

HIGH FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
MINI MOLD

FEATURES

- Low Noise, High Gain
- Low Voltage Operation
- Low Feedback Capacitance

$C_{re} = 0.4 \text{ pF TYP.}$

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC4955-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Collector) face to perforation side of the tape.
2SC4955-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 evaluation sample. Unit sample quantity shall be 50 pcs.

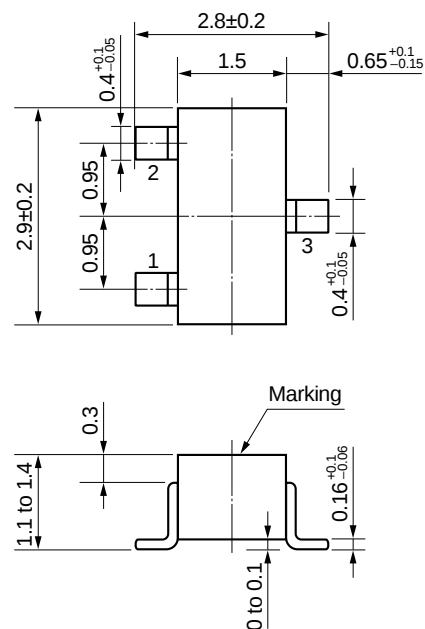
(Part No.: 2SC4955)

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}	-64 to +150	$^\circ\text{C}$

PACKAGE DIMENSIONS

in millimeters



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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

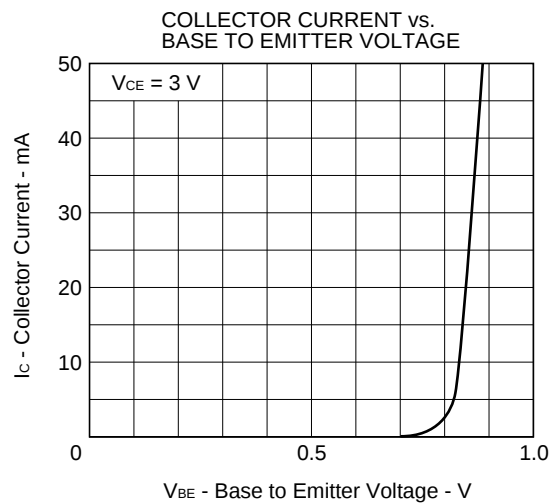
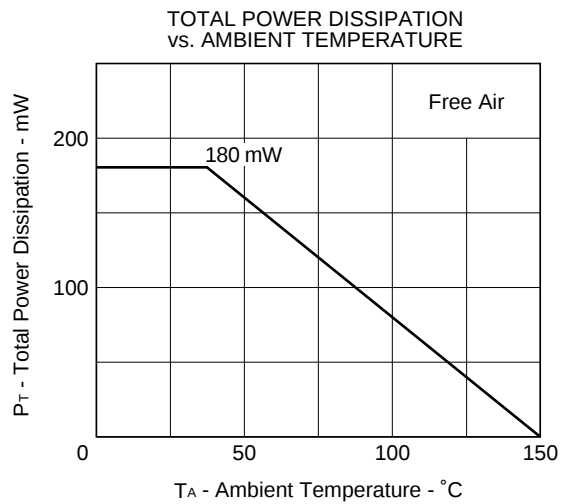
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			0.1	μA	$V_{CB} = 5\text{ V}$, $I_E = 0$
Emitter Cutoff Current	I_{EBO}			0.1	μA	$V_{EB} = 1\text{ V}$, $I_C = 0$
DC Current Gain	h_{FE}	75		150		$V_{CB} = 3\text{ V}$, $I_C = 10\text{ mA}$ * ¹
Gain Bandwidth Product	f_T		12		GHz	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$
Feed-back Capacitance	C_{re}		0.4	0.7	pF	$V_{CB} = 3\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ * ²
Insertion Gain	$ S_{21e} ^2$	7	8.5		dB	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $f = 2.0\text{ GHz}$
Noise Figure	NF		1.5	2.5	dB	$V_{CE} = 3\text{ V}$, $I_C = 3\text{ mA}$, $f = 2.0\text{ GHz}$

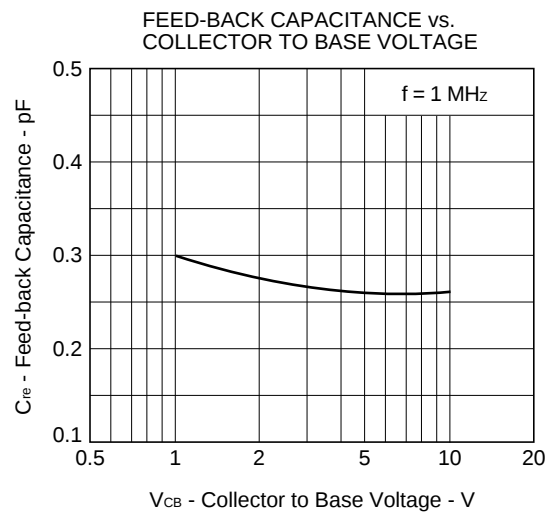
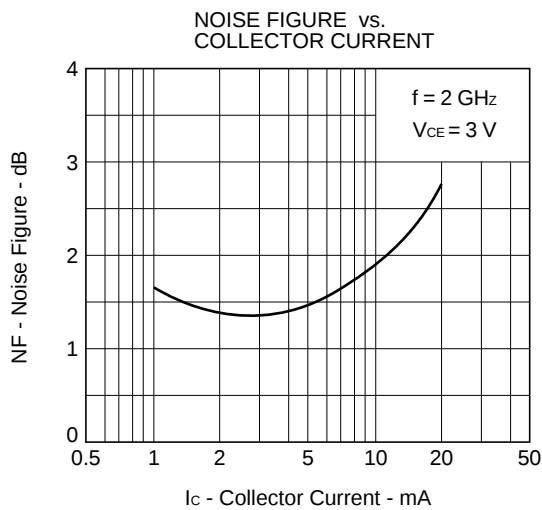
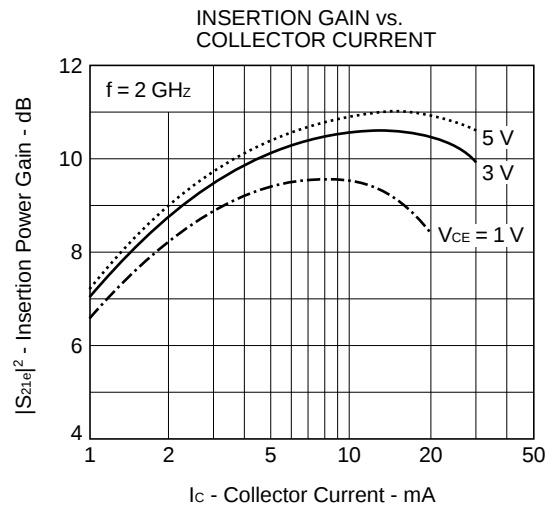
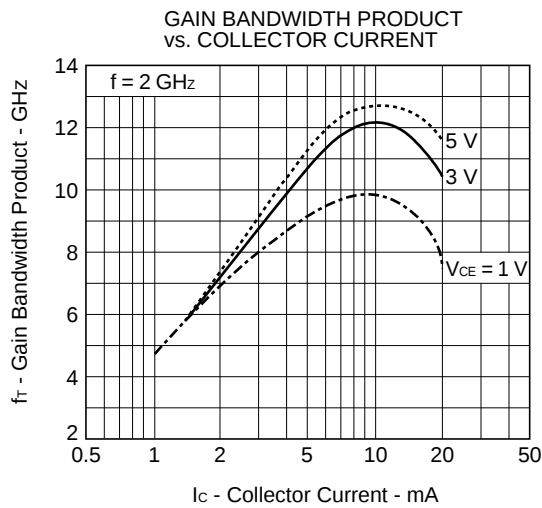
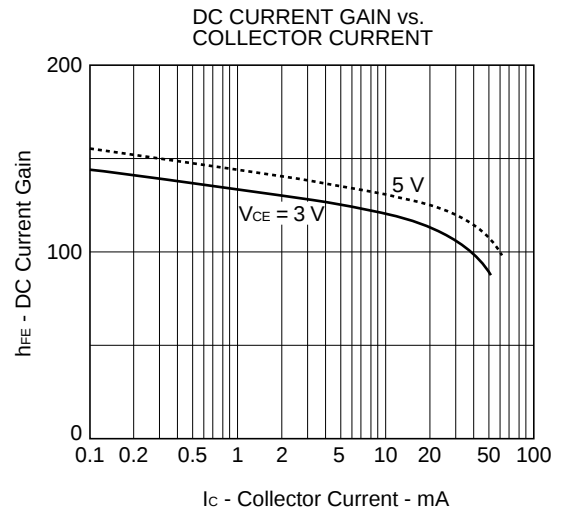
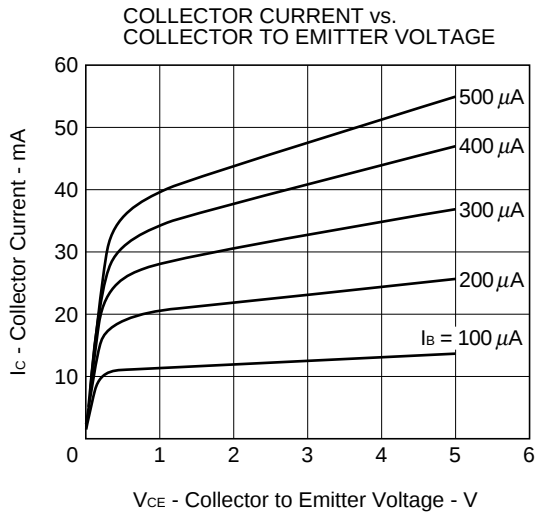
*¹ Pulse Measurement; $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$ Pulsed.

*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 V, I_C = 1 mA, Z_O = 50 Ω)

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.9400	-15.3	3.4560	165.0	0.0420	76.0	0.9780	-8.7
0.400	0.8770	-29.0	3.1870	149.2	0.0800	71.7	0.9490	-16.0
0.600	0.8020	-43.6	3.0390	136.4	0.1140	63.8	0.8910	-23.4
0.800	0.7030	-55.3	2.8000	123.9	0.1340	56.7	0.8280	-29.1
1.000	0.6240	-67.2	2.5890	113.1	0.1520	52.2	0.7630	-33.7
1.200	0.5570	-79.0	2.4320	102.9	0.1690	49.0	0.7170	-37.9
1.400	0.4670	-89.9	2.2140	94.7	0.1810	45.6	0.6940	-41.8
1.600	0.4130	-99.8	2.0430	86.9	0.1880	45.2	0.6450	-43.9
1.800	0.3680	-108.1	1.8790	79.0	0.1910	43.0	0.6050	-46.2
2.000	0.3140	-120.9	1.7720	73.0	0.1990	44.3	0.5860	-50.5
2.200	0.2690	-137.1	1.7010	66.9	0.2140	45.9	0.5600	-53.7
2.400	0.2740	-147.6	1.6030	61.4	0.2170	44.2	0.5520	-54.5
2.600	0.2530	-157.0	1.5010	57.1	0.2270	46.9	0.5260	-58.3
2.800	0.2200	-175.7	1.4330	51.6	0.2460	46.7	0.5160	-61.4
3.000	0.2130	173.7	1.3860	47.5	0.2500	48.9	0.4870	-64.7

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

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.8160	-24.9	8.5180	154.3	0.0410	77.4	0.9240	-14.9
0.400	0.6610	-42.6	6.9310	133.1	0.0680	67.4	0.8190	-24.8
0.600	0.5300	-58.7	5.7770	118.4	0.0900	64.1	0.7120	-31.7
0.800	0.4090	-69.1	4.8150	106.7	0.1070	61.2	0.6430	-34.3
1.000	0.3280	-79.6	4.1130	97.3	0.1250	62.3	0.5820	-36.7
1.200	0.2670	-88.9	3.6270	89.7	0.1440	58.4	0.5300	-38.1
1.400	0.2080	-98.5	3.1680	83.4	0.1570	57.1	0.5100	-40.9
1.600	0.1800	-108.0	2.8600	77.1	0.1680	58.4	0.4870	-41.6
1.800	0.1300	-112.7	2.5690	71.9	0.1870	57.7	0.4550	-42.6
2.000	0.0970	-132.3	2.3660	66.9	0.2030	56.7	0.4490	-45.7
2.200	0.0830	-156.8	2.2340	62.7	0.2230	55.3	0.4250	-50.3
2.400	0.1010	-167.1	2.0840	57.4	0.2450	56.3	0.4270	-48.0
2.600	0.0840	169.7	1.9230	54.3	0.2540	56.5	0.4120	-55.0
2.800	0.0950	156.3	1.8400	49.5	0.2760	54.9	0.3850	-58.0
3.000	0.1010	126.6	1.7450	46.5	0.2930	52.0	0.3650	-59.7

S-PARAMETER(V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω)

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.7170	-30.9	11.5670	147.4	0.0340	77.4	0.8840	-18.6
0.400	0.5230	-48.6	8.6210	124.7	0.0630	68.1	0.7490	-28.2
0.600	0.4020	-64.1	6.7610	110.7	0.0840	67.1	0.6190	-32.6
0.800	0.2860	-71.9	5.4360	100.2	0.0970	62.7	0.5560	-34.2
1.000	0.2270	-77.9	4.5550	91.8	0.1110	65.0	0.5030	-35.0
1.200	0.1830	-85.3	3.9560	85.3	0.1380	63.9	0.4750	-36.8
1.400	0.1280	-95.6	3.4140	79.5	0.1600	62.8	0.4630	-38.5
1.600	0.1080	-105.1	3.0630	74.3	0.1800	62.2	0.4440	-38.5
1.800	0.0680	-113.1	2.7510	69.4	0.1920	61.5	0.4240	-38.5
2.000	0.0370	-131.4	2.5150	64.9	0.2190	60.4	0.4100	-44.3
2.200	0.0410	171.2	2.3620	60.5	0.2310	59.8	0.3850	-49.2
2.400	0.0480	170.0	2.2000	56.8	0.2460	57.9	0.3960	-45.0
2.600	0.0540	146.9	2.0470	53.7	0.2700	56.4	0.3650	-54.6
2.800	0.0760	127.6	1.9320	49.2	0.2980	56.3	0.3790	-55.9
3.000	0.0900	111.8	1.8520	45.8	0.3190	52.5	0.3160	-61.2

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

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.542	-38.9	15.738	136.5	0.035	73.8	0.789	-22.9
0.400	0.348	-53.6	10.350	114.2	0.058	66.8	0.626	-29.9
0.600	0.247	-62.6	7.604	102.2	0.075	70.8	0.529	-31.7
0.800	0.168	-70.7	5.939	93.4	0.094	69.1	0.474	-30.9
1.000	0.120	-73.9	4.899	86.4	0.106	69.3	0.457	-31.3
1.200	0.091	-79.6	4.218	81.0	0.138	68.3	0.427	-33.1
1.400	0.060	-85.7	3.615	76.0	0.160	66.9	0.407	-34.6
1.600	0.041	-97.8	3.244	71.5	0.179	65.2	0.408	-35.2
1.800	0.016	-68.1	2.884	66.9	0.200	66.8	0.383	-38.5
2.000	0.017	54.7	2.625	63.0	0.217	62.8	0.375	-39.4
2.200	0.040	109.0	2.480	59.0	0.238	62.1	0.361	-45.8
2.400	0.053	114.8	2.291	55.5	0.262	58.2	0.356	-42.6
2.600	0.054	97.4	2.139	52.6	0.289	59.3	0.337	-51.4
2.800	0.084	99.5	1.995	47.9	0.292	54.8	0.326	-49.9
3.000	0.108	87.6	1.917	45.4	0.331	54.4	0.274	-58.4

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customer must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

“Standard”, “Special”, and “Specific”. The Specific quality grade applies only to devices developed based on a customer designated “quality assurance program” for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in “Standard” unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.