

---

# 2SC5136

Silicon NPN Epitaxial

## HITACHI

ADE-208-223

1st. Edition

---

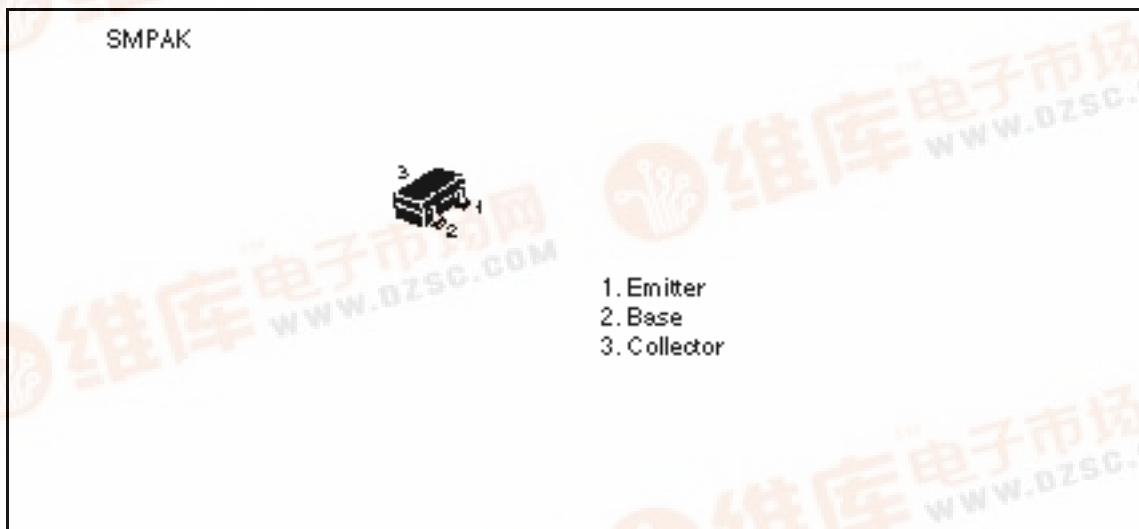
### Application

VHF/UHF wide band amplifier

### Features

- High gain bandwidth product  
 $f_T = 3.8 \text{ GHz typ}$
- High gain, low noise figure  
 $PG = 11 \text{ dB typ, NF} = 2.5 \text{ dB typ at } f = 900 \text{ MHz}$

### Outline



---

## 2SC5136

---

### Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	25	V
Collector to emitter voltage	$V_{CEO}$	13	V
Emitter to base voltage	$V_{EBO}$	3	V
Collector current	$I_C$	50	mA
Collector power dissipation	$P_C$	80	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

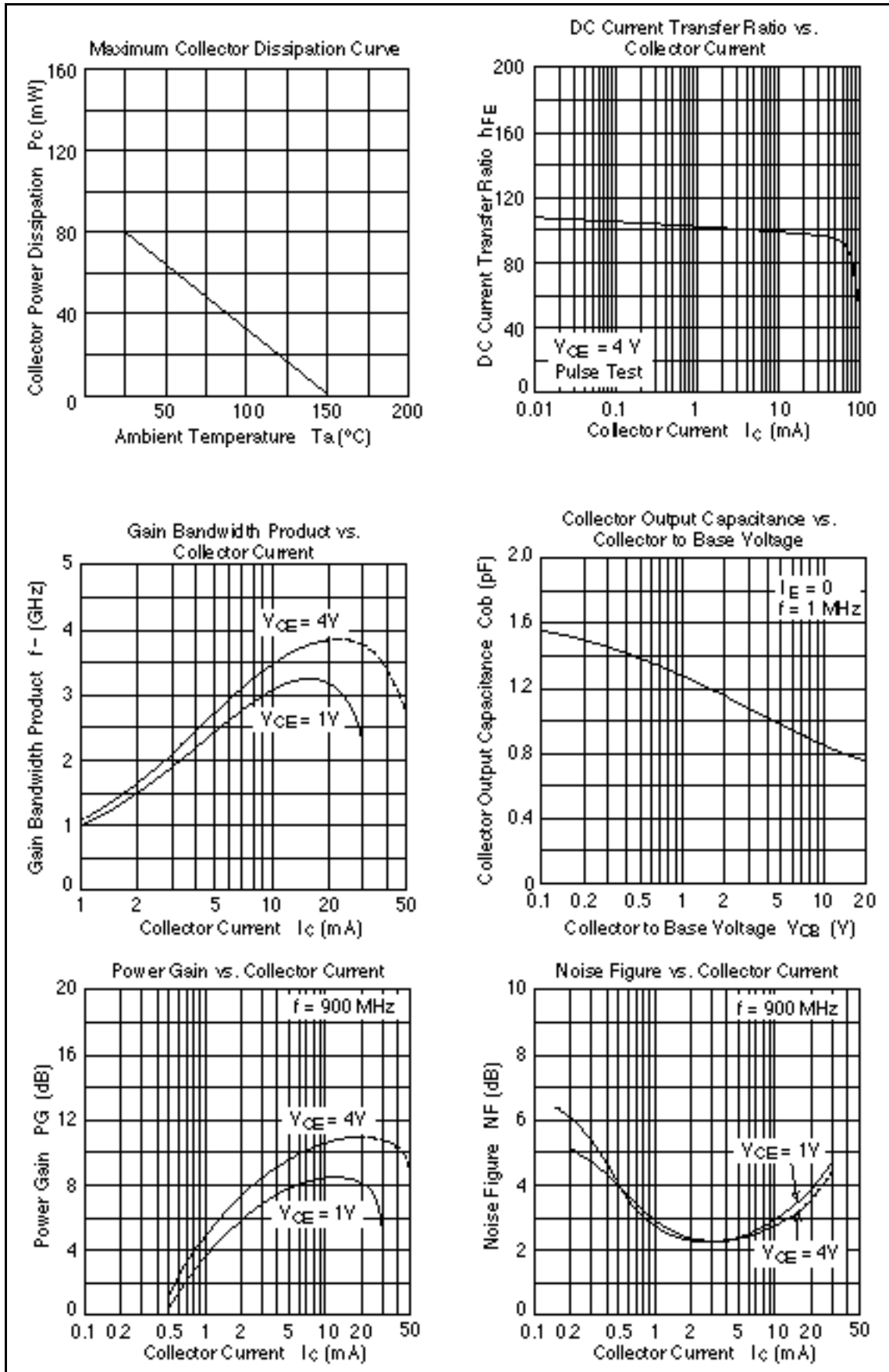
Note: Marking is "TI-".

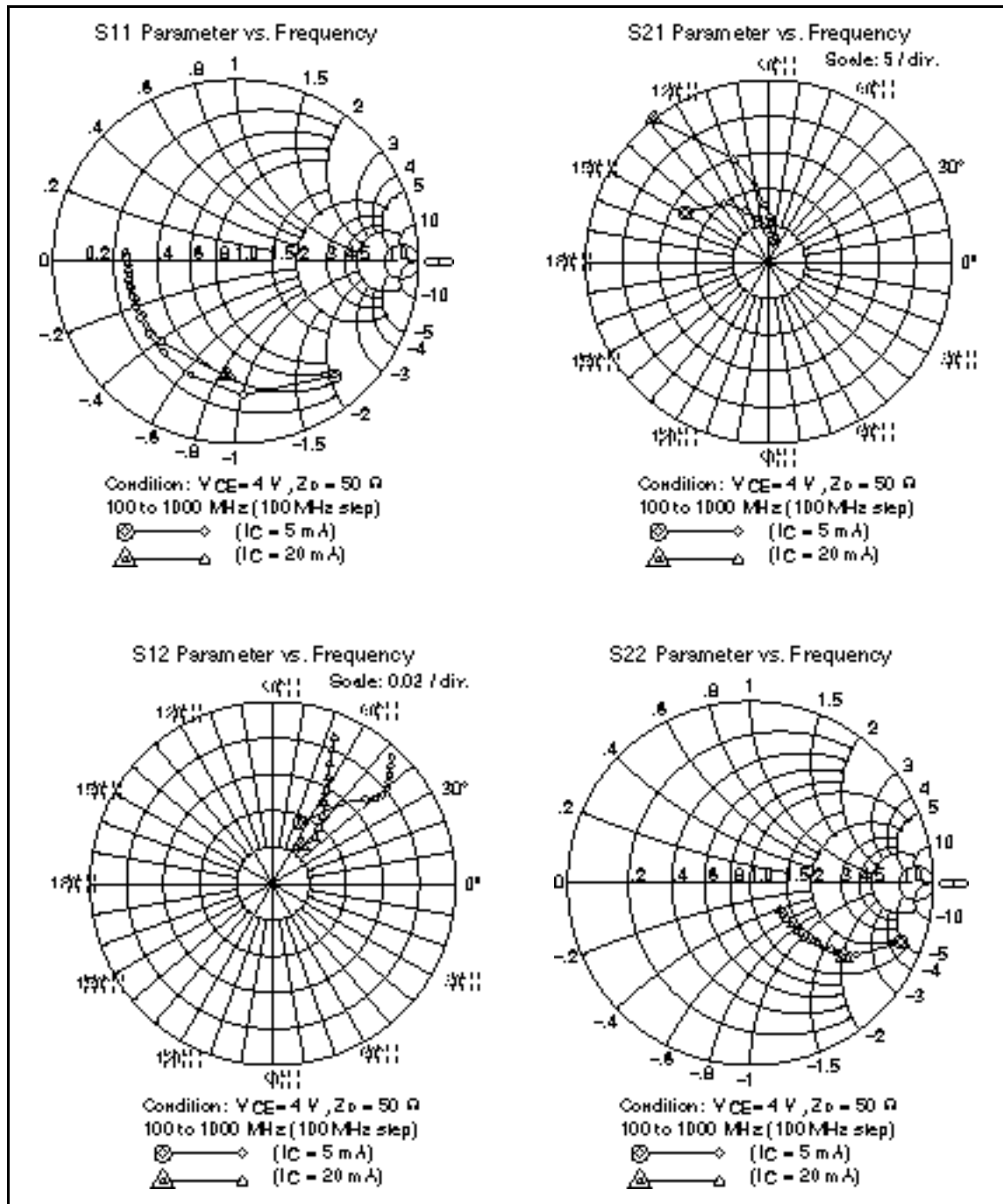
Attention: This device is very sensitive to electro static discharge.

It is recommended to adopt appropriate cautions when handling this transistor.

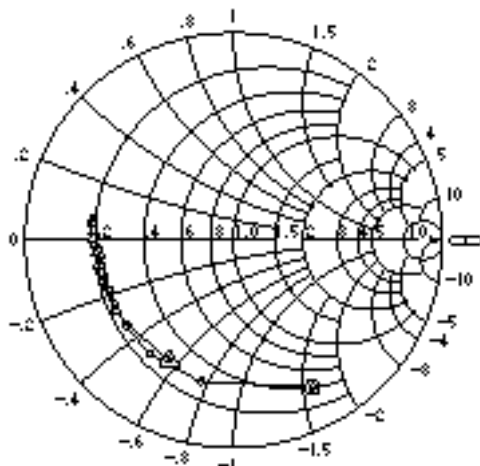
### Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	25	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	100	nA	$V_{CB} = 15 V, I_E = 0$
	$I_{CEO}$	—	—	10	$\mu A$	$V_{CE} = 13 V, R_{BE} =$
Emitter cutoff current	$I_{EBO}$	—	—	300	nA	$V_{EB} = 3 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	50	100	180		$V_{CE} = 4 V, I_C = 20 mA$
Collector output capacitance	$C_{ob}$	—	0.85	1.3	pF	$V_{CB} = 10 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	$f_T$	3.0	3.8	—	GHz	$V_{CE} = 4 V, I_C = 20 mA$
Power gain	PG	7	11	—	dB	$V_{CE} = 4 V, I_C = 20 mA,$ $f = 900 MHz$
Noise figure	NF	—	2.5	4.0	dB	$V_{CE} = 4 V, I_C = 5 mA,$ $f = 900 MHz$



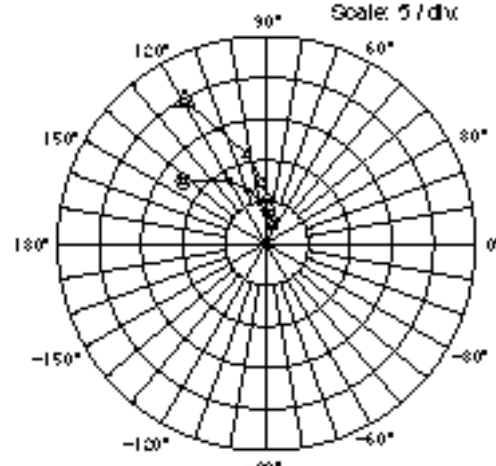


S11 Parameter vs. Frequency



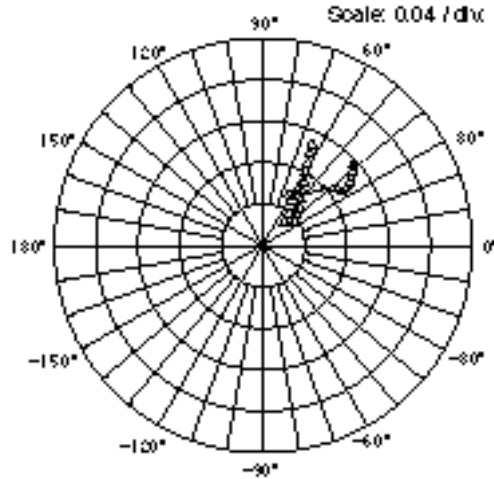
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ → (Ic = 5 mA)  
 △ → (Ic = 20 mA)

S21 Parameter vs. Frequency



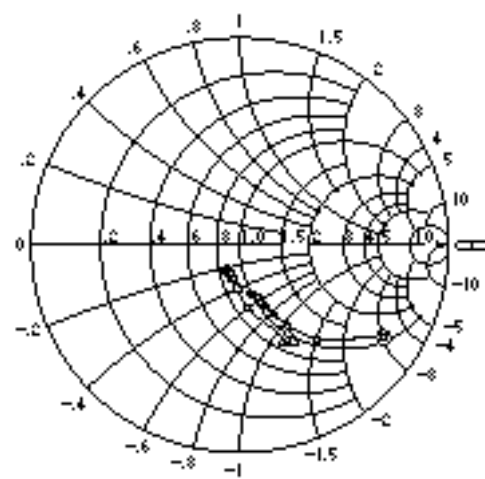
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ → (Ic = 5 mA)  
 △ → (Ic = 20 mA)

S12 Parameter vs. Frequency



Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ → (Ic = 5 mA)  
 △ → (Ic = 20 mA)

S22 Parameter vs. Frequency



Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ → (Ic = 5 mA)  
 △ → (Ic = 20 mA)

When using this document, keep the following in mind:

1. This document may, wholly or partially, be subject to change without notice.
2. All rights are reserved: No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without Hitachi's permission.
3. Hitachi will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit according to this document.
4. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Hitachi's semiconductor products. Hitachi assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
5. No license is granted by implication or otherwise under any patents or other rights of any third party or Hitachi, Ltd.
6. **MEDICAL APPLICATIONS:** Hitachi's products are not authorized for use in **MEDICAL APPLICATIONS** without the written consent of the appropriate officer of Hitachi's sales company. Such use includes, but is not limited to, use in life support systems. Buyers of Hitachi's products are requested to notify the relevant Hitachi sales offices when planning to use the products in **MEDICAL APPLICATIONS**.

---

---

# HITACHI

## **Hitachi, Ltd.**

Semiconductor & IC Div.  
Nippon Bldg., 2-6-2, Ohite-machi, Chiyoda-ku, Tokyo 100, Japan  
Tel Tokyo (03) 3270-2111  
Fax (03) 3270-5109

### For further information write to:

Hitachi America, Ltd.  
Semiconductor & IC Div.  
2000 Sierra Point Parkway  
Brisbane, CA. 94005-4835  
U.S.A.  
Tel 415-589-8300  
Fax 415-589-4207

Hitachi Europe GmbH  
Electronic Components Group  
Continental Europe  
Dornacher StraÙe 3  
D-85622 Feldkirchen  
München  
Tel 089-9 94 80 0  
Fax 089-9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Div.  
Northern Europe Headquarters  
Whitbrook Park  
Lower Cookham Road  
M Maidenhead  
Berkshire SL6 8YA  
United Kingdom  
Tel 0628-885000  
Fax 0628-778322

Hitachi Asia Pte. Ltd.  
45 Collyer Quay #20-00  
Hitachi Tower  
Singapore 0404  
Tel 535-2100  
Fax 535-1533

Hitachi Asia (Hong Kong) Ltd.  
Unit 705, North Tower,  
World Finance Centre  
Harbour City, Canton Road  
Tsim Sha Tsui, Kowloon  
Hong Kong  
Tel 27359218  
Fax 27308074