
2SC4126

Silicon NPN Epitaxial

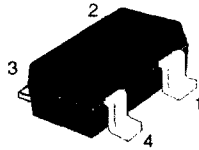
HITACHI

Application

VHF and UHF wide band amplifier

Outline

MPAK-4



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

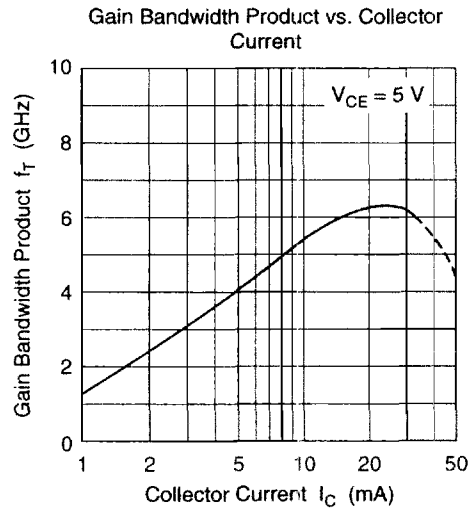
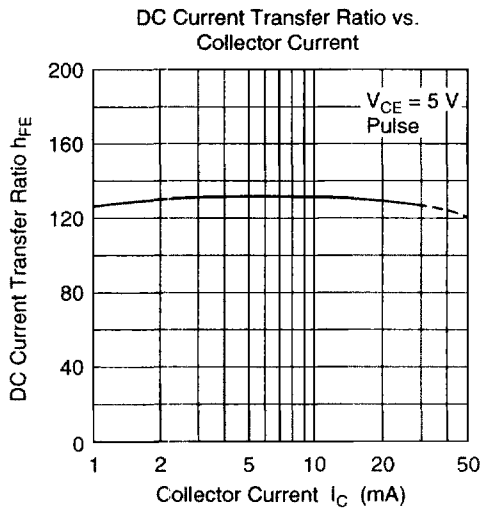
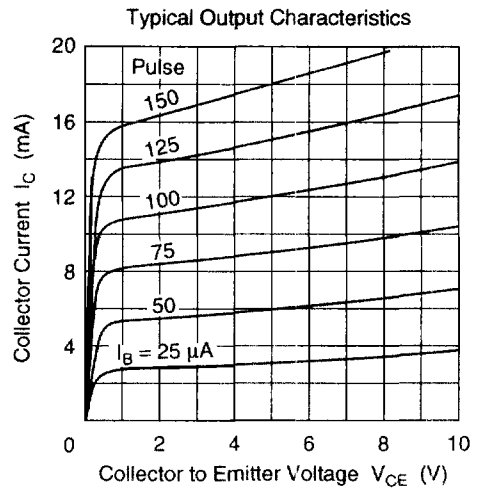
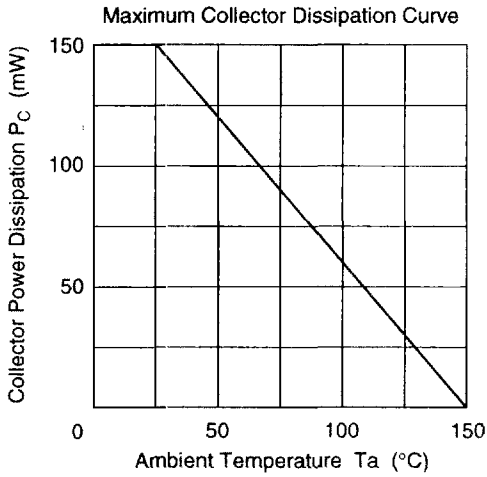
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	11	V
Emitter to base voltage	V_{EBO}	2	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	$^\circ\text{C}$

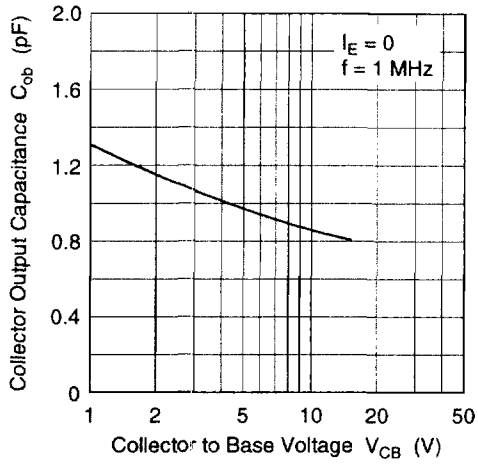
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

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}	—	—	1	μA	$V_{\text{CB}} = 12 \text{ V}$, $I_{\text{E}} = 0$
	I_{CEO}	—	—	1	μA	$V_{\text{CE}} = 10 \text{ V}$, $R_{\text{BE}} = \infty$
Emitter cutoff current	I_{EBO}	—	—	1	μA	$V_{\text{EB}} = 1 \text{ V}$, $I_{\text{C}} = 0$
DC current transfer ratio	h_{FE}	50	—	250		$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$
Collector output capacitance	C_{ob}	—	1.0	1.5	pF	$V_{\text{CB}} = 5 \text{ V}$, $I_{\text{E}} = 0$, $f = 1 \text{ MHz}$
Gain bandwidth product	f_{T}	4.5	6.0	—	GHz	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$
Power gain	PG	9.0	11.0	—	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$, $f = 900 \text{ MHz}$
Noise figure	NF	—	1.5	3.0	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 5 \text{ mA}$, $f = 900 \text{ MHz}$

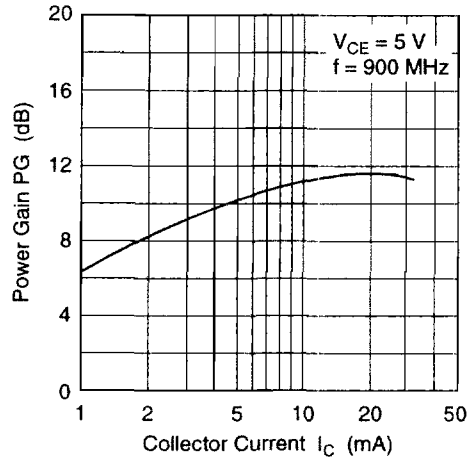
Note: Marking is "MI-".



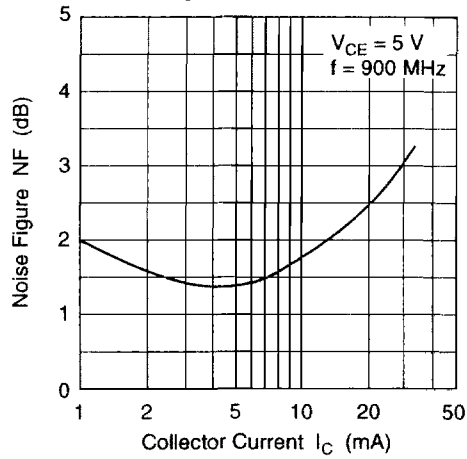
Collector Output Capacitance vs. Collector to Base Voltage



Power Gain vs. Collector Current

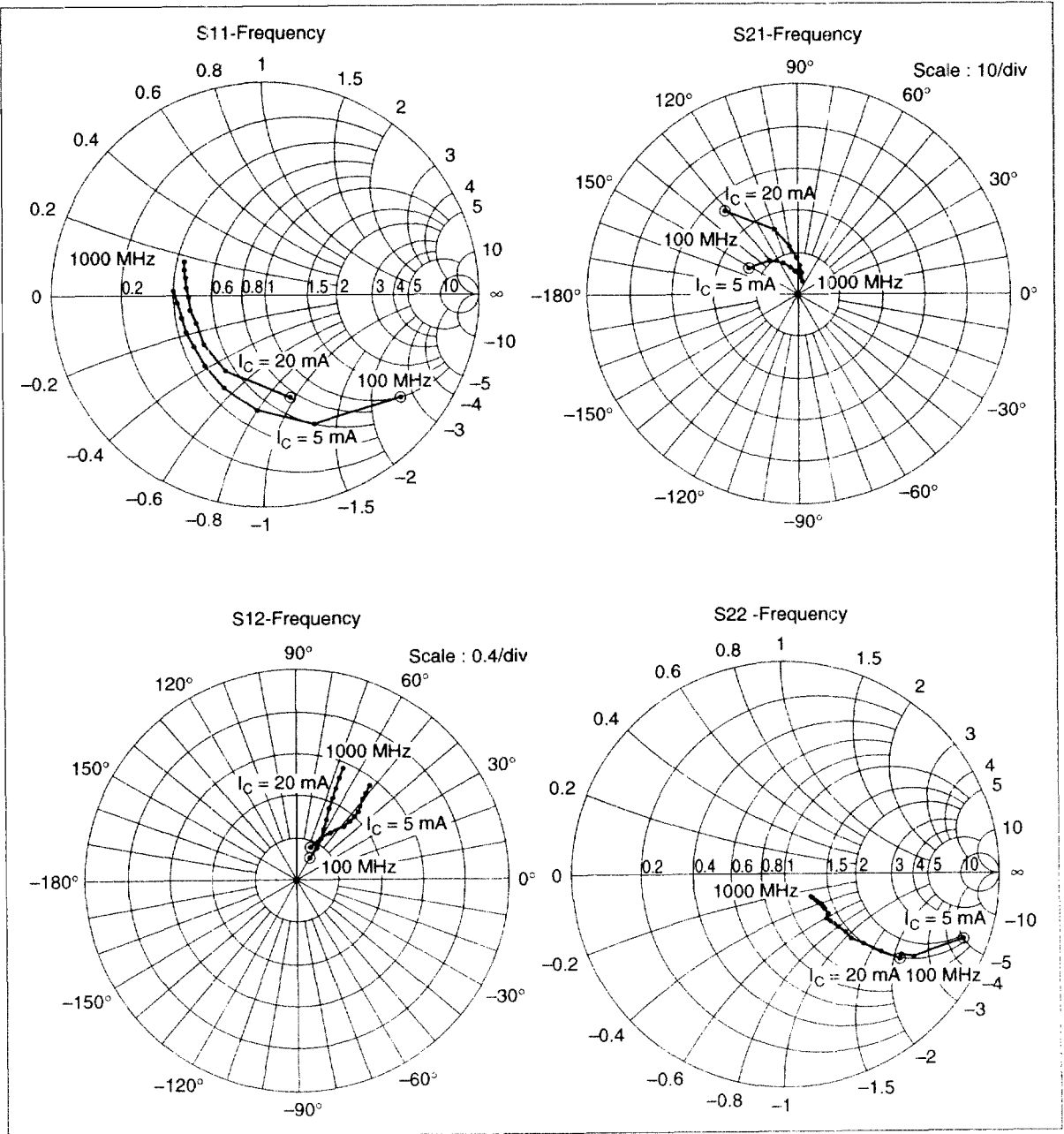


Noise Figure vs. Collector Current



S Parameters (Emitter Common)

Test condition $V_{CE} = 5\text{ V}$, $Z_O = 50\ \Omega$, Freq. = 100 to 1000 MHz (100 MHz Step)



S Parameters (Emitter Common)

Test condition $V_{CE} = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_0 = 50 \Omega$

Freq. (MHz)	$ S_{11} $	$\angle S_{11}$ (DEG.)	$ S_{21} $	$\angle S_{21}$ (DEG.)	$ S_{12} $	$\angle S_{12}$ (DEG.)	$ S_{22} $	$\angle S_{22}$ (DEG.)	Gmax ^{*1} (dB)
100	0.798	-37.3	13.345	152.3	0.033	69.6	0.898	-20.1	34.03
200	0.659	-69.4	10.696	131.4	0.054	56.0	0.730	-33.1	26.37
300	0.550	-93.7	8.434	117.0	0.067	49.2	0.592	-39.3	21.96
400	0.480	-113.6	6.815	107.3	0.074	47.3	0.502	-42.3	19.07
500	0.438	-129.8	5.684	100.0	0.081	47.0	0.442	-43.7	16.96
600	0.414	-143.6	4.847	94.2	0.087	47.3	0.399	-44.4	15.28
700	0.410	-154.4	4.229	89.4	0.092	48.6	0.366	-45.3	13.95
800	0.406	-164.7	3.750	85.0	0.098	49.5	0.340	-46.3	12.80
900	0.412	-174.9	3.352	81.0	0.104	50.6	0.317	-47.4	11.78
1000	0.424	-178.1	3.071	77.4	0.110	51.6	0.299	-48.3	11.01

Test condition $V_{CE} = 5 \text{ V}$, $I_C = 20 \text{ mA}$, $Z_0 = 50 \Omega$

Freq. (MHz)	$ S_{11} $	$\angle S_{11}$ (DEG.)	$ S_{21} $	$\angle S_{21}$ (DEG.)	$ S_{12} $	$\angle S_{12}$ (DEG.)	$ S_{22} $	$\angle S_{22}$ (DEG.)	Gmax ^{*1} (dB)
100	0.501	-75.1	26.789	131.8	0.024	62.2	0.683	-36.5	32.54
200	0.402	-117.1	16.600	111.1	0.035	58.5	0.446	-45.4	26.13
300	0.368	-141.0	11.543	100.7	0.044	61.3	0.337	-45.6	22.40
400	0.347	-157.6	8.823	94.7	0.054	63.3	0.282	-44.2	19.83
500	0.354	-169.0	7.131	89.5	0.063	65.0	0.250	-42.8	17.92
600	0.358	-178.7	5.979	85.8	0.074	66.6	0.228	-42.1	16.36
700	0.370	174.9	5.158	82.3	0.084	66.9	0.208	-42.1	15.08
800	0.380	167.1	4.536	79.2	0.094	67.3	0.192	-42.7	13.98
900	0.400	161.5	4.042	76.5	0.104	67.6	0.178	-43.2	13.03
1000	0.411	157.0	3.677	73.5	0.114	67.4	0.165	-43.3	12.24

Note: 1. $G_{\text{max}} = \frac{1}{1 - |S_{11}|^2} \cdot |S_{21}|^2 \cdot \frac{1}{1 - |S_{22}|^2}$