

2SC5631

Silicon NPN Epitaxial
UHF / VHF Wide Band Amplifier

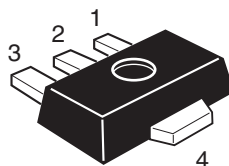
REJ03G0128-0300Z
(Previous ADE-208-981A(Z))
Rev.3.00
Oct.20.2003

Features

- High gain bandwidth product
 $f_T = 11 \text{ GHz typ.}$
- High power gain and low noise figure ;
 $PG = 10 \text{ dB typ. , } NF = 1.2 \text{ dB typ. at } f = 900 \text{ MHz}$

Outline

UPAK



1. Base
2. Collector
3. Emitter
4. Collector

Note: Marking is "JR".

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V _{CBO}	15	V
Collector to emitter voltage	V _{CEO}	6	V
Emitter to base voltage	V _{EBO}	1.5	V
Collector current	I _C	80	mA
Collector power dissipation	P _c	800*	mW
Junction temperature	T _j	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

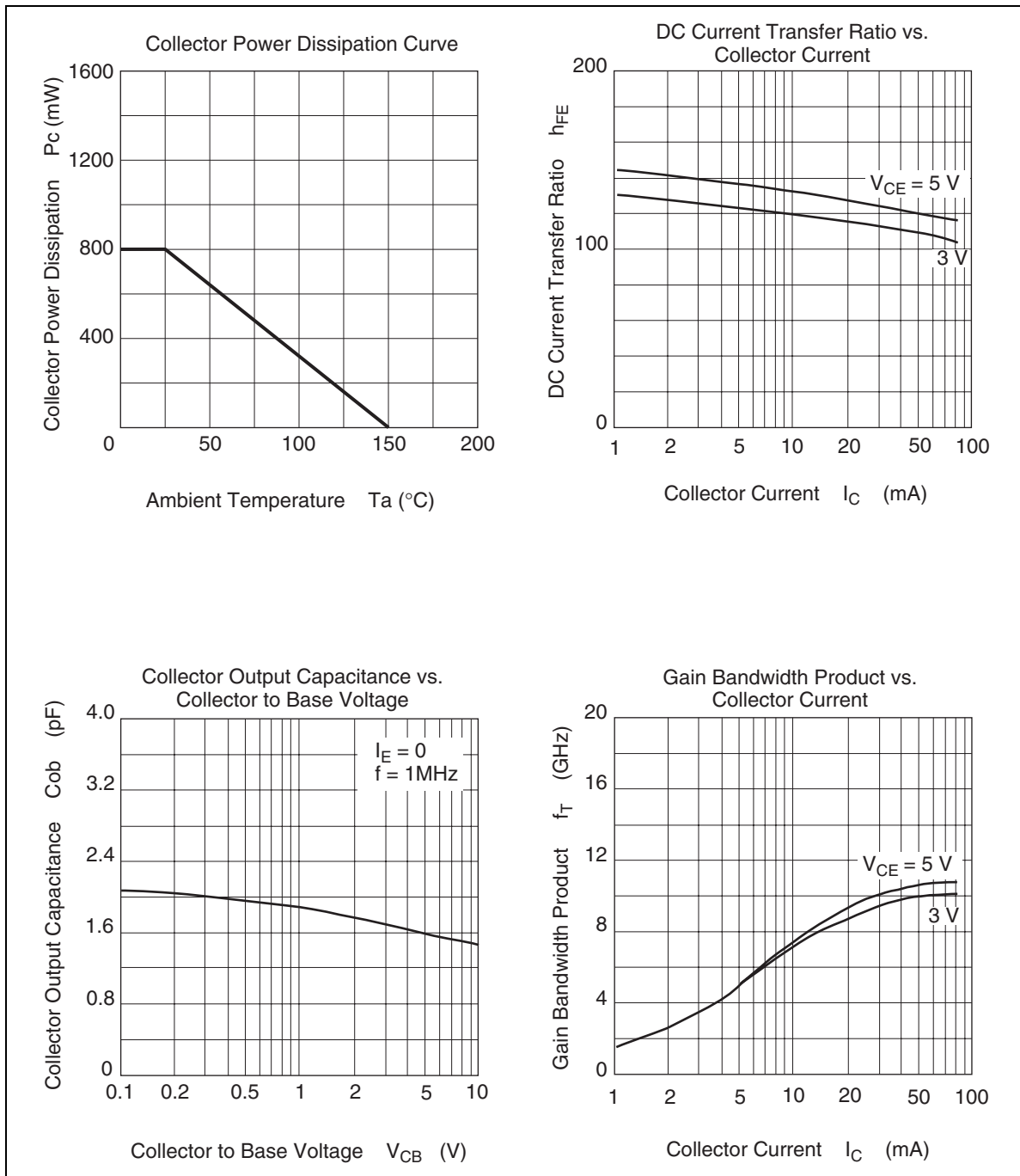
* When using alumina ceramic board (12.5 x 20 x 0.7 mm)

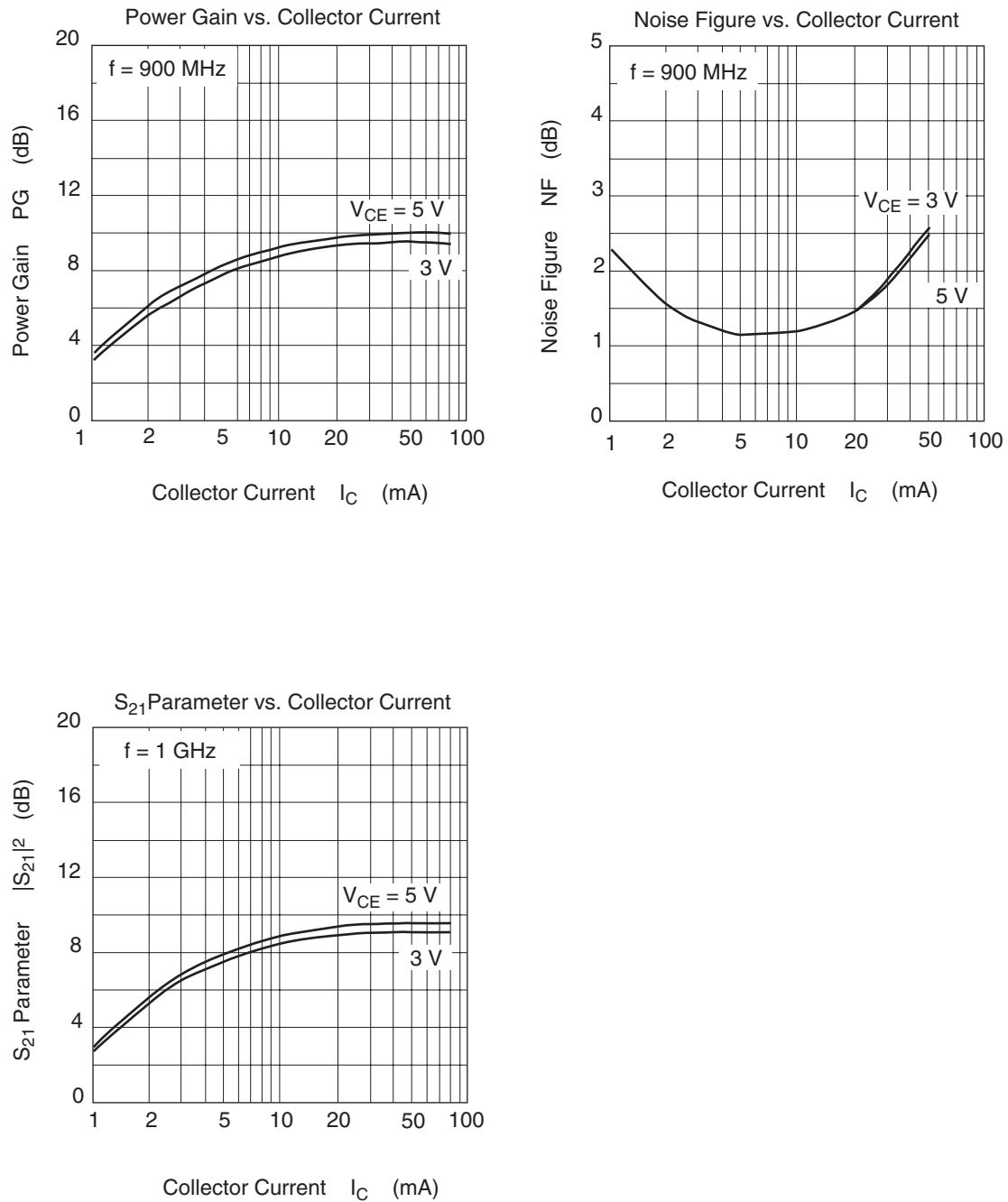
Electrical Characteristics

(Ta = 25°C)

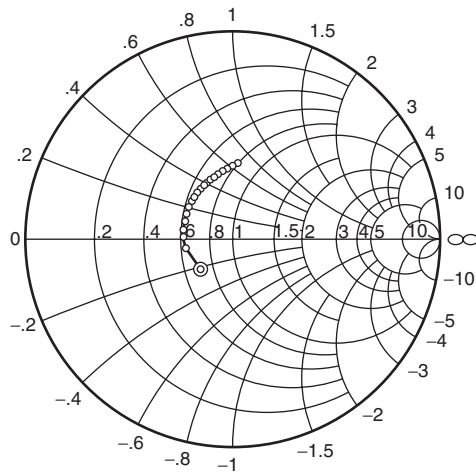
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	V _{(BR)CBO}	15	—	—	V	I _C = 10 μA, I _E = 0
Collector cutoff current	I _{CBO}	—	—	1	μA	V _{CB} = 12 V, I _E = 0
Collector cutoff current	I _{CEO}	—	—	1	mA	V _{CE} = 6 V, R _{BE} = ∞
Emitter cutoff current	I _{EBO}	—	—	10	μA	V _{EB} = 1.5 V, I _C = 0
DC current transfer ratio	h _{FE}	80	120	160	V	V _{CE} = 5 V, I _C = 50 mA
Collector output capacitance	C _{ob}	—	1.6	2.2	pF	V _{CB} = 5 V, I _E = 0 f = 1 MHz
Gain bandwidth product	f _T	8	11	—	GHz	V _{CE} = 5 V, I _C = 50 mA f = 1 GHz
Power gain	PG	7	10	—	dB	V _{CE} = 5 V, I _C = 50 mA f = 900 MHz
Noise figure	NF	—	1.2	1.9	dB	V _{CE} = 5 V, I _C = 5 mA f = 900 MHz

Main Characteristics





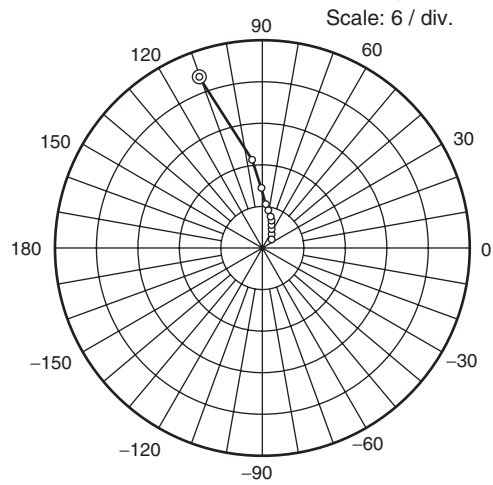
S11 Parameter vs. Frequency

Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

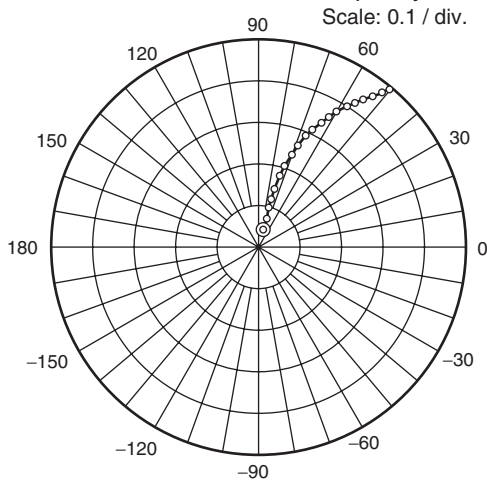
S21 Parameter vs. Frequency

Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

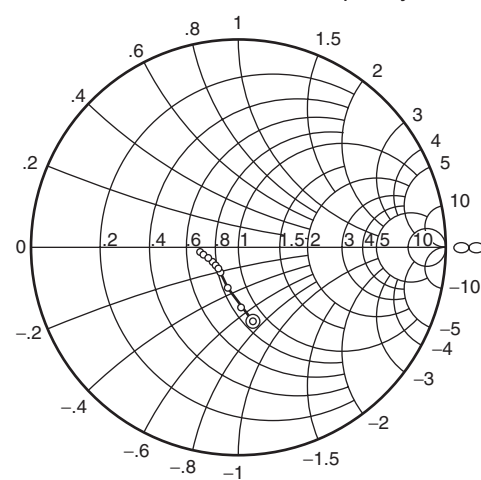
S12 Parameter vs. Frequency

Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

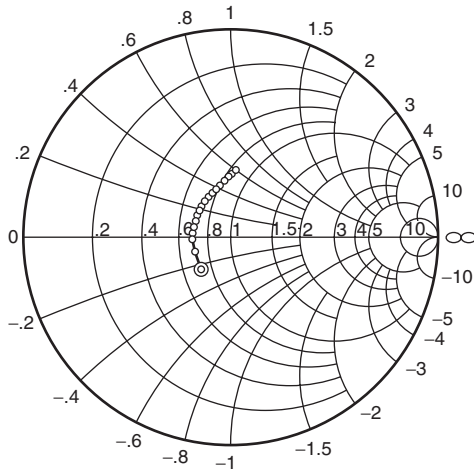
S22 Parameter vs. Frequency

Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S11 Parameter vs. Frequency

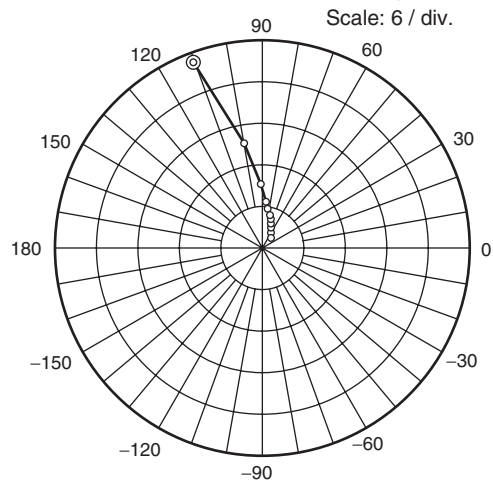


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

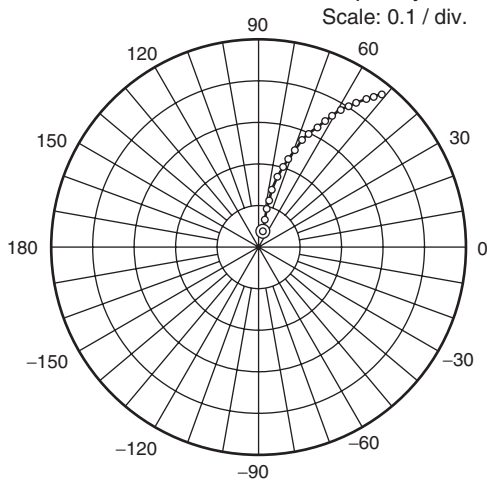


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

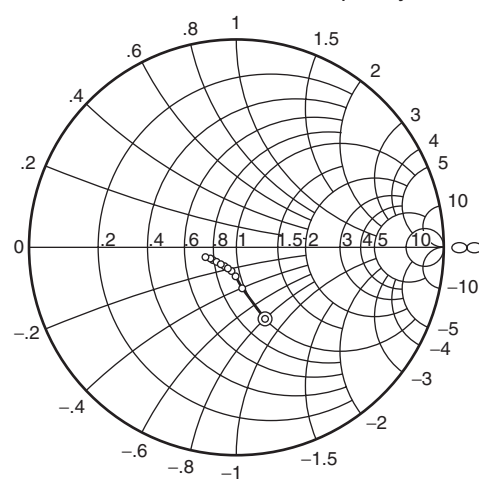


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S parameter

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.234	-135.7	26.57	109.9	0.0299	75.5	0.353	-77.7
200	0.233	-165.2	13.47	96.1	0.0575	78.0	0.199	-99.6
300	0.234	179.3	8.92	89.7	0.0863	77.8	0.153	-112.5
400	0.238	170.1	6.70	84.9	0.114	76.9	0.135	-121.8
500	0.242	161.2	5.37	81.2	0.142	75.4	0.127	-128.3
600	0.249	153.9	4.52	77.8	0.169	73.9	0.124	-133.5
700	0.250	145.9	3.89	74.5	0.196	72.2	0.125	-138.0
800	0.259	140.4	3.43	71.4	0.223	70.4	0.126	-141.3
900	0.267	134.2	3.08	68.6	0.249	68.4	0.128	-145.0
1000	0.274	128.0	2.80	65.8	0.275	66.9	0.131	-147.7
1100	0.282	123.5	2.58	63.2	0.299	65.0	0.136	-150.3
1200	0.290	119.2	2.40	60.3	0.323	63.2	0.140	-153.0
1300	0.297	114.2	2.25	57.9	0.346	61.3	0.144	-155.6
1400	0.307	109.6	2.12	55.9	0.367	59.7	0.149	-158.1
1500	0.318	105.3	2.01	53.4	0.389	57.8	0.153	-160.5
1600	0.324	101.7	1.92	51.3	0.409	56.2	0.159	-162.7
1700	0.334	97.7	1.83	48.6	0.430	54.4	0.163	-165.1
1800	0.345	93.9	1.77	46.8	0.448	52.8	0.170	-167.9
1900	0.357	91.6	1.72	44.6	0.468	50.9	0.174	-170.2
2000	0.366	87.9	1.65	42.6	0.485	49.5	0.180	-172.6

S parameter

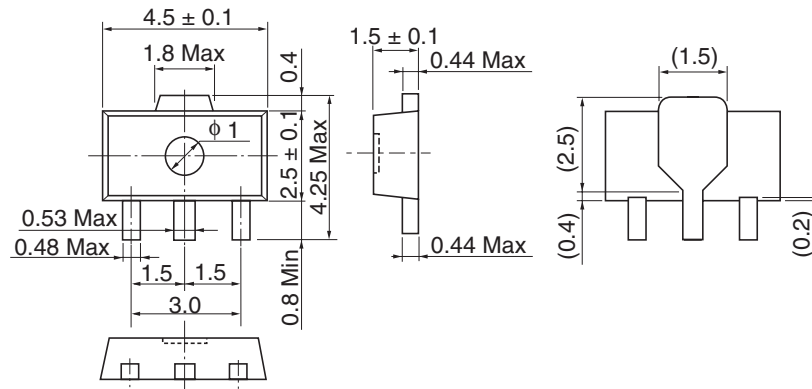
($V_{CE} = 5V$, $I_C = 50\text{ mA}$, $Z_0 = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.205	-123.9	28.04	110.8	0.0284	74.9	0.360	-69.1
200	0.193	-159.6	14.24	96.9	0.0547	78.2	0.197	-84.5
300	0.190	-177.1	9.44	90.2	0.0820	78.3	0.145	-92.5
400	0.193	169.9	7.09	85.3	0.109	77.5	0.123	-99.0
500	0.201	162.0	5.68	81.8	0.135	76.3	0.112	-104.1
600	0.206	153.7	4.76	78.4	0.162	74.6	0.107	-109.5
700	0.206	145.4	4.11	75.1	0.188	72.9	0.105	-113.7
800	0.221	139.0	3.62	72.2	0.213	71.3	0.105	-117.6
900	0.224	132.6	3.25	69.4	0.238	69.4	0.106	-121.8
1000	0.234	126.8	2.94	66.6	0.262	67.8	0.110	-125.4
1100	0.243	120.8	2.72	64.0	0.286	66.0	0.113	-128.7
1200	0.249	116.8	2.53	61.3	0.309	64.3	0.117	-132.0
1300	0.261	111.3	2.36	59.0	0.331	62.5	0.120	-135.5
1400	0.270	107.4	2.23	56.9	0.353	60.9	0.125	-138.7
1500	0.280	103.5	2.10	54.5	0.373	59.1	0.129	-142.0
1600	0.285	99.1	2.01	52.1	0.393	57.6	0.135	-144.9
1700	0.298	95.4	1.92	50.3	0.414	56.0	0.139	-148.1
1800	0.312	91.8	1.84	47.6	0.431	54.3	0.145	-151.3
1900	0.321	87.9	1.79	45.7	0.450	52.5	0.148	-154.5
2000	0.330	85.6	1.71	43.8	0.467	51.4	0.155	-157.5

Package Dimensions

As of January, 2003

Unit: mm



Package Code	UPAK
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.050 g

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>

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

Renesas Technology Europe GmbH
Dornacher Str. 3, D-85622 Feldkirchen, Germany
Tel: <49> (89) 380 70 0, Fax: <49> (89) 929 30 11

Renesas Technology Hong Kong Ltd.
7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2375-6836

Renesas Technology Taiwan Co., Ltd.
FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.
26/F., Ruijin 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