To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 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 1st, 2010
Renesas Electronics Corporation

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

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2SK2596

Silicon N-Channel MOS FET
UHF Power Amplifier

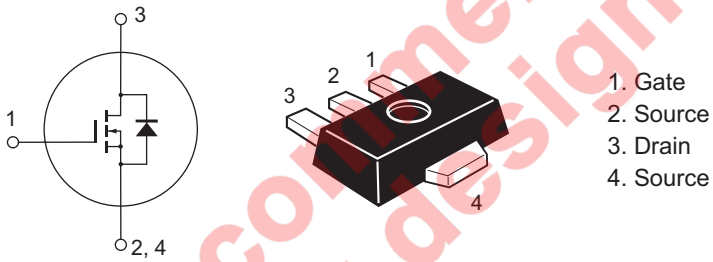
REJ03G0207-0400
Rev.4.00
Nov 08, 2007

Features

- High power output, High gain, High efficiency
  PG = 12.2 dB, Pout = 1.05 W, ηD = 45%min. (f = 836.5 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 “BX”.

*UPAK is a trademark of Renesas Technology Corp.

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	17	V
Gate to source voltage	V_{GSS}	±10	V
Drain current	I_D	0.4	A
Drain peak current	$I_{D(pulse)}$ Note1	1	A
Channel dissipation	Pch Note2	3	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–45 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. Value at Tc = 25°C

This device is sensitive to electro static discharge. An adequate careful handling procedure is requested.

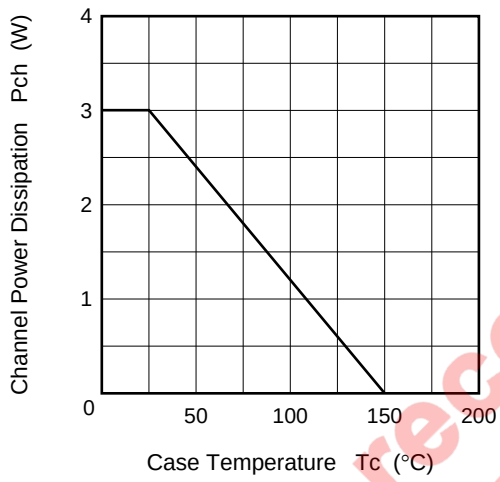
Electrical Characteristics

(Ta = 25°C)

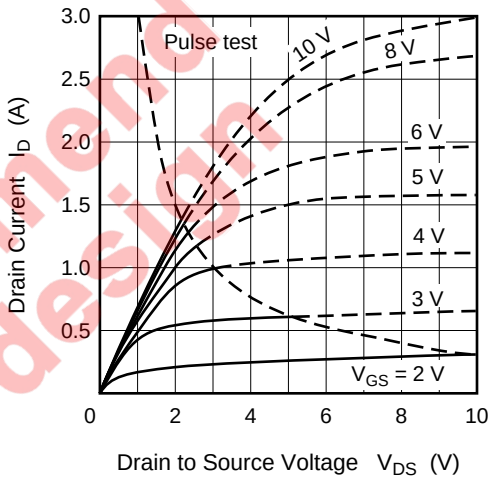
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 12 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±5.0	µA	V_{GS} = ±10 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0.4	—	1.1	V	V_{DS} = 12 V, I_D = 2 mA
Input capacitance	Ciss	—	22	—	pF	V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz
Output capacitance	Coss	—	10.5	—	pF	V_{DS} = 12 V, V_{GS} = 0, f = 1 MHz
Output Power	Pout	30.2	31.5	—	dBm	V_{DS} = 12 V, I_{DQ} = 50 mA
		1.05	1.4	—	W	f = 836.5 MHz, Pin = 63 mW
Drain Efficiency	ηD	45	55	—	%	

Main Characteristics

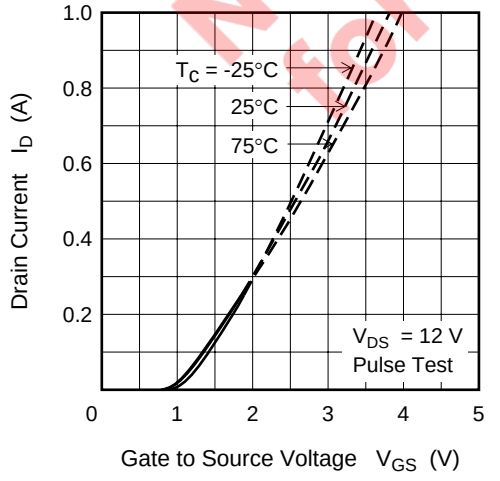
Maximum Channel Power Dissipation Curve



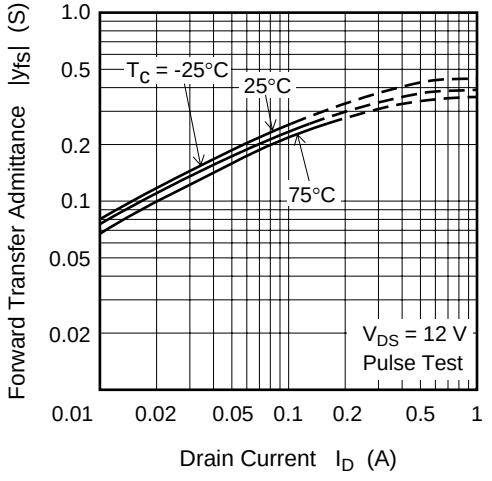
Typical Output Characteristics



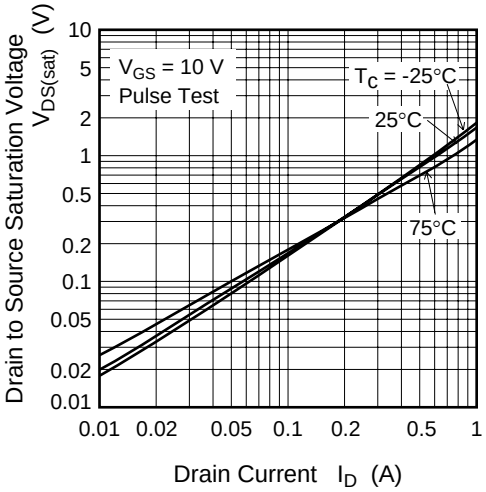
Typical Transfer Characteristics



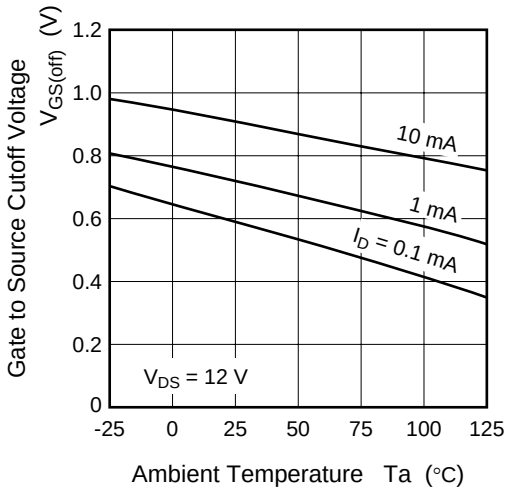
Forward Transfer Admittance vs. Drain Current



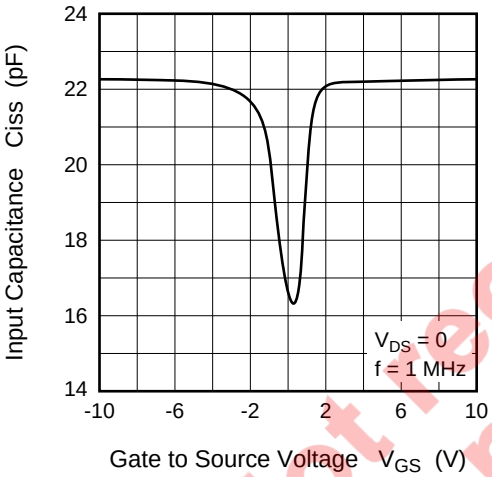
Drain to Source Saturation Voltage vs. Drain Current



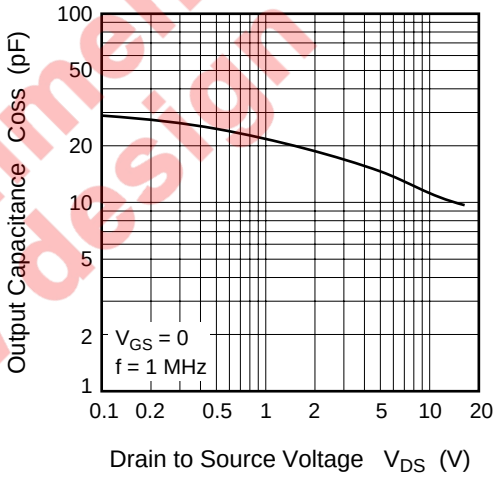
Gate to Source Cutoff Voltage vs. Ambient Temperature



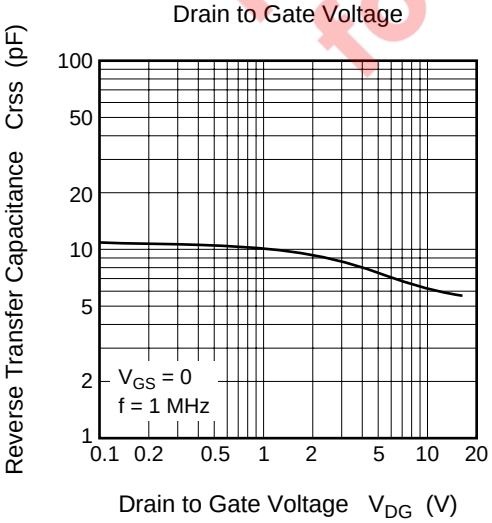
Input Capacitance vs. Gate to Source Voltage



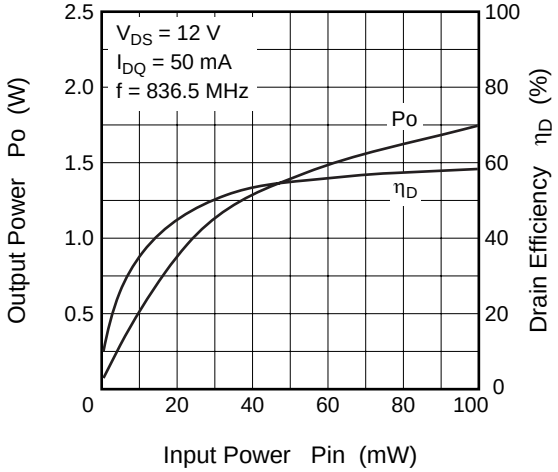
Output Capacitance vs. Drain to Source Voltage



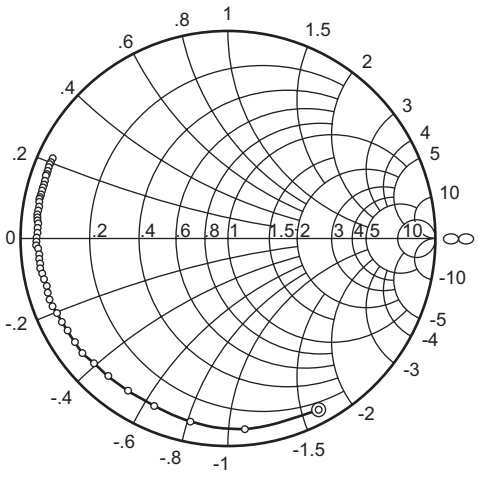
Reverse Transfer Capacitance vs. Drain to Gate Voltage



Output Power, Drain Efficiency vs. Input Power

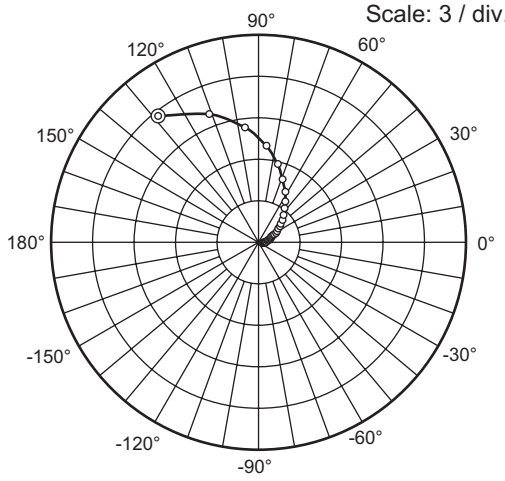


S_{11} Parameter vs. Frequency



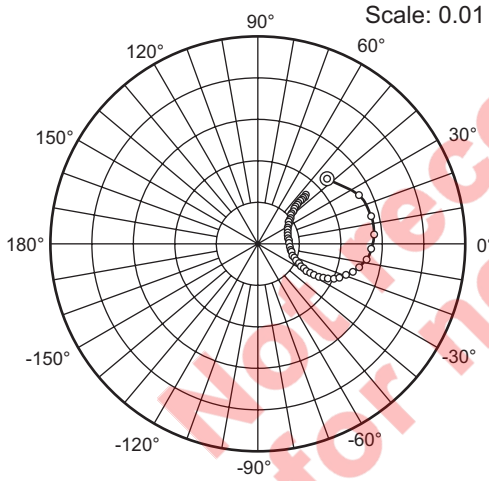
Test condition: V_{DS} = 12 V, I_{DQ} = 50 mA, Z_O = 50 Ω
100 to 2500 MHz (50 MHz step)

S_{21} Parameter vs. Frequency



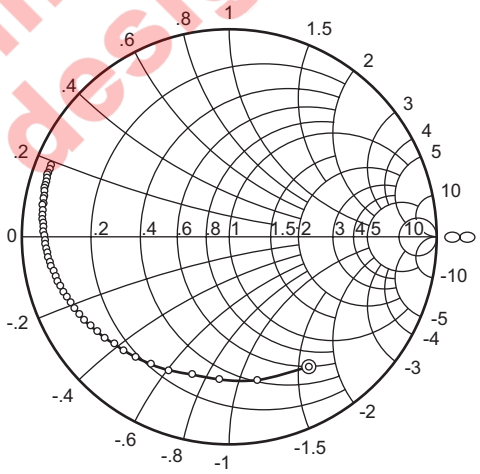
Test condition: V_{DS} = 12 V, I_{DQ} = 50 mA, Z_O = 50 Ω
100 to 2500 MHz (50 MHz step)

S_{12} Parameter vs. Frequency



Test condition: V_{DS} = 12 V, I_{DQ} = 50 mA, Z_O = 50 Ω
100 to 2500 MHz (50 MHz step)

S_{22} Parameter vs. Frequency



Test condition: V_{DS} = 12 V, I_{DQ} = 50 mA, Z_O = 50 Ω
100 to 2500 MHz (50 MHz step)

S Parameter

(V_{DS} = 3.8 V, I_{DQ} = 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	0.875	-71.1	7.24	121.4	0.0440	28.8	0.646	-97.9
150	0.825	-95.7	6.41	100.9	0.0474	12.2	0.662	-118.6
200	0.807	-110.8	5.28	86.8	0.0471	1.8	0.677	-130.6
250	0.806	-121.1	4.27	76.7	0.0454	-6.9	0.711	-139.0
300	0.811	-129.1	3.46	68.9	0.0440	-12.7	0.731	-145.0
350	0.824	-135.7	2.85	62.4	0.0416	-17.6	0.746	-149.9
400	0.840	-141.1	2.39	56.8	0.0393	-21.4	0.764	-153.5
450	0.853	-145.4	2.03	52.1	0.0374	-24.9	0.774	-156.9
500	0.860	-149.1	1.75	48.1	0.0352	-27.0	0.788	-159.6
550	0.868	-152.6	1.52	44.6	0.0334	-29.7	0.800	-162.1
600	0.874	-155.8	1.34	41.4	0.0316	-31.1	0.808	-164.1
650	0.883	-158.6	1.19	38.5	0.0301	-32.5	0.817	-166.0
700	0.890	-160.9	1.06	35.9	0.0289	-33.7	0.818	-167.9
750	0.895	-163.1	0.96	33.4	0.0273	-34.7	0.827	-169.6
800	0.895	-165.1	0.87	31.0	0.0259	-35.2	0.834	-171.3
850	0.897	-167.1	0.79	28.9	0.0247	-36.1	0.835	-172.7
900	0.900	-169.1	0.72	26.9	0.0233	-36.8	0.839	-174.1
950	0.904	-170.8	0.67	25.1	0.0224	-36.7	0.843	-175.5
1000	0.908	-172.3	0.62	23.2	0.0214	-37.0	0.849	-176.8
1050	0.908	-173.8	0.57	21.3	0.0204	-36.6	0.853	-178.0
1100	0.909	-175.3	0.53	19.4	0.0197	-37.0	0.858	-179.3
1150	0.910	-176.8	0.50	17.6	0.0187	-36.6	0.858	179.5
1200	0.911	-178.1	0.47	16.1	0.0179	-35.9	0.864	178.3
1250	0.915	-179.3	0.44	14.6	0.0172	-34.9	0.866	177.2
1300	0.918	179.6	0.41	13.0	0.0165	-34.9	0.870	176.2
1350	0.918	178.4	0.39	11.4	0.0157	-33.1	0.873	175.1
1400	0.915	177.1	0.37	9.8	0.0150	-32.4	0.871	174.0
1450	0.916	175.9	0.35	8.4	0.0144	-30.6	0.874	173.1
1500	0.918	174.7	0.33	6.9	0.0139	-29.2	0.876	172.0
1550	0.919	173.6	0.32	5.6	0.0131	-27.5	0.878	170.7
1600	0.921	172.8	0.30	4.2	0.0128	-25.5	0.883	169.8
1650	0.923	171.8	0.29	3.0	0.0122	-23.1	0.882	169.0
1700	0.923	170.8	0.27	1.6	0.0120	-22.0	0.885	167.9
1750	0.923	169.6	0.26	0.1	0.0119	-18.9	0.887	166.9
1800	0.925	168.5	0.25	-1.2	0.0116	-16.6	0.892	165.8
1850	0.926	167.6	0.24	-2.6	0.0114	-13.7	0.893	164.7
1900	0.925	166.9	0.23	-3.8	0.0111	-10.7	0.893	163.5
1950	0.923	165.9	0.22	-5.3	0.0111	-7.1	0.896	163.3
2000	0.923	164.9	0.21	-6.4	0.0109	-6.1	0.898	161.9
2050	0.923	163.9	0.20	-7.5	0.0110	-3.0	0.898	161.0
2100	0.923	162.9	0.20	-8.6	0.0111	0.8	0.899	160.1
2150	0.924	161.9	0.19	-9.9	0.0111	3.0	0.903	159.1
2200	0.927	160.8	0.18	-11.0	0.0115	5.6	0.901	158.6
2250	0.927	159.9	0.18	-12.2	0.0114	7.9	0.905	157.5
2300	0.927	158.9	0.17	-13.1	0.0116	9.9	0.905	156.5
2350	0.929	157.9	0.16	-14.4	0.0120	12.4	0.908	155.6
2400	0.930	157.0	0.16	-15.4	0.0123	13.2	0.909	155.1
2450	0.931	156.2	0.15	-16.4	0.0124	15.0	0.905	154.1
2500	0.930	155.2	0.15	-17.4	0.0130	16.2	0.903	153.2

S Parameter

(V_{DS} = 6.0 V, I_{DQ} = 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	0.883	-68.6	9.10	123.1	0.0371	33.6	0.675	-83.2
150	0.851	-92.2	7.85	104.4	0.0411	15.6	0.668	-105.0
200	0.836	-108.2	6.46	89.9	0.0410	4.6	0.672	-118.6
250	0.828	-119.0	5.26	79.3	0.0405	-3.2	0.699	-128.4
300	0.829	-127.4	4.28	71.1	0.0388	-10.1	0.715	-135.6
350	0.839	-134.4	3.54	64.2	0.0369	-15.2	0.732	-141.2
400	0.852	-139.9	2.97	58.4	0.0352	-19.6	0.751	-145.8
450	0.863	-144.3	2.53	53.4	0.0332	-22.8	0.763	-149.4
500	0.869	-148.1	2.18	49.3	0.0315	-25.2	0.778	-152.7
550	0.875	-151.8	1.90	45.5	0.0299	-27.6	0.787	-155.6
600	0.880	-155.0	1.68	42.2	0.0283	-29.4	0.796	-158.2
650	0.887	-157.8	1.48	39.1	0.0269	-31.1	0.805	-160.5
700	0.894	-160.2	1.33	36.3	0.0255	-32.4	0.811	-162.6
750	0.897	-162.4	1.19	33.6	0.0245	-33.3	0.822	-164.4
800	0.898	-164.4	1.08	31.1	0.0230	-34.5	0.827	-166.4
850	0.900	-166.6	0.99	28.8	0.0218	-34.7	0.828	-167.9
900	0.902	-168.5	0.90	26.8	0.0208	-35.2	0.834	-169.8
950	0.906	-170.3	0.83	24.8	0.0195	-35.6	0.839	-171.3
1000	0.910	-171.8	0.77	22.7	0.0188	-35.8	0.846	-172.9
1050	0.910	-173.3	0.71	20.7	0.0178	-35.5	0.849	-174.3
1100	0.912	-174.8	0.66	18.8	0.0169	-34.7	0.854	-175.8
1150	0.911	-176.3	0.62	16.9	0.0160	-34.6	0.855	-176.9
1200	0.914	-177.6	0.58	15.2	0.0153	-33.8	0.861	-178.2
1250	0.918	-178.8	0.54	13.7	0.0144	-32.6	0.864	-179.4
1300	0.920	-179.9	0.51	12.1	0.0139	-31.3	0.868	179.3
1350	0.920	178.9	0.48	10.4	0.0133	-28.6	0.871	178.3
1400	0.917	177.5	0.45	8.8	0.0125	-28.2	0.873	177.0
1450	0.918	176.2	0.43	7.2	0.0121	-26.1	0.877	176.0
1500	0.919	175.0	0.41	5.6	0.0116	-23.4	0.877	174.7
1550	0.921	174.0	0.39	4.4	0.0110	-21.4	0.879	173.5
1600	0.923	173.1	0.37	2.9	0.0106	-17.6	0.883	172.5
1650	0.925	172.2	0.35	1.5	0.0103	-15.3	0.886	171.5
1700	0.925	171.1	0.33	0.1	0.0103	-12.9	0.889	170.5
1750	0.925	169.9	0.32	-1.5	0.0098	-8.7	0.894	169.5
1800	0.927	168.9	0.31	-2.8	0.0100	-5.4	0.897	168.4
1850	0.928	167.9	0.29	-4.2	0.0100	-1.3	0.901	167.1
1900	0.926	167.3	0.28	-5.5	0.0099	0.5	0.896	165.9
1950	0.925	166.2	0.26	-7.0	0.0100	5.7	0.897	165.5
2000	0.924	165.2	0.25	-8.2	0.0101	8.1	0.903	164.1
2050	0.925	164.2	0.24	-9.3	0.0102	10.3	0.900	163.1
2100	0.925	163.2	0.24	-10.5	0.0103	12.8	0.904	162.0
2150	0.926	162.1	0.23	-11.8	0.0106	15.5	0.906	161.2
2200	0.929	161.1	0.22	-13.0	0.0110	17.7	0.908	160.4
2250	0.929	160.2	0.21	-14.1	0.0114	20.0	0.904	159.5
2300	0.929	159.2	0.20	-15.2	0.0118	22.1	0.909	158.2
2350	0.931	158.2	0.20	-16.4	0.0123	24.2	0.915	157.6
2400	0.934	157.3	0.19	-17.5	0.0126	25.3	0.910	156.8
2450	0.933	156.5	0.18	-18.6	0.0128	26.1	0.909	155.8
2500	0.932	155.5	0.18	-19.7	0.0134	26.9	0.910	154.8

S Parameter

(V_{DS} = 7.2 V, I_{DQ} = 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	0.895	-67.4	9.82	124.2	0.0332	37.0	0.689	-76.7
150	0.866	-90.5	8.41	106.1	0.0382	18.0	0.676	-98.7
200	0.850	-106.8	6.97	91.5	0.0385	6.6	0.673	-112.6
250	0.842	-117.9	5.71	80.7	0.0382	-1.9	0.697	-123.1
300	0.840	-126.6	4.66	72.3	0.0362	-8.4	0.715	-130.8
350	0.847	-133.6	3.87	65.3	0.0348	-13.8	0.728	-136.8
400	0.858	-139.3	3.25	59.2	0.0328	-17.8	0.746	-141.6
450	0.869	-143.8	2.77	54.2	0.0313	-21.7	0.760	-145.7
500	0.874	-147.7	2.40	49.8	0.0298	-24.2	0.772	-149.4
550	0.879	-151.3	2.09	46.0	0.0282	-26.4	0.782	-152.4
600	0.884	-154.6	1.84	42.6	0.0267	-28.9	0.793	-155.1
650	0.891	-157.5	1.63	39.4	0.0253	-30.6	0.802	-157.7
700	0.896	-159.9	1.46	36.5	0.0241	-31.3	0.810	-159.6
750	0.899	-162.1	1.31	33.7	0.0225	-32.9	0.816	-162.1
800	0.900	-164.1	1.19	31.1	0.0215	-33.2	0.822	-163.9
850	0.901	-166.3	1.08	28.8	0.0205	-34.3	0.827	-165.5
900	0.904	-168.3	0.99	26.6	0.0191	-34.5	0.834	-167.5
950	0.908	-170.0	0.91	24.5	0.0183	-34.5	0.839	-169.1
1000	0.912	-171.6	0.84	22.5	0.0173	-34.5	0.844	-170.6
1050	0.912	-173.0	0.78	20.4	0.0165	-34.1	0.851	-172.3
1100	0.913	-174.6	0.72	18.3	0.0155	-33.9	0.854	-173.8
1150	0.913	-176.0	0.68	16.5	0.0146	-33.2	0.857	-175.2
1200	0.915	-177.4	0.63	14.7	0.0139	-32.0	0.862	-176.4
1250	0.919	-178.6	0.59	13.1	0.0132	-30.1	0.866	-177.8
1300	0.921	-179.7	0.56	11.5	0.0126	-28.9	0.869	-178.9
1350	0.921	179.1	0.53	9.7	0.0119	-25.8	0.873	179.8
1400	0.918	177.7	0.49	8.1	0.0113	-23.4	0.876	178.5
1450	0.919	176.4	0.47	6.4	0.0108	-22.4	0.880	177.5
1500	0.920	175.3	0.44	4.9	0.0102	-19.1	0.878	176.3
1550	0.922	174.1	0.42	3.5	0.0101	-15.1	0.881	175.0
1600	0.923	173.3	0.40	2.0	0.0097	-12.4	0.885	173.8
1650	0.926	172.3	0.38	0.7	0.0093	-8.8	0.886	172.9
1700	0.927	171.3	0.36	-0.8	0.0093	-5.0	0.890	171.7
1750	0.926	170.1	0.35	-2.3	0.0094	-1.7	0.894	170.7
1800	0.928	169.1	0.33	-3.8	0.0091	1.6	0.897	169.3
1850	0.929	168.1	0.32	-5.2	0.0093	6.0	0.898	168.3
1900	0.928	167.4	0.30	-6.5	0.0095	8.8	0.900	166.9
1950	0.925	166.3	0.29	-8.1	0.0099	14.4	0.899	166.6
2000	0.926	165.3	0.27	-9.2	0.0100	15.8	0.904	165.1
2050	0.926	164.3	0.26	-10.4	0.0102	18.8	0.904	164.2
2100	0.926	163.3	0.25	-11.6	0.0104	20.4	0.907	162.9
2150	0.928	162.2	0.24	-12.9	0.0108	23.0	0.908	162.1
2200	0.929	161.2	0.24	-14.1	0.0114	25.2	0.912	161.6
2250	0.930	160.3	0.23	-15.3	0.0114	26.2	0.909	160.4
2300	0.930	159.3	0.22	-16.4	0.0121	27.4	0.913	159.2
2350	0.933	158.2	0.21	-17.6	0.0124	28.9	0.917	158.4
2400	0.935	157.4	0.20	-18.8	0.0131	29.6	0.911	157.6
2450	0.934	156.6	0.20	-19.7	0.0133	31.0	0.912	156.9
2500	0.934	155.6	0.19	-20.9	0.0134	31.5	0.912	155.8

S Parameter

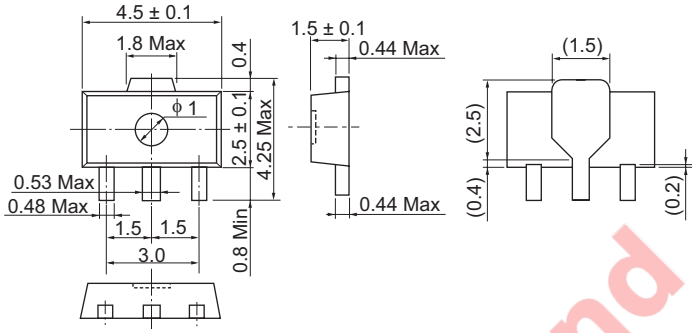
(V_{DS} = 12 V, I_{DQ} = 50 mA, Z_O = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG(deg.)	MAG	ANG(deg.)	MAG	ANG(deg.)	MAG	ANG(deg.)
100	0.932	-62.1	11.71	128.4	0.0228	42.3	0.735	-59.0
150	0.921	-85.1	9.96	111.2	0.0270	25.0	0.709	-79.5
200	0.898	-101.9	8.40	96.8	0.0281	13.2	0.691	-94.0
250	0.882	-114.0	7.04	85.0	0.0282	4.1	0.694	-105.3
300	0.877	-123.5	5.80	76.1	0.0275	-3.0	0.714	-114.4
350	0.879	-131.1	4.86	68.7	0.0265	-8.9	0.723	-121.6
400	0.884	-137.2	4.11	62.1	0.0252	-13.4	0.738	-127.7
450	0.892	-141.9	3.53	56.6	0.0239	-17.1	0.753	-132.7
500	0.893	-146.0	3.06	52.0	0.0228	-20.2	0.765	-137.0
550	0.893	-150.2	2.68	47.7	0.0215	-23.0	0.776	-140.9
600	0.895	-153.4	2.37	43.7	0.0203	-25.1	0.788	-144.3
650	0.900	-156.4	2.10	40.3	0.0191	-27.0	0.799	-147.3
700	0.907	-158.8	1.88	37.0	0.0179	-27.9	0.808	-150.1
750	0.909	-161.1	1.70	33.9	0.0168	-29.4	0.816	-152.7
800	0.909	-163.2	1.53	30.9	0.0157	-30.1	0.825	-155.1
850	0.906	-165.4	1.40	28.3	0.0147	-30.2	0.831	-157.3
900	0.909	-167.5	1.28	25.8	0.0136	-30.2	0.837	-159.5
950	0.912	-169.4	1.18	23.3	0.0127	-29.4	0.845	-161.5
1000	0.917	-170.9	1.08	21.1	0.0119	-28.5	0.851	-163.5
1050	0.915	-172.3	1.00	18.9	0.0111	-26.8	0.857	-165.3
1100	0.916	-173.9	0.93	16.5	0.0103	-25.1	0.862	-167.1
1150	0.916	-175.3	0.87	14.3	0.0096	-22.8	0.866	-168.8
1200	0.917	-177.0	0.81	12.4	0.0090	-19.8	0.871	-170.4
1250	0.923	-178.0	0.75	10.8	0.0085	-15.8	0.876	-171.9
1300	0.925	-179.3	0.71	8.8	0.0080	-11.9	0.880	-173.4
1350	0.923	179.7	0.67	7.0	0.0078	-7.0	0.883	-174.8
1400	0.921	178.2	0.62	5.2	0.0074	-1.8	0.886	-176.2
1450	0.920	176.8	0.59	3.4	0.0074	3.6	0.889	-177.6
1500	0.920	175.5	0.56	1.9	0.0074	8.5	0.890	-178.9
1550	0.923	174.5	0.52	0.2	0.0075	13.5	0.893	179.7
1600	0.927	173.7	0.50	-1.4	0.0076	18.0	0.897	178.4
1650	0.928	172.7	0.47	-2.8	0.0079	23.3	0.899	177.2
1700	0.926	171.5	0.45	-4.5	0.0082	26.4	0.902	175.9
1750	0.926	170.3	0.43	-5.9	0.0086	29.8	0.905	174.7
1800	0.927	169.1	0.41	-7.5	0.0090	33.1	0.910	173.5
1850	0.929	168.2	0.39	-9.0	0.0095	35.5	0.912	172.2
1900	0.927	167.5	0.38	-10.4	0.0100	37.1	0.913	170.8
1950	0.927	166.6	0.36	-12.0	0.0105	40.0	0.911	170.2
2000	0.928	165.4	0.34	-13.4	0.0109	41.0	0.917	168.6
2050	0.927	164.5	0.33	-14.6	0.0115	41.8	0.916	167.6
2100	0.924	163.5	0.32	-15.9	0.0121	42.8	0.918	166.4
2150	0.925	162.4	0.30	-17.2	0.0126	43.1	0.921	165.3
2200	0.930	161.1	0.29	-18.3	0.0132	44.0	0.922	164.6
2250	0.928	160.4	0.28	-19.8	0.0137	44.4	0.921	163.4
2300	0.929	159.3	0.26	-20.9	0.0142	44.7	0.924	162.3
2350	0.931	158.3	0.26	-22.1	0.0148	44.5	0.927	161.4
2400	0.932	157.3	0.25	-23.4	0.0153	44.4	0.926	160.6
2450	0.931	156.6	0.24	-24.5	0.0158	44.6	0.924	159.4
2500	0.930	155.6	0.23	-25.7	0.0163	44.4	0.925	158.4

Package Dimensions

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

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
2SK2596BXTL-E	1000 pcs.	φ178 mm Reel, 12 mm Emboss taping

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