

# RQA0004PXDQS

R07DS0418EJ0300

Rev.3.00

## Silicon N-Channel MOS FET

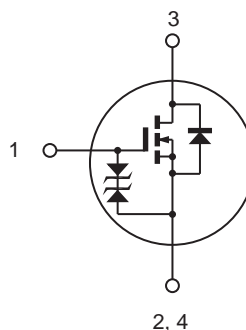
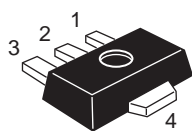
Sep 09, 2011

### Features

- High Output Power, High Efficiency  
Pout = +29.7 dBm, PAE = 68% (f = 520 MHz)
- Compact package capable of surface mounting

### Outline

RENESAS Package code: PLZZ0004CA-A  
(Package Name : UPAK)



1. Gate
2. Source
3. Drain
4. Source

Note: Marking is "PX".

### Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	16	V
Gate to source voltage	V <sub>GSS</sub>	±5	V
Drain current	I <sub>D</sub>	0.3	A
Channel dissipation	P <sub>ch</sub> <sup>note</sup>	3	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

Note: Value at Tc = 25°C

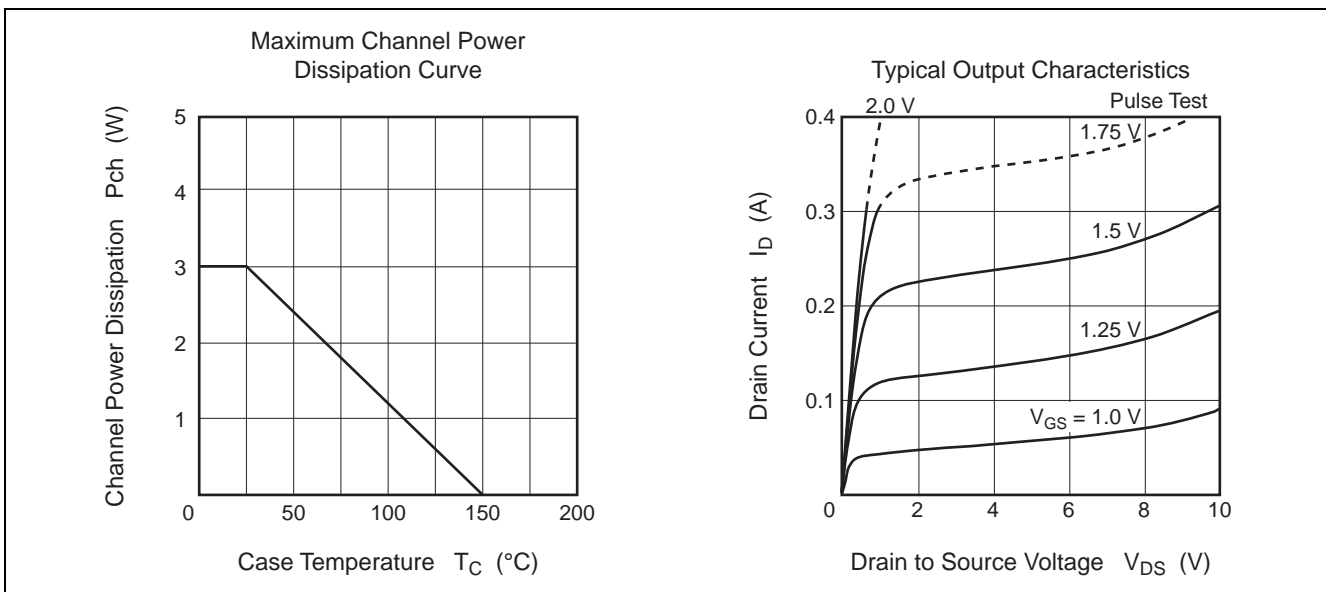
This Device is sensitive to Electro Static Discharge. An Adequate careful handling procedure is requested.

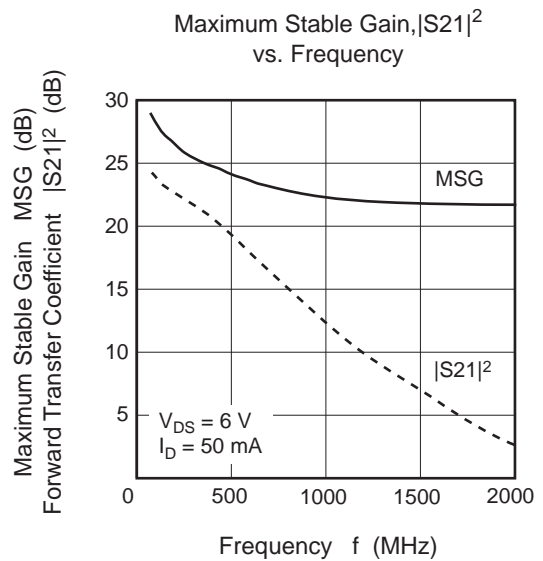
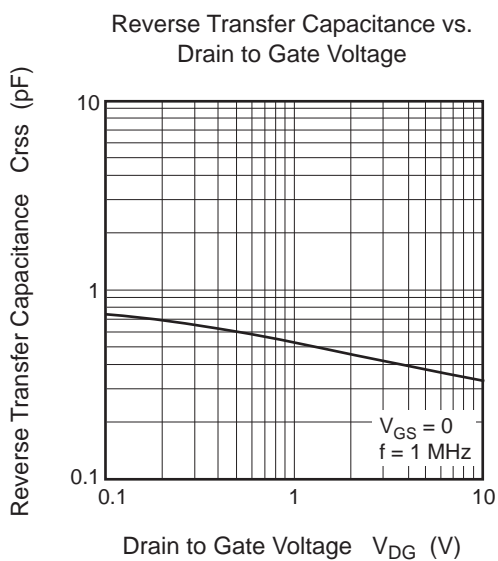
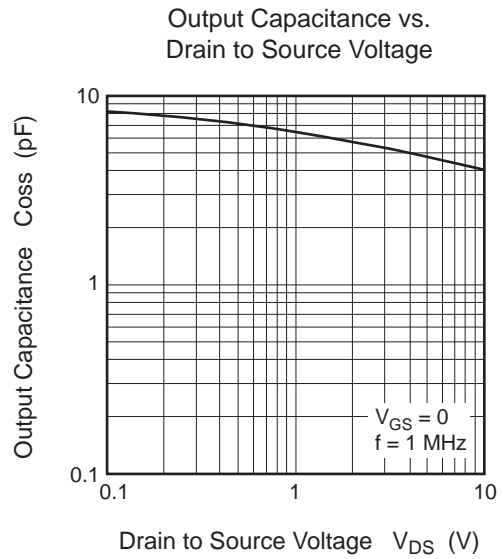
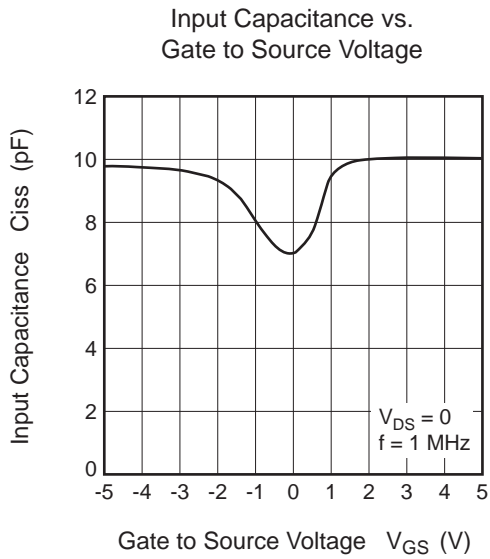
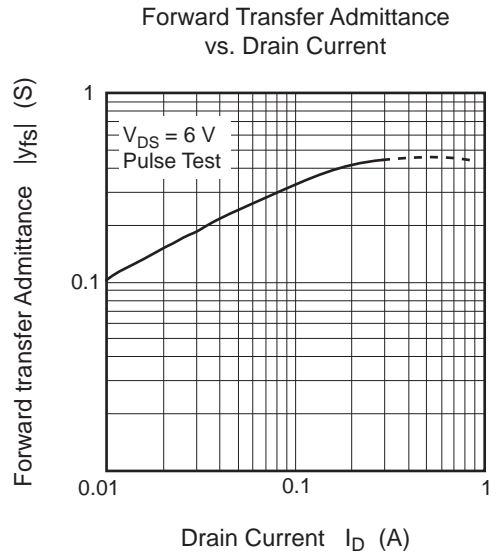
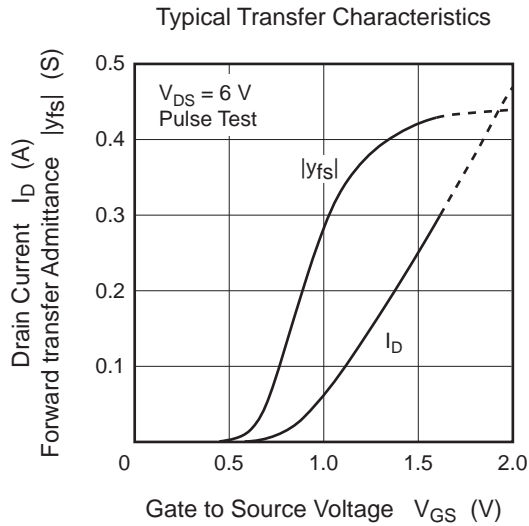
## Electrical Characteristics

(Ta = 25°C)

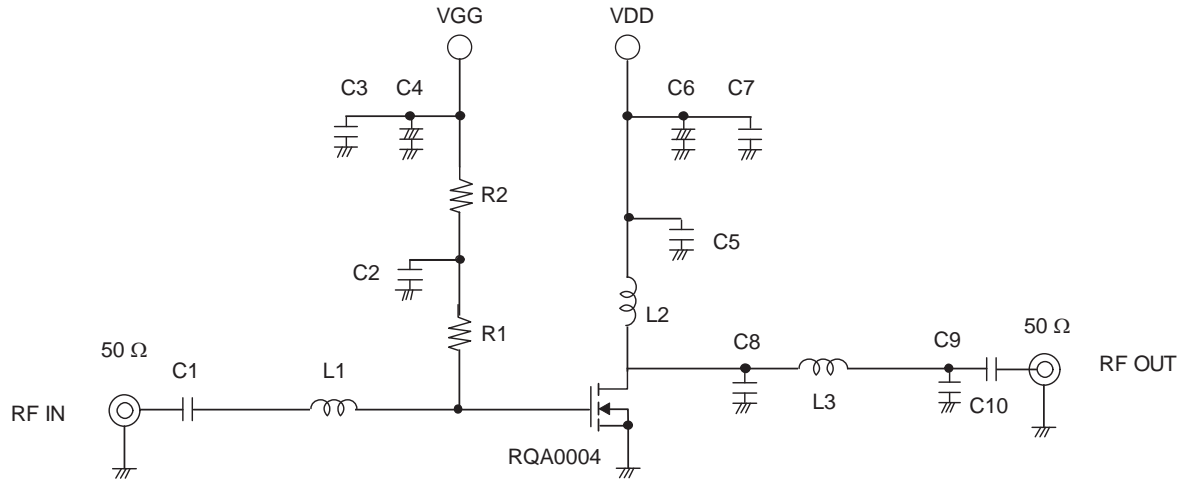
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	$I_{DSS}$	—	—	2	$\mu\text{A}$	$V_{DS} = 16\text{ V}, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 2$	$\mu\text{A}$	$V_{GS} = \pm 5\text{ V}, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.3	0.6	0.9	V	$V_{DS} = 6\text{ V}, I_D = 1\text{ mA}$
Forward Transfer Admittance	$ y_{fs} $	0.3	0.43	0.6	S	$V_{DS} = 6\text{ V}, I_D = 0.3\text{ A}$
Input capacitance	$C_{iss}$	—	10	—	pF	$V_{GS} = 5\text{ V}, V_{DS} = 0, f = 1\text{ MHz}$
Output capacitance	$C_{oss}$	—	5	—	pF	$V_{DS} = 6\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	—	0.4	—	pF	$V_{DG} = 6\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$
Output Power	Pout	—	25.1	—	dBm	$V_{DS} = 3.7\text{ V}, I_{DQ} = 50\text{ mA}$ $f = 174\text{ MHz}$ Pin = +13 dBm (20 mW)
		—	0.33	—	W	
Power Added Efficiency	PAE	—	65	—	%	
Output Power	Pout	—	26.6	—	dBm	$V_{DS} = 3.7\text{ V}, I_{DQ} = 50\text{ mA}$ $f = 520\text{ MHz}$ Pin = +13 dBm (20 mW)
		—	0.46	—	W	
Power Added Efficiency	PAE	—	71	—	%	
Output Power	Pout	28.7	29.7	—	dBm	$V_{DS} = 6\text{ V}, I_{DQ} = 50\text{ mA}$ $f = 520\text{ MHz}$ Pin = +13 dBm (20 mW)
		0.74	0.93	—	W	
Power Added Efficiency	PAE	60	68	—	%	

## Main Characteristics

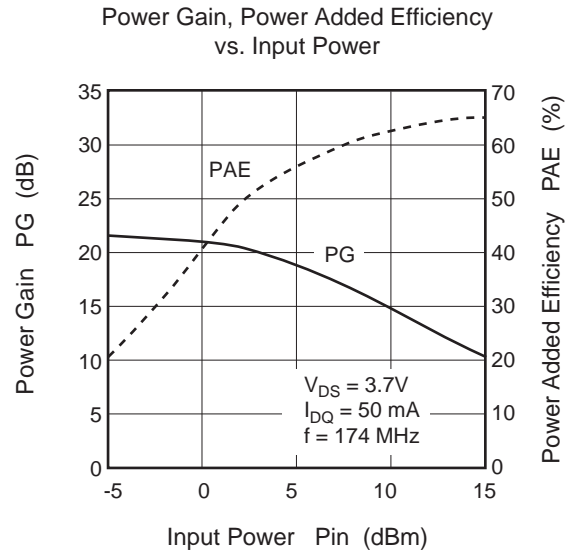
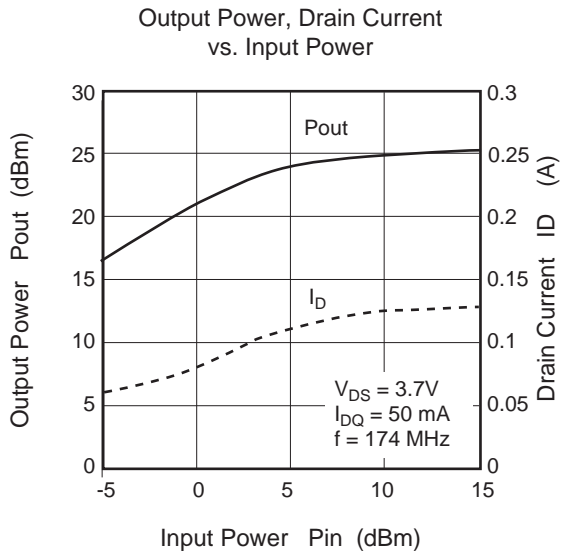


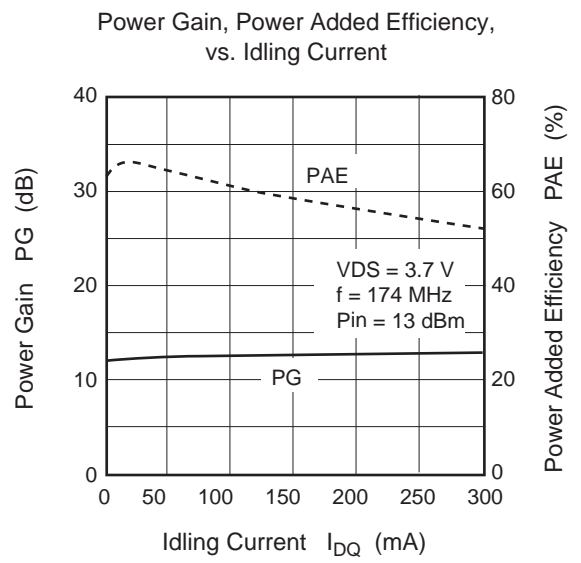
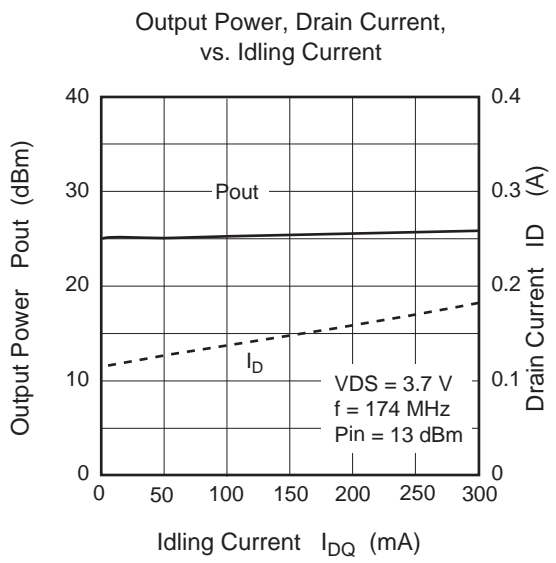
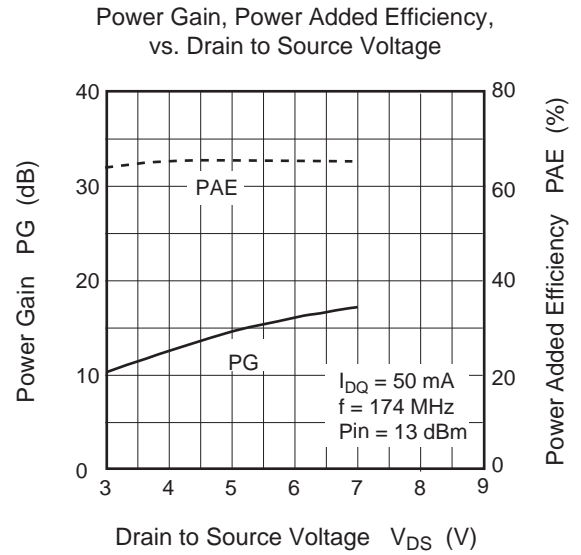
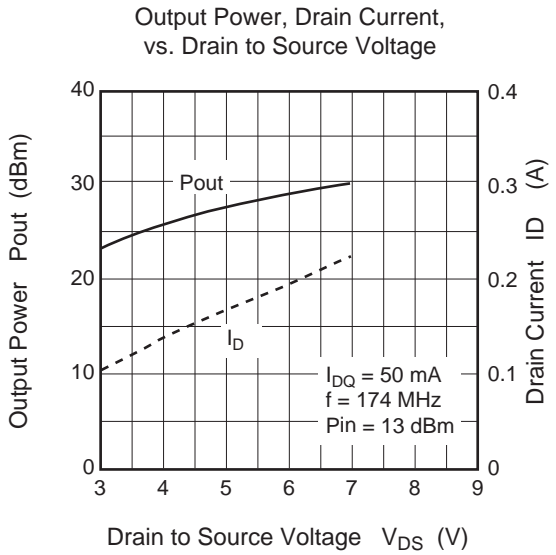
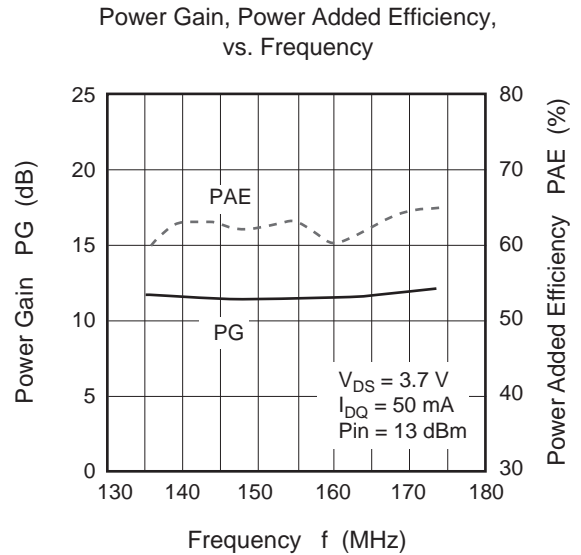
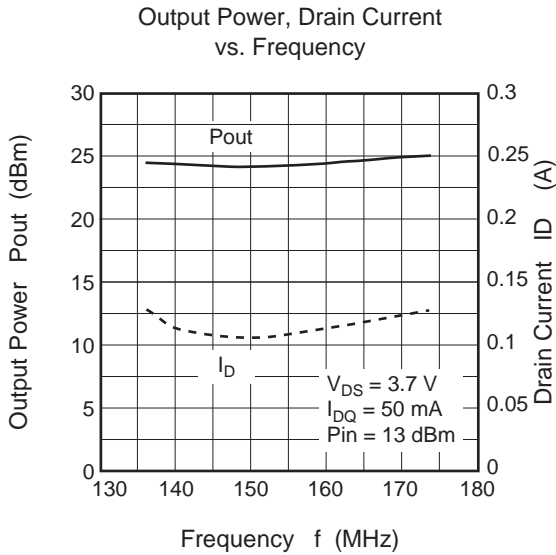


Evaluation Circuit 1 (@V<sub>DD</sub> = 3.7 V Tuning, f = 174 MHz)

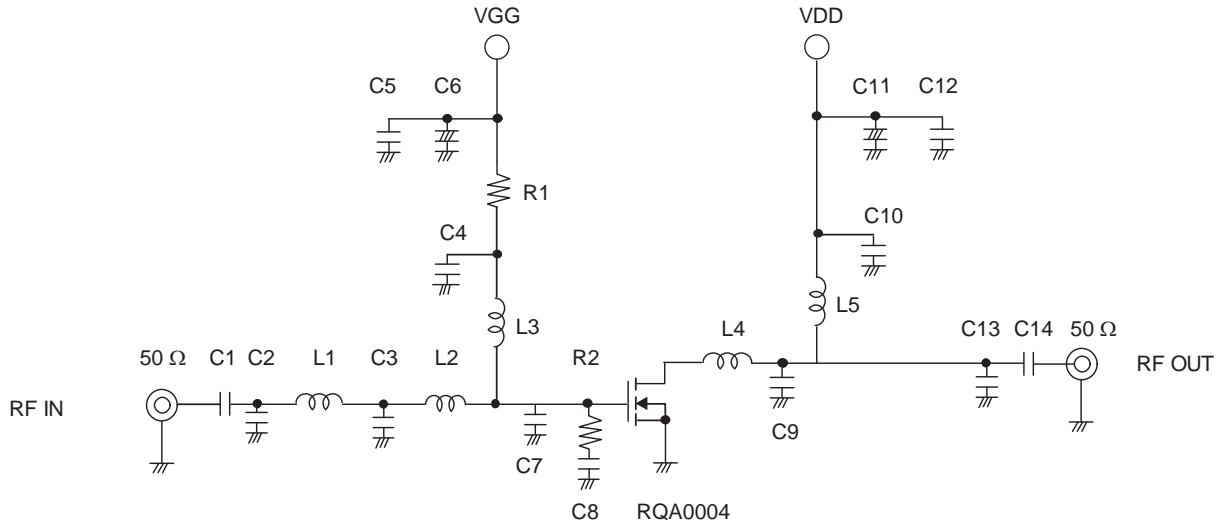


- C1, C2, C5, C10: 100 pF Chip Capacitor
- C3, C7: 1000 pF Chip Capacitor
- C4, C6: 1 μF /+16V Chip Tantalum Capacitor
- C8, C9: 22 pF Chip Capacitor
- L1: 33 nH Chip Inductor
- L2: 10 nH Chip Inductor
- L3: 5.6 nH Chip Inductor
- R1: 200 Ω Chip Resistor
- R2: 6.8 kΩ Chip Resistor



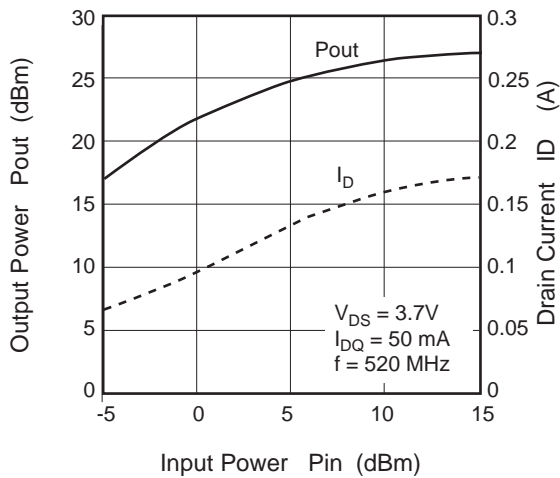


Evaluation Circuit 2 (@V<sub>DD</sub> = 3.7 & 6.0V Tuning, f = 520 MHz)

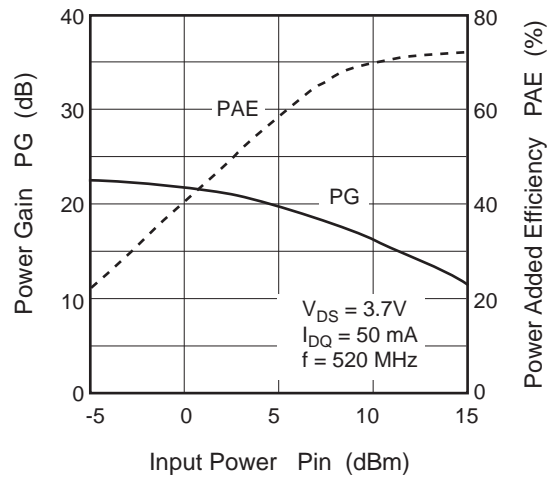


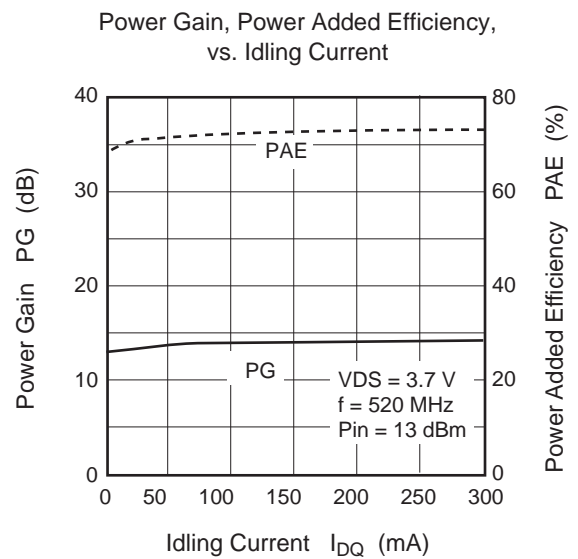
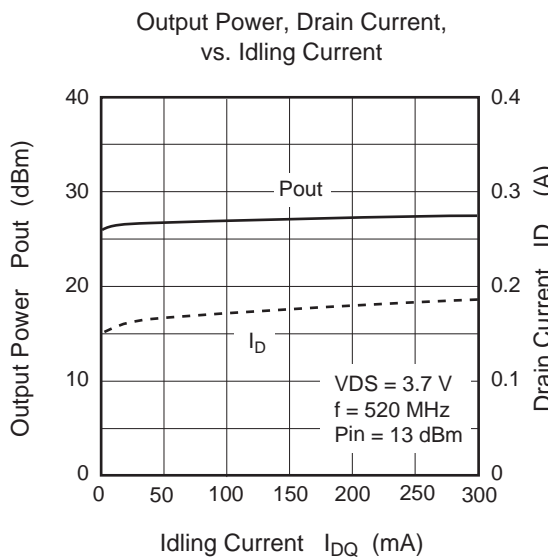
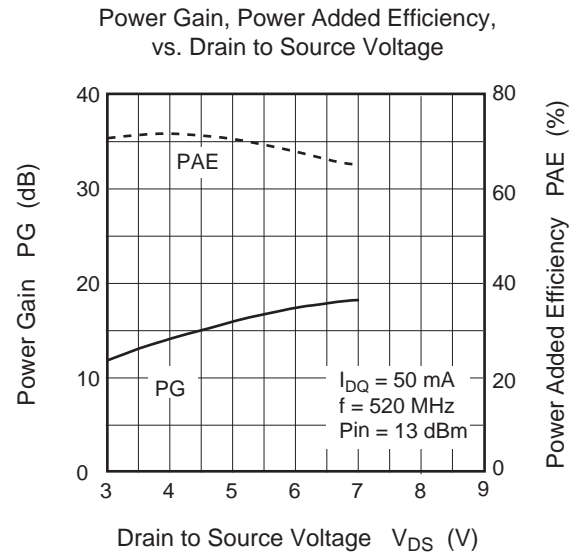
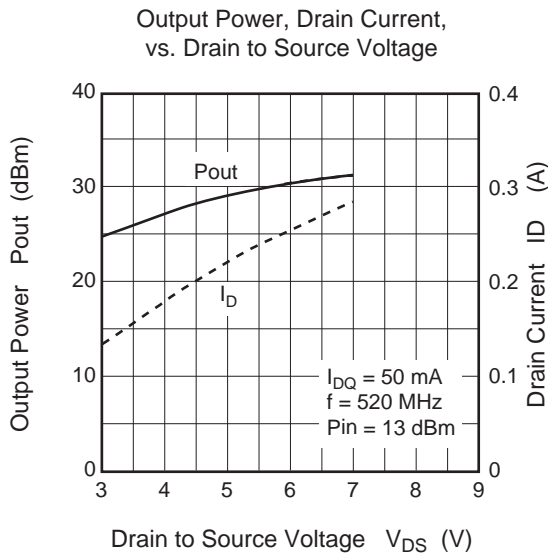
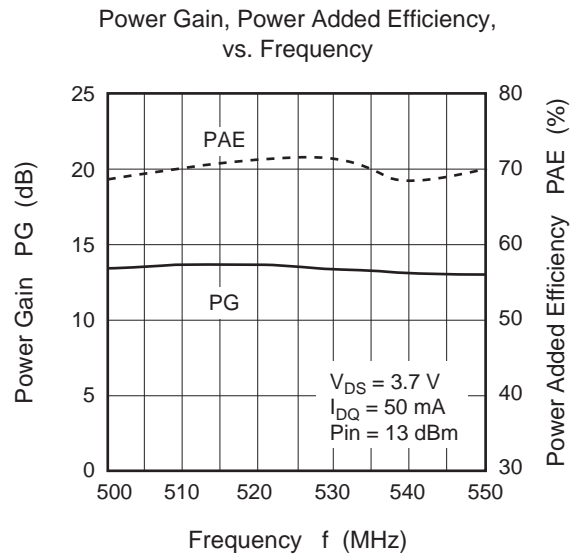
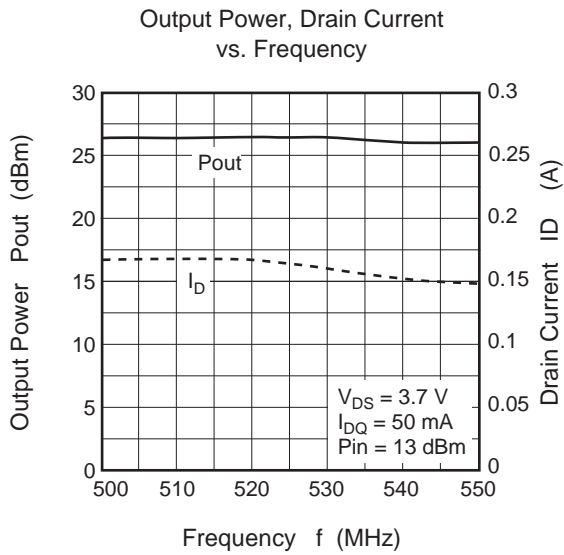
- C1, C4, C10, C14: 100 pF Chip Capacitor
- C2: 10 pF Chip Capacitor
- C3, C7: 2 pF Chip Capacitor
- C5, C12: 1000 pF Chip Capacitor
- C6, C11: 1 μF /+16V Chip Tantalum Capacitor
- C8: 2200 pF Chip Capacitor
- C9: 3 pF Chip Capacitor
- C13: 8 pF Chip Capacitor
- L1, L2, L4: 5.6 nH Chip Inductor
- L3: 27 nH Chip Inductor
- L5: 4Turns D : 0.5 mm, φ2.4 mm Enamel Wire
- R1: 6.8k Ω Chip Resistor
- R2: 180 Ω Chip Resistor

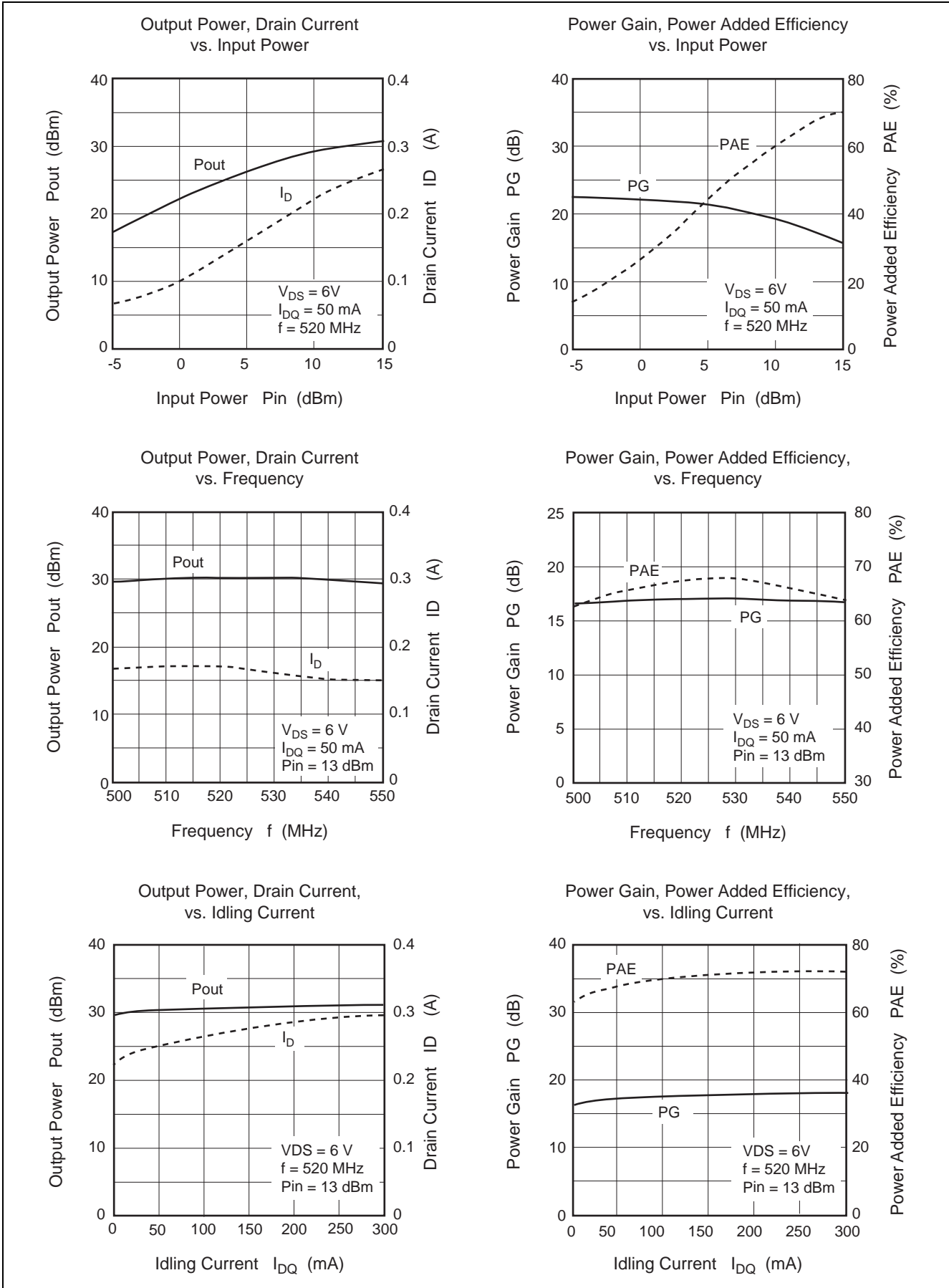
Output Power, Drain Current vs. Input Power



Power Gain, Power Added Efficiency vs. Input Power









## S Parameter

 $(V_{DS} = 3.6 \text{ V}, I_{DQ} = 50 \text{ mA}, Z_o = 50 \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.946	-40.3	15.41	148.7	0.021	69.4	0.784	-30.2
150	0.931	-58.4	12.58	136.4	0.029	46.8	0.744	-51.2
200	0.898	-74.0	11.57	126.4	0.034	36.1	0.700	-66.0
250	0.865	-87.5	11.08	117.4	0.037	27.8	0.657	-77.8
300	0.856	-99.2	10.15	109.2	0.038	20.8	0.640	-86.9
350	0.827	-108.7	9.91	102.2	0.039	14.1	0.615	-94.4
400	0.812	-116.8	9.44	95.7	0.040	8.9	0.601	-100.8
450	0.804	-122.6	8.78	90.2	0.040	4.0	0.595	-106.1
500	0.792	-128.2	8.15	84.9	0.040	-0.9	0.595	-110.9
550	0.791	-132.4	7.55	80.5	0.040	-4.6	0.596	-115.2
600	0.790	-136.4	7.00	76.4	0.039	-8.2	0.602	-119.1
650	0.787	-140.2	6.48	72.3	0.038	-11.5	0.608	-122.7
700	0.787	-143.7	6.03	68.5	0.038	-14.5	0.616	-125.9
750	0.788	-147.1	5.59	64.9	0.037	-17.6	0.626	-129.2
800	0.792	-150.0	5.22	61.3	0.036	-20.5	0.634	-132.1
850	0.797	-152.7	4.86	58.0	0.035	-23.1	0.643	-134.9
900	0.801	-155.2	4.54	54.7	0.034	-25.1	0.654	-137.6
950	0.807	-157.3	4.29	51.4	0.033	-27.5	0.664	-140.2
1000	0.812	-159.4	4.06	48.8	0.032	-29.7	0.675	-142.8
1050	0.817	-161.7	3.83	46.1	0.031	-31.6	0.686	-145.3
1100	0.827	-163.5	3.62	43.7	0.030	-33.7	0.695	-147.5
1150	0.834	-165.6	3.42	41.0	0.028	-35.1	0.704	-149.8
1200	0.840	-167.1	3.24	38.6	0.027	-36.6	0.714	-152.0
1250	0.846	-168.4	3.06	36.3	0.026	-38.2	0.723	-154.0
1300	0.845	-170.1	2.89	33.7	0.025	-39.6	0.733	-156.0
1350	0.839	-171.7	2.73	31.2	0.024	-40.9	0.740	-158.1
1400	0.843	-173.8	2.59	28.6	0.023	-41.9	0.749	-160.2
1450	0.847	-175.4	2.47	26.3	0.022	-43.0	0.755	-161.9
1500	0.850	-177.1	2.34	24.0	0.020	-43.9	0.760	-164.0
1550	0.852	-179.0	2.24	21.8	0.019	-44.6	0.768	-166.0
1600	0.858	-179.6	2.13	19.7	0.018	-44.7	0.774	-167.8
1650	0.861	-178.3	2.05	17.6	0.017	-45.2	0.777	-169.6
1700	0.863	-176.8	1.96	15.4	0.016	-45.3	0.784	-171.7
1750	0.863	-174.8	1.88	13.1	0.015	-44.9	0.792	-173.6
1800	0.873	-173.0	1.81	10.9	0.014	-44.9	0.798	-175.3
1850	0.878	-171.4	1.75	9.0	0.013	-43.7	0.800	-177.3
1900	0.886	-170.2	1.68	7.3	0.012	-42.9	0.807	-179.3
1950	0.895	-168.9	1.61	5.5	0.012	-41.0	0.816	-179.1
2000	0.894	-168.2	1.55	4.2	0.011	-38.6	0.818	-177.6
2050	0.895	-167.3	1.48	2.7	0.010	-35.6	0.822	-175.6
2100	0.890	-165.8	1.42	0.9	0.010	-33.6	0.830	-173.8
2150	0.890	-164.0	1.37	-1.1	0.009	-29.1	0.837	-172.3
2200	0.896	-162.6	1.32	-3.1	0.009	-24.1	0.838	-170.7
2250	0.898	-161.1	1.27	-5.2	0.008	-19.0	0.842	-168.9
2300	0.902	-159.8	1.22	-7.1	0.008	-12.8	0.848	-167.1
2350	0.903	-158.4	1.19	-9.0	0.008	-8.3	0.851	-165.8
2400	0.901	-157.4	1.15	-11.0	0.008	-3.0	0.852	-164.1
2450	0.895	-155.9	1.11	-12.6	0.008	2.0	0.855	-162.4
2500	0.894	-154.0	1.07	-14.4	0.008	6.9	0.861	-160.9

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 10 mA, Z<sub>o</sub> = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.973	-34.4	12.25	150.2	0.022	69.9	0.869	-20.3
150	0.931	-49.5	11.13	138.3	0.031	54.5	0.858	-35.1
200	0.913	-63.2	10.12	128.8	0.038	43.4	0.823	-45.4
250	0.896	-74.6	9.10	120.5	0.043	34.8	0.801	-54.6
300	0.892	-85.3	8.08	113.3	0.046	26.8	0.788	-62.5
350	0.878	-93.6	7.27	107.0	0.048	19.3	0.773	-70.0
400	0.870	-101.5	6.56	100.5	0.050	12.6	0.759	-77.0
450	0.861	-108.4	5.95	94.8	0.051	6.6	0.754	-83.0
500	0.853	-114.4	5.40	89.2	0.051	0.9	0.749	-88.6
550	0.853	-119.5	4.91	84.0	0.051	-3.9	0.747	-93.9
600	0.851	-124.3	4.50	79.0	0.050	-8.5	0.750	-98.8
650	0.845	-128.6	4.15	74.4	0.050	-12.8	0.752	-103.3
700	0.844	-132.8	3.79	70.0	0.048	-16.7	0.755	-107.5
750	0.846	-136.7	3.48	65.6	0.047	-20.3	0.761	-111.6
800	0.849	-140.2	3.22	61.6	0.046	-23.9	0.767	-115.4
850	0.853	-143.5	2.99	57.7	0.045	-27.1	0.772	-119.2
900	0.857	-146.4	2.78	53.9	0.043	-29.8	0.778	-122.7
950	0.860	-149.0	2.59	50.1	0.042	-32.9	0.785	-126.1
1000	0.867	-151.5	2.44	47.2	0.041	-35.5	0.792	-129.4
1050	0.870	-154.0	2.30	44.3	0.039	-38.2	0.798	-132.5
1100	0.875	-156.5	2.15	41.4	0.037	-40.8	0.805	-135.5
1150	0.883	-158.7	2.03	38.5	0.036	-43.1	0.811	-138.4
1200	0.888	-161.0	1.92	35.9	0.034	-45.2	0.818	-141.1
1250	0.890	-162.5	1.79	33.4	0.033	-47.4	0.823	-143.7
1300	0.890	-164.5	1.69	30.7	0.031	-49.1	0.830	-146.2
1350	0.886	-166.6	1.59	27.7	0.030	-51.1	0.834	-148.7
1400	0.886	-168.7	1.51	25.2	0.028	-52.6	0.840	-151.2
1450	0.886	-170.8	1.43	22.9	0.027	-54.4	0.843	-153.3
1500	0.889	-172.6	1.36	20.3	0.025	-56.0	0.846	-155.9
1550	0.891	-174.5	1.29	18.1	0.024	-57.4	0.851	-158.2
1600	0.895	-176.1	1.23	15.9	0.022	-58.5	0.855	-160.3
1650	0.898	-177.6	1.18	13.7	0.021	-59.9	0.855	-162.4
1700	0.896	-179.5	1.12	11.4	0.020	-60.8	0.859	-164.7
1750	0.897	178.5	1.08	9.3	0.019	-61.8	0.866	-166.9
1800	0.903	176.4	1.03	7.0	0.017	-62.7	0.869	-168.8
1850	0.911	174.8	0.99	4.9	0.016	-62.8	0.869	-171.0
1900	0.917	173.4	0.95	3.2	0.015	-63.2	0.874	-173.3
1950	0.926	172.0	0.91	1.5	0.014	-63.2	0.881	-175.1
2000	0.928	171.1	0.87	0.2	0.012	-63.1	0.879	-176.8
2050	0.925	170.1	0.83	-1.5	0.011	-61.7	0.883	-179.1
2100	0.918	168.7	0.80	-3.3	0.010	-60.9	0.888	179.0
2150	0.916	166.8	0.76	-5.3	0.009	-59.1	0.894	177.4
2200	0.918	165.3	0.73	-7.4	0.008	-55.0	0.894	175.6
2250	0.922	163.6	0.71	-9.4	0.007	-52.5	0.895	173.6
2300	0.921	162.2	0.68	-11.4	0.007	-46.3	0.900	171.8
2350	0.923	160.6	0.65	-13.3	0.006	-40.6	0.902	170.3
2400	0.920	159.7	0.63	-15.2	0.006	-33.7	0.902	168.5
2450	0.913	158.0	0.61	-16.8	0.005	-24.3	0.902	166.6
2500	0.911	156.0	0.59	-18.6	0.005	-14.3	0.907	164.9

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 25 mA, Z<sub>o</sub> = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.959	-37.1	15.64	150.5	0.021	68.6	0.793	-24.9
150	0.921	-53.7	13.98	137.6	0.030	51.0	0.772	-42.1
200	0.900	-68.0	12.68	128.1	0.034	40.6	0.732	-54.4
250	0.880	-80.1	11.49	119.6	0.038	31.7	0.701	-64.6
300	0.875	-90.8	10.21	112.2	0.040	24.1	0.685	-73.2
350	0.857	-99.6	9.32	105.9	0.042	17.3	0.663	-80.8
400	0.844	-107.8	8.53	99.4	0.043	11.5	0.649	-87.5
450	0.836	-114.7	7.76	93.6	0.044	6.1	0.642	-93.1
500	0.827	-120.7	7.12	88.2	0.044	1.3	0.639	-98.3
550	0.824	-125.9	6.56	83.3	0.043	-3.1	0.637	-103.0
600	0.821	-130.4	6.06	78.7	0.043	-7.0	0.641	-107.4
650	0.818	-134.3	5.63	74.4	0.042	-10.7	0.645	-111.3
700	0.813	-138.3	5.20	70.4	0.041	-14.2	0.651	-115.1
750	0.816	-142.1	4.83	66.5	0.040	-17.5	0.659	-118.7
800	0.817	-145.5	4.50	62.6	0.040	-20.5	0.667	-122.0
850	0.820	-148.4	4.19	59.2	0.039	-23.3	0.674	-125.3
900	0.826	-150.9	3.93	55.7	0.037	-25.8	0.684	-128.3
950	0.830	-153.2	3.70	52.4	0.036	-28.5	0.693	-131.4
1000	0.834	-155.8	3.50	49.4	0.035	-30.8	0.703	-134.3
1050	0.841	-158.3	3.31	46.4	0.034	-33.1	0.713	-137.1
1100	0.847	-160.3	3.12	44.0	0.033	-35.4	0.722	-139.6
1150	0.852	-162.3	2.96	41.3	0.031	-37.3	0.730	-142.2
1200	0.856	-164.4	2.80	38.8	0.030	-39.1	0.739	-144.7
1250	0.865	-165.9	2.63	36.5	0.029	-41.0	0.747	-147.0
1300	0.862	-167.5	2.49	33.8	0.028	-42.5	0.756	-149.3
1350	0.860	-169.6	2.35	30.9	0.026	-43.9	0.762	-151.6
1400	0.860	-171.5	2.24	28.5	0.025	-45.5	0.771	-153.8
1450	0.862	-173.2	2.12	26.1	0.024	-46.8	0.777	-155.8
1500	0.863	-175.2	2.02	23.6	0.023	-48.1	0.781	-158.1
1550	0.866	-176.9	1.93	21.6	0.022	-49.2	0.788	-160.3
1600	0.871	-178.4	1.84	19.3	0.020	-49.9	0.793	-162.4
1650	0.875	-179.8	1.76	17.2	0.019	-50.8	0.796	-164.3
1700	0.873	-178.5	1.68	14.8	0.018	-51.4	0.802	-166.5
1750	0.876	-176.5	1.61	12.7	0.017	-51.4	0.810	-168.5
1800	0.883	-174.5	1.56	10.4	0.016	-51.6	0.815	-170.3
1850	0.889	-173.0	1.50	8.5	0.015	-51.7	0.816	-172.5
1900	0.897	-171.7	1.44	6.7	0.014	-50.9	0.823	-174.6
1950	0.905	-170.4	1.38	5.1	0.013	-50.1	0.832	-176.4
2000	0.909	-169.7	1.33	3.6	0.012	-49.2	0.833	-178.0
2050	0.905	-168.7	1.27	2.1	0.011	-47.0	0.837	-179.9
2100	0.899	-167.3	1.21	0.1	0.010	-45.2	0.843	-177.9
2150	0.898	-165.3	1.17	-1.8	0.009	-42.2	0.850	-176.5
2200	0.902	-163.9	1.12	-3.8	0.008	-37.3	0.851	-174.7
2250	0.906	-162.2	1.09	-6.0	0.008	-33.6	0.854	-172.8
2300	0.908	-160.9	1.05	-7.9	0.007	-28.1	0.860	-171.0
2350	0.908	-159.5	1.02	-9.8	0.007	-22.0	0.863	-169.5
2400	0.907	-158.5	0.98	-11.5	0.007	-16.1	0.863	-167.8
2450	0.898	-157.1	0.95	-13.3	0.007	-9.5	0.866	-166.0
2500	0.898	-154.9	0.92	-15.0	0.007	-2.6	0.872	-164.4

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 50 mA, Z<sub>o</sub> = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.960	-41.0	19.06	150.1	0.019	63.9	0.702	-28.7
150	0.916	-58.4	16.77	137.1	0.027	48.6	0.688	-48.7
200	0.892	-73.5	15.28	127.1	0.031	38.3	0.646	-62.4
250	0.868	-86.2	14.02	118.4	0.035	30.0	0.613	-73.4
300	0.860	-97.3	12.48	110.8	0.036	22.9	0.602	-82.6
350	0.840	-106.3	11.51	104.4	0.037	16.3	0.582	-90.1
400	0.825	-114.5	10.57	98.0	0.038	11.5	0.571	-96.7
450	0.816	-121.2	9.62	92.7	0.038	6.3	0.567	-102.2
500	0.810	-126.8	8.80	87.6	0.038	2.0	0.567	-107.1
550	0.806	-131.6	8.12	83.0	0.038	-2.0	0.569	-111.4
600	0.802	-135.9	7.49	78.8	0.037	-5.4	0.573	-115.4
650	0.797	-139.6	6.94	74.9	0.037	-8.7	0.578	-119.0
700	0.795	-143.4	6.44	71.2	0.036	-11.8	0.586	-122.3
750	0.797	-146.7	5.97	67.5	0.035	-14.7	0.596	-125.5
800	0.798	-149.7	5.57	64.0	0.035	-17.6	0.604	-128.4
850	0.806	-152.4	5.20	60.7	0.034	-19.9	0.612	-131.3
900	0.807	-155.0	4.89	57.4	0.033	-21.9	0.623	-134.0
950	0.811	-157.3	4.59	54.3	0.032	-24.5	0.632	-136.6
1000	0.817	-159.5	4.35	51.4	0.031	-26.4	0.645	-139.2
1050	0.822	-161.6	4.11	48.7	0.030	-28.4	0.655	-141.7
1100	0.831	-163.6	3.90	46.3	0.029	-30.5	0.666	-144.0
1150	0.834	-165.7	3.69	43.7	0.028	-32.1	0.674	-146.3
1200	0.842	-167.2	3.50	41.3	0.027	-33.4	0.685	-148.5
1250	0.846	-168.7	3.30	39.0	0.026	-35.1	0.695	-150.5
1300	0.848	-170.2	3.13	36.4	0.025	-36.5	0.703	-152.6
1350	0.842	-171.9	2.97	33.7	0.024	-37.5	0.711	-154.7
1400	0.843	-173.9	2.82	31.4	0.023	-38.5	0.721	-156.7
1450	0.844	-175.6	2.69	29.0	0.022	-40.1	0.727	-158.5
1500	0.849	-177.3	2.56	26.7	0.021	-40.5	0.733	-160.7
1550	0.849	-178.8	2.45	24.5	0.020	-41.3	0.740	-162.7
1600	0.857	-179.6	2.33	22.4	0.018	-41.5	0.748	-164.6
1650	0.860	-178.2	2.24	20.1	0.017	-42.1	0.752	-166.3
1700	0.860	-176.8	2.15	17.9	0.017	-42.2	0.758	-168.4
1750	0.861	-174.8	2.06	15.9	0.016	-42.1	0.767	-170.3
1800	0.870	-172.9	1.99	13.6	0.015	-41.9	0.774	-172.1
1850	0.878	-171.4	1.92	11.5	0.014	-40.8	0.776	-174.0
1900	0.884	-170.1	1.84	9.8	0.013	-39.7	0.784	-176.1
1950	0.889	-169.0	1.77	8.3	0.012	-38.1	0.793	-177.7
2000	0.895	-168.3	1.71	6.7	0.011	-36.3	0.796	-179.3
2050	0.890	-167.5	1.63	5.3	0.011	-33.9	0.799	-178.7
2100	0.886	-165.9	1.57	3.3	0.010	-31.3	0.808	-176.8
2150	0.887	-164.1	1.51	1.3	0.009	-27.8	0.816	-175.3
2200	0.891	-162.6	1.46	-0.7	0.009	-23.0	0.818	-173.6
2250	0.895	-161.2	1.40	-2.7	0.009	-19.0	0.822	-171.8
2300	0.897	-159.7	1.36	-4.8	0.008	-14.5	0.828	-170.1
2350	0.898	-158.5	1.31	-6.6	0.008	-9.8	0.833	-168.6
2400	0.896	-157.4	1.27	-8.5	0.008	-5.1	0.835	-167.0
2450	0.890	-155.8	1.23	-10.4	0.008	-0.3	0.836	-165.2
2500	0.890	-154.0	1.19	-12.1	0.008	5.2	0.843	-163.6

## S Parameter

 $(V_{DS} = 6\text{ V}, I_{DQ} = 100\text{ mA}, Z_o = 50\ \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.972	-45.9	22.91	149.6	0.019	65.4	0.615	-34.3
150	0.920	-64.3	19.70	136.4	0.024	48.3	0.597	-55.7
200	0.888	-80.4	17.99	125.8	0.028	37.6	0.560	-70.8
250	0.860	-93.9	16.78	116.9	0.031	29.8	0.534	-82.5
300	0.847	-104.9	14.91	109.3	0.032	23.1	0.517	-91.7
350	0.827	-113.3	13.65	103.1	0.033	16.8	0.517	-99.6
400	0.816	-120.8	12.39	97.3	0.033	11.9	0.511	-106.1
450	0.809	-126.9	11.24	92.4	0.033	7.4	0.512	-111.3
500	0.799	-132.3	10.23	87.7	0.033	3.3	0.513	-115.9
550	0.800	-136.7	9.38	83.4	0.033	-0.3	0.518	-120.0
600	0.801	-140.6	8.68	79.5	0.033	-3.5	0.524	-123.5
650	0.792	-144.0	8.00	75.9	0.032	-6.6	0.531	-126.7
700	0.788	-147.5	7.41	72.3	0.032	-9.3	0.540	-129.7
750	0.790	-150.6	6.89	68.9	0.031	-11.7	0.550	-132.5
800	0.793	-153.5	6.42	65.6	0.031	-14.3	0.558	-135.0
850	0.798	-156.1	5.99	62.3	0.030	-16.5	0.567	-137.5
900	0.801	-158.5	5.62	59.1	0.029	-18.3	0.578	-139.8
950	0.805	-160.5	5.31	56.1	0.028	-20.2	0.588	-142.2
1000	0.809	-162.7	5.03	53.5	0.027	-21.9	0.601	-144.5
1050	0.814	-164.5	4.77	51.1	0.027	-23.6	0.612	-146.5
1100	0.823	-166.3	4.51	48.5	0.026	-25.4	0.622	-148.5
1150	0.829	-168.2	4.29	45.9	0.025	-26.6	0.632	-150.6
1200	0.835	-169.7	4.08	43.7	0.024	-27.9	0.643	-152.6
1250	0.837	-171.0	3.85	41.5	0.023	-28.9	0.653	-154.3
1300	0.836	-172.5	3.65	39.0	0.022	-30.3	0.662	-156.1
1350	0.834	-174.2	3.47	36.4	0.021	-30.8	0.670	-158.1
1400	0.835	-176.1	3.31	33.9	0.021	-31.5	0.681	-159.9
1450	0.837	-177.8	3.15	31.6	0.020	-32.5	0.688	-161.4
1500	0.839	-179.4	3.00	29.4	0.019	-33.0	0.694	-163.4
1550	0.844	179.0	2.88	27.2	0.018	-33.2	0.702	-165.3
1600	0.849	177.7	2.75	25.1	0.017	-32.9	0.711	-167.0
1650	0.850	176.5	2.64	23.1	0.016	-32.8	0.715	-168.7
1700	0.850	174.9	2.53	20.8	0.015	-32.6	0.722	-170.6
1750	0.854	173.0	2.44	18.5	0.015	-31.9	0.731	-172.5
1800	0.861	171.4	2.36	16.4	0.014	-31.0	0.738	-174.1
1850	0.868	170.0	2.27	14.4	0.013	-29.7	0.741	-175.9
1900	0.875	168.7	2.19	12.6	0.012	-28.0	0.749	-177.9
1950	0.881	167.5	2.11	11.0	0.012	-26.0	0.759	-179.4
2000	0.886	166.8	2.03	9.6	0.011	-24.3	0.763	179.0
2050	0.882	166.0	1.95	8.0	0.011	-21.0	0.768	177.1
2100	0.878	164.6	1.87	6.2	0.010	-18.4	0.776	175.3
2150	0.877	163.1	1.80	4.2	0.010	-15.2	0.785	174.0
2200	0.883	161.5	1.74	2.2	0.010	-10.2	0.787	172.3
2250	0.891	159.9	1.68	0.1	0.009	-6.5	0.792	170.6
2300	0.892	158.6	1.63	-1.9	0.010	-2.2	0.799	168.9
2350	0.896	157.7	1.58	-3.8	0.009	1.0	0.804	167.5
2400	0.892	156.4	1.53	-5.7	0.009	4.1	0.806	166.0
2450	0.885	155.1	1.47	-7.5	0.010	7.7	0.810	164.3
2500	0.884	153.0	1.43	-9.4	0.010	11.4	0.816	162.7



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