

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# RQA0010UXAQS

## Silicon N-Channel MOS FET

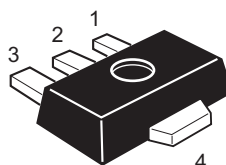
REJ03G1693-0200  
Rev.2.00  
Oct 29, 2008

### Features

- High output power, High gain, High efficiency  
Pout = +31.8 dBm, Linear Gain = 20 dB, PAE = 60%  
(f = 450 MHz)
- Compact package capable of surface mounting
- Electrostatic Discharge Immunity Test  
(IEC Standard 61000-4-2, Level 4)

### Outline

RENESAS package code: PLZZ0004CA-A  
(Package name: UPAK®)



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

Note: Marking is "UX".

\*UPAK is a trademark of Renesas Technology Corp.

### Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	16	V
Gate to source voltage	$V_{GSS}$	±5	V
Drain current	$I_D$	1.2	A
Channel dissipation	$P_{ch}^{note}$	9	W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

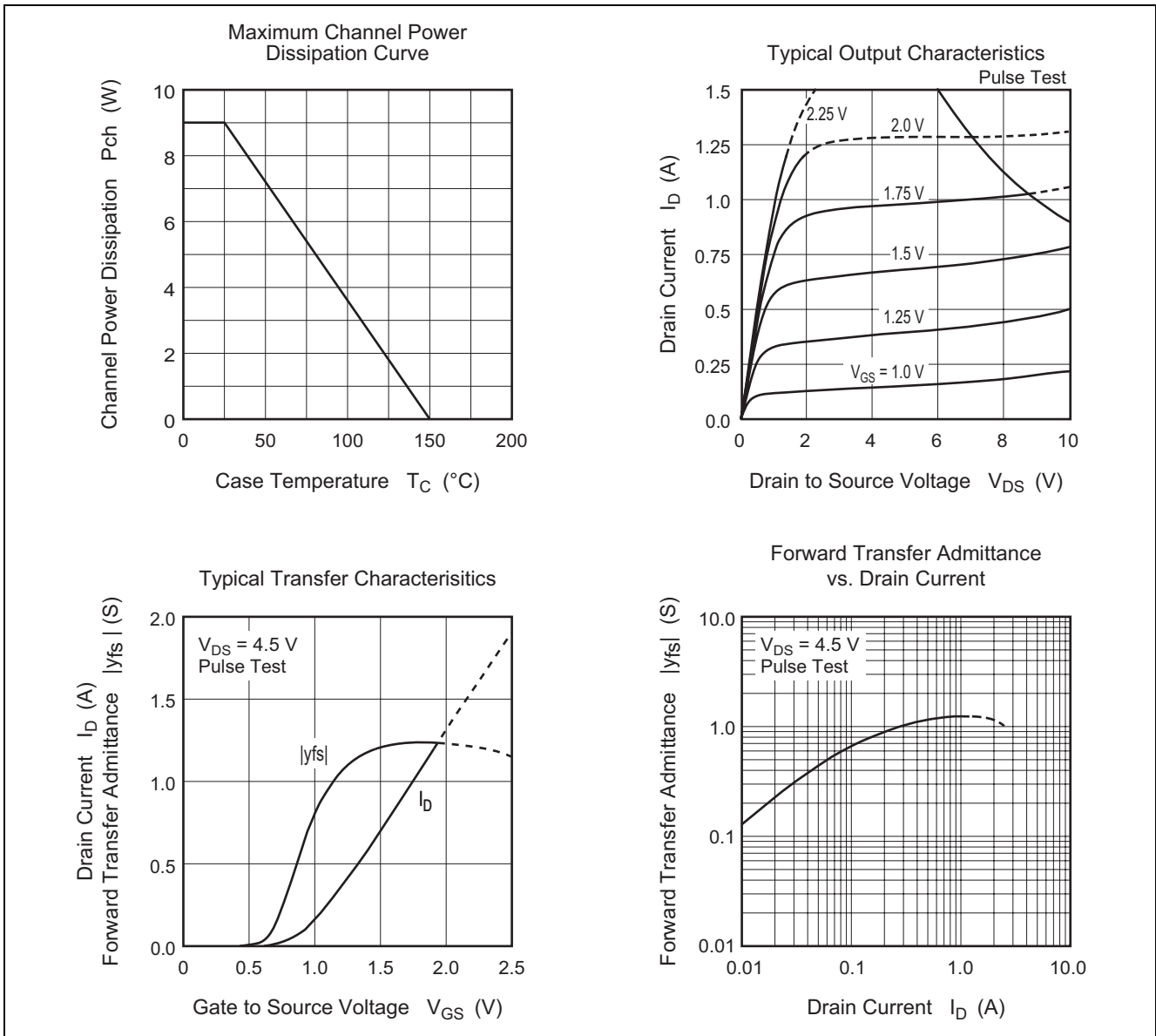
Note: Value at Tc = 25°C

### Electrical Characteristics

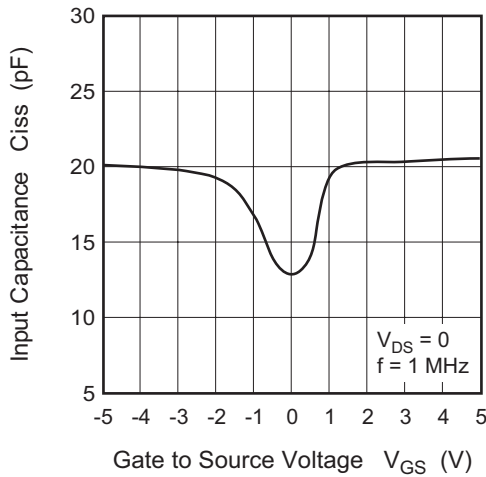
(Ta = 25°C)

Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 16 V, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 2$	$\mu A$	$V_{GS} = \pm 5 V, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.35	0.6	0.8	V	$V_{DS} = 4.5 V, I_D = 1 mA$
Forward Transfer Admittance	$ y_{fs} $	0.7	1.2	1.6	S	$V_{DS} = 4.5 V, I_D = 600 mA$
Input capacitance	$C_{iss}$	—	20	—	pF	$V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz$
Output capacitance	$C_{oss}$	—	12	—	pF	$V_{DS} = 4.5 V, V_{GS} = 0, f = 1 MHz$
Reverse transfer capacitance	$C_{rss}$	—	1.5	—	pF	$V_{DG} = 4.5 V, V_{GS} = 0, f = 1 MHz$
Output Power	Pout	—	31.8	—	dBm	$V_{DS} = 4.5 V, I_D = 150 mA$
		—	1.5	—	W	$f = 450 MHz,$ $P_{in} = +17 dBm (50 mW)$
Power Added Efficiency	PAE	—	60	—	%	

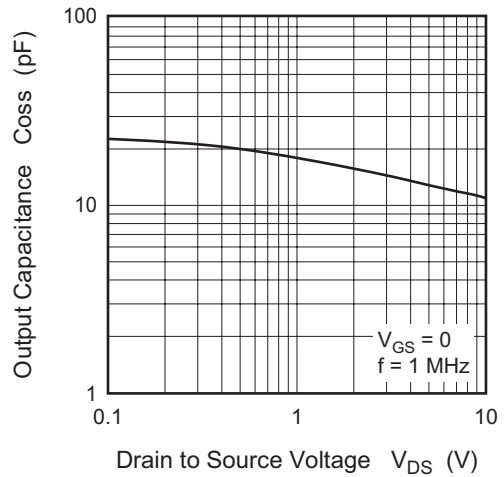
### Main Characteristics



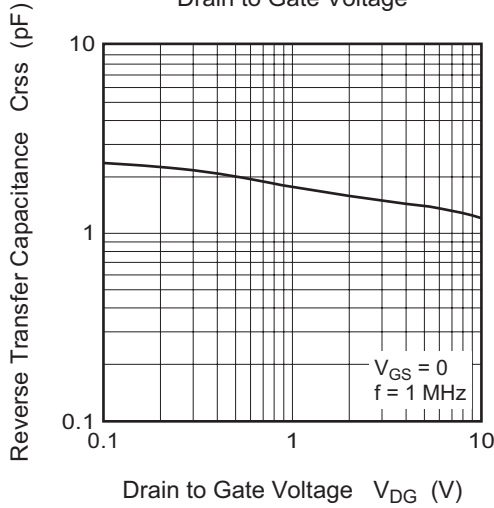
Input Capacitance vs. Gate to Source Voltage



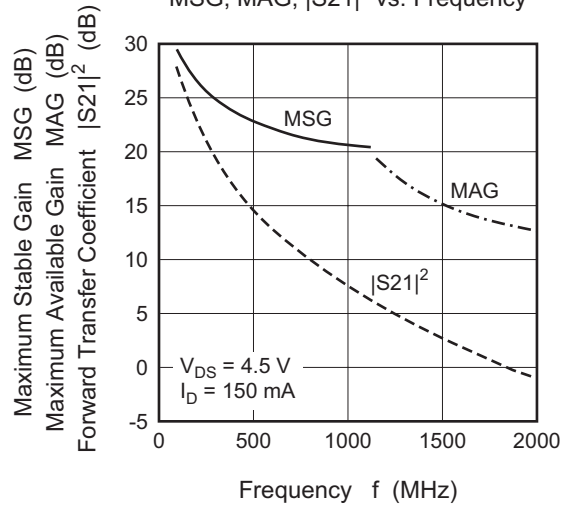
Output Capacitance vs. Drain to Source Voltage



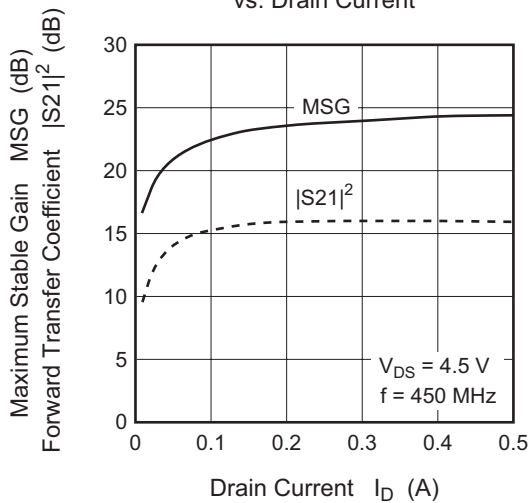
Reverse Transfer Capacitance vs. Drain to Gate Voltage



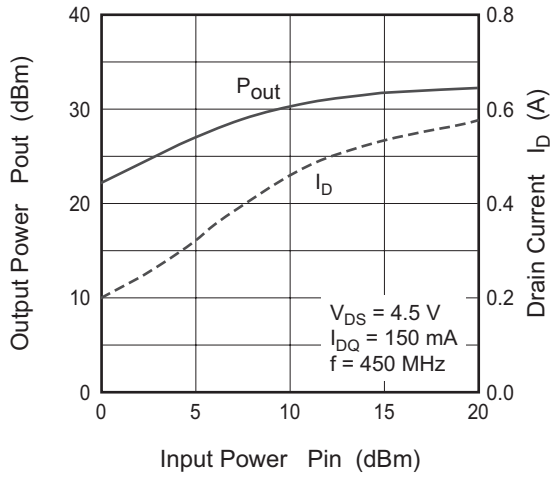
MSG, MAG,  $|S_{21}|^2$  vs. Frequency



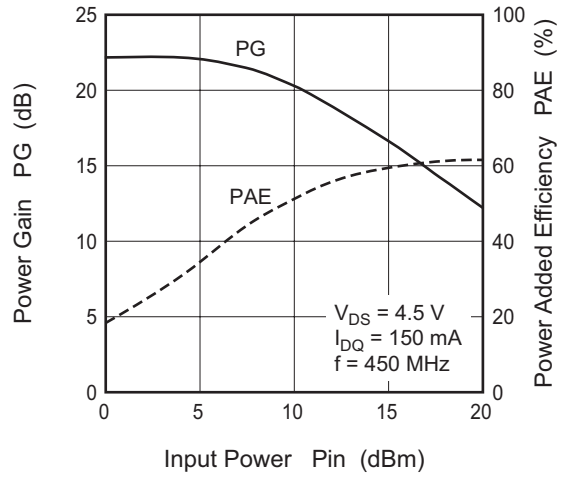
Maximum Stable Gain,  $|S_{21}|^2$  vs. Drain Current



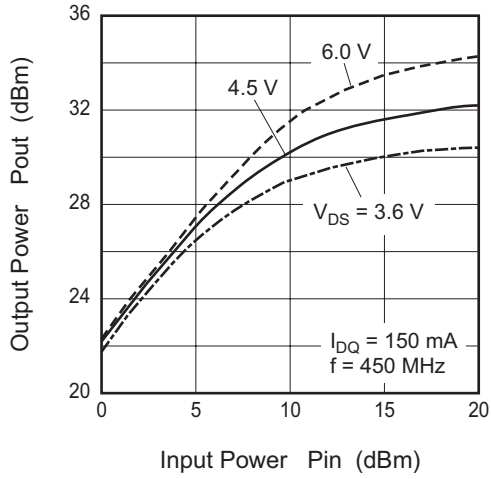
Output Power, Drain Current vs. Input Power



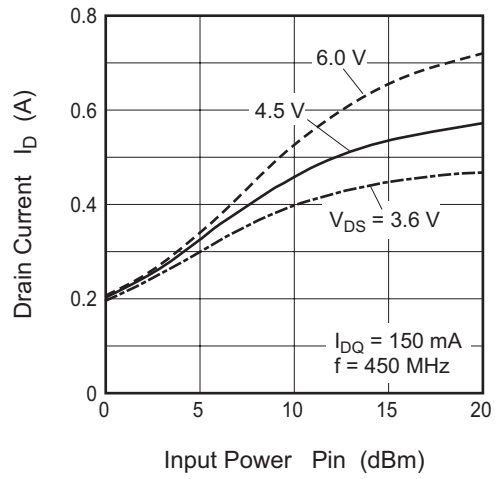
Power Gain, Power Added Efficiency, vs. Input Power



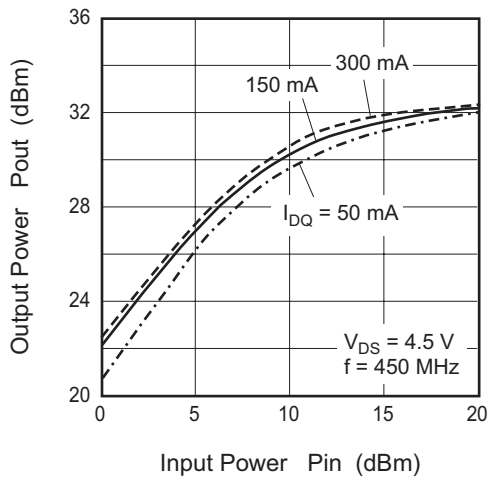
Output Power vs. Input Power



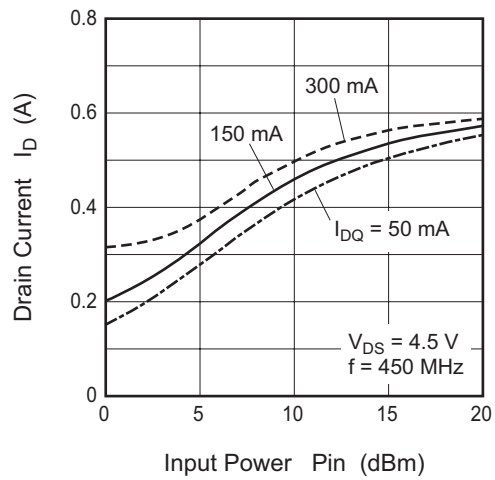
Drain Current vs. Input Power



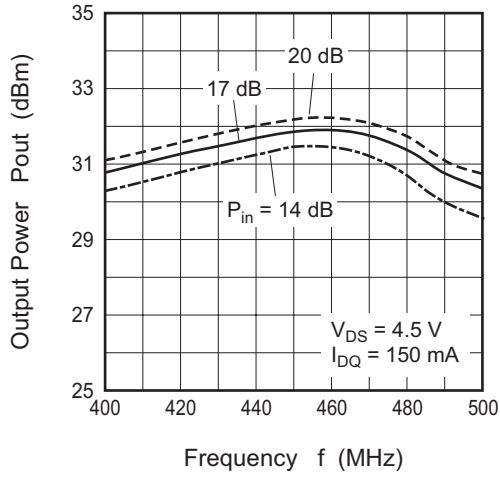
Output Power vs. Input Power



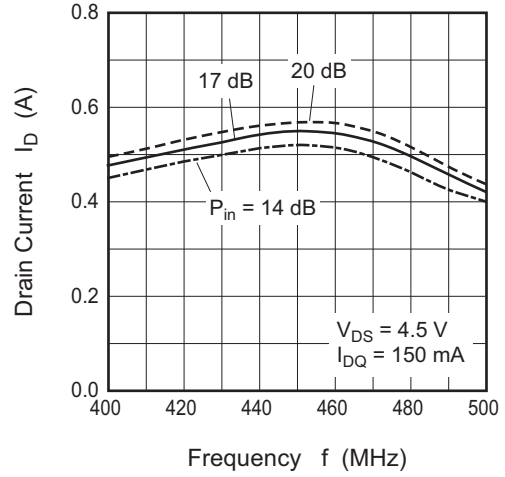
Drain Current vs. Input Power



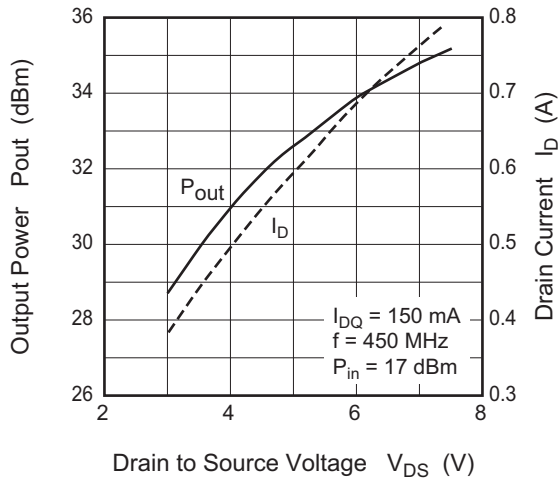
Output Power vs. Frequency



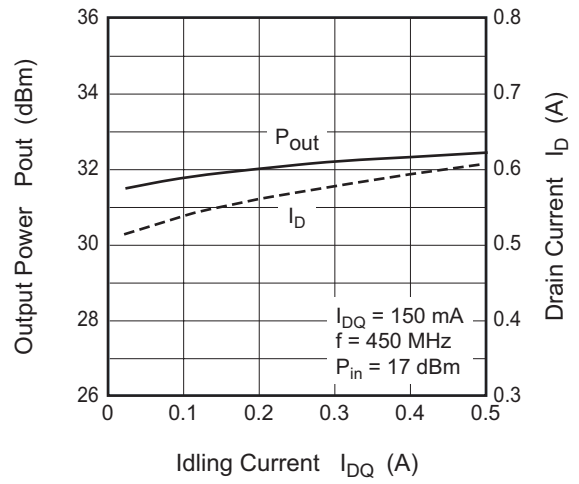
Drain Current vs. Frequency



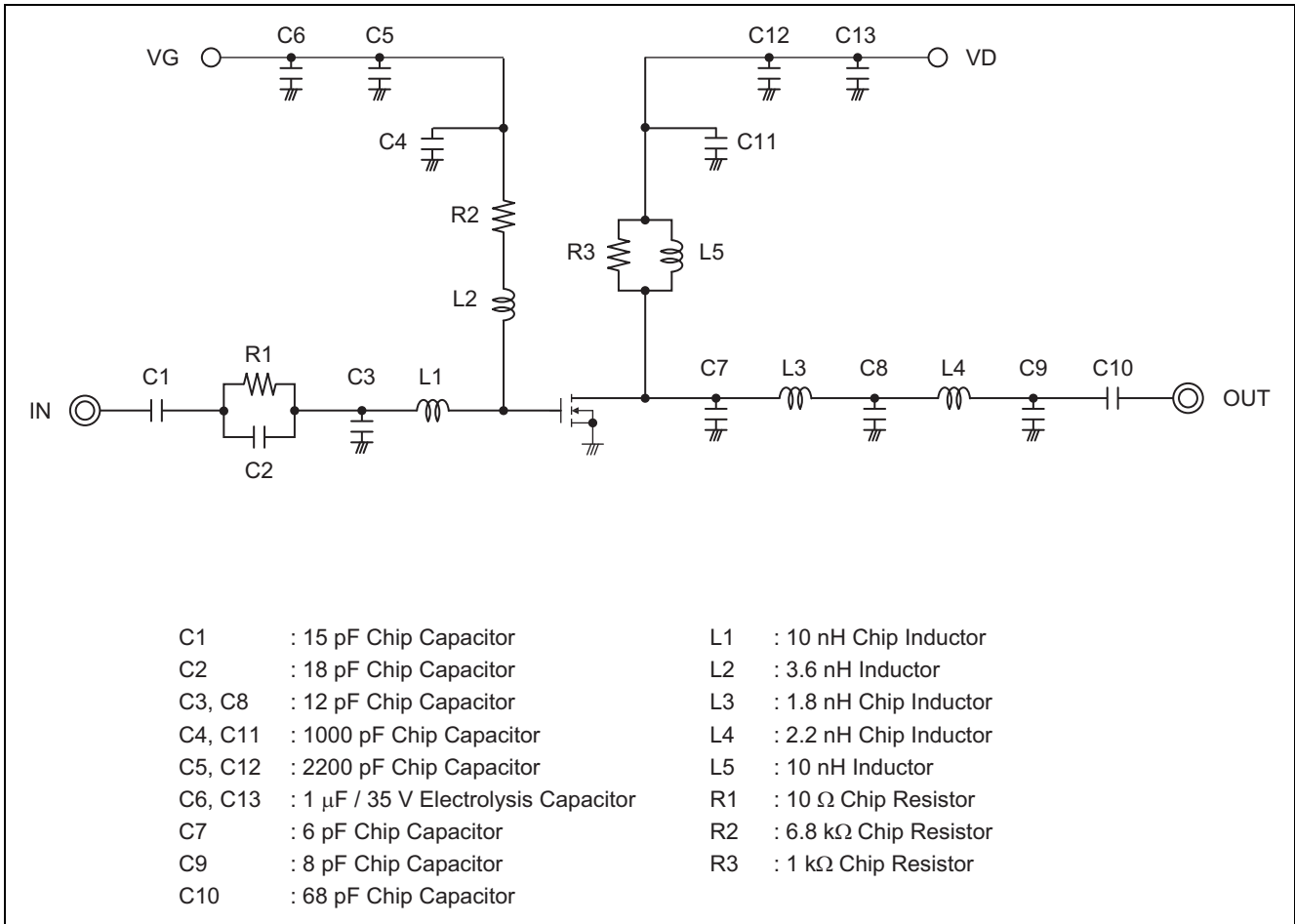
Output Power, Drain Current vs. Drain to Source Voltage



Output Power, Drain Current vs. Idling Current



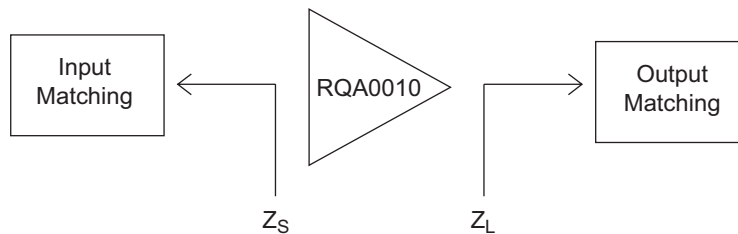
Evaluation Circuit (f = 450 MHz)



Large Signal Impedance

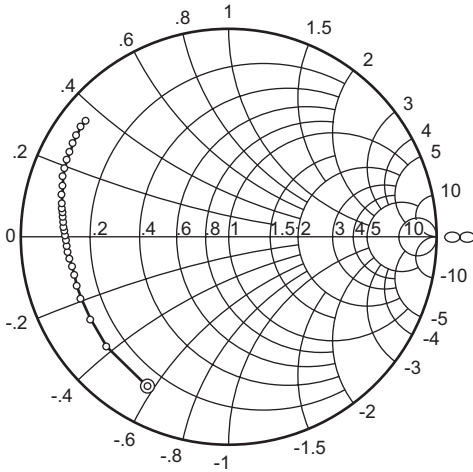
Item	Symbol	Result	Unit	Test Conditions
Frequency	f	450	MHz	V <sub>DS</sub> = 4.5 V, I <sub>DQ</sub> = 150 mA, Pin = 17 dBm, Pout = 31.8 dBm, PAE = 60%
Source Impedance	Z <sub>s</sub>	0.15 + j0.2	Ω	
Load Impedance	Z <sub>L</sub> <sup>note</sup>	0.13 - j0.01	Ω	

Note: Z<sub>L</sub> was selected to get the best balance of Pout and PAE.



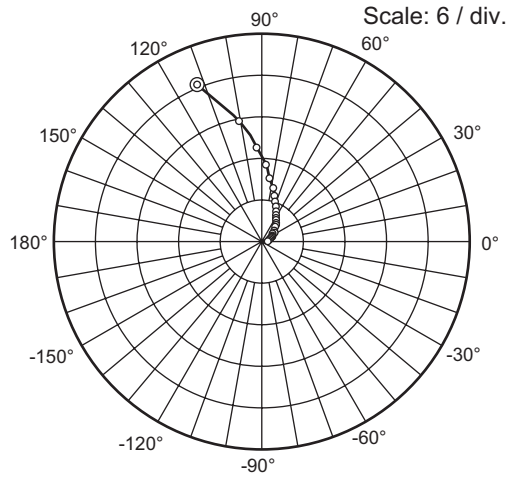


S<sub>11</sub> Parameter vs. Frequency



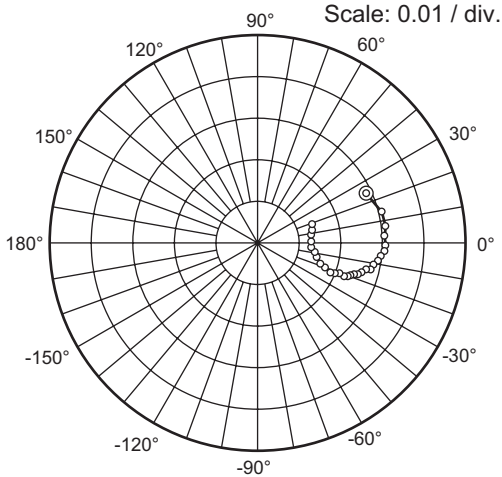
Condition: V<sub>DS</sub> = 4.5 V, I<sub>DQ</sub> = 150 mA, Z<sub>o</sub> = 50 Ω  
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2000 MHz (100 MHz Step)

S<sub>21</sub> Parameter vs. Frequency



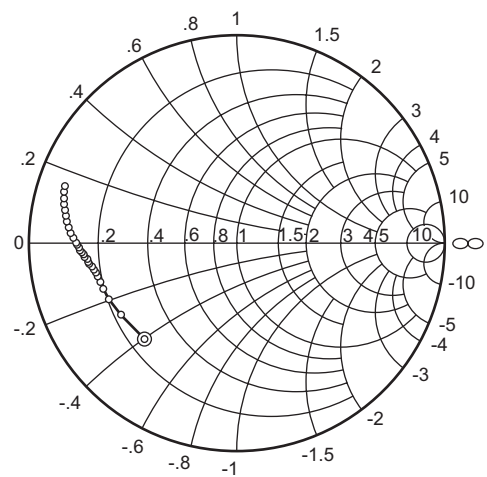
Condition: V<sub>DS</sub> = 4.5 V, I<sub>DQ</sub> = 150 mA, Z<sub>o</sub> = 50 Ω  
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2000 MHz (100 MHz Step)

S<sub>12</sub> Parameter vs. Frequency



Condition: V<sub>DS</sub> = 4.5 V, I<sub>DQ</sub> = 150 mA, Z<sub>o</sub> = 50 Ω  
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2000 MHz (100 MHz Step)

S<sub>22</sub> Parameter vs. Frequency



Condition: V<sub>DS</sub> = 4.5 V, I<sub>DQ</sub> = 150 mA, Z<sub>o</sub> = 50 Ω  
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2000 MHz (100 MHz Step)

## S Parameter

(V<sub>DS</sub> = 3.0 V, I<sub>D</sub> = 150 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	0.816	-119.8	21.59	111.2	0.030	22.5	0.653	-136.4
150	0.782	-138.3	16.09	99.7	0.031	12.5	0.672	-150.3
200	0.766	-149.4	12.54	91.8	0.031	6.6	0.688	-157.6
250	0.761	-156.8	10.19	85.9	0.031	1.0	0.693	-162.0
300	0.760	-161.6	8.55	81.4	0.031	-1.7	0.700	-165.2
350	0.758	-165.7	7.29	76.8	0.031	-5.2	0.706	-167.3
400	0.763	-168.9	6.35	73.1	0.030	-7.6	0.709	-168.7
450	0.765	-171.4	5.60	69.4	0.030	-9.7	0.716	-170.3
500	0.770	-173.7	5.00	65.8	0.029	-11.9	0.722	-171.6
550	0.774	-176.0	4.50	62.4	0.028	-14.2	0.731	-172.8
600	0.777	-177.9	4.09	59.2	0.027	-15.4	0.736	-173.5
650	0.782	-179.4	3.73	56.2	0.027	-17.5	0.740	-174.5
700	0.787	178.8	3.42	53.2	0.026	-18.2	0.751	-175.6
750	0.790	177.3	3.15	50.3	0.024	-20.3	0.756	-176.6
800	0.795	175.6	2.92	47.5	0.024	-21.4	0.762	-177.2
850	0.802	174.2	2.69	44.6	0.023	-22.3	0.769	-178.3
900	0.803	172.7	2.51	41.9	0.022	-22.2	0.777	-179.2
950	0.809	171.1	2.34	39.3	0.021	-23.5	0.786	179.9
1000	0.814	169.4	2.20	36.9	0.020	-23.8	0.790	179.3
1050	0.818	168.0	2.06	34.5	0.020	-23.0	0.796	178.3
1100	0.822	166.6	1.93	31.9	0.018	-22.7	0.804	177.4
1150	0.827	165.2	1.82	29.5	0.018	-21.5	0.809	176.4
1200	0.835	163.8	1.72	27.2	0.017	-20.8	0.815	175.7
1250	0.838	162.3	1.63	25.1	0.016	-20.9	0.819	174.9
1300	0.844	160.9	1.54	22.7	0.016	-19.3	0.826	173.9
1350	0.847	159.3	1.45	20.4	0.015	-17.5	0.832	172.9
1400	0.851	158.1	1.38	18.3	0.014	-15.6	0.837	172.0
1450	0.854	156.8	1.32	16.2	0.014	-13.3	0.840	171.0
1500	0.858	155.4	1.25	14.4	0.013	-11.2	0.846	170.2
1550	0.861	154.0	1.18	12.1	0.014	-8.0	0.847	169.1
1600	0.862	152.6	1.13	10.1	0.013	-4.8	0.854	168.4
1650	0.862	151.1	1.08	8.1	0.012	-1.2	0.858	167.4
1700	0.869	149.5	1.03	6.4	0.012	1.8	0.862	166.6
1750	0.874	148.3	0.98	4.5	0.012	4.6	0.864	165.6
1800	0.874	147.0	0.94	2.5	0.013	8.8	0.869	164.7
1850	0.874	145.4	0.90	0.7	0.013	10.9	0.873	163.6
1900	0.881	143.7	0.87	-0.8	0.013	13.8	0.874	162.7
1950	0.888	143.0	0.83	-2.5	0.013	16.5	0.879	161.8
2000	0.879	141.6	0.80	-4.3	0.014	17.7	0.880	161.0

## S Parameter

(V<sub>DS</sub> = 3.3 V, I<sub>D</sub> = 150 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	0.814	-119.6	22.46	111.2	0.030	23.3	0.651	-136.0
150	0.779	-138.3	16.58	99.8	0.031	12.7	0.669	-149.8
200	0.767	-149.4	12.82	92.0	0.031	6.5	0.685	-157.2
250	0.762	-156.8	10.39	86.1	0.031	1.9	0.691	-161.7
300	0.764	-161.7	8.72	81.5	0.031	-1.7	0.697	-164.8
350	0.759	-165.7	7.42	76.9	0.030	-5.0	0.701	-167.0
400	0.761	-168.8	6.46	73.3	0.030	-7.1	0.706	-168.6
450	0.767	-171.5	5.71	69.6	0.029	-9.9	0.711	-170.1
500	0.770	-173.8	5.09	66.0	0.029	-12.3	0.720	-171.3
550	0.775	-176.0	4.58	62.6	0.028	-13.7	0.727	-172.6
600	0.776	-177.8	4.16	59.4	0.027	-15.3	0.732	-173.3
650	0.782	-179.6	3.81	56.5	0.026	-17.5	0.737	-174.3
700	0.787	178.7	3.48	53.4	0.026	-18.9	0.745	-175.3
750	0.792	177.2	3.20	50.5	0.025	-19.9	0.751	-176.4
800	0.795	175.6	2.97	47.7	0.024	-21.1	0.758	-176.9
850	0.802	174.1	2.75	45.0	0.023	-21.7	0.766	-178.0
900	0.802	172.6	2.56	42.1	0.022	-22.4	0.773	-179.0
950	0.809	171.1	2.39	39.5	0.021	-23.1	0.781	-179.8
1000	0.812	169.4	2.24	37.1	0.020	-22.5	0.786	179.4
1050	0.818	167.9	2.10	34.7	0.020	-23.0	0.794	178.5
1100	0.822	166.6	1.97	32.1	0.019	-22.6	0.801	177.6
1150	0.829	165.1	1.86	29.7	0.018	-21.3	0.805	176.6
1200	0.834	163.7	1.75	27.5	0.017	-21.3	0.812	176.0
1250	0.838	162.3	1.66	25.3	0.016	-20.3	0.818	175.1
1300	0.843	160.8	1.57	23.1	0.015	-19.5	0.821	174.1
1350	0.847	159.3	1.48	20.7	0.015	-16.4	0.828	173.2
1400	0.851	158.2	1.41	18.6	0.014	-15.1	0.832	172.3
1450	0.854	156.8	1.34	16.5	0.014	-12.7	0.836	171.3
1500	0.858	155.3	1.28	14.6	0.013	-11.3	0.843	170.4
1550	0.861	154.0	1.21	12.5	0.013	-8.7	0.846	169.5
1600	0.863	152.6	1.15	10.3	0.013	-6.2	0.851	168.6
1650	0.863	151.1	1.10	8.4	0.013	-1.5	0.856	167.7
1700	0.867	149.5	1.06	6.7	0.013	0.4	0.861	166.8
1750	0.874	148.2	1.01	4.9	0.013	3.7	0.861	165.9
1800	0.874	147.0	0.96	2.8	0.012	8.5	0.867	165.0
1850	0.872	145.3	0.92	0.9	0.013	10.5	0.870	163.8
1900	0.881	143.7	0.89	-0.6	0.013	13.9	0.873	162.9
1950	0.887	143.0	0.85	-2.3	0.014	15.6	0.877	162.1
2000	0.876	141.7	0.82	-4.0	0.013	18.0	0.878	161.2

## S Parameter

 $(V_{DS} = 3.6 \text{ V}, I_D = 150 \text{ mA}, Z_o = 50 \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.814	-119.4	23.16	111.3	0.030	23.2	0.647	-135.0
150	0.781	-138.0	16.92	100.0	0.031	12.8	0.668	-149.4
200	0.768	-149.4	13.07	92.1	0.031	6.4	0.682	-156.7
250	0.763	-156.9	10.58	86.2	0.031	1.8	0.687	-161.3
300	0.762	-161.6	8.86	81.7	0.031	-1.9	0.694	-164.6
350	0.760	-165.9	7.55	77.2	0.030	-5.0	0.697	-166.8
400	0.765	-168.9	6.57	73.5	0.030	-6.5	0.702	-168.3
450	0.766	-171.5	5.79	69.7	0.029	-9.8	0.709	-169.9
500	0.772	-173.9	5.18	66.3	0.029	-12.1	0.716	-171.2
550	0.776	-176.0	4.67	62.9	0.028	-14.3	0.724	-172.3
600	0.778	-177.8	4.23	59.6	0.027	-15.7	0.728	-173.1
650	0.783	-179.5	3.86	56.6	0.026	-16.7	0.735	-174.3
700	0.787	178.6	3.54	53.7	0.025	-18.3	0.744	-175.2
750	0.791	177.1	3.27	50.9	0.025	-19.4	0.748	-176.1
800	0.797	175.6	3.02	47.9	0.024	-20.2	0.756	-176.8
850	0.801	174.1	2.80	45.2	0.023	-21.1	0.763	-177.9
900	0.803	172.5	2.61	42.5	0.022	-21.4	0.770	-178.8
950	0.809	171.0	2.43	39.9	0.021	-22.3	0.779	-179.8
1000	0.813	169.4	2.29	37.5	0.020	-23.6	0.785	179.7
1050	0.818	167.9	2.14	34.9	0.020	-22.4	0.790	178.8
1100	0.821	166.5	2.01	32.5	0.019	-23.4	0.797	177.7
1150	0.827	165.1	1.90	30.1	0.018	-21.6	0.803	176.9
1200	0.833	163.7	1.79	27.9	0.017	-20.9	0.808	176.3
1250	0.839	162.3	1.69	25.5	0.017	-20.8	0.815	175.2
1300	0.842	160.7	1.60	23.3	0.016	-19.0	0.819	174.2
1350	0.846	159.3	1.52	21.1	0.015	-17.3	0.826	173.3
1400	0.850	158.0	1.44	19.0	0.015	-15.5	0.831	172.4
1450	0.854	156.7	1.37	16.9	0.014	-13.8	0.834	171.6
1500	0.858	155.3	1.30	14.9	0.014	-11.8	0.840	170.6
1550	0.860	154.0	1.23	12.7	0.013	-8.1	0.843	169.6
1600	0.861	152.5	1.18	10.7	0.013	-4.4	0.850	168.7
1650	0.862	151.1	1.13	8.7	0.013	-3.8	0.854	167.9
1700	0.867	149.5	1.08	7.0	0.013	0.5	0.859	167.0
1750	0.873	148.3	1.03	5.0	0.013	4.7	0.859	166.1
1800	0.872	147.0	0.98	3.1	0.013	8.5	0.864	165.1
1850	0.873	145.3	0.95	1.3	0.013	10.7	0.867	164.0
1900	0.881	143.6	0.91	-0.2	0.013	13.5	0.870	163.0
1950	0.888	143.1	0.87	-2.0	0.013	15.9	0.875	162.2
2000	0.875	141.8	0.83	-3.9	0.014	19.1	0.875	161.3

## S Parameter

(V<sub>DS</sub> = 3.9 V, I<sub>D</sub> = 150 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	0.814	-118.9	23.65	111.6	0.029	23.8	0.646	-134.5
150	0.784	-138.0	17.21	100.2	0.031	13.5	0.664	-149.0
200	0.770	-149.3	13.26	92.3	0.031	6.4	0.679	-156.2
250	0.764	-156.5	10.71	86.3	0.031	2.4	0.684	-161.0
300	0.763	-161.6	8.99	81.8	0.031	-1.4	0.691	-164.3
350	0.762	-165.8	7.66	77.3	0.030	-4.7	0.695	-166.4
400	0.764	-168.7	6.65	73.6	0.030	-7.7	0.699	-168.2
450	0.767	-171.6	5.88	69.9	0.029	-9.8	0.706	-169.7
500	0.773	-173.8	5.26	66.5	0.029	-11.1	0.713	-171.0
550	0.776	-176.1	4.73	63.0	0.028	-13.1	0.720	-172.0
600	0.777	-177.8	4.28	59.8	0.027	-15.0	0.726	-173.0
650	0.783	-179.7	3.92	56.9	0.027	-16.7	0.732	-174.0
700	0.789	178.6	3.60	53.9	0.026	-18.0	0.740	-174.9
750	0.792	177.1	3.32	51.1	0.025	-19.5	0.745	-175.8
800	0.795	175.6	3.06	48.1	0.024	-20.0	0.753	-176.5
850	0.803	174.1	2.84	45.5	0.023	-21.1	0.759	-177.7
900	0.803	172.5	2.65	42.8	0.022	-22.2	0.766	-178.5
950	0.808	170.9	2.47	40.2	0.021	-22.4	0.776	-179.4
1000	0.813	169.3	2.31	37.6	0.021	-22.1	0.781	179.8
1050	0.817	168.0	2.17	35.2	0.020	-21.5	0.787	178.8
1100	0.821	166.4	2.04	32.8	0.019	-22.3	0.793	178.0
1150	0.827	165.0	1.93	30.4	0.018	-21.7	0.800	177.1
1200	0.833	163.7	1.81	28.0	0.017	-22.1	0.806	176.5
1250	0.838	162.2	1.72	25.8	0.016	-20.0	0.813	175.4
1300	0.842	160.7	1.63	23.6	0.015	-19.6	0.817	174.5
1350	0.847	159.2	1.54	21.4	0.015	-17.9	0.823	173.5
1400	0.851	158.0	1.47	19.2	0.015	-15.5	0.829	172.7
1450	0.852	156.7	1.39	17.0	0.014	-15.1	0.831	171.7
1500	0.857	155.2	1.32	15.1	0.014	-10.6	0.837	170.8
1550	0.859	154.0	1.26	13.0	0.013	-8.1	0.840	169.8
1600	0.861	152.6	1.20	11.0	0.013	-5.6	0.848	169.1
1650	0.863	151.1	1.15	8.9	0.013	-1.1	0.850	168.0
1700	0.867	149.5	1.09	7.1	0.013	1.4	0.856	167.2
1750	0.873	148.2	1.05	5.3	0.013	4.5	0.857	166.2
1800	0.871	147.0	1.00	3.3	0.013	7.7	0.861	165.5
1850	0.872	145.3	0.97	1.5	0.013	9.8	0.866	164.3
1900	0.881	143.6	0.92	-0.1	0.013	12.4	0.868	163.4
1950	0.889	143.1	0.89	-1.9	0.013	15.1	0.873	162.5
2000	0.875	141.7	0.85	-3.6	0.014	17.1	0.874	161.5

## S Parameter

(V<sub>DS</sub> = 4.2 V, I<sub>D</sub> = 150 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	0.814	-118.7	24.09	111.8	0.029	24.6	0.643	-133.8
150	0.784	-137.5	17.42	100.4	0.031	13.5	0.661	-148.4
200	0.771	-149.1	13.42	92.4	0.031	7.1	0.676	-156.1
250	0.765	-156.5	10.86	86.5	0.031	2.4	0.679	-160.6
300	0.764	-161.4	9.09	82.0	0.031	-1.3	0.687	-164.0
350	0.763	-165.7	7.75	77.5	0.030	-4.5	0.693	-166.3
400	0.766	-168.7	6.74	73.8	0.030	-6.7	0.695	-167.8
450	0.767	-171.5	5.95	70.1	0.030	-9.4	0.703	-169.4
500	0.773	-173.8	5.32	66.6	0.029	-11.2	0.711	-170.8
550	0.777	-176.0	4.79	63.2	0.028	-13.4	0.717	-171.8
600	0.779	-178.0	4.35	60.0	0.027	-15.5	0.722	-172.7
650	0.784	-179.6	3.97	57.0	0.026	-16.8	0.728	-173.8
700	0.791	178.6	3.64	54.1	0.025	-17.5	0.738	-174.7
750	0.792	177.1	3.36	51.2	0.025	-18.7	0.742	-175.7
800	0.797	175.4	3.11	48.4	0.024	-20.1	0.749	-176.3
850	0.802	174.1	2.88	45.6	0.023	-21.0	0.755	-177.5
900	0.804	172.5	2.69	42.9	0.022	-22.7	0.763	-178.4
950	0.808	170.9	2.51	40.3	0.021	-21.9	0.772	-179.4
1000	0.814	169.4	2.35	37.9	0.021	-22.9	0.778	-179.8
1050	0.817	167.8	2.21	35.5	0.020	-22.7	0.784	179.1
1100	0.823	166.5	2.07	32.9	0.019	-22.2	0.791	178.2
1150	0.828	165.0	1.96	30.6	0.018	-21.4	0.796	177.2
1200	0.833	163.6	1.85	28.3	0.017	-21.2	0.804	176.6
1250	0.838	162.2	1.75	26.1	0.017	-20.4	0.810	175.7
1300	0.843	160.7	1.65	23.7	0.016	-19.1	0.814	174.6
1350	0.845	159.3	1.56	21.5	0.015	-17.4	0.819	173.8
1400	0.849	158.0	1.49	19.4	0.014	-15.3	0.825	172.8
1450	0.853	156.7	1.42	17.3	0.014	-13.2	0.829	171.9
1500	0.857	155.2	1.35	15.4	0.014	-11.9	0.835	171.1
1550	0.859	154.1	1.28	13.1	0.013	-9.2	0.837	170.0
1600	0.861	152.5	1.22	11.1	0.013	-5.3	0.845	169.2
1650	0.862	151.1	1.17	9.1	0.013	-3.7	0.847	168.3
1700	0.866	149.5	1.12	7.4	0.012	-0.7	0.854	167.6
1750	0.873	148.2	1.06	5.4	0.013	2.8	0.855	166.4
1800	0.871	147.1	1.02	3.4	0.013	5.9	0.861	165.5
1850	0.873	145.3	0.98	1.6	0.013	9.5	0.864	164.4
1900	0.880	143.6	0.94	0.1	0.013	11.4	0.867	163.6
1950	0.888	143.1	0.90	-1.6	0.014	13.8	0.870	162.6
2000	0.874	141.7	0.86	-3.5	0.014	17.6	0.873	161.7

## S Parameter

(V<sub>DS</sub> = 4.5 V, I<sub>D</sub> = 150 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	0.818	-118.3	24.40	111.9	0.029	24.2	0.642	-134.0
150	0.790	-137.6	17.67	100.5	0.031	13.9	0.659	-148.1
200	0.774	-148.8	13.58	92.6	0.031	7.1	0.674	-155.9
250	0.768	-156.6	10.99	86.7	0.031	2.8	0.680	-160.8
300	0.767	-161.5	9.23	82.2	0.031	-1.6	0.684	-163.8
350	0.764	-165.6	7.85	77.7	0.031	-4.2	0.689	-166.2
400	0.767	-168.7	6.83	74.1	0.030	-6.6	0.693	-167.9
450	0.771	-171.6	6.05	70.4	0.029	-8.7	0.699	-169.4
500	0.776	-174.0	5.41	66.9	0.028	-11.1	0.708	-170.7
550	0.778	-176.0	4.86	63.4	0.028	-13.5	0.715	-171.8
600	0.780	-178.0	4.41	60.3	0.027	-14.0	0.720	-172.7
650	0.785	-179.7	4.04	57.4	0.026	-16.4	0.724	-173.6
700	0.789	178.5	3.70	54.4	0.025	-17.9	0.734	-174.6
750	0.792	177.1	3.41	51.5	0.025	-18.6	0.740	-175.5
800	0.796	175.4	3.16	48.7	0.024	-19.4	0.747	-176.4
850	0.802	173.9	2.93	46.1	0.023	-20.9	0.754	-177.3
900	0.803	172.3	2.74	43.3	0.022	-21.5	0.760	-178.3
950	0.809	170.9	2.54	40.6	0.021	-21.2	0.769	-179.2
1000	0.813	169.3	2.39	38.2	0.020	-22.2	0.774	-180.0
1050	0.817	167.9	2.25	35.9	0.020	-21.7	0.782	179.2
1100	0.822	166.4	2.11	33.3	0.019	-22.4	0.789	178.2
1150	0.826	164.9	1.99	30.8	0.018	-21.4	0.795	177.4
1200	0.832	163.5	1.88	28.6	0.017	-20.4	0.799	176.6
1250	0.839	162.1	1.78	26.4	0.017	-20.1	0.807	175.6
1300	0.842	160.6	1.69	24.3	0.016	-19.0	0.813	174.9
1350	0.845	159.2	1.60	22.0	0.015	-16.8	0.818	173.9
1400	0.849	157.9	1.51	19.7	0.015	-14.5	0.823	173.0
1450	0.852	156.7	1.44	17.6	0.015	-11.8	0.827	171.9
1500	0.856	155.1	1.37	15.8	0.014	-10.4	0.833	171.1
1550	0.860	153.9	1.31	13.7	0.014	-9.1	0.835	170.1
1600	0.859	152.4	1.24	11.4	0.013	-5.6	0.843	169.3
1650	0.862	150.9	1.19	9.5	0.013	-2.5	0.845	168.5
1700	0.866	149.5	1.14	7.8	0.013	0.9	0.852	167.5
1750	0.871	148.1	1.09	6.0	0.013	4.6	0.853	166.5
1800	0.871	146.9	1.04	3.9	0.013	7.8	0.858	165.6
1850	0.874	145.4	1.00	1.9	0.013	8.6	0.862	164.5
1900	0.880	143.8	0.96	0.4	0.013	12.6	0.865	163.6
1950	0.885	142.9	0.92	-1.3	0.014	14.1	0.869	162.8
2000	0.878	141.5	0.89	-3.0	0.014	18.2	0.870	161.8

## S Parameter

(V<sub>DS</sub> = 4.8 V, I<sub>D</sub> = 150 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	0.817	-117.8	24.62	112.3	0.029	24.4	0.638	-132.7
150	0.790	-137.0	17.81	100.8	0.030	13.8	0.656	-147.7
200	0.774	-148.7	13.72	92.8	0.031	7.2	0.670	-155.1
250	0.768	-156.0	11.08	86.9	0.031	3.0	0.675	-160.1
300	0.767	-161.3	9.30	82.3	0.031	-1.0	0.681	-163.6
350	0.766	-165.5	7.93	77.8	0.031	-4.3	0.686	-165.6
400	0.767	-168.6	6.89	74.1	0.030	-6.5	0.691	-167.5
450	0.770	-171.3	6.09	70.4	0.029	-8.7	0.695	-169.1
500	0.776	-173.7	5.45	67.0	0.029	-10.7	0.705	-170.4
550	0.780	-175.9	4.91	63.6	0.028	-13.2	0.712	-171.5
600	0.780	-177.8	4.44	60.3	0.027	-14.9	0.715	-172.3
650	0.786	-179.6	4.07	57.4	0.027	-16.1	0.723	-173.3
700	0.790	178.6	3.74	54.5	0.026	-17.7	0.731	-174.4
750	0.792	177.2	3.44	51.7	0.025	-19.8	0.735	-175.3
800	0.796	175.6	3.18	48.7	0.024	-20.2	0.743	-176.0
850	0.803	174.1	2.95	46.0	0.023	-21.0	0.751	-177.1
900	0.805	172.4	2.76	43.3	0.022	-20.9	0.758	-178.1
950	0.809	170.9	2.57	40.7	0.021	-21.9	0.766	-178.9
1000	0.814	169.3	2.41	38.3	0.021	-22.6	0.773	-179.6
1050	0.817	167.9	2.26	35.8	0.020	-22.3	0.779	179.5
1100	0.823	166.5	2.13	33.4	0.019	-23.0	0.785	178.5
1150	0.827	164.9	2.01	31.0	0.018	-21.1	0.792	177.7
1200	0.833	163.6	1.90	28.7	0.017	-20.5	0.798	177.0
1250	0.838	162.2	1.79	26.4	0.017	-20.0	0.804	176.0
1300	0.842	160.7	1.70	24.2	0.016	-18.2	0.809	175.1
1350	0.847	159.2	1.61	22.0	0.015	-16.4	0.815	174.1
1400	0.851	158.0	1.53	19.8	0.015	-16.9	0.821	173.3
1450	0.853	156.6	1.46	17.7	0.014	-14.5	0.825	172.3
1500	0.857	155.3	1.38	15.7	0.014	-10.1	0.832	171.3
1550	0.859	154.0	1.31	13.6	0.013	-8.5	0.834	170.4
1600	0.861	152.5	1.26	11.6	0.013	-6.4	0.841	169.5
1650	0.862	151.0	1.20	9.6	0.013	-2.9	0.844	168.6
1700	0.866	149.5	1.14	7.6	0.013	1.0	0.849	167.9
1750	0.872	148.2	1.09	5.8	0.013	2.1	0.851	166.8
1800	0.872	146.9	1.05	3.9	0.013	6.9	0.856	165.9
1850	0.871	145.4	1.01	2.1	0.013	10.0	0.860	164.8
1900	0.878	143.6	0.97	0.5	0.013	11.8	0.861	163.9
1950	0.887	143.0	0.93	-1.4	0.014	14.5	0.868	163.0
2000	0.875	141.7	0.89	-3.1	0.014	16.0	0.869	162.0



## S Parameter

(V<sub>DS</sub> = 6.0 V, I<sub>D</sub> = 150 mA, Z<sub>o</sub> = 50 Ω)

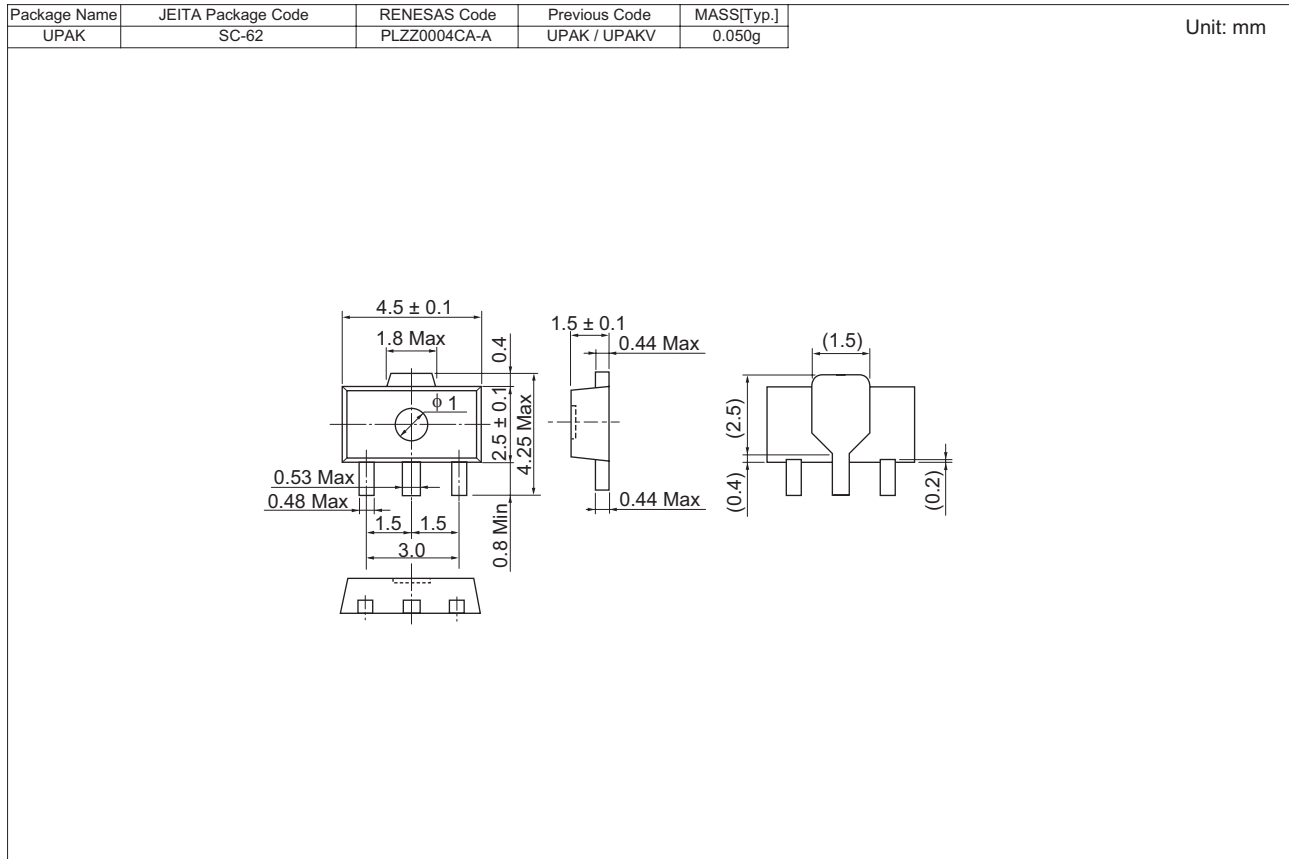
f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.830	-115.6	25.26	113.7	0.028	25.3	0.617	-131.4
150	0.798	-135.1	18.30	102.0	0.030	15.1	0.640	-146.7
200	0.784	-147.1	14.13	93.9	0.030	8.0	0.658	-154.6
250	0.777	-155.2	11.45	87.8	0.031	4.1	0.662	-159.5
300	0.774	-160.2	9.60	83.2	0.030	-0.3	0.670	-163.0
350	0.772	-164.7	8.19	78.7	0.030	-3.3	0.674	-165.3
400	0.774	-168.0	7.13	75.0	0.030	-6.0	0.678	-166.9
450	0.776	-170.8	6.30	71.3	0.029	-8.1	0.685	-168.5
500	0.780	-173.4	5.64	67.8	0.028	-9.5	0.693	-170.0
550	0.784	-175.6	5.08	64.4	0.028	-11.9	0.699	-171.0
600	0.787	-177.6	4.62	61.3	0.027	-13.7	0.705	-171.8
650	0.789	-179.3	4.22	58.3	0.026	-15.3	0.711	-173.0
700	0.793	178.9	3.87	55.3	0.025	-16.6	0.720	-173.9
750	0.797	177.2	3.57	52.5	0.025	-17.6	0.726	-175.0
800	0.799	175.6	3.32	49.7	0.024	-18.7	0.733	-175.6
850	0.806	174.2	3.07	46.9	0.023	-20.1	0.740	-176.6
900	0.805	172.6	2.87	44.2	0.022	-20.2	0.747	-177.5
950	0.813	170.9	2.68	41.7	0.021	-20.7	0.755	-178.5
1000	0.816	169.2	2.52	39.3	0.021	-21.1	0.763	-179.1
1050	0.821	167.9	2.37	36.8	0.020	-21.8	0.769	-180.0
1100	0.824	166.5	2.22	34.3	0.019	-21.1	0.775	179.0
1150	0.828	165.0	2.10	31.9	0.018	-20.6	0.782	178.1
1200	0.833	163.6	1.98	29.6	0.018	-20.0	0.788	177.5
1250	0.838	162.2	1.88	27.4	0.016	-19.3	0.795	176.6
1300	0.843	160.7	1.77	25.1	0.016	-18.3	0.800	175.6
1350	0.847	159.2	1.68	22.9	0.015	-17.1	0.806	174.6
1400	0.850	157.9	1.60	20.7	0.015	-15.2	0.811	173.8
1450	0.853	156.7	1.53	18.6	0.015	-12.6	0.815	172.8
1500	0.855	155.3	1.45	16.7	0.014	-11.3	0.821	171.9
1550	0.859	153.9	1.38	14.4	0.014	-7.8	0.826	170.9
1600	0.861	152.5	1.32	12.4	0.013	-4.2	0.831	170.1
1650	0.861	151.0	1.26	10.4	0.013	-1.6	0.835	169.3
1700	0.866	149.5	1.21	8.7	0.013	0.3	0.841	168.4
1750	0.871	148.2	1.15	6.7	0.013	3.4	0.842	167.4
1800	0.871	147.0	1.10	4.7	0.013	6.6	0.847	166.4
1850	0.873	145.3	1.06	2.9	0.013	9.4	0.852	165.3
1900	0.879	143.6	1.02	1.3	0.013	12.4	0.855	164.4
1950	0.886	143.1	0.98	-0.4	0.013	15.4	0.861	163.6
2000	0.877	141.6	0.94	-2.3	0.014	16.4	0.860	162.6

## S Parameter

 $(V_{DS} = 7.5 \text{ V}, I_D = 150 \text{ mA}, Z_o = 50 \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.841	-111.8	25.75	115.8	0.026	28.7	0.585	-131.9
150	0.812	-132.4	18.83	103.8	0.029	17.3	0.619	-146.9
200	0.796	-144.8	14.58	95.5	0.030	9.9	0.640	-154.4
250	0.788	-152.9	11.81	89.3	0.029	5.7	0.648	-159.5
300	0.787	-158.7	9.93	84.7	0.029	1.6	0.657	-163.0
350	0.785	-163.4	8.48	80.1	0.029	-1.6	0.661	-165.1
400	0.784	-166.7	7.38	76.3	0.028	-3.7	0.667	-166.9
450	0.785	-170.0	6.53	72.7	0.028	-5.7	0.673	-168.6
500	0.791	-172.6	5.85	69.2	0.027	-7.9	0.681	-169.8
550	0.793	-174.9	5.27	65.7	0.027	-10.3	0.689	-170.9
600	0.793	-177.0	4.79	62.5	0.026	-11.3	0.693	-171.9
650	0.798	-178.9	4.39	59.7	0.025	-14.0	0.697	-172.9
700	0.801	179.1	4.04	56.8	0.025	-14.4	0.708	-173.8
750	0.803	177.5	3.73	54.0	0.024	-15.2	0.714	-174.7
800	0.805	175.9	3.45	51.0	0.023	-16.6	0.720	-175.3
850	0.812	174.3	3.21	48.4	0.022	-16.5	0.727	-176.6
900	0.810	172.6	3.00	45.7	0.022	-17.6	0.734	-177.2
950	0.816	171.1	2.80	43.1	0.021	-18.6	0.744	-178.0
1000	0.819	169.6	2.63	40.6	0.020	-18.2	0.749	-178.9
1050	0.823	168.0	2.47	38.2	0.020	-17.6	0.757	-179.8
1100	0.826	166.6	2.33	35.8	0.019	-18.2	0.762	179.4
1150	0.832	164.9	2.20	33.4	0.018	-18.2	0.768	178.6
1200	0.836	163.7	2.08	31.0	0.018	-16.9	0.776	177.8
1250	0.842	162.3	1.97	28.8	0.017	-17.1	0.782	176.9
1300	0.844	160.7	1.87	26.6	0.016	-15.5	0.787	176.0
1350	0.847	159.2	1.78	24.4	0.016	-13.9	0.793	175.0
1400	0.852	157.8	1.69	22.2	0.015	-12.7	0.801	174.2
1450	0.854	156.7	1.61	19.9	0.015	-10.9	0.804	173.3
1500	0.858	155.3	1.53	18.0	0.014	-7.8	0.809	172.3
1550	0.859	154.0	1.46	15.9	0.014	-6.5	0.814	171.3
1600	0.861	152.5	1.40	13.9	0.014	-3.4	0.820	170.6
1650	0.862	151.0	1.33	11.7	0.013	-0.8	0.825	169.6
1700	0.866	149.5	1.27	9.9	0.014	2.2	0.831	168.9
1750	0.871	148.1	1.22	8.1	0.013	5.1	0.833	167.8
1800	0.871	147.0	1.17	6.1	0.014	8.0	0.837	167.0
1850	0.873	145.4	1.13	4.2	0.014	10.6	0.844	165.9
1900	0.879	143.6	1.08	2.5	0.014	13.1	0.847	164.9
1950	0.886	143.0	1.04	0.7	0.014	14.0	0.851	164.0
2000	0.874	141.7	1.00	-1.1	0.014	16.6	0.851	163.1

## Package Dimensions



## Recommended Soldering Conditions

This product should be soldered and mounted under the following recommended conditions.  
 For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Method	Item	Conditions
Partial Heating	Peak temperature (terminal temperature)	350°C or below
	Soldering time (per side of device)	3 seconds or less
Infrared Reflow	Peak temperature (package surface temperature)	260°C or below
	Time at peak temperature	10 seconds or less
	Time at temperature of 230°C or higher	15 to 50 seconds or less
	Preheating time at 150 to 180°C	60 to 300 seconds
	Maximum number of reflow processes	Twice

## Ordering Information

Part Name	Quantity	Shipping Container
RQA0010UXAQSTL-E	1000 pcs	$\phi$ 178 mm reel, 12 mm emboss taping

Notes:

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