
2SC4422

Silicon NPN Epitaxial

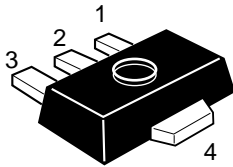
HITACHI

Application

VHF / UHF wide band amplifier

Outline

UPAK



1. Base
2. Collector
3. Emitter
4. Collector (Flange)

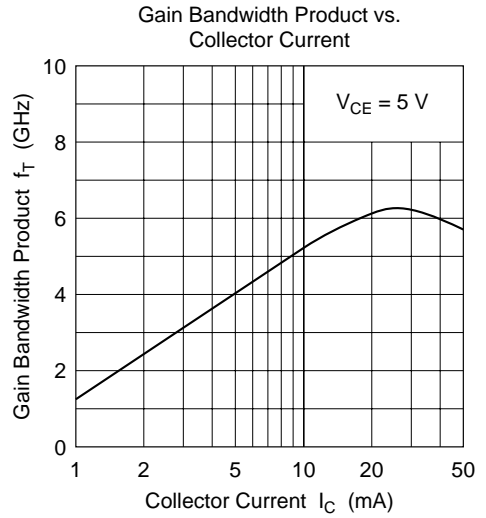
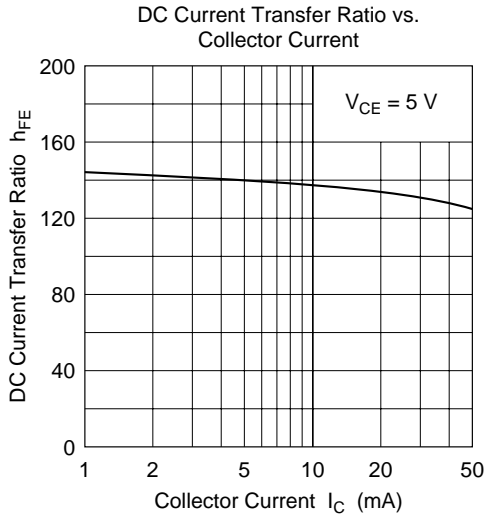
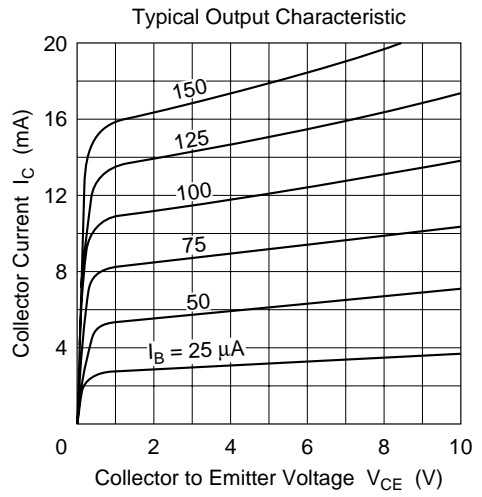
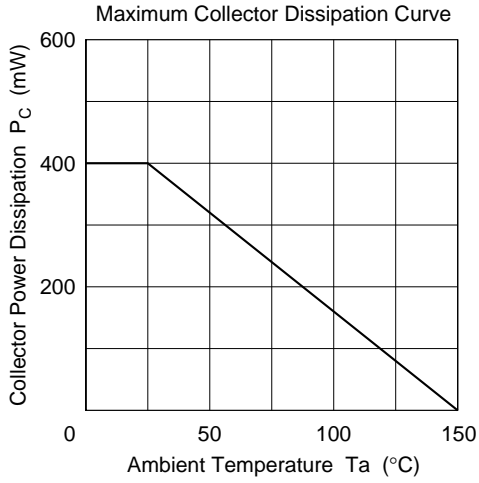
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

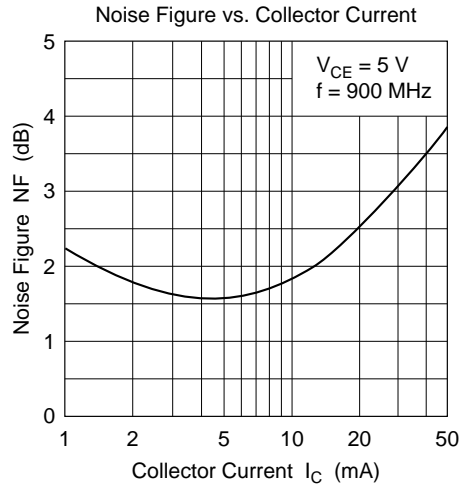
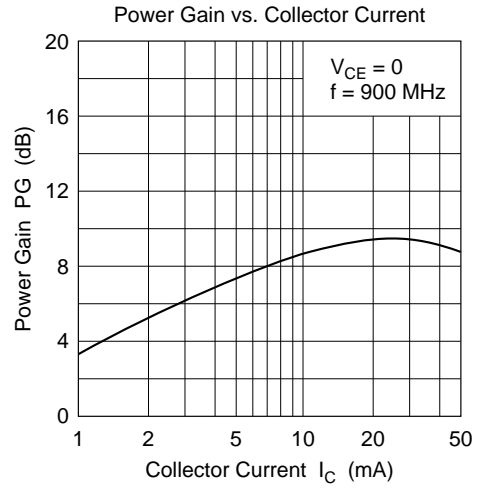
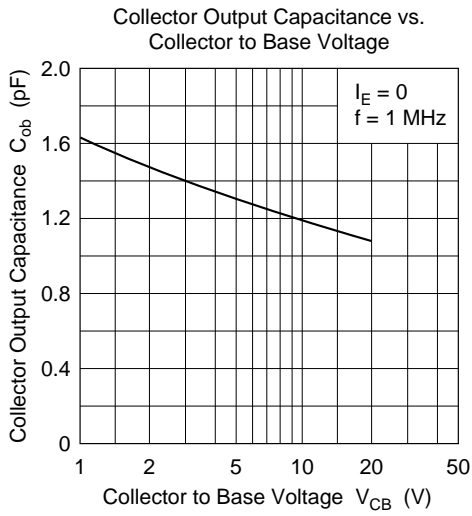
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	11	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_{C}	50	mA
Collector power dissipation	P_{C}	400	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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}	—	1.2	1.6	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	7.0	9.0	—	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$, $f = 900 \text{ MHz}$
Noise figure	NF	—	1.6	3.0	dB	$V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 5 \text{ mA}$, $f = 900 \text{ MHz}$

Note: Marking is "CR".



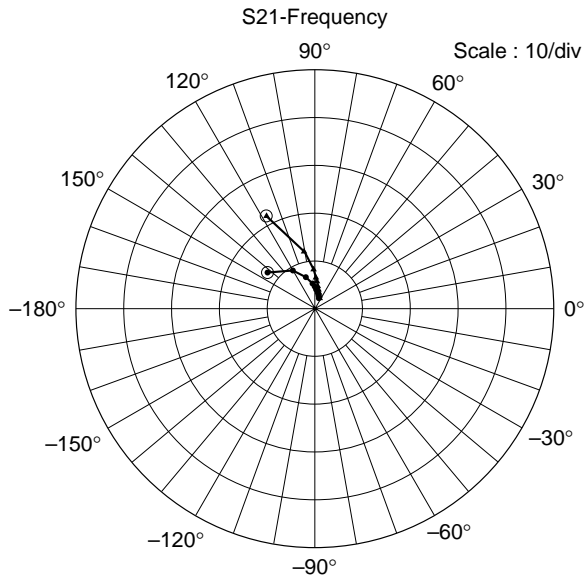
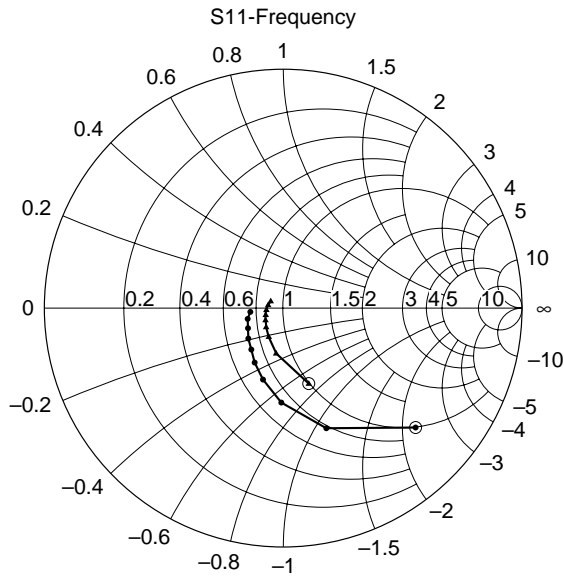


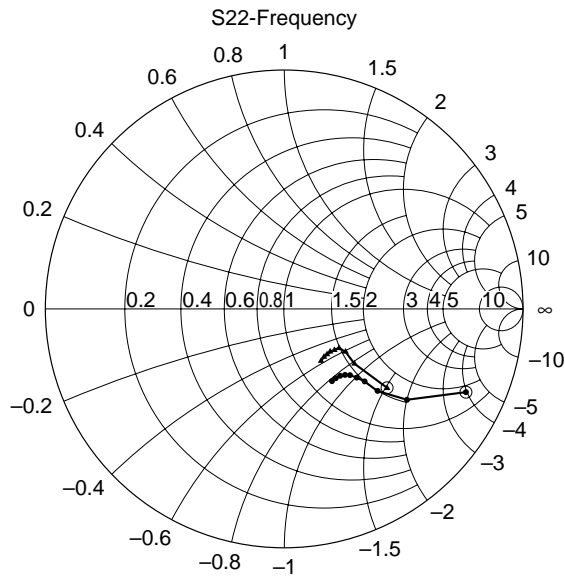
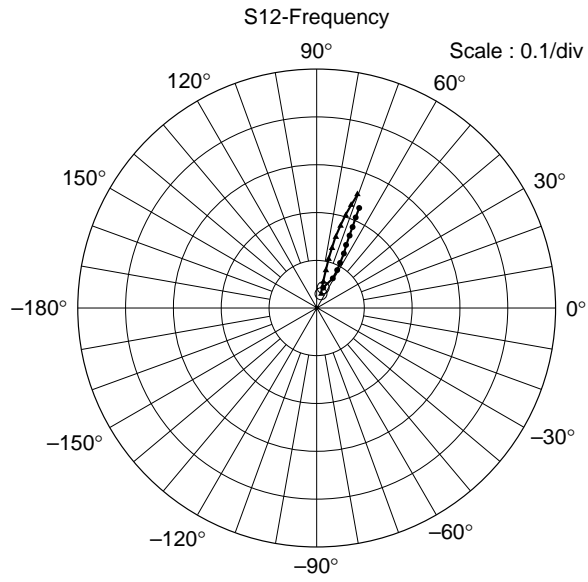
S Parameters (Emitter Common)

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

$I_C = 5\text{ mA}$ ● ————— ●

$I_C = 10\text{ mA}$ ◐ ————— ◐





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

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.747	-42.0	12.471	143.1	0.044	69.5	0.840	-24.6
200	0.534	-70.3	8.958	119.9	0.071	62.3	0.640	-36.3
300	0.394	-91.0	6.624	106.1	0.090	61.2	0.522	-40.4
400	0.310	-105.3	5.194	96.8	0.108	62.5	0.456	-42.4
500	0.258	-117.0	4.280	89.7	0.126	64.1	0.417	-43.7
600	0.216	-126.9	3.636	84.0	0.145	65.1	0.391	-45.4
700	0.193	-139.0	3.170	79.0	0.165	65.9	0.376	-47.5
800	0.167	-149.6	2.824	74.5	0.185	66.5	0.368	-50.0
900	0.157	-162.3	2.543	70.2	0.206	66.9	0.363	-53.1
1000	0.136	-171.9	2.326	66.6	0.227	67.0	0.362	-56.3

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

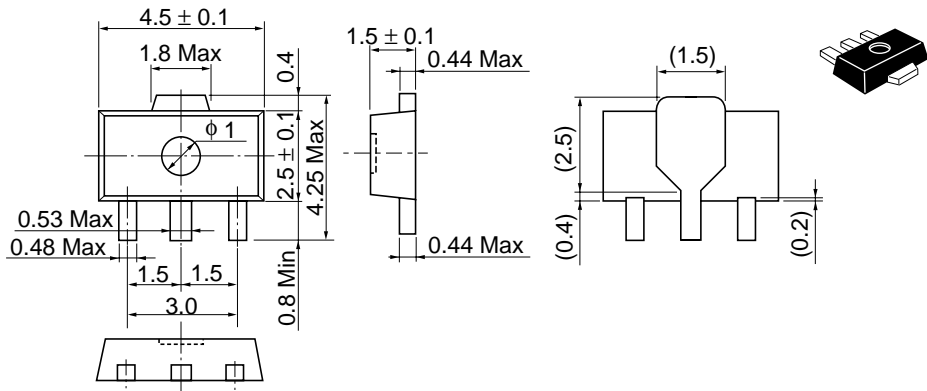
Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.333	-71.6	21.905	117.7	0.031	71.9	0.547	-37.3
200	0.192	-98.5	12.026	100.7	0.054	74.6	0.378	-37.6
300	0.135	-116.1	8.123	92.4	0.079	75.8	0.322	-35.5
400	0.107	-130.9	6.151	86.7	0.104	76.2	0.297	-35.7
500	0.088	-145.2	4.967	82.3	0.129	75.5	0.285	-36.6
600	0.078	-155.4	4.174	78.2	0.153	74.8	0.275	-38.8
700	0.069	-170.6	3.616	74.7	0.178	73.8	0.271	-42.0
800	0.060	176.2	3.201	71.1	0.203	72.8	0.268	-45.3
900	0.063	162.6	2.876	67.9	0.227	71.7	0.268	-49.3
1000	0.051	147.4	2.624	65.0	0.251	70.5	0.271	-53.5

Y Parameters (Emitter Common)Test Condition $V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$

Freq. (MHz)	Yie (mS)		Yfe (mS)		Yre (mS)		Yoe (mS)	
	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.
100	1.949	3.563	147.837	-43.785	-0.001	-0.544	0.175	0.922
200	3.994	5.961	120.026	-75.352	0.005	-1.122	0.218	1.731
300	6.433	7.295	89.506	-98.131	0.006	-1.711	0.206	2.618
400	8.206	7.536	62.937	-90.892	0.017	-2.299	0.250	3.531
500	9.403	7.501	43.528	-87.146	0.043	-2.877	0.295	4.395
600	10.179	7.259	29.375	-81.334	0.058	-3.445	0.421	5.324
700	10.910	7.124	19.483	-75.831	0.098	-4.063	0.387	6.235
800	11.193	6.776	11.803	-70.096	0.127	-4.642	0.413	7.209
900	11.543	6.593	6.205	-65.171	0.192	-5.302	0.338	8.218
1000	11.387	6.328	2.208	-60.095	0.249	-5.855	0.401	9.171

Test Condition $V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$

Freq. (MHz)	Yie (mS)		Yfe (mS)		Yre (mS)		Yoe (mS)	
	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.
100	5.863	2.308	276.917	-268.988	0.000	-0.522	0.244	0.751
200	7.022	2.660	109.913	-221.759	0.005	-1.121	0.309	1.637
300	7.375	2.861	50.698	-167.756	0.006	-1.713	0.305	2.507
400	7.527	3.094	26.179	-133.425	0.024	-2.302	0.363	3.373
500	7.607	3.429	14.053	-110.501	0.025	-2.885	0.394	4.282
600	7.562	3.893	7.198	-94.442	0.056	-3.477	0.463	5.156
700	7.537	4.211	2.859	-82.874	0.079	-4.077	0.478	6.093
800	7.383	4.635	-0.221	-73.836	0.124	-4.674	0.506	7.046
900	7.403	5.047	-2.127	-67.183	0.180	-5.312	0.444	8.018
1000	7.074	5.411	-3.292	-61.241	0.246	-5.871	0.509	8.943



Hitachi Code	UPAK
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.050 g

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