
2SC4900

Silicon NPN Epitaxial

HITACHI

Application

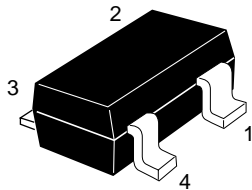
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 9 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 13.0 \text{ dB Typ}$, $NF = 1.2 \text{ dB Typ}$ at $f = 900 \text{ MHz}$

Outline

MPAK-4



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

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

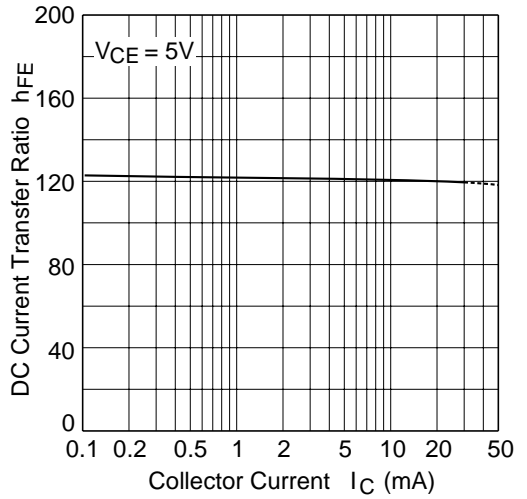
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	9	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_{C}	50	mA
Collector power dissipation	P_{C}	150	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_a = 25^\circ\text{C}$)

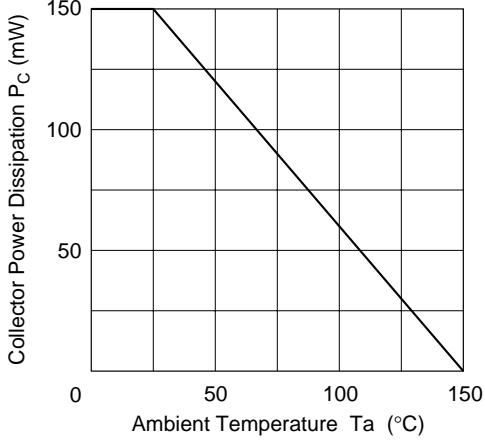
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(\text{BR})\text{CBO}}$	15	—	—	V	$I_{\text{C}} = 10 \mu\text{A}$, $I_{\text{E}} = 0$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{\text{CB}} = 12 \text{ V}$, $I_{\text{E}} = 0$
	I_{CEO}	—	—	1	mA	$V_{\text{CE}} = 9 \text{ V}$, $R_{\text{BE}} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{\text{EB}} = 1.5 \text{ V}$, $I_{\text{C}} = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$
Collector output capacitance	C_{ob}	—	0.8	1.3	pF	$V_{\text{CB}} = 5 \text{ V}$, $I_{\text{E}} = 0$, $f = 1 \text{ MHz}$
Gain bandwidth product	f_{T}	6.0	9.0	—	GHz	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$
Power gain	PG	10.5	13.5	—	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$, $f = 900 \text{ MHz}$
Noise figure	NF	—	1.2	2.5	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 5 \text{ mA}$, $f = 900 \text{ MHz}$

Note: Marking is “YJ—”.

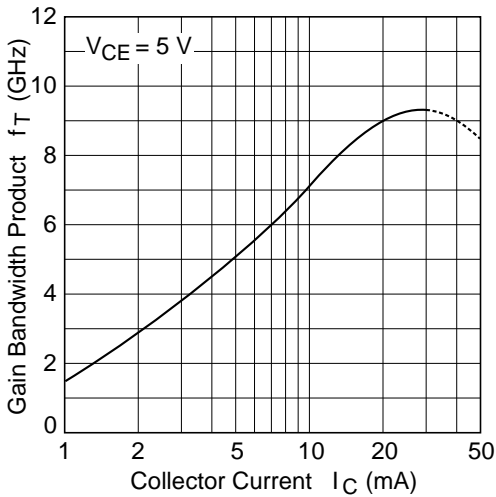
DC Current Transfer Ratio vs. Collector Current



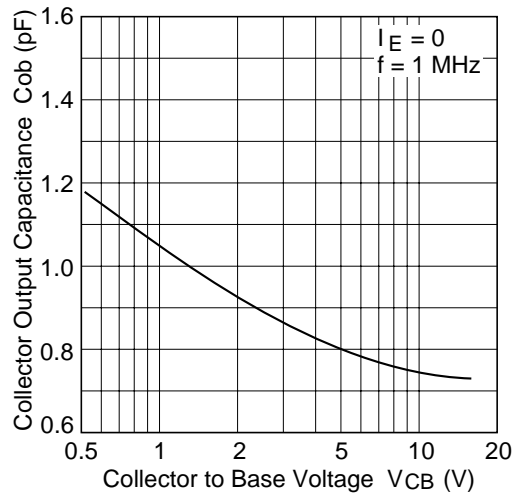
Maximum Collector Dissipation Curve



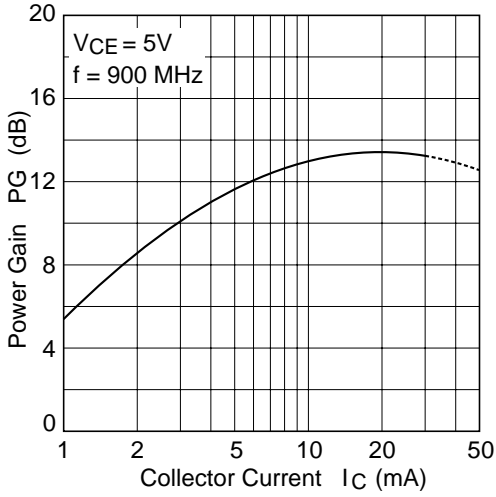
Gain Bandwidth Product vs. Collector Current



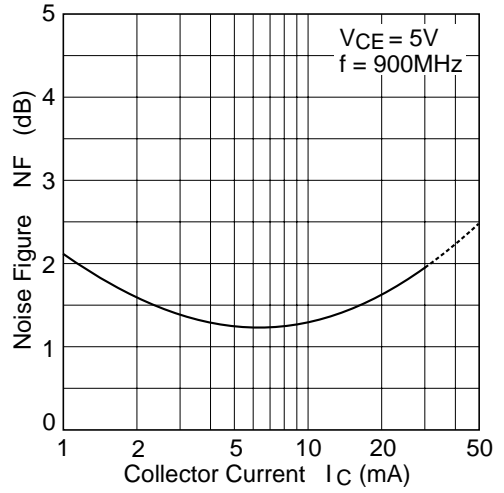
Collector Output Capacitance vs. Collector to Base Voltage



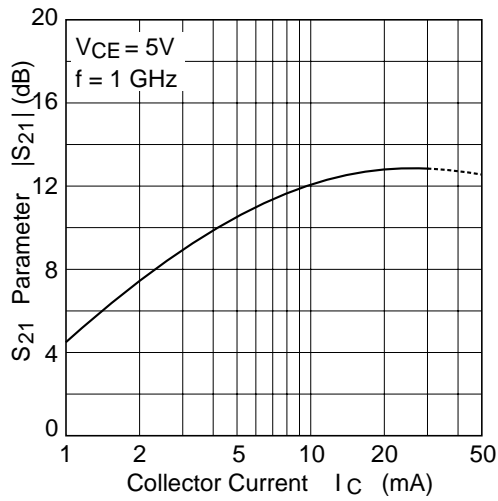
Power Gain vs. Collector Current



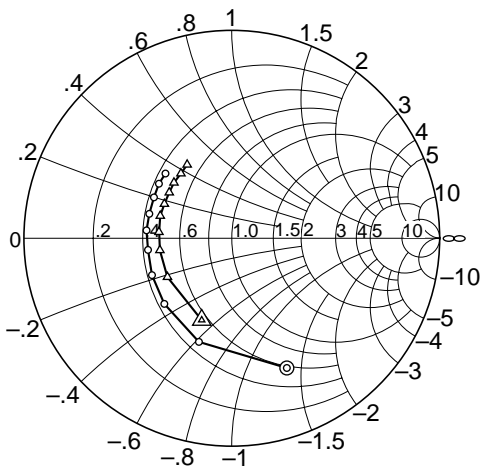
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current



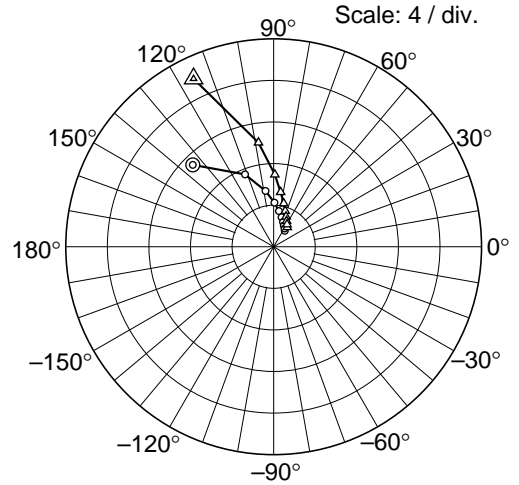
S11 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

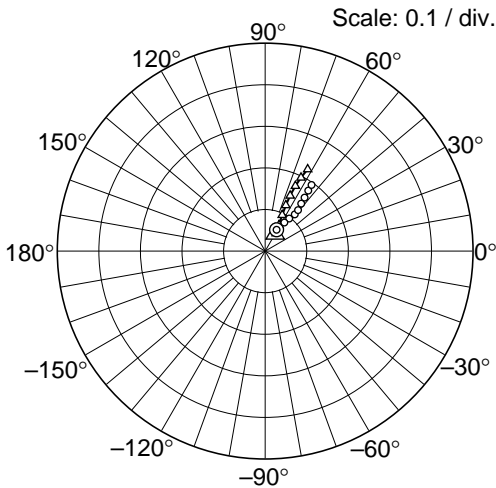
S21 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

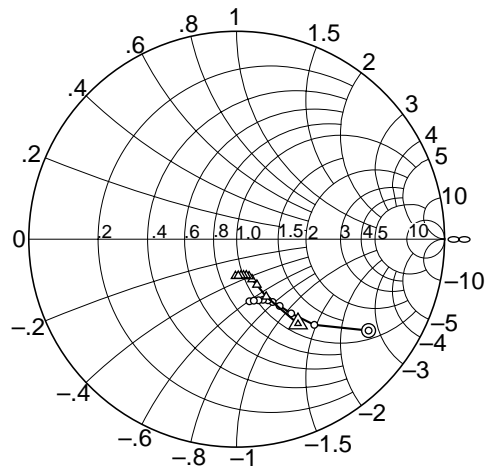
S12 Parameter vs. Frequency



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)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

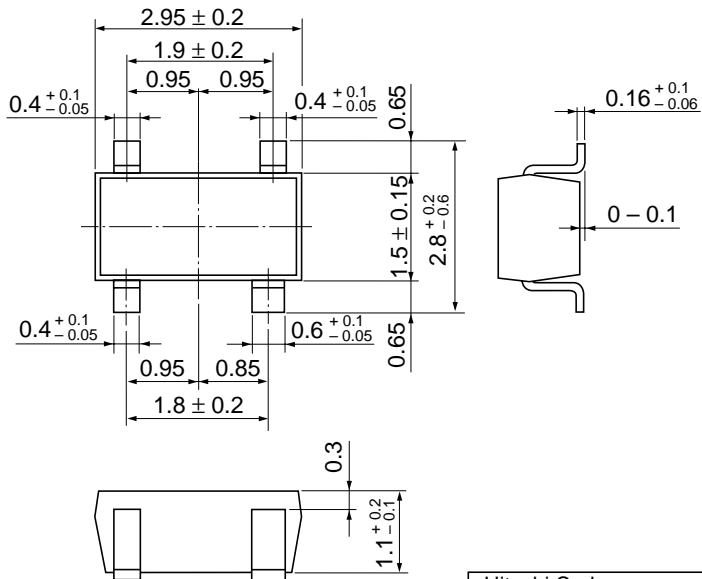
2SC4900

S Parameter ($V_{CE} = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$, Emitter Common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.678	-67.0	11.09	134.6	0.0572	59.2	0.772	-34.7
400	0.523	-107.6	7.49	111.6	0.0802	48.8	0.556	-47.8
600	0.453	-135.8	5.43	98.3	0.0933	47.1	0.443	-53.7
800	0.423	-155.2	4.24	89.0	0.105	47.8	0.382	-57.2
1000	0.407	-172.1	3.47	81.6	0.118	49.7	0.348	-60.2
1200	0.412	174.7	2.94	75.0	0.130	50.7	0.330	-62.9
1400	0.414	163.5	2.54	69.2	0.145	51.9	0.318	-66.5
1600	0.423	152.3	2.26	64.3	0.158	52.7	0.312	-70.3
1800	0.438	143.2	2.05	59.2	0.174	53.3	0.307	-74.4
2000	0.446	135.7	1.87	55.0	0.189	53.4	0.305	-78.4

S Parameter ($V_{CE} = 5 \text{ V}$, $I_C = 20 \text{ mA}$, $Z_O = 50 \Omega$, Emitter Common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.420	-110.3	17.91	115.5	0.0381	59.7	0.502	-54.1
400	0.362	-148.9	10.13	98.4	0.0572	62.2	0.311	-62.8
600	0.351	-170.5	6.94	89.2	0.0766	64.7	0.240	-66.1
800	0.352	175.2	5.29	82.9	0.0966	65.7	0.207	-69.1
1000	0.361	162.7	4.27	77.1	0.117	65.8	0.189	-71.6
1200	0.364	153.1	3.60	72.3	0.138	65.1	0.181	-75.1
1400	0.373	143.9	3.12	67.9	0.158	64.0	0.178	-79.3
1600	0.386	136.2	2.76	63.6	0.178	62.5	0.176	-83.3
1800	0.396	128.2	2.49	59.4	0.199	61.3	0.177	-87.5
2000	0.414	121.3	2.27	55.5	0.218	59.8	0.178	-91.9



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

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