

2SC5700

Silicon NPN Epitaxial
VHF/UHF wide band amplifier

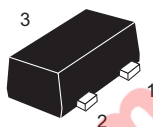
REJ03G0751-0100
(Previous ADE-208-1435)
Rev.1.00
Aug.10.2005

Features

- High power gain low noise figure at low power operation:
 $|S_{21}|^2 = 16 \text{ dB typ}$, $NF = 1.0 \text{ dB typ}$ ($V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 900 \text{ MHz}$)

Outline

RENESAS Package code: PUSF0003ZA-A
(Package name: MFPAK[®])



1. Emitter
2. Base
3. Collector

Note: Marking is "WB-".

*MFPAK is a trademark of Renesas Technology Corp.

Absolute Maximum Ratings

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

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	4	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

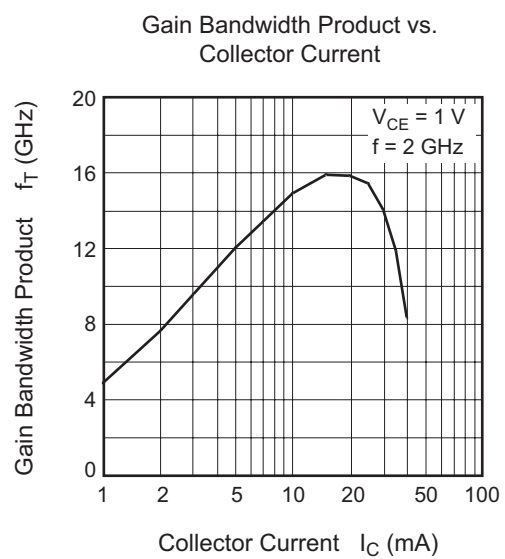
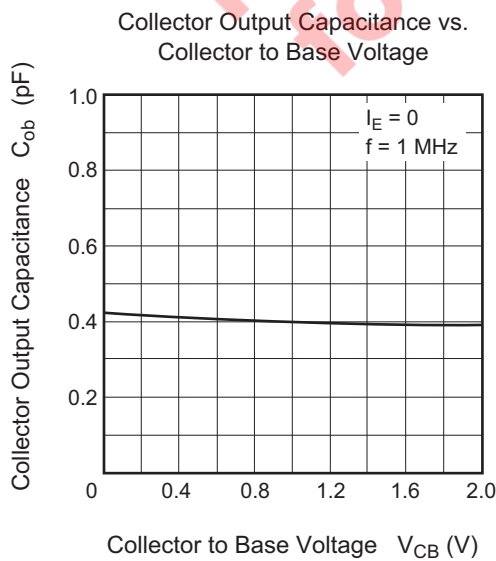
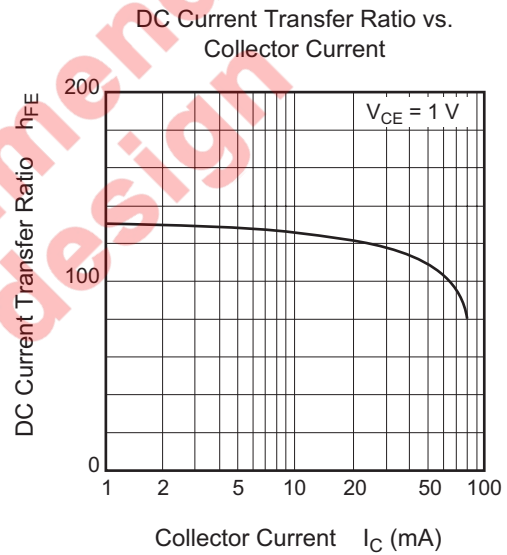
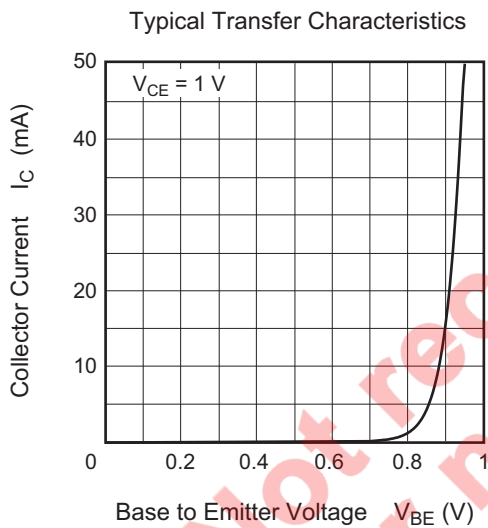
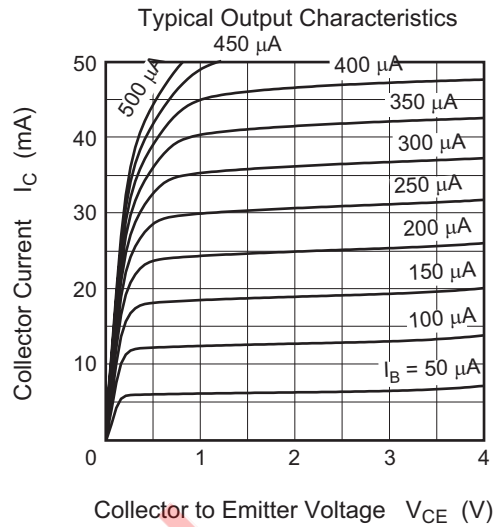
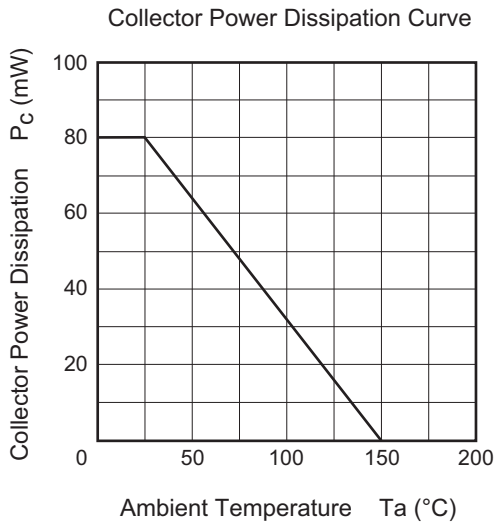
Electrical Characteristics

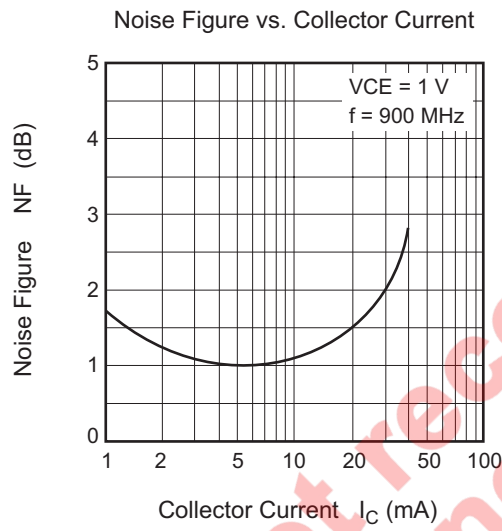
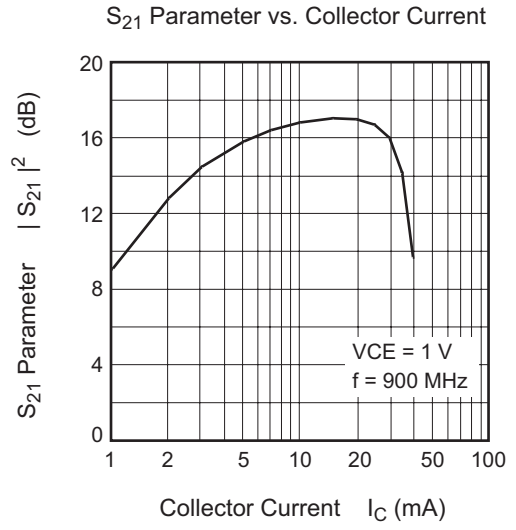
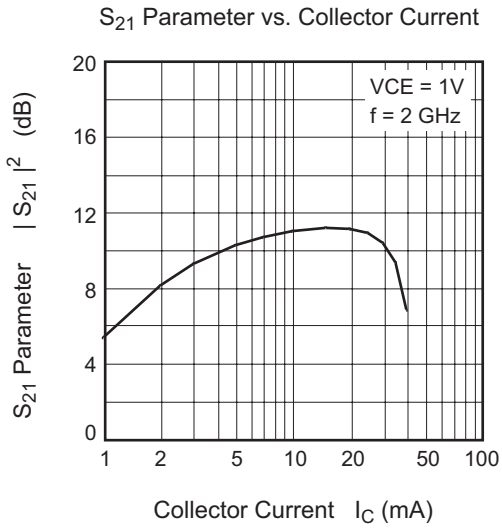
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 4 V, R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	200	nA	$V_{EB} = 0.8 V, I_C = 0$
DC current transfer ratio	h_{FE}	100	130	170		$V_{CE} = 1 V, I_C = 5 mA$
Collector output capacitance	C_{ob}	—	0.4	0.7	pF	$V_{CB} = 1 V, I_E = 0,$ $f = 1 MHz$
Gain bandwidth product	f_T	10	12	—	GHz	$V_{CE} = 1 V, I_C = 5 mA$
Forward transmission coefficient	$ S_{21} ^2$	13	16	—	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz,$ $Z_S = Z_L = 50 \Omega$

Not recommend
for new design

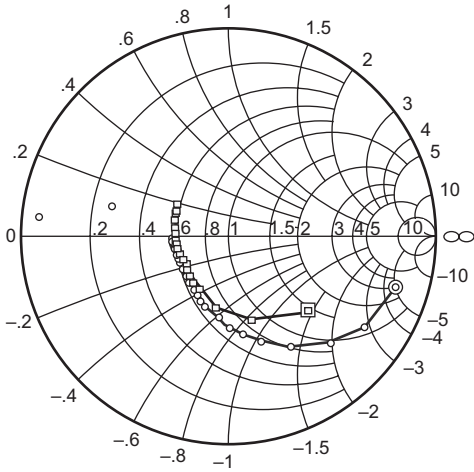
Main Characteristics





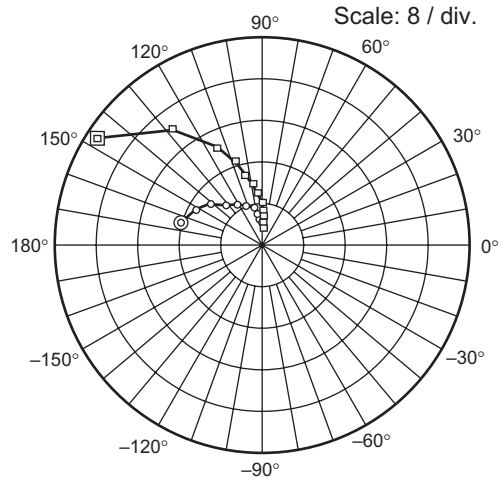
Not recommended for new design

S₁₁ Parameter vs. Frequency



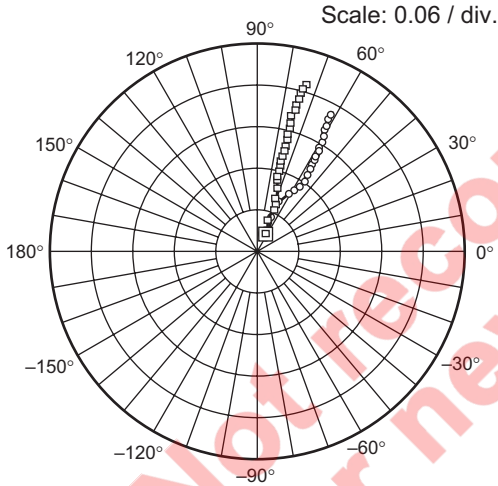
Condition: V_{CE} = 1 V , Z_O = 50 Ω
 100 to 2000 MHz (100 MHz Step)
 ○—○ (I_c = 5 mA)
 □—□ (I_c = 20 mA)

S₂₁ Parameter vs. Frequency



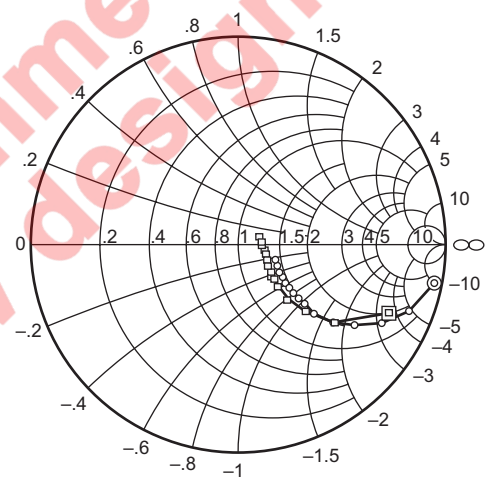
Condition: V_{CE} = 1 V , Z_O = 50 Ω
 100 to 2000 MHz (100 MHz Step)
 ○—○ (I_c = 5 mA)
 □—□ (I_c = 20 mA)

S₁₂ Parameter vs. Frequency



Condition: V_{CE} = 1 V , Z_O = 50 Ω
 100 to 2000 MHz (100 MHz Step)
 ○—○ (I_c = 5 mA)
 □—□ (I_c = 20 mA)

S₂₂ Parameter vs. Frequency



Condition: V_{CE} = 1 V , Z_O = 50 Ω
 100 to 2000 MHz (100 MHz Step)
 ○—○ (I_c = 5 mA)
 □—□ (I_c = 20 mA)

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	0.855	-16.3	15.67	165.4	0.018	81.2	0.962	-10.7
200	0.784	-32.7	14.42	152.1	0.035	72.2	0.889	-20.9
300	0.703	-48.4	12.92	140.6	0.048	65.3	0.791	-28.9
400	0.616	-60.4	11.41	131.2	0.059	61.2	0.698	-34.6
500	0.540	-72.1	10.09	123.5	0.067	58.6	0.618	-38.2
600	0.475	-81.4	8.94	117.2	0.074	57.3	0.549	-40.7
700	0.428	-90.3	8.00	112.3	0.080	56.6	0.492	-42.1
800	0.385	-99.1	7.23	108.2	0.085	56.1	0.445	-42.5
900	0.348	-106.5	6.54	104.2	0.091	56.3	0.404	-42.7
1000	0.320	-113.6	6.00	100.9	0.096	57.3	0.373	-42.0
1100	0.297	-121.6	5.51	98.2	0.101	57.4	0.344	-41.6
1200	0.283	-128.8	5.14	95.4	0.106	57.8	0.321	-40.7
1300	0.271	-134.6	4.80	93.1	0.111	58.7	0.298	-39.1
1400	0.262	-142.4	4.47	90.8	0.117	59.2	0.283	-37.5
1500	0.254	-149.0	4.23	89.0	0.122	60.0	0.263	-36.3
1600	0.246	-155.3	3.99	87.0	0.128	60.5	0.252	-34.6
1700	0.248	-160.8	3.79	85.3	0.134	61.1	0.238	-33.0
1800	0.249	-167.3	3.59	83.7	0.140	61.5	0.226	-31.3
1900	0.253	-172.0	3.44	81.9	0.145	62.1	0.215	-29.6
2000	0.253	-177.5	3.29	80.5	0.151	62.7	0.204	-27.2

Not recommended for new design

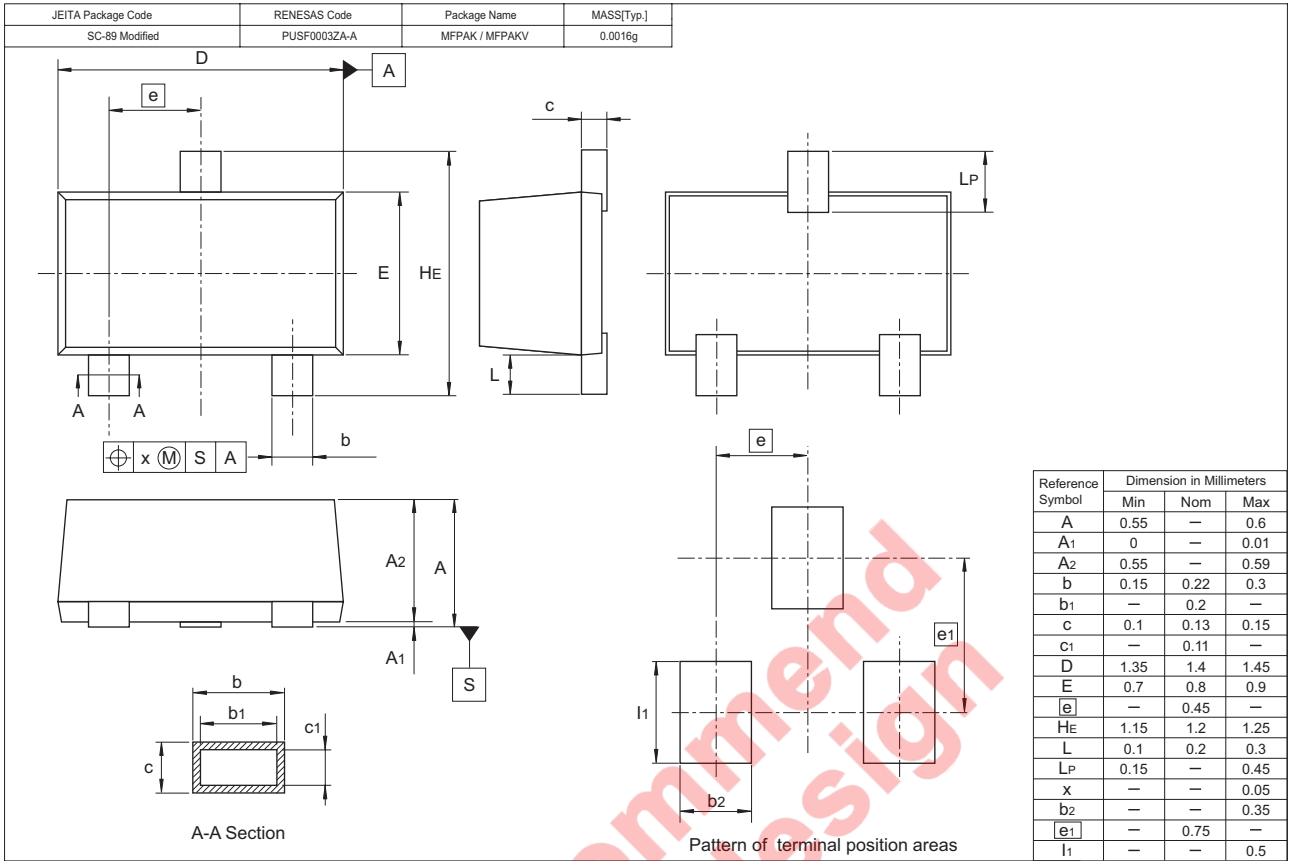
Sparameter

 $(V_{CE} = 1V, I_C = 20mA, Z_o = 50\Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.526	-43.0	37.91	148.3	0.015	75.0	0.817	-25.2
200	0.406	-76.6	27.98	127.5	0.025	67.3	0.605	-40.0
300	0.334	-100.0	20.76	115.3	0.033	66.9	0.453	-45.9
400	0.284	-116.6	16.30	108.1	0.040	68.0	0.360	-47.1
500	0.263	-131.4	13.33	103.0	0.047	69.8	0.300	-46.2
600	0.243	-143.4	11.24	99.2	0.055	71.1	0.257	-44.4
700	0.242	-152.6	9.74	96.3	0.063	72.0	0.226	-41.4
800	0.236	-159.6	8.57	93.6	0.071	72.7	0.203	-38.2
900	0.230	-167.8	7.62	91.4	0.078	73.5	0.184	-34.3
1000	0.239	-173.4	6.91	89.4	0.086	74.1	0.170	-30.5
1100	0.240	-179.4	6.31	87.7	0.094	73.9	0.160	-26.8
1200	0.247	175.6	5.82	85.9	0.102	74.1	0.150	-22.6
1300	0.246	172.4	5.38	84.4	0.110	74.4	0.143	-18.1
1400	0.255	167.4	5.02	82.9	0.117	74.3	0.138	-14.0
1500	0.257	163.8	4.71	81.3	0.126	74.2	0.133	-9.6
1600	0.265	160.2	4.45	80.1	0.134	74.4	0.130	-5.3
1700	0.268	158.7	4.19	78.9	0.142	74.2	0.128	-1.2
1800	0.282	154.1	3.97	77.6	0.149	73.9	0.125	2.5
1900	0.283	152.7	3.80	76.4	0.157	74.1	0.123	7.1
2000	0.300	150.3	3.63	75.4	0.165	73.7	0.123	11.8

Not recommended
for new design

Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
2SC5700WB-TR-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

Keep safety first in your circuit designs!

1. Renesas Technology Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corp. product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corp. or a third party.
2. Renesas Technology Corp. assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corp. without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors.
Renesas Technology Corp. assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Renesas Technology Corp. by various means, including the Renesas Technology Corp. Semiconductor home page (<http://www.renesas.com>).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corp. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corp. semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corp. is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corp. for further details on these materials or the products contained therein.



RENESAS SALES OFFICES

<http://www.renesas.com>

Refer to "<http://www.renesas.com/en/network>" for the latest and detailed information.

Renesas Technology America, Inc.

450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
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