
2SC5140

Silicon NPN Epitaxial

HITACHI

ADE-208-227

1st. Edition

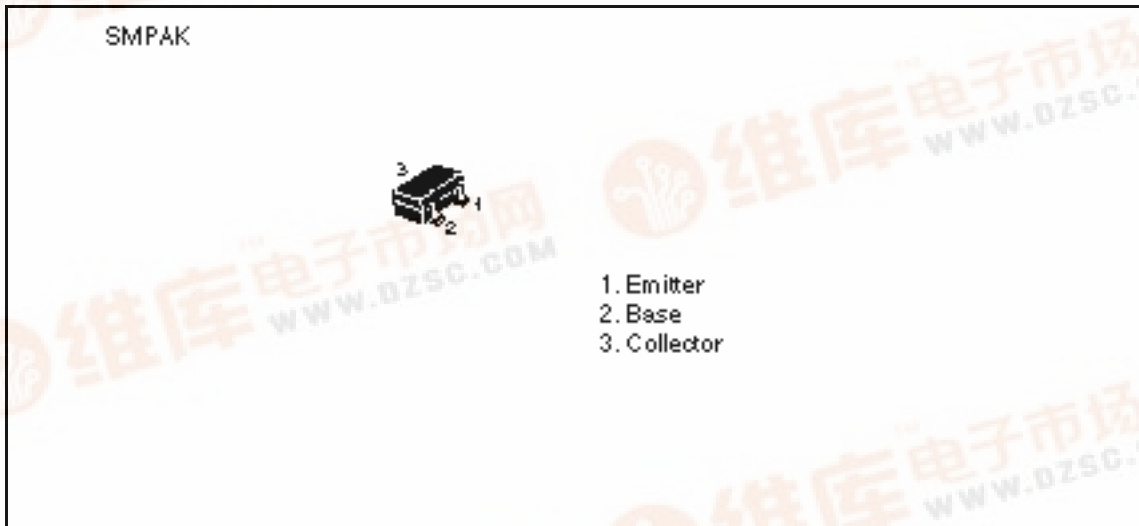
Application

VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 9 \text{ GHz typ}$
- High gain, low noise figure
 $PG = 15 \text{ dB typ, NF} = 1.6 \text{ dB typ at } f = 900 \text{ MHz}$

Outline



2SC5140

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	9	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	20	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

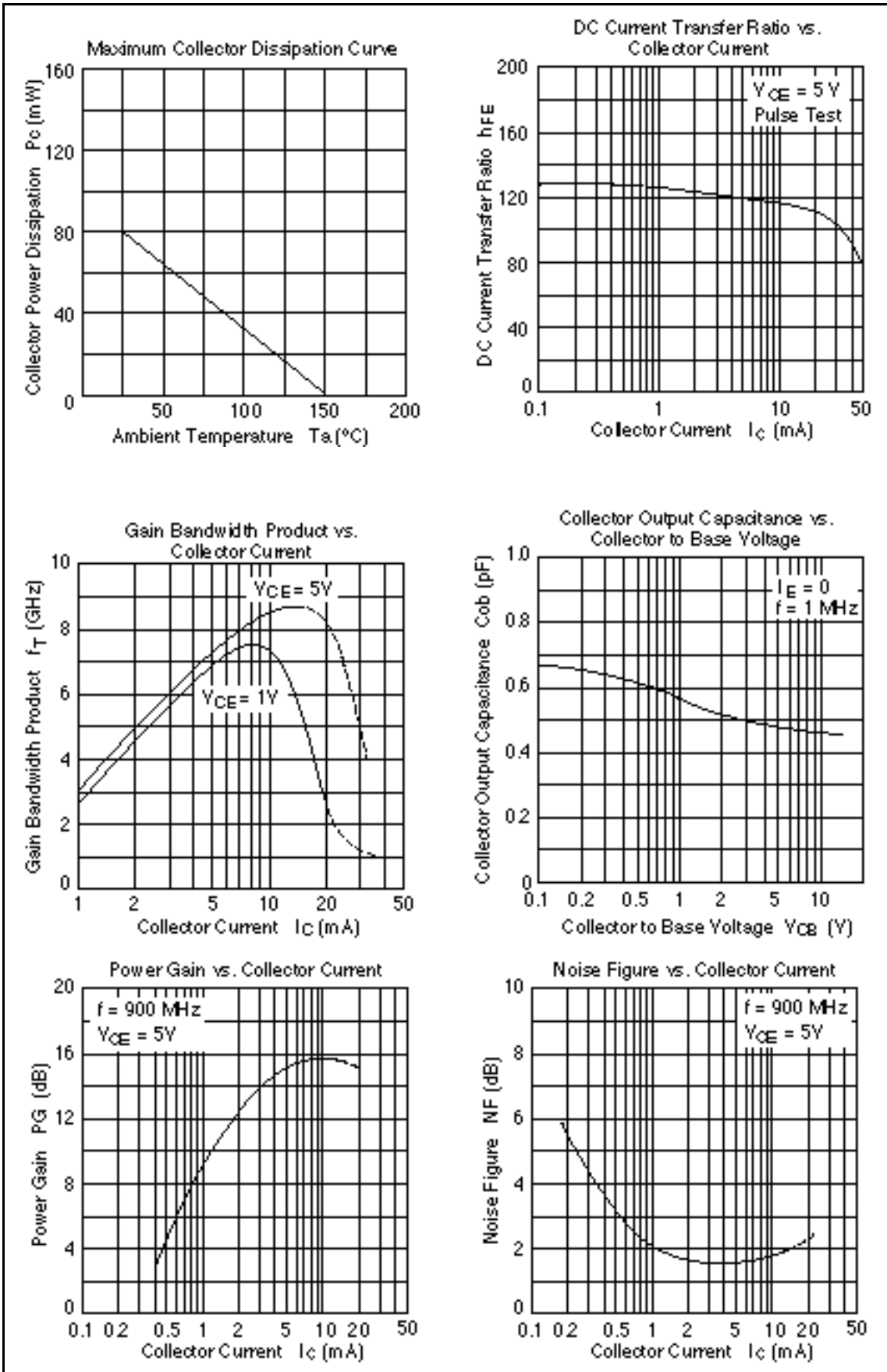
Note: Marking is "YH-".

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

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

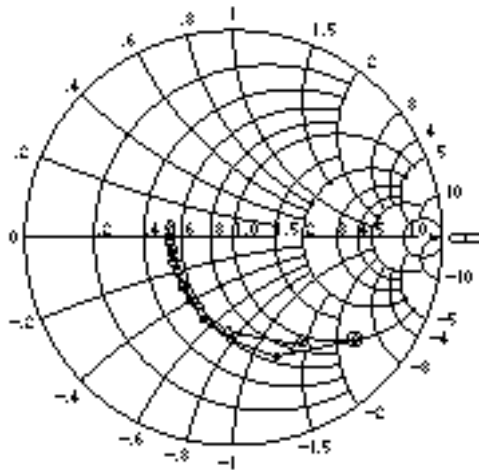
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 15\text{ V}, I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 9\text{ V}, R_{BE} =$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 1.5\text{ V}, I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Collector output capacitance	C_{ob}	—	0.5	0.85	pF	$V_{CB} = 5\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$
Gain bandwidth product	f_T	6	9	—	GHz	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Power gain	PG	11	15	—	dB	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA},$ $f = 900\text{ MHz}$
Noise figure	NF	—	1.6	2.5	dB	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA},$ $f = 900\text{ MHz}$



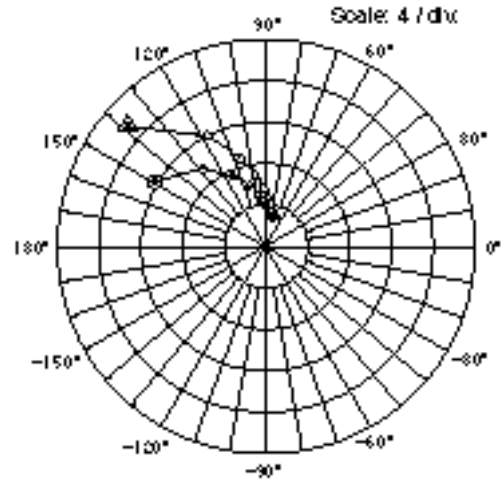
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S11 Parameter vs. Frequency



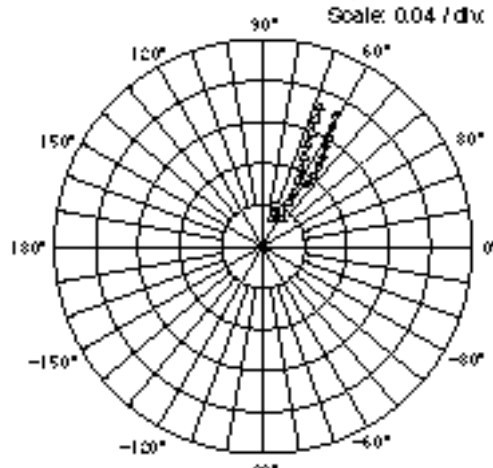
Condition: $V_{CE} = 5\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ —→ (Ic = 5 mA)
 ⊚ —→ (Ic = 10 mA)

S21 Parameter vs. Frequency



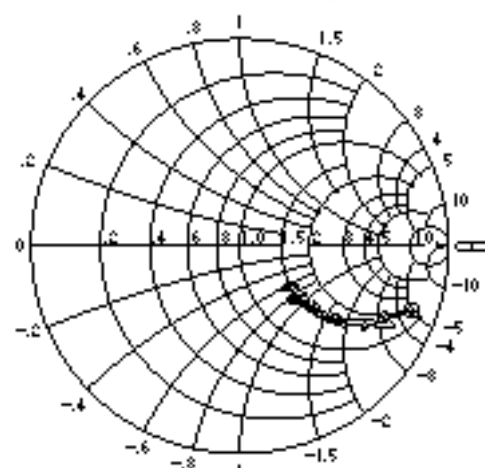
Condition: $V_{CE} = 5\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ —→ (Ic = 5 mA)
 ⊚ —→ (Ic = 10 mA)

S12 Parameter vs. Frequency



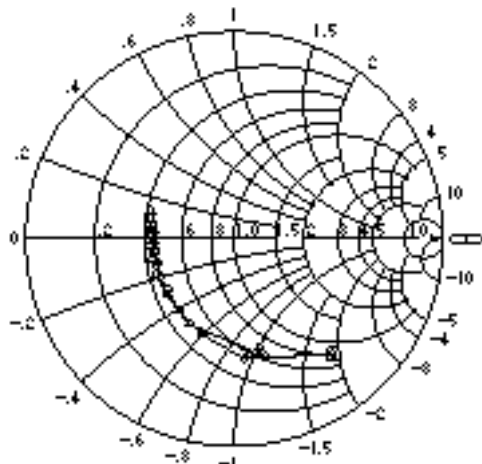
Condition: $V_{CE} = 5\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ —→ (Ic = 5 mA)
 ⊚ —→ (Ic = 10 mA)

S22 Parameter vs. Frequency



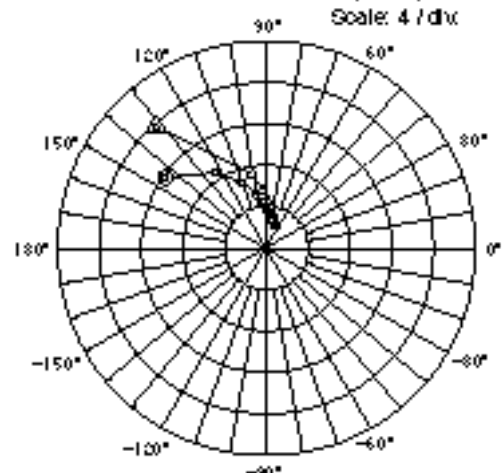
Condition: $V_{CE} = 5\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ —→ (Ic = 5 mA)
 ⊚ —→ (Ic = 10 mA)

S11 Parameter vs. Frequency



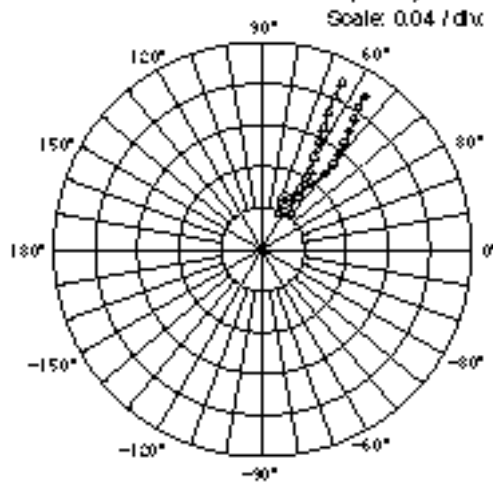
Condition: $V_{CE} = 1\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ → (Ic = 5 mA)
 ⊚ → (Ic = 10 mA)

S21 Parameter vs. Frequency



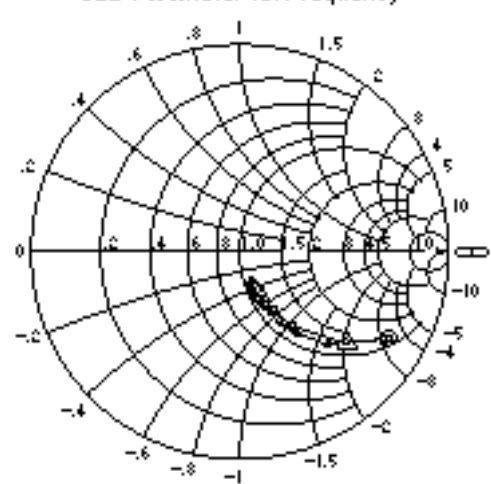
Condition: $V_{CE} = 1\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ → (Ic = 5 mA)
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S12 Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
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S22 Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_0 = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ⊙ → (Ic = 5 mA)
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