NEC

SILICON TRANSISTOR
2SC4958

HIGH FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
SUPER MINI MOLD

FEATURES

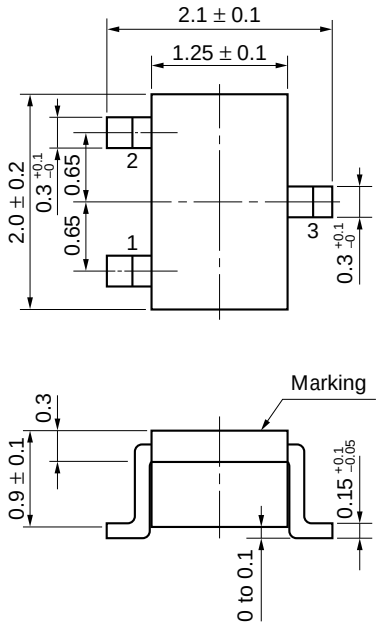
- Low Noise, High Gain
- Low Voltage Operation
- Low Feedback Capacitance
  C_{re} = 0.3 pF TYP.

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC4958–T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Collector) face to perforation side of the tape.
2SC4958–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.: 2SC4958)

PACKAGE DIMENSIONS
in millimeters



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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

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 = 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.

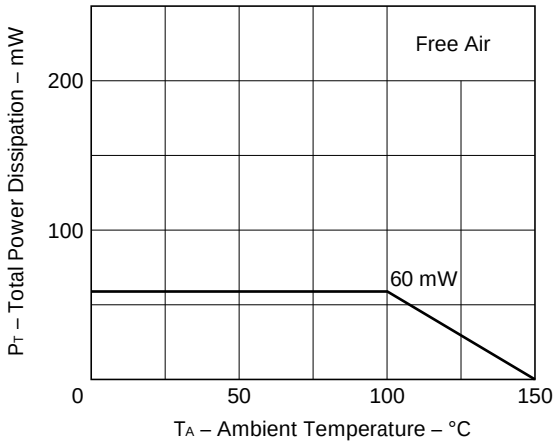
***2** Measured with 3 terminals bridge, Emitter and Case should be grounded.

h_{FE} Classification

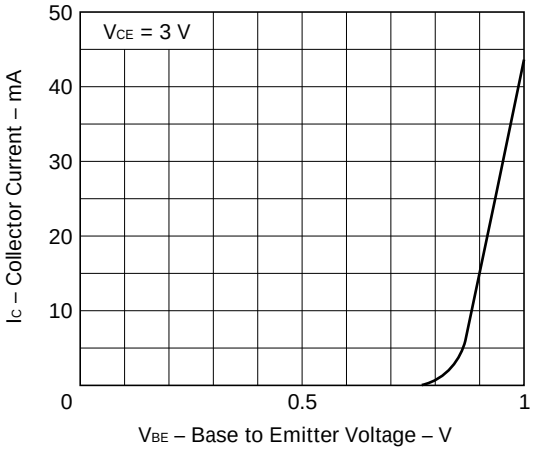
Rank	T82
Marking	T82
h_{FE}	75 to 150

TYPICAL CHARACTERISTICS (T_A = 25 °C)

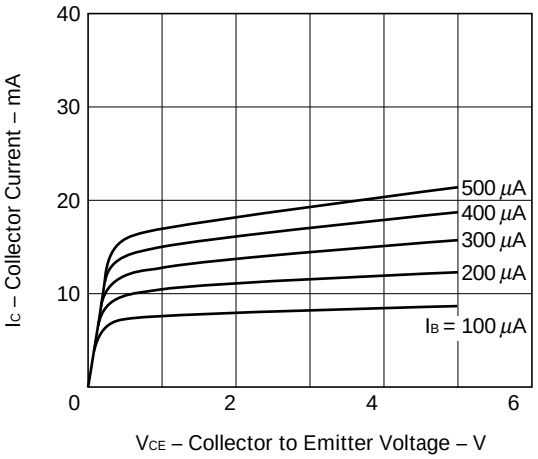
TOTAL POWER DISSIPATION vs.AMBIENT TEMPERATURE



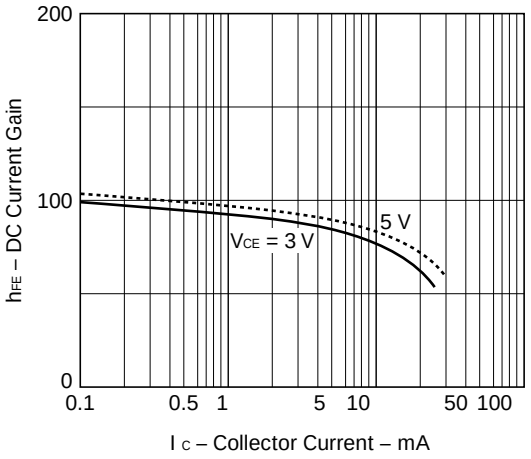
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



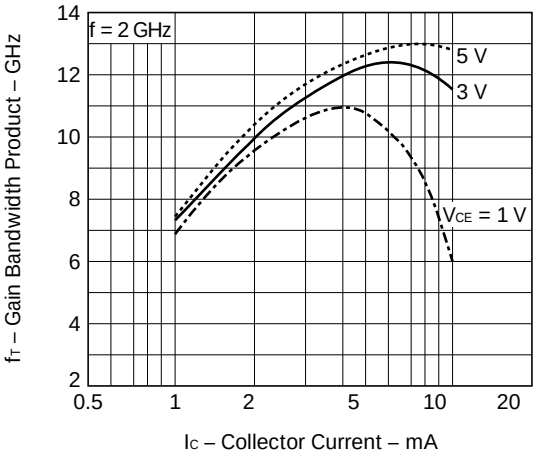
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



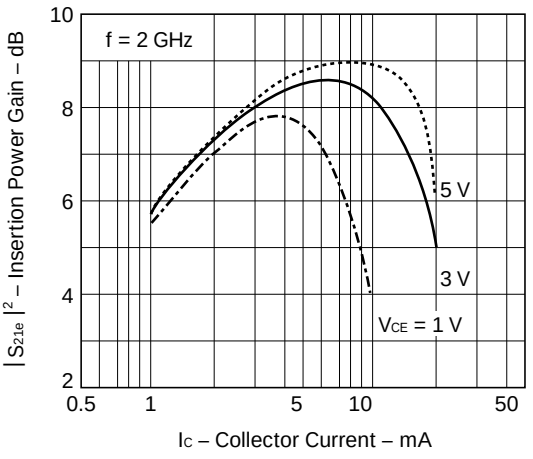
DC CURRENT GAIN vs.
COLLECTOR CURRENT



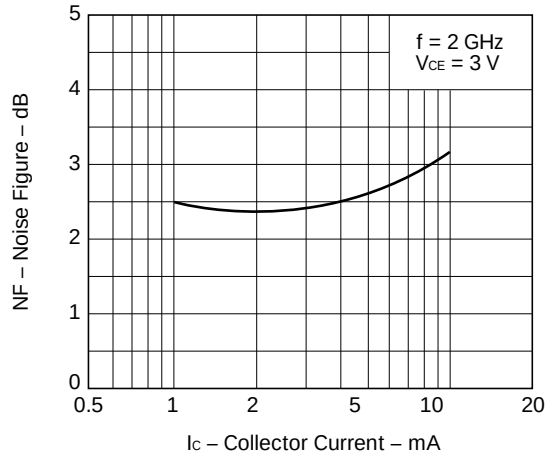
GAIN BANDWIDTH PRODUCT
vs.COLLECTOR CURRENT



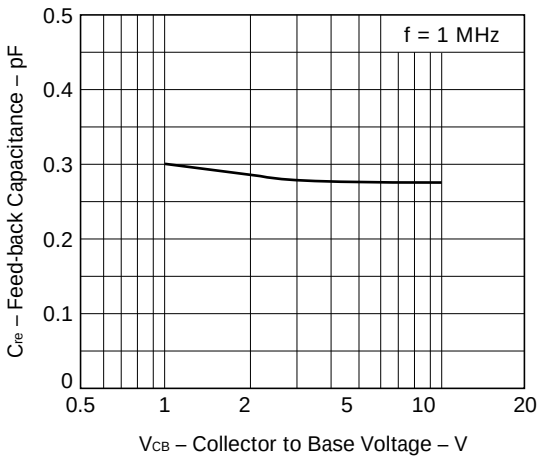
INSERTION POWER GAIN vs.
COLLECTOR CURRENT



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	0.9410	–9.3	3.3070	167.3	0.0330	82.8	0.9900	–6.8
0.400	0.9280	–17.7	3.1860	156.0	0.0650	78.5	0.9540	–13.7
0.600	0.8670	–26.0	3.0130	144.9	0.0930	71.1	0.9250	–19.5
0.800	0.8150	–33.6	2.8740	134.6	0.1160	67.0	0.8730	–24.9
1.000	0.7280	–41.5	2.6360	124.4	0.1330	59.7	0.8250	–29.5
1.200	0.6700	–47.3	2.5360	115.5	0.1480	59.1	0.7920	–33.6
1.400	0.5970	–51.7	2.3840	107.7	0.1710	53.6	0.7640	–36.6
1.600	0.5430	–56.3	2.2170	100.7	0.1820	52.0	0.7180	–39.9
1.800	0.5040	–60.7	2.0650	95.0	0.1990	49.8	0.6810	–42.4
2.000	0.4350	–64.4	2.0420	88.3	0.2040	51.6	0.6600	–46.9
2.200	0.3920	–69.4	1.9690	82.0	0.2270	48.3	0.6210	–50.1
2.400	0.3560	–71.5	1.8470	76.6	0.2320	50.1	0.6040	–51.8
2.600	0.3240	–81.1	1.7690	71.1	0.2420	46.4	0.5840	–53.6
2.800	0.3120	–76.7	1.7240	68.1	0.2520	45.1	0.5660	–57.6
3.000	0.2450	–85.1	1.6690	63.2	0.2670	45.3	0.5410	–58.3

(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	0.8480	–15.9	7.7420	158.5	0.0320	79.4	0.9640	–11.3
0.400	0.7640	–27.6	6.8190	141.1	0.0560	68.2	0.8730	–20.5
0.600	0.6470	–37.3	5.8070	127.1	0.0770	66.9	0.7950	–26.1
0.800	0.5600	–44.1	5.0060	116.0	0.1000	64.5	0.7140	–30.2
1.000	0.4650	–49.4	4.2790	106.6	0.1110	64.1	0.6540	–33.0
1.200	0.4050	–51.9	3.8350	98.8	0.1250	62.2	0.6250	–34.4
1.400	0.3470	–53.4	3.4290	92.4	0.1340	62.6	0.5850	–36.3
1.600	0.3040	–55.0	3.0820	86.6	0.1570	60.9	0.5530	–38.2
1.800	0.2790	–55.7	2.7740	82.3	0.1840	60.8	0.5450	–39.3
2.000	0.2260	–53.6	2.6370	77.1	0.1910	57.5	0.5140	–42.2
2.200	0.2090	–57.9	2.4900	72.2	0.2090	59.4	0.5020	–45.3
2.400	0.1820	–53.8	2.2890	67.9	0.2260	58.1	0.4850	–46.1
2.600	0.1600	–67.3	2.1710	63.7	0.2280	53.4	0.4680	–47.9
2.800	0.1650	–58.5	2.0820	61.3	0.2580	57.0	0.4650	–51.6
3.000	0.1210	–51.3	2.0030	57.3	0.2670	52.6	0.4490	–51.4

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	0.7750	–19.9	10.2330	153.0	0.0290	78.0	0.9310	–14.1
0.400	0.6530	–32.4	8.4080	133.2	0.0560	66.1	0.8150	–23.3
0.600	0.5270	–39.8	6.7610	119.0	0.0730	70.0	0.7170	–27.3
0.800	0.4470	–45.7	5.5980	108.5	0.0880	67.6	0.6390	–30.3
1.000	0.3590	–49.6	4.6700	100.0	0.1110	66.9	0.5950	–31.2
1.200	0.3140	–50.3	4.1180	92.7	0.1230	67.5	0.5650	–32.4
1.400	0.2790	–48.1	3.6300	87.1	0.1400	66.8	0.5450	–34.4
1.600	0.2460	–46.9	3.2460	82.1	0.1540	64.1	0.5190	–35.9
1.800	0.2190	–46.8	2.8850	78.1	0.1780	62.0	0.5210	–37.0
2.000	0.1780	–43.6	2.7470	73.7	0.1940	62.9	0.5000	–38.9
2.200	0.1650	–44.7	2.5810	68.8	0.2010	62.0	0.4780	–43.1
2.400	0.1490	–37.6	2.3820	64.8	0.2240	60.1	0.4550	–43.1
2.600	0.1370	–50.0	2.2440	61.4	0.2410	60.9	0.4710	–43.9
2.800	0.1320	–47.6	2.1380	59.0	0.2530	57.7	0.4490	–47.9
3.000	0.1030	–33.7	2.0440	55.3	0.2650	55.3	0.4380	–47.0