

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5497

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure : NF=1.4dB (f=2GHz)
- High Gain : Ga=14dB (f=2GHz)

MAXIMUM RATINGS (Ta = 25°C)

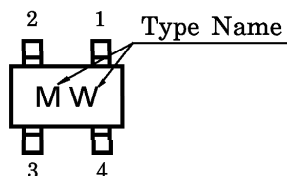
CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V _{CB0}	8	V
Collector-Emitter Voltage	V _{CEO}	4.5	V
Emitter-Base Voltage	V _{EBO}	1.5	V
Collector Current	I _C	15	mA
Base Current	I _B	7.5	mA
Collector Power Dissipation	P _C	67.5	mW
Junction Temperature	T _j	125	°C
Storage Temperature Range	T _{stg}	-55~125	°C

1, 3. EMITTER
2. BASE
3. COLLECTOR

USQ	
JEDEC	—
EIAJ	—
TOSHIBA	2-2K1A

Weight : 0.006mg

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f _T	V _{CE} =3V, I _C =10mA	14	18	22	GHz
Insertion Gain	S _{21e} ² (1)	V _{CE} =3V, I _C =10mA, f=1GHz	16.5	19	21.5	dB
	S _{21e} ² (2)	V _{CE} =3V, I _C =10mA, f=2GHz	11.5	14	16.5	
Noise Figure	NF (1)	V _{CE} =3V, I _C =3mA, f=1GHz	—	1.0	1.4	dB
	NF (2)	V _{CE} =3V, I _C =3mA, f=2GHz	—	1.4	1.8	

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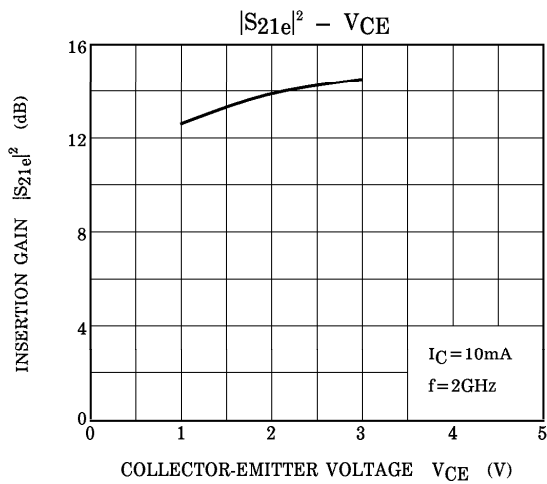
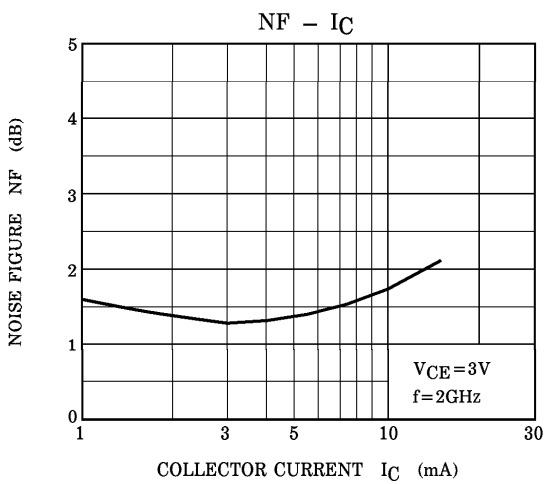
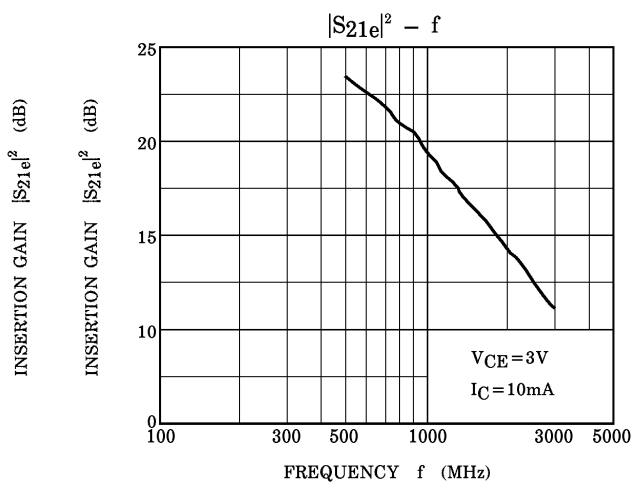
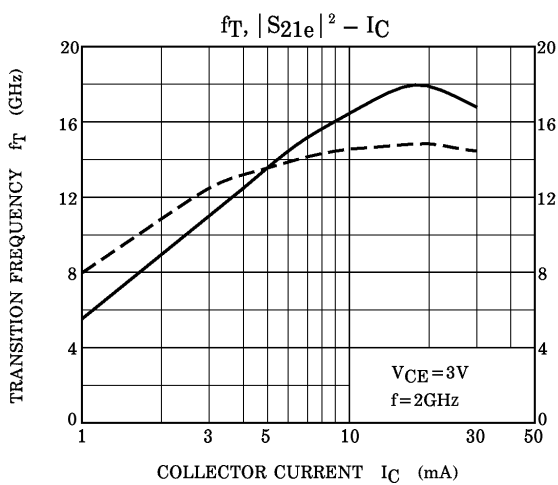
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 8V, I_E = 0$	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1V, I_C = 0$	—	—	1	μA
DC Current Gain	h_{FE} (Note 1)	$V_{CE} = 3V, I_C = 10mA$	50	—	150	—
Output Capacitance	C_{ob}	$V_{CB} = 3V, I_E = 0, f = 1MHz$ (Note 2)	—	0.40	0.65	pF
Reverse Transfer Capacitance	C_{re}		—	0.20	0.45	pF

(Note) : C_{re} is measured by 3 terminal method with Capacitance Bridge.

CAUTION

This device electrostatic sensitivity. Please handle with caution.



S-PARAMETER $Z_O = 50\Omega$, $T_a = 25^\circ\text{C}$
 $V_{CE} = 3\text{V}$, $I_C = 3\text{mA}$

f (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
100	0.918	-9.5	9.134	171.9	0.015	74.7	0.978	-6.5
200	0.910	-18.7	8.939	164.5	0.027	82.9	0.960	-12.1
300	0.886	-27.6	8.725	157.3	0.039	74.8	0.931	-18.7
400	0.855	-36.4	8.430	150.5	0.050	68.5	0.905	-24.3
500	0.824	-44.6	8.090	144.5	0.059	66.8	0.868	-29.3
600	0.802	-52.1	7.716	138.1	0.072	61.8	0.841	-34.1
700	0.762	-59.9	7.341	133.0	0.073	56.3	0.796	-39.1
800	0.728	-67.3	7.078	127.5	0.091	52.0	0.765	-43.6
900	0.698	-75.0	6.691	123.5	0.091	50.5	0.721	-47.0
1000	0.667	-80.4	6.411	118.2	0.103	44.4	0.694	-50.2
1100	0.653	-86.7	6.080	114.3	0.097	45.9	0.654	-53.9
1200	0.620	-92.8	5.862	110.1	0.111	38.0	0.629	-57.1
1300	0.607	-98.8	5.551	106.6	0.113	39.7	0.593	-61.1
1400	0.576	-104.5	5.363	102.6	0.110	35.9	0.574	-62.9
1500	0.569	-109.8	5.088	99.6	0.114	35.9	0.558	-65.6
1600	0.550	-115.0	4.901	96.0	0.114	32.1	0.527	-68.8
1700	0.536	-119.8	4.717	93.2	0.119	28.3	0.501	-70.7
1800	0.530	-124.5	4.492	89.7	0.124	32.5	0.482	-72.4
1900	0.508	-130.2	4.331	87.2	0.121	30.4	0.458	-74.9
2000	0.498	-133.2	4.169	83.7	0.123	30.4	0.438	-76.3
2100	0.502	-138.9	4.032	81.9	0.120	28.5	0.432	-78.1
2200	0.490	-140.9	3.893	78.5	0.124	27.3	0.412	-80.7
2300	0.484	-145.9	3.747	77.3	0.137	28.1	0.401	-79.2
2400	0.487	-149.3	3.646	73.3	0.135	23.2	0.387	-82.3
2500	0.477	-153.3	3.525	72.0	0.132	25.0	0.364	-83.1
2600	0.462	-156.5	3.452	69.0	0.136	32.0	0.358	-84.5

$V_{CE} = 3V, I_C = 5mA$

f (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
100	0.873	-12.1	13.426	169.8	0.011	91.9	0.961	-7.6
200	0.853	-24.4	12.949	160.4	0.025	82.7	0.933	-15.9
300	0.819	-35.7	12.471	152.0	0.038	69.0	0.893	-23.7
400	0.784	-45.7	11.751	144.3	0.053	61.6	0.852	-30.0
500	0.738	-55.7	11.046	136.9	0.055	66.2	0.797	-35.8
600	0.699	-64.8	10.327	130.4	0.059	56.2	0.757	-40.9
700	0.655	-73.5	9.581	124.9	0.064	51.4	0.711	-46.4
800	0.621	-81.3	9.097	119.8	0.066	46.1	0.661	-50.1
900	0.595	-88.3	8.423	114.8	0.077	45.9	0.620	-53.9
1000	0.564	-95.6	7.925	110.6	0.081	40.6	0.582	-57.1
1100	0.548	-102.2	7.436	106.7	0.084	40.8	0.547	-60.4
1200	0.519	-107.2	7.068	102.7	0.097	41.7	0.518	-62.9
1300	0.508	-114.1	6.638	99.4	0.091	42.0	0.491	-66.6
1400	0.488	-119.7	6.333	95.9	0.083	39.9	0.476	-67.8
1500	0.477	-125.6	5.970	92.9	0.098	41.3	0.445	-70.2
1600	0.467	-129.3	5.720	89.6	0.100	40.2	0.437	-73.7
1700	0.456	-134.9	5.457	87.3	0.098	36.1	0.404	-74.1
1800	0.459	-139.7	5.159	83.9	0.111	41.0	0.390	-75.8
1900	0.454	-143.1	4.945	81.8	0.105	36.1	0.373	-78.8
2000	0.453	-147.1	4.749	78.8	0.109	38.3	0.352	-79.2
2100	0.441	-152.1	4.587	76.7	0.116	35.7	0.330	-80.1
2200	0.430	-155.2	4.420	74.1	0.117	35.2	0.315	-81.7
2300	0.433	-159.0	4.254	72.6	0.116	34.2	0.313	-84.6
2400	0.414	-162.4	4.100	69.1	0.122	34.6	0.308	-85.6
2500	0.438	-167.1	3.963	67.9	0.117	33.4	0.286	-86.2
2600	0.424	-169.2	3.870	65.4	0.114	32.4	0.282	-90.4

$V_{CE} = 3V, I_C = 10mA$

f (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
100	0.772	-17.7	21.134	166.1	0.014	69.7	0.942	-11.3
200	0.735	-33.8	19.870	153.8	0.026	72.6	0.894	-21.9
300	0.678	-49.2	18.317	142.9	0.029	73.4	0.818	-31.5
400	0.623	-63.2	16.563	133.9	0.044	64.8	0.738	-38.2
500	0.576	-74.3	14.956	126.2	0.045	56.9	0.674	-45.2
600	0.547	-85.3	13.473	119.5	0.048	58.7	0.607	-50.1
700	0.506	-94.0	12.201	114.2	0.053	53.4	0.559	-54.4
800	0.475	-103.4	11.213	109.2	0.056	50.0	0.516	-57.8
900	0.461	-111.2	10.178	105.2	0.065	58.3	0.475	-61.2
1000	0.439	-117.5	9.440	101.3	0.070	45.9	0.444	-64.0
1100	0.423	-123.0	8.705	97.8	0.062	52.5	0.407	-64.9
1200	0.417	-130.9	8.205	94.4	0.068	49.0	0.389	-68.2
1300	0.415	-135.7	7.597	91.4	0.072	48.8	0.351	-71.0
1400	0.409	-141.8	7.191	88.5	0.075	43.8	0.347	-71.7
1500	0.395	-144.5	6.760	85.9	0.084	46.0	0.324	-75.4
1600	0.400	-149.6	6.429	83.3	0.080	43.6	0.319	-76.4
1700	0.393	-154.1	6.096	81.2	0.086	47.5	0.288	-78.2
1800	0.387	-158.5	5.753	78.1	0.091	40.3	0.287	-78.5
1900	0.391	-161.2	5.503	76.5	0.086	41.3	0.271	-78.2
2000	0.395	-164.9	5.246	73.6	0.100	44.5	0.254	-80.1
2100	0.402	-168.9	5.037	71.9	0.098	44.0	0.254	-85.8
2200	0.395	-171.3	4.841	69.5	0.104	41.1	0.244	-85.2
2300	0.397	-172.4	4.641	68.3	0.110	43.1	0.242	-83.4
2400	0.387	-179.3	4.503	64.9	0.115	50.8	0.244	-87.0
2500	0.397	179.8	4.306	63.7	0.109	42.8	0.228	-87.5
2600	0.390	176.3	4.197	61.5	0.118	41.6	0.216	-87.6



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