To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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2SC4126

Silicon NPN Epitaxial

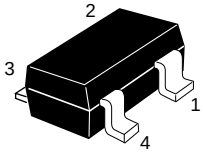
RENESAS

Application

VHF and UHF wide band amplifier

Outline

MPAK-4



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

Absolute Maximum Ratings (Ta = 25°C)

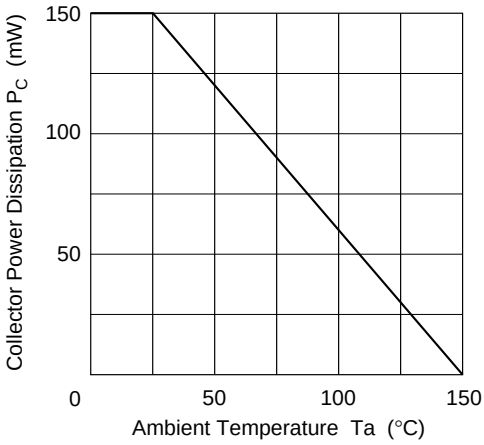
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	11	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

Electrical Characteristics (Ta = 25°C)

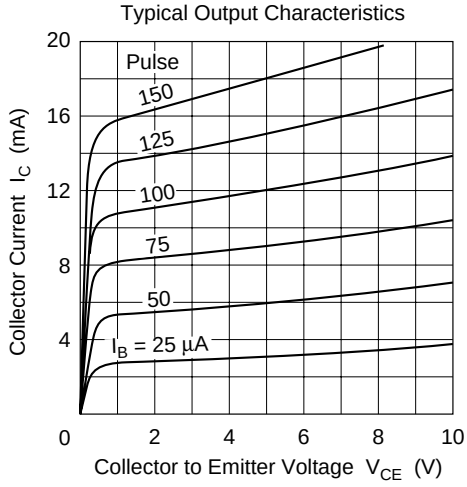
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10 µA, I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	µA	V_{CB} = 12 V, I_E = 0
	I_{CEO}	—	—	1	µA	V_{CE} = 10 V, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	1	µA	V_{EB} = 1 V, I_C = 0
DC current transfer ratio	h_{FE}	50	—	250		V_{CE} = 5 V, I_C = 20 mA
Collector output capacitance	Cob	—	1.0	1.5	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	4.5	6.0	—	GHz	V_{CE} = 5 V, I_C = 20 mA
Power gain	PG	9.0	11.0	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	1.5	3.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

Note: Marking is “MI–”.

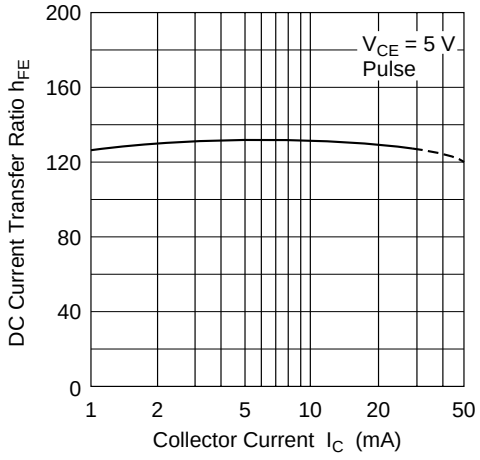
Maximum Collector Dissipation Curve



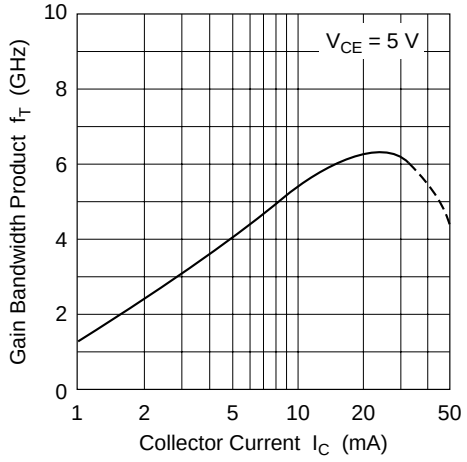
Typical Output Characteristics



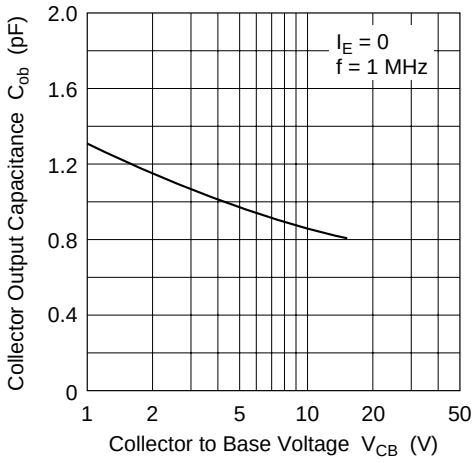
DC Current Transfer Ratio vs. Collector Current



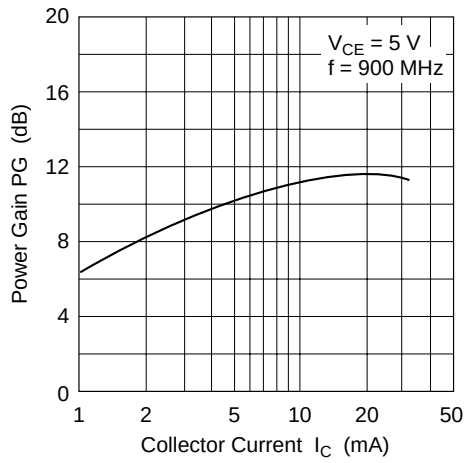
Gain Bandwidth Product vs. Collector Current



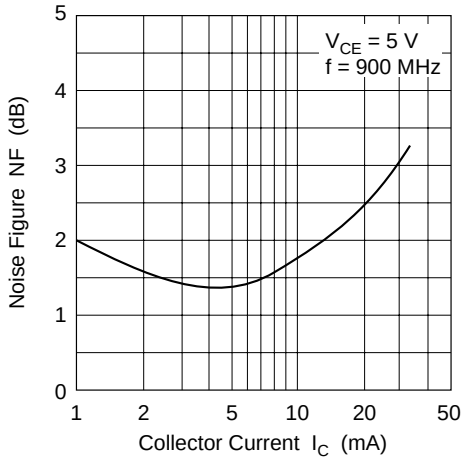
Collector Output Capacitance vs. Collector to Base Voltage



Power Gain vs. Collector Current

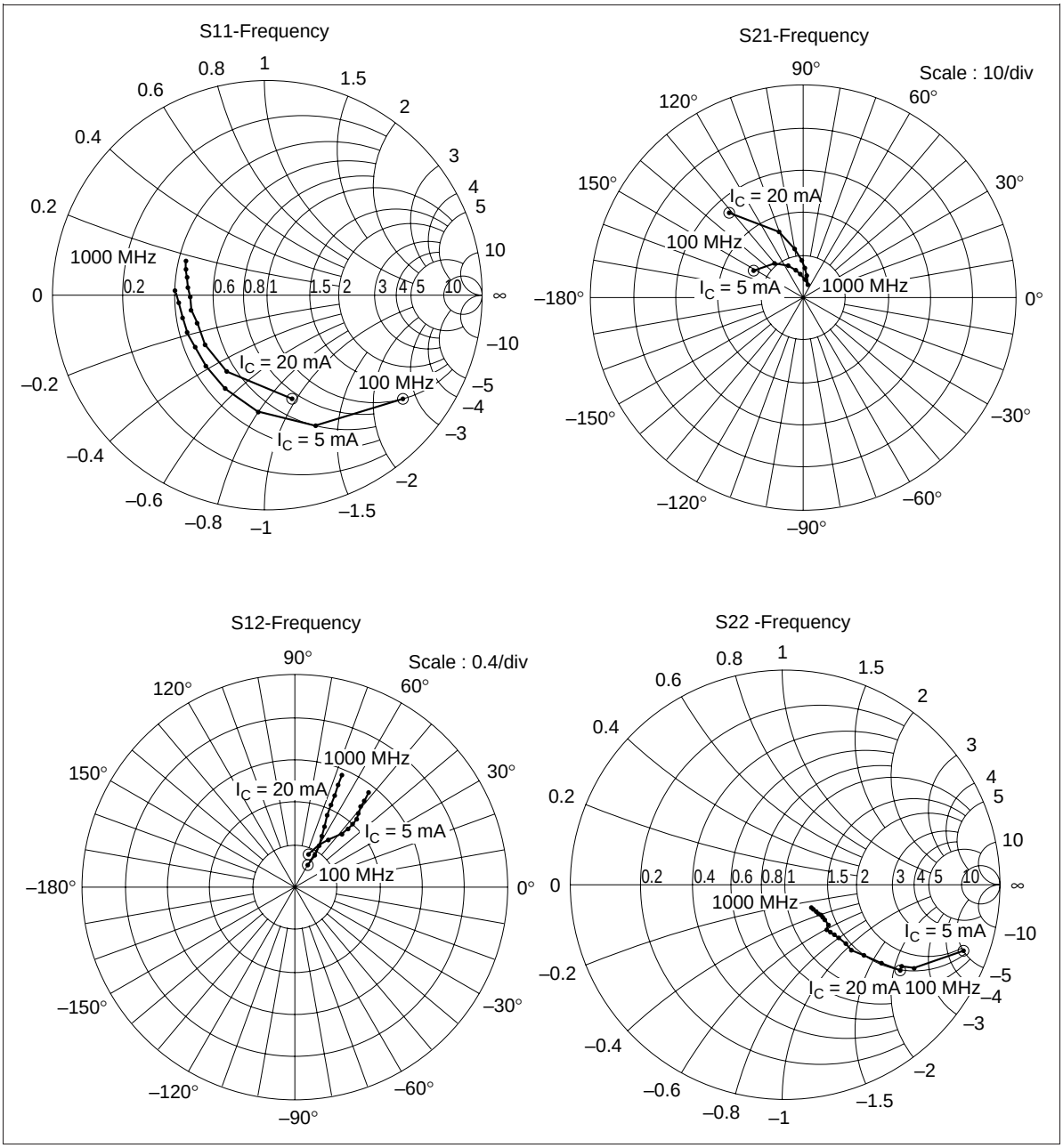


Noise Figure vs. Collector Current



S Parameters (Emitter Common)

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



S Parameters (Emitter Common)

Test condition V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω

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 V, I_C = 20 mA, Z_O = 50 Ω

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. $\text{Gmax} = \dfrac{1}{\left|1-|S_{11}|^2\right|} \cdot |S_{21}|^2 \cdot \dfrac{1}{\left|1-|S_{22}|^2\right|}$

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