
2SC5623

Silicon NPN Epitaxial High Frequency Low Noise Amplifier

HITACHI

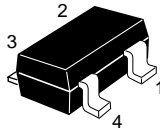
ADE-208-977 (Z)
1st. Edition
Nov. 2000

Features

- High gain bandwidth product
 $f_T = 26$ GHz typ.
- High power gain and low noise figure ;
PG = 18 dB typ. , NF = 1.8 dB typ. at $f = 1.8$ GHz

Outline

CMPAK-4



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

Note: Marking is "WH-".

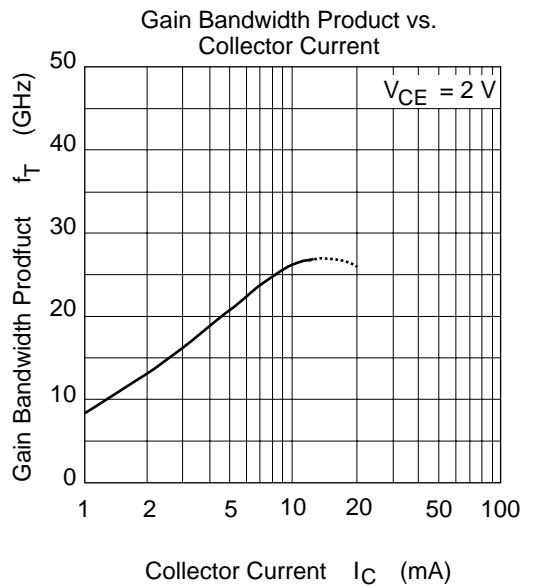
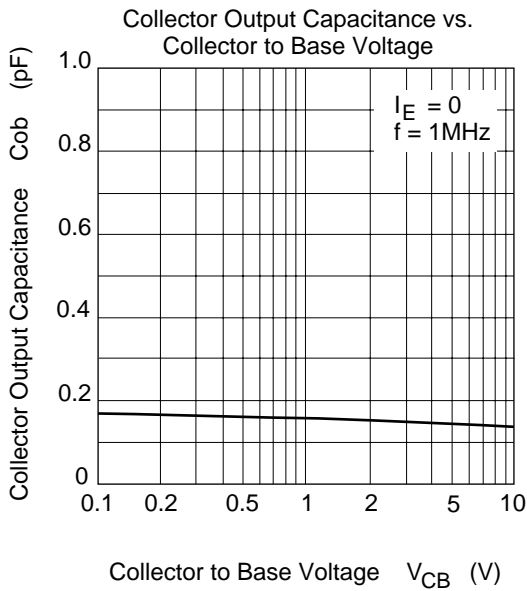
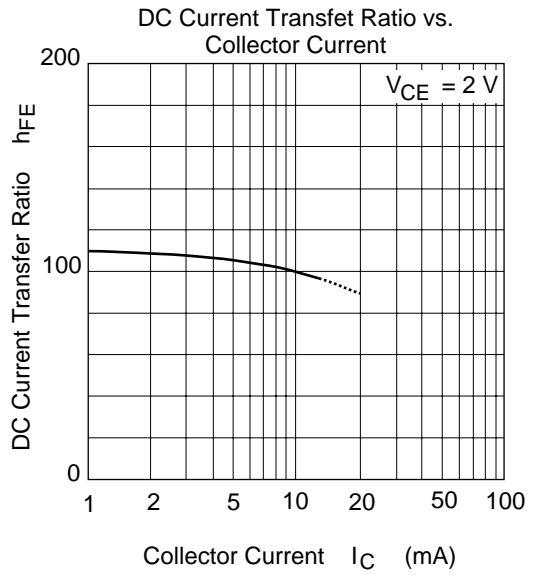
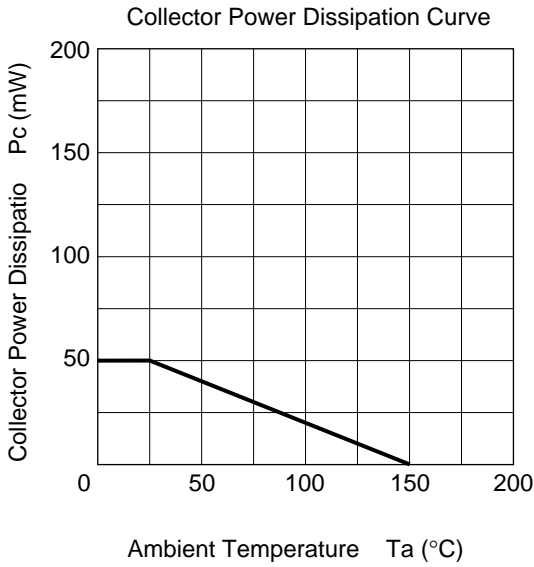
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

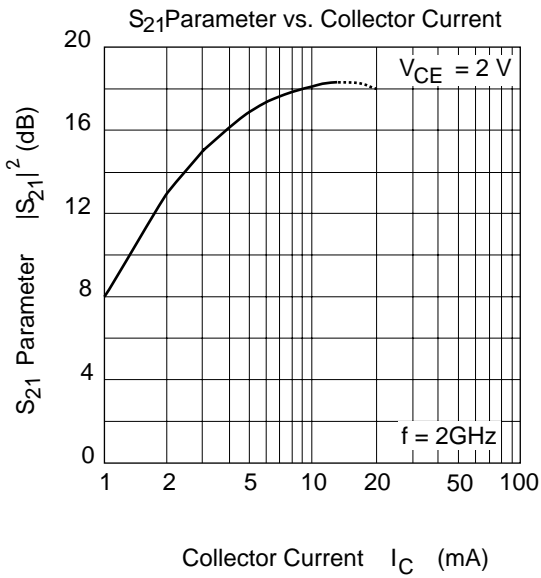
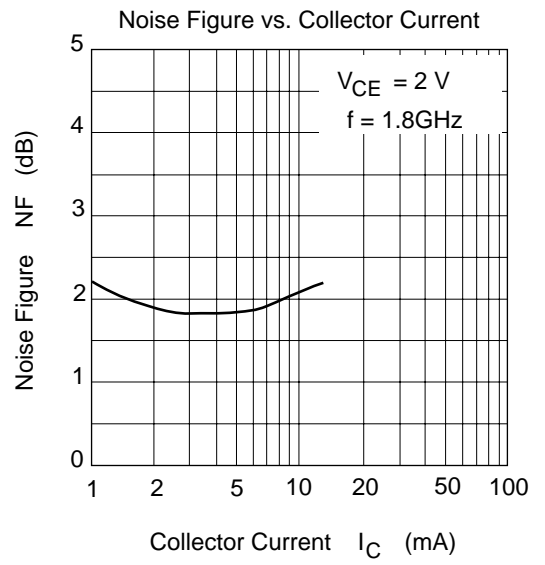
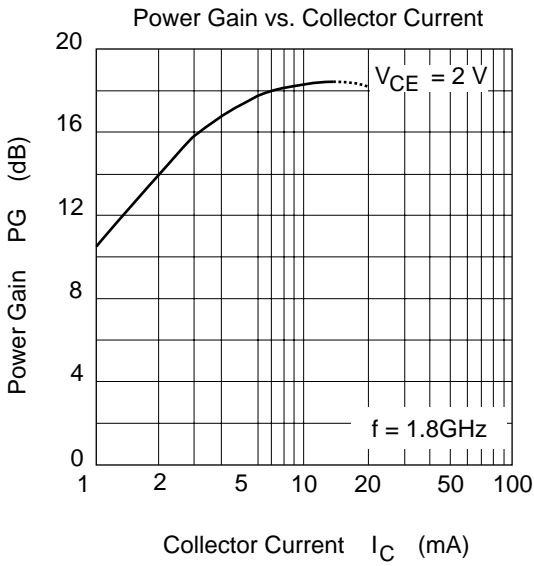
| Item | Symbol | Ratings | Unit |
|------------------------------|------------------|-------------|------------------|
| Collector to base voltage | V_{CBO} | 10 | V |
| Collector to emitter voltage | V_{CEO} | 3.5 | V |
| Emitter to base voltage | V_{EBO} | 1 | V |
| Collector current | I_{C} | 12 | mA |
| Collector power dissipation | P_{C} | 50 | mW |
| Junction temperature | T_{J} | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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

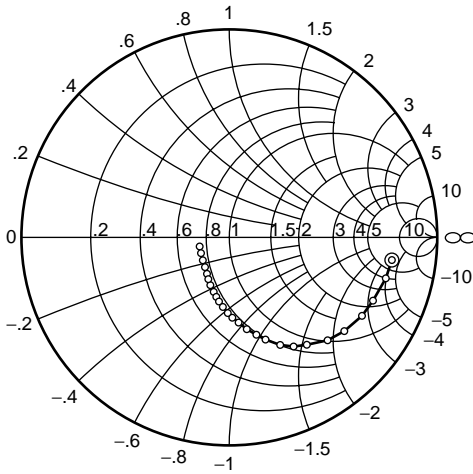
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|-------------------------------------|-----------------------------|-----|------|-----|---------------|---|
| Collector to base breakdown voltage | $V_{(\text{BR})\text{CBO}}$ | 10 | — | — | V | $I_{\text{C}} = 10 \mu\text{A}$, $I_{\text{E}} = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{\text{CB}} = 8 \text{ V}$, $I_{\text{E}} = 0$ |
| Collector cutoff current | I_{CEO} | — | — | 1 | μA | $V_{\text{CE}} = 3 \text{ V}$, $R_{\text{BE}} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{\text{EB}} = 1 \text{ V}$, $I_{\text{C}} = 0$ |
| DC current transfer ratio | h_{FE} | 60 | 100 | 140 | V | $V_{\text{CE}} = 2 \text{ V}$, $I_{\text{C}} = 10 \text{ mA}$ |
| Collector output capacitance | C_{ob} | — | 0.15 | 0.4 | pF | $V_{\text{CB}} = 2 \text{ V}$, $I_{\text{E}} = 0$ $f = 1 \text{ MHz}$ |
| Gain bandwidth product | f_{T} | 23 | 26 | — | GHz | $V_{\text{CE}} = 2 \text{ V}$, $I_{\text{C}} = 10 \text{ mA}$ $f = 2 \text{ GHz}$ |
| Power gain | PG | 14 | 18 | — | dB | $V_{\text{CE}} = 2 \text{ V}$, $I_{\text{C}} = 10 \text{ mA}$ $f = 1.8 \text{ GHz}$ |
| Noise figure | NF | — | 1.8 | 2.3 | dB | $V_{\text{CE}} = 2 \text{ V}$, $I_{\text{C}} = 3 \text{ mA}$ $f = 1.8 \text{ GHz}$ |

Main Characteristics





S11 Parameter vs. Frequency

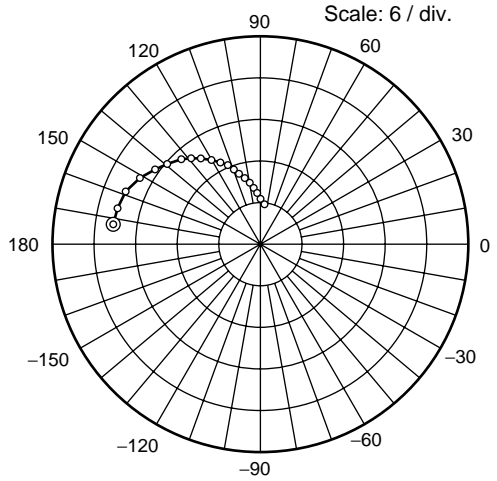


Condition : $V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

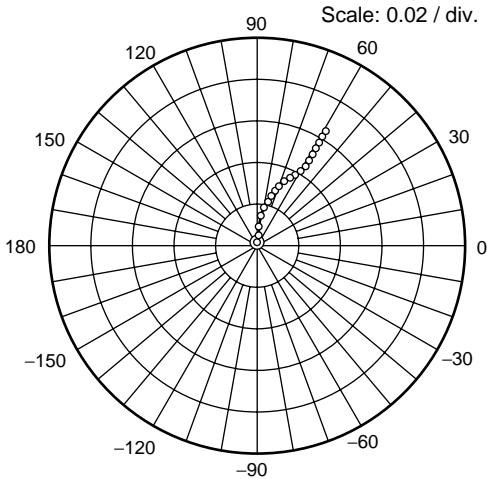


Condition : $V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

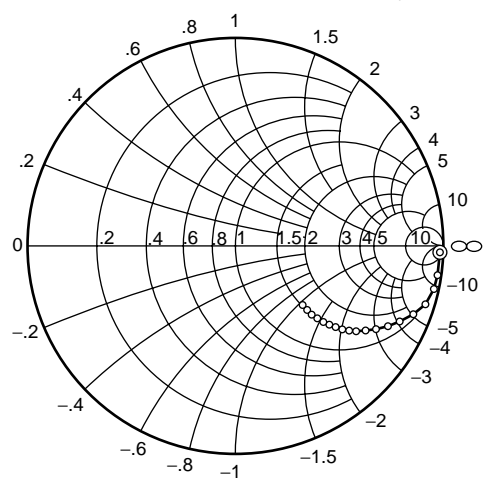


Condition : $V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition : $V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

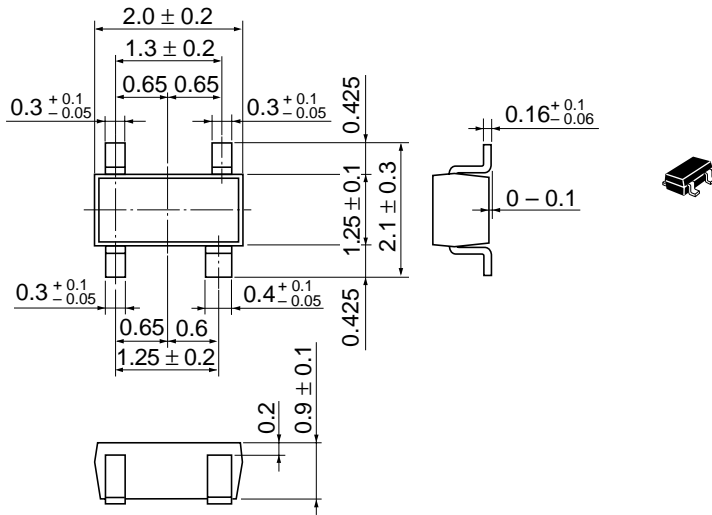
⊙—○

Sparameter ($V_{CE} = 2 \text{ V}$, $I_C = 10 \text{ mA}$, $Z_o = 50 \Omega$)

| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|---------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.779 | -6.9 | 21.32 | 173.3 | 0.0028 | 95.3 | 0.971 | -3.6 |
| 200 | 0.773 | -14.5 | 20.95 | 166.2 | 0.0064 | 92.6 | 0.971 | -7.5 |
| 300 | 0.763 | -22.9 | 20.35 | 158.9 | 0.0102 | 91.8 | 0.961 | -12.1 |
| 400 | 0.741 | -31.4 | 19.65 | 151.7 | 0.0142 | 87.0 | 0.941 | -16.7 |
| 500 | 0.714 | -38.7 | 18.72 | 145.2 | 0.0183 | 83.4 | 0.911 | -20.8 |
| 600 | 0.679 | -46.2 | 17.65 | 139.3 | 0.0222 | 79.7 | 0.876 | -24.7 |
| 700 | 0.641 | -53.6 | 16.61 | 133.9 | 0.0255 | 75.6 | 0.836 | -27.9 |
| 800 | 0.601 | -59.7 | 15.54 | 129.3 | 0.0286 | 72.7 | 0.795 | -30.8 |
| 900 | 0.563 | -65.6 | 14.54 | 124.4 | 0.0313 | 69.5 | 0.756 | -33.1 |
| 1000 | 0.523 | -70.7 | 13.62 | 120.5 | 0.0335 | 67.8 | 0.720 | -34.9 |
| 1100 | 0.488 | -75.0 | 12.78 | 117.1 | 0.0356 | 66.0 | 0.687 | -36.5 |
| 1200 | 0.458 | -80.1 | 12.05 | 114.1 | 0.0376 | 64.1 | 0.657 | -37.5 |
| 1300 | 0.427 | -83.8 | 11.36 | 111.0 | 0.0393 | 62.8 | 0.628 | -38.4 |
| 1400 | 0.400 | -88.9 | 10.64 | 108.5 | 0.0410 | 62.4 | 0.607 | -38.9 |
| 1500 | 0.374 | -91.9 | 10.15 | 106.0 | 0.0426 | 61.0 | 0.582 | -39.6 |
| 1600 | 0.350 | -96.1 | 9.59 | 104.0 | 0.0441 | 61.1 | 0.567 | -39.8 |
| 1700 | 0.326 | -100.1 | 9.14 | 101.7 | 0.0455 | 60.4 | 0.548 | -40.2 |
| 1800 | 0.304 | -102.9 | 8.68 | 100.1 | 0.0469 | 59.7 | 0.533 | -40.2 |
| 1900 | 0.282 | -107.0 | 8.29 | 98.1 | 0.0486 | 59.1 | 0.521 | -40.5 |
| 2000 | 0.267 | -110.8 | 7.93 | 96.1 | 0.0500 | 59.2 | 0.508 | -40.5 |
| 2100 | 0.253 | -115.2 | 7.62 | 94.4 | 0.0517 | 59.3 | 0.498 | -40.5 |
| 2200 | 0.234 | -118.7 | 7.30 | 92.6 | 0.0527 | 59.2 | 0.489 | -40.7 |
| 2300 | 0.225 | -122.1 | 7.03 | 91.0 | 0.0543 | 58.6 | 0.481 | -40.6 |
| 2400 | 0.212 | -127.9 | 6.76 | 89.6 | 0.0557 | 58.4 | 0.473 | -40.7 |
| 2500 | 0.199 | -131.8 | 6.54 | 88.8 | 0.0573 | 58.2 | 0.468 | -40.5 |
| 2600 | 0.193 | -135.2 | 6.31 | 86.8 | 0.0579 | 58.3 | 0.461 | -40.7 |
| 2700 | 0.186 | -141.9 | 6.11 | 85.4 | 0.0600 | 58.2 | 0.456 | -40.4 |
| 2800 | 0.178 | -146.0 | 5.89 | 84.2 | 0.0612 | 58.2 | 0.450 | -40.6 |
| 2900 | 0.177 | -151.4 | 5.73 | 82.7 | 0.0624 | 58.3 | 0.447 | -40.5 |
| 3000 | 0.168 | -157.0 | 5.56 | 81.4 | 0.0642 | 57.8 | 0.442 | -40.9 |

Package Dimensions

As of January, 2001
Unit: mm



| | |
|------------------------|------------|
| Hitachi Code | CMPAK-4(T) |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.006 g |

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HITACHI

Hitachi, Ltd.

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

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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 GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

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

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