

TENTATIVE

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

MT3S03AT

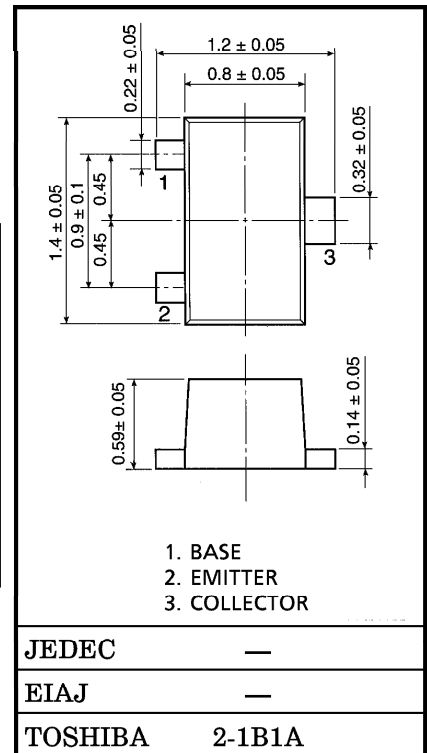
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure : NF = 1.4 dB (at f = 2 GHz)
- High Gain : Gain = 8 dB (at f = 2 GHz)

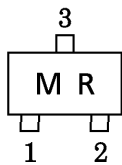
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V _{CB0}	10	V
Collector-Emitter Voltage	V _{CEO}	5	V
Emitter-Base Voltage	V _{EBO}	2	V
Collector Current	I _C	40	mA
Base Current	I _B	10	mA
Collector Power Dissipation	P _C	100	mW
Junction Temperature	T _j	125	°C
Storage Temperature Range	T _{stg}	-55~125	°C



Weight : 0.0022 g

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f _T (1)	V _{CE} = 1 V, I _C = 5 mA	5	7	—	GHz
	f _T (2)	V _{CE} = 3 V, I _C = 10 mA	7	10	—	
Insertion Gain	S _{21e} ² (1)	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	—	5.5	—	dB
	S _{21e} ² (2)	V _{CE} = 3 V, I _C = 20 mA, f = 2 GHz	6	8	—	
Noise Figure	NF (1)	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	—	1.7	3	dB
	NF (2)	V _{CE} = 3 V, I _C = 7 mA, f = 2 GHz	—	1.4	2.2	

000707EAA2

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

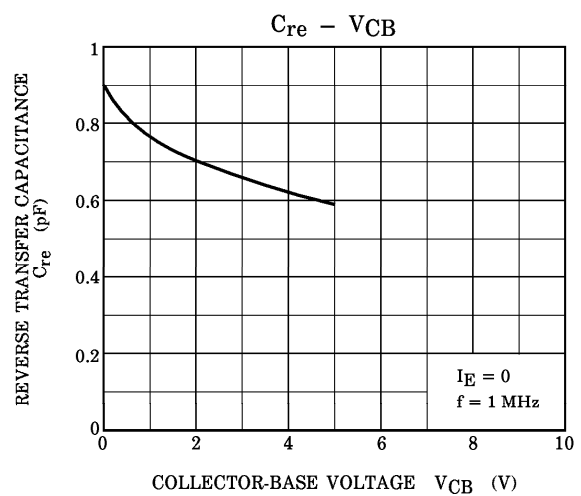
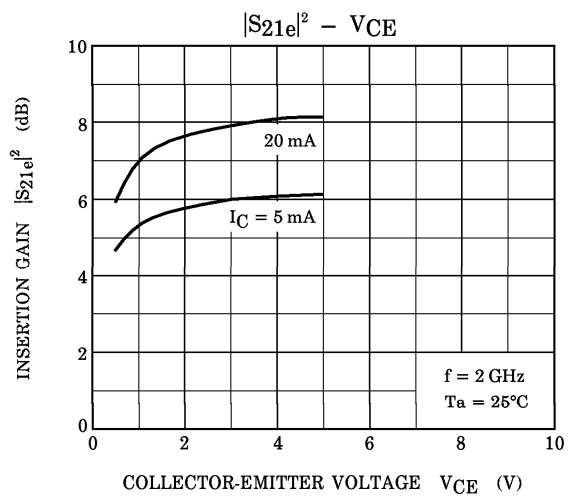
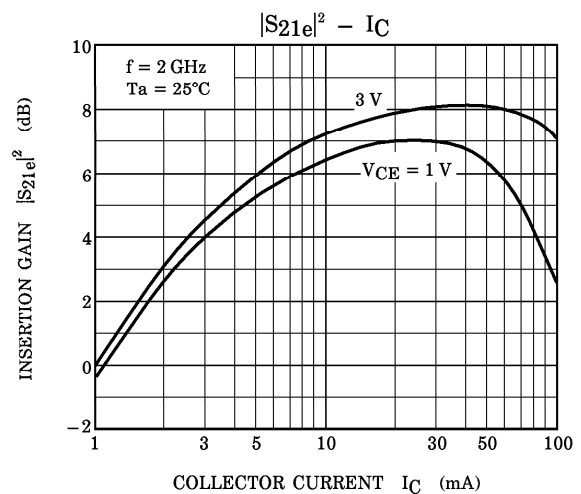
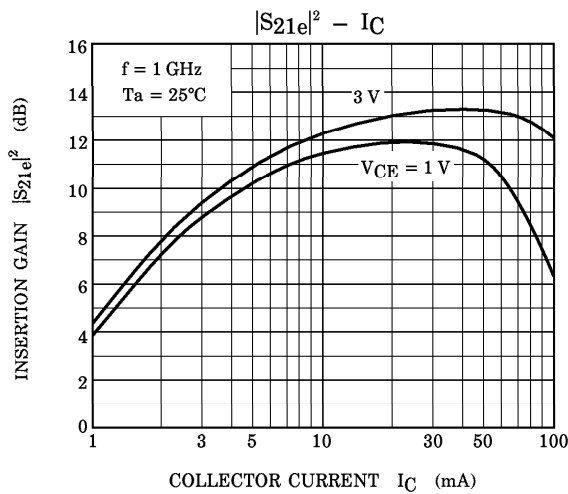
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

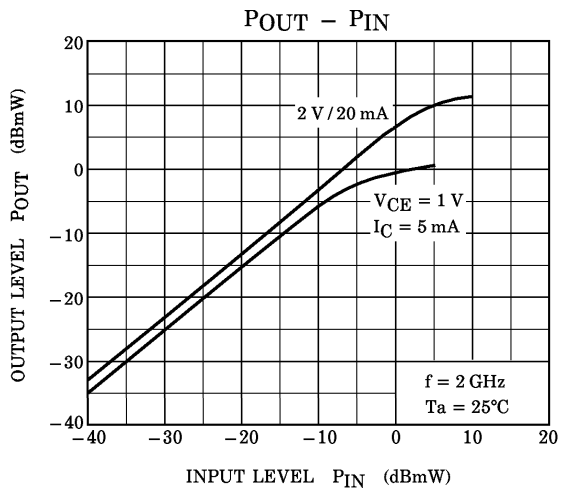
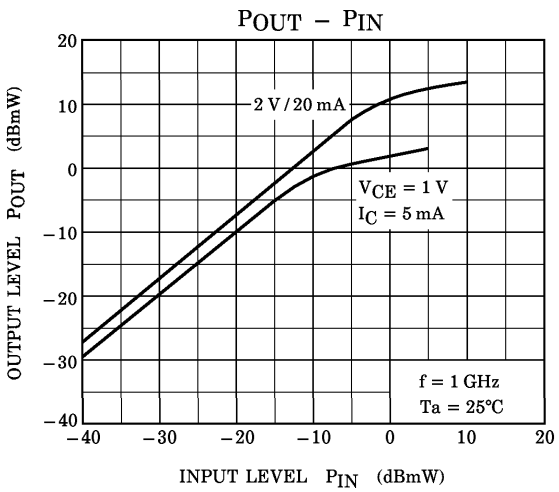
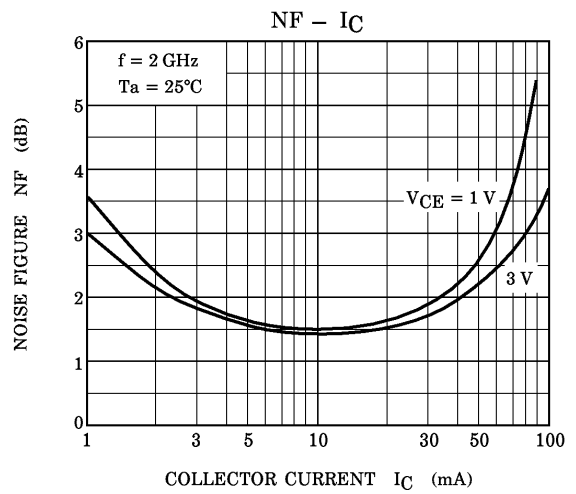
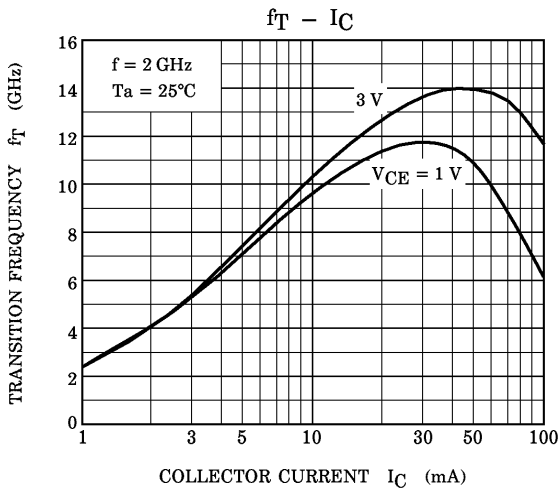
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	ICBO	V _{CB} = 5 V, I _E = 0	—	—	0.1	μA
Emitter Cut-off Current	IEBO	V _{EB} = 1 V, I _C = 0	—	—	1	μA
DC Current Gain	h _{FE}	V _{CE} = 1 V, I _C = 5 mA	80	—	160	—
Reverse Transfer Capacitance	C _{re}	V _{CB} = 1 V, I _E = 0, f = 1 MHz (Note)	—	0.75	1.1	pF

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

CAUTION

This device electrostatic sensitivity. Please handle with caution.





MT3S03AT

V_{CE} = 1 V, I_C = 5 mA, f = 100~2000 MHz Step 100 MHz

frequency (MHz)	S11		S21		S12		S22		S ₂₁ ² (dB)
	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	
100	0.829	-42.09	13.97	152.75	0.044	67.95	0.872	-26.75	22.91
200	0.697	-74.86	11.12	131.99	0.071	55.16	0.695	-46.64	20.93
300	0.607	-98.64	8.78	119.37	0.086	48.94	0.548	-58.76	18.87
400	0.537	-116.18	7.10	110.48	0.095	46.46	0.442	-67.42	17.02
500	0.499	-130.11	5.91	103.78	0.102	45.94	0.372	-73.36	15.43
600	0.476	-140.68	5.05	98.73	0.109	46.82	0.320	-78.15	14.07
700	0.459	-149.97	4.42	94.75	0.116	47.94	0.283	-81.90	12.90
800	0.445	-157.67	3.93	91.11	0.123	49.17	0.255	-84.50	11.88
900	0.437	-164.71	3.55	88.00	0.130	50.80	0.233	-86.64	10.99
1000	0.430	-170.88	3.22	85.10	0.138	52.41	0.214	-88.82	10.17
1100	0.424	-176.25	2.96	82.46	0.146	53.41	0.202	-90.56	9.42
1200	0.421	179.03	2.76	80.09	0.154	54.93	0.191	-91.76	8.81
1300	0.413	174.76	2.59	77.80	0.163	56.15	0.181	-93.92	8.26
1400	0.414	170.58	2.43	75.44	0.172	57.35	0.174	-93.26	7.71
1500	0.408	166.41	2.29	73.26	0.181	57.94	0.172	-93.59	7.18
1600	0.407	162.15	2.18	71.49	0.191	59.12	0.165	-94.64	6.76
1700	0.400	158.83	2.08	69.51	0.201	59.83	0.163	-95.43	6.38
1800	0.395	155.08	2.00	67.45	0.213	60.20	0.166	-94.98	6.00
1900	0.394	152.17	1.91	65.71	0.224	60.47	0.167	-95.20	5.63
2000	0.391	148.78	1.85	63.69	0.234	60.42	0.166	-96.54	5.34

V_{CE} = 2 V, I_C = 20 mA, f = 100~2000 MHz Step 100 MHz

frequency (MHz)	S11		S21		S12		S22		S ₂₁ ² (dB)
	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	Mag. (°)	Ang. (°)	
100	0.537	-80.38	30.70	132.46	0.027	62.04	0.622	-52.35	29.74
200	0.435	-120.48	18.94	112.69	0.040	59.57	0.389	-76.84	25.55
300	0.400	-142.77	13.32	104.00	0.051	62.40	0.276	-90.44	22.49
400	0.384	-154.99	10.24	98.52	0.062	65.36	0.213	-101.30	20.21
500	0.373	-165.10	8.30	94.44	0.074	67.95	0.174	-109.99	18.38
600	0.370	-172.70	6.96	91.41	0.086	69.26	0.149	-117.89	16.85
700	0.367	-178.98	6.01	88.83	0.098	70.37	0.130	-124.15	15.58
800	0.364	175.68	5.32	86.47	0.110	71.06	0.114	-129.15	14.52
900	0.365	170.51	4.77	84.51	0.123	71.31	0.102	-133.86	13.57
1000	0.363	165.94	4.30	82.50	0.136	71.64	0.092	-138.99	12.67
1100	0.362	162.06	3.96	80.56	0.148	71.54	0.083	-142.41	11.95
1200	0.356	158.37	3.66	78.86	0.162	71.29	0.074	-144.85	11.28
1300	0.354	154.54	3.42	77.07	0.174	71.27	0.067	-145.86	10.67
1400	0.347	150.55	3.19	75.49	0.188	70.88	0.059	-144.94	10.09
1500	0.344	147.06	3.02	73.43	0.201	70.44	0.053	-143.48	9.60
1600	0.341	143.15	2.85	72.09	0.214	70.07	0.046	-142.20	9.09
1700	0.334	140.08	2.73	70.46	0.229	69.53	0.042	-137.65	8.72
1800	0.329	136.43	2.61	68.56	0.242	68.74	0.042	-124.50	8.33
1900	0.323	133.53	2.49	67.10	0.256	67.93	0.043	-114.28	7.93
2000	0.320	131.09	2.40	65.14	0.269	66.91	0.044	-110.52	7.61