

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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>)

Send any inquiries to <http://www.renesas.com/inquiry>.

EOL announced product

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## 2SC4899

Silicon NPN Epitaxial

REJ03G0732-0300  
 (Previous ADE-208-1126A)  
 Rev.3.00  
 Aug.10.2005

### Application

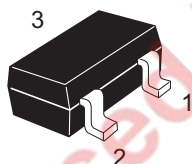
VHF / UHF wide band amplifier

### Features

- High gain bandwidth product  
 $f_T = 9$  GHz Typ
- High gain, low noise figure  
 $PG = 14.0$  dB Typ,  $NF = 1.2$  dB Typ at  $f = 900$  MHz

### Outline

RENESAS Package code: PTSP0003ZA-A  
 (Package name: CMPAK<sup>®</sup>)



1. Emitter
2. Base
3. Collector

Note: Marking is "YH-".

\*CMPAK is a trademark of Renesas Technology Corp.

Attention: This is electrostatic sensitive device.

### Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	9	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	20	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

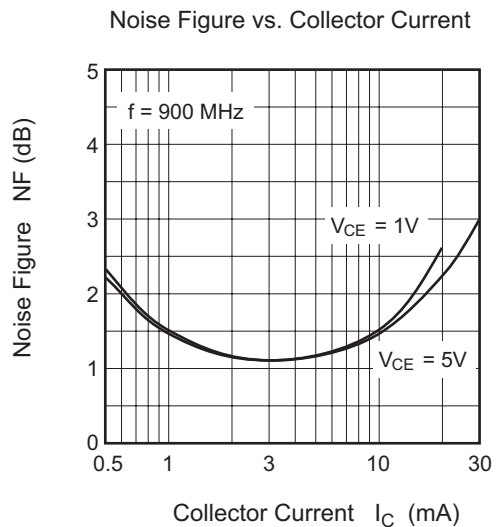
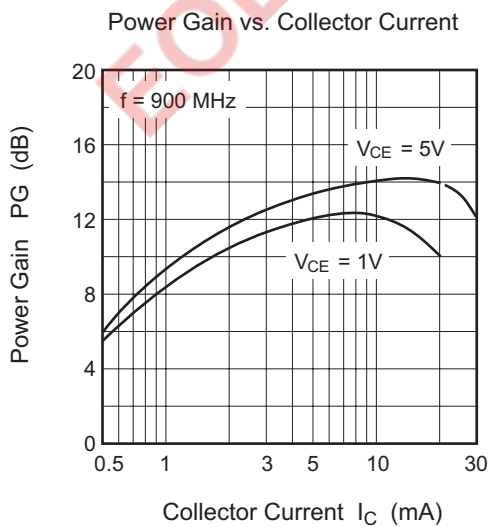
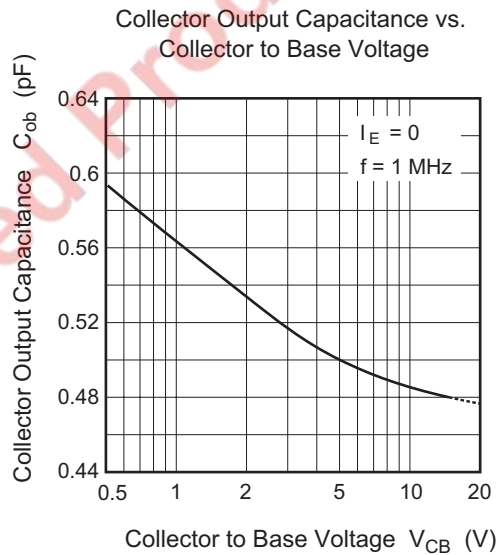
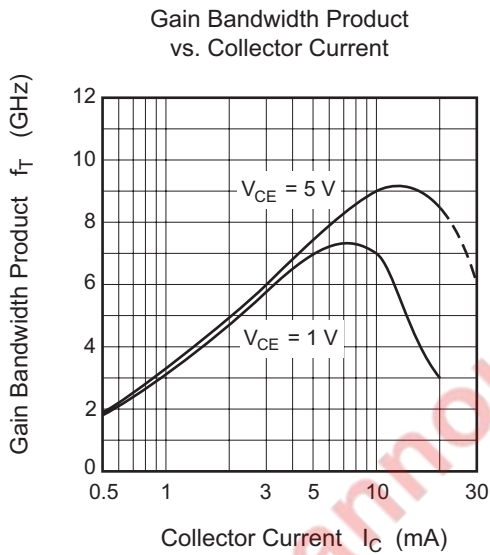
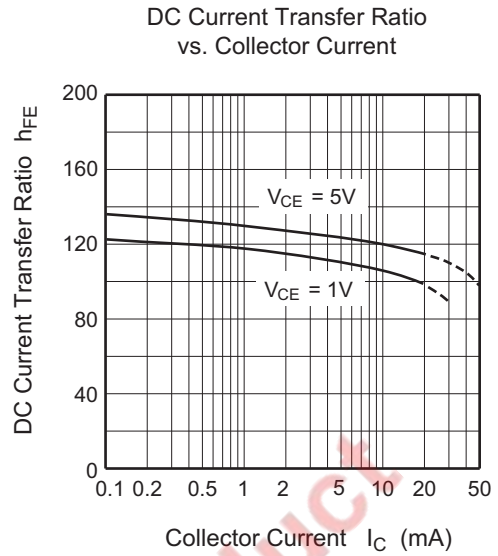
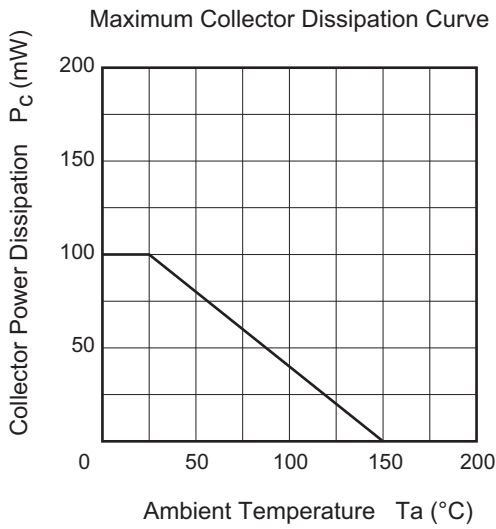
## Electrical Characteristics

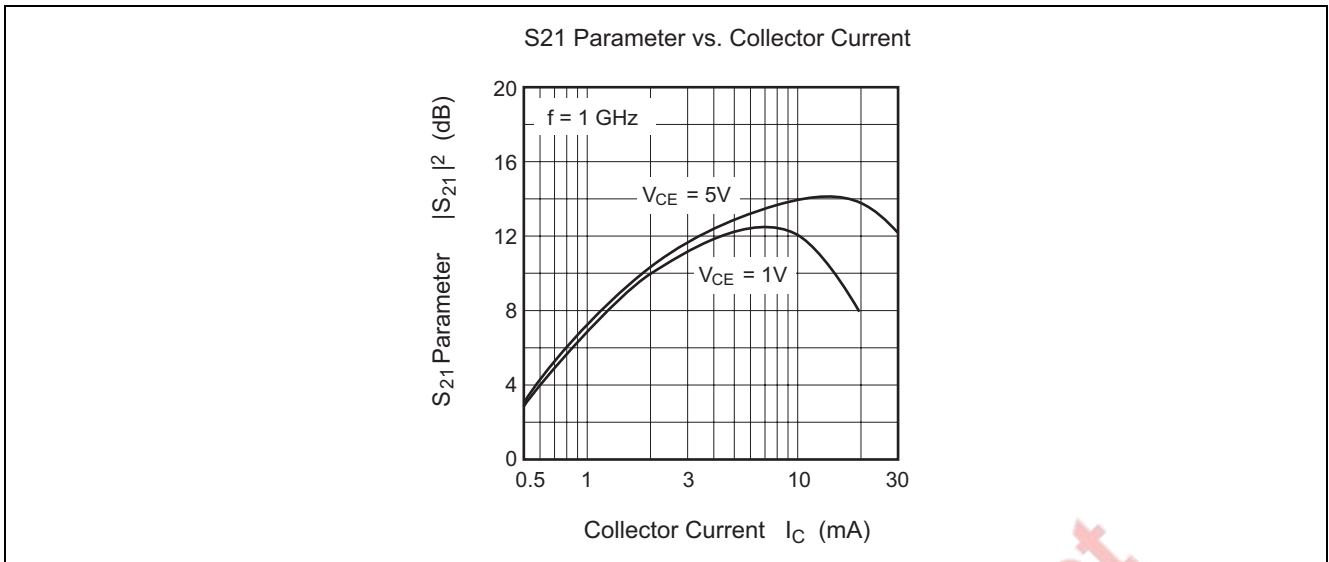
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	$I_{CBO}$	—	—	10	$\mu\text{A}$	$V_{CB} = 15\text{ V}, I_E = 0$
	$I_{CEO}$	—	—	1	mA	$V_{CE} = 9\text{ V}, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu\text{A}$	$V_{EB} = 1.5\text{ V}, I_C = 0$
DC current transfer ratio	$h_{FE}$	50	120	250		$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Collector output capacitance	$C_{ob}$	—	0.5	0.85	pF	$V_{CB} = 5\text{ V}, I_E = 0, f = 1\text{ MHz}$
Gain bandwidth product	$f_T$	6.0	9.0	—	GHz	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Power gain	PG	11.0	14.0	—	dB	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA},$ $f = 900\text{ MHz}$
Noise figure	NF	—	1.2	2.5	dB	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA},$ $f = 900\text{ MHz}$

EOL announced Product

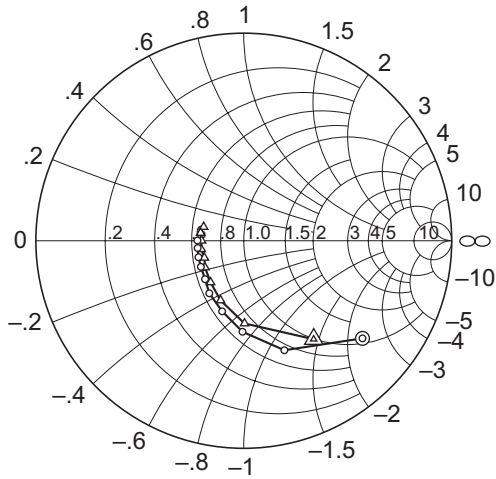
Main Characteristics





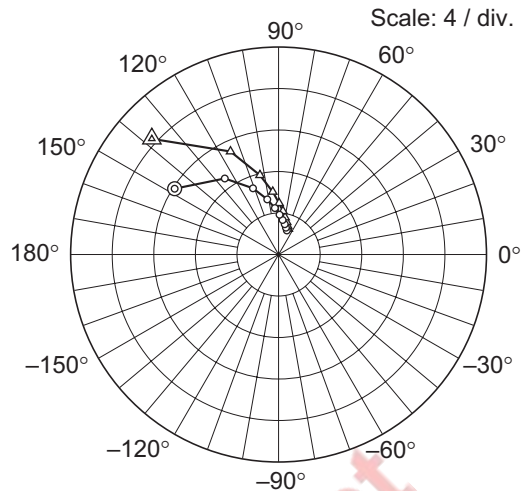
EOL announced Product

S11 Parameter vs. Frequency



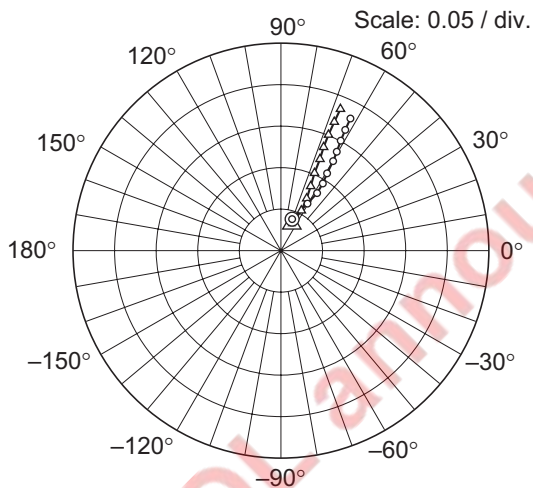
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (  $I_C = 5\text{ mA}$  )  
 △ (  $I_C = 10\text{ mA}$  )

S21 Parameter vs. Frequency



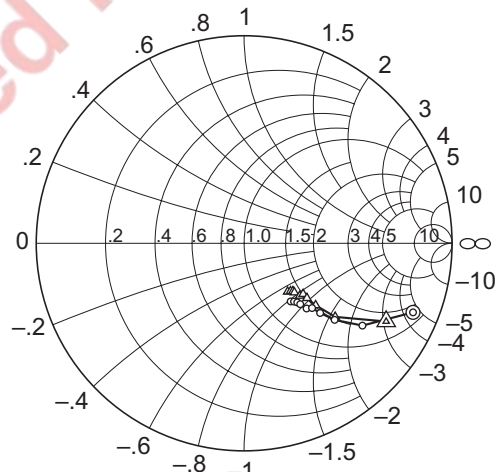
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 200 to 2000 MHz (200 MHz step)  
 ○ (  $I_C = 5\text{ mA}$  )  
 △ (  $I_C = 10\text{ mA}$  )

S12 Parameter vs. Frequency



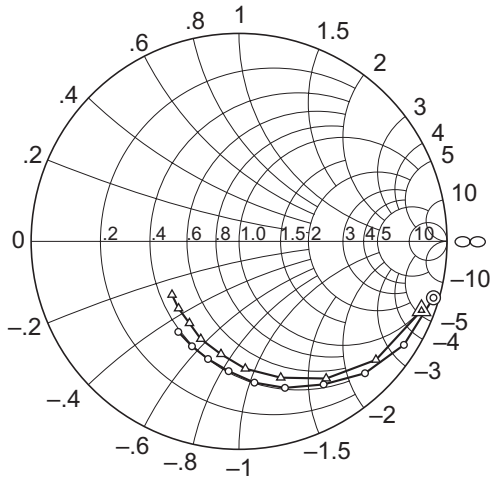
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (  $I_C = 5\text{ mA}$  )  
 △ (  $I_C = 10\text{ mA}$  )

S22 Parameter vs. Frequency



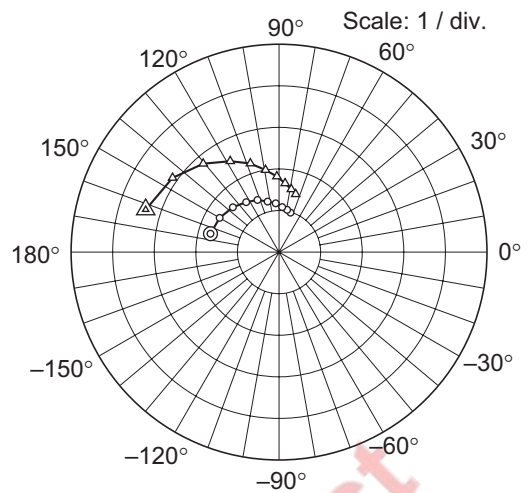
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (  $I_C = 5\text{ mA}$  )  
 △ (  $I_C = 10\text{ mA}$  )

S11 Parameter vs. Frequency



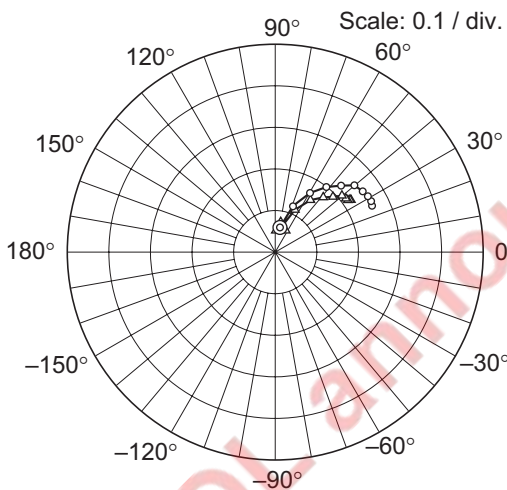
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (I<sub>C</sub> = 0.5 mA)  
 △ (I<sub>C</sub> = 1 mA)

S21 Parameter vs. Frequency



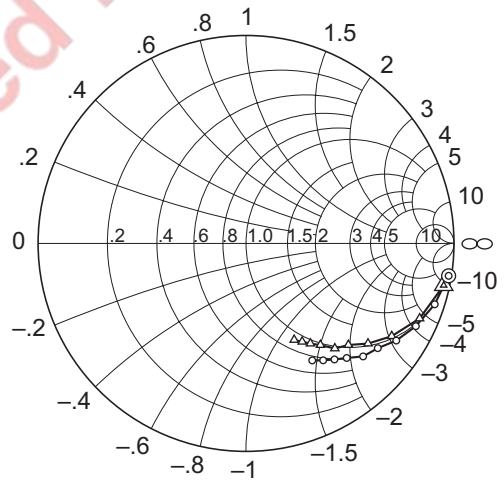
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (I<sub>C</sub> = 0.5 mA)  
 △ (I<sub>C</sub> = 1 mA)

S12 Parameter vs. Frequency



Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (I<sub>C</sub> = 0.5 mA)  
 △ (I<sub>C</sub> = 1 mA)

S22 Parameter vs. Frequency



Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ (I<sub>C</sub> = 0.5 mA)  
 △ (I<sub>C</sub> = 1 mA)

## S Parameter

(V<sub>CE</sub> = 5 V, I<sub>C</sub> = 5 mA, Z<sub>O</sub> = 50 Ω, Emitter Common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.814	-20.5	13.23	163.0	0.0214	79.4	0.961	-11.8
200	0.740	-39.5	11.84	147.6	0.0403	70.6	0.878	-22.3
300	0.648	-56.3	10.34	134.9	0.0550	64.1	0.780	-29.7
400	0.563	-69.7	8.99	125.2	0.0653	60.6	0.694	-34.9
500	0.499	-80.8	7.81	117.6	0.0744	58.4	0.626	-38.1
600	0.439	-90.8	6.81	111.1	0.0821	57.9	0.571	-40.3
700	0.393	-99.1	6.11	106.0	0.0888	57.8	0.528	-41.8
800	0.356	-107.0	5.44	101.6	0.0956	58.1	0.497	-42.6
900	0.322	-115.5	4.93	97.7	0.102	58.3	0.469	-43.0
1000	0.303	-123.2	4.51	94.6	0.109	59.2	0.452	-43.7
1100	0.275	-129.7	4.17	91.6	0.116	60.3	0.442	-43.8
1200	0.263	-135.1	3.86	88.7	0.125	59.8	0.435	-46.3
1300	0.253	-141.7	3.61	85.9	0.130	60.2	0.414	-47.3
1400	0.242	-148.6	3.37	83.5	0.137	60.6	0.399	-47.4
1500	0.237	-154.2	3.17	81.1	0.144	61.2	0.360	-47.8
1600	0.232	-160.0	3.00	78.7	0.151	61.5	0.383	-48.1
1700	0.224	-166.4	2.83	77.0	0.158	61.8	0.376	-48.8
1800	0.225	-171.0	2.70	74.9	0.165	62.0	0.370	-49.5
1900	0.228	-176.5	2.59	73.0	0.172	62.2	0.363	-50.2
2000	0.223	179.7	2.47	71.3	0.180	62.3	0.359	-51.4

## S Parameter

(V<sub>CE</sub> = 5 V, I<sub>C</sub> = 10 mA, Z<sub>O</sub> = 50 Ω, Emitter Common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.688	-29.6	20.06	156.3	0.0201	76.3	0.921	-16.8
200	0.582	-54.7	16.54	137.5	0.0349	67.8	0.780	-28.9
300	0.479	-74.0	13.31	124.0	0.0459	64.0	0.653	-35.6
400	0.399	-89.5	10.97	114.9	0.0544	63.0	0.564	-39.0
500	0.345	-101.3	9.20	108.4	0.0624	62.6	0.501	-40.4
600	0.309	-111.2	7.87	103.1	0.0702	63.7	0.456	-41.0
700	0.280	-120.4	6.90	98.7	0.0782	64.3	0.424	-41.1
800	0.257	-128.5	6.09	95.2	0.0857	65.2	0.402	-41.2
900	0.243	-137.6	5.45	92.0	0.0936	66.0	0.384	-41.0
1000	0.227	-145.3	4.97	89.3	0.102	66.6	0.375	-40.8
1100	0.216	-153.0	4.56	86.8	0.111	67.3	0.373	-40.8
1200	0.207	-156.5	4.22	84.2	0.120	66.9	0.369	-43.5
1300	0.206	-163.1	3.93	82.2	0.126	67.1	0.350	-44.4
1400	0.209	-168.6	3.65	80.0	0.135	67.6	0.339	-44.5
1500	0.204	-176.8	3.43	77.9	0.143	67.5	0.334	-44.4
1600	0.203	180.0	3.24	75.9	0.151	67.7	0.330	-44.6
1700	0.207	173.7	3.06	74.2	0.160	67.6	0.325	-45.5
1800	0.211	169.8	2.91	72.5	0.168	67.5	0.322	-46.1
1900	0.215	164.6	2.78	71.1	0.177	67.4	0.317	-47.2
2000	0.204	161.2	2.66	69.2	0.185	67.2	0.314	-48.2

## S Parameter

(V<sub>CE</sub> = 1 V, I<sub>C</sub> = 0.5 mA, Z<sub>O</sub> = 50 Ω, Emitter Common)

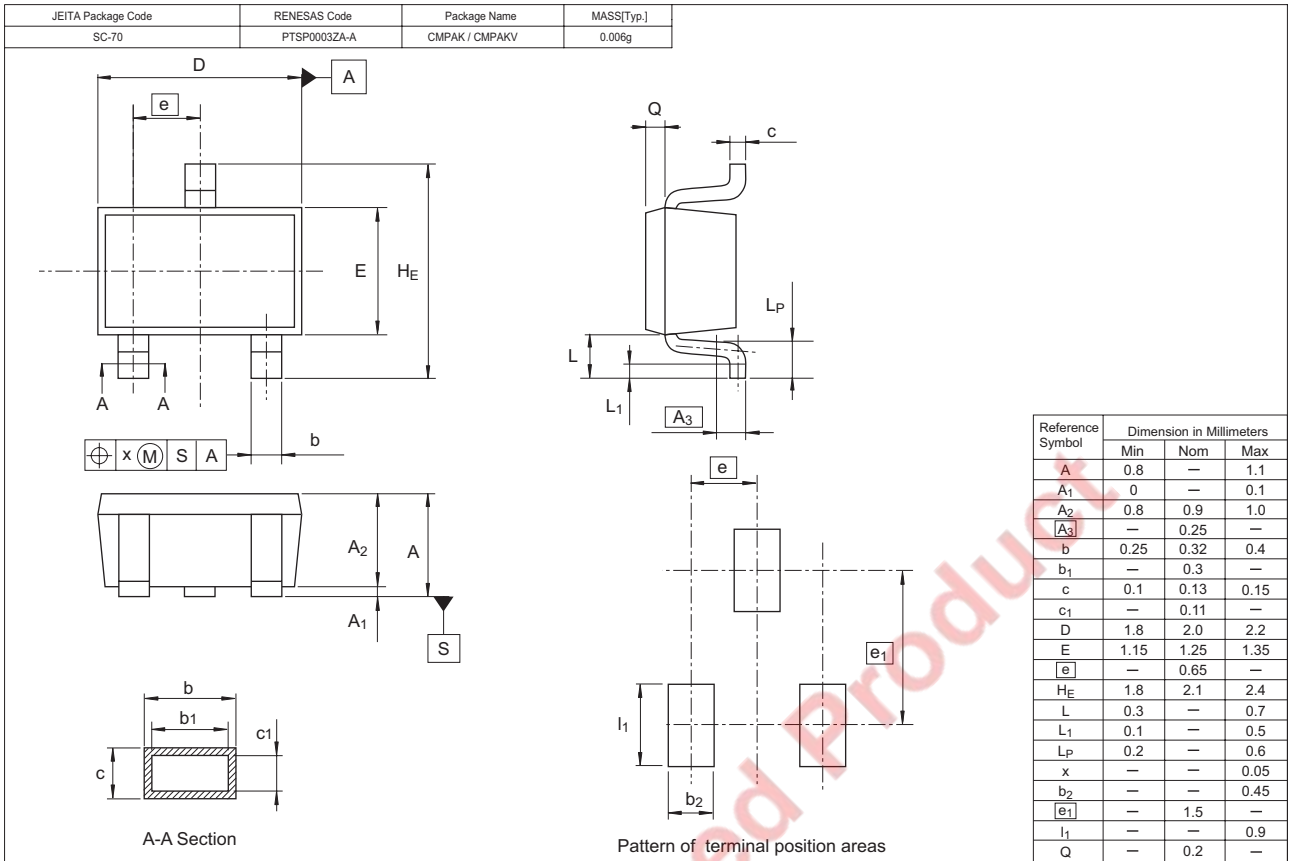
Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.983	-7.8	1.76	172.6	0.0295	85.3	0.996	-4.5
200	0.974	-16.2	1.71	165.0	0.0604	79.3	0.987	-9.1
300	0.958	-24.3	1.69	157.1	0.0910	73.8	0.972	-13.7
400	0.936	-32.1	1.65	149.9	0.118	68.9	0.954	-17.9
500	0.904	-39.4	1.59	142.8	0.143	64.1	0.933	-22.0
600	0.877	-46.3	1.55	135.7	0.165	59.6	0.909	-26.0
700	0.845	-53.1	1.48	129.3	0.184	55.5	0.886	-29.3
800	0.799	-59.4	1.44	123.2	0.199	51.9	0.861	-32.9
900	0.781	-66.6	1.39	117.4	0.214	48.3	0.835	-35.9
1000	0.738	-72.6	1.36	112.3	0.225	45.3	0.810	-38.5
1100	0.714	-78.0	1.32	107.2	0.235	43.5	0.791	-40.9
1200	0.683	-83.8	1.25	102.6	0.249	40.2	0.783	-44.0
1300	0.657	-89.0	1.21	98.3	0.253	37.0	0.758	-46.7
1400	0.626	-94.6	1.18	93.8	0.256	34.8	0.734	-48.7
1500	0.603	-99.6	1.14	89.8	0.259	32.9	0.717	-50.9
1600	0.585	-104.8	1.09	85.9	0.260	31.1	0.702	-52.7
1700	0.567	-109.5	1.06	82.5	0.261	29.6	0.687	-54.7
1800	0.553	-114.2	1.04	79.1	0.261	28.0	0.674	-56.6
1900	0.538	-119.8	1.02	76.5	0.260	27.1	0.659	-58.7
2000	0.524	-123.9	0.994	73.7	0.258	25.6	0.647	-60.5

## S Parameter

(V<sub>CE</sub> = 1 V, I<sub>C</sub> = 1 mA, Z<sub>O</sub> = 50 Ω, Emitter Common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.956	-10.5	3.49	171.1	0.0298	83.7	0.991	-6.1
200	0.938	-20.8	3.37	162.3	0.0596	77.0	0.972	-12.0
300	0.912	-31.1	3.26	153.2	0.0874	70.7	0.945	-18.1
400	0.871	-40.9	3.12	145.1	0.112	65.1	0.910	-23.4
500	0.830	-50.1	2.94	137.9	0.133	60.0	0.871	-28.1
600	0.782	-57.6	2.80	130.6	0.151	56.0	0.831	-32.5
700	0.740	-65.8	2.63	124.0	0.164	51.9	0.795	-36.1
800	0.686	-73.0	2.48	118.2	0.175	48.8	0.759	-39.4
900	0.656	-80.7	2.35	112.5	0.185	45.9	0.725	-42.4
1000	0.613	-87.2	2.24	107.9	0.192	43.8	0.694	-44.8
1100	0.582	-93.3	2.13	103.8	0.200	42.8	0.672	-47.0
1200	0.551	-99.1	2.00	99.3	0.210	40.3	0.662	-49.8
1300	0.532	-104.7	1.91	95.3	0.210	38.1	0.631	-52.4
1400	0.505	-111.4	1.82	91.6	0.213	37.2	0.606	-53.8
1500	0.483	-116.3	1.74	88.1	0.215	36.3	0.587	-55.6
1600	0.461	-121.2	1.66	84.9	0.216	35.6	0.573	-57.3
1700	0.445	-127.2	1.59	81.9	0.217	34.9	0.558	-58.6
1800	0.435	-132.0	1.54	78.9	0.219	35.0	0.545	-60.3
1900	0.425	-137.6	1.49	76.7	0.221	34.7	0.531	-61.8
2000	0.413	-141.4	1.45	73.9	0.221	34.6	0.519	-63.5

### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
2SC4899YH-TR-E	3000	φ 178 mm Reel, 8 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.

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

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450 Holger Way, San Jose, CA 95134-1368, U.S.A  
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#### Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
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Tel: <852> 2265-6688, Fax: <852> 2730-6071

#### Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

#### Renesas Technology (Shanghai) Co., Ltd.

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China  
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

#### Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

#### Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

#### Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510