NEC

SILICON TRANSISTOR
2SC4954

HIGH FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
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
2SC4954-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Collector) face to perforation side of the tape.
2SC4954-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Emitter), Pin2 (Base) face to perforation side of the tape.

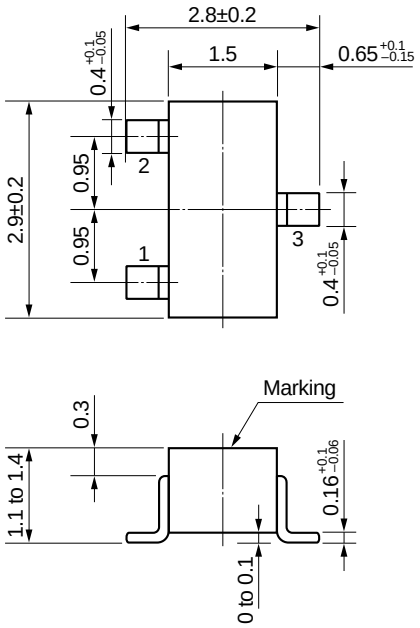
* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4954)

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	10	mA
Total Power Dissipation	P_T	60	mW
Junction Temperature	T_j	150	˚C
Storage Temperature	T_{stg}	–65 to +150	˚C

PACKAGE DIMENSIONS

in millimeters



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

Caution; Electrostatic Sensitive Device.

Document No. P10376EJ2V0DS00 (2nd edition)
(Previous No. TD-2405)
Date Published July 1995 P
Printed in Japan

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 = 5 mA*1
Gain Bandwidth Product	f_T		12		GHz	V_{CE} = 3 V, I_C = 5 mA, f = 2.0 GHz
Feed-back Capacitance	C_{re}		0.3	0.5	pF	V_{CB} = 3 V, I_E = 0, f = 1 MHz*2
Insertion Power Gain	$\|S_{21e}\|^2$	7	8.5		dB	V_{CE} = 3 V, I_C = 5 mA, f = 2.0 GHz
Noise Figure	NF		2.5	4.0	dB	V_{CE} = 3 V, I_C = 3 mA, f = 2.0 GHz

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

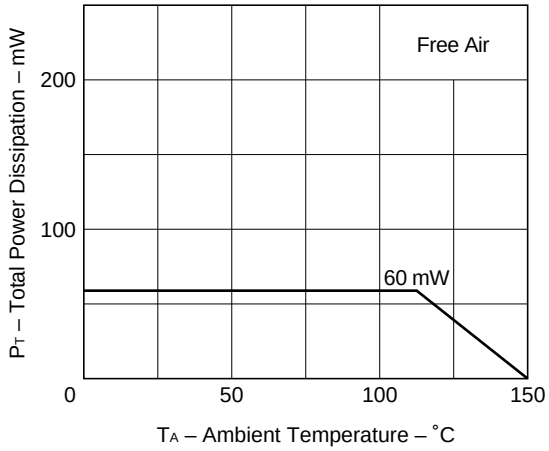
***2** Measured with 3 terminals bridge, Emitter and Case should be grounded.

h_{FE} Classification

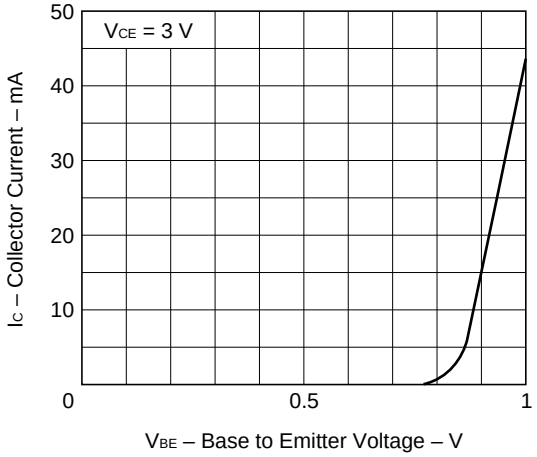
Rank	T82
Marking	T82
h_{FE}	75 to 150

TYPICAL CHARACTERISTICS (T_A = 25 °C)

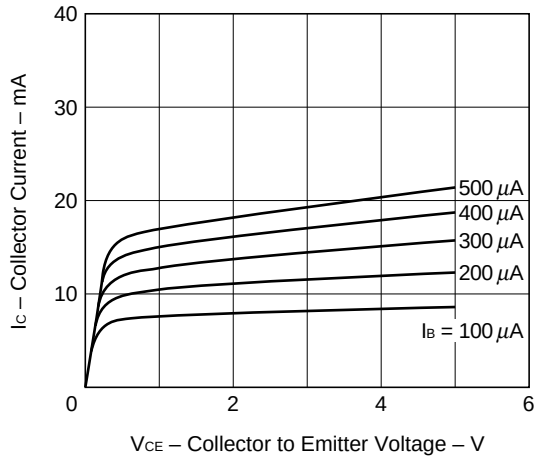
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



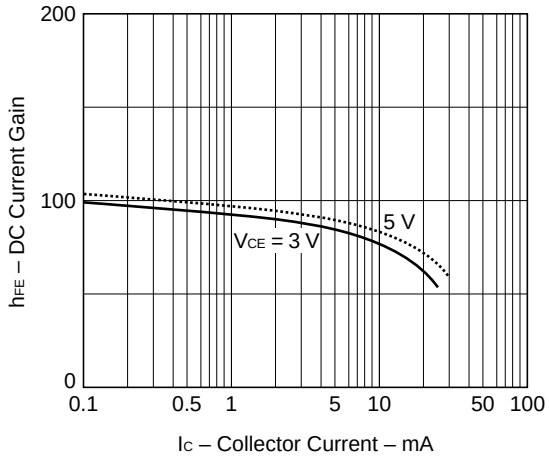
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



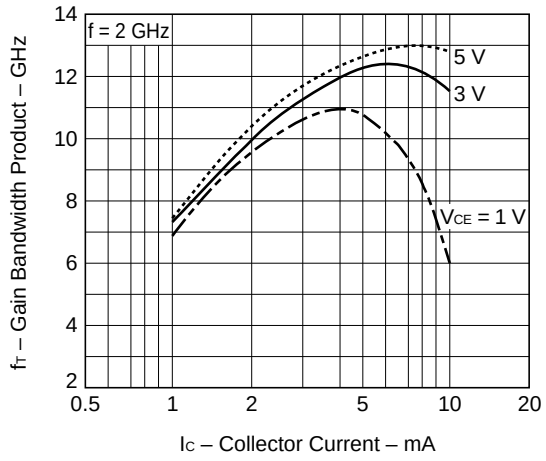
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



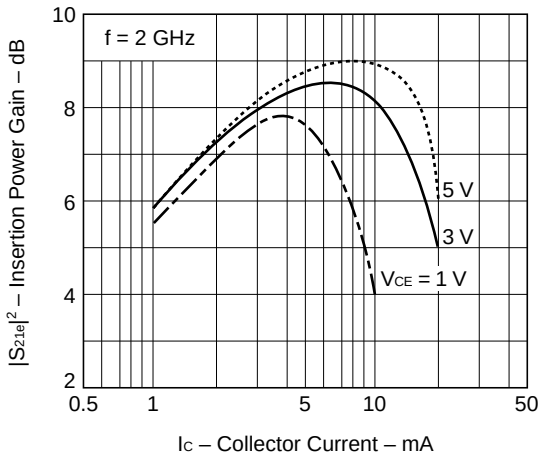
DC CURRENT GAIN vs.
COLLECTOR CURRENT



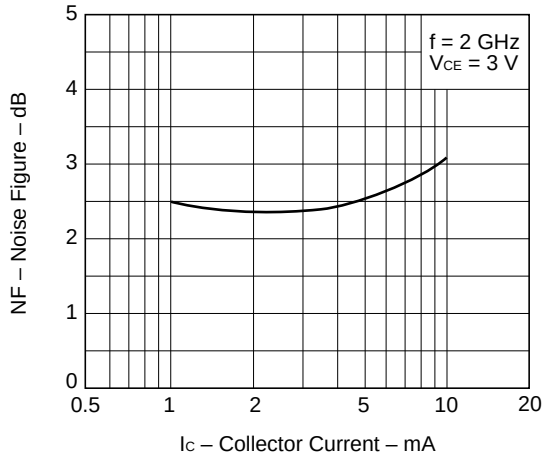
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



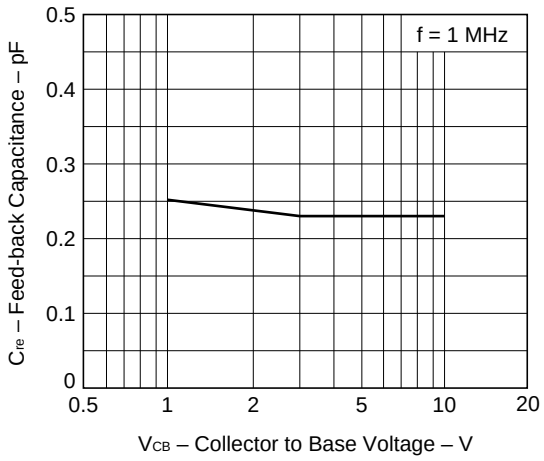
INSERTION POWER GAIN
vs. COLLECTOR CURRENT



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	0.9550	–9.0	3.2340	168.1	0.0340	77.3	0.9870	–6.8
0.400	0.9140	–17.3	3.0460	154.7	0.0650	76.7	0.9640	–13.4
0.600	0.8630	–25.8	2.9630	144.2	0.0930	71.6	0.9250	–19.5
0.800	0.7880	–33.1	2.7870	133.1	0.1180	66.7	0.8850	–24.3
1.000	0.7320	–39.1	2.6480	123.5	0.1360	63.7	0.8330	–28.9
1.200	0.6720	–45.2	2.5390	114.4	0.1570	57.2	0.7820	–33.2
1.400	0.5910	–50.5	2.3460	106.8	0.1780	56.3	0.7570	–37.1
1.600	0.5430	–55.0	2.2000	99.0	0.1870	51.7	0.7250	–40.1
1.800	0.4830	–57.4	2.0710	91.6	0.2030	51.3	0.6720	–43.2
2.000	0.4240	–60.7	1.9590	85.7	0.2090	50.4	0.6490	–46.1
2.200	0.3710	–66.9	1.8970	79.8	0.2240	50.9	0.6230	–49.1
2.400	0.3390	–68.0	1.8100	74.8	0.2440	47.8	0.5970	–49.4
2.600	0.3030	–71.3	1.6980	70.2	0.2530	47.7	0.5740	–54.1
2.800	0.2460	–72.2	1.6530	64.7	0.2550	44.5	0.5610	–56.8
3.000	0.1990	–68.9	1.5750	59.9	0.2830	43.0	0.5130	–61.6

(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	0.8730	–15.0	7.3980	159.5	0.0340	74.6	0.9590	–11.1
0.400	0.7600	–26.2	6.3600	140.6	0.0580	71.3	0.8830	–18.9
0.600	0.6530	–35.6	5.5680	127.0	0.0840	69.6	0.7970	–25.7
0.800	0.6530	–35.6	5.5680	127.0	0.0840	69.6	0.7970	–25.7
1.000	0.4750	–45.3	4.1940	105.8	0.1160	64.0	0.6690	–32.7
1.200	0.4110	–48.3	3.7680	98.0	0.1330	64.0	0.6690	–32.7
1.400	0.3470	–49.3	3.3170	91.8	0.1510	61.9	0.6060	–36.3
1.600	0.3190	–50.4	3.0080	85.7	0.1600	62.5	0.5720	–37.6
1.800	0.2830	–46.5	2.7180	79.4	0.1820	58.0	0.5510	–39.9
2.000	0.2510	–45.6	2.5040	74.9	0.1980	57.5	0.5290	–41.8
2.200	0.2020	–48.2	2.3810	70.4	0.2150	56.6	0.5170	–44.1
2.400	0.1940	–47.4	2.2280	66.0	0.2290	53.2	0.5070	–45.2
2.600	0.1850	–47.8	2.0580	62.7	0.2310	56.3	0.4920	–49.6
2.800	0.1710	–39.0	1.9740	57.8	0.2620	54.7	0.4670	–51.7
3.000	0.1430	–31.7	1.8480	54.4	0.2940	53.6	0.4160	–54.9

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	.775	–19.9	10.233	153.0	.029	78.0	.931	–14.1
0.400	.653	–32.4	8.408	133.2	.056	66.1	.815	–23.3
0.600	.527	–39.8	6.761	119.0	.073	70.0	.717	–27.3
0.800	.447	–45.7	5.598	108.5	.088	67.6	.639	–30.3
1.000	.359	–49.6	4.670	100.0	.111	66.9	.595	–31.2
1.200	.314	–50.3	4.118	92.7	.123	67.5	.565	–32.4
1.400	.279	–48.1	3.630	87.1	.140	66.8	.545	–34.4
1.600	.246	–46.9	3.246	82.1	.154	64.1	.519	–35.9
1.800	.219	–46.8	2.885	78.1	.178	62.0	.521	–37.0
2.000	.178	–43.6	2.747	73.7	.194	62.9	.500	–38.9
2.200	.165	–44.7	2.581	68.8	.201	62.0	.478	–43.1
2.400	.149	–37.6	2.382	64.8	.224	60.1	.455	–43.1
2.600	.137	–50.0	2.244	61.4	.241	60.9	.471	–43.9
2.800	.132	–47.6	2.138	59.0	.253	57.7	.449	–47.9
3.000	.103	–33.7	2.044	55.3	.265	55.3	.438	–47.0