



# 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

$C_{re} = 0.3 \text{ pF TYP.}$

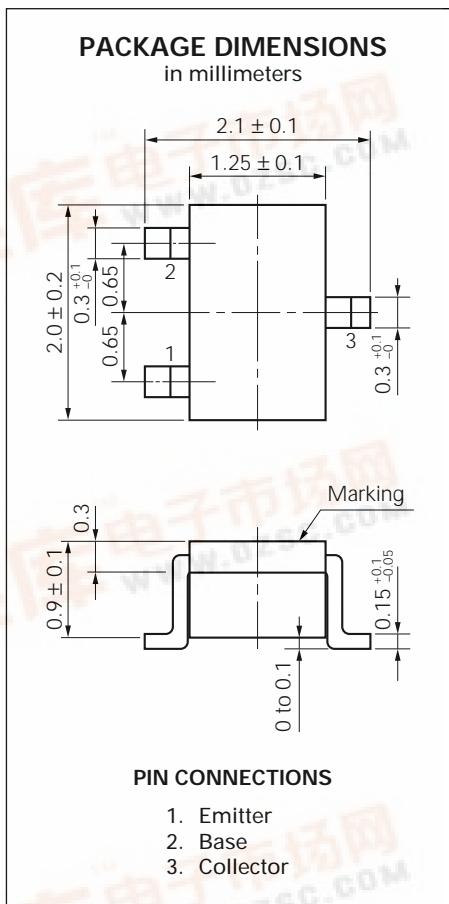
#### ORDERING INFORMATION

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)

#### 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	$I_C$	10	mA
Total Power Dissipation	$P_T$	60	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$



**Caution:** Electrostatic sensitive Device.

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

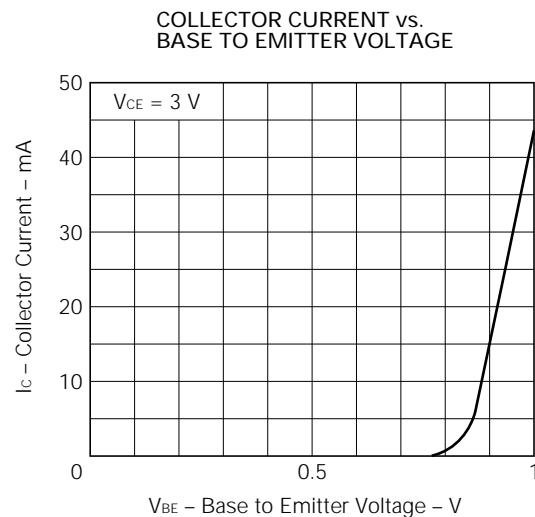
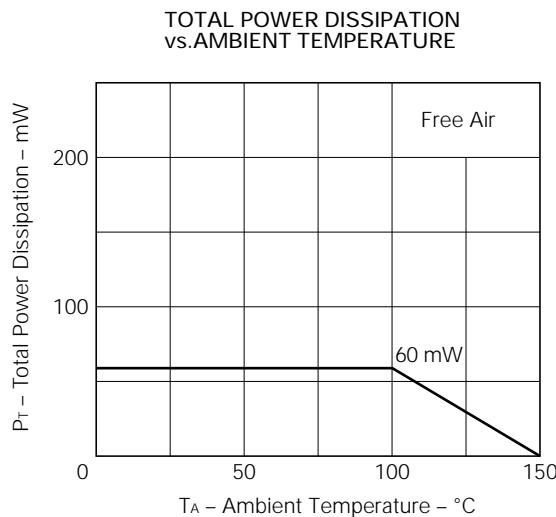
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	$I_{CBO}$			0.1	$\mu\text{A}$	$V_{CB} = 5\text{ V}$ , $I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			0.1	$\mu\text{A}$	$V_{EB} = 1\text{ V}$ , $I_C = 0$
DC Current Gain	$h_{FE}$	75		150		$V_{CE} = 3\text{ V}$ , $I_C = 5\text{ mA}$ <sup>*1</sup>
Gain Bandwidth Product	$f_T$		12		GHz	$V_{CE} = 3\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 2.0\text{ GHz}$
Feed back Capacitance	$C_{re}$		0.3	0.5	pF	$V_{CB} = 3\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$ <sup>*2</sup>
Insertion Power Gain	$ S_{21e} ^2$	7	8.5		dB	$V_{CE} = 3\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 2.0\text{ GHz}$
Noise Figure	NF		2.5	4.0	dB	$V_{CE} = 3\text{ V}$ , $I_C = 3\text{ mA}$ , $f = 2.0\text{ GHz}$

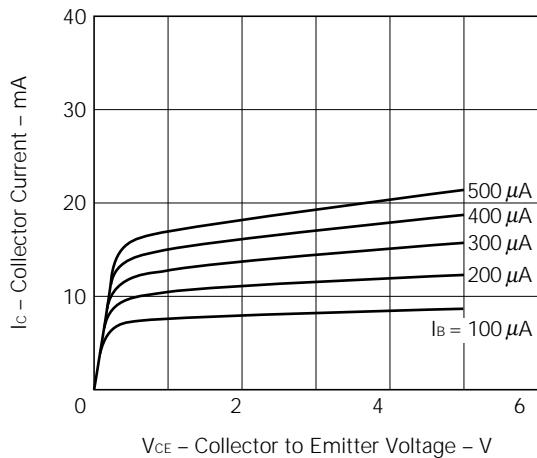
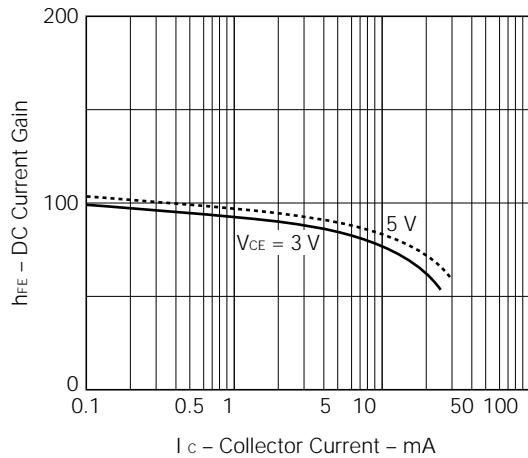
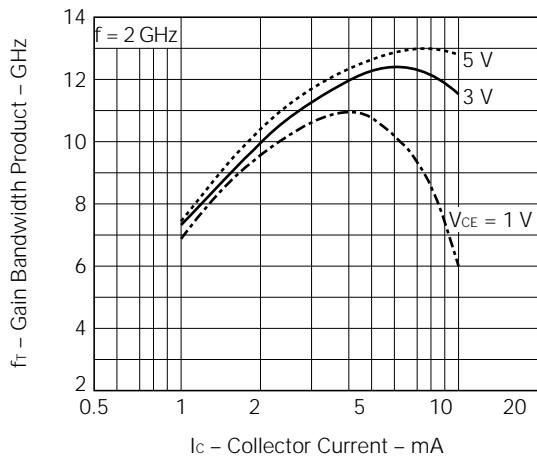
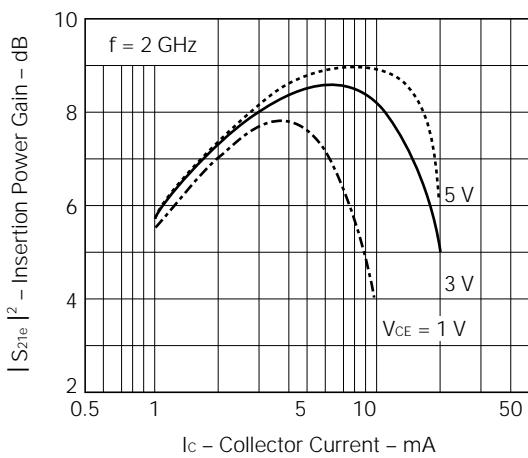
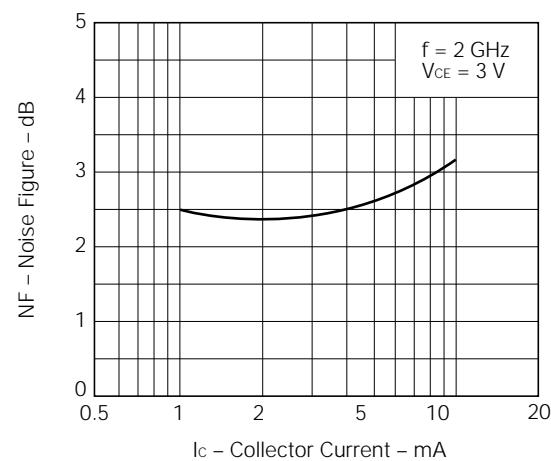
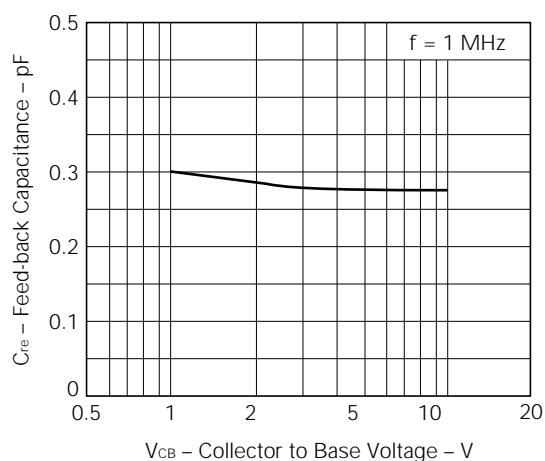
\*1 Pulse Measurement ;  $PW \leq 350\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$  Pulsed.

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

 $h_{FE}$  Classification

Rank	T82
Marking	T82
$h_{FE}$	75 to 150

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

COLLECTOR CURRENT vs.  
COLLECTOR TO Emitter VOLTAGEDC CURRENT GAIN vs.  
COLLECTOR CURRENTGAIN BANDWIDTH PRODUCT  
vs. COLLECTOR CURRENTINSERTION POWER GAIN vs.  
COLLECTOR CURRENTNOISE FIGURE vs.  
COLLECTOR CURRENTFEED-BACK CAPACITANCE vs.  
COLLECTOR TO BASE VOLTAGE

**S-PARAMETER**(V<sub>CE</sub> = 3 V, I<sub>C</sub> = 1 mA, Z<sub>O</sub> = 50 Ω)

f (GHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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<sub>CE</sub> = 3 V, I<sub>C</sub> = 3 mA, Z<sub>O</sub> = 50 Ω)

f (GHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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<sub>CE</sub> = 3 V, I<sub>C</sub> = 5 mA, Z<sub>O</sub> = 50 Ω)

f (GHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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

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