

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

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Not recommended  
for new design

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# 3SK324

## Si Nch Dual Gate MOS FET UHF RF LOW NOISE Amplifier

REJ03G0532-0100

Rev.1.00

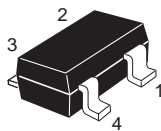
May 18, 2005

### Features

- Low noise characteristics; NF = 1.0 dB typ. (at f = 900 MHz)
- High gain characteristics; PG = 24 dB typ. (at f = 900 MHz)
- Capable low voltage operation; +B = 3.5 V
- High Endurance Voltage;  $V_{DS} = 6$  V

### Outline

RENESAS Package code: PTSP0004ZA-A  
(Package name: CMPAK-4)



1. Source
2. Gate1
3. Gate2
4. Drain

Notes: 1. Marking is "UG-".

### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DS}$	6	V
Gate1 to source voltage	$V_{G1S}$	+6 -6	V
Gate2 to source voltage	$V_{G2S}$	+6 -6	V
Drain current	$I_D$	20	mA
Channel power dissipation	$P_{ch}^{*2}$	250	mW
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

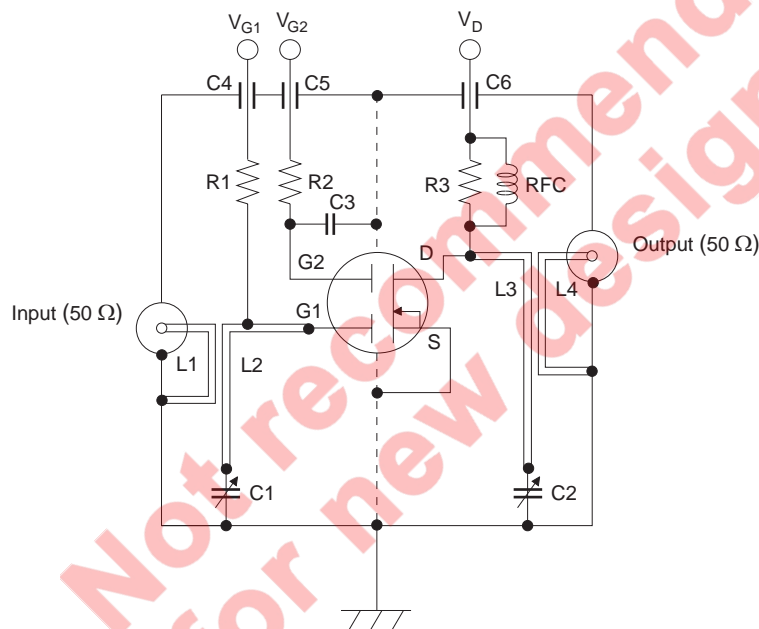
Notes: 2. Value on the glass epoxy board (50 mm × 40 mm × 1 mm).

## Electrical Characteristics

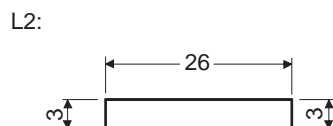
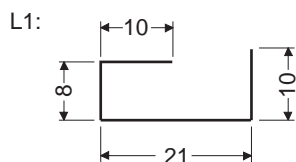
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DS}$	6	—	—	V	$I_D = 200 \mu A, V_{G1S} = V_{G2S} = 0$
Gate1 to source breakdown voltage	$V_{(BR)G1S}$	$\pm 6$	—	—	V	$I_{G1} = \pm 10 \mu A, V_{G2S} = V_{DS} = 0$
Gate2 to source breakdown voltage	$V_{(BR)G2S}$	$\pm 6$	—	—	V	$I_{G2} = \pm 10 \mu A, V_{G1S} = V_{DS} = 0$
Gate1 to source cutoff current	$I_{G1SS}$	—	—	$\pm 100$	nA	$V_{G1S} = \pm 5 V, V_{G2S} = V_{DS} = 0$
Gate2 to source cutoff current	$I_{G2SS}$	—	—	$\pm 100$	nA	$V_{G2S} = \pm 5 V, V_{G1S} = V_{DS} = 0$
Gate1 to source cutoff voltage	$V_{G1S(off)}$	0	0.5	1	V	$V_{DS} = 5 V, V_{G2S} = 3 V, I_D = 100 \mu A$
Gate2 to source cutoff voltage	$V_{G2S(off)}$	0.3	0.7	1.1	V	$V_{DS} = 5 V, V_{G1S} = 3 V, I_D = 100 \mu A$
Forward transfer admittance	$ y_{fs} $	30	42	—	mS	$V_{DS} = 3.5 V, I_D = 10 mA, V_{G2S} = 3 V, f = 1 kHz$
Power gain	PG	20	24	—	dB	$V_{DS} = 3.5 V, I_D = 10 mA, V_{G2S} = 3 V, f = 900 MHz$
Noise figure	NF	—	1.0	1.6	dB	$V_{DS} = 3.5 V, I_D = 10 mA, V_{G2S} = 3 V, f = 900 MHz$

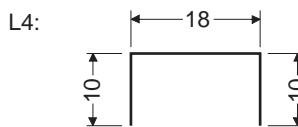
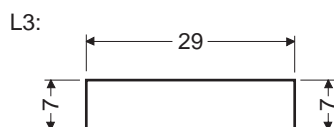
## 900MHz PG, NF Test Circuit



- C1, C2 : Variable Capacitor (10 pF MAX)  
 C3 : Disk Capacitor (1000 pF)  
 C4 to C6 : Air Capacitor (1000 pF)  
 R1 : 47 k $\Omega$   
 R2 : 47 k $\Omega$   
 R3 : 4.7 k $\Omega$

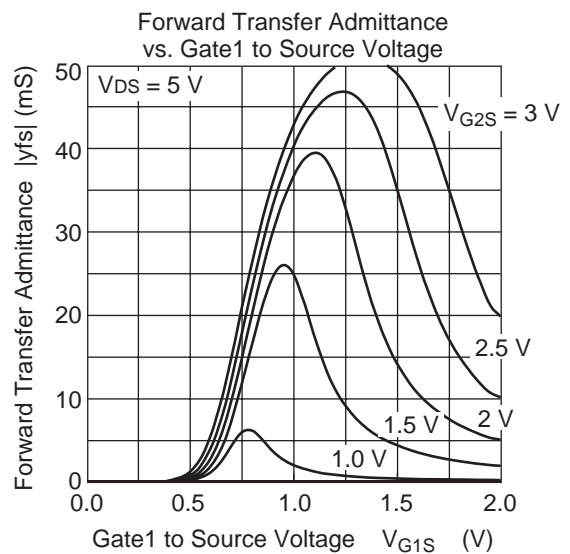
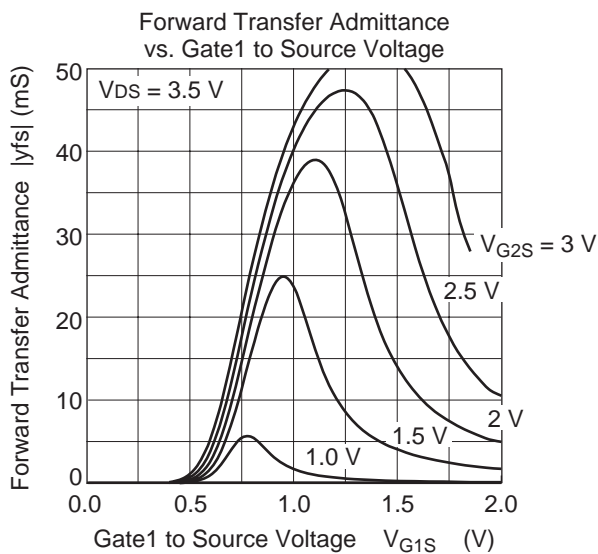
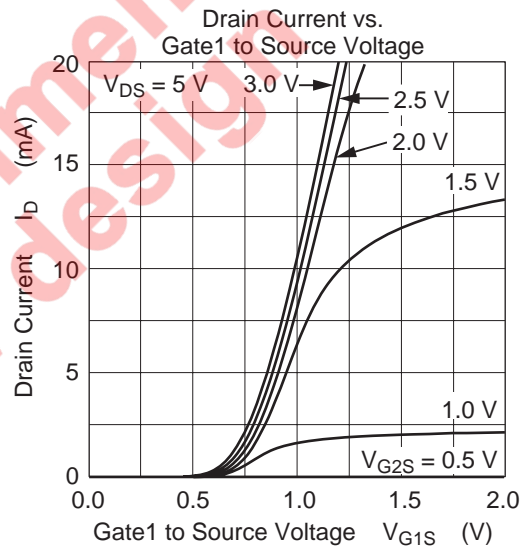
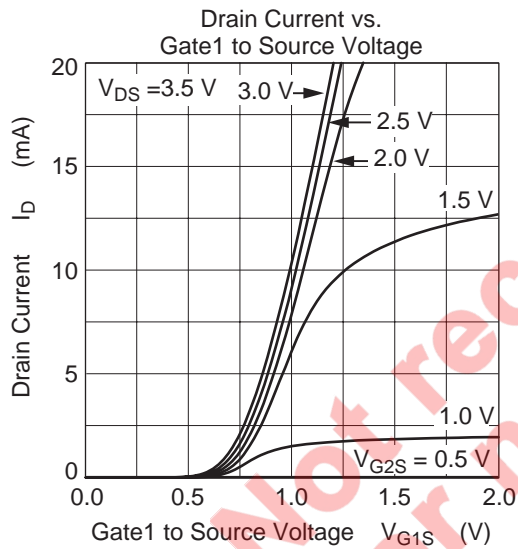
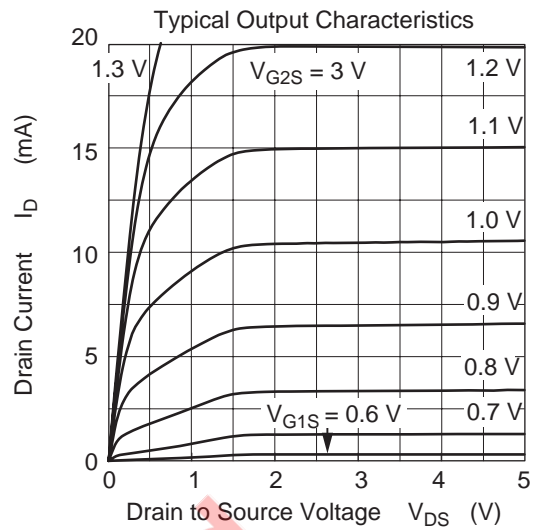
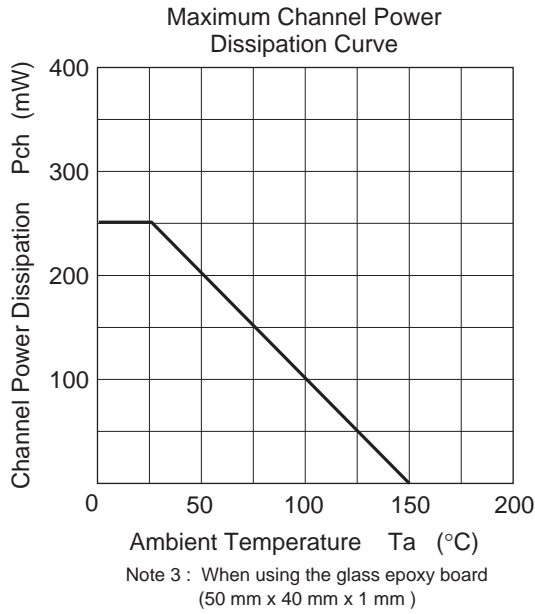


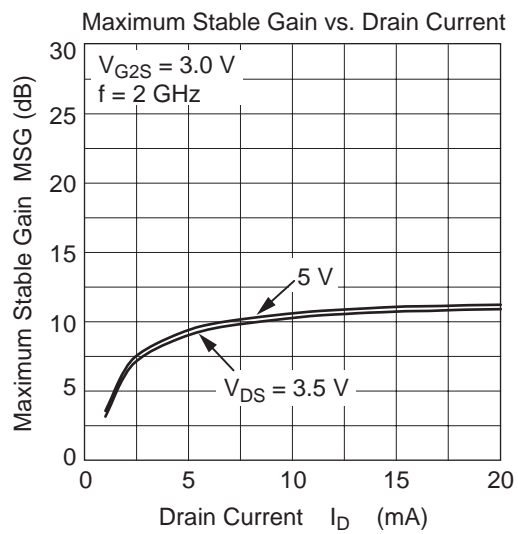
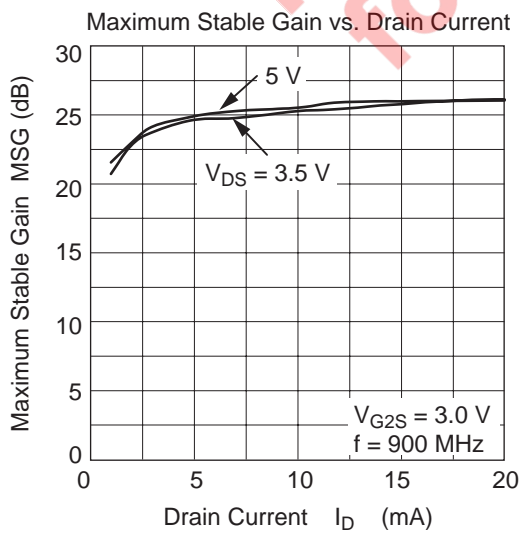
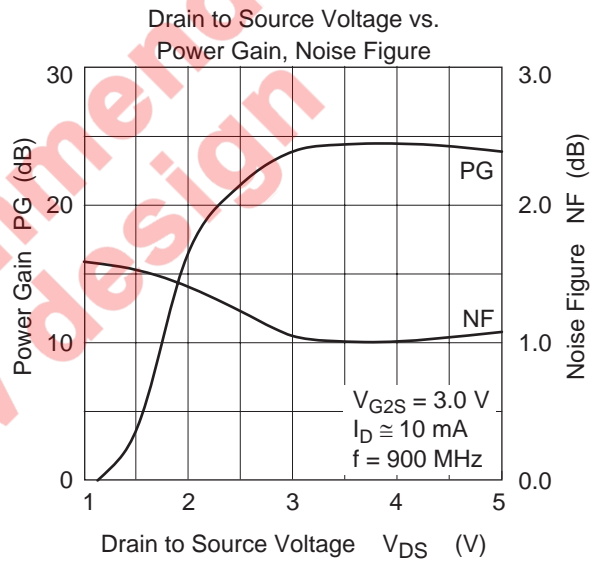
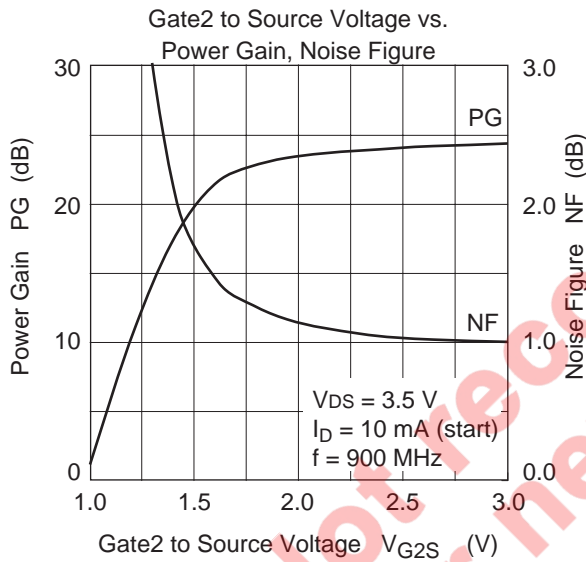
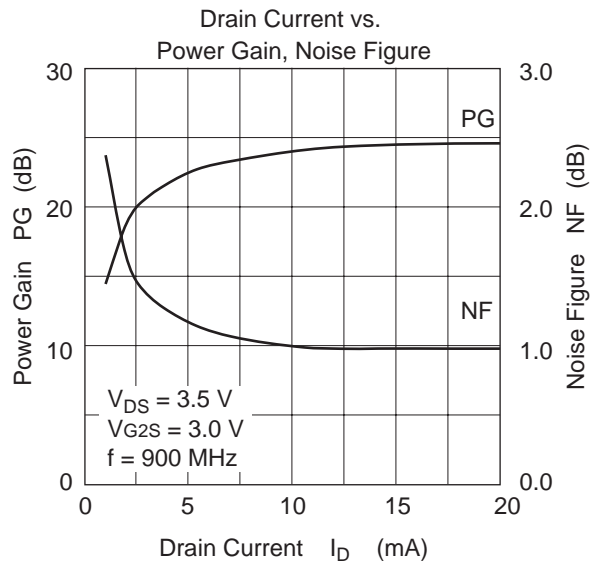
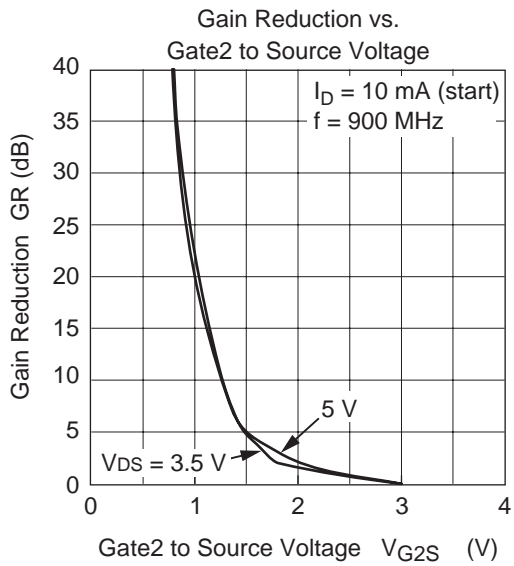
( $\phi 1$  mm Copper wire)  
Unit : mm

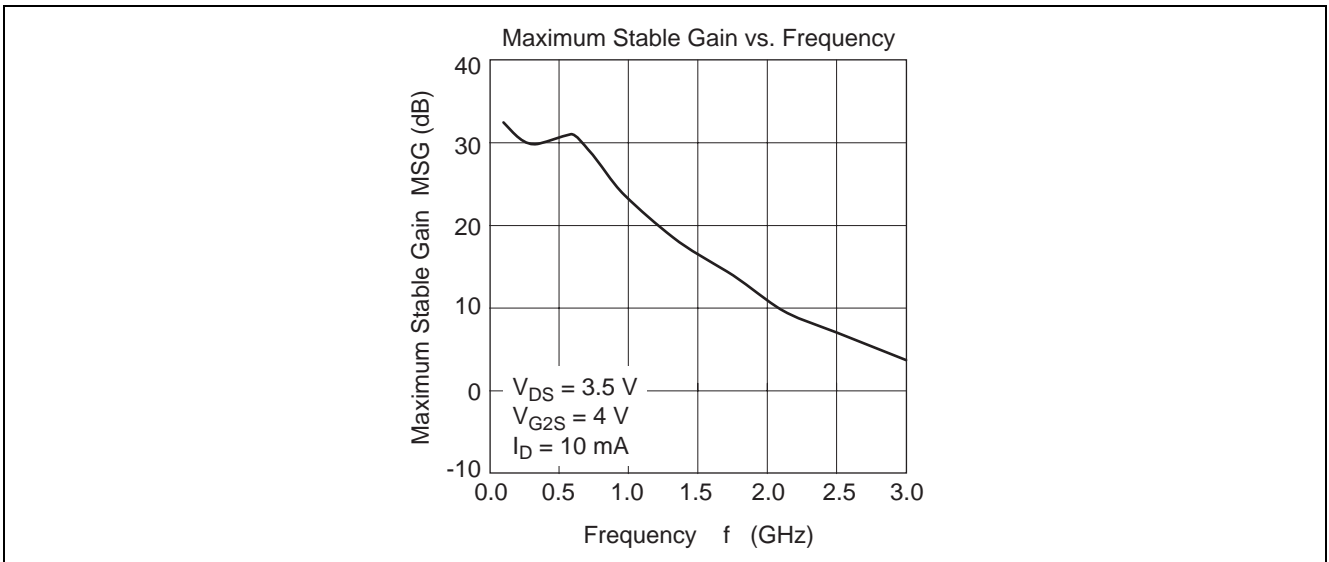


RFC :  $\phi 1$ mm Copper wire with enamel 4 turns inside dia 6 mm

Main Characteristics







Not recommend  
for new design

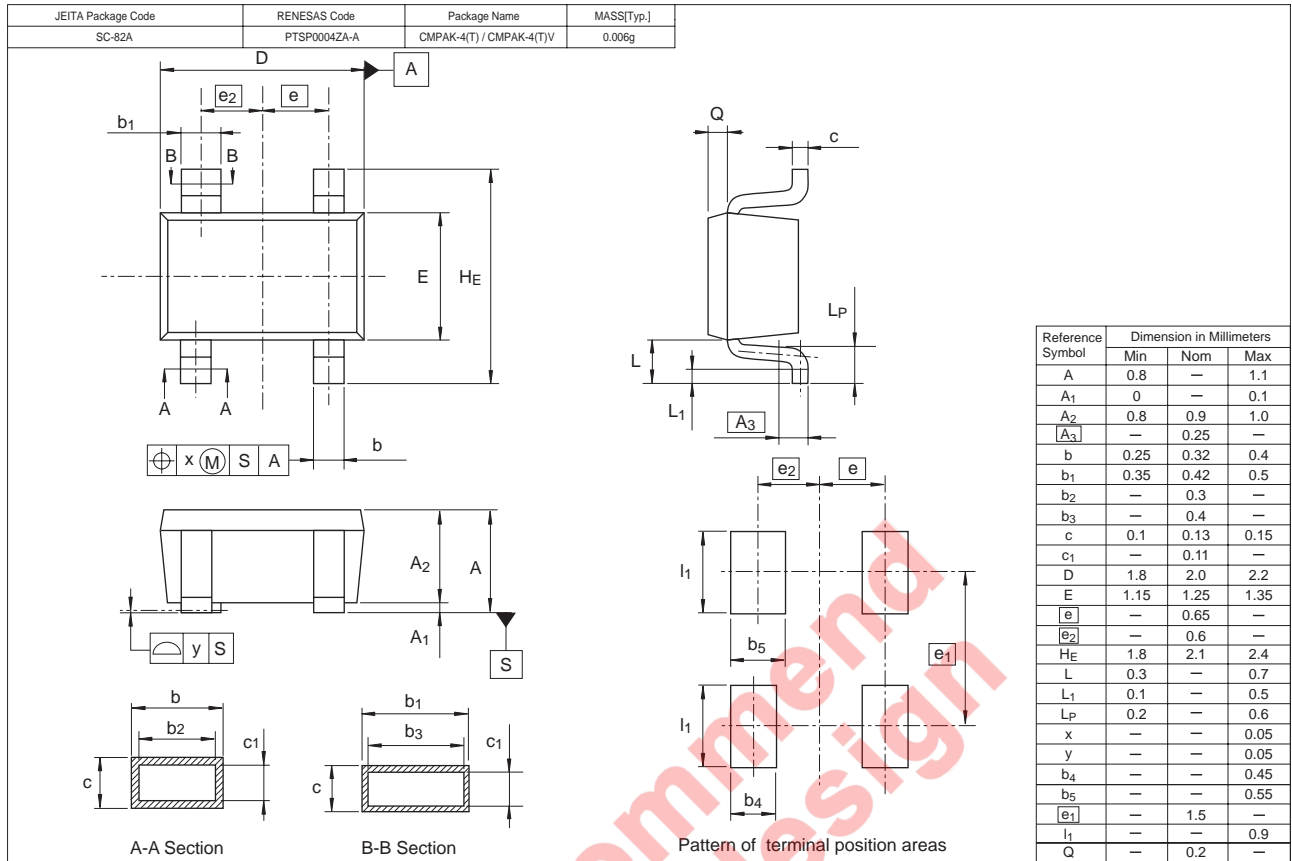
## S parameter

 $(V_{DS} = 3.5 \text{ V}, V_{GS} = 4 \text{ V}, I_D = 10 \text{ mA}, Z_o = 50 \Omega)$ 

f (GHz)	S11		S21		S12		S22	
	Mag	Phase	Mag	Phase	Mag	Phase	Mag	Phase
0.1	0.996	-6.0	4.33	170.1	0.002	139.0	0.992	-6.1
0.2	0.989	-11.7	4.23	160.5	0.003	84.8	0.988	-11.9
0.3	0.973	-17.1	4.15	151.2	0.003	96.9	0.978	-17.7
0.4	0.956	-22.6	4.06	142.1	0.004	75.9	0.963	-23.5
0.5	0.940	-27.8	3.94	133.5	0.004	82.6	0.948	-28.9
0.6	0.920	-32.9	3.84	125.0	0.003	91.7	0.931	-34.4
0.7	0.899	-37.7	3.73	116.7	0.004	132.5	0.915	-39.6
0.8	0.879	-42.4	3.62	108.6	0.005	157.1	0.899	-44.7
0.9	0.858	-46.9	3.52	100.5	0.010	169.9	0.883	-49.7
1.0	0.840	-51.3	3.42	92.5	0.014	173.8	0.869	-54.5
1.1	0.816	-55.5	3.30	84.4	0.020	174.8	0.857	-59.3
1.2	0.794	-59.3	3.19	76.2	0.028	175.0	0.846	-63.9
1.3	0.772	-62.8	3.08	67.8	0.036	169.6	0.838	-68.5
1.4	0.752	-66.0	2.97	59.2	0.048	165.1	0.835	-72.9
1.5	0.734	-68.5	2.84	49.4	0.058	160.8	0.837	-77.3
1.6	0.727	-69.7	2.63	38.2	0.069	156.3	0.849	-82.4
1.7	0.754	-70.0	2.28	26.6	0.079	152.6	0.867	-88.1
1.8	0.825	-73.3	1.77	20.3	0.092	152.4	0.869	-95.5
1.9	0.877	-80.3	1.47	24.7	0.111	150.7	0.847	-102.1
2.0	0.890	-88.0	1.45	29.7	0.136	147.2	0.818	-108.0
2.1	0.882	-94.7	1.52	28.9	0.162	142.4	0.796	-112.9
2.2	0.867	-100.9	1.56	25.0	0.192	136.6	0.780	-117.7
2.3	0.851	-106.6	1.58	19.9	0.223	130.5	0.766	-122.4
2.4	0.834	-112.1	1.56	14.4	0.256	123.9	0.753	-127.3
2.5	0.816	-117.5	1.54	8.8	0.294	117.3	0.739	-132.2
2.6	0.795	-122.8	1.50	3.2	0.333	109.8	0.724	-137.2
2.7	0.771	-128.1	1.47	-2.2	0.374	101.9	0.706	-142.2
2.8	0.744	-133.2	1.43	-7.7	0.416	93.6	0.681	-146.9
2.9	0.713	-138.1	1.39	-12.9	0.458	84.6	0.654	-151.2
3.0	0.677	-142.4	1.36	-18.3	0.497	74.7	0.624	-154.8



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
3SK324UG-	3000 pcs.	Taping

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