

## 2SC5628

Silicon NPN Epitaxial  
High Frequency Amplifier / Oscillator

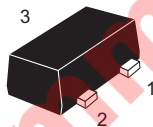
REJ03G0750-0300  
(Previous ADE-208-979A)  
Rev.3.00  
Aug.10.2005

### Features

- Super compact package;  
(1.4 × 0.8 × 0.59mm)
- High power gain and low noise figure;  
(PG = 9 dB, NF = 1.1 dB typ, at f = 900 MHz, V<sub>CE</sub> = 1 V)

### Outline

RENESAS Package code: PUSF0003ZA-A  
(Package name: MFPAK<sup>®</sup>)



1. Emitter
2. Base
3. Collector

Note: Marking is "XZ-".

\*MFPAK is a trademark of Renesas Technology Corp.

### Absolute Maximum Ratings

(T<sub>a</sub> = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	15	V
Collector to emitter voltage	V <sub>CEO</sub>	8	V
Emitter to base voltage	V <sub>EBO</sub>	1.5	V
Collector current	I <sub>C</sub>	50	mA
Collector power dissipation	P <sub>C</sub>	80	mW
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

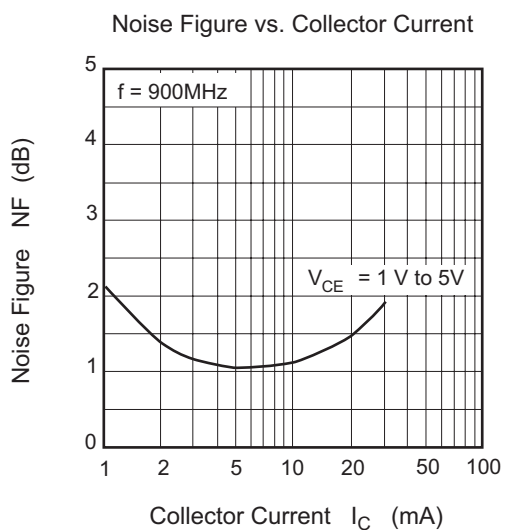
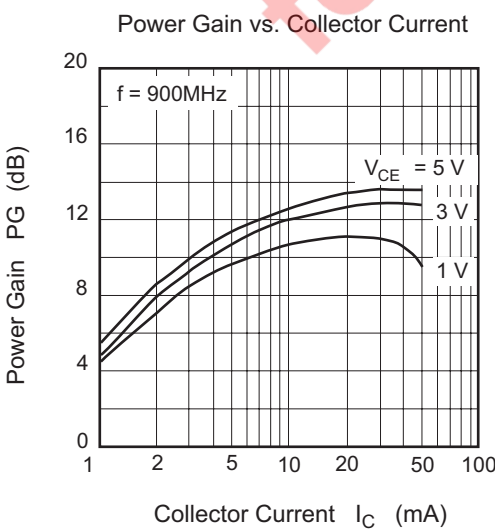
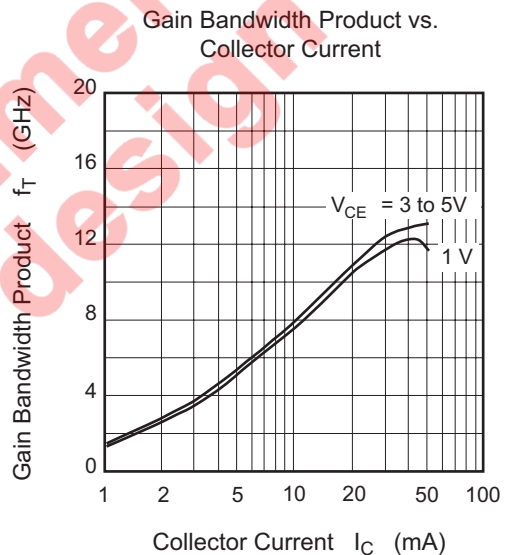
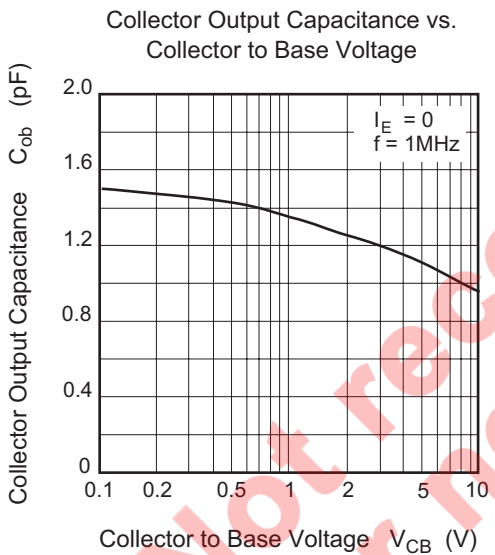
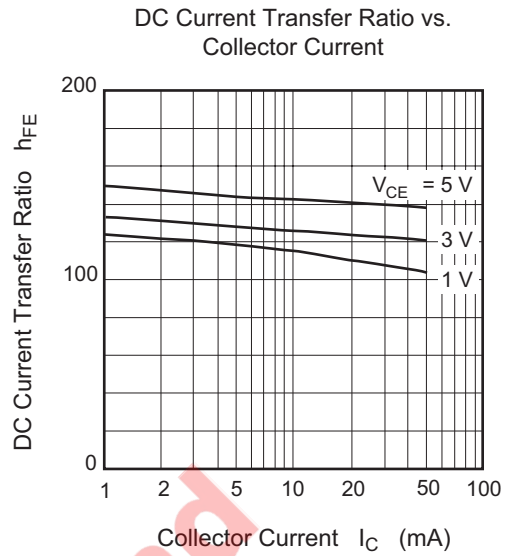
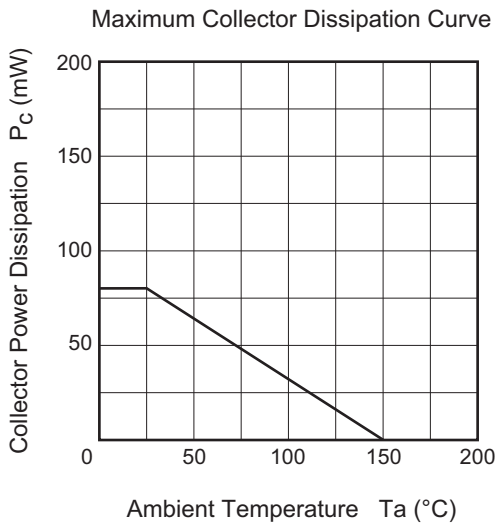
## Electrical Characteristics

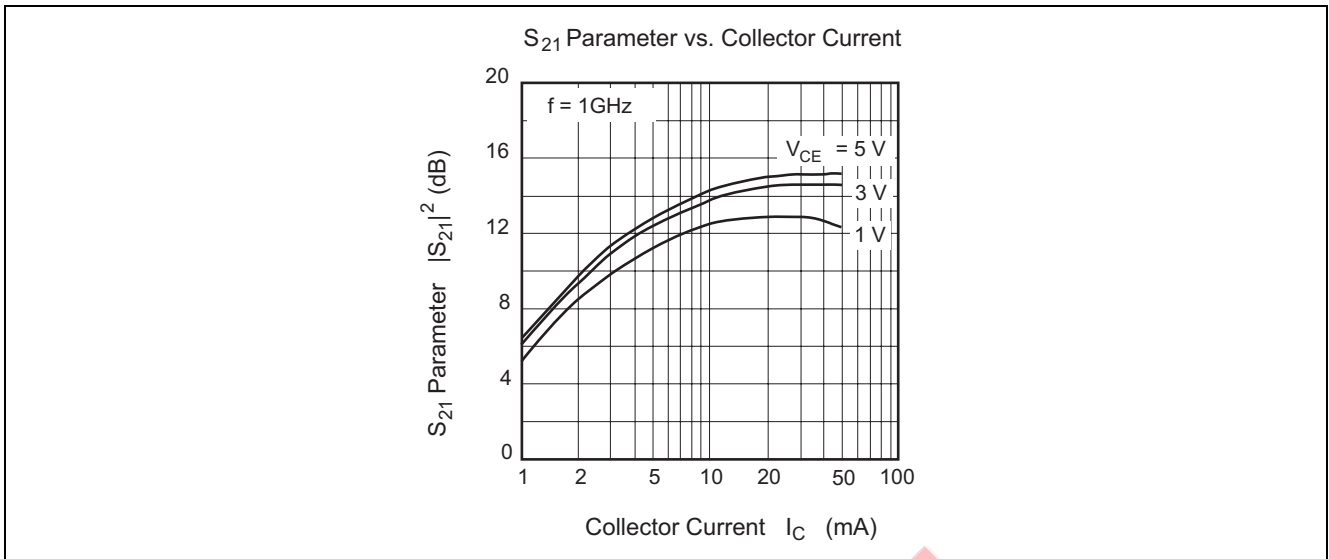
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10\mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.2	$\mu A$	$V_{CB} = 12V, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	$\mu A$	$V_{CE} = 8V, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	1	$\mu A$	$V_{EB} = 1.5V, I_C = 0$
DC current transfer ratio	$h_{FE}$	80	100	160		$V_{CE} = 1V, I_C = 5mA$
Collector output capacitance	$C_{ob}$	—	0.55	0.85	pF	$V_{CB} = 1V, I_E = 0$ $f = 1MHz$
Gain bandwidth product	$f_T$	6	9	—	GHz	$V_{CE} = 1V, I_C = 5mA$
Power gain	PG	11	14	—	dB	$V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$
Noise figure	NF	—	1.1	2.0	dB	$V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$

Not recommend  
for new design

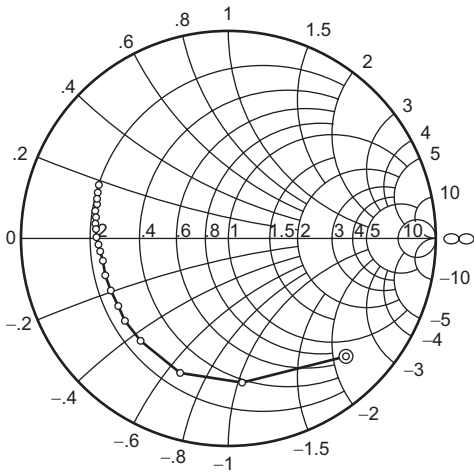
Main Characteristics





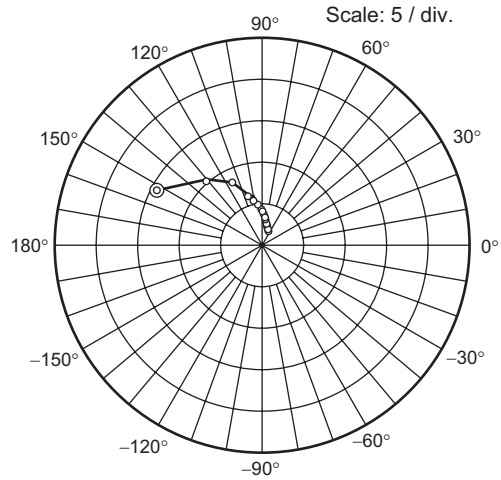
Not recommended  
for new design

S11 Parameter vs. Frequency



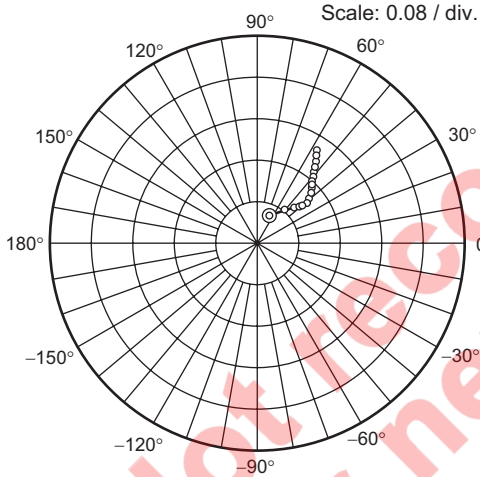
Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$   
 100 to 2000 MHz (100 MHz step)  
 ⊙—○

S21 Parameter vs. Frequency



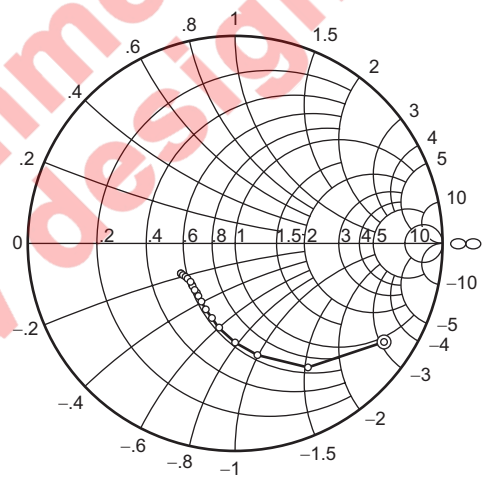
Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$   
 100 to 2000 MHz (100 MHz step)  
 ⊙—○

S12 Parameter vs. Frequency



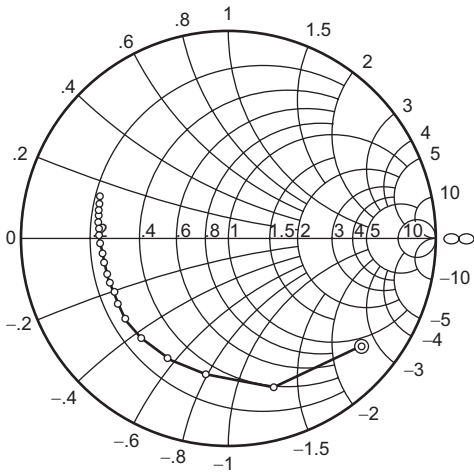
Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$   
 100 to 2000 MHz (100 MHz step)  
 ⊙—○

S22 Parameter vs. Frequency



Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$   
 100 to 2000 MHz (100 MHz step)  
 ⊙—○

S11 Parameter vs. Frequency

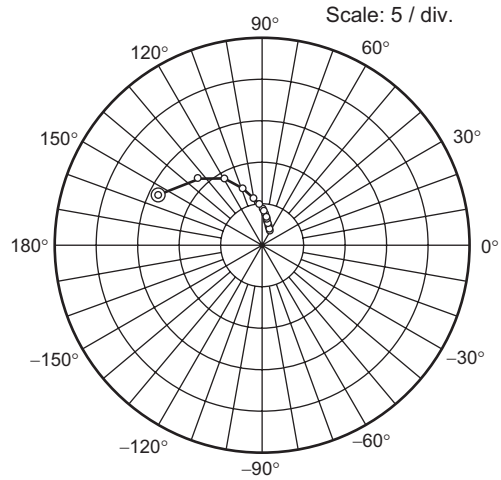


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S21 Parameter vs. Frequency

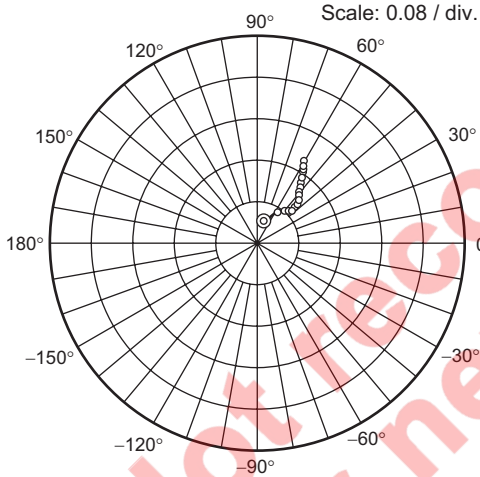


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S12 Parameter vs. Frequency

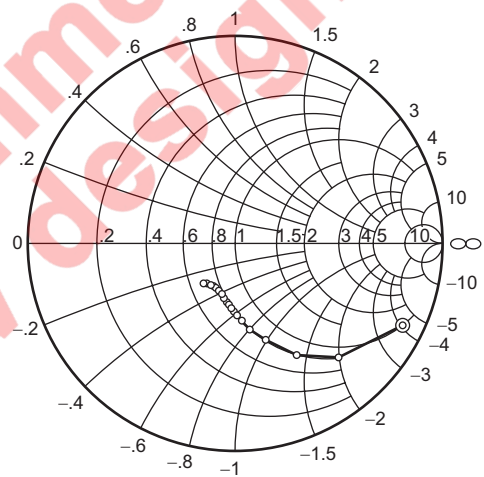


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S22 Parameter vs. Frequency



Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



## Sparameter

 $(V_{CE} = 1V, I_C = 5mA, Z_o = 50\Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.815	-46.1	13.63	152.2	0.0509	67.0	0.882	-32.5
200	0.734	-84.6	10.68	130.6	0.0834	51.0	0.695	-58.5
300	0.692	-111.2	8.23	116.8	0.0998	42.9	0.550	-76.0
400	0.665	-127.4	6.58	107.9	0.108	39.5	0.459	-88.5
500	0.650	-139.6	5.44	101.4	0.114	38.0	0.399	-98.1
600	0.644	-148.8	4.61	96.3	0.120	38.3	0.360	-105.7
700	0.640	-155.6	4.03	92.2	0.124	39.0	0.333	-112.2
800	0.641	-161.6	3.56	88.6	0.128	39.9	0.315	-117.8
900	0.638	-166.9	3.20	85.3	0.134	41.8	0.301	-122.4
1000	0.638	-171.6	2.90	82.2	0.138	43.5	0.292	-126.7
1100	0.643	-175.1	2.66	79.6	0.143	44.4	0.286	-130.2
1200	0.643	-178.5	2.46	77.2	0.149	46.2	0.280	-133.6
1300	0.648	178.5	2.28	74.9	0.154	47.8	0.279	-135.6
1400	0.651	175.4	2.15	72.8	0.161	49.1	0.278	-138.6
1500	0.658	173.2	2.03	70.5	0.168	50.9	0.277	-140.9
1600	0.663	170.0	1.92	68.5	0.174	51.8	0.279	-143.3
1700	0.667	167.2	1.82	66.7	0.182	53.2	0.281	-145.0
1800	0.669	165.0	1.74	64.4	0.189	54.6	0.282	-147.1
1900	0.673	163.1	1.67	63.2	0.196	55.5	0.286	-149.3
2000	0.682	161.0	1.60	61.4	0.204	56.4	0.289	-150.6

Not recommended for new designs

## Sparameter

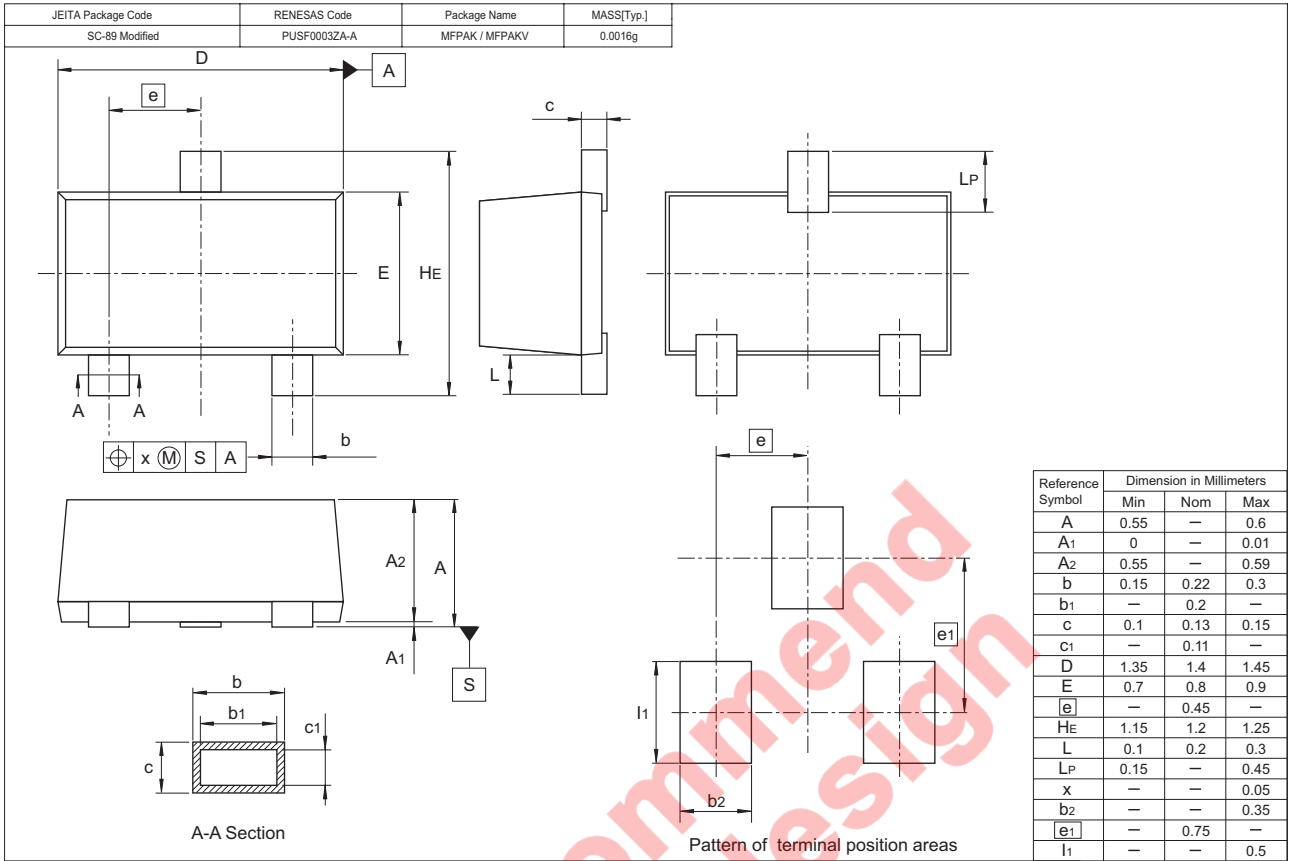
 $(V_{CE} = 3V, I_C = 5mA, Z_o = 50\Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.826	-39.3	14.04	155.5	0.0412	69.9	0.906	-25.8
200	0.746	-74.6	11.47	134.9	0.0700	54.9	0.738	-47.3
300	0.685	-100.5	9.14	121.1	0.0864	46.7	0.591	-61.9
400	0.646	-117.4	7.41	111.9	0.0950	43.0	0.490	-71.9
500	0.627	-130.7	6.19	104.8	0.101	41.3	0.419	-79.9
600	0.617	-141.0	5.27	99.6	0.107	41.3	0.369	-85.7
700	0.606	-149.0	4.61	95.0	0.111	41.6	0.333	-90.7
800	0.598	-155.4	4.09	91.6	0.115	42.5	0.307	-95.3
900	0.605	-161.3	3.67	87.7	0.120	44.3	0.287	-99.0
1000	0.604	-166.1	3.35	84.7	0.124	45.6	0.273	-102.6
1100	0.604	-170.6	3.06	81.8	0.129	46.8	0.262	-106.0
1200	0.607	-174.2	2.83	79.5	0.134	49.0	0.253	-108.8
1300	0.605	-178.2	2.62	77.1	0.139	50.4	0.249	-111.0
1400	0.608	178.9	2.47	74.9	0.145	51.9	0.245	-114.3
1500	0.618	175.5	2.32	72.7	0.152	53.4	0.242	-116.6
1600	0.622	172.4	2.19	70.7	0.157	54.8	0.241	-118.9
1700	0.627	170.0	2.08	68.9	0.164	56.2	0.241	-121.3
1800	0.629	166.9	1.99	66.7	0.171	57.6	0.242	-123.4
1900	0.633	164.3	1.90	65.2	0.177	58.7	0.243	-125.9
2000	0.641	162.3	1.82	63.4	0.186	59.5	0.245	-127.7

Not recommended  
for new designs



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
2SC5628XZ-TL-E	9000	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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Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

#### Renesas Technology Europe Limited

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Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

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#### 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  
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#### Renesas Technology Singapore Pte. Ltd.

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

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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  
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