

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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# RQA0005MXAQS

## Silicon N-Channel MOS FET

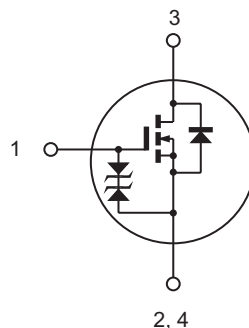
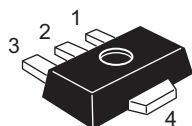
REJ03G1568-0100  
Rev.1.00  
Jul 04, 2007

### Features

- High Output Power, High Gain, High Efficiency  
Pout = +33 dBm, Linear Gain = 21 dB, PAE = 68% (f = 520 MHz)
- Compact package capable of surface mounting

### Outline

RENESAS Package code: PLZZ0004CA-A  
(Package Name : UPAK<sup>®</sup>)



1. Gate
2. Source
3. Drain
4. Source

Note: Marking is "MX".

\*UPAK is a trademark of Renesas Technology Corp.

### Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	16	V
Gate to source voltage	V <sub>GSS</sub>	±5	V
Drain current	I <sub>D</sub>	0.8	A
Channel dissipation	P <sub>ch</sub> <sup>note</sup>	9	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-50 to +150	°C

Note: Value at Tc = 25°C

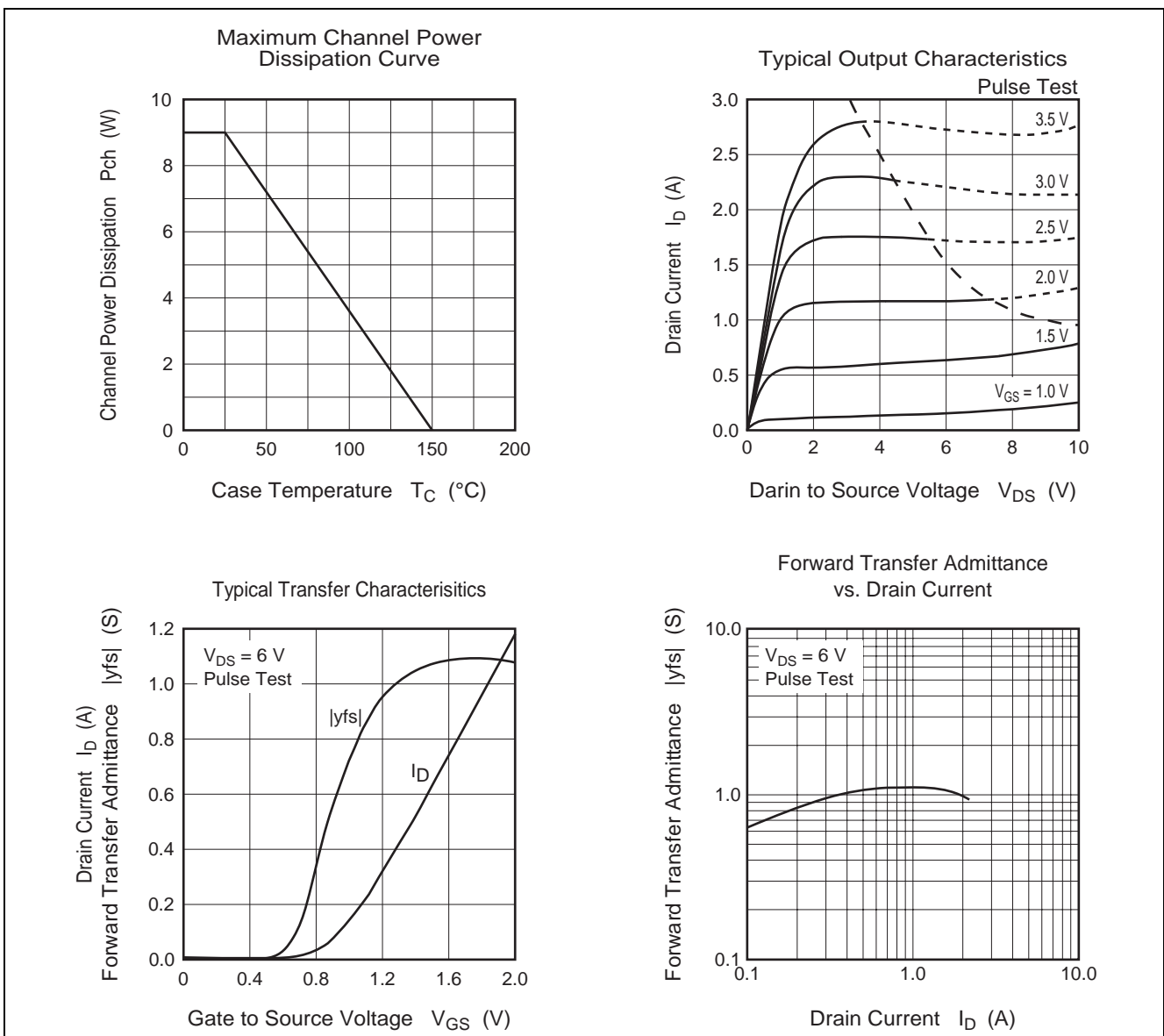
This device is sensitive to electro static discharge. An adequate careful handling procedure is requested.

### Electrical Characteristics

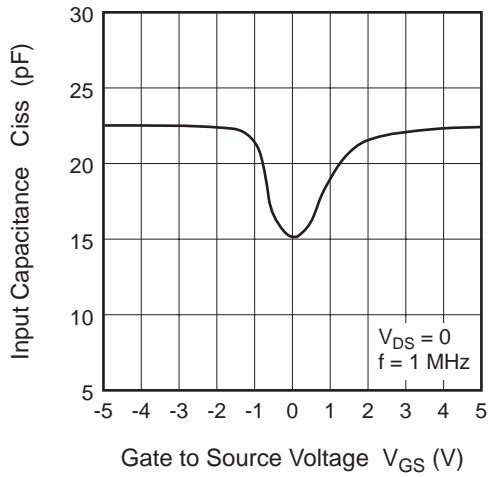
(Ta = 25°C)

Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 16 V, V_{GS} = 0$
Gate to source leakage current	$I_{GSS}$	—	—	$\pm 2$	$\mu A$	$V_{GS} = \pm 5 V, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.15	0.45	0.75	V	$V_{DS} = 6 V, I_D = 1mA$
Forward Transfer Admittance	$ y_{fs} $	—	1.1	—	S	$V_{DS} = 6 V, I_D = 600mA$
Input capacitance	$C_{iss}$	—	22	—	pF	$V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz$
Output capacitance	$C_{oss}$	—	12	—	pF	$V_{DS} = 6 V, V_{GS} = 0, f = 1 MHz$
Reverse transfer capacitance	$C_{rss}$	—	2.6	—	pF	$V_{DG} = 6 V, V_{GS} = 0, f = 1 MHz$
Output Power	Pout	—	33	—	dBm	$V_{DS} = 6V, I_{DQ} = 200 mA$
		—	2	—	W	$f = 520 MHz, Pin = +20 dBm$
Power Added Efficiency	PAE	—	68	—	%	

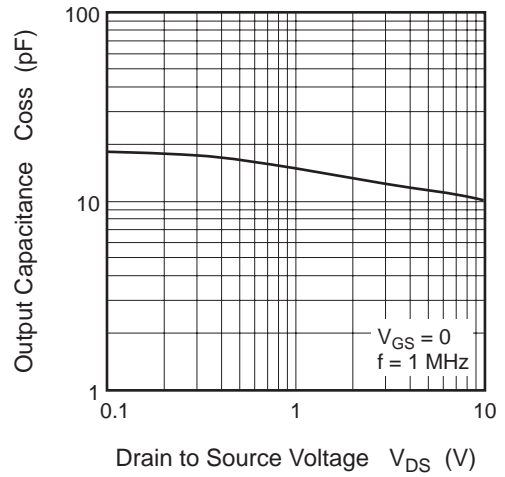
### Main Characteristics



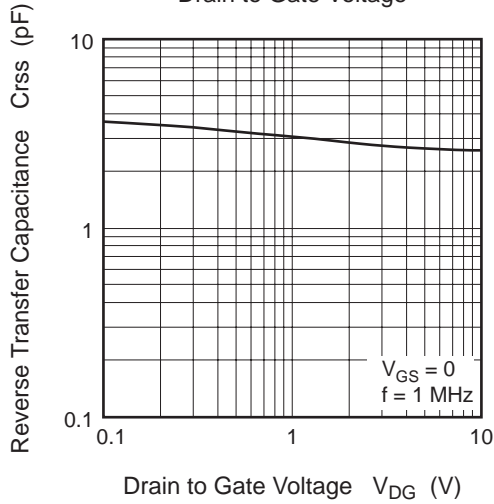
Input Capacitance vs. Gate to Source Voltage



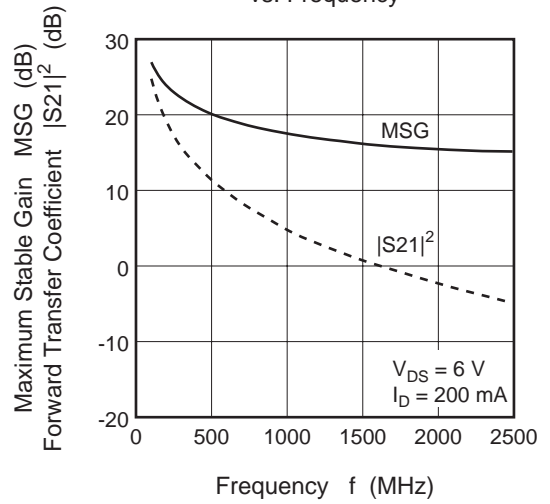
Output Capacitance vs. Drain to Source Voltage



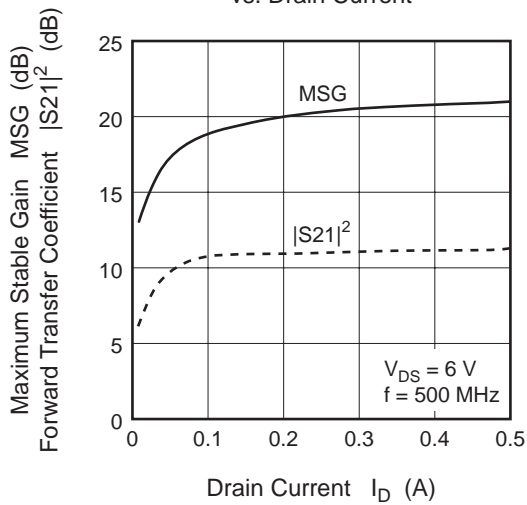
Reverse Transfer Capacitance vs. Drain to Gate Voltage



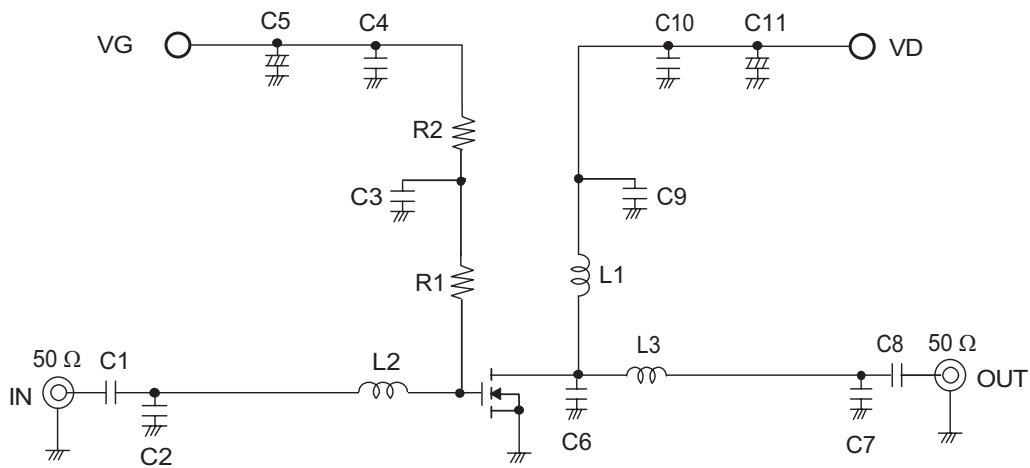
Maximum Stable Gain,  $|S_{21}|^2$  vs. Frequency



Maximum Stable Gain,  $|S_{21}|^2$  vs. Drain Current

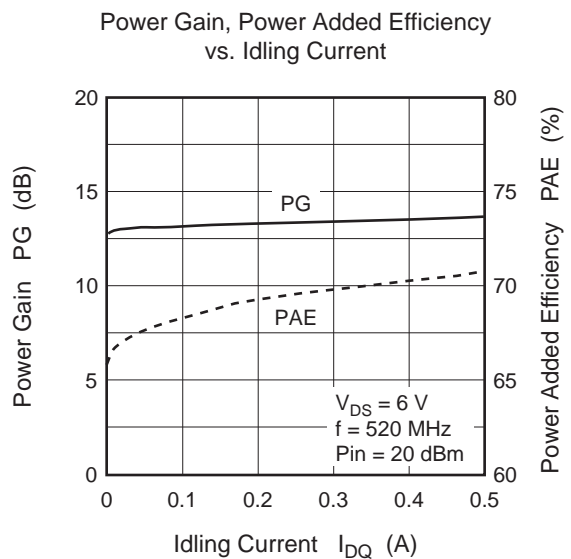
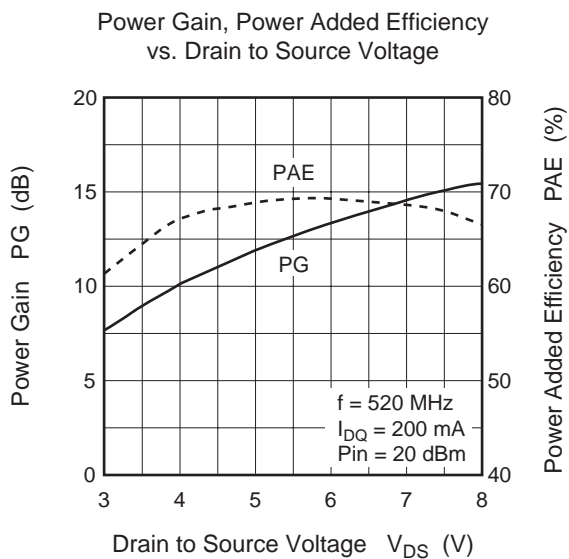
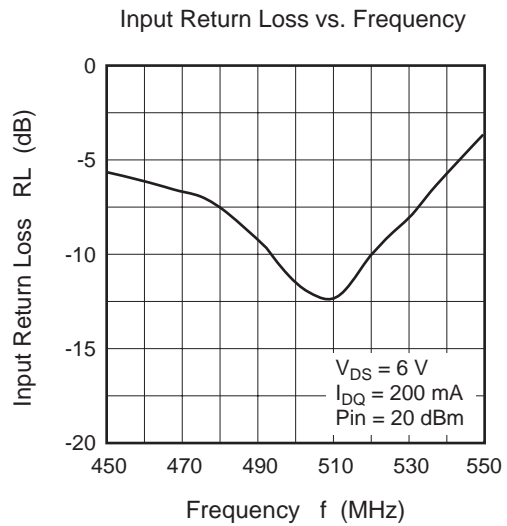
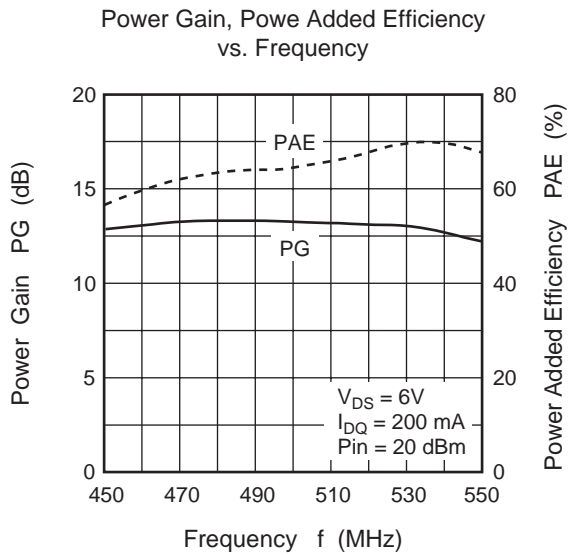
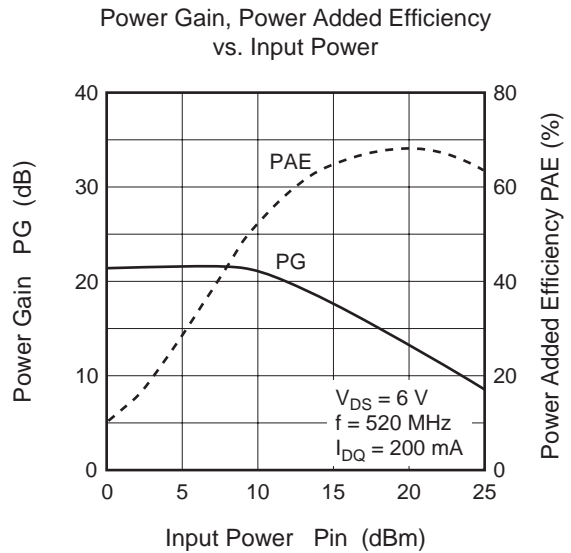
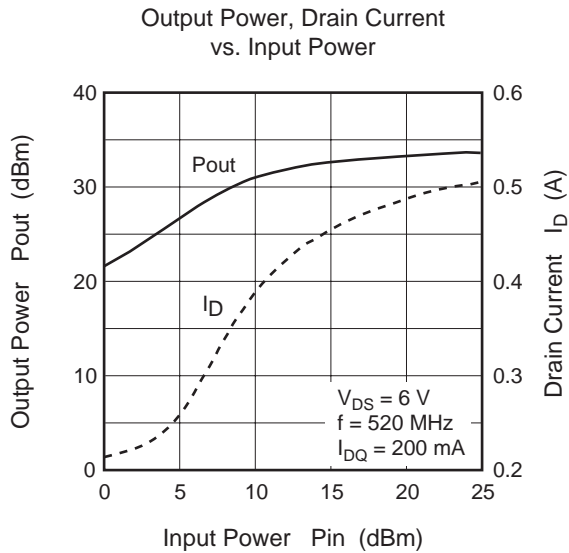


## Evaluation Circuit (f = 520 MHz)



C1, C8	68 pF Chip Capacitor
C2	16 pF Chip Capacitor
C3, C9	100 pF Chip Capacitor
C4, C10	1000 pF Chip Capacitor
C5, C11	2.2 $\mu$ F Electrolysis Capacitor
C6	4 pF Chip Capacitor
C7	11 pF Chip Capacitor
L1	8 Turns D: 0.5 mm, $\phi$ 2.4 mm Enamel Wire
L2	2.2 nH Chip Inductor
L3	3.3 nH Chip Inductor
R1	33 $\Omega$ Chip Resistor
R2	2.7 k $\Omega$ Chip Resistor

Micro strip line width = 2.2 mm / 50  $\Omega$ ,  $\epsilon_r$  3.6



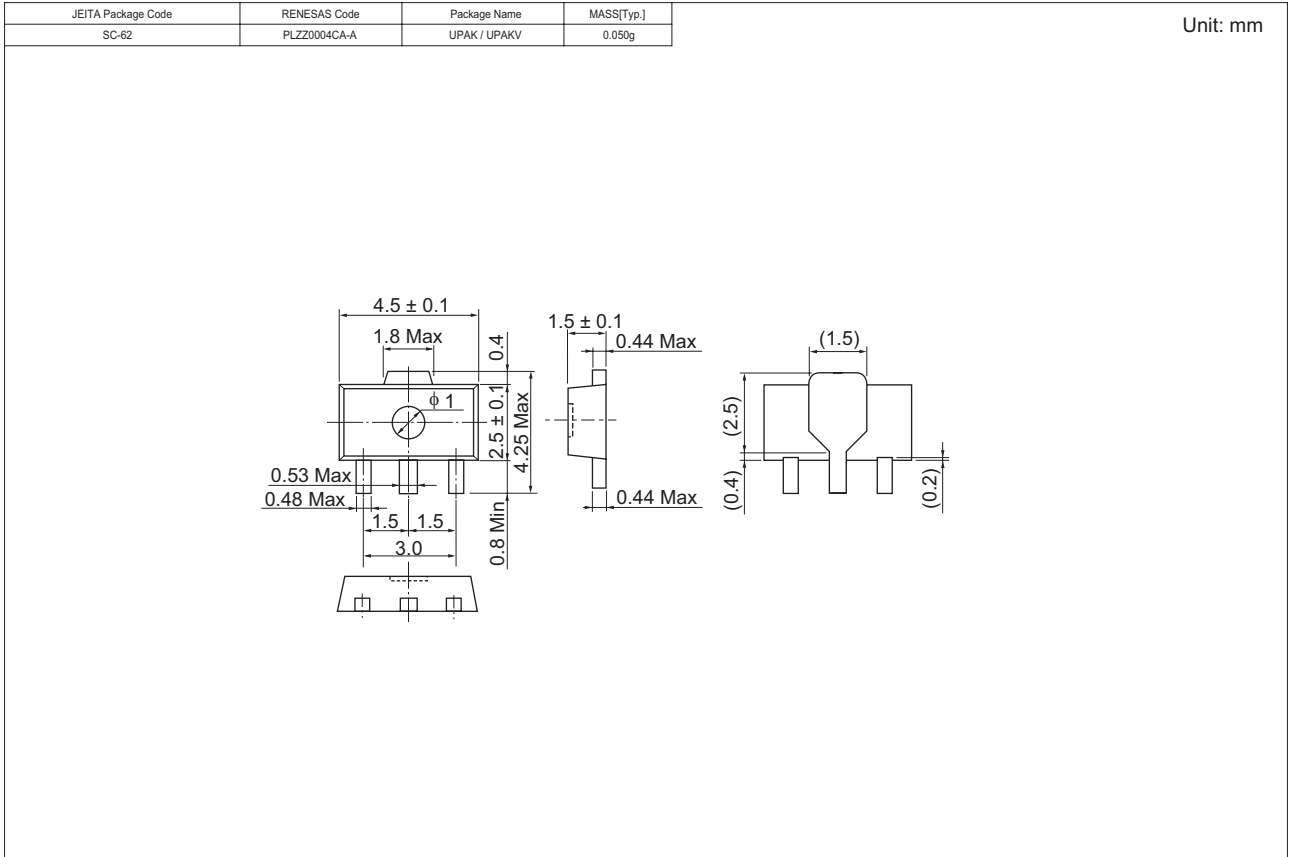
## S Parameter

 $(V_{DS} = 6\text{ V}, I_{DQ} = 200\text{ mA}, Z_o = 50\ \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)	MAG	ANG (deg.)
100	0.843	-136.4	12.72	104.1	0.037	-5.7	0.765	-150.7
150	0.863	-154.9	11.92	89.1	0.037	-6.3	0.727	-162.2
200	0.853	-161.8	9.13	79.6	0.037	-7.4	0.728	-166.8
250	0.847	-167.1	7.38	72.5	0.037	-13.4	0.730	-170.8
300	0.844	-170.8	6.16	66.1	0.037	-19.0	0.733	-173.5
350	0.843	-173.7	5.27	60.0	0.037	-24.0	0.734	-175.5
400	0.841	-176.2	4.59	54.2	0.037	-29.2	0.735	-177.3
450	0.840	-178.2	4.08	48.7	0.037	-33.6	0.736	-178.8
500	0.841	180.0	3.65	43.3	0.036	-38.4	0.738	180.0
550	0.842	178.4	3.31	37.9	0.036	-42.7	0.741	178.8
600	0.843	176.9	3.02	32.6	0.035	-47.0	0.743	177.8
650	0.844	175.6	2.78	27.5	0.035	-51.4	0.746	176.9
700	0.845	174.3	2.56	22.2	0.035	-55.3	0.746	176.0
750	0.844	173.1	2.38	17.1	0.034	-59.6	0.748	174.9
800	0.845	171.8	2.21	12.0	0.034	-63.9	0.750	174.0
850	0.845	170.6	2.07	6.9	0.033	-67.9	0.753	173.2
900	0.848	169.5	1.94	1.9	0.033	-71.9	0.755	172.4
950	0.851	168.4	1.83	-3.1	0.032	-76.0	0.758	171.4
1000	0.853	167.4	1.73	-8.0	0.032	-79.8	0.760	170.5
1050	0.856	166.4	1.64	-12.9	0.031	-83.8	0.764	169.7
1100	0.858	165.5	1.55	-17.7	0.031	-87.6	0.765	168.7
1150	0.860	164.5	1.47	-22.5	0.030	-91.4	0.769	167.8
1200	0.861	163.5	1.40	-27.4	0.030	-95.3	0.774	166.9
1250	0.862	162.5	1.33	-32.1	0.029	-98.9	0.778	166.1
1300	0.864	161.5	1.27	-37.0	0.029	-102.6	0.780	165.3
1350	0.865	160.5	1.21	-41.8	0.028	-106.3	0.784	164.4
1400	0.867	159.4	1.16	-46.6	0.028	-109.9	0.789	163.5
1450	0.868	158.5	1.11	-51.3	0.027	-113.4	0.792	162.8
1500	0.871	157.5	1.06	-56.0	0.027	-116.7	0.794	161.9
1550	0.874	156.6	1.02	-60.6	0.026	-120.2	0.796	161.1
1600	0.876	155.7	0.98	-65.4	0.025	-123.4	0.799	160.2
1650	0.878	154.8	0.94	-70.1	0.025	-126.8	0.801	159.3
1700	0.879	154.0	0.91	-74.8	0.024	-130.3	0.803	158.5
1750	0.879	153.2	0.88	-79.3	0.024	-133.2	0.805	157.4
1800	0.880	152.4	0.85	-83.8	0.023	-136.4	0.808	156.4
1850	0.882	151.5	0.82	-88.2	0.023	-139.6	0.812	155.5
1900	0.886	150.2	0.79	-92.7	0.022	-142.7	0.814	154.5
1950	0.888	148.9	0.76	-97.3	0.022	-146.0	0.818	153.4
2000	0.890	147.8	0.74	-101.7	0.021	-149.0	0.820	152.5
2050	0.893	146.8	0.71	-106.2	0.021	-151.9	0.825	151.7
2100	0.897	145.9	0.69	-110.6	0.020	-155.0	0.826	150.7
2150	0.900	145.0	0.67	-115.2	0.020	-157.7	0.829	149.6
2200	0.902	144.1	0.65	-119.7	0.019	-160.4	0.832	148.6
2250	0.904	143.3	0.63	-124.1	0.019	-163.0	0.837	147.8
2300	0.904	142.5	0.61	-128.6	0.019	-165.3	0.839	146.9
2350	0.904	141.7	0.59	-133.0	0.018	-168.3	0.839	145.9
2400	0.903	140.9	0.57	-137.5	0.018	-170.7	0.841	144.8
2450	0.901	139.9	0.55	-142.0	0.018	-173.1	0.843	144.0
2500	0.898	138.9	0.54	-146.5	0.017	-175.5	0.842	143.0



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
RQA0005MXTL-E	1000 pcs.	$\phi 178$ mm reel, 12 mm emboss taping

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