2SK3390

Silicon N-Channel MOS FET
UHF Power Amplifier

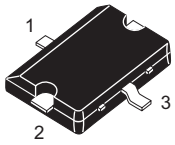
REJ03G0208-0400
Rev.4.00
Nov 08, 2007

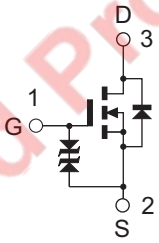
Features

- High power output, High gain, High efficiency
  PG = 17 dB, Pout = 6.31 W, ηadd = 60% min. (f = 836 MHz)
- Compact package capable of surface mounting

Outline

RENESAS Package code : PLSS0003ZA-A
(Package name: RP8P)





1. Gate
2. Source
3. Drain

Note: Marking is “IX”.

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	1	A
Drain peak current	$I_{D(pulse)}$ Note1	2.5	A
Channel dissipation	Pch Note2	20	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–45 to +150	°C

Notes: 1. PW < 1sec, Tch < 150°C
2. Value at Tc = 25°C

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

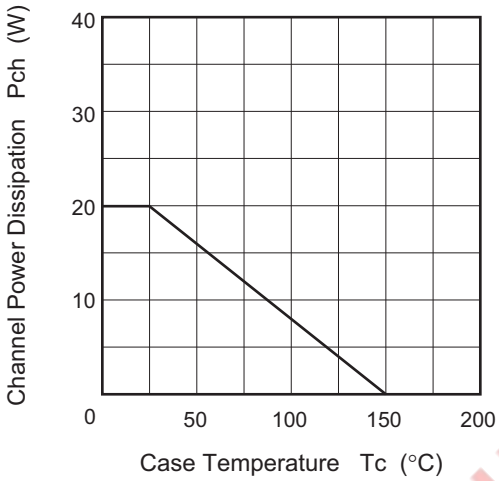
Electrical Characteristics

(Ta = 25°C)

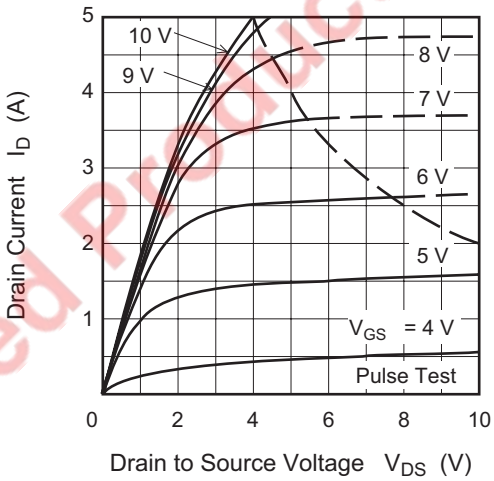
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 13.7 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±5	µA	V_{GS} = ±10 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	2.2	—	3.0	V	V_{DS} = 13.7 V, I_D = 1 mA
Input capacitance	Ciss	—	27.5	—	pF	V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz
Output capacitance	Coss	—	10.5	—	pF	V_{DS} = 13.7 V, V_{GS} = 0, f = 1 MHz
Output Power	Pout	6.31	—	—	W	V_{DS} = 13.7 V, I_{DQ} = 250 mA
Added Efficiency	ηadd	60	—	—	%	f = 836 MHz, Pin = 126 mW

Main Characteristics

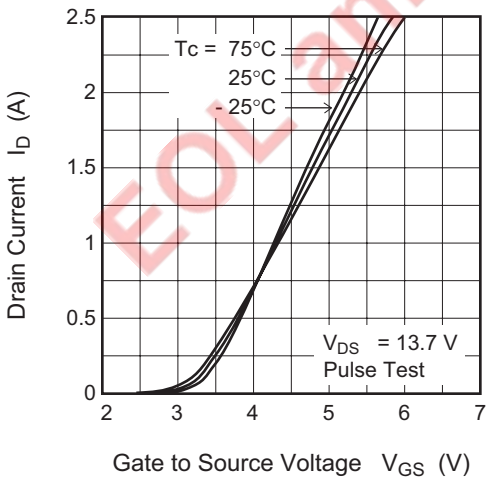
Maximum Channel Power Dissipation Curve



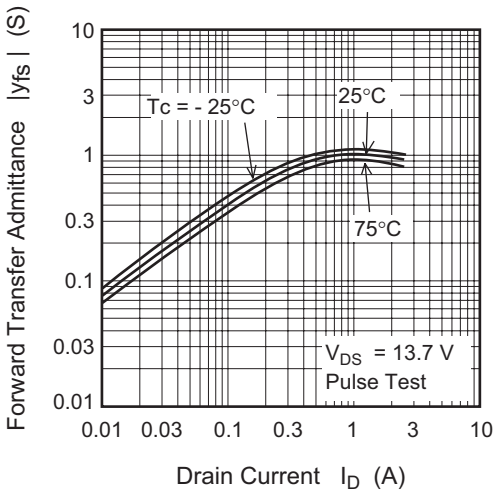
Typical Output Characteristics



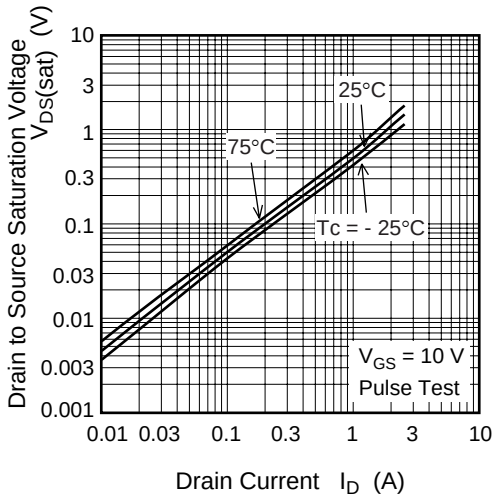
Typical Transfer Characteristics



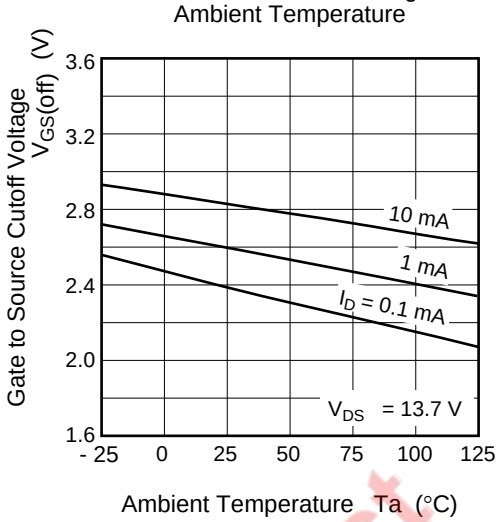
Forward Transfer Admittance vs. Drain Current



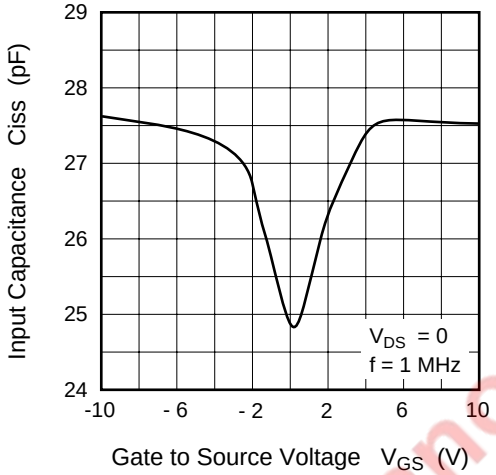
Drain to Source Saturation Voltage vs. Drain Current



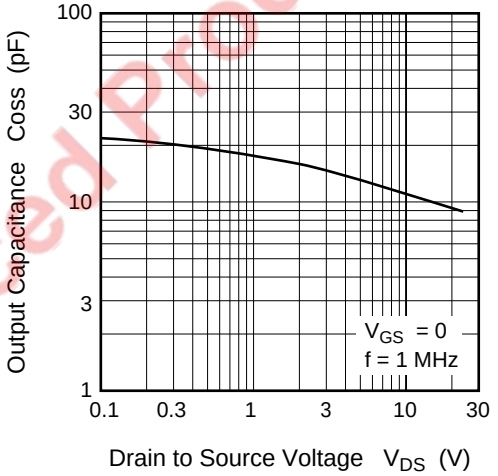
Gate to Source Cutoff Voltage vs. Ambient Temperature



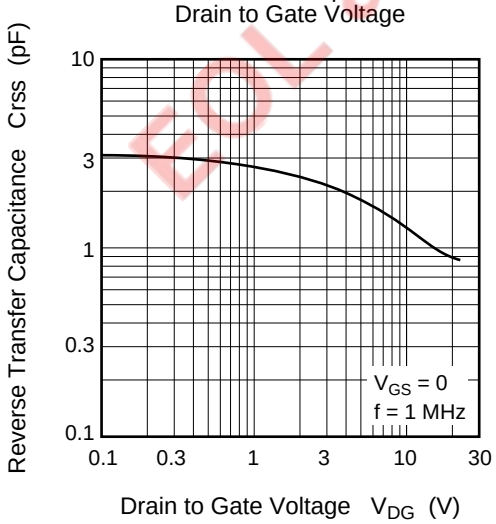
Input Capacitance vs. Gate to Source Voltage



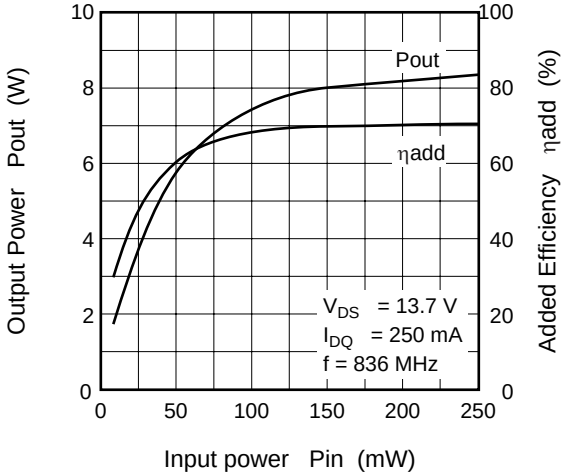
Output Capacitance vs. Drain to Source Voltage



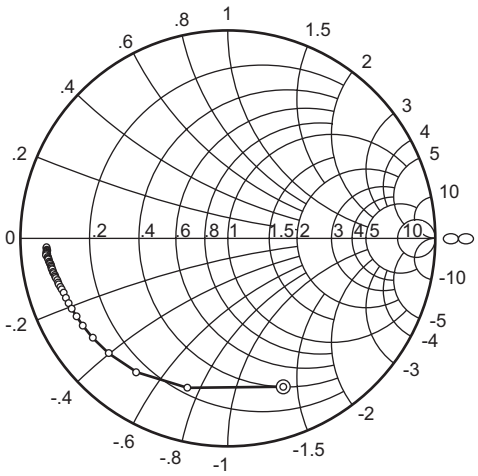
Reverse Transfer Capacitance vs. Drain to Gate Voltage



Output Power, Added Efficiency vs. Input Power

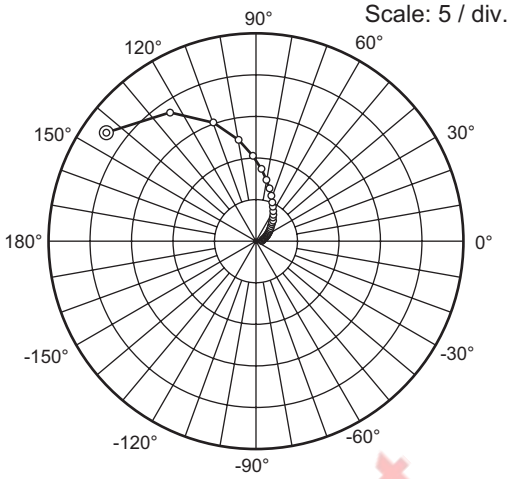


S_{11} Parameter vs. Frequency



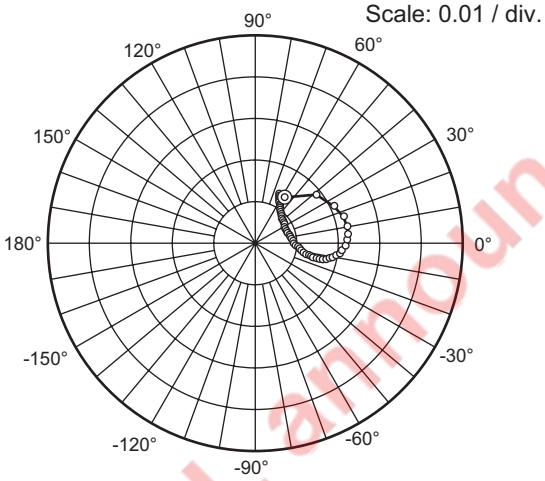
Test condition: V_{DS} = 13.7 V, I_{DQ} = 250 mA,
Z_O = 50 Ω
50 to 2550 MHz (50 MHz step)

S_{21} Parameter vs. Frequency



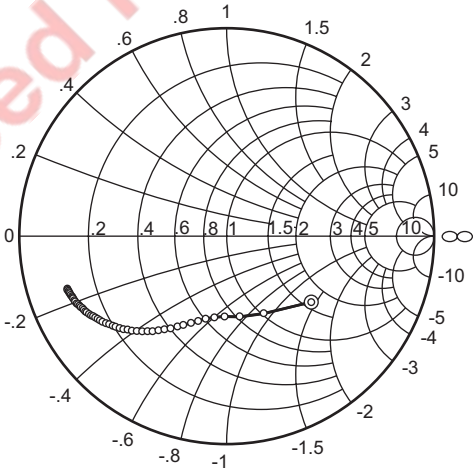
Test condition: V_{DS} = 13.7 V, I_{DQ} = 250 mA,
Z_O = 50 Ω
50 to 2550 MHz (50 MHz step)

S_{12} Parameter vs. Frequency



Test condition: V_{DS} = 13.7 V, I_{DQ} = 250 mA,
Z_O = 50 Ω
50 to 2550 MHz (50 MHz step)

S_{22} Parameter vs. Frequency



Test condition: V_{DS} = 13.7 V, I_{DQ} = 250 mA,
Z_O = 50 Ω
50 to 2550 MHz (50 MHz step)

S Parameter

(V_{DS} = 4.5 V, I_{DQ} = 250 mA, Test Power Level = +5 dBm, Z_O = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)
50	0.832	-65.3	9.46	146.5	0.0232	49.0	0.376	-103.4
100	0.820	-115.8	9.28	120.3	0.0310	27.6	0.471	-133.2
150	0.857	-138.4	8.01	105.4	0.0335	16.6	0.518	-144.8
200	0.866	-149.1	6.79	96.7	0.0342	9.9	0.539	-150.6
250	0.869	-154.9	5.80	91.0	0.0345	5.5	0.553	-153.8
300	0.871	-158.7	4.94	86.1	0.0343	1.5	0.566	-155.8
350	0.875	-161.2	4.30	82.3	0.0339	-1.4	0.577	-156.7
400	0.876	-163.1	3.79	78.7	0.0335	-4.3	0.590	-157.4
450	0.880	-164.5	3.37	75.5	0.0328	-6.4	0.601	-158.0
500	0.883	-165.8	3.01	72.7	0.0323	-8.4	0.613	-158.1
550	0.884	-166.8	2.71	69.9	0.0315	-10.2	0.627	-158.8
600	0.887	-167.6	2.46	67.3	0.0308	-11.9	0.637	-158.7
650	0.889	-168.2	2.24	65.0	0.0300	-13.3	0.649	-158.8
700	0.892	-168.9	2.05	62.5	0.0293	-14.8	0.660	-159.1
750	0.893	-169.2	1.88	60.5	0.0284	-15.6	0.670	-159.3
800	0.896	-169.9	1.74	58.4	0.0276	-16.5	0.682	-159.4
850	0.899	-170.2	1.61	56.5	0.0269	-17.5	0.694	-159.6
900	0.901	-170.6	1.50	54.6	0.0260	-18.2	0.704	-159.9
950	0.903	-170.8	1.39	52.7	0.0252	-18.7	0.714	-160.3
1000	0.907	-171.2	1.30	51.0	0.0244	-19.1	0.723	-160.6
1050	0.909	-171.5	1.22	49.4	0.0237	-19.4	0.732	-161.0
1100	0.910	-171.8	1.15	47.8	0.0230	-19.7	0.739	-161.1
1150	0.913	-172.3	1.08	46.2	0.0221	-19.9	0.746	-161.5
1200	0.912	-172.3	1.02	45.0	0.0214	-19.8	0.754	-162.0
1250	0.915	-172.6	0.96	43.3	0.0207	-19.7	0.761	-162.3
1300	0.919	-172.9	0.91	42.1	0.0200	-19.7	0.769	-162.9
1350	0.918	-173.2	0.86	40.8	0.0194	-19.1	0.775	-163.1
1400	0.920	-173.5	0.82	39.5	0.0187	-18.6	0.780	-163.5
1450	0.922	-173.6	0.78	38.4	0.0181	-18.0	0.788	-163.8
1500	0.923	-173.9	0.74	37.2	0.0174	-17.1	0.793	-164.1
1550	0.927	-174.2	0.71	36.2	0.0168	-16.3	0.797	-164.1
1600	0.928	-174.4	0.68	35.1	0.0163	-15.6	0.803	-164.6
1650	0.927	-174.6	0.65	34.1	0.0157	-14.4	0.809	-164.8
1700	0.928	-174.6	0.62	33.1	0.0152	-13.1	0.813	-165.4
1750	0.930	-174.7	0.59	32.2	0.0148	-12.0	0.814	-165.7
1800	0.931	-175.0	0.57	31.7	0.0143	-10.3	0.818	-165.9
1850	0.931	-175.2	0.55	30.5	0.0139	-8.6	0.821	-166.2
1900	0.934	-175.1	0.53	29.8	0.0136	-6.8	0.826	-166.3
1950	0.936	-175.4	0.51	29.1	0.0132	-5.5	0.828	-166.8
2000	0.937	-175.4	0.49	28.1	0.0129	-2.9	0.833	-167.2
2050	0.932	-175.7	0.47	27.3	0.0126	-0.9	0.835	-167.6
2100	0.936	-175.8	0.46	26.3	0.0123	1.0	0.838	-168.0
2150	0.935	-176.0	0.44	25.6	0.0121	3.3	0.838	-168.4
2200	0.937	-176.3	0.43	25.1	0.0119	6.2	0.842	-168.7
2250	0.936	-176.3	0.41	24.2	0.0118	8.0	0.844	-169.0
2300	0.937	-176.6	0.40	23.4	0.0116	10.7	0.848	-169.2
2350	0.937	-176.7	0.39	22.8	0.0116	12.8	0.847	-169.8
2400	0.937	-177.2	0.38	22.0	0.0116	15.3	0.852	-170.0
2450	0.938	-177.3	0.37	21.3	0.0116	17.8	0.852	-170.2
2500	0.937	-177.7	0.36	20.6	0.0116	19.8	0.853	-170.6
2550	0.939	-177.9	0.35	20.2	0.0116	22.4	0.852	-170.9

S Parameter

(V_{DS} = 6 V, I_{DQ} = 250 mA, Test Power Level = +5 dBm, Z_O = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)
50	0.748	-68.2	12.89	146.5	0.0214	53.3	0.372	-84.0
100	0.820	-116.0	11.53	120.1	0.0281	30.4	0.428	-119.1
150	0.850	-137.0	9.88	105.7	0.0304	18.7	0.466	-133.7
200	0.860	-146.8	8.27	97.3	0.0315	11.1	0.487	-141.1
250	0.866	-152.4	7.00	91.3	0.0318	6.2	0.502	-144.8
300	0.867	-156.4	5.90	86.3	0.0316	1.7	0.517	-147.5
350	0.876	-159.2	5.10	82.1	0.0313	-1.4	0.532	-148.8
400	0.877	-161.4	4.45	78.3	0.0308	-4.3	0.548	-149.7
450	0.880	-163.1	3.94	75.0	0.0302	-6.9	0.564	-150.9
500	0.883	-164.4	3.50	71.7	0.0295	-9.0	0.578	-151.1
550	0.885	-165.5	3.15	69.0	0.0288	-10.7	0.594	-151.7
600	0.889	-166.4	2.85	66.1	0.0281	-12.4	0.610	-152.3
650	0.891	-167.1	2.58	63.5	0.0272	-13.8	0.623	-152.6
700	0.895	-167.9	2.36	61.1	0.0265	-15.2	0.639	-153.1
750	0.898	-168.4	2.16	59.0	0.0256	-16.2	0.654	-153.5
800	0.900	-168.9	1.99	56.6	0.0248	-17.1	0.667	-153.9
850	0.900	-169.3	1.84	54.7	0.0240	-18.0	0.679	-154.4
900	0.904	-169.6	1.71	52.8	0.0232	-18.6	0.694	-154.7
950	0.908	-170.1	1.59	50.9	0.0224	-19.0	0.705	-155.5
1000	0.910	-170.5	1.49	49.1	0.0216	-19.2	0.715	-156.0
1050	0.912	-170.8	1.39	47.5	0.0208	-19.6	0.725	-156.5
1100	0.913	-171.2	1.30	45.8	0.0200	-19.6	0.732	-157.0
1150	0.916	-171.6	1.22	44.1	0.0193	-19.6	0.741	-157.5
1200	0.919	-171.9	1.15	42.9	0.0185	-19.2	0.752	-157.9
1250	0.920	-172.3	1.08	41.4	0.0178	-18.9	0.759	-158.5
1300	0.921	-172.4	1.02	40.1	0.0172	-18.0	0.768	-159.1
1350	0.920	-172.7	0.97	38.8	0.0165	-17.6	0.775	-159.6
1400	0.924	-172.9	0.92	37.6	0.0159	-16.8	0.783	-159.9
1450	0.926	-173.2	0.87	36.5	0.0153	-15.8	0.788	-160.4
1500	0.927	-173.5	0.83	35.2	0.0147	-14.5	0.792	-160.8
1550	0.929	-173.8	0.79	34.2	0.0142	-13.2	0.800	-161.3
1600	0.930	-173.9	0.75	33.0	0.0137	-11.8	0.803	-161.6
1650	0.930	-174.2	0.72	31.9	0.0132	-10.0	0.811	-162.0
1700	0.931	-174.2	0.69	31.0	0.0128	-8.5	0.816	-162.7
1750	0.932	-174.4	0.66	30.2	0.0123	-6.6	0.818	-162.9
1800	0.935	-174.7	0.63	29.4	0.0120	-4.6	0.822	-163.3
1850	0.935	-174.8	0.61	28.3	0.0117	-2.0	0.827	-163.5
1900	0.938	-174.8	0.58	27.9	0.0114	0.5	0.830	-163.9
1950	0.937	-175.1	0.56	26.8	0.0111	2.6	0.832	-164.4
2000	0.942	-175.2	0.54	26.4	0.0109	5.6	0.836	-164.9
2050	0.936	-175.5	0.52	25.2	0.0108	8.0	0.840	-165.3
2100	0.940	-175.7	0.50	24.5	0.0106	11.2	0.842	-165.7
2150	0.940	-175.8	0.49	23.6	0.0105	13.7	0.843	-166.3
2200	0.938	-176.1	0.47	22.9	0.0105	16.9	0.846	-166.5
2250	0.938	-176.1	0.45	22.2	0.0105	19.4	0.844	-166.7
2300	0.940	-176.4	0.44	21.5	0.0105	22.2	0.850	-167.2
2350	0.940	-176.5	0.43	20.8	0.0106	24.8	0.849	-167.5
2400	0.939	-176.9	0.41	20.0	0.0107	27.5	0.855	-167.9
2450	0.941	-177.0	0.40	19.5	0.0108	30.0	0.855	-168.2
2500	0.939	-177.6	0.39	18.9	0.0110	32.1	0.859	-168.6
2550	0.943	-177.6	0.38	18.2	0.0112	34.5	0.857	-169.0

S Parameter

(V_{DS} = 7.5 V, I_{DQ} = 250 mA, Test Power Level = +5 dBm, Z_O = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)
50	0.776	-73.4	16.83	144.2	0.0187	53.9	0.386	-70.8
100	0.816	-115.0	13.62	120.7	0.0256	31.7	0.407	-107.1
150	0.846	-134.4	11.45	106.6	0.0283	19.5	0.434	-123.4
200	0.858	-144.1	9.48	98.2	0.0296	12.4	0.452	-131.8
250	0.867	-150.2	7.89	91.8	0.0297	6.9	0.468	-136.7
300	0.871	-154.7	6.64	86.4	0.0296	2.3	0.483	-139.7
350	0.875	-157.6	5.69	82.0	0.0292	-1.1	0.502	-141.5
400	0.880	-160.0	4.97	77.9	0.0288	-4.0	0.519	-142.8
450	0.881	-161.8	4.37	74.4	0.0282	-6.7	0.539	-144.0
500	0.885	-163.2	3.88	71.1	0.0274	-8.8	0.557	-144.9
550	0.887	-164.5	3.49	67.9	0.0267	-10.6	0.578	-145.9
600	0.892	-165.5	3.15	65.2	0.0259	-12.4	0.594	-146.5
650	0.894	-166.2	2.85	62.6	0.0251	-13.9	0.612	-146.9
700	0.898	-167.1	2.60	60.1	0.0243	-15.3	0.628	-148.1
750	0.901	-167.6	2.38	57.9	0.0234	-16.4	0.642	-148.8
800	0.902	-168.2	2.19	55.5	0.0226	-17.2	0.659	-149.2
850	0.905	-168.9	2.02	53.5	0.0218	-18.0	0.672	-150.0
900	0.909	-169.2	1.87	51.3	0.0210	-18.2	0.687	-150.6
950	0.911	-169.7	1.74	49.5	0.0202	-18.8	0.700	-151.5
1000	0.913	-170.0	1.62	47.7	0.0194	-19.0	0.712	-152.2
1050	0.915	-170.4	1.51	46.1	0.0187	-18.9	0.723	-152.8
1100	0.917	-170.8	1.42	44.4	0.0179	-19.0	0.733	-153.5
1150	0.919	-171.2	1.33	42.8	0.0172	-18.4	0.741	-154.2
1200	0.921	-171.5	1.25	41.3	0.0164	-17.9	0.752	-154.8
1250	0.925	-171.8	1.18	40.0	0.0158	-17.4	0.759	-155.5
1300	0.923	-172.1	1.11	38.8	0.0152	-16.5	0.767	-156.3
1350	0.923	-172.3	1.05	37.3	0.0146	-15.4	0.775	-156.8
1400	0.926	-172.6	0.99	36.0	0.0140	-14.3	0.784	-157.3
1450	0.928	-172.9	0.94	34.9	0.0134	-13.1	0.789	-157.8
1500	0.930	-173.2	0.89	33.7	0.0128	-11.3	0.796	-158.3
1550	0.933	-173.6	0.85	32.7	0.0124	-9.5	0.801	-158.6
1600	0.933	-173.8	0.81	31.6	0.0120	-7.7	0.806	-159.3
1650	0.937	-174.1	0.77	30.6	0.0115	-5.8	0.814	-159.7
1700	0.934	-174.1	0.74	29.6	0.0111	-3.0	0.816	-160.5
1750	0.934	-174.2	0.71	28.7	0.0108	-1.1	0.823	-160.6
1800	0.937	-174.5	0.68	27.9	0.0106	2.1	0.824	-161.1
1850	0.937	-174.6	0.65	26.9	0.0103	4.7	0.829	-161.7
1900	0.940	-174.7	0.63	26.3	0.0101	8.0	0.833	-161.9
1950	0.940	-174.9	0.60	25.4	0.0100	10.8	0.838	-162.4
2000	0.943	-175.1	0.58	24.6	0.0098	14.0	0.840	-163.0
2050	0.941	-175.2	0.56	23.8	0.0098	16.9	0.842	-163.4
2100	0.943	-175.7	0.54	23.0	0.0098	20.2	0.845	-163.8
2150	0.939	-175.6	0.52	22.1	0.0098	23.1	0.845	-164.5
2200	0.941	-175.9	0.50	21.7	0.0099	26.1	0.849	-164.7
2250	0.940	-176.0	0.49	20.7	0.0100	28.7	0.849	-165.2
2300	0.942	-176.3	0.47	20.1	0.0101	31.8	0.855	-165.5
2350	0.941	-176.5	0.45	19.3	0.0103	34.4	0.852	-165.9
2400	0.943	-176.9	0.44	18.6	0.0105	36.9	0.857	-166.4
2450	0.943	-177.1	0.43	17.9	0.0108	39.1	0.859	-166.7
2500	0.941	-177.5	0.41	17.2	0.0110	41.2	0.859	-167.0
2550	0.943	-177.6	0.40	16.8	0.0113	43.6	0.859	-167.5

S Parameter

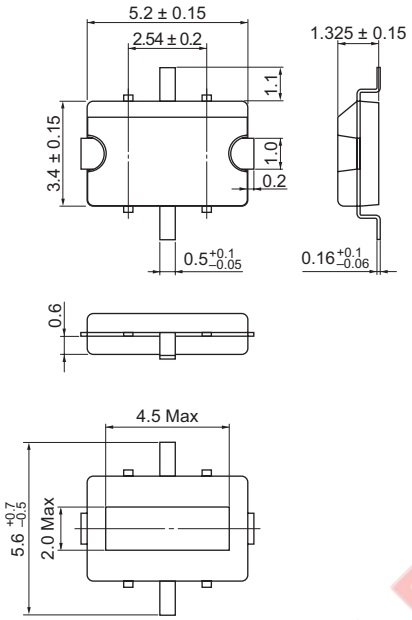
(V_{DS} = 13.7 V, I_{DQ} = 250 mA, Test Power Level = +5 dBm, Z_O = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)	Mag	Ang(deg.)
50	0.761	-69.6	22.54	144.6	0.0130	56.7	0.518	-37.9
100	0.802	-105.3	18.78	124.5	0.0187	38.1	0.448	-64.1
150	0.841	-124.6	15.25	110.6	0.0210	24.5	0.425	-80.6
200	0.860	-136.3	12.40	100.9	0.0222	16.0	0.418	-91.1
250	0.872	-143.8	10.33	93.5	0.0226	9.7	0.427	-98.3
300	0.880	-149.2	8.68	87.2	0.0225	4.8	0.443	-104.0
350	0.887	-153.0	7.44	82.1	0.0223	1.3	0.465	-108.4
400	0.891	-155.9	6.50	77.5	0.0217	-2.3	0.488	-112.1
450	0.896	-158.1	5.70	73.3	0.0210	-5.1	0.513	-115.6
500	0.898	-160.1	5.05	69.7	0.0205	-7.3	0.535	-118.4
550	0.901	-161.7	4.53	66.0	0.0197	-9.2	0.560	-121.1
600	0.906	-162.9	4.06	62.8	0.0190	-11.0	0.582	-123.4
650	0.908	-164.0	3.67	59.8	0.0183	-12.3	0.604	-125.8
700	0.912	-165.0	3.33	57.1	0.0175	-13.5	0.627	-127.9
750	0.914	-165.7	3.04	54.6	0.0167	-14.1	0.644	-129.8
800	0.915	-166.4	2.78	52.2	0.0160	-14.6	0.661	-131.6
850	0.920	-167.2	2.56	49.8	0.0152	-15.0	0.679	-133.3
900	0.921	-167.7	2.36	47.8	0.0144	-14.7	0.696	-134.9
950	0.922	-168.2	2.19	45.8	0.0138	-14.3	0.708	-136.6
1000	0.926	-168.9	2.03	43.8	0.0132	-14.0	0.722	-137.9
1050	0.928	-169.3	1.89	41.9	0.0125	-12.9	0.733	-139.2
1100	0.928	-169.8	1.76	40.1	0.0119	-11.9	0.745	-140.7
1150	0.929	-170.2	1.65	38.6	0.0112	-10.5	0.754	-141.7
1200	0.932	-170.5	1.54	37.2	0.0107	-8.4	0.763	-143.0
1250	0.931	-171.0	1.45	35.7	0.0102	-6.4	0.773	-144.1
1300	0.933	-171.5	1.36	34.1	0.0098	-4.2	0.784	-145.4
1350	0.933	-171.8	1.29	32.8	0.0094	-1.6	0.790	-146.3
1400	0.936	-172.0	1.22	31.4	0.0090	1.5	0.796	-147.3
1450	0.937	-172.3	1.15	30.4	0.0087	5.1	0.803	-148.2
1500	0.939	-172.7	1.09	29.1	0.0085	8.0	0.809	-149.0
1550	0.940	-173.0	1.04	28.1	0.0083	11.6	0.816	-149.6
1600	0.942	-173.5	0.99	26.8	0.0081	15.5	0.822	-150.4
1650	0.941	-173.7	0.94	25.8	0.0080	20.0	0.828	-151.4
1700	0.942	-173.9	0.90	24.7	0.0079	23.4	0.832	-151.9
1750	0.942	-173.9	0.86	23.8	0.0080	27.6	0.835	-152.7
1800	0.944	-174.2	0.82	23.0	0.0081	31.1	0.837	-153.4
1850	0.944	-174.4	0.78	22.0	0.0082	34.8	0.843	-154.0
1900	0.947	-174.4	0.75	21.4	0.0083	38.1	0.846	-154.6
1950	0.947	-174.7	0.72	20.4	0.0086	41.8	0.849	-155.3
2000	0.950	-174.9	0.70	19.6	0.0089	44.6	0.854	-155.7
2050	0.946	-175.2	0.67	18.7	0.0091	47.2	0.857	-156.6
2100	0.950	-175.2	0.65	17.7	0.0094	49.6	0.858	-157.1
2150	0.946	-175.5	0.62	17.0	0.0097	52.0	0.860	-157.8
2200	0.947	-175.8	0.60	16.3	0.0101	54.5	0.862	-158.2
2250	0.946	-175.8	0.58	15.5	0.0105	55.9	0.863	-158.7
2300	0.947	-176.1	0.56	14.8	0.0109	57.9	0.866	-159.2
2350	0.945	-176.4	0.54	14.1	0.0112	59.6	0.867	-159.9
2400	0.943	-176.6	0.52	13.2	0.0116	60.6	0.870	-160.3
2450	0.945	-176.8	0.51	12.5	0.0121	61.7	0.869	-160.8
2500	0.946	-177.3	0.49	11.8	0.0125	63.0	0.873	-161.2
2550	0.946	-177.6	0.48	11.3	0.0129	64.1	0.872	-161.7

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
RP8P	—	PLSS0003ZA-A	RP8P / RP8PV	0.08g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
2SK3390IXTB-E	1000 pcs.	ϕ178 mm Reel, 12 mm Emboss taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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