

NPN EPITAXIAL SILICON TRANSISTOR FOR MICROWAVE HIGH-GAIN AMPLIFICATION

FEATURE

- High f_T
17 GHz TYP.
- High gain
 $|S_{21e}|^2 = 15.5$ dB TYP.
@ $f = 2$ GHz, $V_{CE} = 2$ V, $I_c = 7$ mA
- NF = 1.1 dB, @ $f = 2$ GHz $V_{CE} = 2$ V, $I_c = 1$ mA
- 6-pin Small Mini Mold Package

ORDERING INFORMATION

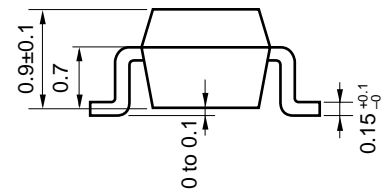
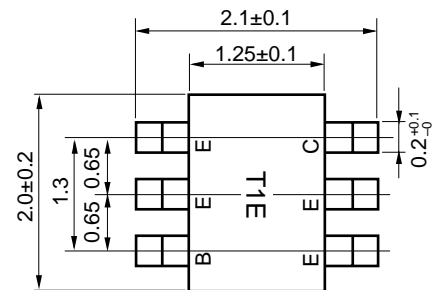
PART NUMBER	QUANTITY	PACKING STYLE
2SC5408-T1	3 kpcs/reel	8-mm wide emboss taping, 6-pin (collector) feed hole direction

Remark To order evaluation samples, consult your NEC sales personnel (supported in 50-pcs units).

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	5	V
Collector to Emitter Voltage	V_{CEO}	3	V
Emitter to Base Voltage	V_{EBO}	2	V
Collector Current	I_c	10	mA
Total Power Dissipation	P_T	30	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-65 to +150	°C

PACKAGE DIMENSIONS (in mm)



PIN CONNECTIONS

- E: Emitter
- C: Collector
- B: Base

Because this product uses high-frequency process, avoid excessive input of static electricity, etc.

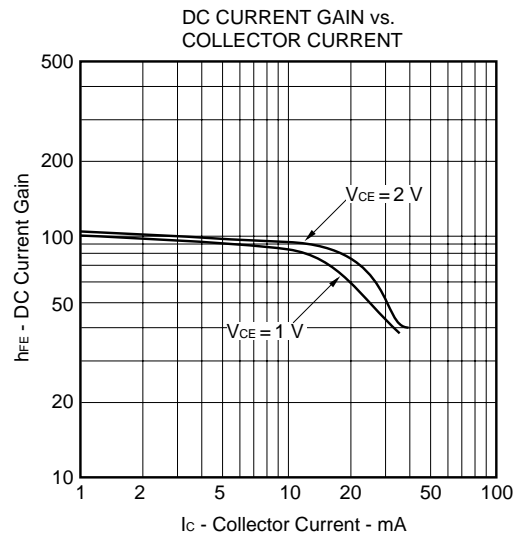
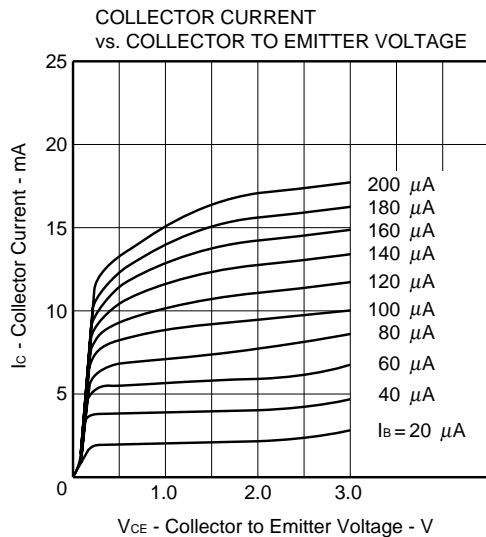
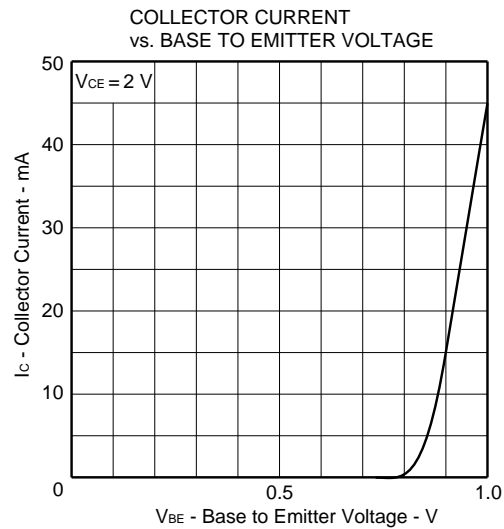
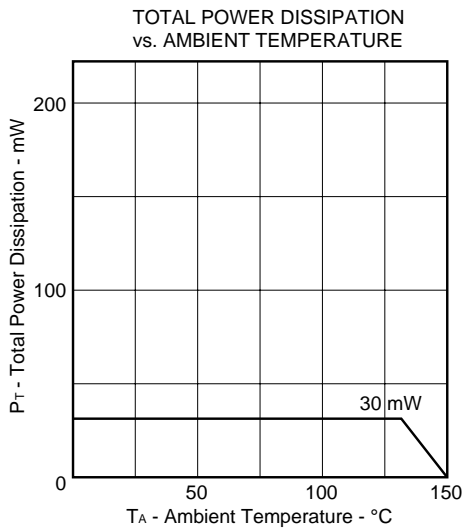
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

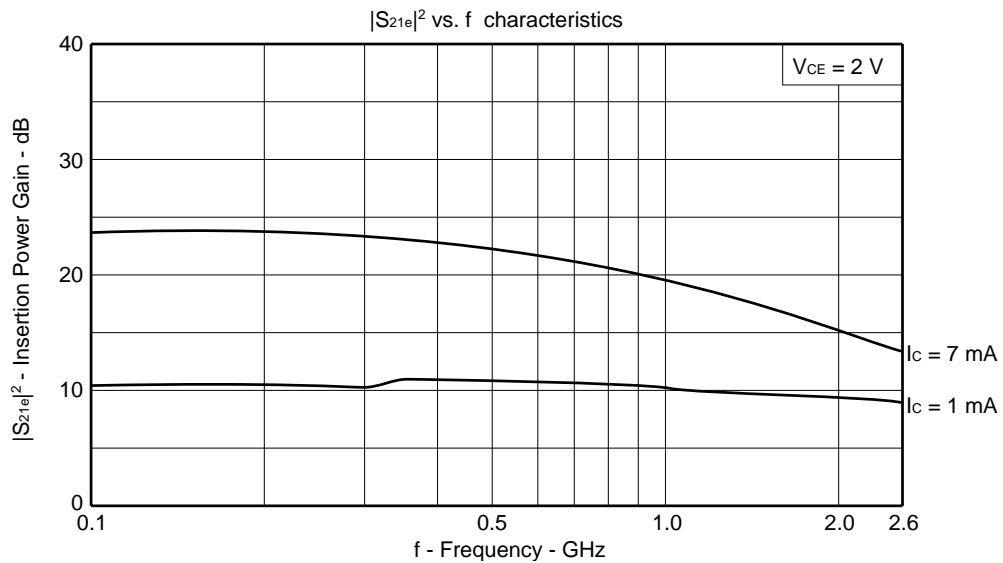
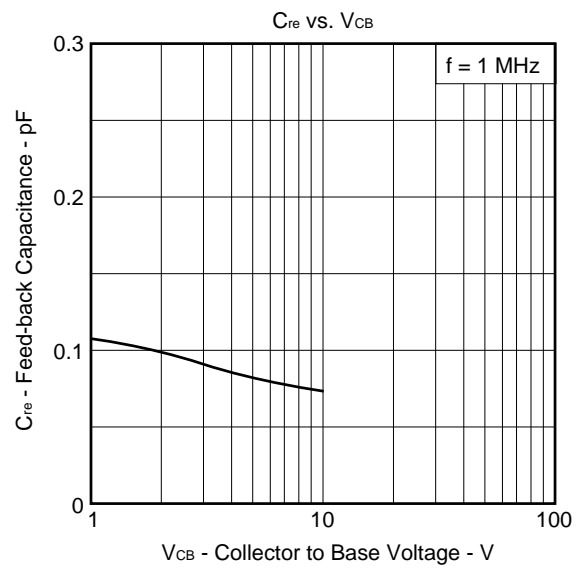
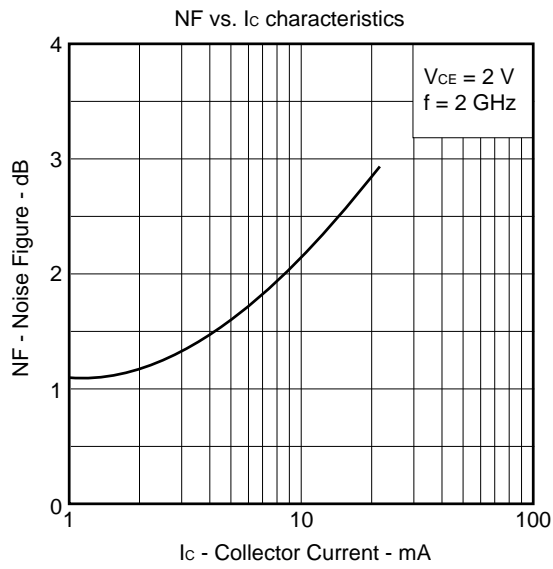
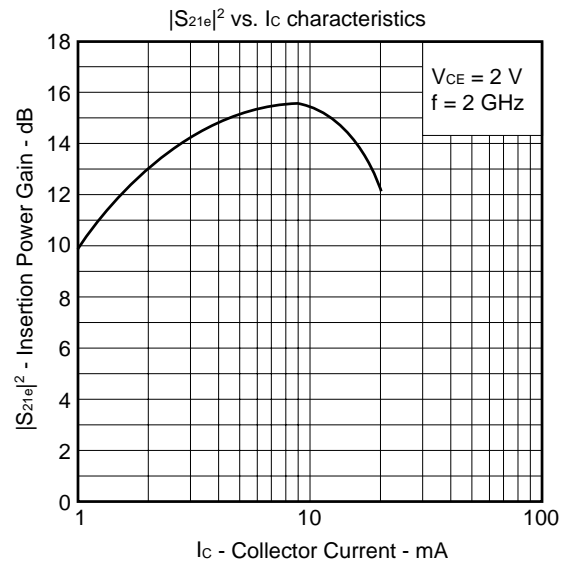
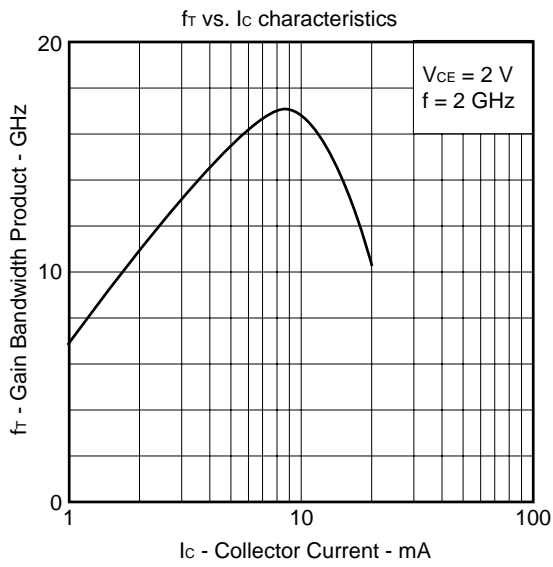
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0			0.1	μA
Emitter Cut-off Current	I _{EB0}	V _{EB} = 1 V, I _C = 0			0.1	μA
DC Current Gain	h _{FE}	V _{CE} = 2 V, I _C = 7 mA Note 1	70		140	
Gain Bandwidth Product	f _T	V _{CE} = 2 V, I _C = 7 mA, f = 2.0 GHz		17		GHz
Feed-back Capacitance	C _{re}	V _{CB} = 2 V, I _E = 0, f = 1 MHz Note 2		0.1	0.15	pF
Insertion Power Gain	S _{21e} ²	V _{CE} = 2 V, I _C = 7 mA, f = 2.0 GHz	13	15.5		dB
Noise Figure	NF	V _{CE} = 2 V, I _C = 1 mA, f = 2.0 GHz		1.1	1.8	dB

Rank	FB
Marking	T1E
h _{FE}	70 to 40

- Notes**
1. Pulse measurement PW ≤ 350 μs, duty cycle ≤ 2 %, pulsed
 2. Measured with three-pin bridge, with emitter pin connected to the bridge guard.

TYPICAL CHARACTERISTICS (T_A = 25 °C)





S PARAMETER

V_{CE} = 2 V I_c = 1 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.000	0.969	-4.1	3.345	174.9	0.006	84.6	0.991	-3.2
200.000	0.967	-8.2	3.287	170.3	0.012	82.8	0.993	-6.8
300.000	0.959	-12.3	3.334	165.9	0.018	79.0	0.990	-10.0
400.000	0.952	-16.6	3.361	161.4	0.024	75.8	0.990	-13.6
500.000	0.943	-20.8	3.280	156.3	0.031	71.8	0.980	-17.3
600.000	0.931	-25.2	3.307	151.2	0.036	68.4	0.971	-20.8
700.000	0.919	-29.5	3.286	146.9	0.042	64.5	0.963	-24.2
800.000	0.903	-34.1	3.278	141.6	0.047	61.0	0.952	-28.1
900.000	0.883	-38.6	3.268	136.4	0.052	57.0	0.940	-31.6
1 000.000	0.865	-42.9	3.226	132.3	0.057	53.4	0.927	-35.3
1 100.000	0.842	-47.4	3.197	127.4	0.060	49.9	0.913	-38.8
1 200.000	0.817	-51.9	3.175	122.4	0.065	46.0	0.901	-42.6
1 300.000	0.796	-56.6	3.127	118.2	0.067	42.8	0.885	-46.2
1 400.000	0.774	-61.3	3.077	113.1	0.070	39.4	0.863	-49.6
1 500.000	0.748	-66.2	3.059	108.5	0.072	36.6	0.852	-53.2
1 600.000	0.725	-71.1	3.047	103.9	0.073	33.5	0.836	-56.8
1 700.000	0.702	-76.1	2.978	99.4	0.074	30.8	0.824	-60.0
1 800.000	0.678	-81.1	2.920	95.4	0.075	28.1	0.808	-64.0
1 900.000	0.653	-86.3	2.920	90.5	0.074	25.7	0.794	-67.2
2 000.000	0.633	-91.5	2.856	86.3	0.074	23.5	0.780	-70.8
2 100.000	0.611	-97.3	2.834	82.0	0.074	21.1	0.771	-74.1
2 200.000	0.591	-102.9	2.795	77.6	0.073	19.0	0.756	-77.6
2 300.000	0.571	-108.8	2.751	73.0	0.072	16.9	0.748	-81.4
2 400.000	0.554	-114.9	2.713	68.6	0.071	15.0	0.744	-85.0
2 500.000	0.535	-120.7	2.656	64.2	0.068	13.6	0.733	-88.5
2 600.000	0.520	-127.0	2.619	59.7	0.065	12.7	0.727	-91.6

V_{CE} = 2 V I_c = 7 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.000	0.828	-9.4	15.424	169.5	0.005	82.0	0.969	-5.9
200.000	0.806	-18.5	14.864	160.4	0.011	77.6	0.951	-11.9
300.000	0.765	-27.2	14.467	151.7	0.016	72.4	0.920	-17.2
400.000	0.722	-35.7	13.904	143.2	0.020	67.5	0.892	-22.0
500.000	0.675	-43.3	12.879	135.6	0.024	62.8	0.846	-26.7
600.000	0.625	-50.8	12.259	127.9	0.028	59.6	0.809	-30.5
700.000	0.575	-57.8	11.555	121.5	0.030	56.6	0.772	-33.9
800.000	0.527	-64.6	10.806	115.1	0.033	54.4	0.738	-37.6
900.000	0.481	-70.9	10.151	109.2	0.035	52.6	0.708	-40.2
1 000.000	0.439	-77.0	9.573	104.2	0.037	51.0	0.678	-42.9
1 100.000	0.400	-82.9	8.988	99.2	0.038	50.0	0.650	-45.4
1 200.000	0.364	-89.1	8.510	94.4	0.039	49.3	0.628	-47.9
1 300.000	0.335	-95.3	8.017	90.2	0.041	48.9	0.611	-50.3
1 400.000	0.309	-101.6	7.572	85.8	0.042	48.9	0.589	-52.4
1 500.000	0.284	-108.2	7.203	82.0	0.043	48.7	0.575	-54.8
1 600.000	0.264	-115.1	6.876	78.1	0.044	49.5	0.563	-57.4
1 700.000	0.249	-122.5	6.569	74.1	0.046	49.4	0.553	-59.5
1 800.000	0.239	-129.9	6.225	70.9	0.047	50.1	0.541	-62.4
1 900.000	0.226	-138.1	6.019	67.4	0.048	50.8	0.532	-64.7
2 000.000	0.222	-145.1	5.728	63.8	0.050	50.9	0.525	-68.0
2 100.000	0.220	-154.2	5.541	60.6	0.052	51.9	0.519	-70.5
2 200.000	0.220	-161.9	5.326	57.0	0.054	52.3	0.511	-73.1
2 300.000	0.223	-169.9	5.112	53.7	0.056	52.5	0.511	-76.3
2 400.000	0.230	-176.7	4.951	50.6	0.059	53.1	0.510	-79.8
2 500.000	0.235	176.3	4.761	47.3	0.062	53.1	0.510	-83.1
2 600.000	0.245	169.7	4.602	43.9	0.065	53.0	0.513	-86.4

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Anti-radioactive design is not implemented in this product.