

RQA0014XXDQS

Silicon N-Channel MOS FET

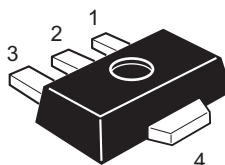
REJ03G1704-0100
Rev.1.00
Oct 20, 2008

Features

- High output power, High gain, High efficiency
Pout = +28.5 dBm, Linear Gain = 20 dB, PAE = 60% (f = 450 MHz)
- Suitable for UHF driver stage of high power transmission amplifiers
- 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 "XX".

*UPAK is a trademark of Renesas Technology Corp.

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	14	V
Gate to source voltage	V _{GSS}	±5	V
Drain current	I _D	0.3	A
Channel dissipation	P _{ch} ^{note}	3	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

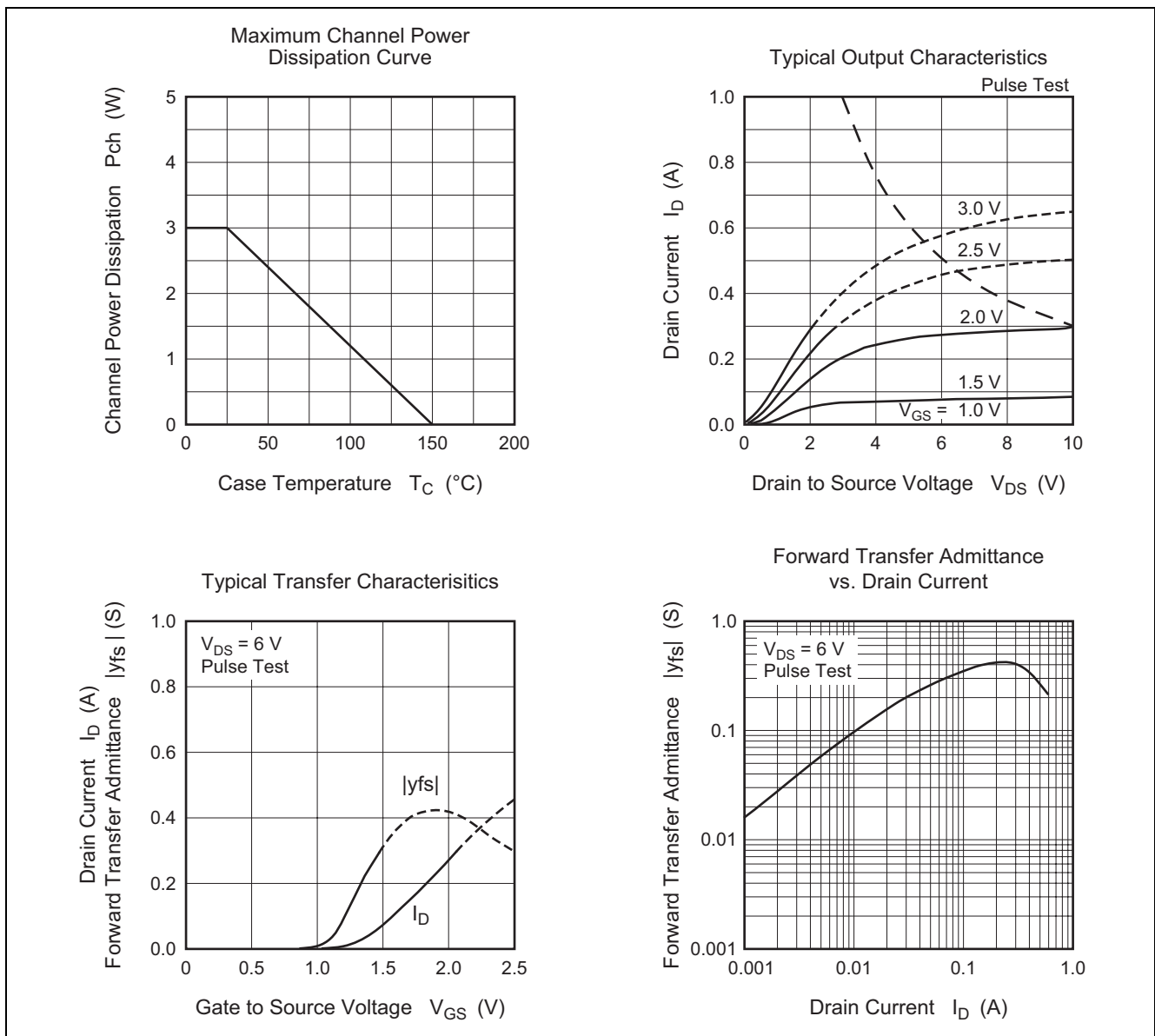
Note: Value at Tc = 25°C

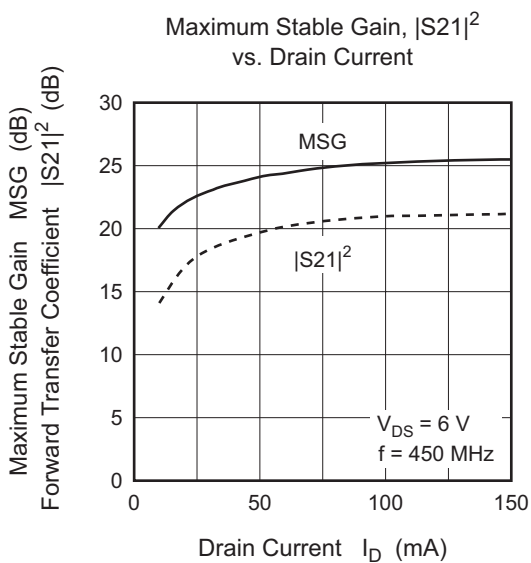
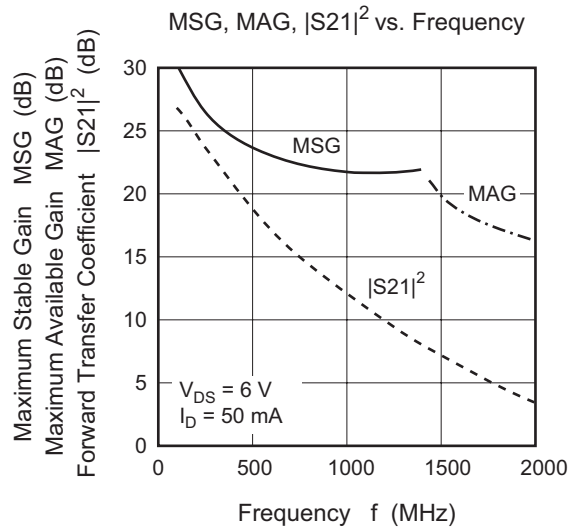
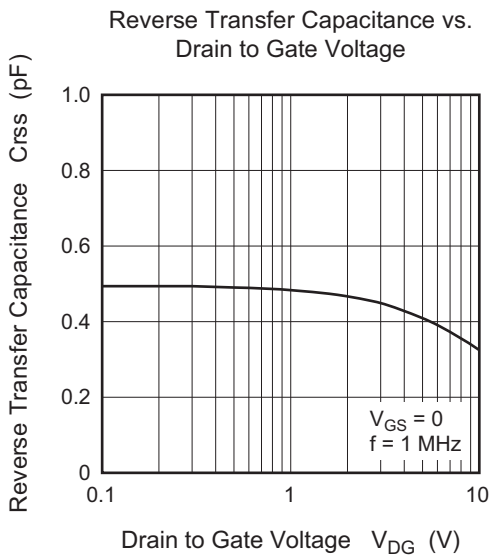
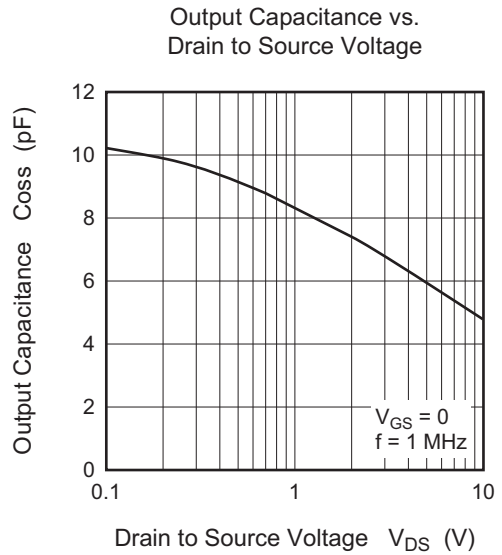
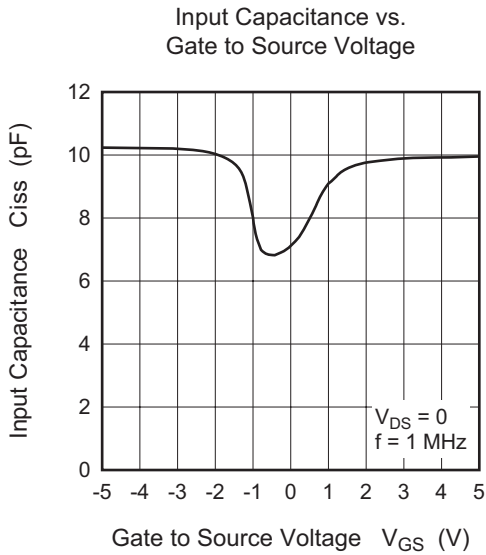
Electrical Characteristics

(Ta = 25°C)

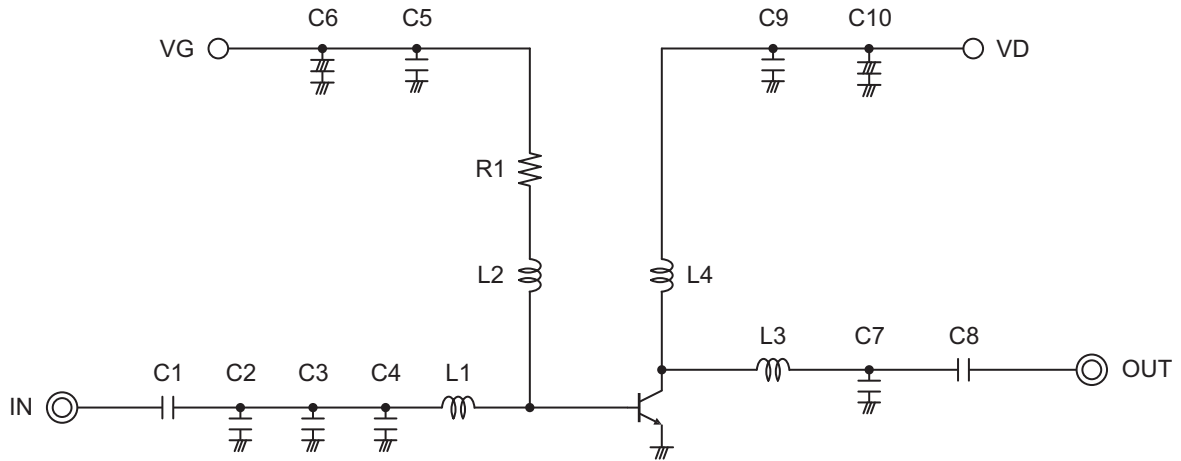
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	I_{DSS}	—	—	2	μA	$V_{DS} = 14\text{ V}, V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.5	μA	$V_{GS} = \pm 5\text{ V}, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.7	1.0	1.3	V	$V_{DS} = 6\text{ V}, I_D = 1\text{ mA}$
Input capacitance	C_{iss}	—	10	—	pF	$V_{GS} = 5\text{ V}, V_{DS} = 0, f = 1\text{ MHz}$
Output capacitance	C_{oss}	—	6	—	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	27.5	28.5	—	dBm	$V_{DS} = 6\text{ V}, I_D = 50\text{ mA}$
		0.56	0.71	—	W	$f = 450\text{ MHz}$,
Power Added Efficiency	PAE	50	60	—	%	Pin = +15 dBm (31.6 mW)

Main Characteristics





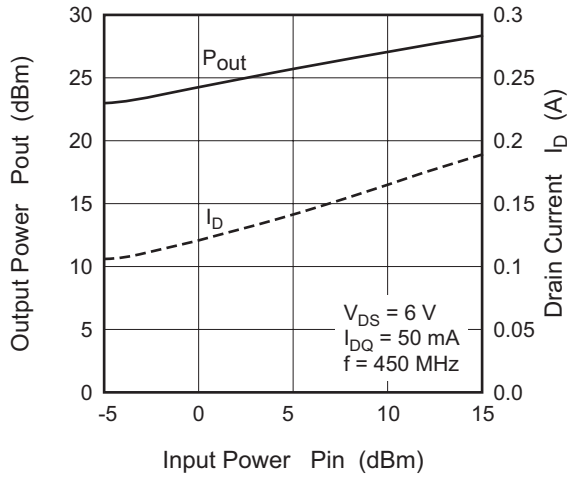
Evaluation Circuit (f = 450 MHz)



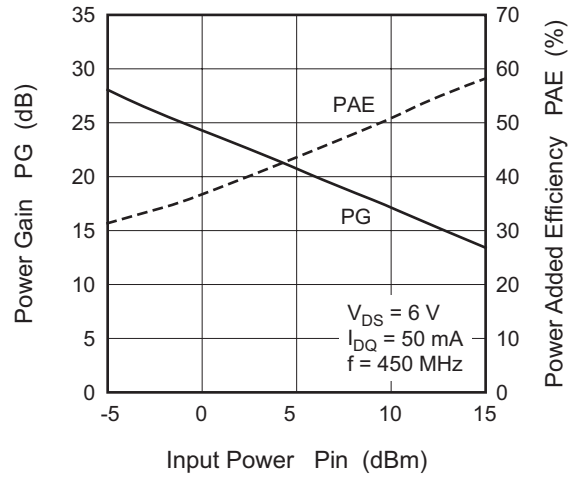
C1, C2, C3, C4, C7 : 10 pF Chip Capacitor
 C8 : 100 pF Chip Capacitor
 C5, C9 : 1000 pF Chip Capacitor
 C6, C10 : 10 μ F Chip Capacitor

L1 : 12 nH Chip Inductor
 L2 : 1 nH Chip Inductor
 L3 : 10 nH Chip Inductor
 L4 : 4 turns D: 0.5 mm, ϕ 2.4 mm Enamel Wire
 R1 : 1 k Ω Chip Resistor

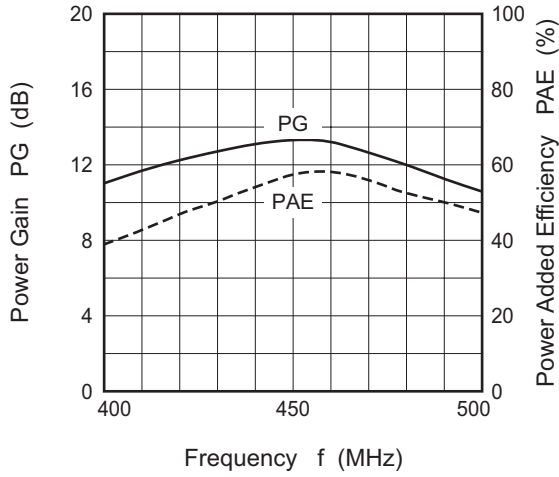
Output Power, Drain Current vs. Input Power



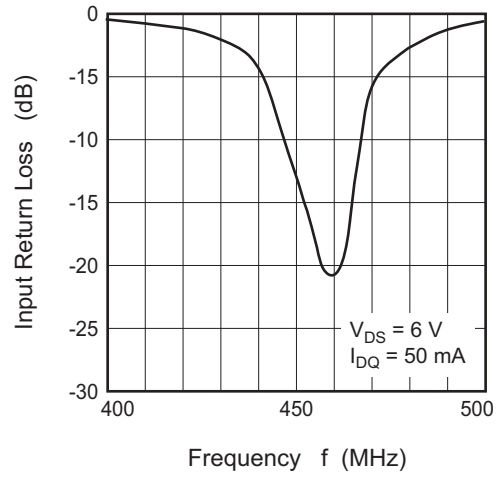
Power Gain, Power Added Efficiency vs. Input Power



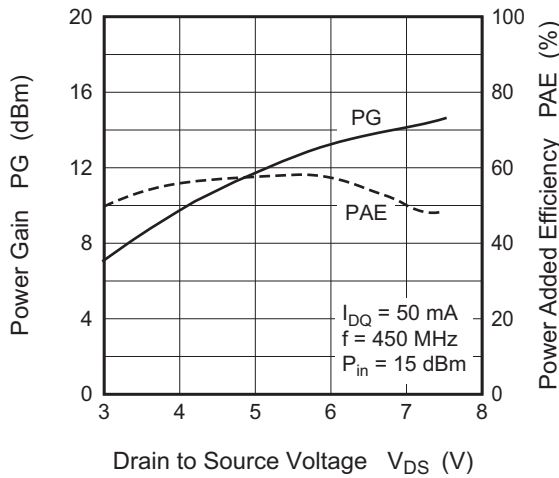
PG, PAE vs. Frequency



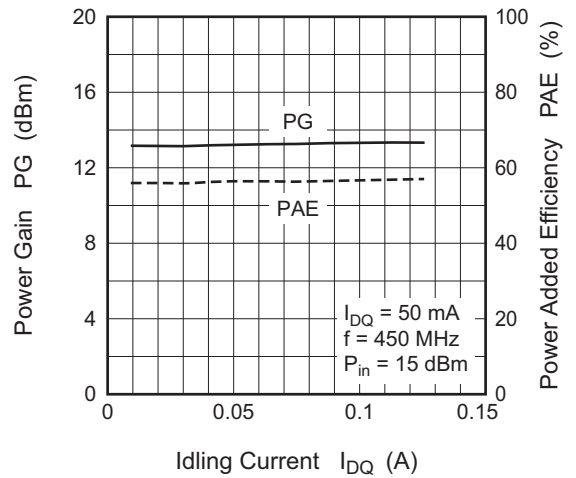
Input Return Loss vs. Frequency



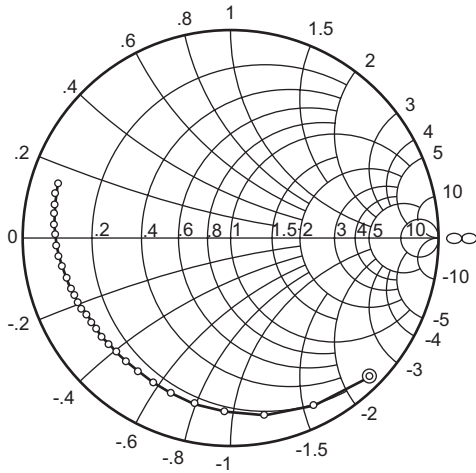
Power Gain vs. Idling Current



Power Added Efficiency vs. Idling Current

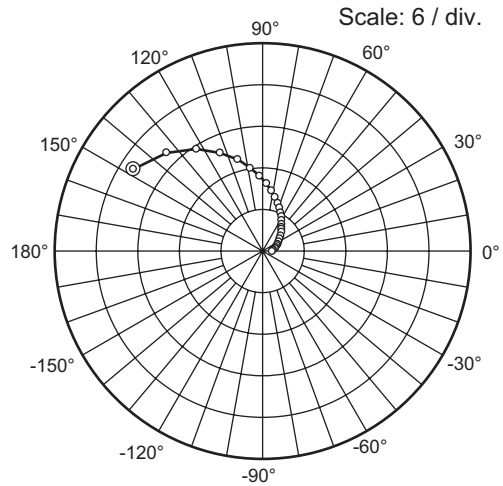


S₁₁ Parameter vs. Frequency



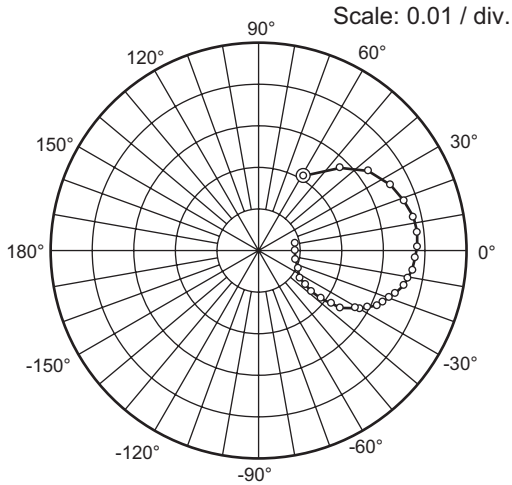
Condition: $V_{DS} = 6\text{ V}$, $I_{DQ} = 50\text{ mA}$, $Z_0 = 50\ \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2000 MHz (100 MHz Step)

S₂₁ Parameter vs. Frequency



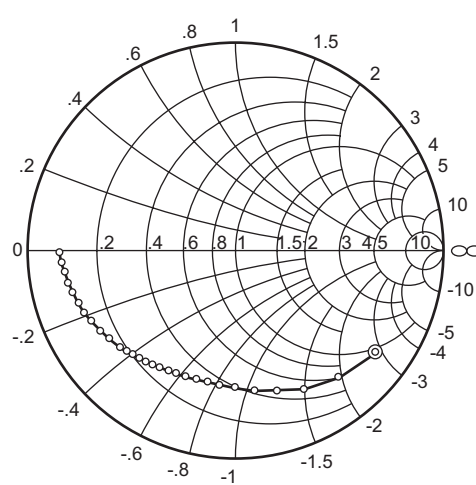
Condition: $V_{DS} = 6\text{ V}$, $I_{DQ} = 50\text{ mA}$, $Z_0 = 50\ \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2000 MHz (100 MHz Step)

S₁₂ Parameter vs. Frequency



Condition: $V_{DS} = 6\text{ V}$, $I_{DQ} = 50\text{ mA}$, $Z_0 = 50\ \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2000 MHz (100 MHz Step)

S₂₂ Parameter vs. Frequency



Condition: $V_{DS} = 6\text{ V}$, $I_{DQ} = 50\text{ mA}$, $Z_0 = 50\ \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2000 MHz (100 MHz Step)

S Parameter

(V_{DS} = 3 V, I_D = 50 mA, Z_o = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.942	-49.4	15.91	144.7	0.027	55.3	0.595	-50.0
150	0.895	-69.3	14.10	130.5	0.035	41.7	0.579	-69.0
200	0.855	-85.5	12.35	118.8	0.041	30.8	0.568	-84.0
250	0.823	-98.6	10.81	109.1	0.044	21.9	0.562	-95.4
300	0.800	-109.0	9.48	100.9	0.045	14.3	0.561	-104.5
350	0.786	-117.5	8.36	93.8	0.046	8.1	0.566	-111.9
400	0.777	-124.4	7.44	87.6	0.046	2.1	0.572	-117.9
450	0.770	-130.3	6.66	82.0	0.046	-2.4	0.582	-122.8
500	0.768	-135.3	6.01	77.0	0.045	-6.5	0.592	-127.0
550	0.767	-139.7	5.45	72.3	0.045	-10.6	0.604	-130.6
600	0.770	-143.7	4.97	67.9	0.044	-14.4	0.616	-134.0
650	0.772	-147.2	4.55	63.7	0.043	-17.7	0.629	-137.1
700	0.775	-150.3	4.18	59.9	0.041	-20.8	0.641	-139.8
750	0.778	-153.2	3.85	56.1	0.040	-24.1	0.654	-142.5
800	0.783	-155.9	3.57	52.6	0.039	-26.7	0.666	-144.9
850	0.787	-158.5	3.31	49.2	0.038	-29.1	0.677	-147.3
900	0.791	-161.0	3.08	45.9	0.036	-31.4	0.689	-149.6
950	0.796	-163.3	2.87	42.7	0.035	-33.7	0.699	-151.7
1000	0.801	-165.4	2.69	39.8	0.033	-36.0	0.710	-153.9
1050	0.805	-167.4	2.52	36.8	0.031	-37.6	0.721	-155.9
1100	0.810	-169.5	2.36	34.1	0.030	-39.4	0.730	-157.9
1150	0.816	-171.4	2.22	31.4	0.028	-40.3	0.741	-159.8
1200	0.819	-173.3	2.10	28.8	0.027	-41.5	0.749	-161.6
1250	0.824	-175.2	1.98	26.2	0.026	-43.2	0.759	-163.5
1300	0.827	-177.0	1.87	23.6	0.024	-43.8	0.768	-165.2
1350	0.830	-178.8	1.77	21.2	0.022	-45.0	0.775	-167.0
1400	0.834	179.4	1.68	18.9	0.022	-44.5	0.782	-168.7
1450	0.839	177.8	1.60	16.6	0.020	-44.5	0.788	-170.4
1500	0.842	176.1	1.52	14.2	0.019	-44.0	0.794	-172.1
1550	0.844	174.4	1.45	11.9	0.018	-44.9	0.800	-173.7
1600	0.849	172.7	1.38	9.8	0.016	-43.8	0.806	-175.5
1650	0.850	171.1	1.32	7.7	0.015	-43.0	0.811	-177.1
1700	0.853	169.5	1.26	5.5	0.014	-40.1	0.816	-178.6
1750	0.856	167.9	1.20	3.4	0.013	-37.1	0.822	179.7
1800	0.857	166.4	1.15	1.4	0.012	-35.9	0.825	178.2
1850	0.859	164.9	1.10	-0.5	0.011	-31.2	0.831	176.8
1900	0.862	163.2	1.06	-2.6	0.011	-27.6	0.835	175.2
1950	0.864	161.7	1.02	-4.6	0.010	-21.9	0.840	173.6
2000	0.866	160.0	0.98	-6.6	0.010	-17.1	0.842	172.1

S Parameter

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.936	-48.9	19.40	144.5	0.025	55.7	0.767	-43.7
150	0.887	-68.4	17.15	130.3	0.033	42.2	0.723	-60.9
200	0.844	-84.3	14.96	118.7	0.038	30.5	0.686	-75.0
250	0.811	-97.0	13.06	108.9	0.041	22.0	0.657	-86.1
300	0.789	-107.2	11.43	100.8	0.043	14.1	0.641	-95.1
350	0.774	-115.6	10.07	93.7	0.043	7.9	0.632	-102.7
400	0.765	-122.5	8.96	87.5	0.044	2.2	0.629	-109.1
450	0.759	-128.3	8.00	82.0	0.044	-2.7	0.631	-114.6
500	0.757	-133.3	7.22	76.9	0.043	-7.3	0.635	-119.2
550	0.757	-137.7	6.53	72.2	0.042	-11.1	0.642	-123.2
600	0.760	-141.6	5.95	67.8	0.041	-14.6	0.651	-126.9
650	0.762	-145.3	5.44	63.6	0.040	-18.2	0.662	-130.3
700	0.766	-148.4	5.00	59.8	0.039	-21.4	0.669	-133.4
750	0.770	-151.4	4.61	56.0	0.038	-24.6	0.681	-136.5
800	0.774	-154.1	4.26	52.5	0.036	-27.3	0.691	-139.2
850	0.781	-156.7	3.95	49.1	0.035	-29.7	0.702	-141.9
900	0.786	-159.2	3.67	45.9	0.033	-31.9	0.711	-144.4
950	0.790	-161.5	3.42	42.7	0.032	-34.8	0.721	-146.9
1000	0.796	-163.7	3.20	39.7	0.030	-35.9	0.731	-149.1
1050	0.800	-165.8	2.99	36.8	0.029	-38.1	0.740	-151.4
1100	0.805	-167.8	2.81	34.1	0.027	-39.6	0.749	-153.6
1150	0.811	-170.0	2.64	31.4	0.025	-40.7	0.758	-155.6
1200	0.815	-171.8	2.49	28.8	0.024	-42.4	0.767	-157.6
1250	0.820	-173.8	2.35	26.2	0.023	-43.3	0.775	-159.7
1300	0.824	-175.6	2.22	23.7	0.021	-43.1	0.783	-161.6
1350	0.827	-177.5	2.11	21.4	0.020	-44.1	0.790	-163.5
1400	0.832	-179.2	1.99	19.0	0.019	-44.3	0.797	-165.2
1450	0.837	-179.1	1.89	16.7	0.017	-44.6	0.802	-167.1
1500	0.840	-177.4	1.80	14.4	0.016	-44.3	0.808	-168.8
1550	0.842	-175.6	1.71	12.1	0.015	-43.7	0.814	-170.5
1600	0.846	-173.9	1.63	10.0	0.014	-40.2	0.819	-172.4
1650	0.850	-172.3	1.56	7.9	0.012	-38.2	0.823	-174.2
1700	0.852	-170.6	1.49	5.8	0.012	-35.3	0.828	-175.8
1750	0.856	-169.0	1.42	3.7	0.011	-30.9	0.834	-177.4
1800	0.857	-167.5	1.36	1.7	0.010	-29.8	0.838	-179.1
1850	0.859	-165.9	1.30	-0.2	0.009	-22.1	0.843	179.2
1900	0.862	-164.3	1.25	-2.3	0.009	-14.9	0.846	177.6
1950	0.863	-162.8	1.21	-4.2	0.009	-10.3	0.850	176.2
2000	0.866	-161.1	1.16	-6.2	0.009	-3.3	0.853	174.5

S Parameter

 $(V_{DS} = 4.2 \text{ V}, I_D = 50 \text{ mA}, Z_o = 50 \Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.939	-47.4	20.94	145.3	0.023	56.0	0.822	-40.5
150	0.892	-66.6	18.57	131.3	0.031	43.0	0.772	-56.8
200	0.850	-82.2	16.24	119.7	0.036	32.4	0.728	-70.1
250	0.817	-94.9	14.19	110.1	0.039	23.1	0.694	-81.0
300	0.794	-105.2	12.45	101.9	0.040	15.5	0.671	-90.1
350	0.779	-113.6	10.98	94.8	0.041	8.8	0.657	-97.6
400	0.770	-120.6	9.78	88.6	0.041	3.0	0.650	-104.0
450	0.762	-126.4	8.74	83.0	0.041	-1.7	0.648	-109.6
500	0.761	-131.6	7.89	77.9	0.041	-6.0	0.649	-114.5
550	0.760	-136.1	7.15	73.1	0.040	-10.4	0.655	-118.7
600	0.761	-140.1	6.51	68.7	0.039	-13.8	0.661	-122.5
650	0.764	-143.7	5.96	64.6	0.038	-17.2	0.670	-126.1
700	0.769	-147.1	5.48	60.7	0.037	-20.5	0.679	-129.4
750	0.772	-150.1	5.05	57.0	0.035	-23.5	0.687	-132.6
800	0.777	-152.8	4.67	53.4	0.034	-26.7	0.698	-135.5
850	0.782	-155.5	4.33	50.0	0.033	-28.9	0.708	-138.2
900	0.786	-158.1	4.03	46.8	0.031	-31.2	0.716	-140.9
950	0.791	-160.4	3.76	43.6	0.030	-33.3	0.724	-143.6
1000	0.797	-162.6	3.51	40.7	0.028	-35.3	0.734	-145.9
1050	0.801	-164.8	3.29	37.7	0.027	-36.8	0.744	-148.3
1100	0.806	-166.9	3.09	35.0	0.026	-39.0	0.752	-150.5
1150	0.812	-169.1	2.90	32.2	0.024	-38.8	0.761	-152.7
1200	0.816	-170.9	2.74	29.7	0.023	-40.8	0.770	-154.8
1250	0.820	-172.8	2.58	27.1	0.021	-42.1	0.778	-157.0
1300	0.824	-174.8	2.44	24.6	0.020	-42.2	0.786	-158.9
1350	0.829	-176.6	2.31	22.2	0.019	-42.7	0.794	-160.8
1400	0.833	-178.5	2.19	19.9	0.017	-42.5	0.799	-162.7
1450	0.837	180.0	2.08	17.6	0.016	-41.2	0.805	-164.6
1500	0.840	178.1	1.98	15.3	0.015	-40.9	0.811	-166.5
1550	0.843	176.3	1.88	13.0	0.013	-40.1	0.816	-168.2
1600	0.848	174.6	1.80	10.9	0.012	-38.1	0.820	-170.1
1650	0.849	173.0	1.71	8.8	0.011	-36.0	0.825	-171.9
1700	0.852	171.4	1.64	6.7	0.010	-33.4	0.831	-173.5
1750	0.855	169.8	1.57	4.6	0.010	-25.7	0.835	-175.3
1800	0.858	168.2	1.50	2.6	0.009	-20.3	0.840	-177.0
1850	0.860	166.5	1.44	0.7	0.009	-14.3	0.843	-178.6
1900	0.863	164.9	1.38	-1.3	0.008	-9.6	0.848	179.7
1950	0.864	163.4	1.33	-3.3	0.008	-0.4	0.852	178.2
2000	0.866	161.7	1.27	-5.3	0.008	5.5	0.855	176.5

S Parameter

(V_{DS} = 4.8 V, I_D = 50 mA, Z_o = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.943	-46.2	21.58	146.2	0.022	57.6	0.841	-38.3
150	0.898	-65.1	19.22	132.5	0.029	44.7	0.790	-54.1
200	0.858	-80.6	16.88	120.9	0.034	33.4	0.745	-67.0
250	0.826	-93.3	14.80	111.3	0.037	23.9	0.709	-77.7
300	0.802	-103.8	13.01	103.0	0.039	16.6	0.683	-86.5
350	0.787	-112.2	11.51	96.0	0.040	10.1	0.666	-94.0
400	0.777	-119.3	10.25	89.7	0.040	4.3	0.657	-100.6
450	0.768	-125.4	9.18	84.0	0.040	-0.3	0.654	-106.2
500	0.767	-130.5	8.30	79.0	0.039	-5.0	0.655	-111.1
550	0.766	-135.1	7.52	74.2	0.038	-9.3	0.658	-115.4
600	0.767	-139.2	6.86	69.8	0.038	-12.7	0.664	-119.3
650	0.769	-142.9	6.29	65.6	0.036	-16.6	0.671	-123.0
700	0.772	-146.3	5.78	61.7	0.036	-19.7	0.679	-126.4
750	0.775	-149.4	5.33	57.9	0.034	-22.2	0.689	-129.7
800	0.780	-152.2	4.93	54.4	0.033	-25.4	0.698	-132.7
850	0.785	-154.9	4.58	51.0	0.032	-27.9	0.706	-135.5
900	0.788	-157.5	4.26	47.7	0.030	-30.5	0.715	-138.2
950	0.793	-159.9	3.97	44.5	0.029	-32.6	0.724	-140.8
1000	0.798	-162.1	3.72	41.6	0.027	-33.7	0.732	-143.4
1050	0.803	-164.3	3.48	38.7	0.026	-35.5	0.742	-145.9
1100	0.809	-166.4	3.27	35.9	0.025	-37.3	0.751	-148.2
1150	0.813	-168.5	3.07	33.2	0.023	-39.5	0.759	-150.4
1200	0.817	-170.4	2.90	30.6	0.022	-39.8	0.768	-152.5
1250	0.821	-172.4	2.74	28.0	0.021	-40.5	0.777	-154.6
1300	0.827	-174.3	2.59	25.6	0.019	-40.7	0.783	-156.7
1350	0.829	-176.1	2.45	23.2	0.018	-41.5	0.791	-158.7
1400	0.834	-178.1	2.33	20.8	0.016	-40.9	0.797	-160.7
1450	0.838	-179.8	2.21	18.5	0.015	-40.5	0.803	-162.6
1500	0.842	-178.5	2.10	16.2	0.014	-38.2	0.808	-164.4
1550	0.844	-176.8	2.00	13.9	0.013	-38.5	0.814	-166.3
1600	0.848	-175.0	1.91	11.8	0.012	-36.5	0.818	-168.2
1650	0.851	-173.4	1.82	9.7	0.011	-33.5	0.823	-170.1
1700	0.852	-171.7	1.74	7.5	0.010	-30.5	0.829	-171.7
1750	0.856	-170.1	1.67	5.5	0.009	-22.3	0.832	-173.5
1800	0.858	-168.5	1.59	3.5	0.009	-18.5	0.838	-175.2
1850	0.860	-166.8	1.53	1.6	0.009	-11.2	0.842	-176.9
1900	0.864	-165.2	1.47	-0.5	0.008	-1.9	0.845	-178.6
1950	0.865	-163.6	1.41	-2.4	0.008	1.9	0.851	-179.8
2000	0.867	-162.0	1.36	-4.5	0.009	9.8	0.854	-178.1

S Parameter

(V_{DS} = 6 V, I_D = 50 mA, Z_o = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.950	-44.7	22.00	147.6	0.020	58.7	0.843	-35.6
150	0.909	-63.1	19.75	134.2	0.027	45.8	0.795	-50.4
200	0.871	-78.7	17.46	122.8	0.032	35.1	0.749	-62.9
250	0.839	-91.4	15.39	113.2	0.035	26.1	0.711	-73.2
300	0.816	-101.9	13.59	105.0	0.037	18.5	0.684	-81.8
350	0.800	-110.6	12.07	97.9	0.038	11.9	0.666	-89.3
400	0.790	-117.8	10.78	91.6	0.038	6.3	0.656	-95.8
450	0.780	-124.1	9.68	85.9	0.038	1.4	0.651	-101.5
500	0.777	-129.5	8.76	80.8	0.038	-3.1	0.650	-106.4
550	0.775	-134.1	7.96	76.0	0.037	-7.6	0.652	-110.8
600	0.776	-138.4	7.28	71.6	0.036	-10.6	0.657	-114.9
650	0.777	-142.2	6.68	67.4	0.035	-14.5	0.664	-118.6
700	0.779	-145.6	6.15	63.5	0.034	-17.8	0.671	-122.1
750	0.781	-148.7	5.68	59.8	0.033	-20.7	0.679	-125.4
800	0.786	-151.7	5.26	56.2	0.032	-23.3	0.688	-128.6
850	0.789	-154.4	4.89	52.8	0.031	-25.7	0.696	-131.5
900	0.793	-157.0	4.56	49.5	0.029	-27.8	0.705	-134.4
950	0.797	-159.5	4.26	46.3	0.028	-31.0	0.713	-136.9
1000	0.802	-161.7	3.99	43.4	0.026	-32.9	0.724	-139.6
1050	0.806	-163.9	3.74	40.4	0.026	-33.9	0.731	-142.0
1100	0.810	-166.0	3.51	37.7	0.024	-35.3	0.740	-144.5
1150	0.815	-168.1	3.31	35.0	0.023	-36.4	0.749	-146.8
1200	0.819	-170.1	3.12	32.4	0.021	-37.4	0.757	-149.0
1250	0.822	-172.1	2.95	29.7	0.020	-38.5	0.766	-151.2
1300	0.827	-174.1	2.79	27.2	0.019	-39.6	0.774	-153.3
1350	0.830	-175.9	2.65	24.8	0.017	-39.1	0.780	-155.3
1400	0.834	-177.8	2.51	22.5	0.016	-39.0	0.787	-157.4
1450	0.840	-179.4	2.39	20.2	0.015	-38.5	0.793	-159.3
1500	0.842	178.9	2.28	17.9	0.014	-37.5	0.799	-161.3
1550	0.844	177.1	2.17	15.5	0.013	-36.0	0.805	-163.1
1600	0.848	175.2	2.07	13.4	0.012	-33.7	0.809	-165.2
1650	0.849	173.8	1.97	11.3	0.011	-30.5	0.814	-167.0
1700	0.852	172.0	1.89	9.2	0.010	-26.6	0.819	-168.8
1750	0.856	170.3	1.81	7.1	0.009	-20.5	0.824	-170.5
1800	0.857	168.8	1.73	5.0	0.008	-15.2	0.828	-172.4
1850	0.858	167.1	1.66	3.1	0.008	-8.8	0.833	-174.1
1900	0.863	165.5	1.60	1.1	0.008	-2.5	0.838	-175.8
1950	0.864	164.0	1.54	-0.9	0.008	6.8	0.843	-177.4
2000	0.868	162.3	1.48	-3.0	0.009	10.4	0.846	-179.2

S Parameter

(V_{DS} = 7.2 V, I_D = 50 mA, Z_o = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.954	-43.7	22.12	148.6	0.019	59.9	0.830	-33.8
150	0.915	-62.1	19.97	135.5	0.026	47.3	0.786	-48.0
200	0.880	-77.5	17.77	124.2	0.030	36.3	0.741	-60.0
250	0.849	-90.3	15.73	114.7	0.033	27.1	0.704	-70.0
300	0.826	-100.9	13.94	106.5	0.035	19.8	0.678	-78.5
350	0.810	-109.7	12.42	99.4	0.036	13.7	0.659	-86.0
400	0.800	-117.1	11.12	93.1	0.037	7.8	0.646	-92.3
450	0.790	-123.4	10.01	87.5	0.037	2.7	0.641	-97.9
500	0.787	-128.9	9.08	82.4	0.036	-1.6	0.639	-103.0
550	0.783	-133.7	8.27	77.6	0.036	-6.3	0.641	-107.3
600	0.783	-138.0	7.56	73.1	0.035	-9.6	0.646	-111.5
650	0.784	-141.9	6.95	69.0	0.035	-13.0	0.652	-115.3
700	0.786	-145.3	6.41	65.1	0.033	-16.1	0.658	-118.8
750	0.787	-148.5	5.93	61.3	0.032	-18.7	0.667	-122.1
800	0.790	-151.5	5.50	57.7	0.031	-21.6	0.675	-125.3
850	0.794	-154.2	5.12	54.3	0.030	-24.4	0.683	-128.3
900	0.797	-157.0	4.78	51.1	0.029	-26.7	0.691	-131.1
950	0.800	-159.4	4.46	47.9	0.028	-28.9	0.700	-134.0
1000	0.804	-161.6	4.19	45.0	0.026	-30.6	0.708	-136.4
1050	0.807	-163.9	3.93	42.0	0.025	-32.5	0.718	-139.1
1100	0.812	-166.0	3.70	39.2	0.024	-33.5	0.727	-141.6
1150	0.817	-168.1	3.48	36.5	0.023	-35.1	0.736	-143.9
1200	0.820	-170.0	3.29	33.9	0.021	-36.1	0.744	-146.2
1250	0.825	-172.0	3.11	31.3	0.020	-36.4	0.752	-148.4
1300	0.829	-174.0	2.95	28.7	0.019	-37.0	0.762	-150.6
1350	0.831	-175.8	2.80	26.3	0.017	-37.7	0.769	-152.6
1400	0.835	-177.7	2.66	24.0	0.016	-37.1	0.775	-154.7
1450	0.839	-179.4	2.53	21.6	0.015	-37.6	0.780	-156.7
1500	0.841	-178.9	2.41	19.3	0.014	-36.6	0.787	-158.7
1550	0.845	-177.2	2.30	16.9	0.013	-33.7	0.794	-160.5
1600	0.849	-175.4	2.19	14.8	0.012	-31.1	0.800	-162.6
1650	0.851	-173.7	2.09	12.7	0.011	-27.7	0.804	-164.4
1700	0.852	-172.1	2.00	10.5	0.010	-24.4	0.810	-166.3
1750	0.856	-170.5	1.92	8.4	0.009	-19.5	0.815	-168.1
1800	0.858	-168.8	1.84	6.4	0.009	-12.9	0.818	-169.9
1850	0.860	-167.2	1.77	4.4	0.008	-7.7	0.824	-171.7
1900	0.863	-165.6	1.70	2.3	0.008	0.1	0.829	-173.4
1950	0.864	-164.0	1.64	0.3	0.008	8.0	0.833	-175.1
2000	0.866	-162.3	1.57	-1.7	0.009	12.4	0.836	-176.8

S Parameter

 $(V_{DS} = 7.8 \text{ V}, I_D = 50 \text{ mA}, Z_o = 50 \Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.955	-43.5	22.16	148.9	0.019	60.1	0.830	-33.3
150	0.919	-61.8	20.04	135.8	0.025	47.8	0.786	-47.3
200	0.882	-77.1	17.85	124.6	0.030	36.9	0.742	-59.2
250	0.853	-90.0	15.82	115.1	0.033	28.1	0.705	-69.1
300	0.829	-100.6	14.03	106.9	0.035	20.3	0.678	-77.7
350	0.813	-109.5	12.51	99.7	0.036	13.8	0.659	-84.8
400	0.802	-116.8	11.20	93.4	0.036	7.8	0.646	-91.3
450	0.794	-123.2	10.09	87.8	0.036	3.7	0.641	-96.8
500	0.788	-128.7	9.16	82.7	0.036	-1.4	0.639	-101.9
550	0.786	-133.5	8.34	77.9	0.036	-4.9	0.640	-106.3
600	0.786	-137.9	7.63	73.5	0.035	-9.3	0.645	-110.5
650	0.786	-141.8	7.02	69.3	0.034	-12.7	0.651	-114.3
700	0.787	-145.2	6.47	65.4	0.033	-16.1	0.656	-117.8
750	0.789	-148.5	5.99	61.7	0.032	-18.5	0.665	-121.2
800	0.792	-151.5	5.56	58.0	0.031	-21.4	0.673	-124.4
850	0.795	-154.2	5.18	54.6	0.030	-23.4	0.683	-127.4
900	0.798	-156.8	4.82	51.4	0.029	-26.2	0.691	-130.3
950	0.801	-159.4	4.51	48.1	0.028	-28.6	0.698	-133.1
1000	0.805	-161.5	4.24	45.2	0.026	-30.6	0.707	-135.7
1050	0.810	-163.8	3.97	42.2	0.025	-31.3	0.716	-138.2
1100	0.814	-166.0	3.74	39.5	0.024	-33.8	0.724	-140.7
1150	0.816	-168.0	3.52	36.8	0.022	-34.9	0.735	-143.1
1200	0.821	-170.1	3.33	34.2	0.021	-34.9	0.742	-145.4
1250	0.825	-172.0	3.15	31.5	0.020	-35.3	0.751	-147.7
1300	0.828	-173.9	2.99	29.0	0.018	-37.4	0.759	-149.8
1350	0.831	-175.8	2.83	26.6	0.017	-36.1	0.767	-151.9
1400	0.835	-177.7	2.69	24.2	0.016	-36.6	0.774	-153.9
1450	0.840	-179.3	2.56	21.9	0.015	-35.8	0.779	-156.0
1500	0.842	178.9	2.44	19.5	0.014	-36.2	0.786	-158.0
1550	0.844	177.1	2.33	17.3	0.013	-32.2	0.793	-159.9
1600	0.848	175.4	2.22	15.1	0.012	-31.1	0.797	-161.9
1650	0.850	173.8	2.12	12.9	0.011	-28.3	0.802	-163.9
1700	0.851	172.1	2.03	10.7	0.010	-24.4	0.808	-165.6
1750	0.856	170.5	1.95	8.6	0.009	-20.3	0.813	-167.5
1800	0.858	168.8	1.86	6.6	0.009	-13.8	0.818	-169.2
1850	0.860	167.2	1.79	4.7	0.008	-5.6	0.823	-171.0
1900	0.863	165.6	1.72	2.6	0.009	-0.2	0.826	-172.8
1950	0.864	164.0	1.66	0.6	0.009	8.9	0.832	-174.4
2000	0.866	162.4	1.59	-1.5	0.009	13.3	0.835	-176.1

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
UPAK	SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050g	

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
RQA0014XXDQSTL-E	1000 pcs	φ178 mm reel, 12 mm emboss taping

Notes:

1. This document is provided for reference purposes only so that Renesas customers may select the appropriate Renesas products for their use. Renesas neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights or any other rights of Renesas or any third party with respect to the information in this document.
2. Renesas shall have no liability for damages or infringement of any intellectual property or other rights arising out of the use of any information in this document, including, but not limited to, product data, diagrams, charts, programs, algorithms, and application circuit examples.
3. You should not use the products or the technology described in this document for the purpose of military applications such as the development of weapons of mass destruction or for the purpose of any other military use. When exporting the products or technology described herein, you should follow the applicable export control laws and regulations, and procedures required by such laws and regulations.
4. All information included in this document such as product data, diagrams, charts, programs, algorithms, and application circuit examples, is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas products listed in this document, please confirm the latest product information with a Renesas sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas such as that disclosed through our website. (<http://www.renesas.com>)
5. Renesas has used reasonable care in compiling the information included in this document, but Renesas assumes no liability whatsoever for any damages incurred as a result of errors or omissions in the information included in this document.
6. When using or otherwise relying on the information in this document, you should evaluate the information in light of the total system before deciding about the applicability of such information to the intended application. Renesas makes no representations, warranties or guarantees regarding the suitability of its products for any particular application and specifically disclaims any liability arising out of the application and use of the information in this document or Renesas products.
7. With the exception of products specified by Renesas as suitable for automobile applications, Renesas products are not designed, manufactured or tested for applications or otherwise in systems the failure or malfunction of which may cause a direct threat to human life or create a risk of human injury or which require especially high quality and reliability such as safety systems, or equipment or systems for transportation and traffic, healthcare, combustion control, aerospace and aeronautics, nuclear power, or undersea communication transmission. If you are considering the use of our products for such purposes, please contact a Renesas sales office beforehand. Renesas shall have no liability for damages arising out of the uses set forth above.
8. Notwithstanding the preceding paragraph, you should not use Renesas products for the purposes listed below:
 - (1) artificial life support devices or systems
 - (2) surgical implantations
 - (3) healthcare intervention (e.g., excision, administration of medication, etc.)
 - (4) any other purposes that pose a direct threat to human lifeRenesas shall have no liability for damages arising out of the uses set forth in the above and purchasers who elect to use Renesas products in any of the foregoing applications shall indemnify and hold harmless Renesas Technology Corp., its affiliated companies and their officers, directors, and employees against any and all damages arising out of such applications.
9. You should use the products described herein within the range specified by Renesas, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas shall have no liability for malfunctions or damages arising out of the use of Renesas products beyond such specified ranges.
10. Although Renesas endeavors to improve the quality and reliability of its products, IC products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other applicable measures. Among others, since the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
11. In case Renesas products listed in this document are detached from the products to which the Renesas products are attached or affixed, the risk of accident such as swallowing by infants and small children is very high. You should implement safety measures so that Renesas products may not be easily detached from your products. Renesas shall have no liability for damages arising out of such detachment.
12. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written approval from Renesas.
13. Please contact a Renesas sales office if you have any questions regarding the information contained in this document, Renesas semiconductor products, or if you have any other inquiries.



RENESAS SALES OFFICES

<http://www.renesas.com>

Refer to "<http://www.renesas.com/en/network>" for the latest and detailed information.

Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510