

2SC4875

Silicon NPN Bipolar Transistor

Application

VHF & UHF wide band amplifire

Features

- High gain bandwidth product
 $f_T = 8.5 \text{ GHz typ}$
- High gain, low noise figure
 $PG = 11.5 \text{ dB typ,}$
 $NF = 1.3 \text{ dB typ at } f = 900 \text{ MHz}$

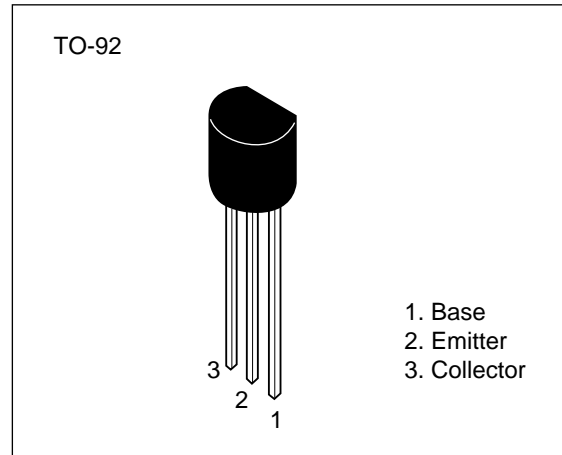


Table 1 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

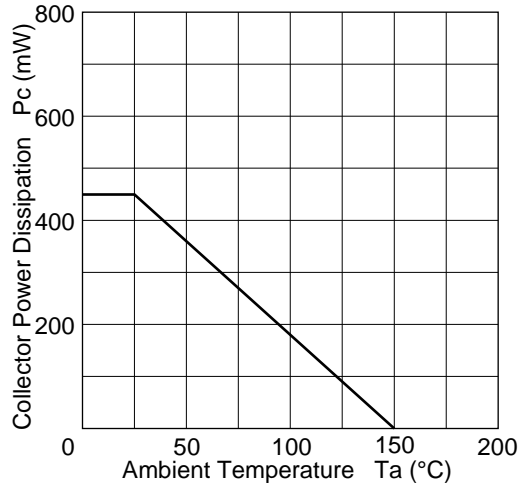
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	9	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	450	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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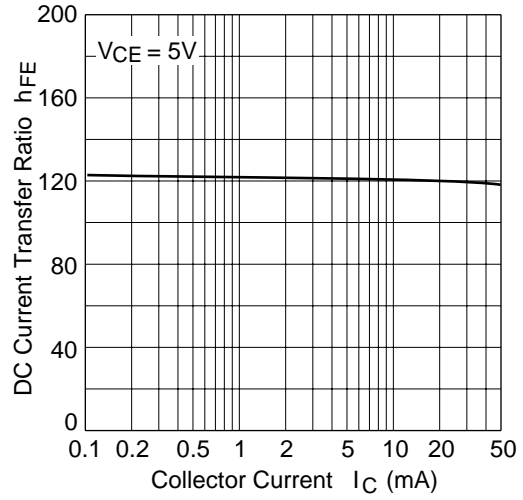
Table 2 Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 12 V, I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 9 V, R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5 V, I_C = 20 mA$
Output capacitance	C_{ob}	—	1.2	1.7	pF	$V_{CB} = 5 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	f_T	5.5	8.5	—	GHz	$V_{CE} = 5 V, I_C = 20 mA$
Power gain	PG	8.5	11.5	—	dB	$V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz$
Noise figure	NF	—	1.3	2.5	dB	$V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz$

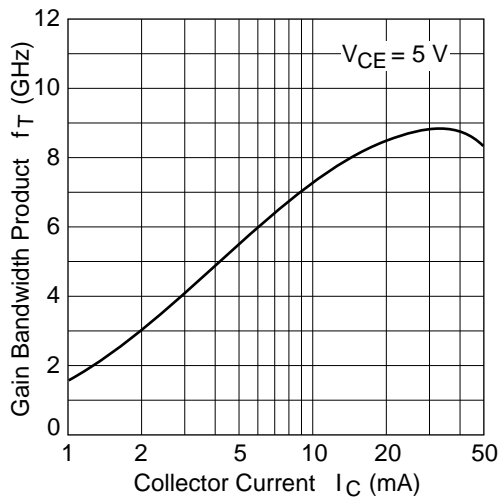
Maximum collector power dissipation curve



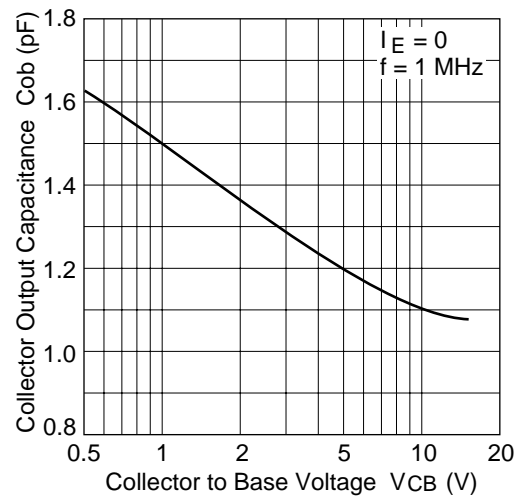
DC current transfer ratio vs. collector current



Gain bandwidth product vs. collector current

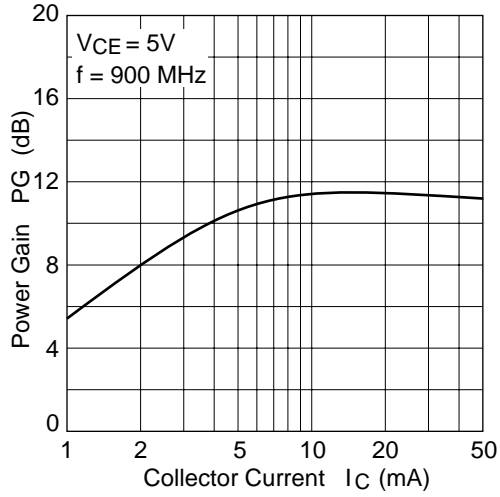


Collector output capacitance vs. collector to base voltage

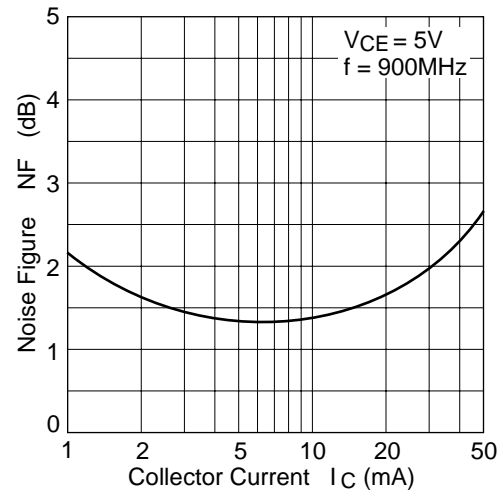


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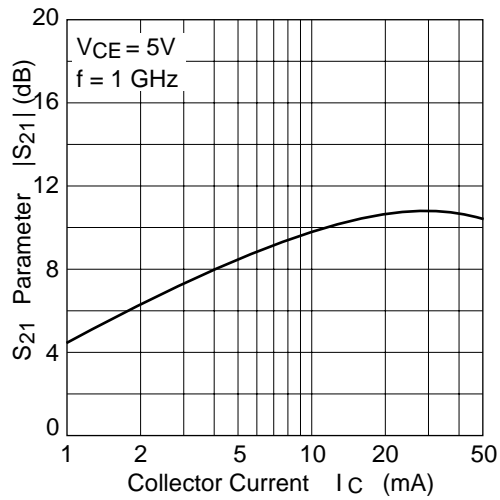
Power gain vs. collector current



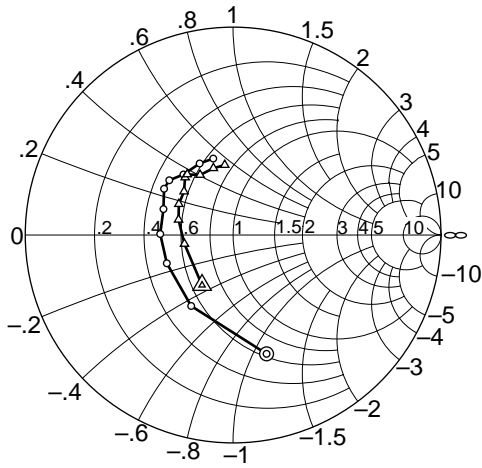
Noise figure vs. collector current



S21 parameter vs. collector current



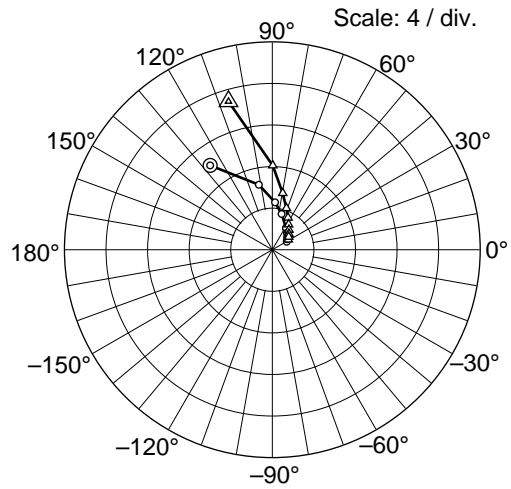
S11 parameter vs. frequency



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

○ — ○ (Ic = 5 mA)
△ — △ (Ic = 20 mA)

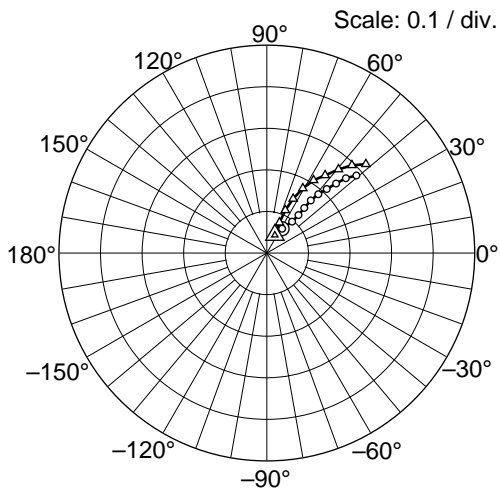
S21 parameter vs. frequency



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

○ — ○ (Ic = 5 mA)
△ — △ (Ic = 20 mA)

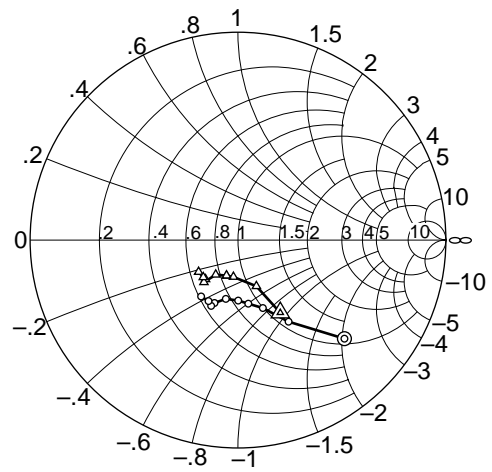
S12 parameter vs. frequency



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

○ — ○ (Ic = 5 mA)
△ — △ (Ic = 20 mA)

S22 parameter vs. frequency



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

○ — ○ (Ic = 5 mA)
△ — △ (Ic = 10 mA)

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Table 3 S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $Z_O = 50\ \Omega$, Emitter common)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.594	-74.3	10.08	126.4	0.0692	57.8	0.697	-42.8
400	0.397	-120.6	6.39	101.7	0.0970	51.2	0.462	-58.2
600	0.347	-156.9	4.57	86.7	0.119	50.2	0.348	-69.9
800	0.351	179.2	3.56	75.5	0.141	50.3	0.310	-80.8
1000	0.358	159.6	2.92	66.0	0.165	50.1	0.291	-89.8
1200	0.400	146.2	2.47	57.7	0.188	48.8	0.289	-101.7
1400	0.405	139.4	2.15	49.1	0.211	46.9	0.323	-110.5
1600	0.377	129.4	1.92	41.7	0.236	45.1	0.342	-112.2
1800	0.380	115.1	1.75	35.5	0.262	43.5	0.326	-115.8
2000	0.380	104.6	1.58	29.0	0.285	40.9	0.324	-123.2

Table 4 S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$, $Z_O = 50\ \Omega$, Emitter common)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.282	-121.9	14.86	106.5	0.0471	65.9	0.404	-59.9
400	0.239	-169.9	8.09	89.6	0.0793	67.5	0.238	-68.4
600	0.274	164.3	5.52	79.4	0.112	66.7	0.180	-82.8
800	0.302	150.3	4.21	71.0	0.145	64.1	0.178	-97.4
1000	0.317	138.5	3.42	63.6	0.178	60.9	0.179	-108.3
1200	0.362	129.9	2.88	56.7	0.208	57.3	0.198	-123.1
1400	0.367	127.2	2.49	49.6	0.234	53.2	0.245	-129.9
1600	0.331	118.9	2.21	43.1	0.265	49.4	0.261	-129.2
1800	0.336	106.6	2.00	37.5	0.294	45.9	0.245	-133.3
2000	0.340	97.0	1.82	31.7	0.320	41.9	0.244	-141.3