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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HTT1129E

Silicon NPN Epitaxial Twin Transistor

RENESAS

ADE-208-1541A (Z)

Rev.1
Jan. 2003

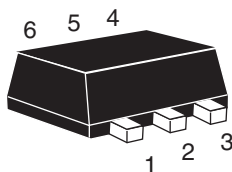
Features

- Include 2 transistors in a small size SMD package: EMFPAK-6 (6 Leads: 1.2 x 0.8 x 0.5 mm)

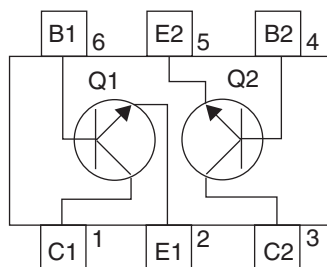
Q1: Equivalent Buffer transistor	Q2: Equivalent OSC transistor
2SC5849	2SC5872

Outline

EMFPAK-6



Pin Arrangement



- | | |
|-----------------|---------------|
| 1. Collector Q1 | 4. Base Q2 |
| 2. Emitter Q1 | 5. Emitter Q2 |
| 3. Collector Q2 | 6. Base Q1 |

Note: Mark is "Z".

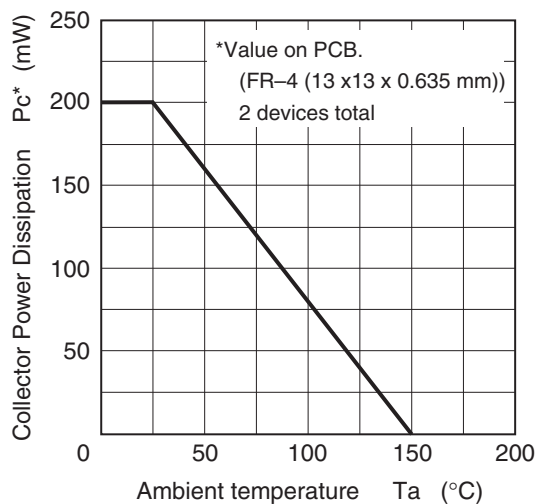
Absolute Maximum Ratings

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

Item	Symbol	Ratings		Unit
		Q1	Q2	
Collector to base voltage	V_{CBO}	15	15	V
Collector to emitter voltage	V_{CEO}	6	6	V
Emitter to base voltage	V_{EBO}	1.5	0.8	V
Collector current	I_C	80	50	mA
Collector power dissipation	P_C	Total 200*		mW
Junction temperature	T_j	150	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	-50 to +150	$^\circ\text{C}$

*Value on PCB. (FR-4 (13 x 13 x 0.635 mm)).

Collector Power Dissipation Curve



Q1 Electrical Characteristics

(Ta = 25°C)

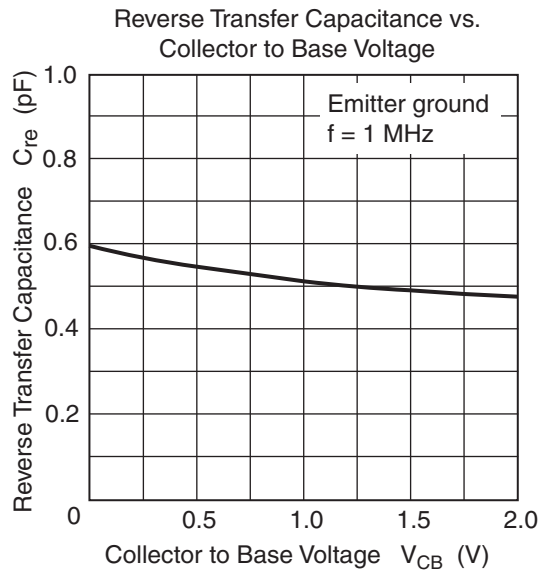
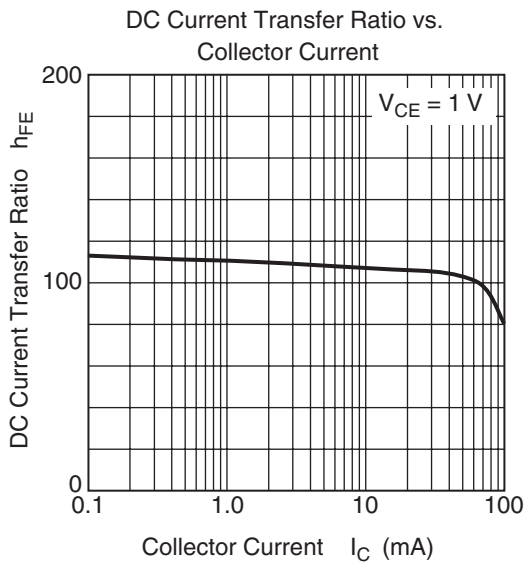
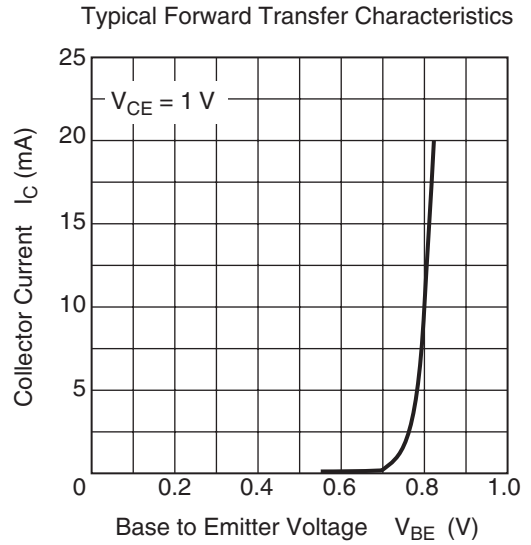
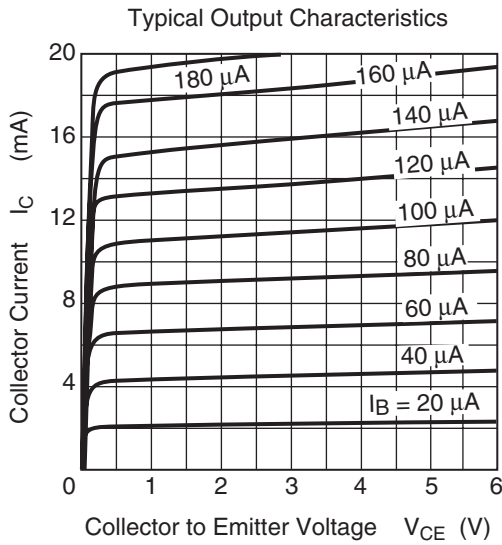
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	I_{CEO}	—	—	0.1	μA	$V_{CE} = 6 V, R_{BE} = \text{infinite}$
Emitter cutoff current	I_{EBO}	—	—	0.1	μA	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	h_{FE}	90	120	140	—	$V_{CE} = 1 V, I_C = 5 \text{ mA}$
Reverse transfer capacitance	C_{re}	—	0.50	0.65	pF	$V_{CB} = 1 V, f = 1 \text{ MHz}$ Emitter ground
Gain bandwidth product	f_T	2	4	—	GHz	$V_{CE} = 1 V, I_C = 5 \text{ mA}, f = 1 \text{ GHz}$
Forward transfer coefficient	$ S_{21} ^2$	7	11	—	dB	$V_{CE} = 1 V, I_C = 5 \text{ mA},$ $f = 900 \text{ MHz},$
Noise figure	NF	—	1.7	2.3	dB	$\Gamma_S = \Gamma_L = 50 \Omega$

Q2 Electrical Characteristics

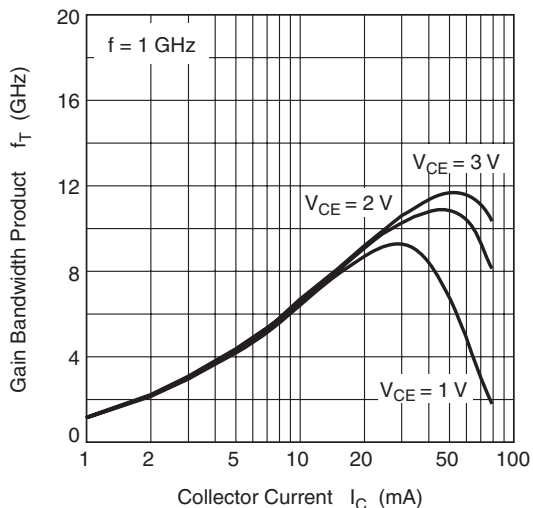
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	$V_{(BR)CBO}$	16	—	—	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}	—	—	0.1	μA	$V_{CE} = 6 V, R_{BE} = \text{infinite}$
Emitter cutoff current	I_{EBO}	—	—	0.1	μA	$V_{EB} = 0.8 V, I_C = 0$
DC current transfer ratio	h_{FE}	90	120	140	—	$V_{CE} = 1 V, I_C = 5 \text{ mA}$
Reverse transfer capacitance	C_{re}	—	0.25	0.35	pF	$V_{CB} = 1 V, f = 1 \text{ MHz}$ Emitter ground
Gain bandwidth product	f_T	8	10	—	GHz	$V_{CE} = 1 V, I_C = 5 \text{ mA}, f = 1 \text{ GHz}$
Forward transfer coefficient	$ S_{21} ^2$	13	16	—	dB	$V_{CE} = 1 V, I_C = 5 \text{ mA},$ $f = 900 \text{ MHz}$
Noise figure	NF	—	1.0	1.6	dB	$\Gamma_S = \Gamma_L = 50 \Omega$

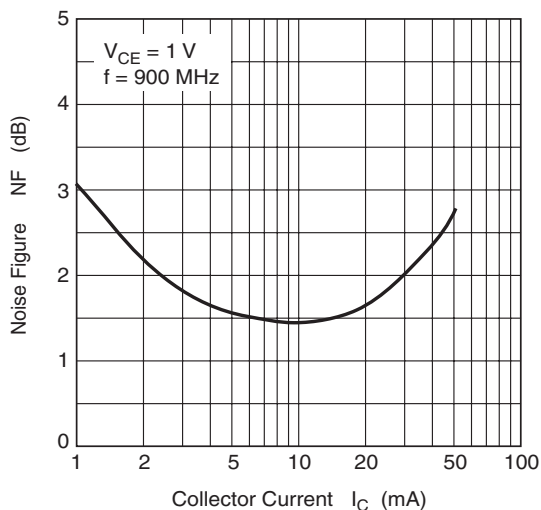
Q1 Main Characteristics



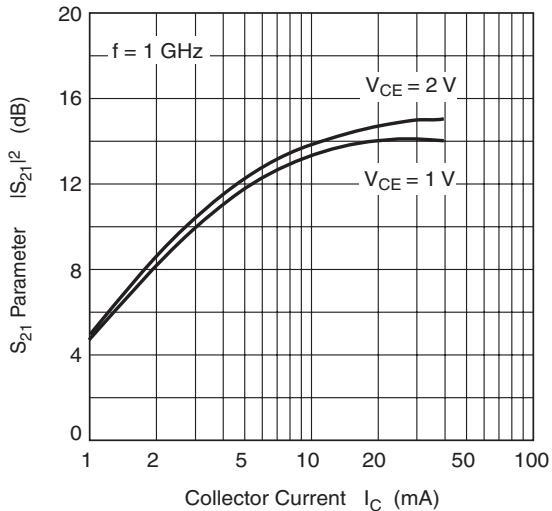
Gain Bandwidth Product vs. Collector Current



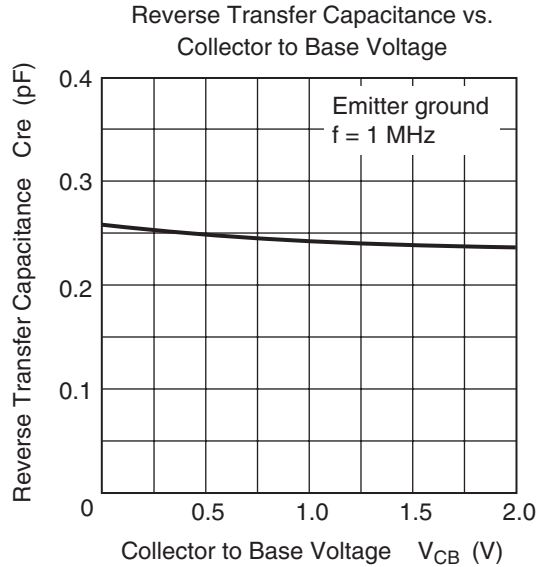
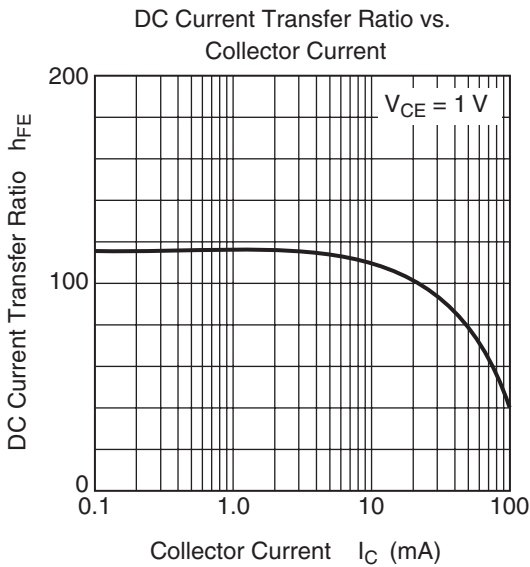
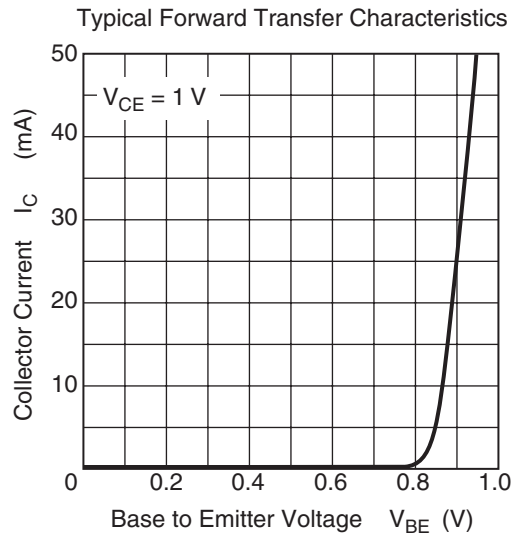
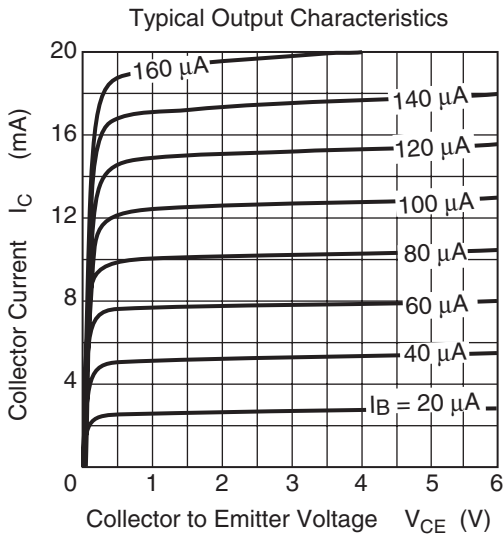
Noise Figure vs. Collector Current



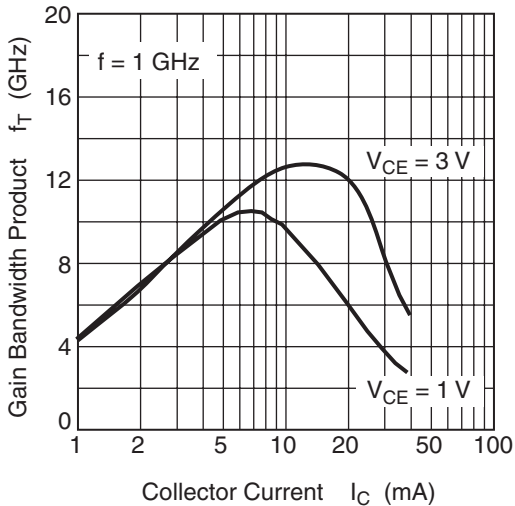
S₂₁ Parameter vs. Collector Current



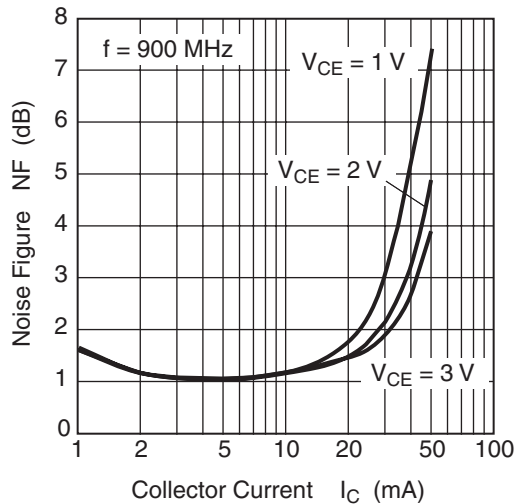
Q2 Main Characteristics



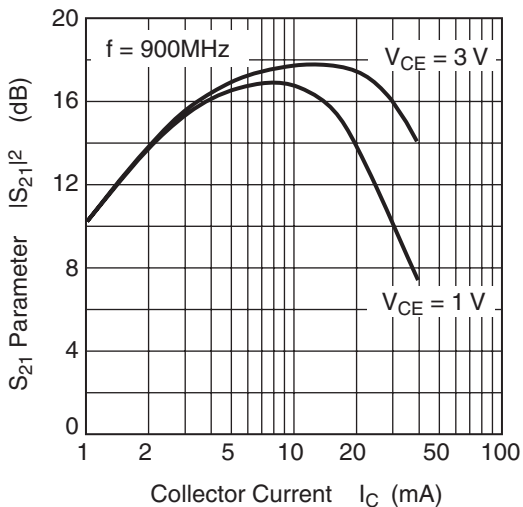
Gain Bandwidth Product vs. Collector Current



Noise Figure vs. Collector Current



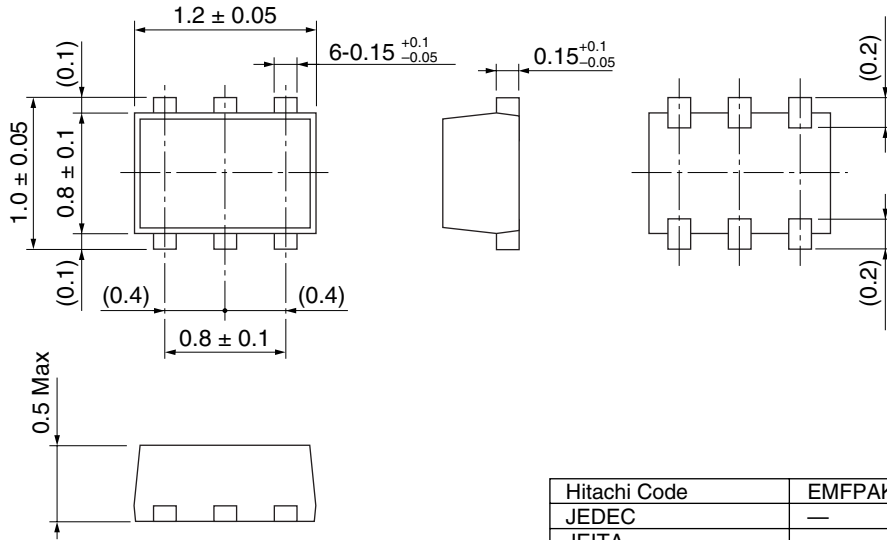
S_{21} Parameter vs. Collector Current



Package Dimensions

As of July, 2002

Unit: mm



Hitachi Code	EMFPAK-6
JEDEC	—
JEITA	—
Mass (reference value)	0.0012 g

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Sales Offices

HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: (03) 3270-2111 Fax: (03) 3270-5109

URL <http://www.hitachisemiconductor.com/>

For further information write to:

Hitachi Semiconductor (America) Inc.
179 East Tasman Drive
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe Ltd.
Electronic Components Group
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Europe GmbH
Electronic Components Group
Dornacher Str 3
D-85622 Feldkirchen
Postfach 201, D-85619 Feldkirchen
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00
Singapore 049318
Tel: <65>-6538-6533/6538-8577
Fax: <65>-6538-6933/6538-3877
URL: <http://semiconductor.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road
Hung-Kuo Building
Taipei (105), Taiwan
Tel: <886>-(2)-2718-3666
Fax: <886>-(2)-2718-8180
Telex: 23222 HAS-TP
URL: <http://semiconductor.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon Hong Kong
Tel: <852>-2735-9218
Fax: <852>-2730-0281
URL: <http://semiconductor.hitachi.com.hk>

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