

HIGH FREQUENCY LOW NOISE AMPLIFIER

NPN SILICON EPITAXIAL TRANSISTOR

4 PINS MINI MOLD

FEATURES

- Low Noise, High Gain
 - Low Voltage Operation
 - Low Feedback Capacitance
- $C_{re} = 0.3 \text{ pF TYP.}$

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC4957-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Base), Pin4 (Emitter) face to perforation side of the tape.
2SC4957-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Collector), Pin2 (Emitter) face to perforation side of the tape.

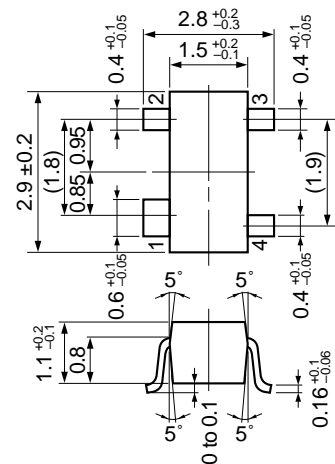
* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4957)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Collector to Base Voltage	V_{CBO}	9	V
Collector to Emitter Voltage	V_{CEO}	6	V
Emitter to Base Voltage	V_{EBO}	2	V
Collector Current	I_C	30	mA
Total Power Dissipation	P_T	180	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

PACKAGE DIMENSIONS

in millimeters



PIN CONNECTIONS

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

Caution; Electrostatic Sensitive Device.

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

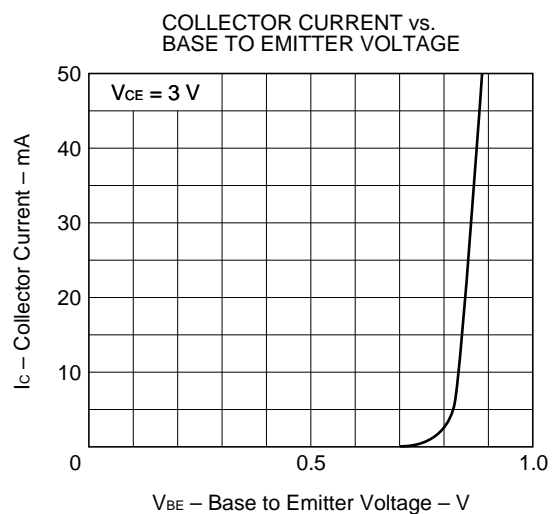
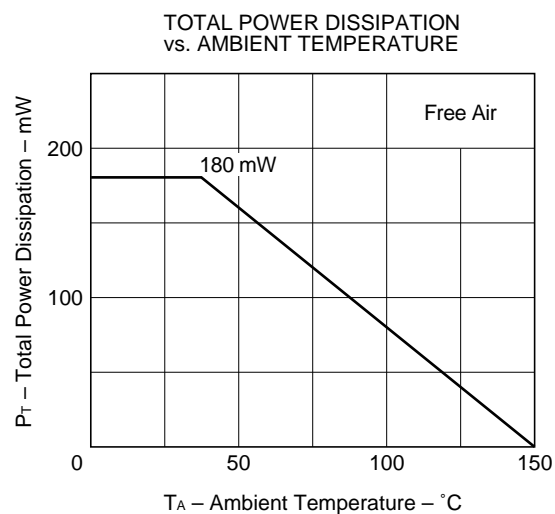
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	I_{CBO}			0.1	μA	$V_{CB} = 5\text{ V}$, $I_E = 0$
Emitter Cutoff Current	I_{EBO}			0.1	μA	$V_{EB} = 1\text{ V}$, $I_C = 0$
DC Current Gain	h_{FE}	75		150		$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$ * ¹
Gain Bandwidth Product	f_T		12		GHz	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$
Feed-back Capacitance	C_{re}		0.3	0.5	pF	$V_{CB} = 3\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ * ²
Insertion Power Gain	$ S_{21e} ^2$	9	11		dB	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $f = 2.0\text{ GHz}$
Noise Figure	NF		1.5	2.5	dB	$V_{CE} = 3\text{ V}$, $I_C = 3\text{ mA}$, $f = 2.0\text{ GHz}$

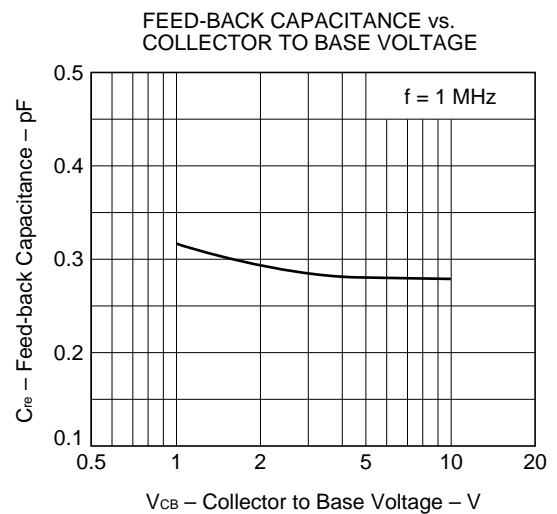
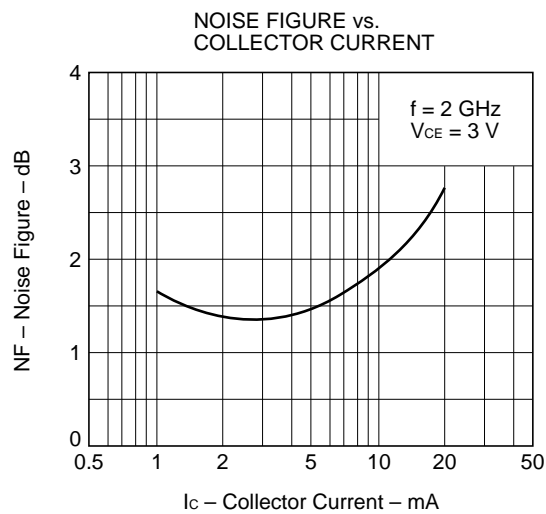
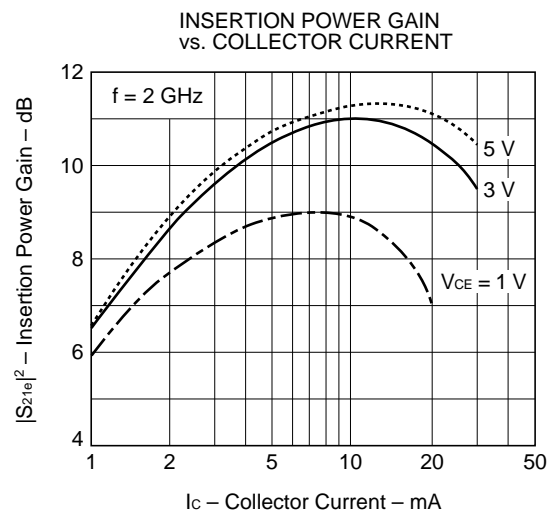
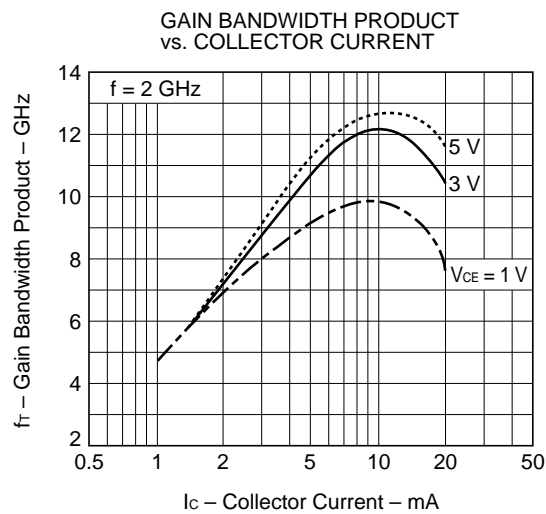
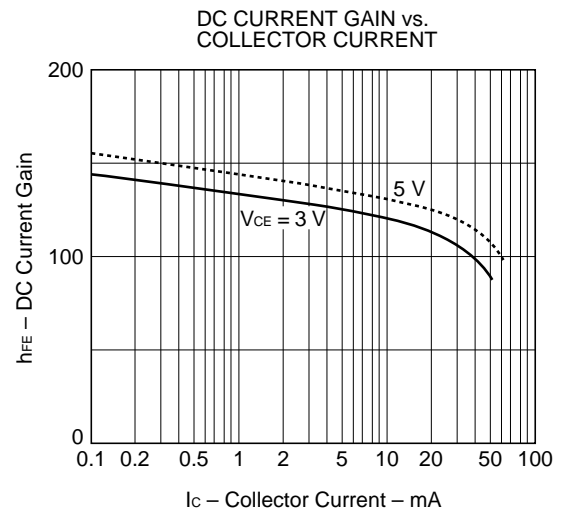
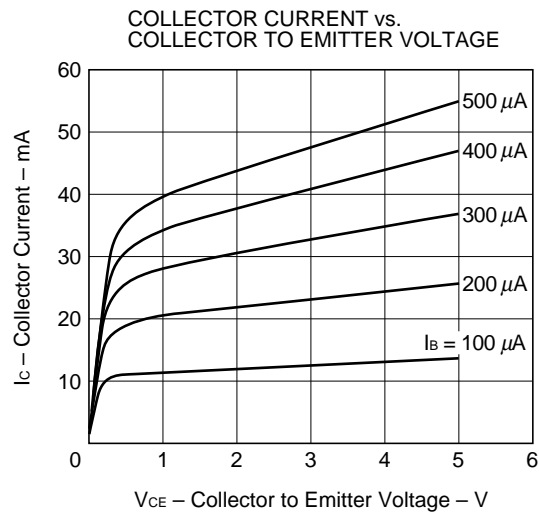
*1 Pulse Measurement; $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$ Pulsed.

*2 Measured with 3 terminals bridge, Emitter and Case should be grounded.

 h_{FE} Classification

Rank	T83
Marking	T83
h_{FE}	75 to 150

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)



S-PARAMETER

($V_{CE} = 3\text{ V}$, $I_C = 1\text{ mA}$, $Z_o = 50\ \Omega$)

f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	.935	-14.9	3.466	165.9	.034	79.7	.991	-7.9
0.400	.891	-30.0	3.392	151.4	.066	73.1	.962	-16.1
0.600	.830	-44.6	3.269	137.9	.096	61.6	.916	-22.6
0.800	.759	-58.8	3.090	125.8	.119	53.2	.870	-29.2
1.000	.677	-74.2	2.891	113.5	.138	45.6	.813	-35.1
1.200	.597	-88.4	2.690	102.0	.154	40.6	.764	-41.2
1.400	.521	-104.0	2.519	92.4	.161	33.9	.706	-46.0
1.600	.467	-119.3	2.327	82.0	.172	31.2	.662	-50.4
1.800	.418	-134.6	2.190	73.1	.177	27.0	.619	-55.3
2.000	.391	-152.1	2.052	64.9	.177	23.4	.581	-60.1
2.200	.382	-168.4	1.909	56.5	.180	19.8	.550	-64.5
2.400	.384	175.2	1.793	49.2	.189	22.1	.531	-68.5
2.600	.379	163.6	1.684	42.4	.181	19.6	.484	-73.2
2.800	.408	151.4	1.574	36.1	.189	18.3	.482	-78.0
3.000	.431	142.5	1.482	31.5	.184	18.0	.454	-84.7

($V_{CE} = 3\text{ V}$, $I_C = 3\text{ mA}$, $Z_o = 50\ \Omega$)

f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	.813	-24.5	8.901	156.5	.034	79.6	.955	-13.4
0.400	.693	-46.7	7.806	135.6	.058	67.4	.862	-24.7
0.600	.563	-65.0	6.683	119.4	.078	59.1	.758	-31.6
0.800	.453	-81.5	5.677	106.9	.092	53.5	.669	-37.3
1.000	.362	-98.3	4.878	95.8	.105	50.1	.606	-40.8
1.200	.290	-115.6	4.249	86.1	.112	47.5	.553	-45.2
1.400	.250	-133.3	3.771	78.6	.123	46.3	.509	-48.4
1.600	.217	-153.6	3.363	70.7	.141	43.2	.472	-52.4
1.800	.206	-171.5	3.053	63.4	.149	42.5	.438	-55.7
2.000	.221	170.3	2.807	57.1	.158	39.6	.407	-60.9
2.200	.238	153.4	2.571	50.5	.169	39.1	.388	-65.7
2.400	.264	142.1	2.382	45.0	.178	36.3	.362	-70.1
2.600	.285	132.7	2.219	39.6	.197	35.2	.326	-73.4
2.800	.317	124.4	2.080	34.3	.204	35.4	.317	-79.0
3.000	.344	119.8	1.953	29.7	.223	32.9	.302	-87.6

S-PARAMETER

(V_{CE} = 3 V, I_C = 5 mA, Z₀ = 50 Ω)

f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	.716	−31.0	12.446	150.0	.030	73.7	.918	−17.3
0.400	.553	−55.6	10.005	126.8	.053	65.2	.777	−28.8
0.600	.412	−74.5	8.004	110.6	.067	60.3	.659	−34.0
0.800	.315	−91.6	6.521	99.2	.084	56.2	.577	−38.0
1.000	.243	−109.4	5.457	89.4	.099	58.4	.526	−40.5
1.200	.190	−130.1	4.678	80.7	.106	53.6	.488	−44.5
1.400	.167	−152.1	4.099	74.1	.120	51.9	.447	−46.9
1.600	.161	−174.4	3.628	67.1	.133	49.3	.420	−51.2
1.800	.162	167.5	3.287	60.5	.146	48.0	.389	−55.1
2.000	.193	149.8	3.008	54.9	.157	46.3	.354	−59.2
2.200	.220	137.4	2.748	48.6	.169	44.9	.341	−63.9
2.400	.252	128.7	2.552	43.7	.185	39.6	.315	−69.2
2.600	.267	122.3	2.366	38.6	.201	40.2	.291	−71.6
2.800	.311	116.7	2.212	33.7	.211	37.0	.270	−76.9
3.000	.330	112.1	2.079	29.2	.228	35.6	.260	−88.5

(V_{CE} = 3 V, I_C = 10 mA, Z₀ = 50 Ω)

f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	.536	−42.2	17.753	139.3	.024	66.6	.840	−22.7
0.400	.349	−68.1	12.387	115.1	.041	67.9	.654	−31.7
0.600	.232	−88.4	9.189	100.7	.057	64.3	.547	−34.1
0.800	.165	−107.1	7.205	91.0	.071	60.3	.489	−35.7
1.000	.124	−130.9	5.913	82.8	.090	62.7	.451	−37.5
1.200	.106	−163.8	5.000	75.3	.103	61.1	.413	−41.4
1.400	.116	173.3	4.352	69.7	.122	58.4	.394	−43.4
1.600	.137	153.2	3.841	63.5	.138	54.9	.367	−47.4
1.800	.149	137.7	3.463	57.5	.145	54.6	.338	−51.0
2.000	.184	129.3	3.168	52.5	.170	51.2	.319	−55.9
2.200	.216	121.9	2.876	46.7	.184	48.0	.298	−63.7
2.400	.249	117.4	2.676	42.1	.191	46.4	.282	−67.7
2.600	.270	111.3	2.486	37.3	.208	42.9	.241	−71.9
2.800	.306	109.1	2.319	32.9	.221	39.2	.236	−76.7
3.000	.328	105.5	2.183	28.4	.238	36.7	.210	−89.3

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