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# 2SC5136

Silicon NPN Epitaxial

# HITACHI

ADE-208-223  
1st. Edition

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## Application

VHF/UHF wide band amplifier

## Features

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

## Outline

SMPAK



1. Emitter
2. Base
3. Collector

## 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

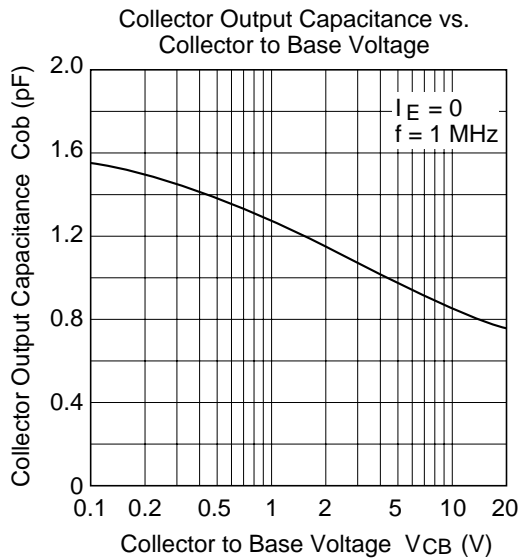
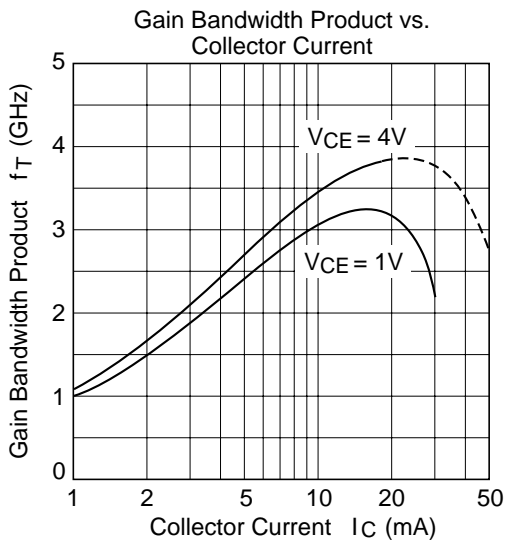
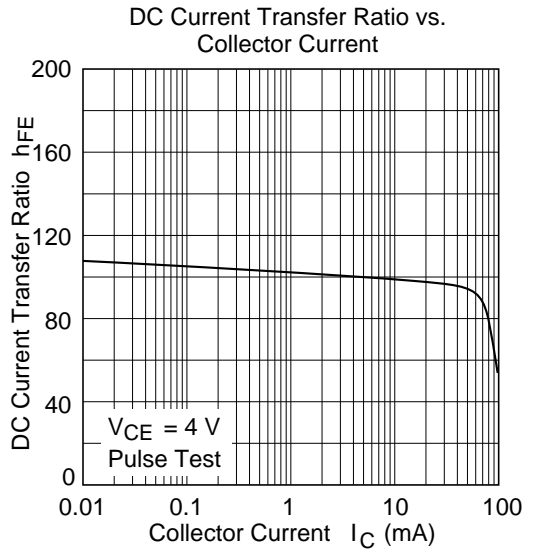
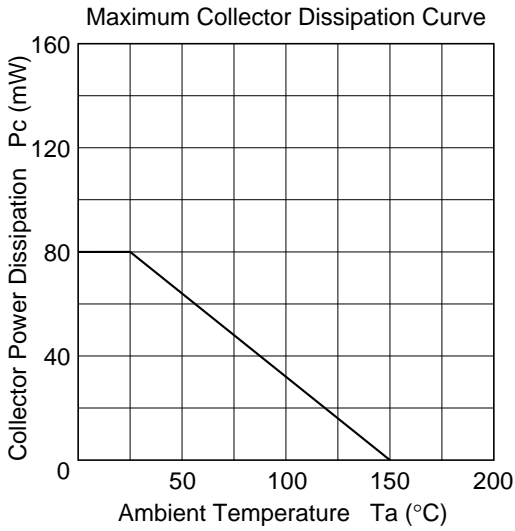
Note: Marking is "Tl-".

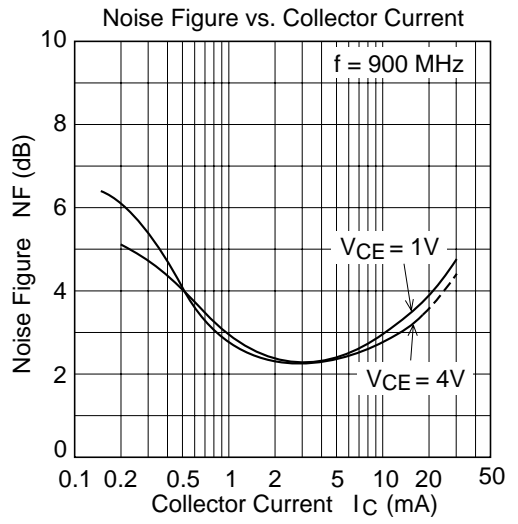
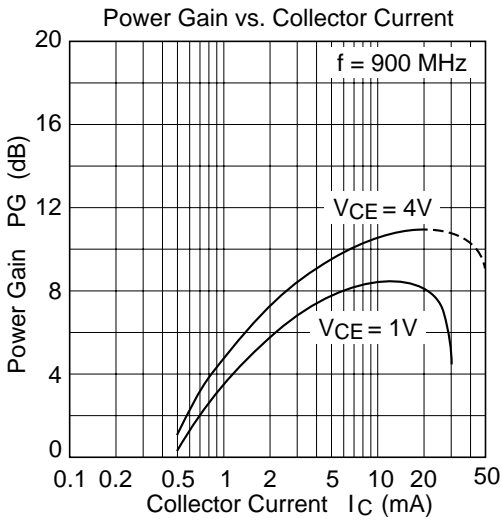
Attention: This device is very sensitive to electro static discharge.

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

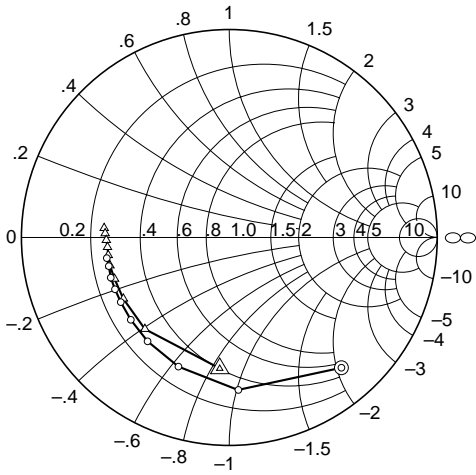
### Electrical Characteristics (Ta = 25°C)

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	$\mu A$	$V_{CE} = 13 V, R_{BE} = \infty$
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	$V_{CE} = 4 V, I_C = 5 mA, f = 900 MHz$



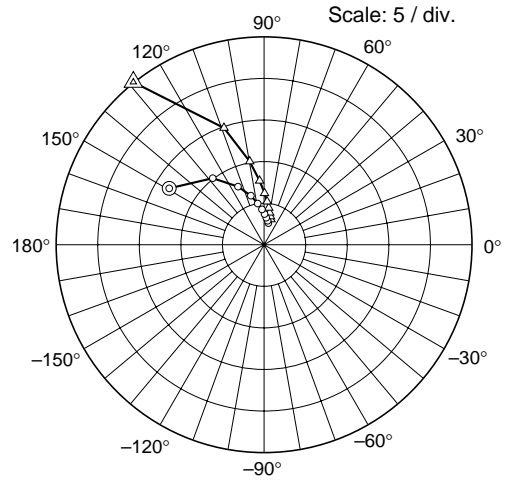


S11 Parameter vs. Frequency



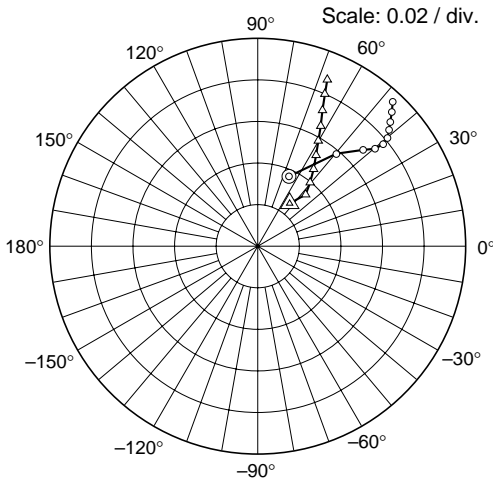
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S21 Parameter vs. Frequency



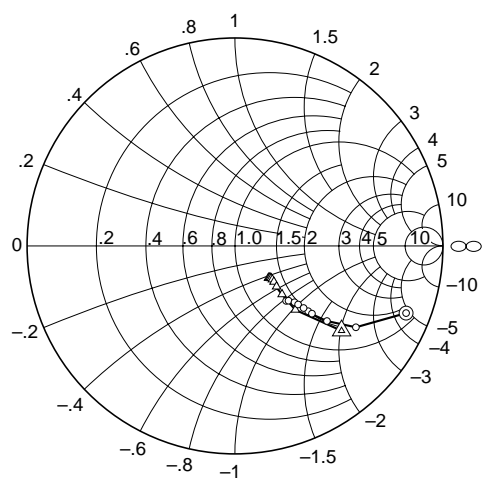
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S12 Parameter vs. Frequency



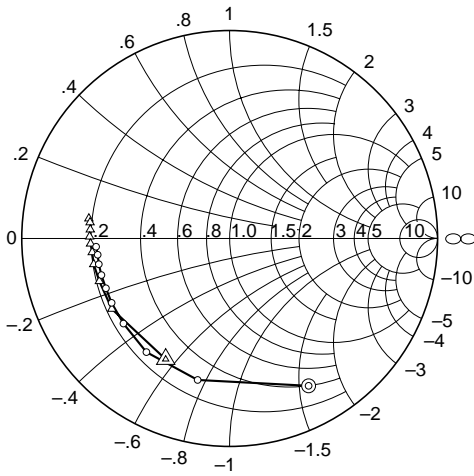
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S22 Parameter vs. Frequency



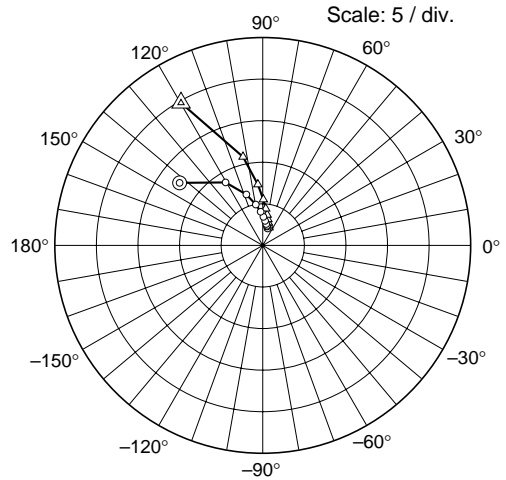
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S11 Parameter vs. Frequency



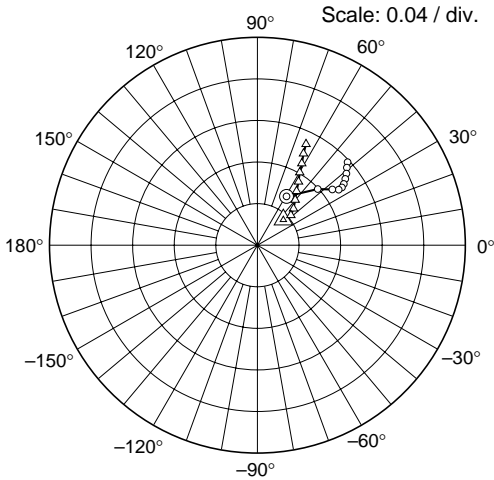
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ (IC = 5 mA)  
 △ — △ (IC = 20 mA)

S21 Parameter vs. Frequency



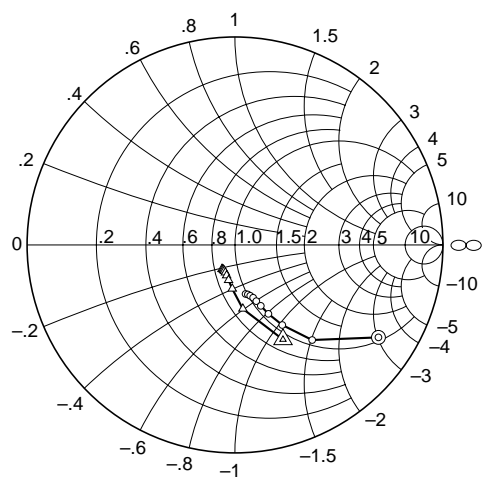
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ (IC = 5 mA)  
 △ — △ (IC = 20 mA)

S12 Parameter vs. Frequency



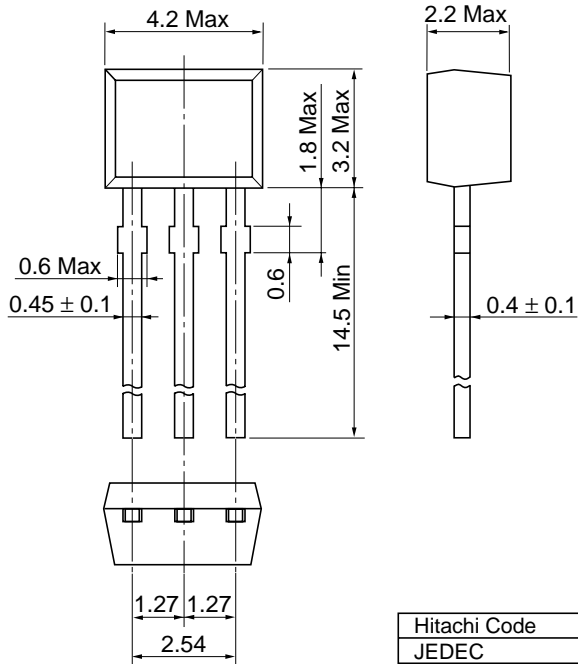
Condition:  $V_{CE} = 1\text{ V}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (100 MHz step)  
 ○ — ○ (IC = 5 mA)  
 △ — △ (IC = 20 mA)

S22 Parameter vs. Frequency



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

Unit: mm



Hitachi Code	SPAK
JEDEC	—
EIAJ	—
Weight (reference value)	0.10 g

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