

HTT1115S

Silicon NPN Epitaxial Twin Transistor

HITACHI

ADE-208-1440C(Z)

Rev.3
Aug. 2001

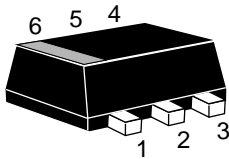
Features

- Include 2 transistors in a small size SMD package: SMFPAK-6(6 Leads: 1.5 x 1.1 x 0.55 mm)

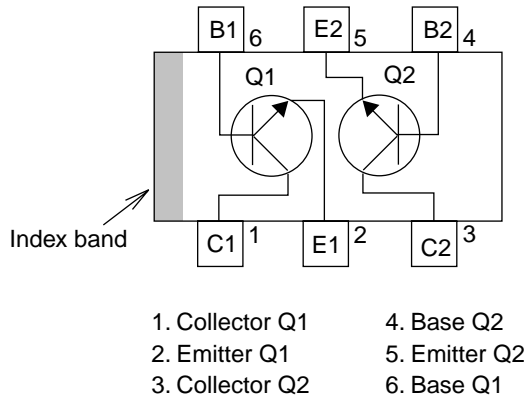
Q1: Equivalent Buffer transistor	Q2: Equivalent OSC transistor
2SC5700	2SC5757

Outline

SMFPAK-6



Pin Arrangement



Note: Marking is "EK1".

HTT1115S

Absolute Maximum Ratings

(Ta = 25 °C)

Item	Symbol	Ratings		Unit
		Q1	Q2	
Collector to base voltage	V_{CBO}	15	10	V
Collector to emitter voltage	V_{CEO}	4	3.5	V
Emitter to base voltage	V_{EBO}	1.5	1.5	V
Collector current	I_C	50	80	mA
Collector power dissipation	P_C	Total 220*		mW
Junction temperature	T_j	150	150	°C
Storage temperature	T_{stg}	-55 to +150	-55 to +150	°C

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

Electrical Characteristics (Q1)

(Ta = 25°C)

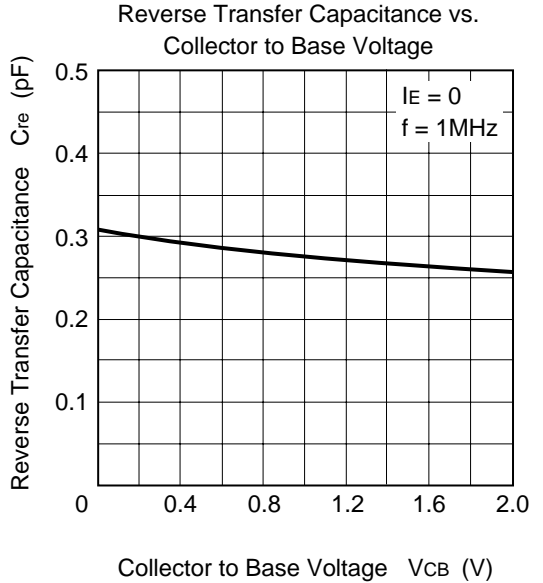
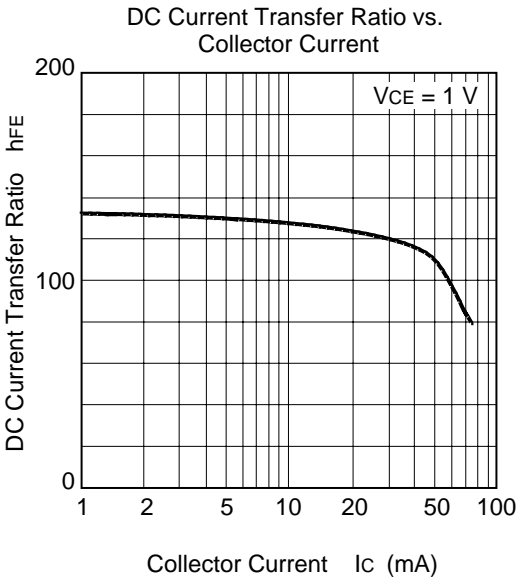
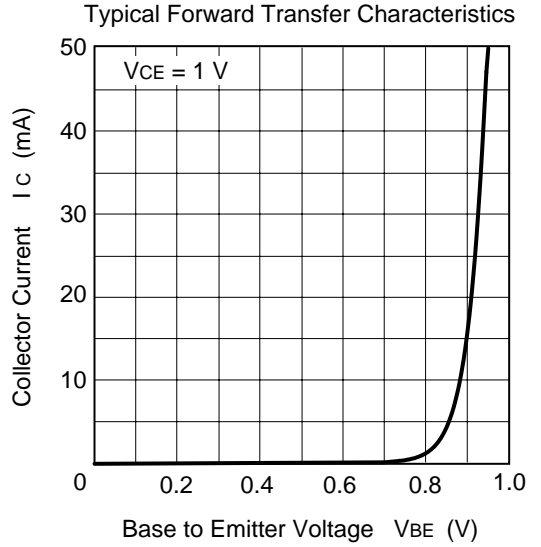
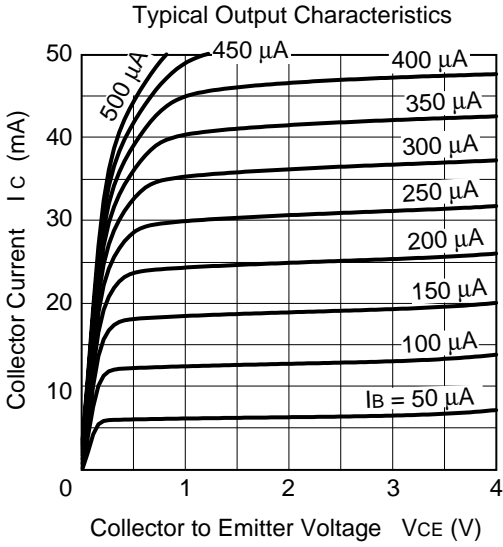
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 4 V, R_{BE} = \text{infinite}$
Emitter cutoff current	I_{EBO}	—	—	0.2	μA	$V_{EB} = 0.8 V, I_C = 0$
DC current transfer ratio	h_{FE}	100	130	170	—	$V_{CE} = 1 V, I_C = 5 mA$
Reverse transfer capacitance	C_{re}	—	—	0.45	pF	$V_{CB} = 1 V, f = 1 MHz,$ Emitter ground
Gain bandwidth product	f_T	10	13	—	GHz	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 1 GHz$
Forward transfer coefficient	$ S_{21} ^2$	13	16	—	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.0	2.0	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz,$ $\Gamma_S = \Gamma_L = 50 \Omega$

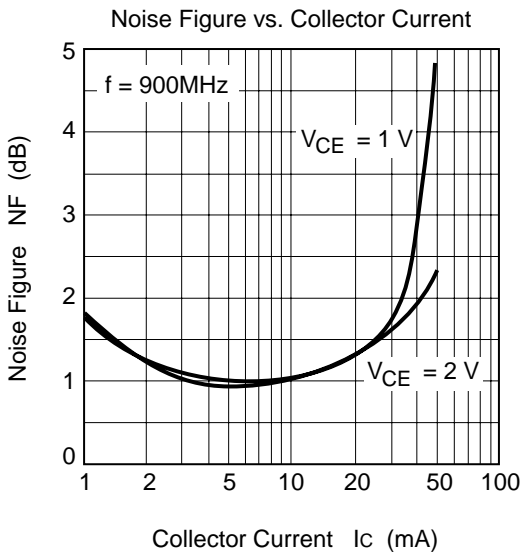
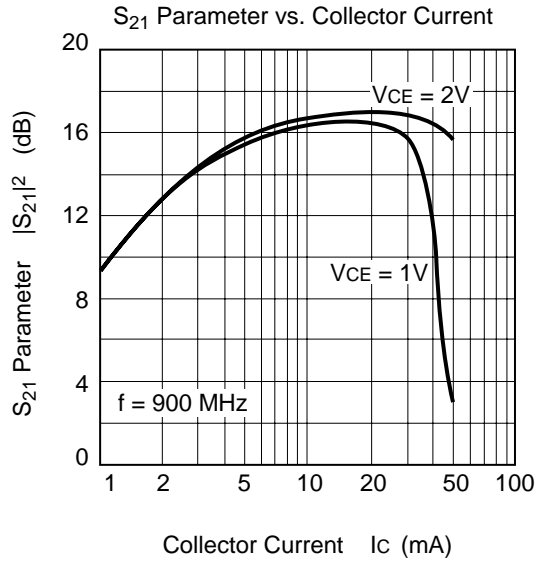
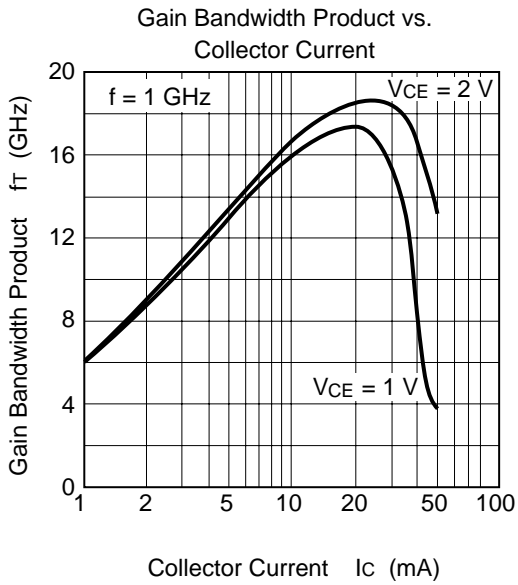
Electrical Characteristics (Q2)

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

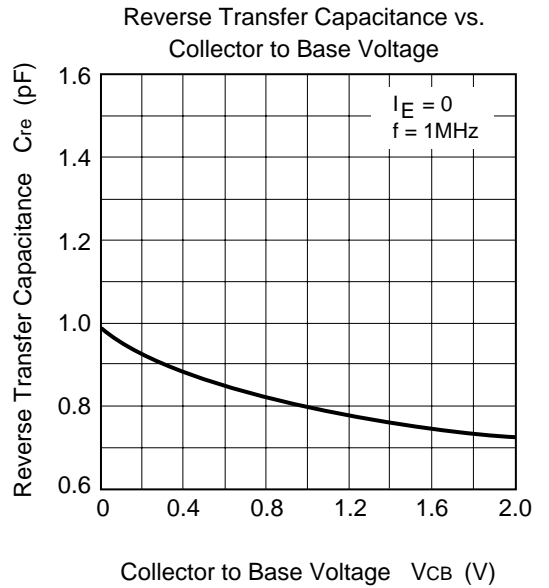
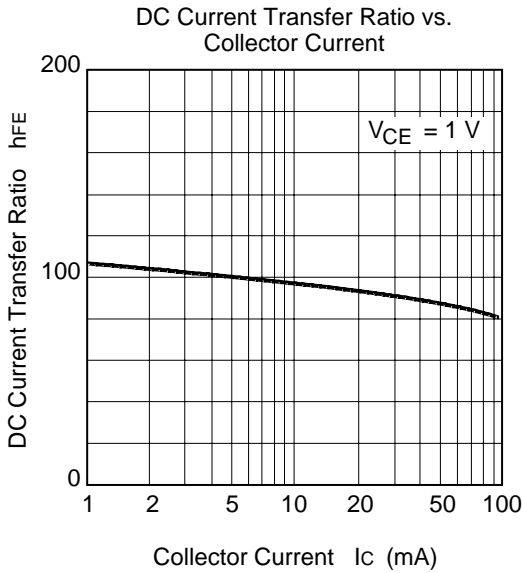
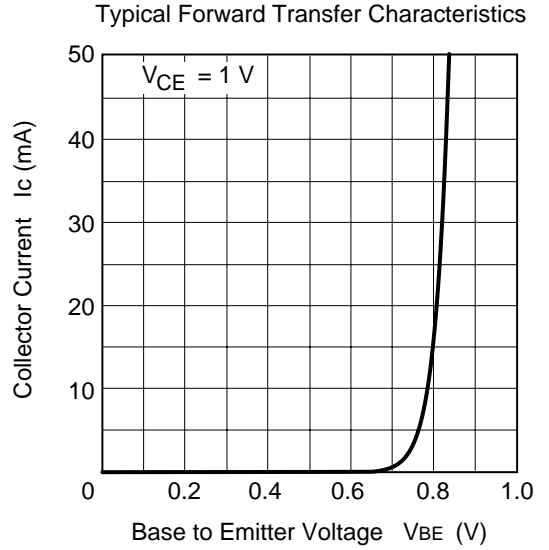
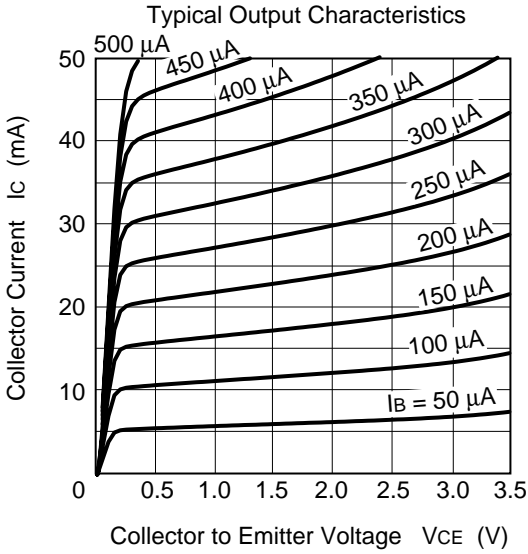
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	$V_{(BR)CBO}$	10	—	—	V	$I_C = 10 \mu\text{A}$, $I_E = 0$
Collector cutoff current	I_{CBO}	—	—	1	μA	$V_{CB} = 10 \text{ V}$, $I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 3.5 \text{ V}$, $R_{BE} = \text{infinite}$
Emitter cutoff current	I_{EBO}	—	—	1.0	μA	$V_{EB} = 1.5 \text{ V}$, $I_C = 0$
DC current transfer ratio	h_{FE}	80	100	130	—	$V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$
Reverse transfer capacitance	C_{re}	—	0.8	1.1	pF	$V_{CB} = 1 \text{ V}$, $f = 1 \text{ MHz}$, Emitter ground
Gain bandwidth product	f_T	4	6	—	GHz	$V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 1 \text{ GHz}$
Forward transfer coefficient	PG	7	12	—	dB	$V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 900 \text{ MHz}$
Noise figure	NF	—	1.5	2.3	dB	$V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 900 \text{ MHz}$, $\Gamma_S = \Gamma_L = 50 \Omega$

Main Characteristics (Q1)

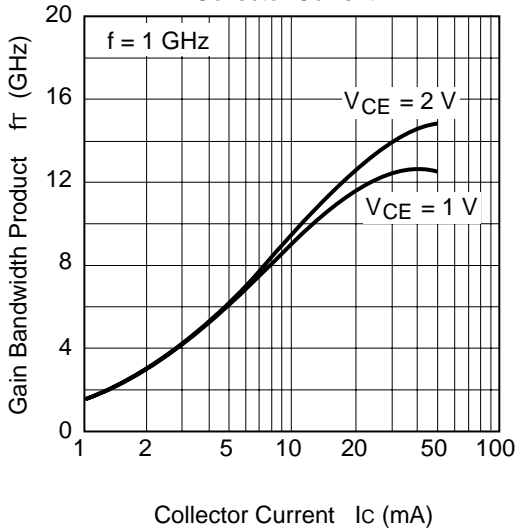




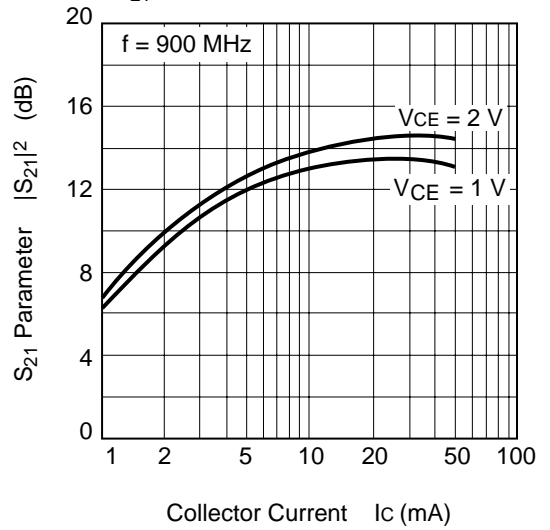
Main Characteristics (Q2)



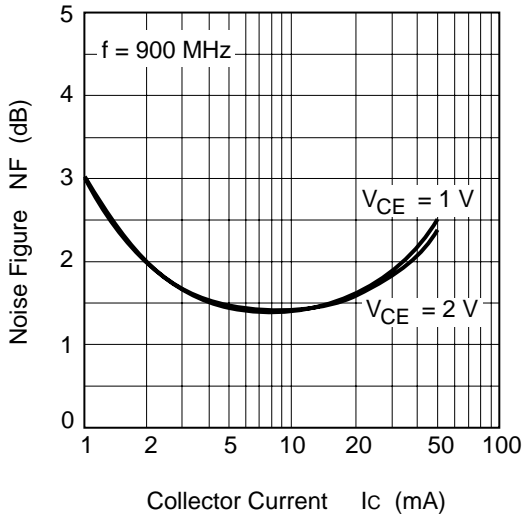
Gain Bandwidth Product vs. Collector Current

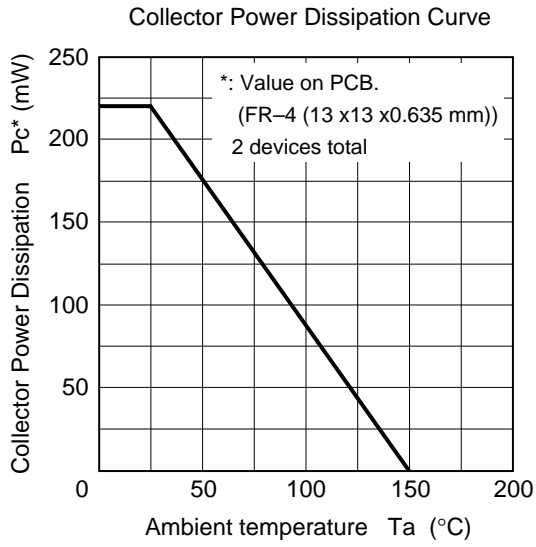


S_{21} Parameter vs. Collector Current



Noise Figure vs. Collector Current





Disclaimer

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

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) 585200

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00
Singapore 049318
Tel: <65>-538-6533/538-8577
Fax: <65>-538-6933/538-3877
URL: <http://semiconductor.hitachi.com.sg>

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>-(2)-735-9218
Fax: <852>-(2)-730-0281
URL: <http://semiconductor.hitachi.com.hk>

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 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.
(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://www.hitachi.com.tw>

Copyright © Hitachi, Ltd., 2001. All rights reserved. Printed in Japan.
Colophon 5.0