RQA0003DNS

Silicon N-Channel MOS FET

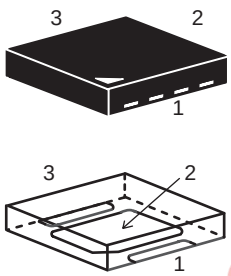
REJ03G0584-0300
Rev.3.00
Oct 12, 2006

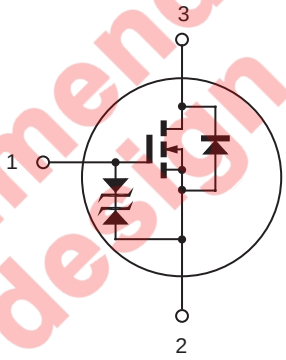
Features

- High Output Power, High Gain, High Efficiency
  Pout = +36 dBm, Linear Gain = 19 dB, PAE = 65% (f = 520 MHz)
- Small Outline Package (WSON0303-2: 3.0 × 3.0 × 0.8mm)

Outline

RENESAS Package code: PWSN0002ZA-A
(Package name: HWSON-2 <WSON0303-2>)





1. Gate
2. Source
3. Drain

Note: Marking is “A0003”.

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	2.4	A
Channel dissipation	Pch[note]	7	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: Value at Tc = 25°C

This Device is sensitive to Electro Static Discharge. An Adequate careful handling procedure is requested.

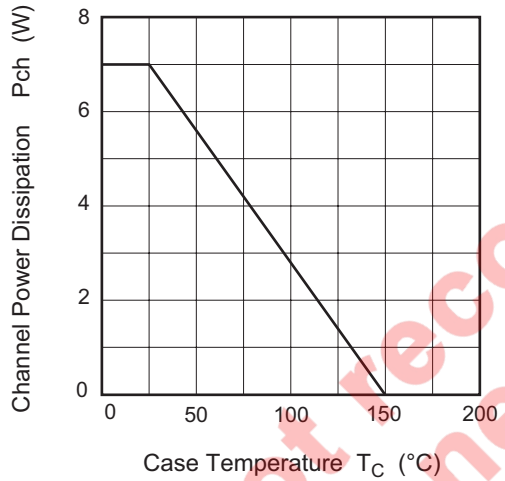
Electrical Characteristics

(Ta = 25°C)

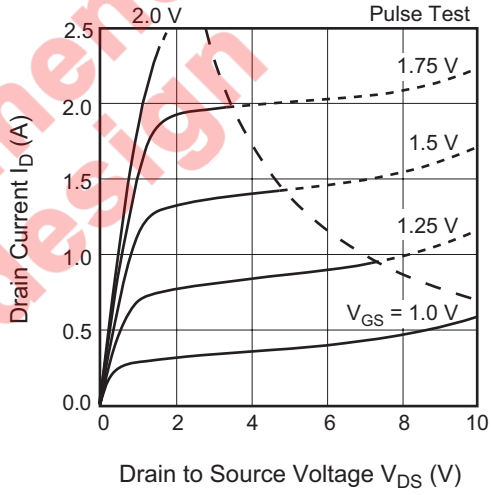
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 16 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±2	µA	V_{GS} = ±5 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0.15	0.4	0.8	V	V_{DS} = 6 V, I_D = 1 mA
Forward Transfer Admittance	|yfs|	1.7	2.4	3.1	S	V_{DS} = 6 V, I_D = 1.2 A
Input capacitance	Ciss	—	44	—	pF	V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz
Output capacitance	Coss	—	25	—	pF	V_{DS} = 6 V, V_{GS} = 0, f = 1 MHz
Reverse transfer capacitance	Crss	—	6.0	—	pF	V_{DG} = 6 V, V_{GS} = 0, f = 1 MHz
Output Power	Pout	35	36	—	dBm	V_{DS} = 6 V, I_{DQ} = 400 mA, f = 520 MHz, Pin = +20 dBm (100 mW)
		3.16	3.98	—	W	
Power Added Efficiency	PAE	50	65	—	%	

Main Characteristics

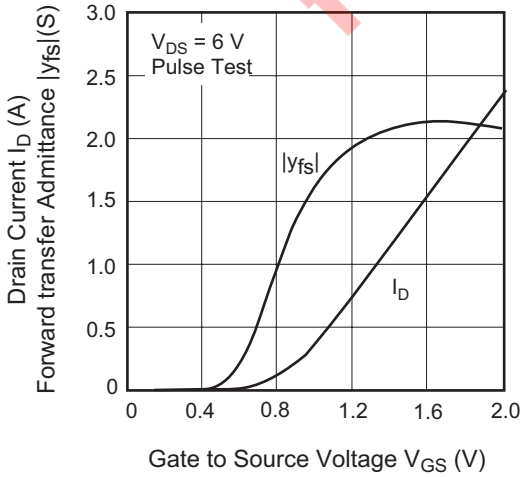
Maximum Channel Power Dissipation Curve



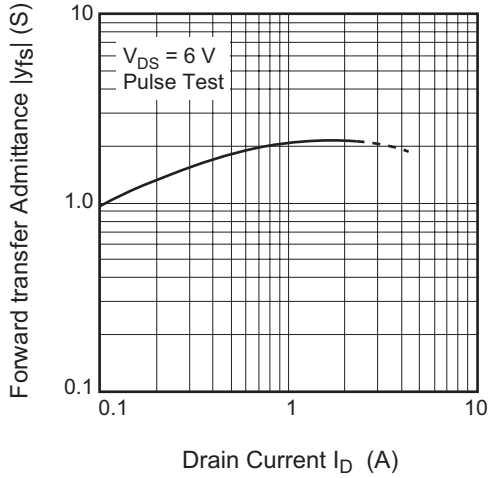
Typical Output Characteristics



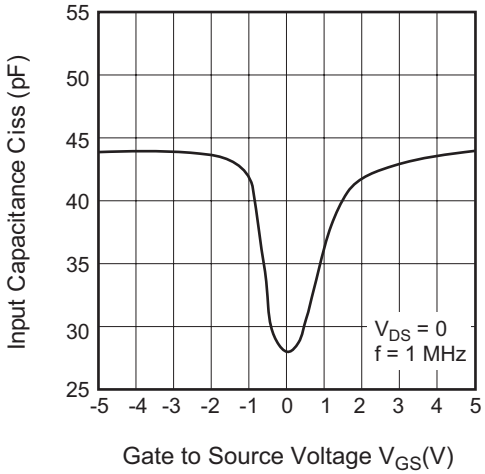
Typical Transfer Characteristics



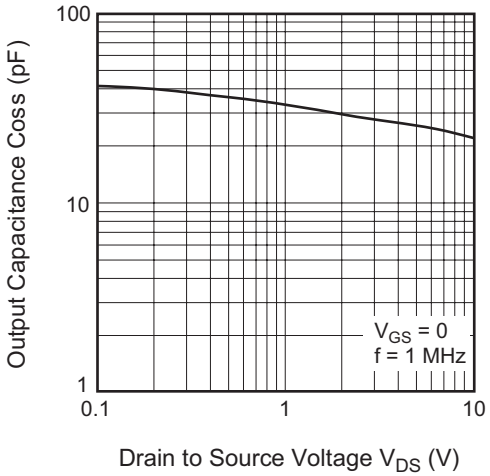
Forward Transfer Admittance vs. Drain Current



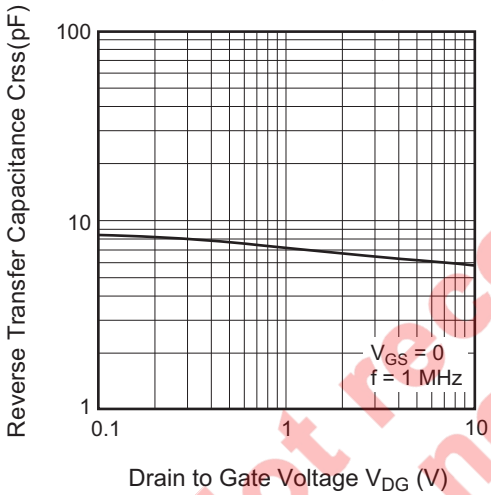
Input Capacitance vs.
Gate to Source Voltage



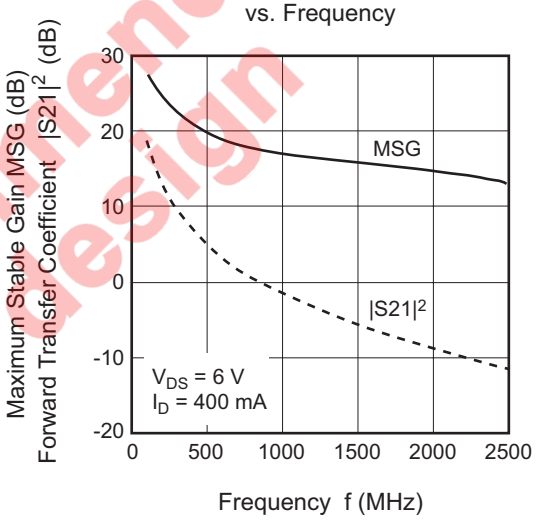
Output Capacitance vs.
Drain to Source Voltage



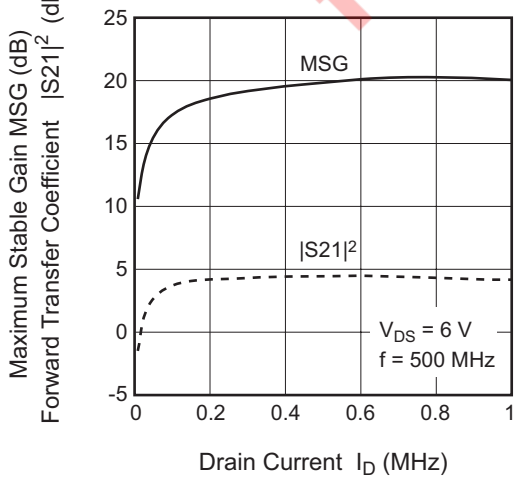
Reverse Transfer Capacitance vs.
Drain to Gate Voltage



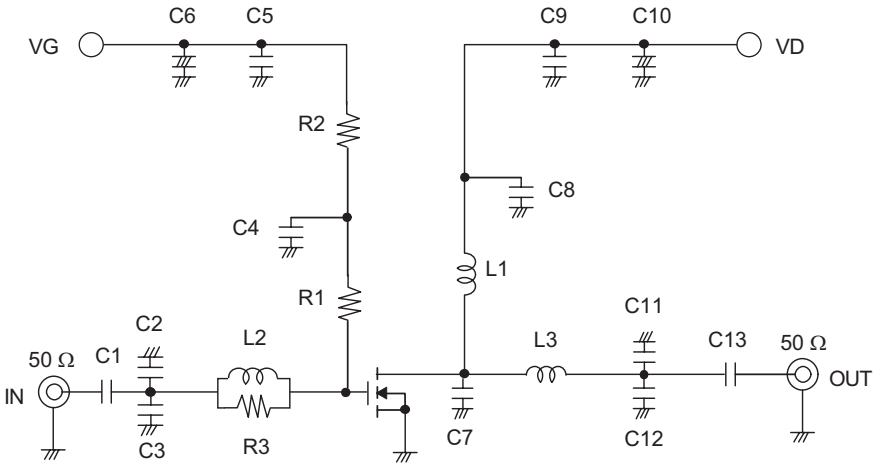
Maximum Stable Gain, $|S21|^2$
vs. Frequency



Maximum Stable Gain, $|S21|^2$
vs. Drain Current

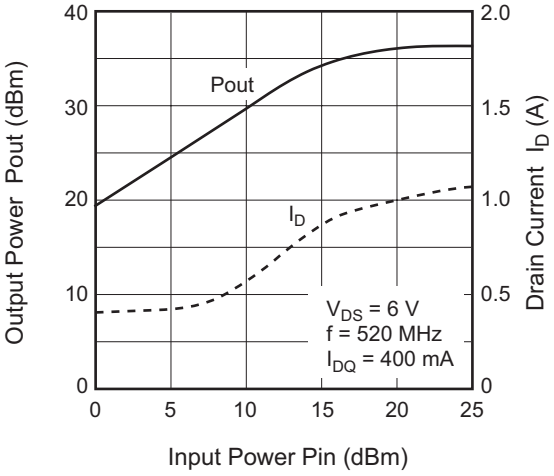


Evaluation Circuit (f = 520 MHz)

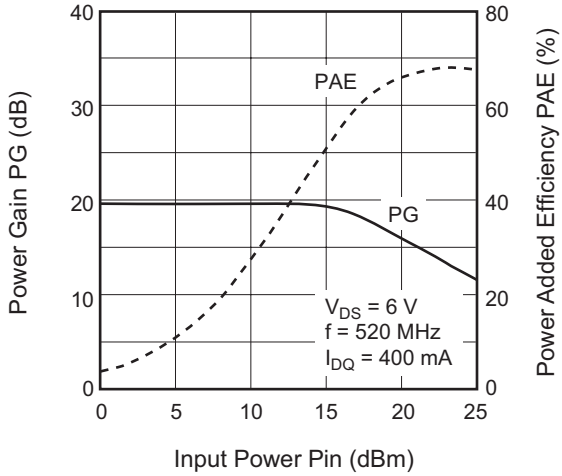


C1, C4, C8, C13: 100 pF Chip Capacitor
C2: 6 pF Chip Capacitor
C3: 20 pF Chip Capacitor
C5, C9: 1000 pF Chip Capacitor
C6, C10: 2.2 μF Electrolysis Capacitor
C7: 3 pF Chip Capacitor
C11: 5 pF Chip Capacitor
C12: 15 pF Chip Capacitor
L1: 8 Turns D : 0.5 mm, ϕ 2.4 mm Enamel Wire
L2: 1.5 nH Chip Inductor
L3: 1.2 nH Chip Inductor
R1: 56 Ω Chip Resistor
R2: 3 kΩ Chip Resistor
R3: 2.2 Ω Chip Resistor

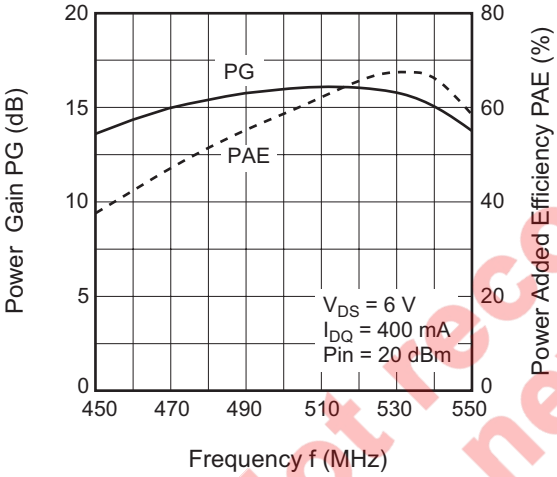
Output Power, Drain Current vs. Input Power



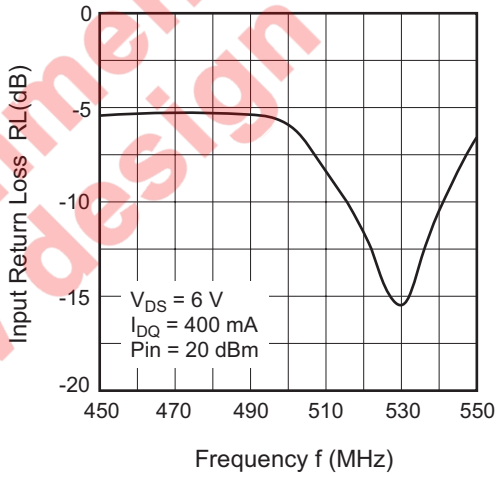
Power Gain, Power Added Efficiency vs. Input Power



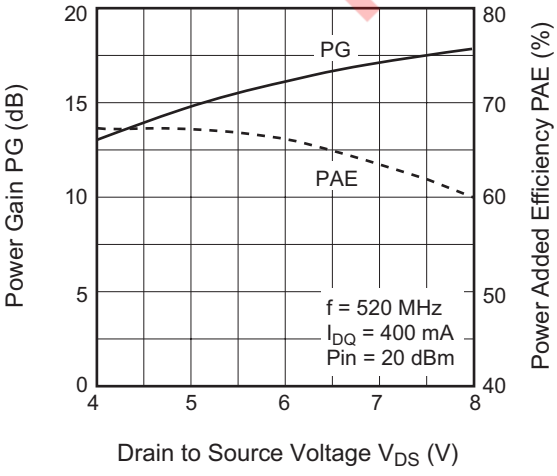
Power Gain, Power Added Efficiency vs. Frequency



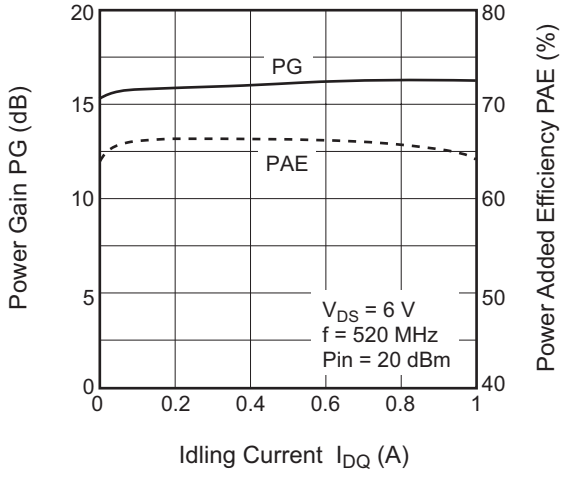
Input Return Loss vs. Frequency



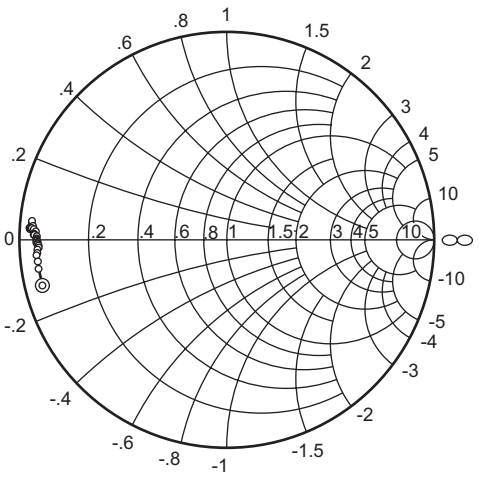
Power Gain, Power Added Efficiency vs. Drain to Source Voltage



Power Gain, Power Added Efficiency vs. Idling Current

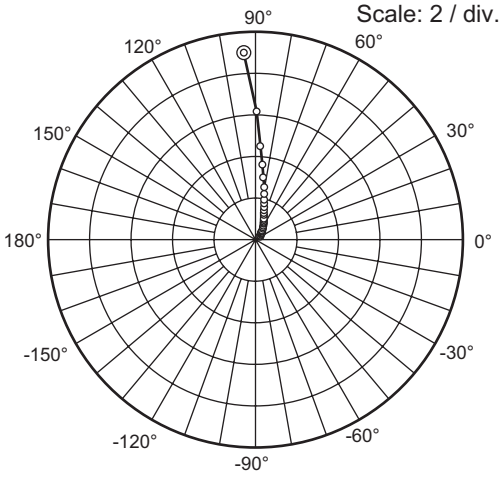


S_{11} Parameter vs. Frequency



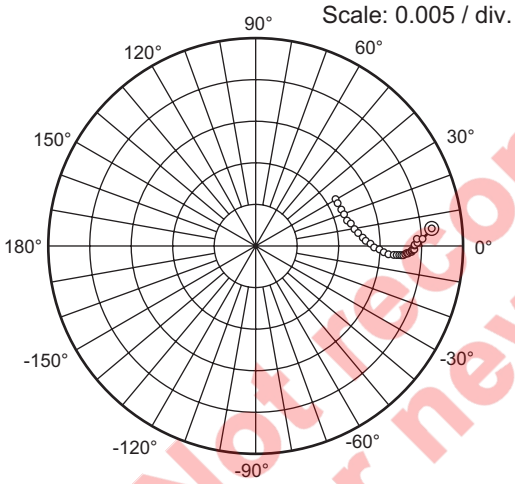
Condition: V_{DS} = 6 V, I_{DQ} = 400 mA, Z_O = 50 Ω
100 to 1000 MHz (50 MHz Step)
1000 to 2500 MHz (100 MHz Step)

S_{21} Parameter vs. Frequency



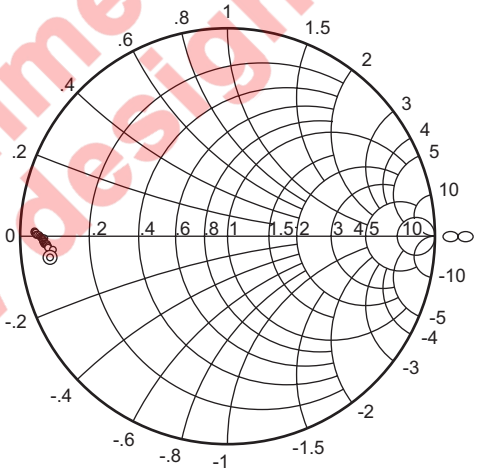
Condition: V_{DS} = 6 V, I_{DQ} = 400 mA, Z_O = 50 Ω
100 to 1000 MHz (50 MHz Step)
1000 to 2500 MHz (100 MHz Step)

S_{12} Parameter vs. Frequency



Condition: V_{DS} = 6 V, I_{DQ} = 400 mA, Z_O = 50 Ω
100 to 1000 MHz (50 MHz Step)
1000 to 2500 MHz (100 MHz Step)

S_{22} Parameter vs. Frequency



Condition: V_{DS} = 6 V, I_{DQ} = 400 mA, Z_O = 50 Ω
100 to 1000 MHz (50 MHz Step)
1000 to 2500 MHz (100 MHz Step)

S Parameter

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.840	-155.9	7.81	94.3	0.050	4.9	0.739	-160.8
150	0.833	-164.0	5.33	87.1	0.049	-1.5	0.731	-166.1
200	0.838	-167.5	3.87	82.2	0.047	-5.2	0.753	-168.1
250	0.834	-169.5	3.07	77.9	0.046	-9.0	0.760	-169.1
300	0.837	-170.7	2.53	74.2	0.046	-11.8	0.765	-169.6
350	0.838	-171.6	2.14	70.8	0.045	-14.4	0.771	-170.0
400	0.841	-172.3	1.84	67.7	0.044	-17.0	0.781	-170.1
450	0.846	-172.8	1.61	64.7	0.043	-19.4	0.789	-170.3
500	0.851	-173.4	1.43	61.8	0.042	-21.7	0.798	-170.4
550	0.856	-173.6	1.27	59.4	0.041	-23.7	0.806	-170.5
600	0.864	-173.9	1.15	56.6	0.040	-25.5	0.816	-170.7
650	0.869	-174.2	1.04	54.2	0.039	-27.5	0.822	-171.0
700	0.874	-174.4	0.94	51.7	0.038	-29.3	0.831	-171.3
750	0.878	-174.5	0.86	49.2	0.036	-31.0	0.838	-171.5
800	0.883	-174.8	0.79	46.8	0.035	-32.8	0.843	-171.7
850	0.886	-174.9	0.72	44.6	0.034	-33.9	0.848	-172.0
900	0.891	-175.4	0.67	42.6	0.033	-35.1	0.853	-172.2
950	0.892	-175.5	0.62	40.6	0.031	-36.5	0.858	-172.5
1000	0.892	-175.9	0.57	38.6	0.030	-37.7	0.861	-172.6
1050	0.894	-176.5	0.53	36.7	0.029	-38.3	0.866	-172.8
1100	0.897	-176.9	0.50	35.1	0.028	-39.4	0.870	-173.1
1150	0.903	-177.6	0.47	33.6	0.027	-40.1	0.876	-173.2
1200	0.911	-177.7	0.44	32.2	0.025	-40.7	0.880	-173.3
1250	0.917	-177.9	0.41	31.1	0.024	-41.2	0.887	-173.6
1300	0.923	-177.8	0.39	29.9	0.023	-41.3	0.891	-173.7
1350	0.923	-177.9	0.36	28.4	0.022	-41.9	0.896	-173.9
1400	0.924	-178.1	0.34	27.0	0.021	-42.4	0.900	-174.1
1450	0.927	-178.3	0.33	25.7	0.021	-42.4	0.904	-174.3
1500	0.928	-178.7	0.31	24.4	0.020	-42.5	0.906	-174.5
1550	0.927	-178.6	0.29	23.3	0.019	-42.7	0.909	-174.9
1600	0.926	-178.7	0.28	22.5	0.018	-42.5	0.913	-175.1
1650	0.926	-179.1	0.26	21.1	0.017	-42.3	0.915	-175.5
1700	0.920	-179.6	0.25	20.0	0.016	-42.0	0.918	-175.7
1750	0.920	180.0	0.24	19.0	0.015	-41.6	0.920	-176.1
1800	0.926	179.3	0.22	17.9	0.015	-40.7	0.925	-176.4
1850	0.934	178.9	0.21	17.0	0.014	-40.3	0.926	-176.5
1900	0.943	178.8	0.21	16.4	0.013	-39.5	0.927	-176.8
1950	0.950	178.8	0.20	15.7	0.013	-38.9	0.931	-177.2
2000	0.956	179.0	0.19	15.2	0.012	-37.5	0.936	-177.3
2050	0.956	179.1	0.18	14.5	0.011	-36.1	0.936	-177.4
2100	0.952	179.1	0.17	14.1	0.011	-34.8	0.939	-177.8
2150	0.949	179.1	0.17	13.5	0.010	-32.5	0.943	-177.9
2200	0.945	178.8	0.16	12.9	0.010	-30.6	0.945	-178.0
2250	0.940	178.5	0.15	12.2	0.009	-29.0	0.945	-178.2
2300	0.940	178.2	0.15	11.7	0.008	-26.1	0.946	-178.4
2350	0.941	177.8	0.14	11.1	0.008	-23.0	0.951	-178.5
2400	0.942	177.5	0.14	10.4	0.008	-19.0	0.951	-178.7
2450	0.941	177.3	0.13	10.2	0.007	-16.1	0.951	-178.9
2500	0.945	176.7	0.13	9.4	0.007	-12.7	0.953	-179.2

S Parameter

(V_{DS} = 6 V, I_{DQ} = 100 mA, Zo = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.875	-161.9	8.51	93.5	0.035	4.5	0.797	-167.5
150	0.873	-168.3	5.76	88.1	0.034	0.0	0.786	-171.3
200	0.875	-171.1	4.20	84.1	0.033	-2.2	0.805	-172.6
250	0.872	-172.8	3.34	81.0	0.033	-5.0	0.810	-173.3
300	0.869	-173.7	2.77	78.4	0.033	-6.6	0.812	-173.8
350	0.871	-174.6	2.36	75.7	0.033	-8.2	0.814	-174.0
400	0.870	-175.1	2.05	73.3	0.032	-10.2	0.823	-174.2
450	0.871	-175.8	1.81	71.1	0.032	-11.7	0.827	-174.2
500	0.873	-176.2	1.62	68.7	0.031	-13.4	0.830	-174.3
550	0.876	-176.4	1.45	66.7	0.031	-14.7	0.837	-174.5
600	0.881	-176.5	1.32	64.5	0.030	-16.0	0.841	-174.5
650	0.883	-176.8	1.20	62.3	0.030	-17.4	0.845	-174.8
700	0.885	-176.9	1.10	60.1	0.029	-18.7	0.849	-175.0
750	0.884	-177.1	1.01	58.1	0.028	-19.9	0.853	-175.1
800	0.889	-177.2	0.94	55.9	0.027	-21.1	0.854	-175.3
850	0.893	-177.3	0.87	53.9	0.027	-22.1	0.856	-175.5
900	0.895	-177.6	0.81	51.9	0.026	-22.8	0.857	-175.5
950	0.897	-177.7	0.75	50.1	0.025	-23.8	0.860	-175.6
1000	0.894	-177.9	0.70	48.5	0.025	-24.6	0.862	-175.6
1050	0.896	-178.1	0.66	46.6	0.024	-25.3	0.863	-175.7
1100	0.898	-178.8	0.62	44.9	0.023	-25.8	0.865	-175.7
1150	0.903	-179.1	0.59	43.7	0.022	-26.3	0.871	-175.8
1200	0.910	-179.2	0.55	42.2	0.021	-26.5	0.873	-175.8
1250	0.918	-179.2	0.52	41.2	0.021	-26.8	0.879	-175.9
1300	0.919	-179.3	0.50	40.0	0.020	-26.8	0.881	-175.9
1350	0.918	-179.4	0.47	38.6	0.019	-27.0	0.885	-175.9
1400	0.920	-179.5	0.44	37.1	0.019	-27.0	0.888	-176.0
1450	0.920	-179.6	0.42	35.5	0.018	-26.9	0.892	-176.1
1500	0.924	-179.7	0.40	34.5	0.017	-26.8	0.895	-176.3
1550	0.924	-179.7	0.38	33.2	0.017	-26.4	0.897	-176.5
1600	0.920	-179.9	0.36	32.3	0.016	-26.2	0.900	-176.6
1650	0.921	179.8	0.35	31.1	0.016	-25.8	0.902	-176.8
1700	0.915	179.5	0.33	29.9	0.015	-25.2	0.905	-177.1
1750	0.918	178.9	0.32	28.9	0.014	-24.7	0.907	-177.3
1800	0.920	178.4	0.30	27.6	0.014	-23.3	0.911	-177.5
1850	0.932	178.2	0.29	26.6	0.013	-22.5	0.913	-177.7
1900	0.940	178.1	0.28	26.1	0.013	-21.7	0.913	-177.9
1950	0.944	178.0	0.27	25.1	0.012	-20.3	0.918	-178.2
2000	0.949	178.1	0.26	24.3	0.012	-18.8	0.923	-178.2
2050	0.950	178.4	0.25	23.8	0.011	-17.0	0.924	-178.3
2100	0.946	178.3	0.24	22.9	0.011	-15.4	0.926	-178.6
2150	0.941	178.2	0.23	22.3	0.010	-13.3	0.931	-178.8
2200	0.940	178.1	0.22	21.6	0.010	-11.1	0.932	-178.8
2250	0.942	177.9	0.21	21.0	0.010	-8.9	0.934	-178.9
2300	0.938	177.5	0.20	20.2	0.009	-6.1	0.935	-179.1
2350	0.940	177.3	0.20	19.6	0.009	-3.7	0.940	-179.2
2400	0.940	176.9	0.19	19.0	0.009	0.1	0.939	-179.3
2450	0.943	176.8	0.18	18.3	0.009	2.2	0.939	-179.5
2500	0.943	176.2	0.18	17.4	0.008	5.6	0.942	-179.8

S Parameter

(V_{DS} = 6 V, I_{DQ} = 200 mA, Zo = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.903	-165.0	8.86	93.3	0.026	5.2	0.838	-171.4
150	0.902	-170.5	6.00	88.8	0.025	1.1	0.826	-174.1
200	0.903	-173.0	4.37	85.8	0.025	0.4	0.845	-175.1
250	0.899	-174.5	3.49	83.3	0.024	-1.6	0.847	-175.5
300	0.896	-175.5	2.91	81.2	0.024	-2.7	0.848	-175.9
350	0.896	-176.2	2.48	79.2	0.024	-3.4	0.851	-176.1
400	0.893	-176.5	2.16	77.4	0.024	-4.8	0.856	-176.1
450	0.895	-177.3	1.92	75.3	0.024	-5.5	0.859	-176.4
500	0.896	-177.8	1.73	73.4	0.024	-6.7	0.862	-176.5
550	0.898	-178.1	1.56	71.8	0.023	-7.1	0.865	-176.7
600	0.901	-178.1	1.42	70.0	0.023	-8.0	0.869	-176.9
650	0.902	-178.4	1.31	68.1	0.023	-8.9	0.870	-177.0
700	0.904	-178.5	1.20	66.5	0.022	-9.5	0.873	-177.3
750	0.901	-178.7	1.11	64.4	0.022	-10.7	0.874	-177.4
800	0.902	-178.7	1.03	62.6	0.022	-11.1	0.874	-177.6
850	0.907	-178.9	0.96	60.8	0.021	-11.6	0.872	-177.8
900	0.906	-179.1	0.90	59.1	0.021	-11.8	0.872	-177.9
950	0.908	-179.3	0.84	57.5	0.020	-12.5	0.874	-178.0
1000	0.904	-179.3	0.79	56.0	0.020	-12.7	0.873	-177.8
1050	0.903	-179.9	0.74	54.3	0.019	-12.9	0.872	-178.0
1100	0.906	179.8	0.71	53.0	0.019	-13.2	0.872	-178.0
1150	0.912	179.5	0.67	51.6	0.018	-13.4	0.877	-177.9
1200	0.914	179.4	0.64	50.5	0.018	-13.1	0.877	-177.8
1250	0.919	179.3	0.60	49.5	0.017	-13.0	0.881	-177.9
1300	0.923	179.4	0.57	48.1	0.017	-12.6	0.882	-177.8
1350	0.920	179.5	0.55	46.9	0.017	-12.5	0.885	-177.9
1400	0.923	179.3	0.52	45.5	0.016	-12.3	0.887	-177.8
1450	0.925	179.2	0.49	44.3	0.016	-11.8	0.890	-177.8
1500	0.926	179.1	0.48	43.1	0.015	-11.1	0.891	-178.0
1550	0.923	179.1	0.45	41.9	0.015	-10.6	0.893	-178.1
1600	0.922	179.0	0.43	40.8	0.015	-9.9	0.894	-178.2
1650	0.921	178.6	0.41	39.6	0.014	-9.3	0.898	-178.4
1700	0.917	178.5	0.40	38.5	0.014	-8.6	0.898	-178.5
1750	0.918	178.0	0.38	37.2	0.013	-7.5	0.901	-178.7
1800	0.923	177.5	0.37	36.0	0.013	-6.3	0.905	-178.9
1850	0.931	177.2	0.35	35.1	0.013	-5.0	0.906	-178.9
1900	0.935	177.2	0.34	34.2	0.012	-3.8	0.907	-179.1
1950	0.943	177.2	0.33	33.5	0.012	-2.4	0.911	-179.3
2000	0.946	177.4	0.32	32.6	0.012	-0.9	0.916	-179.4
2050	0.947	177.5	0.31	31.9	0.011	1.2	0.916	-179.4
2100	0.943	177.7	0.30	31.2	0.011	2.6	0.918	-179.6
2150	0.941	177.5	0.28	30.6	0.011	4.3	0.923	-179.8
2200	0.939	177.4	0.27	29.8	0.011	6.2	0.924	-179.7
2250	0.938	177.0	0.26	29.0	0.011	8.7	0.925	-179.9
2300	0.934	176.8	0.25	28.3	0.010	10.6	0.926	179.9
2350	0.936	176.4	0.25	27.3	0.010	13.1	0.932	179.9
2400	0.939	176.1	0.24	26.7	0.010	15.8	0.931	179.9
2450	0.937	176.0	0.23	26.0	0.010	16.9	0.931	179.7
2500	0.941	175.6	0.23	25.3	0.010	19.2	0.932	179.5

S Parameter

(V_{DS} = 6 V, I_{DQ} = 300 mA, Zo = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.911	-165.6	8.96	93.4	0.023	5.1	0.854	-172.7
150	0.913	-171.0	6.07	89.1	0.022	2.1	0.840	-175.0
200	0.917	-173.6	4.43	86.3	0.021	1.3	0.860	-175.9
250	0.912	-174.8	3.55	84.1	0.021	-0.7	0.861	-176.3
300	0.906	-176.0	2.95	82.3	0.021	-1.0	0.863	-176.7
350	0.908	-176.5	2.52	80.4	0.021	-1.3	0.864	-176.8
400	0.907	-177.3	2.20	78.8	0.021	-2.1	0.868	-176.9
450	0.902	-177.8	1.96	77.0	0.021	-3.0	0.872	-177.1
500	0.907	-178.3	1.76	75.4	0.021	-3.5	0.873	-177.2
550	0.906	-178.6	1.60	73.8	0.020	-4.1	0.877	-177.4
600	0.909	-178.7	1.46	72.1	0.020	-4.5	0.879	-177.5
650	0.909	-178.9	1.34	70.4	0.020	-5.0	0.880	-177.8
700	0.909	-179.1	1.23	68.8	0.020	-5.4	0.883	-178.0
750	0.910	-179.1	1.14	67.2	0.020	-6.2	0.884	-178.1
800	0.910	-179.2	1.06	65.2	0.019	-6.4	0.882	-178.3
850	0.912	-179.3	0.99	63.8	0.019	-6.5	0.881	-178.5
900	0.912	-179.7	0.93	62.2	0.019	-6.4	0.881	-178.7
950	0.914	-179.8	0.88	60.5	0.018	-7.2	0.882	-178.7
1000	0.910	-179.9	0.82	58.9	0.018	-7.4	0.880	-178.7
1050	0.907	179.8	0.78	57.4	0.018	-6.9	0.879	-178.8
1100	0.911	179.3	0.74	56.1	0.017	-7.1	0.881	-178.7
1150	0.915	179.0	0.70	54.9	0.017	-7.0	0.881	-178.8
1200	0.920	179.0	0.67	53.8	0.016	-6.7	0.882	-178.7
1250	0.922	178.8	0.63	52.9	0.016	-6.1	0.884	-178.7
1300	0.926	178.9	0.60	51.6	0.016	-5.9	0.885	-178.6
1350	0.920	178.9	0.57	50.3	0.015	-5.2	0.888	-178.6
1400	0.925	178.8	0.55	49.2	0.015	-5.0	0.889	-178.6
1450	0.928	178.6	0.53	47.8	0.015	-4.3	0.891	-178.7
1500	0.926	178.7	0.50	46.6	0.014	-3.5	0.891	-178.7
1550	0.926	178.6	0.48	45.5	0.014	-2.6	0.894	-178.8
1600	0.925	178.5	0.46	44.4	0.014	-2.1	0.895	-178.9
1650	0.921	178.3	0.44	43.3	0.014	-1.2	0.897	-179.0
1700	0.920	178.0	0.42	42.3	0.013	-0.3	0.898	-179.2
1750	0.919	177.5	0.41	41.0	0.013	0.8	0.900	-179.3
1800	0.926	177.0	0.39	39.7	0.013	2.2	0.903	-179.6
1850	0.933	176.9	0.38	39.0	0.013	3.7	0.905	-179.5
1900	0.938	176.9	0.37	38.1	0.012	4.9	0.905	-179.7
1950	0.944	176.7	0.36	37.2	0.012	6.3	0.909	-179.9
2000	0.946	177.1	0.34	36.3	0.012	8.0	0.913	-180.0
2050	0.948	177.2	0.33	35.8	0.012	9.6	0.914	-180.0
2100	0.944	177.1	0.32	34.9	0.011	10.9	0.917	179.8
2150	0.942	177.0	0.31	34.3	0.011	13.1	0.920	179.7
2200	0.939	177.0	0.30	33.4	0.011	14.3	0.922	179.8
2250	0.937	176.7	0.29	32.6	0.011	16.1	0.922	179.6
2300	0.936	176.4	0.28	31.9	0.011	18.3	0.924	179.5
2350	0.935	176.1	0.27	30.8	0.011	20.3	0.929	179.5
2400	0.940	175.8	0.27	30.2	0.011	23.0	0.928	179.4
2450	0.940	175.7	0.26	29.6	0.011	23.9	0.927	179.3
2500	0.941	175.2	0.25	28.7	0.011	26.0	0.930	179.0

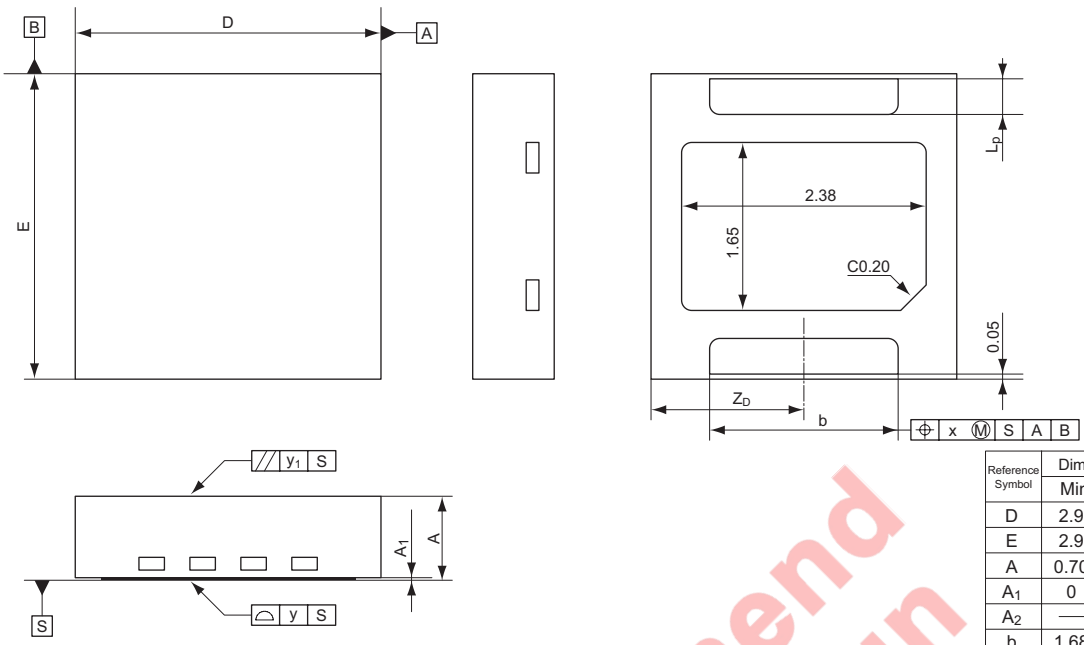
S Parameter

(V_{DS} = 6 V, I_{DQ} = 400 mA, Zo = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.916	-166.0	9.03	93.5	0.021	5.5	0.861	-173.3
150	0.917	-171.2	6.14	89.4	0.020	2.2	0.847	-175.5
200	0.918	-173.4	4.50	86.7	0.019	2.3	0.866	-176.2
250	0.917	-175.2	3.59	84.3	0.020	1.0	0.869	-176.6
300	0.914	-175.8	2.99	82.3	0.019	0.3	0.870	-176.9
350	0.910	-176.8	2.56	80.5	0.019	0.0	0.872	-177.1
400	0.909	-177.6	2.23	78.8	0.019	-1.2	0.877	-177.2
450	0.909	-178.0	1.97	77.3	0.019	-1.4	0.878	-177.3
500	0.911	-178.4	1.78	75.6	0.019	-1.8	0.881	-177.4
550	0.912	-178.7	1.61	74.2	0.019	-2.1	0.883	-177.6
600	0.912	-178.8	1.47	72.7	0.019	-2.4	0.885	-177.7
650	0.915	-179.0	1.35	71.3	0.019	-2.8	0.886	-177.9
700	0.913	-179.1	1.24	69.5	0.018	-2.8	0.889	-178.2
750	0.913	-179.3	1.15	68.1	0.018	-3.3	0.890	-178.3
800	0.916	-179.5	1.07	66.6	0.018	-3.6	0.889	-178.5
850	0.917	-179.6	1.00	65.1	0.018	-3.8	0.887	-178.7
900	0.915	-179.9	0.94	63.6	0.017	-3.7	0.887	-178.9
950	0.916	-180.0	0.89	62.1	0.017	-3.9	0.888	-178.9
1000	0.913	179.8	0.83	60.6	0.017	-3.8	0.887	-178.9
1050	0.913	179.5	0.79	59.1	0.017	-3.4	0.885	-179.1
1100	0.915	179.1	0.75	57.8	0.016	-3.6	0.885	-179.1
1150	0.918	178.8	0.72	56.5	0.016	-3.5	0.887	-179.1
1200	0.923	178.8	0.68	55.6	0.016	-2.8	0.887	-179.0
1250	0.925	178.7	0.65	54.8	0.015	-2.6	0.888	-179.2
1300	0.927	178.7	0.62	53.5	0.015	-1.6	0.889	-179.0
1350	0.929	178.7	0.59	52.2	0.015	-1.2	0.891	-179.0
1400	0.927	178.6	0.56	51.0	0.014	-0.7	0.893	-179.0
1450	0.928	178.5	0.54	49.7	0.014	-0.2	0.894	-179.0
1500	0.929	178.5	0.52	48.6	0.014	0.7	0.894	-179.1
1550	0.929	178.5	0.50	47.4	0.014	1.9	0.894	-179.2
1600	0.924	178.3	0.47	46.5	0.013	2.3	0.897	-179.3
1650	0.924	178.0	0.45	45.2	0.013	3.2	0.898	-179.4
1700	0.922	177.6	0.44	43.9	0.013	4.2	0.899	-179.5
1750	0.923	177.3	0.42	42.9	0.013	5.9	0.901	-179.7
1800	0.929	176.9	0.41	41.7	0.013	7.0	0.903	-179.8
1850	0.936	176.7	0.39	40.7	0.012	8.3	0.905	-179.9
1900	0.940	176.7	0.38	40.1	0.012	9.2	0.904	180.0
1950	0.945	176.6	0.37	39.1	0.012	11.1	0.909	179.8
2000	0.948	176.8	0.36	38.4	0.012	12.9	0.914	179.7
2050	0.948	176.9	0.35	37.8	0.012	14.5	0.913	179.7
2100	0.948	176.9	0.33	37.1	0.012	15.4	0.916	179.5
2150	0.944	176.8	0.32	36.4	0.012	17.1	0.921	179.4
2200	0.942	176.7	0.31	35.5	0.011	18.8	0.921	179.6
2250	0.942	176.5	0.30	34.8	0.011	20.7	0.921	179.3
2300	0.938	176.2	0.29	33.9	0.011	22.6	0.924	179.2
2350	0.938	175.8	0.28	33.0	0.011	24.5	0.928	179.1
2400	0.940	175.6	0.28	32.3	0.011	27.0	0.927	179.1
2450	0.944	175.2	0.27	31.7	0.011	28.0	0.927	179.0
2500	0.943	174.9	0.26	30.8	0.011	29.8	0.928	178.8

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
HWSON-2	—	PWSN0002ZA-A	—	0.022g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	2.9	3.0	3.1
E	2.9	3.0	3.1
A	0.70	0.75	0.80
A_1	0	—	0.05
A_2	—	—	—
b	1.68	1.73	1.78
e	—	—	—
L_p	—	0.33	—
x	—	—	—
y	—	—	0.08
y_1	—	—	0.10
Z_D	—	1.50	—

Ordering Information

Part Name	Quantity	Shipping Container
RQA0003DNSTR-E	2000 pcs.	φ178 mm Reel, 12 mm Emboss Taping

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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