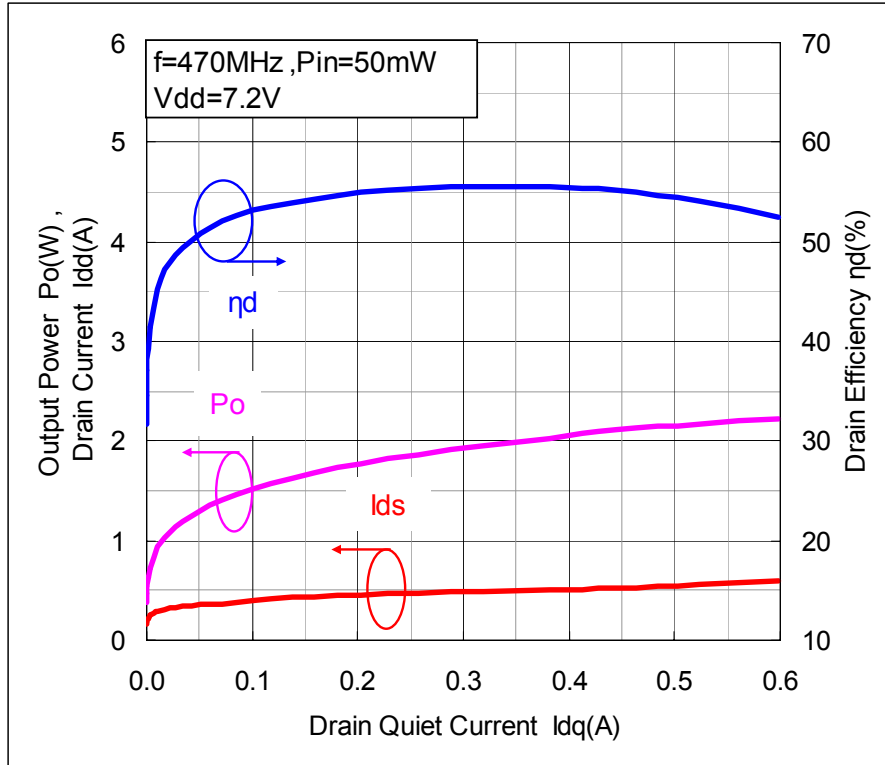
I_{dq} (A)	VGG (V)	Output Power (dBm) : (W)	I_{dd} (A)	η_d (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
0.00	1.5	22.5 : 0.18	0.13	19.4	14.1	-4.5	-16.4	<-55
0.00	1.6	24.0 : 0.25	0.15	22.4	18.0	-4.7	-17.0	<-55
0.00	1.7	25.2 : 0.33	0.18	25.3	21.5	-4.9	-17.9	<-55
0.00	1.8	26.3 : 0.42	0.21	28.0	24.7	-5.1	-18.6	<-55
0.00	1.9	27.3 : 0.53	0.24	30.7	27.8	-5.3	-19.7	<-55
0.01	2.0	28.2 : 0.66	0.28	33.5	31.0	-5.6	-20.6	<-55
0.01	2.1	29.1 : 0.81	0.31	36.2	33.9	-5.8	-21.4	<-55
0.02	2.2	29.8 : 0.95	0.34	38.7	36.7	-6.1	-22.4	<-55
0.03	2.3	30.5 : 1.11	0.38	41.2	39.4	-6.4	-23.4	<-55
0.04	2.4	31.1 : 1.28	0.41	43.7	42.0	-6.8	-24.2	<-55
0.06	2.5	31.6 : 1.45	0.44	45.8	44.2	-7.2	-25.0	<-55
0.09	2.6	32.1 : 1.62	0.47	48.0	46.5	-7.6	-25.9	<-55
0.12	2.7	32.5 : 1.80	0.50	49.8	48.4	-8.0	-26.6	<-55
0.16	2.8	32.9 : 1.97	0.53	51.5	50.2	-8.5	-27.2	<-55
0.20	2.9	33.3 : 2.12	0.56	53.0	51.8	-9.0	-27.7	<-55
0.26	3.0	33.6 : 2.28	0.58	54.4	53.2	-9.6	-28.1	<-55
0.32	3.1	33.8 : 2.42	0.61	55.6	54.4	-10.2	-28.4	<-55
0.38	3.2	34.1 : 2.55	0.63	56.5	55.4	-10.8	-28.5	<-55
0.45	3.3	34.3 : 2.66	0.65	57.3	56.2	-11.5	-28.7	<-55
0.52	3.4	34.4 : 2.77	0.66	57.9	56.8	-12.3	-28.7	<-55
0.60	3.5	34.6 : 2.86	0.68	58.3	57.2	-13.2	-28.5	<-55

**RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Quiet Current
(@ f=435MHz, Pin=50mW, Vdd=7.2V)**



Idq (A)	VGG (V)	Output Power (dBm) : (W)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
0.00	1.5	26.5 : 0.45	0.19	33.3	29.8	-13.2	-27.0	<-55
0.00	1.6	27.4 : 0.55	0.21	36.2	33.0	-13.6	-27.6	<-55
0.00	1.7	28.1 : 0.65	0.23	38.7	35.8	-14.0	-28.3	<-55
0.00	1.8	28.8 : 0.75	0.26	41.0	38.4	-14.3	-29.0	<-55
0.00	1.9	29.4 : 0.87	0.28	43.3	40.8	-14.5	-29.5	<-55
0.01	2.0	30.0 : 0.99	0.30	45.4	43.2	-14.7	-30.4	<-55
0.01	2.1	30.5 : 1.12	0.33	47.6	45.5	-14.8	-31.1	<-55
0.02	2.2	30.9 : 1.24	0.35	49.6	47.6	-14.7	-31.9	<-55
0.03	2.3	31.4 : 1.37	0.37	51.4	49.5	-14.5	-32.5	<-55
0.04	2.4	31.8 : 1.50	0.39	52.9	51.2	-14.3	-33.2	<-55
0.06	2.5	32.1 : 1.62	0.41	54.4	52.8	-13.9	-33.8	<-55
0.09	2.6	32.4 : 1.75	0.44	55.7	54.1	-13.5	-34.5	<-55
0.12	2.7	32.7 : 1.86	0.46	56.9	55.4	-12.9	-34.9	<-55
0.16	2.8	33.0 : 1.98	0.47	57.9	56.5	-12.4	-35.4	<-55
0.20	2.9	33.2 : 2.08	0.49	58.7	57.3	-11.8	-35.6	<-55
0.26	3.0	33.4 : 2.18	0.51	59.4	58.0	-11.3	-35.9	<-55
0.32	3.1	33.6 : 2.27	0.53	59.8	58.5	-10.7	-36.0	<-55
0.38	3.2	33.7 : 2.34	0.54	60.2	58.9	-10.1	-35.9	<-55
0.45	3.3	33.8 : 2.42	0.56	60.3	59.0	-9.6	-36.0	<-55
0.52	3.4	34.0 : 2.49	0.57	60.2	59.0	-9.1	-36.0	<-55
0.60	3.5	34.1 : 2.54	0.59	59.9	58.7	-8.6	-35.8	<-55

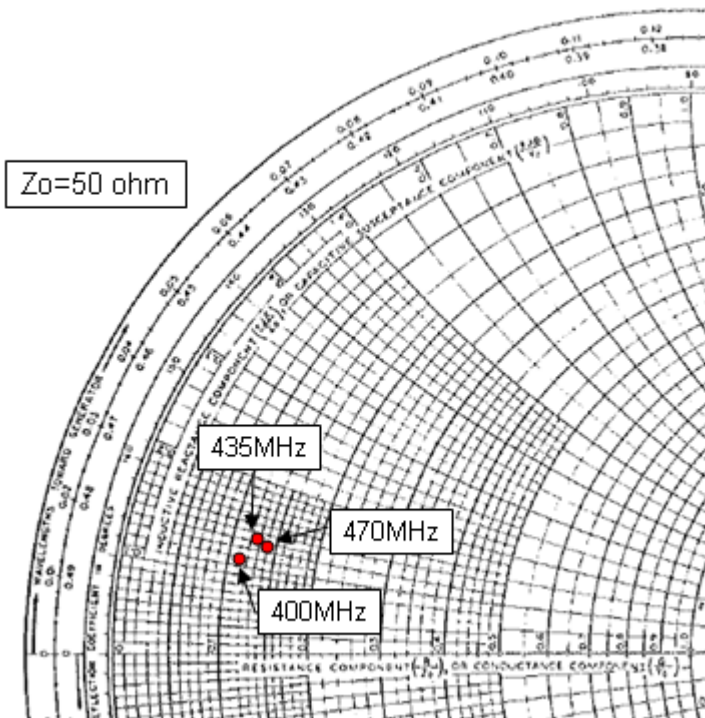
**RD02MUS1B Output Power, Drain Current, Drain Efficiency vs. Drain Quiet Current
(@ f=470MHz, Pin=50mW, Vdd=7.2V)**



Idq (A)	VGG (V)	Output Power (dBm) : (W)	Idd (A)	ηd (%)	P.A.E. (%)	Return Loss (dB)	2fo (dBc)	3fo (dBc)
0.00	1.5	25.7 : 0.37	0.16	31.6	27.6	-12.0	<-55	<-55
0.00	1.6	26.6 : 0.46	0.19	34.6	31.0	-11.7	<-55	<-55
0.00	1.7	27.4 : 0.55	0.21	37.1	33.8	-11.3	<-55	<-55
0.00	1.8	28.0 : 0.63	0.22	39.3	36.3	-10.9	<-55	<-55
0.00	1.9	28.6 : 0.73	0.25	41.4	38.6	-10.5	<-55	<-55
0.01	2.0	29.2 : 0.83	0.27	43.5	40.9	-10.1	<-55	<-55
0.01	2.1	29.7 : 0.93	0.29	45.3	42.9	-9.8	<-55	<-55
0.02	2.2	30.2 : 1.04	0.31	47.2	45.0	-9.4	<-55	<-55
0.03	2.3	30.6 : 1.14	0.33	48.6	46.5	-9.0	<-55	<-55
0.04	2.4	31.0 : 1.25	0.35	50.2	48.2	-8.7	<-55	<-55
0.06	2.5	31.3 : 1.36	0.37	51.4	49.5	-8.3	<-55	<-55
0.09	2.6	31.7 : 1.47	0.39	52.6	50.8	-8.0	<-55	<-55
0.12	2.7	32.0 : 1.57	0.41	53.6	51.9	-7.6	<-55	<-55
0.16	2.8	32.2 : 1.67	0.43	54.3	52.7	-7.3	<-55	<-55
0.20	2.9	32.5 : 1.77	0.45	54.9	53.4	-7.0	<-55	<-55
0.26	3.0	32.7 : 1.86	0.47	55.4	53.9	-6.7	<-55	<-55
0.32	3.1	32.9 : 1.95	0.49	55.5	54.1	-6.4	<-55	<-55
0.38	3.2	33.1 : 2.03	0.51	55.5	54.2	-6.1	<-55	<-55
0.45	3.3	33.2 : 2.11	0.53	55.1	53.8	-5.8	<-55	<-55
0.52	3.4	33.4 : 2.18	0.56	54.1	52.9	-5.6	<-55	<-55
0.60	3.5	33.5 : 2.23	0.59	52.5	51.3	-5.4	<-55	<-55

RD02MUS1B Input / Output Impedance vs. Frequency characteristics

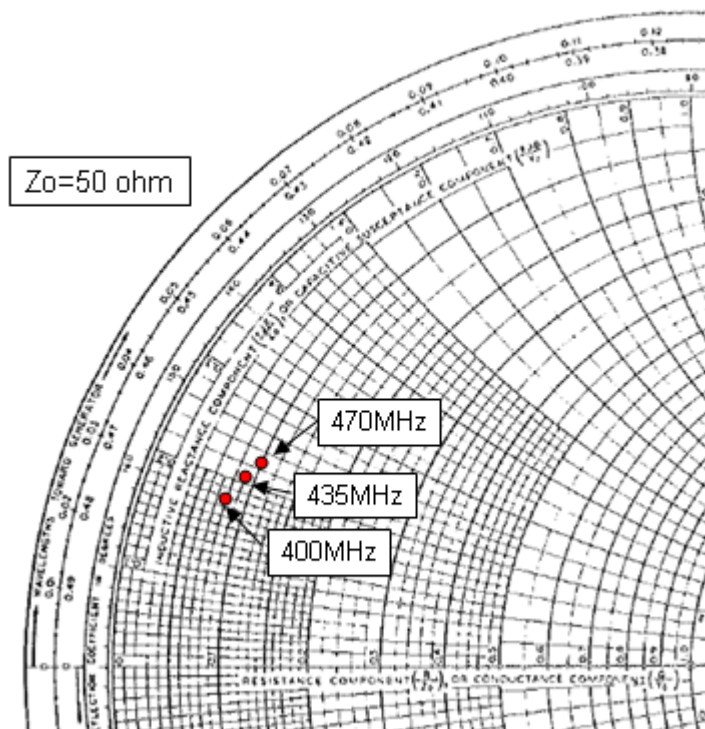
Zout* (f=400,435,470MHz)



f(MHz)	Zout*(ohm)
400	5.82+j6.03
435	6.68+j6.85
470	7.02+j6.58

Zout* : Complex conjugate of Output impedance.

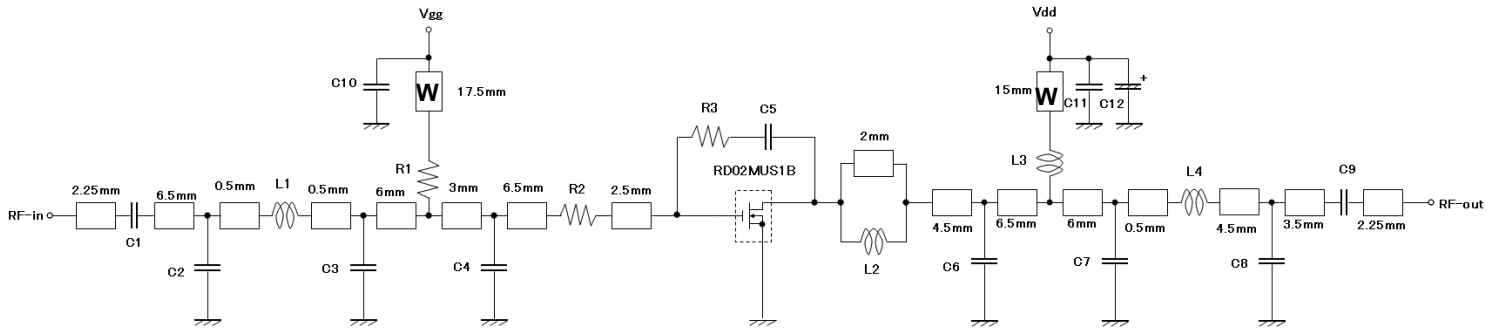
Zin* (f=400,435,470MHz)



f(MHz)	Zin*(ohm)
400	4.16+j9.09
435	4.55+j10.54
470	4.95+j11.66

Zin* : Complex conjugate of Input impedance.

RD02MUS1B Equivalent Circuit (@f=400-470MHz)



Note: Board material – Glass-Epoxy Substrate. Microstrip line width=1.3mm/50 OHM, er:4.8, t=0.8mm. W: Line width=1.0mm.

Parts Type		Value	Type name	Vender
Capacitor	C1	300pF	GRM1882C1H301JA01D	Murata Manufacturing Co.,Ltd.
	C2	9pF	GRM1882C1H9R0DZ01D	Murata Manufacturing Co.,Ltd.
	C3	18pF	GRM1882C1H180JA01D	Murata Manufacturing Co.,Ltd.
	C4	47pF	GRM1882C1H470JA01D	Murata Manufacturing Co.,Ltd.
	C5	47pF	GRM1882C1H470JA01D	Murata Manufacturing Co.,Ltd.
	C6	33pF	GRM1882C1H330JA01D	Murata Manufacturing Co.,Ltd.
	C7	12pF	GRM1882C1H120DZ01D	Murata Manufacturing Co.,Ltd.
	C8	10pF	GRM1882C1H100JA01D	Murata Manufacturing Co.,Ltd.
	C9	100pF	GRM1882C1H101JA01D	Murata Manufacturing Co.,Ltd.
	C10	22000pF	GRM216R11H223KA01E	Murata Manufacturing Co.,Ltd.
	C11	22000pF	GRM216R11H223KA01E	Murata Manufacturing Co.,Ltd.
	C12	22 μ F	A0603	NICHICON CORPORATION
Resistance	R1	5.1k OHM	CR20-512JB	Hokuriku Electric Industry Co.,Ltd.
	R2	1.5 OHM	CR16-1R5JB	Hokuriku Electric Industry Co.,Ltd.
	R3	270 OHM	RPC10 271-J	TAIYOSHA ELECTRIC Co.,Ltd.
Inductance	L1	6.8nH	LQG18HN6N8J00D	Murata Manufacturing Co.,Ltd.
	L2	3.6nH	LLQ1608-F3N6	TOKO Co.,Ltd.
	L3	34.5nH Enameled wire 5Turns, Diameter:0.40mm, φ 2.46mm(the out side diameter)	4005A	yc corporation Co.,Ltd.
	L4	6.6nH Enameled wire 2Turns, Diameter:0.23mm, φ 1.62mm(the out side diameter)	2302S	yc corporation Co.,Ltd.

RD02MUS1B test fixture (@f=400- 470MHz)

