2SC5080

Silicon NPN Epitaxial

HITACHI

Application

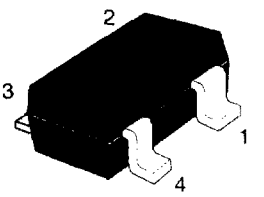
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 13.5 GHz Typ
- High gain, low noise figure
  PG = 18 dB Typ, NF = 1.1 dB Typ at f = 900 MHz

Outline

MPAK-4



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

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	8	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	−55 to +150	°C

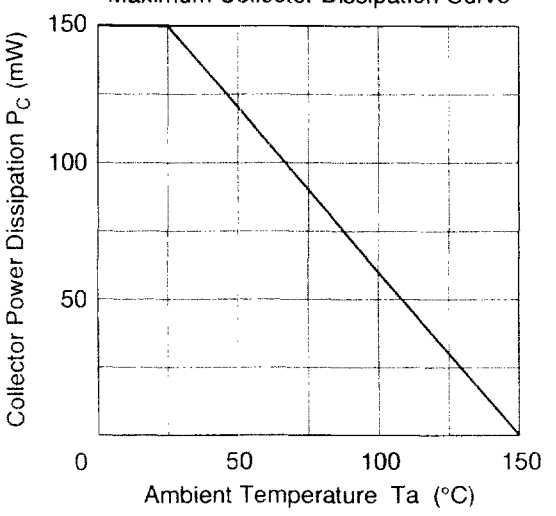
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10 µA, I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	µA	V_{CB} = 12 V, I_E = 0
	I_{CEO}	—	—	1	mA	V_{CE} = 8 V, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	V_{EB} = 1.5 V, I_C = 0
DC current transfer ratio	h_{FE}	50	90	160		V_{CE} = 5 V, I_C = 20 mA
Collector output capacitance	Cob	—	0.4	0.75	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	10.5	13.5	—	GHz	V_{CE} = 5 V, I_C = 20 mA
Power gain	PG	15	18	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	1.1	2.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

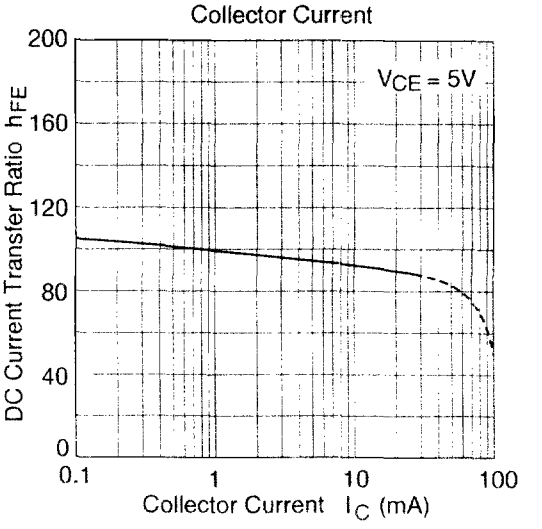
Note: Marking is "ZD–".

Attention: This device is very sensitive to electro static discharge.
It is recommended to adopt appropriate cautions when handling this transistor.

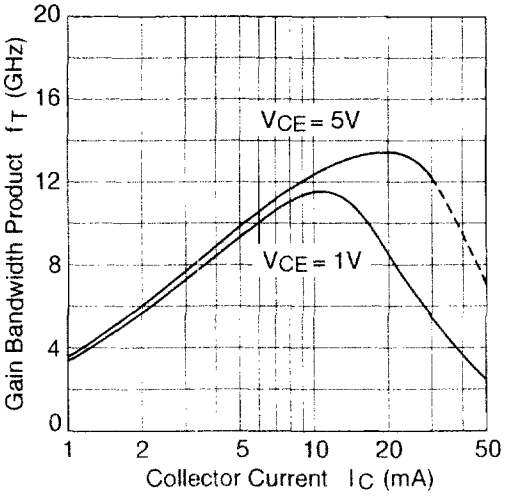
Maximum Collector Dissipation Curve



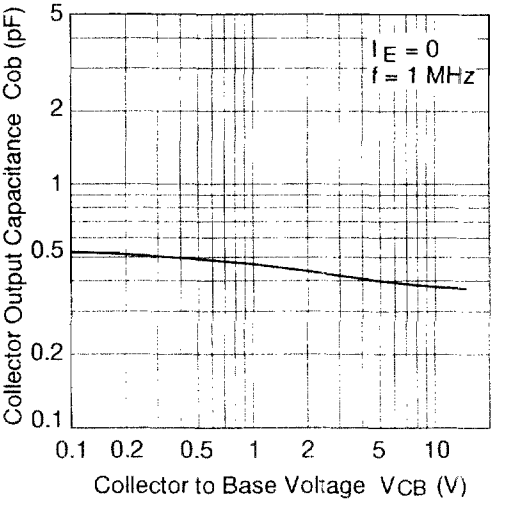
DC Current Transfer Ratio vs. Collector Current



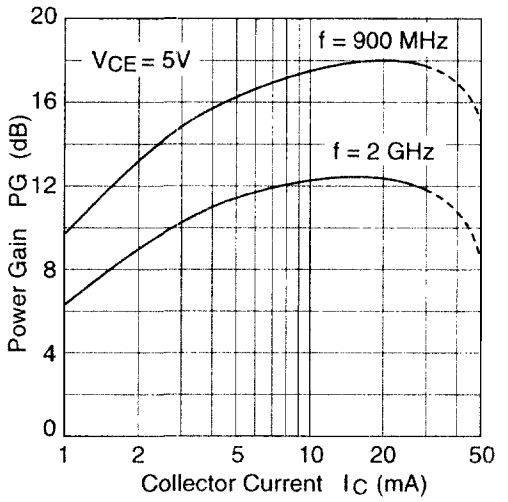
Gain Bandwidth Product vs. Collector Current



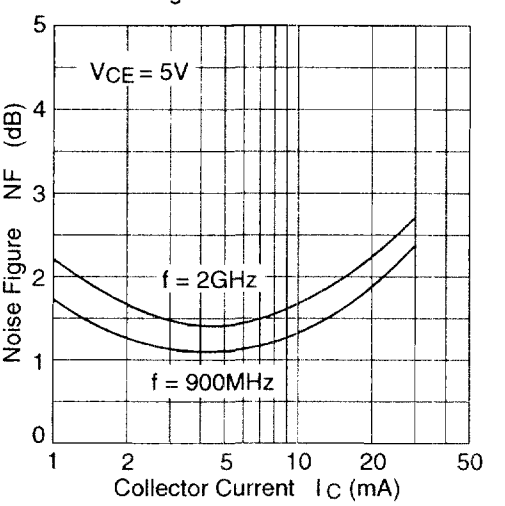
Collector Output Capacitance vs. Collector to Base Voltage



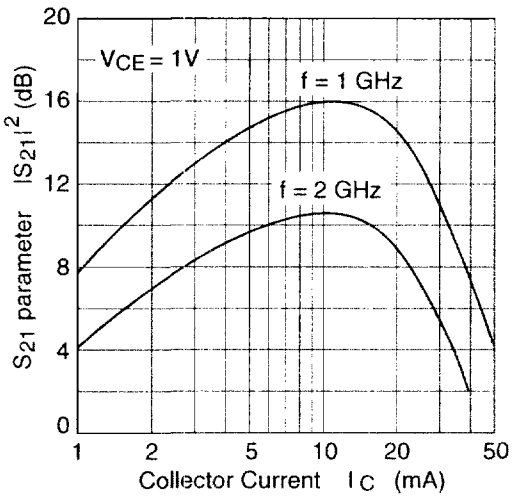
Power Gain vs. Collector Current



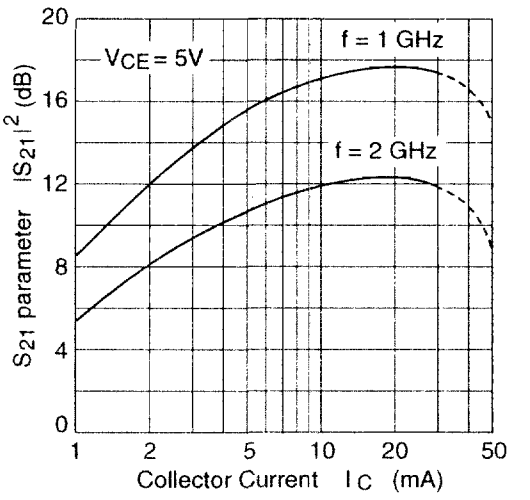
Noise Figure vs. Collector Current



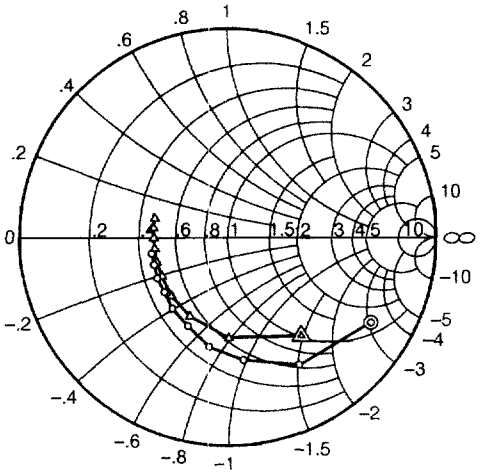
S21 Parameter vs. Collector Current



S21 Parameter vs. Collector Current

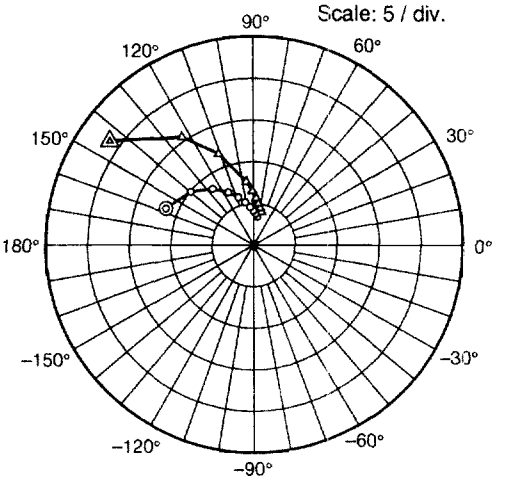


S11 Parameter vs. Frequency



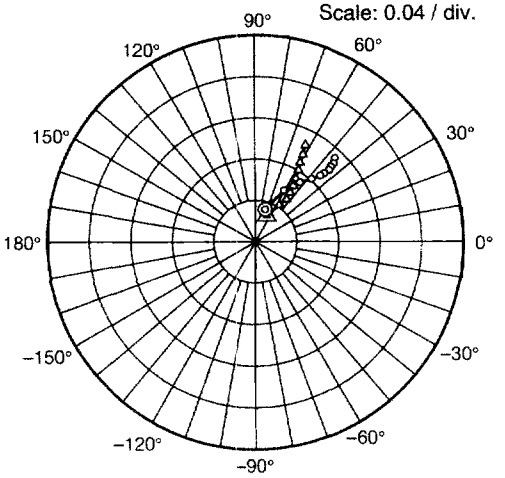
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(◎——○) (I_C = 5 mA)
(△——△) (I_C = 20 mA)

S21 Parameter vs. Frequency



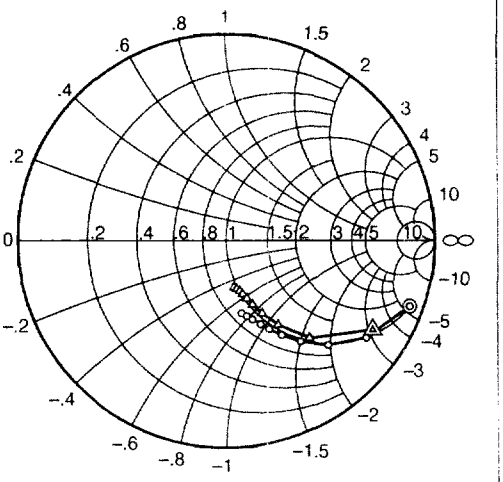
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(◎——○) (I_C = 5 mA)
(△——△) (I_C = 20 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(◎——○) (I_C = 5 mA)
(△——△) (I_C = 20 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(◎——○) (I_C = 5 mA)
(△——△) (I_C = 20 mA)

S Parameters (V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.798	–30.8	11.47	157.3	0.0329	73.0	0.936	–20.0
400	0.699	–60.8	9.88	139.6	0.0570	60.8	0.820	–35.1
600	0.592	–83.0	8.35	126.1	0.0718	53.0	0.703	–46.0
800	0.532	–99.9	7.03	115.7	0.0817	48.0	0.607	–54.0
1000	0.465	–114.5	6.02	107.6	0.0891	45.4	0.532	–59.8
1200	0.432	–128.2	5.23	101.0	0.0939	44.6	0.478	–64.3
1400	0.401	–139.6	4.58	95.2	0.0993	44.1	0.440	–67.7
1600	0.390	–150.2	4.14	90.7	0.103	44.8	0.405	–71.6
1800	0.373	–160.5	3.76	86.4	0.108	45.1	0.382	–74.7
2000	0.373	–168.3	3.42	82.6	0.112	46.5	0.362	–77.9

S Parameters (V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.588	–53.1	21.24	144.3	0.0275	66.3	0.826	–31.8
400	0.482	–89.8	15.59	123.6	0.0423	56.6	0.619	–49.8
600	0.419	–115.9	11.75	111.0	0.0507	53.9	0.480	–58.7
800	0.389	–134.1	9.29	102.4	0.0581	54.5	0.395	–63.8
1000	0.366	–149.7	7.64	96.5	0.0652	55.8	0.337	–67.6
1200	0.365	–161.9	6.47	91.4	0.0726	57.3	0.300	–70.1
1400	0.354	–171.4	5.63	97.1	0.0806	58.7	0.274	–72.8
1600	0.356	–179.7	4.98	83.5	0.0877	60.4	0.255	–74.6
1800	0.361	172.7	4.48	79.9	0.0959	61.2	0.242	–77.1
2000	0.365	165.3	4.06	77.0	0.105	62.4	0.232	–79.9