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# 2SC5141

Silicon NPN Epitaxial

# HITACHI

ADE-208-228

1st. Edition

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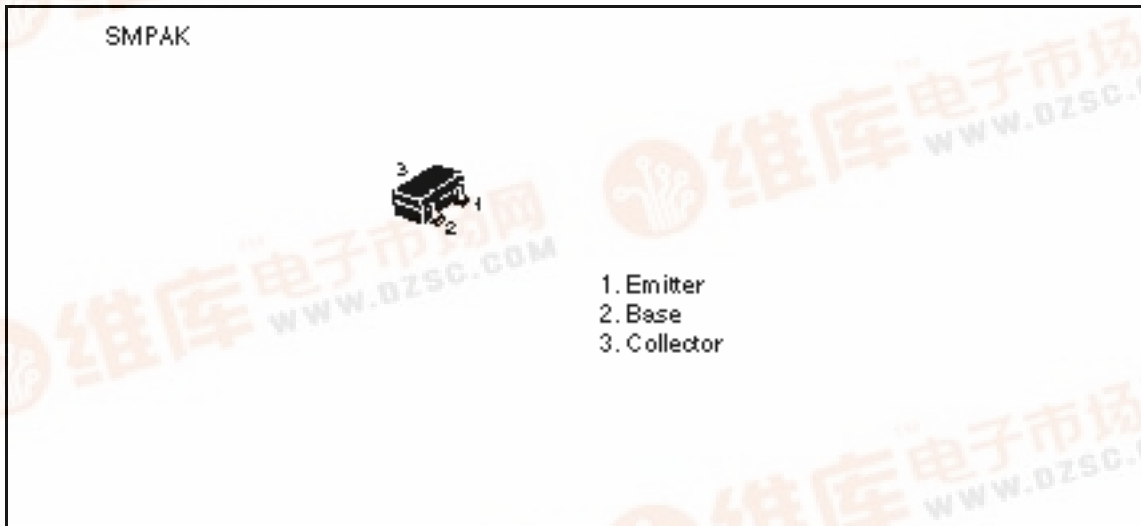
## Application

VHF / UHF wide band amplifier

## Features

- High gain bandwidth product  
 $f_T = 5.8 \text{ GHz typ}$
- High gain, low noise figure  
 $PG = 13 \text{ dB typ}$ ,  $NF = 1.6 \text{ dB typ}$  at  $f = 900 \text{ MHz}$

## Outline



## 2SC5141

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

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	20	V
Collector to emitter voltage	$V_{CEO}$	12	V
Emitter to base voltage	$V_{EBO}$	2	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

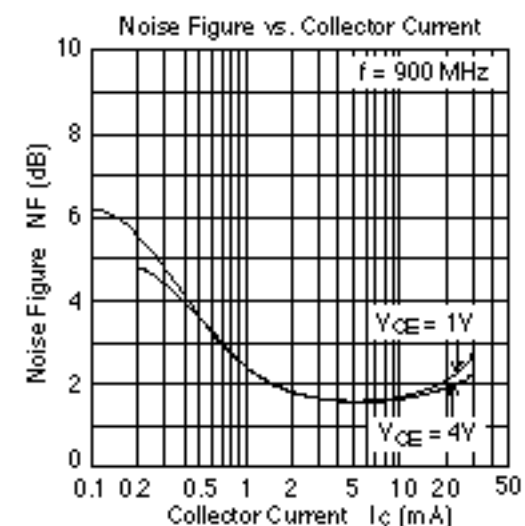
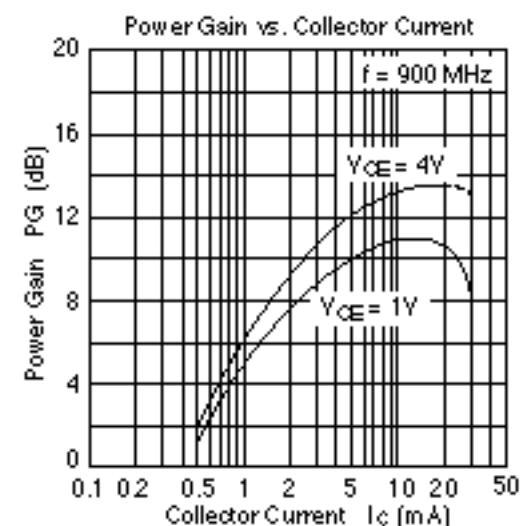
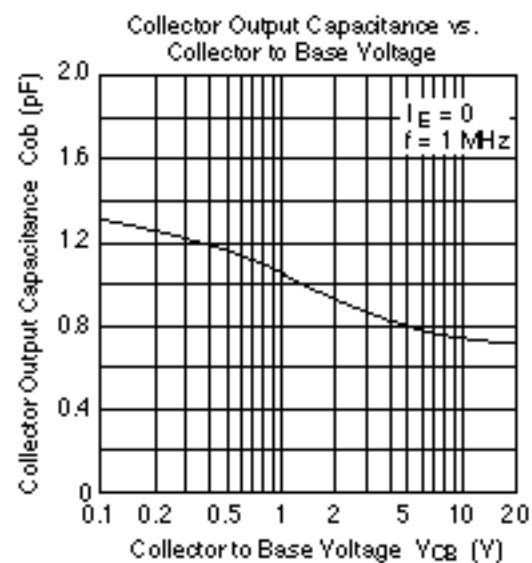
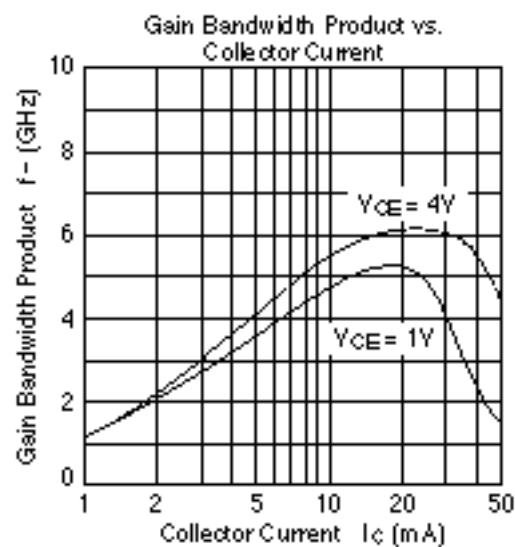
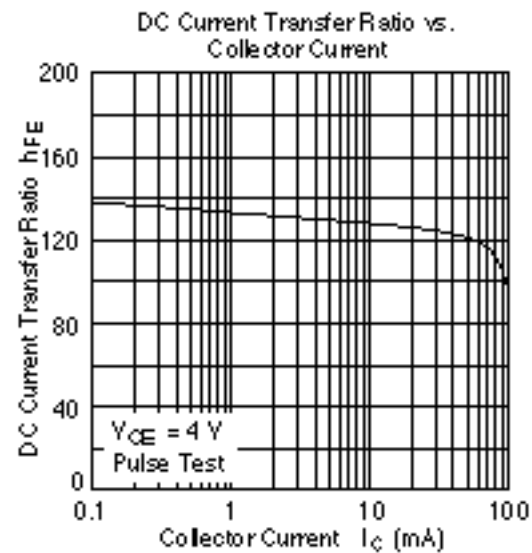
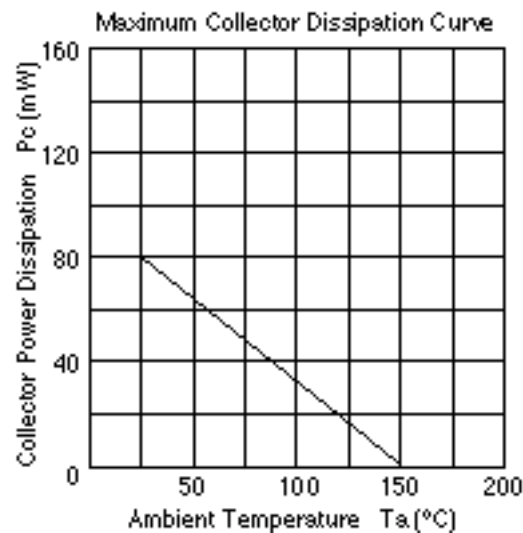
Note: Marking is “YN–”.

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

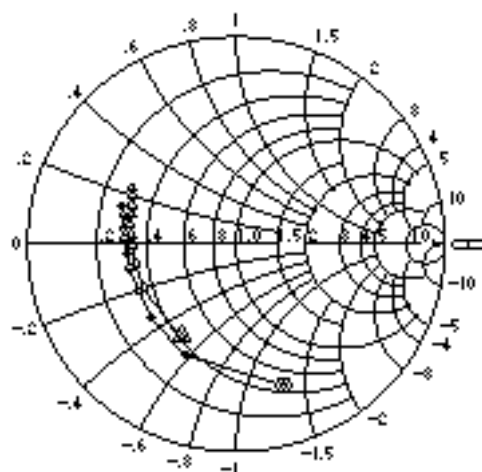
It is recommended to adopt appropriate cautions when handling this transistor.

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

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	20	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu A$	$V_{CB} = 15 V, I_E = 0$
	$I_{CEO}$	—	—	1	mA	$V_{CE} = 12 V, R_{BE} =$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 2 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	50	120	250		$V_{CE} = 4 V, I_C = 20 mA$
Collector output capacitance	$C_{ob}$	—	0.8	1.4	pF	$V_{CB} = 5 V, I_E = 0,$ $f = 1 MHz$
Gain bandwidth product	$f_T$	4.0	5.8	—	GHz	$V_{CE} = 4 V, I_C = 20 mA$
Power gain	PG	9.5	13.0	—	dB	$V_{CE} = 4 V, I_C = 20 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.6	3.0	dB	$V_{CE} = 4 V, I_C = 5 mA,$ $f = 900 MHz$



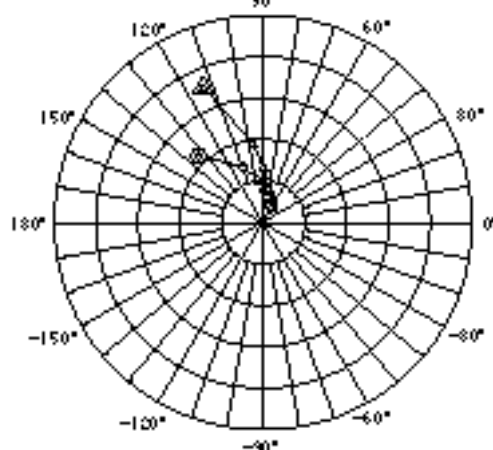
S11 Parameter vs. Frequency



Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S21 Parameter vs. Frequency

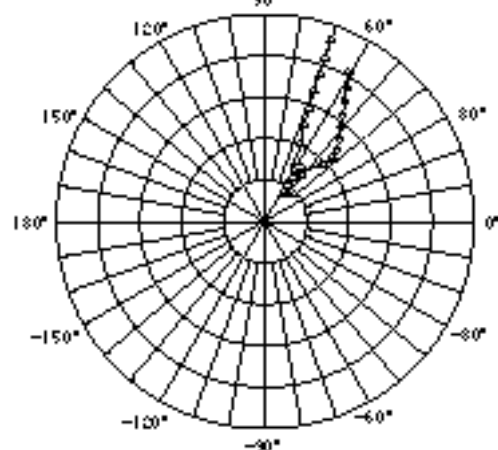
Scale: 5 / dB



Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

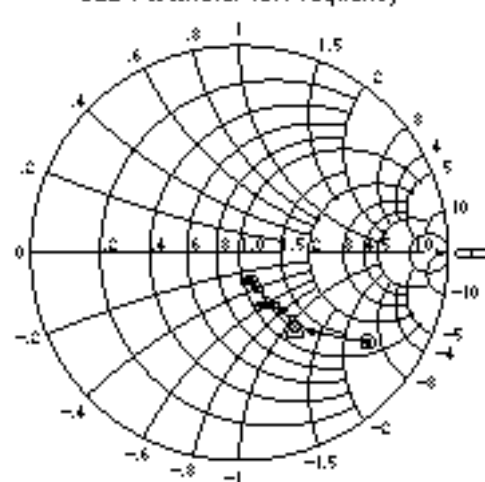
S12 Parameter vs. Frequency

Scale: 0.04 / dB



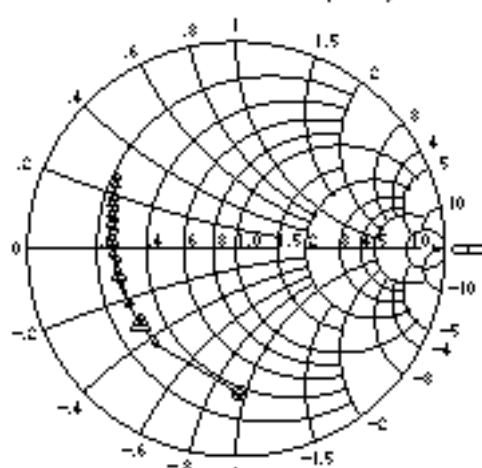
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S22 Parameter vs. Frequency



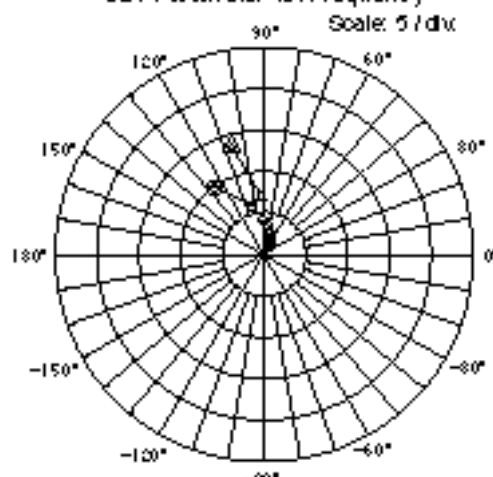
Condition:  $V_{CE} = 4\text{ V}$ ,  $Z_0 = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ ( $I_C = 5\text{ mA}$ )  
 △ — △ ( $I_C = 20\text{ mA}$ )

S11 Parameter vs. Frequency



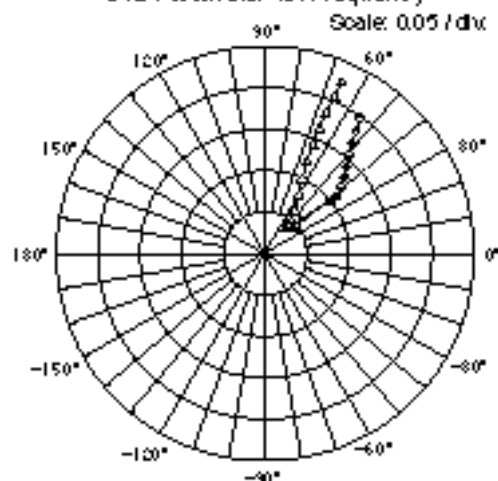
Condition:  $V_{CE} = 1 \text{ V}$ ,  $Z_0 = 50 \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — (  $I_C = 5 \text{ mA}$  )  
 △ — (  $I_C = 20 \text{ mA}$  )

S21 Parameter vs. Frequency



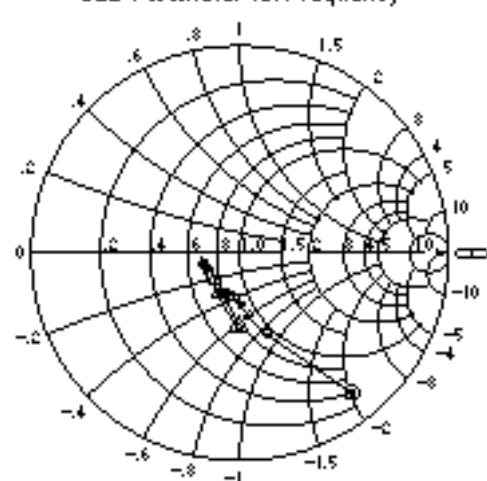
Condition:  $V_{CE} = 1 \text{ V}$ ,  $Z_0 = 50 \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — (  $I_C = 5 \text{ mA}$  )  
 △ — (  $I_C = 20 \text{ mA}$  )

S12 Parameter vs. Frequency



Condition:  $V_{CE} = 1 \text{ V}$ ,  $Z_0 = 50 \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — (  $I_C = 5 \text{ mA}$  )  
 △ — (  $I_C = 20 \text{ mA}$  )

S22 Parameter vs. Frequency



Condition:  $V_{CE} = 1 \text{ V}$ ,  $Z_0 = 50 \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — (  $I_C = 5 \text{ mA}$  )  
 △ — (  $I_C = 20 \text{ mA}$  )

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