
2SC5080

Silicon NPN Epitaxial

HITACHI

Application

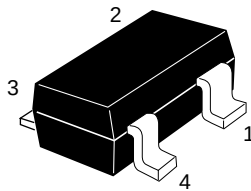
VHF / UHF wide band amplifier

Features

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

Outline

MPAK-4



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

Absolute Maximum Ratings (Ta = 25°C)

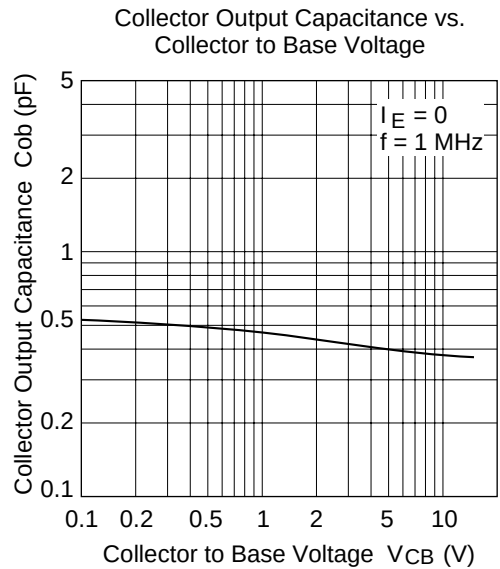
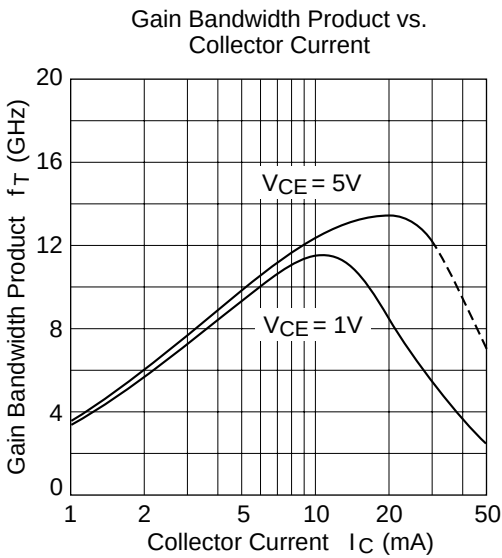
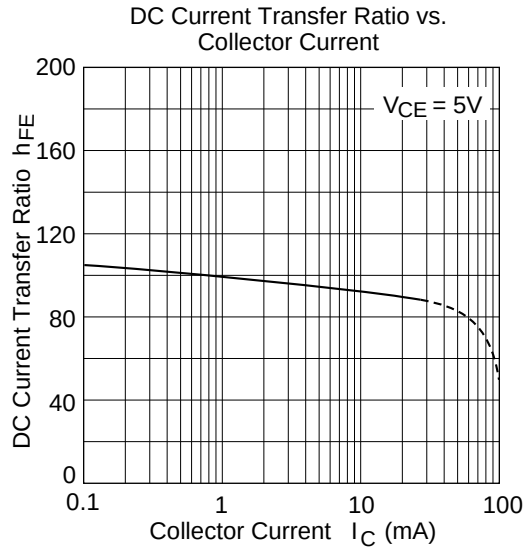
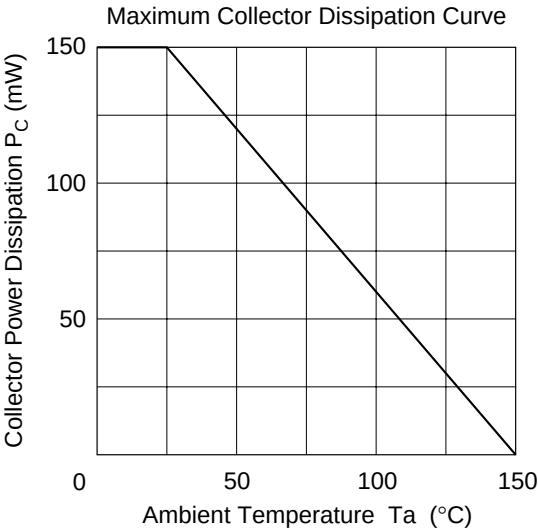
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	8	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

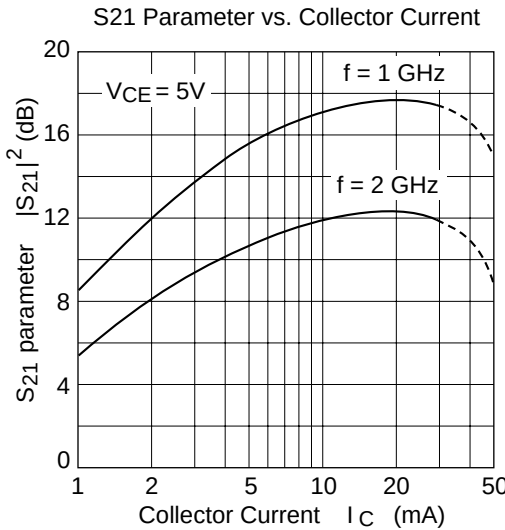
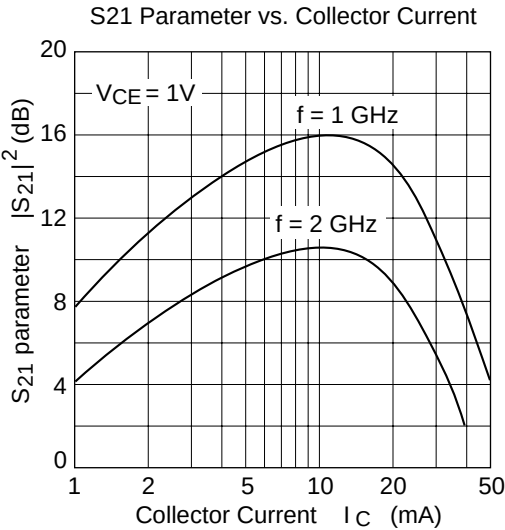
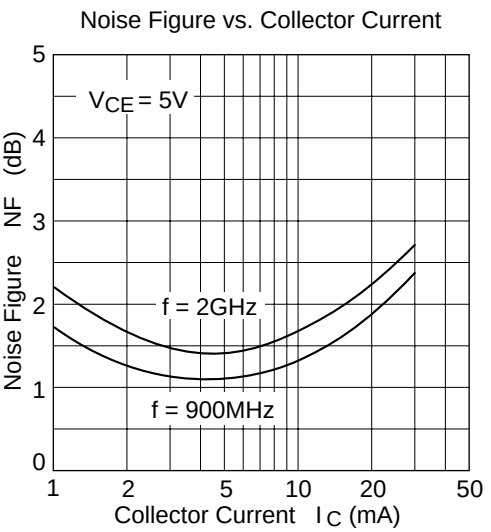
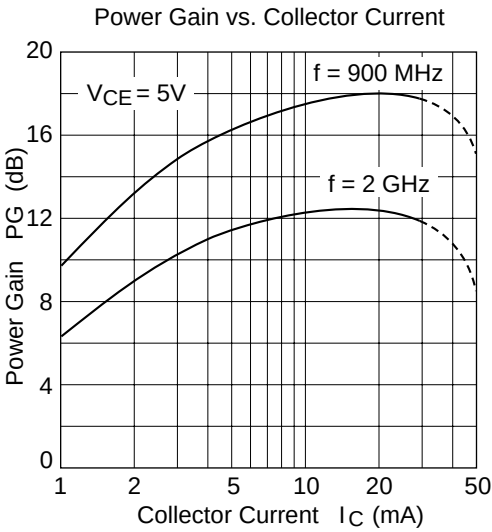
Electrical Characteristics (Ta = 25°C)

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

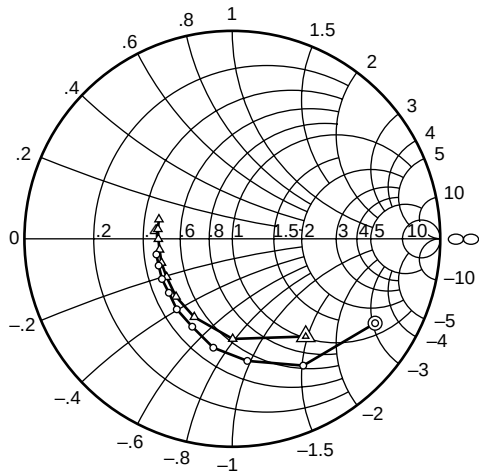
Note: Marking is “ZD—”.

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



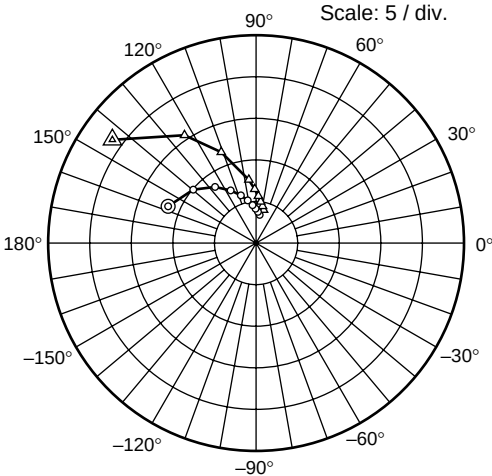


S11 Parameter vs. Frequency



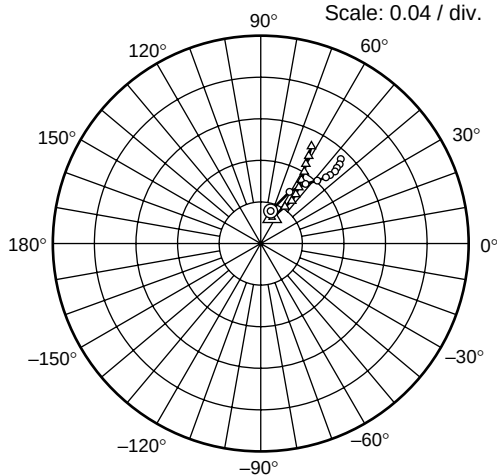
Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
200 to 2000 MHz (200 MHz step)
○ — ○ ($I_C = 5 \text{ mA}$)
△ — △ ($I_C = 20 \text{ mA}$)

S21 Parameter vs. Frequency



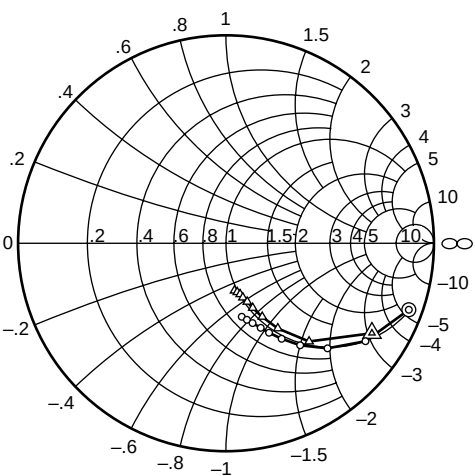
Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
200 to 2000 MHz (200 MHz step)
○ — ○ ($I_C = 5 \text{ mA}$)
△ — △ ($I_C = 20 \text{ mA}$)

S12 Parameter vs. Frequency



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

S22 Parameter vs. Frequency



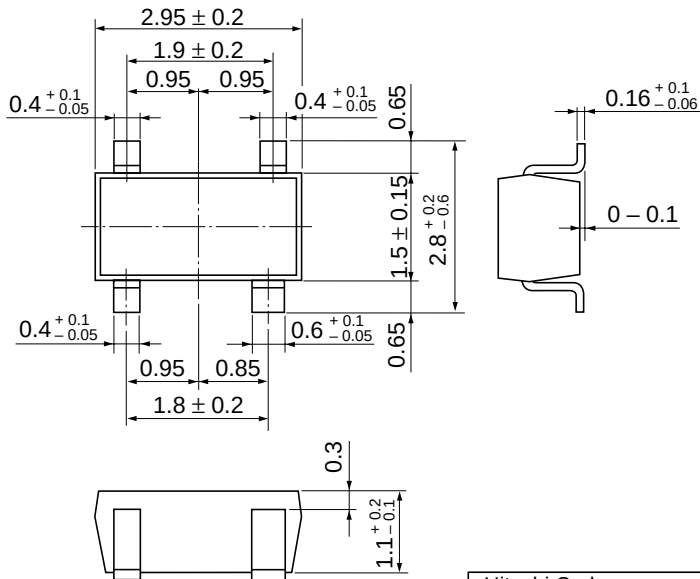
Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
200 to 2000 MHz (200 MHz step)
○ — ○ ($I_C = 5 \text{ mA}$)
△ — △ ($I_C = 20 \text{ mA}$)

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

Freq. (MHz)	S11		S21		S12		S22	
	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. (MHz)	S11		S21		S12		S22	
	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



Hitachi Code	MPAK-4
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.013 g

Cautions

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