NEC

SILICON TRANSISTOR
2SC4957

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 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.

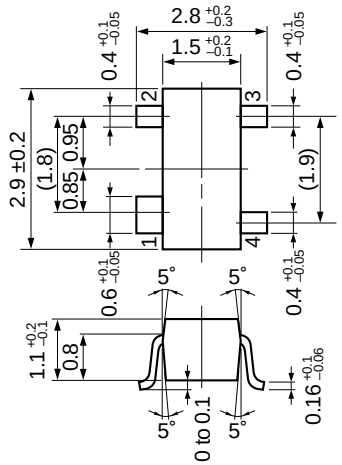
***** Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4957)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ˚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	˚C
Storage Temperature	T_{stg}	–65 to +150	˚C

PACKAGE DIMENSIONS

in millimeters



PIN CONNECTIONS

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

Caution; Electrostatic Sensitive Device.

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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

***1** Pulse Measurement; PW ≤ 350 μs, Duty Cycle ≤ 2 % Pulsed.

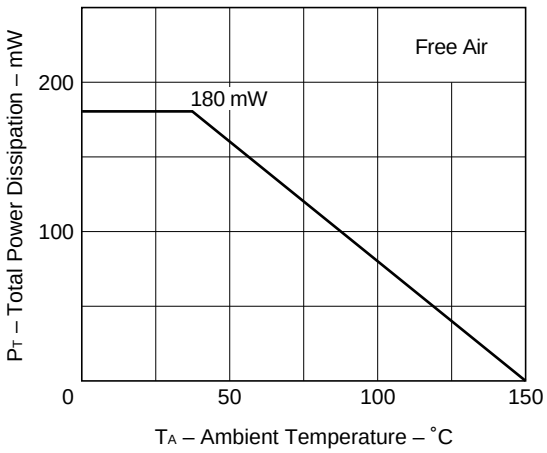
***2** Measured with 3 terminals bridge, Emitter and Case should be grounded.

h_{FE} Classification

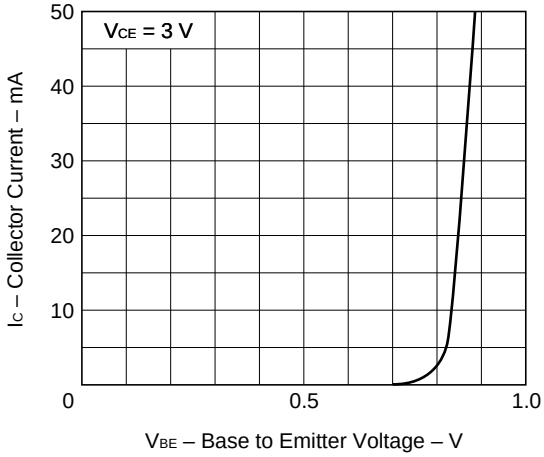
Rank	T83
Marking	T83
h_{FE}	75 to 150

TYPICAL CHARACTERISTICS (T_A = 25 °C)

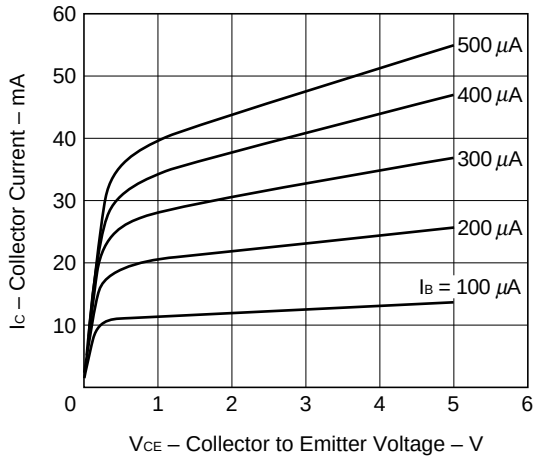
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



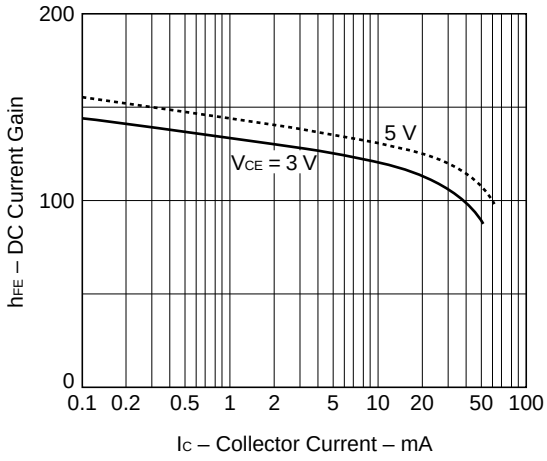
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



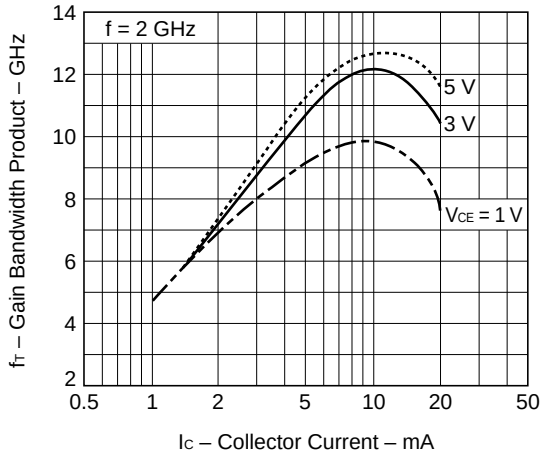
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



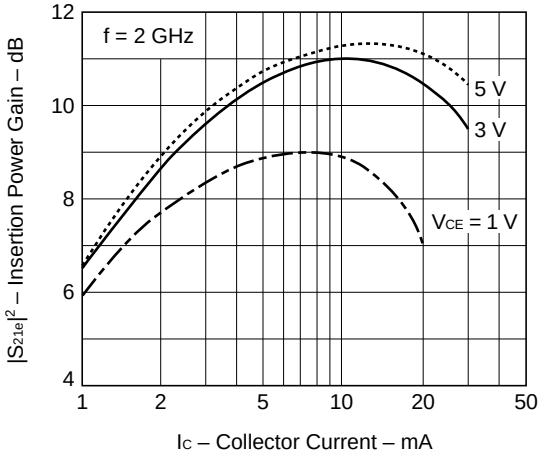
DC CURRENT GAIN vs.
COLLECTOR CURRENT



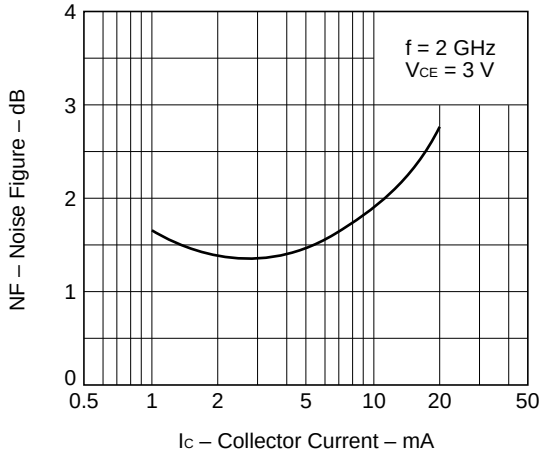
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



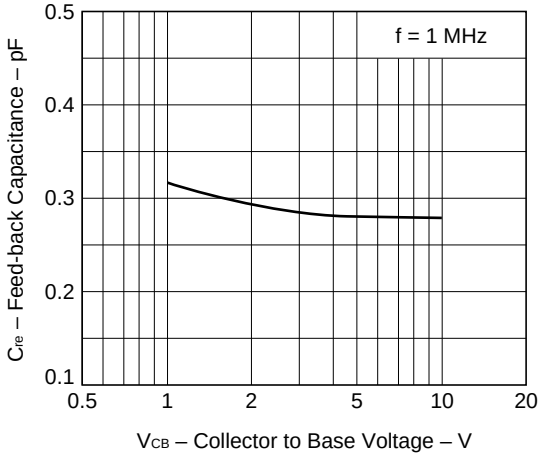
INSERTION POWER GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE vs.
COLLECTOR CURRENT



FEED-BACK CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



S-PARAMETER

(V_{CE} = 3 V, I_C = 1 mA, Z_O = 50 Ω)

f	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	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 V, I_C = 3 mA, Z_O = 50 Ω)

f	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	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, Z_O = 50 Ω)

f	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	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, Z_O = 50 Ω)

f	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	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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