

2SK3391

Silicon N-Channel MOS FET UHF Power Amplifier

REJ03G0209-0300

Rev.3.00

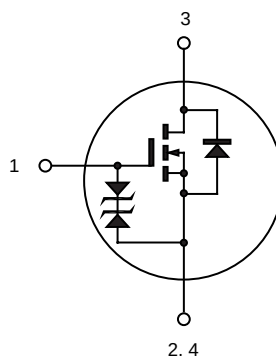
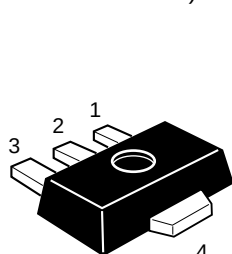
Nov 08, 2007

Features

- High power output, High gain, High efficiency
PG = 18 dB, Pout = 1.6 W, η_{add} = 58% min. (f = 836 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 "JX".

*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	0.3	A
Drain peak current	$I_D(\text{pulse})$ ^{Note1}	0.75	A
Channel dissipation	P_{ch} ^{Note2}	5	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-45 to +150	°C

Notes: 1. PW < 1sec, T_{ch} < 150°C

2. Value at T_c = 25°C

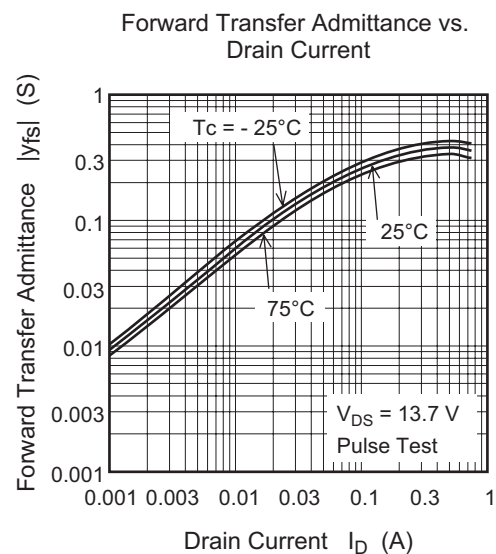
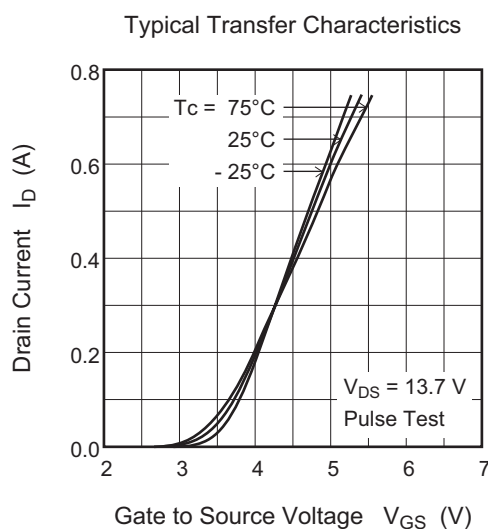
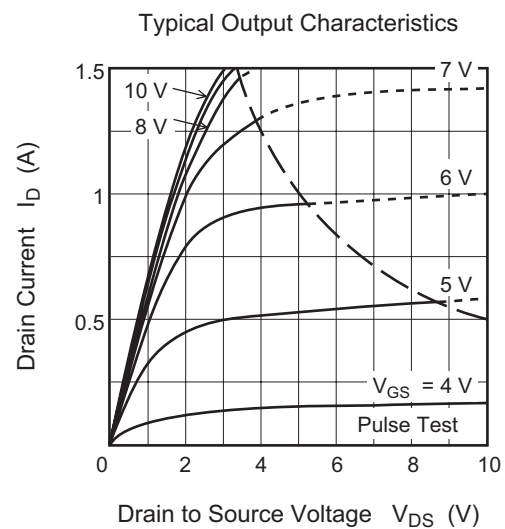
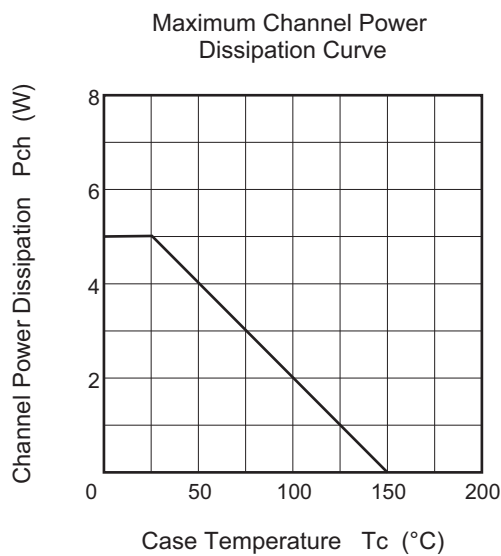
This device is sensitive to electro static discharge. An adequate careful handling procedure is requested.

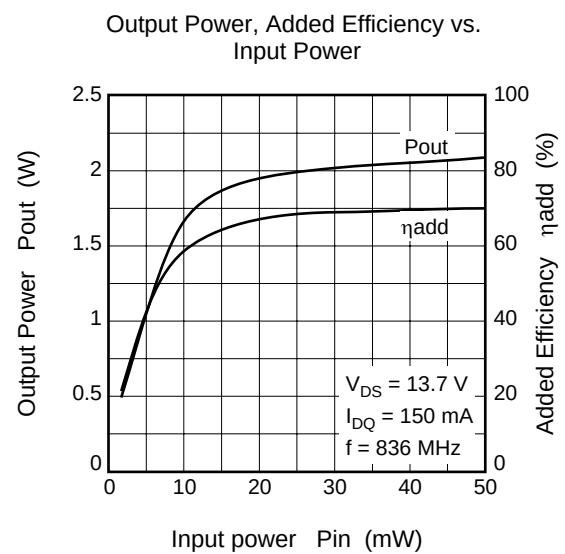
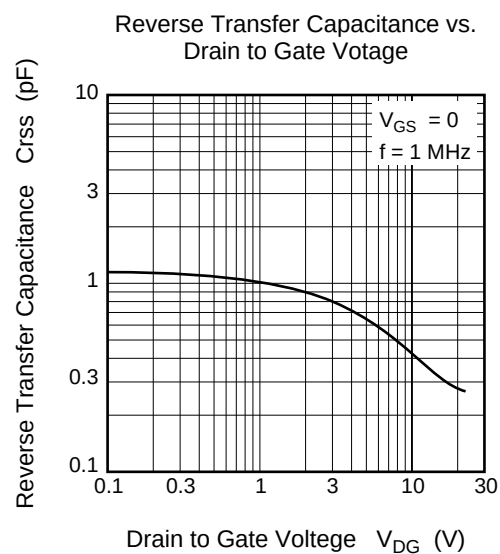
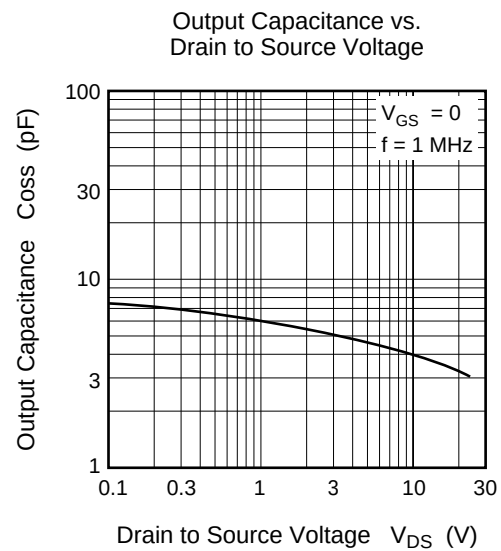
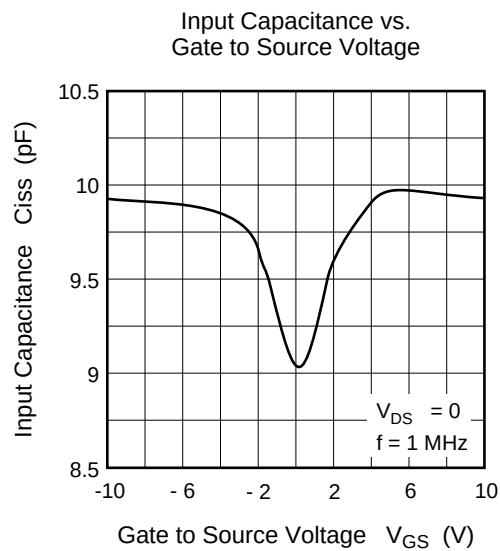
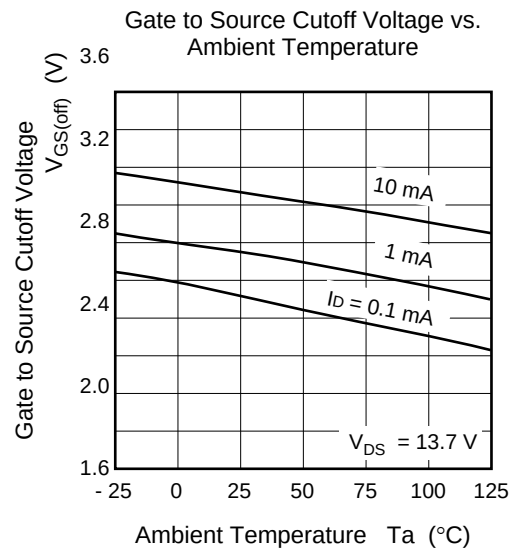
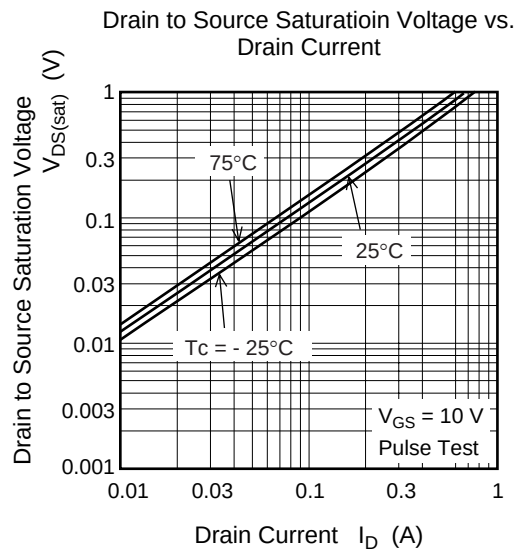
Electrical Characteristics

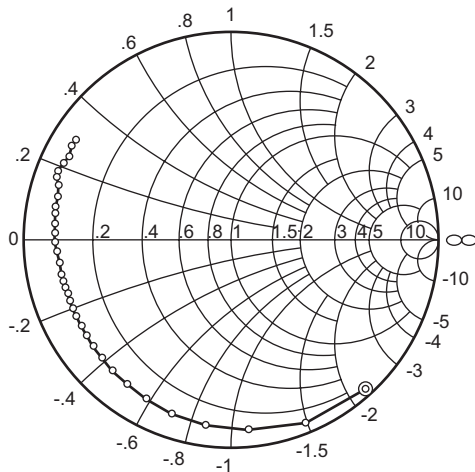
(Ta = 25°C)

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	$V_{GS} = \pm 10 V, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.3	—	3.1	V	$V_{DS} = 13.7 V, I_D = 1 mA$
Input capacitance	C_{iss}	—	10	—	pF	$V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz$
Output capacitance	C_{oss}	—	3.5	—	pF	$V_{DS} = 13.7 V, V_{GS} = 0, f = 1 MHz$
Output Power	P_{out}	1.6	—	—	W	$V_{DS} = 13.7 V, I_{DQ} = 150 mA$
Added Efficiency	η_{add}	58	—	—	%	$f = 836 MHz, P_{in} = 25.1 mW$

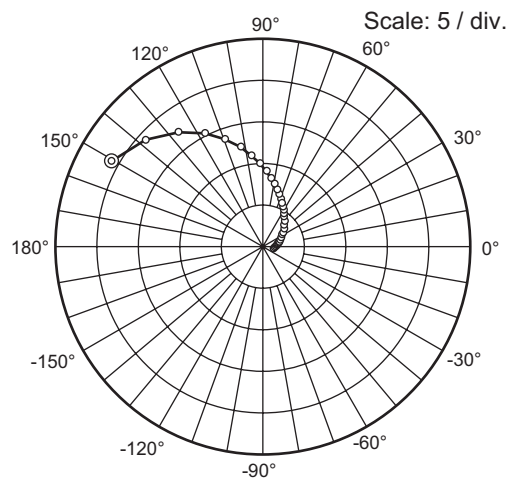
Main Characteristics



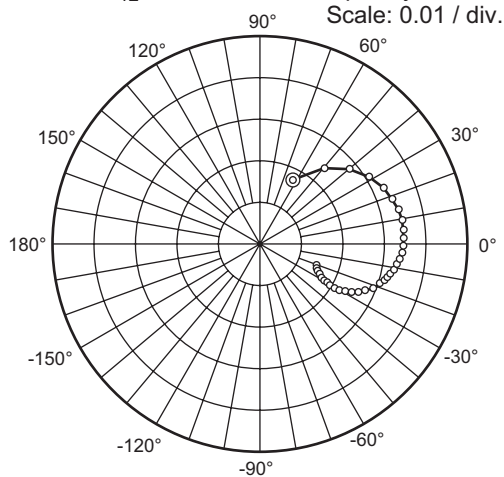


S_{11} Parameter vs. Frequency

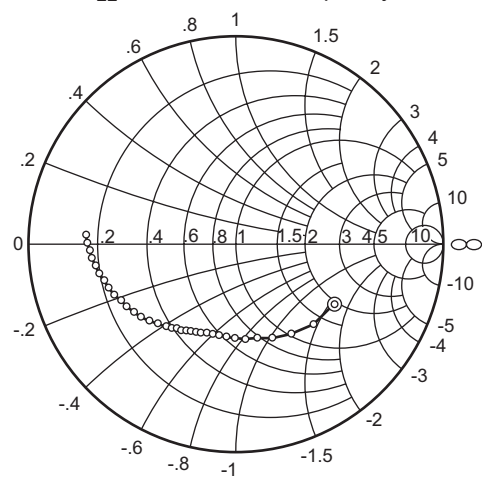
Condition: $V_{DS} = 13.7$ V, $I_{DQ} = 150$ mA, $Z_o = 50 \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2500 MHz (100 MHz Step)

 S_{21} Parameter vs. Frequency

Condition: $V_{DS} = 13.7$ V, $I_{DQ} = 150$ mA, $Z_o = 50 \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2500 MHz (100 MHz Step)

 S_{12} Parameter vs. Frequency

Condition: $V_{DS} = 13.7$ V, $I_{DQ} = 150$ mA, $Z_o = 50 \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2500 MHz (100 MHz Step)

 S_{22} Parameter vs. Frequency

Condition: $V_{DS} = 13.7$ V, $I_{DQ} = 150$ mA, $Z_o = 50 \Omega$
 100 to 1000 MHz (50 MHz Step)
 1000 to 2500 MHz (100 MHz Step)

S Parameter

(V_{DS} = 4.5 V, I_{DQ} = 150 mA, Z₀ = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.942	-62.0	12.61	141.7	0.036	52.5	0.426	-76.6
150	0.920	-85.7	11.22	128.5	0.045	38.2	0.455	-99.8
200	0.885	-105.8	10.04	116.4	0.050	28.2	0.473	-115.6
250	0.854	-120.3	9.15	107.5	0.053	20.8	0.484	-126.7
300	0.836	-130.3	8.11	100.8	0.054	15.1	0.503	-134.5
350	0.814	-138.2	7.32	95.3	0.055	10.3	0.509	-140.5
400	0.809	-144.2	6.64	90.6	0.056	6.2	0.517	-145.0
450	0.806	-148.9	6.04	86.7	0.056	2.3	0.520	-148.5
500	0.802	-152.9	5.54	82.9	0.056	-0.7	0.526	-151.5
550	0.796	-156.2	5.10	79.5	0.056	-3.6	0.530	-154.1
600	0.795	-159.2	4.71	76.4	0.055	-6.4	0.535	-156.2
650	0.795	-162.0	4.37	73.2	0.055	-8.8	0.540	-158.1
700	0.795	-164.5	4.06	70.3	0.055	-11.1	0.544	-159.8
750	0.796	-166.8	3.79	67.5	0.054	-13.1	0.550	-161.5
800	0.795	-168.7	3.53	64.6	0.053	-15.4	0.556	-162.9
850	0.796	-170.6	3.33	62.1	0.053	-17.2	0.561	-164.3
900	0.799	-172.6	3.15	59.5	0.052	-19.0	0.567	-165.6
950	0.802	-174.5	2.97	57.0	0.052	-20.7	0.574	-166.7
1000	0.802	-175.9	2.80	54.8	0.051	-22.6	0.580	-168.0
1050	0.802	-177.5	2.65	52.3	0.050	-24.4	0.586	-169.2
1100	0.803	-179.3	2.51	50.1	0.050	-26.0	0.592	-170.4
1150	0.807	-179.3	2.39	47.9	0.049	-27.4	0.597	-171.4
1200	0.809	-177.6	2.27	45.4	0.048	-28.8	0.602	-172.5
1250	0.813	-176.3	2.16	43.1	0.047	-30.2	0.606	-173.8
1300	0.818	-175.1	2.06	41.0	0.047	-31.6	0.612	-174.7
1350	0.818	-173.9	1.97	38.8	0.046	-33.0	0.617	-175.7
1400	0.820	-172.8	1.88	36.7	0.045	-34.1	0.620	-176.7
1450	0.817	-171.6	1.80	34.8	0.044	-35.4	0.625	-177.9
1500	0.821	-170.1	1.72	32.9	0.043	-36.5	0.630	-178.9
1550	0.825	-168.7	1.64	30.9	0.043	-37.7	0.635	-179.9
1600	0.830	-167.5	1.57	28.9	0.042	-38.9	0.639	-178.6
1650	0.832	-166.6	1.51	26.9	0.041	-40.0	0.646	-177.6
1700	0.833	-165.5	1.45	24.9	0.040	-41.0	0.649	-176.5
1750	0.831	-164.0	1.41	22.9	0.039	-42.1	0.654	-175.3
1800	0.833	-162.4	1.36	21.0	0.039	-42.7	0.660	-174.2
1850	0.836	-160.8	1.32	19.5	0.038	-43.6	0.664	-173.0
1900	0.842	-159.3	1.28	17.9	0.037	-44.3	0.670	-171.9
1950	0.854	-157.9	1.23	16.4	0.037	-45.5	0.675	-170.7
2000	0.869	-156.9	1.19	14.9	0.036	-46.4	0.682	-169.6
2050	0.871	-156.4	1.15	13.3	0.035	-47.2	0.684	-168.5
2100	0.870	-155.7	1.11	11.4	0.034	-48.2	0.689	-167.3
2150	0.864	-154.5	1.07	9.3	0.034	-48.6	0.696	-166.2
2200	0.860	-153.1	1.04	7.2	0.033	-49.4	0.699	-165.2
2250	0.858	-151.9	1.01	5.5	0.032	-50.1	0.702	-164.1
2300	0.855	-150.3	0.98	3.8	0.032	-50.8	0.706	-162.8
2350	0.860	-149.1	0.95	2.5	0.031	-51.5	0.713	-161.7
2400	0.868	-147.7	0.92	0.5	0.031	-51.9	0.714	-160.7
2450	0.868	-146.7	0.89	-1.1	0.030	-52.4	0.716	-159.6
2500	0.865	-145.2	0.86	-3.2	0.029	-53.1	0.720	-158.3

S Parameter

(V_{DS} = 6 V, I_{DQ} = 150 mA, Z_o = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.941	-60.5	15.47	142.1	0.030	53.5	0.476	-61.7
150	0.916	-83.6	13.68	129.2	0.040	40.8	0.471	-83.8
200	0.886	-102.5	12.16	117.5	0.044	30.8	0.468	-100.1
250	0.856	-115.8	11.01	109.0	0.047	23.1	0.465	-112.0
300	0.838	-125.6	9.74	102.6	0.049	17.0	0.475	-120.8
350	0.824	-133.4	8.74	96.9	0.050	11.9	0.475	-127.9
400	0.816	-139.4	7.89	92.0	0.050	7.5	0.479	-133.1
450	0.812	-144.5	7.17	87.8	0.051	3.6	0.482	-137.2
500	0.807	-148.8	6.50	83.7	0.051	0.2	0.485	-140.7
550	0.804	-152.6	5.99	80.2	0.051	-2.6	0.489	-143.7
600	0.800	-155.8	5.50	76.9	0.050	-5.6	0.495	-146.1
650	0.797	-158.7	5.09	73.9	0.050	-8.2	0.500	-148.3
700	0.800	-161.7	4.73	70.5	0.049	-10.6	0.506	-150.3
750	0.800	-164.1	4.40	67.6	0.049	-12.6	0.513	-152.2
800	0.801	-166.2	4.11	64.7	0.048	-15.1	0.520	-153.9
850	0.802	-168.3	3.87	62.0	0.048	-16.7	0.526	-155.3
900	0.802	-170.3	3.65	59.4	0.047	-18.6	0.535	-156.9
950	0.803	-171.9	3.44	56.9	0.046	-20.4	0.543	-158.3
1000	0.807	-173.7	3.24	54.5	0.046	-22.2	0.551	-159.7
1050	0.806	-175.5	3.08	51.9	0.045	-24.0	0.559	-161.1
1100	0.808	-177.2	2.91	49.8	0.044	-25.7	0.566	-162.5
1150	0.811	-178.9	2.77	47.2	0.043	-27.1	0.574	-163.7
1200	0.815	-179.6	2.63	44.9	0.043	-28.5	0.580	-165.0
1250	0.818	-178.1	2.50	42.5	0.042	-29.9	0.586	-166.4
1300	0.824	-176.8	2.39	40.2	0.041	-31.2	0.594	-167.6
1350	0.824	-175.8	2.28	38.0	0.040	-32.6	0.600	-168.7
1400	0.827	-174.4	2.17	36.1	0.040	-33.6	0.605	-169.9
1450	0.825	-173.1	2.07	33.9	0.039	-34.9	0.611	-171.2
1500	0.827	-171.6	1.98	31.9	0.038	-36.0	0.617	-172.5
1550	0.832	-170.3	1.89	30.1	0.037	-37.1	0.622	-173.8
1600	0.838	-168.9	1.81	27.9	0.036	-38.2	0.628	-175.2
1650	0.842	-168.0	1.74	25.9	0.036	-39.2	0.636	-176.4
1700	0.840	-166.8	1.68	23.6	0.035	-40.2	0.640	-177.6
1750	0.838	-165.3	1.62	21.6	0.034	-41.1	0.646	-179.0
1800	0.840	-163.7	1.57	19.9	0.033	-41.5	0.652	-179.8
1850	0.843	-162.0	1.51	18.1	0.033	-42.3	0.658	-178.5
1900	0.852	-160.4	1.47	16.7	0.032	-42.9	0.664	-177.2
1950	0.860	-159.1	1.41	15.2	0.031	-43.9	0.670	-175.9
2000	0.873	-158.1	1.36	13.6	0.031	-44.6	0.677	-174.7
2050	0.879	-157.4	1.31	12.0	0.030	-45.4	0.680	-173.5
2100	0.877	-156.7	1.26	10.1	0.029	-46.1	0.686	-172.1
2150	0.871	-155.4	1.22	8.0	0.029	-46.3	0.693	-171.0
2200	0.869	-154.2	1.19	6.0	0.028	-46.9	0.697	-169.8
2250	0.865	-152.8	1.15	4.1	0.027	-47.4	0.701	-168.7
2300	0.863	-151.2	1.12	2.4	0.027	-47.7	0.705	-167.3
2350	0.868	-149.6	1.08	0.8	0.026	-48.2	0.712	-166.2
2400	0.875	-148.6	1.05	-0.9	0.026	-48.2	0.713	-165.1
2450	0.876	-147.4	1.01	-2.7	0.025	-48.7	0.716	-163.9
2500	0.872	-146.1	0.98	-4.6	0.025	-49.0	0.720	-162.4

S Parameter

(V_{DS} = 7.5 V, I_{DQ} = 150 mA, Z_o = 50 Ω)

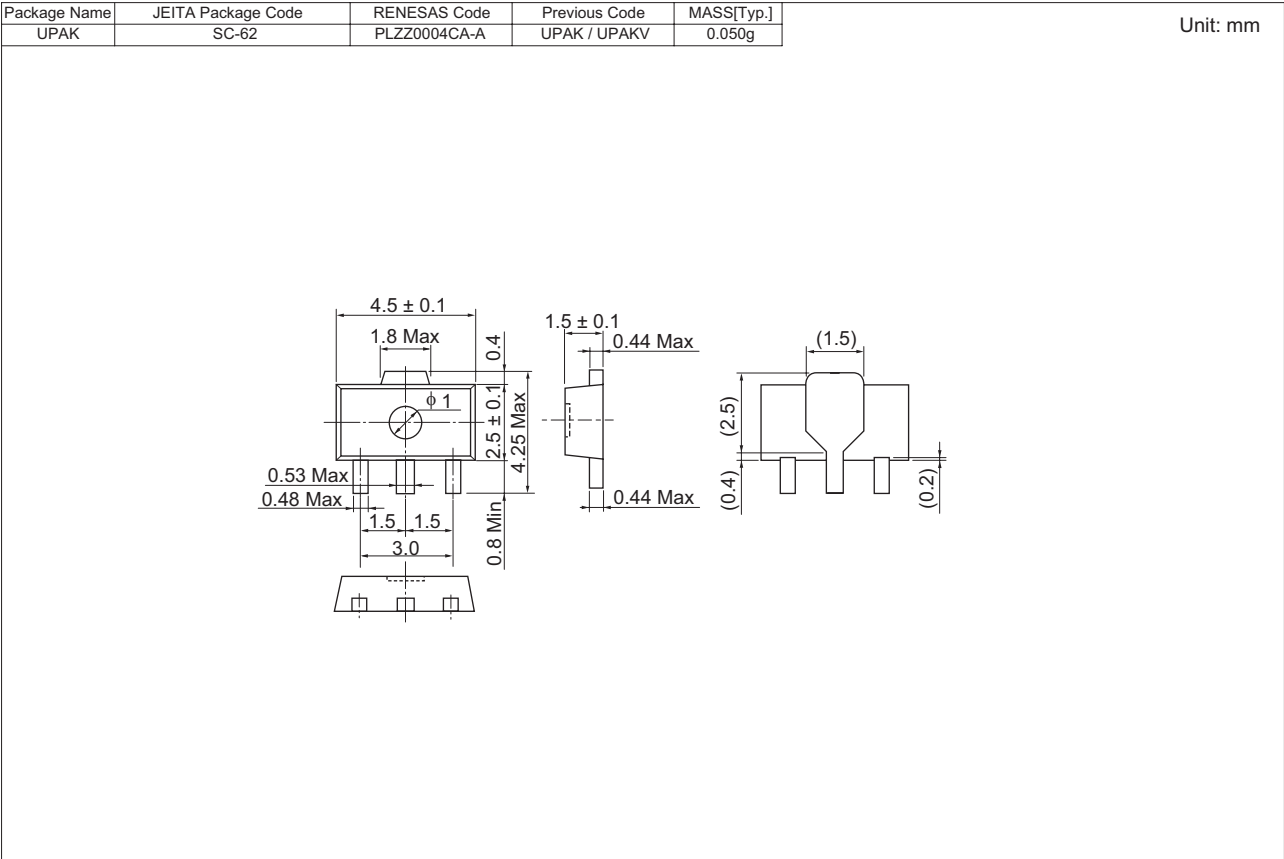
f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.946	-58.3	17.64	143.8	0.027	55.8	0.500	-52.7
150	0.920	-80.2	15.56	130.9	0.036	42.9	0.483	-73.1
200	0.889	-98.1	13.78	119.7	0.040	32.7	0.470	-88.9
250	0.867	-110.4	12.44	111.4	0.043	25.1	0.460	-101.0
300	0.844	-120.8	10.97	104.3	0.045	18.8	0.453	-110.0
350	0.832	-129.0	9.80	98.4	0.046	13.5	0.458	-117.7
400	0.821	-135.6	8.80	93.3	0.047	8.9	0.461	-123.3
450	0.819	-141.1	7.96	88.8	0.047	4.8	0.463	-127.8
500	0.816	-145.8	7.25	84.6	0.047	1.2	0.466	-131.6
550	0.809	-149.8	6.64	80.7	0.047	-1.8	0.469	-135.0
600	0.807	-153.2	6.09	77.4	0.046	-4.7	0.475	-137.7
650	0.804	-156.5	5.63	74.1	0.046	-7.3	0.481	-140.0
700	0.806	-159.3	5.22	70.7	0.046	-9.8	0.488	-142.4
750	0.806	-161.9	4.86	67.7	0.045	-12.1	0.494	-144.5
800	0.806	-164.2	4.54	64.7	0.044	-14.3	0.502	-146.3
850	0.807	-166.3	4.26	62.0	0.044	-16.3	0.510	-148.2
900	0.808	-168.6	4.02	59.3	0.043	-18.0	0.519	-149.9
950	0.811	-170.4	3.79	56.8	0.043	-19.9	0.528	-151.5
1000	0.812	-172.2	3.57	54.3	0.042	-21.8	0.537	-153.1
1050	0.816	-174.0	3.38	51.8	0.041	-23.4	0.546	-154.6
1100	0.814	-175.8	3.21	49.3	0.041	-25.2	0.555	-156.1
1150	0.818	-177.5	3.05	47.0	0.040	-26.5	0.563	-157.6
1200	0.820	-179.1	2.89	44.5	0.039	-28.0	0.569	-159.1
1250	0.826	-179.4	2.75	42.1	0.038	-29.3	0.578	-160.6
1300	0.829	-178.0	2.62	39.8	0.037	-30.7	0.585	-161.9
1350	0.831	-176.8	2.50	37.5	0.037	-31.9	0.592	-163.2
1400	0.832	-175.5	2.38	35.4	0.036	-33.1	0.597	-164.6
1450	0.830	-174.1	2.28	33.2	0.035	-34.0	0.605	-166.0
1500	0.835	-172.6	2.17	31.3	0.034	-35.1	0.611	-167.4
1550	0.835	-171.2	2.07	29.2	0.034	-36.2	0.618	-168.8
1600	0.843	-169.7	1.98	27.1	0.033	-37.2	0.624	-170.4
1650	0.846	-168.8	1.90	25.1	0.032	-38.1	0.632	-171.6
1700	0.845	-167.4	1.83	22.9	0.031	-38.9	0.636	-173.0
1750	0.845	-166.1	1.77	21.1	0.030	-39.8	0.642	-174.5
1800	0.845	-164.5	1.71	19.1	0.030	-40.0	0.649	-175.9
1850	0.848	-162.7	1.65	17.2	0.029	-40.8	0.656	-177.2
1900	0.855	-161.2	1.60	15.7	0.028	-41.3	0.661	-178.6
1950	0.867	-159.9	1.54	14.3	0.028	-42.0	0.668	-180.0
2000	0.880	-158.8	1.49	12.6	0.027	-42.5	0.676	-178.7
2050	0.883	-158.1	1.43	10.9	0.026	-43.0	0.679	-177.4
2100	0.882	-157.2	1.37	9.1	0.026	-43.5	0.685	-176.0
2150	0.876	-156.1	1.33	7.0	0.025	-43.5	0.692	-174.7
2200	0.873	-154.6	1.29	4.8	0.025	-43.9	0.697	-173.5
2250	0.871	-153.3	1.25	3.1	0.024	-44.0	0.701	-172.2
2300	0.869	-151.8	1.21	1.5	0.023	-44.2	0.705	-170.7
2350	0.873	-150.3	1.17	-0.1	0.023	-44.5	0.712	-169.7
2400	0.880	-149.0	1.14	-2.2	0.022	-44.4	0.714	-168.4
2450	0.881	-147.7	1.10	-3.7	0.022	-44.4	0.717	-167.1
2500	0.878	-146.5	1.06	-5.5	0.021	-44.6	0.721	-165.6

S Parameter

(V_{DS} = 13.7 V, I_{DQ} = 150 mA, Z₀ = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.968	-47.9	20.87	150.6	0.017	63.3	0.557	-31.9
150	0.951	-67.8	19.11	137.9	0.024	49.8	0.536	-46.4
200	0.918	-85.0	17.04	126.4	0.028	39.6	0.512	-58.9
250	0.897	-98.0	15.32	117.2	0.031	31.5	0.488	-69.3
300	0.882	-109.0	13.72	109.6	0.033	24.6	0.466	-77.5
350	0.870	-118.4	12.29	102.7	0.034	18.8	0.460	-85.1
400	0.855	-125.9	11.02	97.1	0.034	13.9	0.454	-91.3
450	0.852	-132.2	10.01	92.3	0.035	9.5	0.451	-96.3
500	0.846	-137.6	9.12	87.8	0.035	5.7	0.451	-100.7
550	0.841	-142.4	8.37	83.3	0.035	2.3	0.451	-104.8
600	0.835	-146.5	7.69	79.6	0.035	-0.8	0.456	-108.3
650	0.833	-150.2	7.11	75.8	0.034	-3.5	0.464	-111.6
700	0.833	-153.6	6.58	72.4	0.034	-6.4	0.469	-114.7
750	0.836	-156.5	6.14	68.9	0.033	-8.5	0.477	-117.7
800	0.833	-159.2	5.72	65.9	0.033	-11.0	0.486	-120.4
850	0.832	-161.8	5.37	62.8	0.032	-12.8	0.494	-122.9
900	0.834	-164.1	5.05	59.9	0.032	-14.7	0.503	-125.4
950	0.834	-166.1	4.75	57.1	0.031	-16.4	0.514	-127.8
1000	0.836	-168.2	4.50	54.6	0.031	-18.3	0.525	-130.2
1050	0.837	-170.3	4.24	51.8	0.030	-19.8	0.535	-132.5
1100	0.838	-172.3	4.03	49.1	0.029	-21.4	0.544	-134.7
1150	0.839	-174.5	3.83	46.3	0.029	-22.7	0.554	-136.8
1200	0.843	-176.0	3.63	44.0	0.028	-23.9	0.563	-138.8
1250	0.848	-177.7	3.46	41.6	0.027	-24.9	0.571	-140.9
1300	0.851	-179.3	3.29	39.1	0.026	-25.9	0.580	-142.8
1350	0.851	179.5	3.13	36.8	0.026	-27.0	0.588	-144.7
1400	0.852	177.9	2.98	34.4	0.025	-27.6	0.594	-146.5
1450	0.851	176.4	2.85	32.3	0.024	-28.4	0.602	-148.4
1500	0.853	175.0	2.72	30.0	0.023	-29.1	0.609	-150.3
1550	0.857	173.3	2.59	27.8	0.023	-29.5	0.616	-152.1
1600	0.861	171.8	2.48	25.6	0.022	-30.2	0.623	-154.0
1650	0.864	170.8	2.37	23.5	0.022	-30.3	0.631	-155.7
1700	0.862	169.4	2.29	21.2	0.021	-30.7	0.637	-157.5
1750	0.860	167.9	2.20	19.4	0.020	-30.7	0.643	-159.3
1800	0.861	166.2	2.13	17.3	0.020	-30.4	0.651	-161.0
1850	0.866	164.3	2.05	15.5	0.019	-30.1	0.657	-162.7
1900	0.873	162.6	1.98	13.9	0.019	-29.7	0.664	-164.5
1950	0.884	161.3	1.90	12.2	0.018	-29.7	0.671	-166.2
2000	0.895	160.4	1.83	10.6	0.018	-29.5	0.679	-167.9
2050	0.901	159.5	1.77	8.5	0.017	-28.9	0.683	-169.4
2100	0.898	158.7	1.70	6.7	0.017	-28.5	0.689	-171.1
2150	0.891	157.4	1.65	4.6	0.016	-27.4	0.697	-172.8
2200	0.887	155.9	1.60	2.5	0.016	-26.8	0.702	-174.2
2250	0.882	154.5	1.54	0.7	0.016	-26.2	0.705	-175.7
2300	0.880	153.0	1.49	-0.9	0.015	-24.9	0.709	-177.4
2350	0.887	151.4	1.45	-2.8	0.015	-24.2	0.718	-178.9
2400	0.892	149.9	1.40	-4.7	0.015	-22.7	0.720	179.7
2450	0.894	148.7	1.35	-6.4	0.015	-21.7	0.724	178.3
2500	0.890	147.5	1.31	-8.5	0.015	-20.7	0.727	176.6

Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
2SK3391JXTL-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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