TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC4843

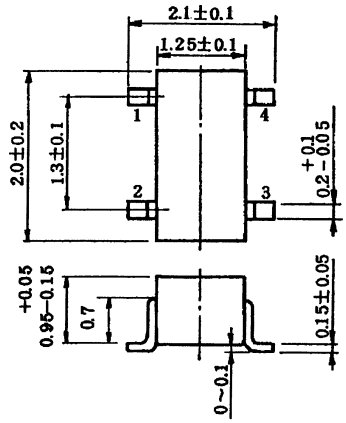
VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 15.5dB (f = 1 GHz)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V_{CEO}	10	V
Emitter-base voltage	V_{EBO}	1.5	V
Base current	I_B	20	mA
Collector current	I_C	40	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Unit: mm



1, 3. EMITTER
2. BASE
4. COLLECTOR

JEDEC	—
JEITA	—
TOSHIBA	2-2K1A

Weight: 0.006 g (typ.)

Microwave Characteristics (Ta = 25°C)

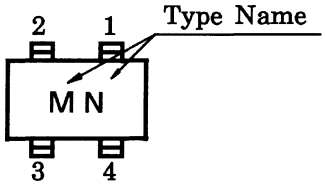
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 8 V, I_C = 20 mA	7	10	—	GHz
Insertion gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 8 V, I_C = 20 mA, f = 1 GHz	12	15.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 8 V, I_C = 20 mA, f = 2 GHz	—	9	—	
Noise figure	NF (1)	V_{CE} = 8 V, I_C = 5 mA, f = 1 GHz	—	1.1	2.5	dB
	NF (2)	V_{CE} = 8 V, I_C = 5 mA, f = 2 GHz	—	1.7	—	

Electrical Characteristics (Ta = 25°C)

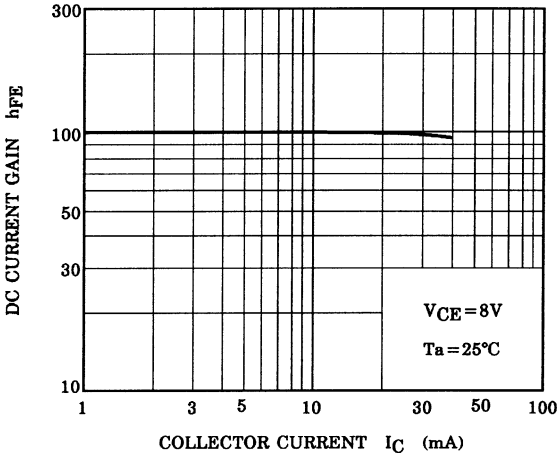
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1 V, I_C = 0	—	—	1	μA
DC current gain	h_{FE}	V_{CE} = 8 V, I_C = 20 mA	50	—	250	
Output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz (Note)	—	0.8	—	pF
Reverse transfer capacitance	C_{re}		—	0.45	0.9	pF

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

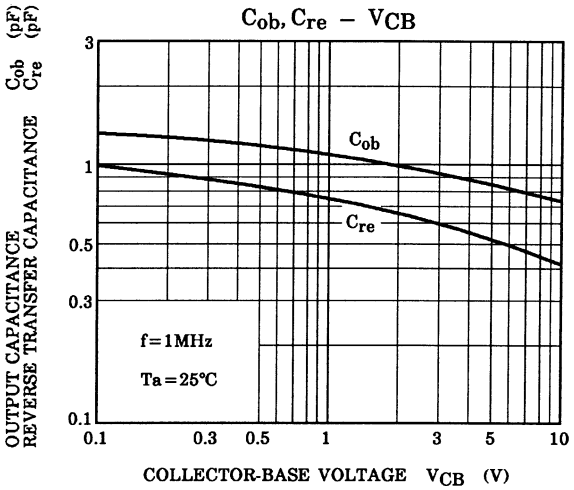
Marking



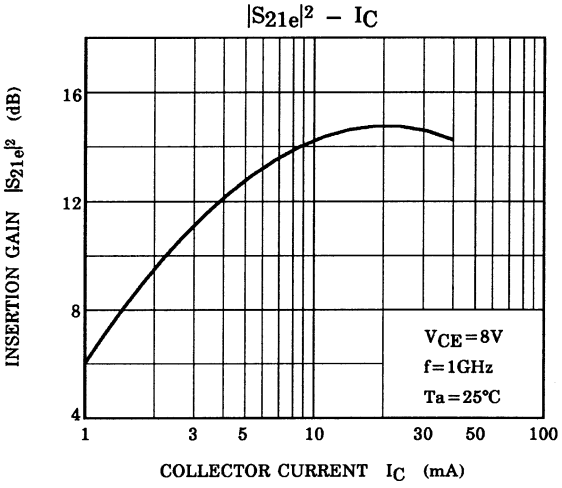
h_{FE} – I_C



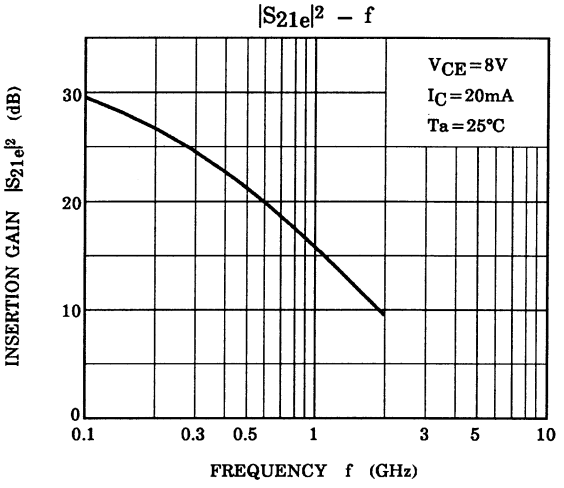
C_{ob}, C_{re} – V_{CB}



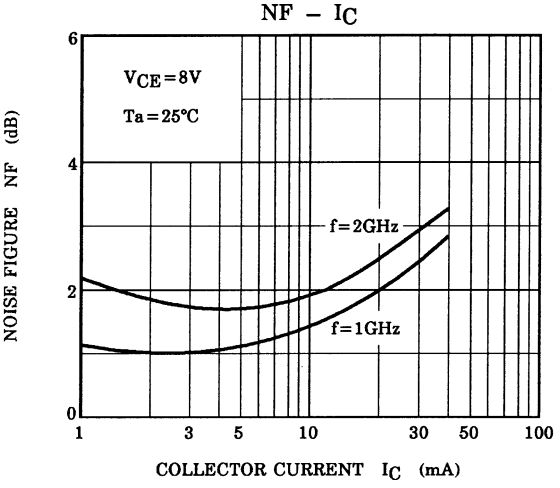
$|S_{21e}|^2$ – I_C



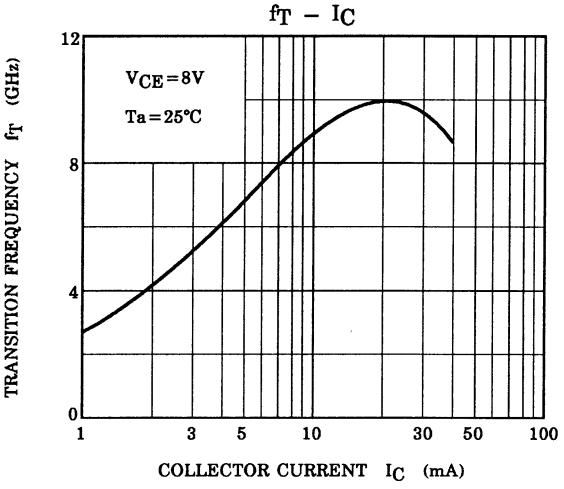
$|S_{21e}|^2$ – f

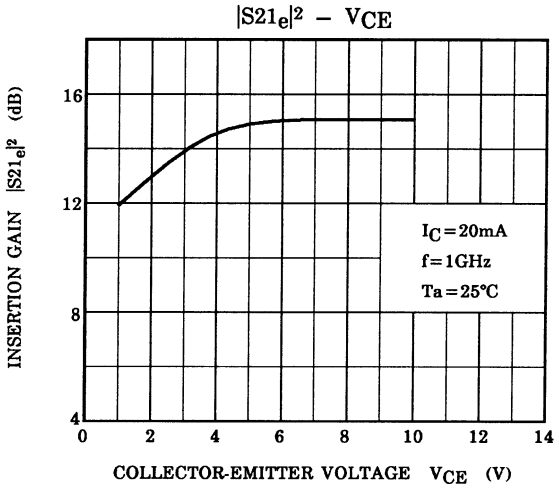


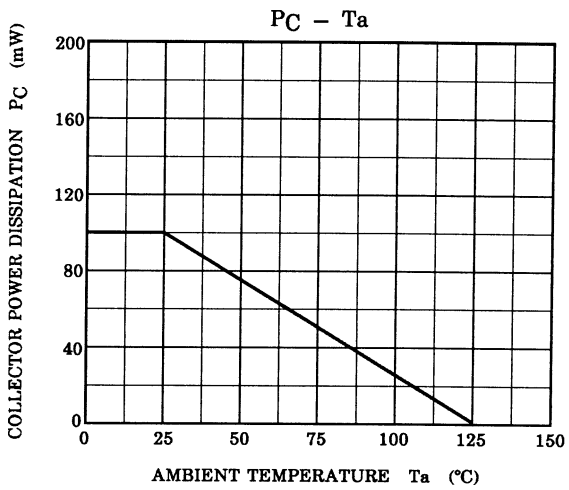
NF – I_C



f_T – I_C







S-Parameter Z_O = 50 Ω, Ta = 25°C

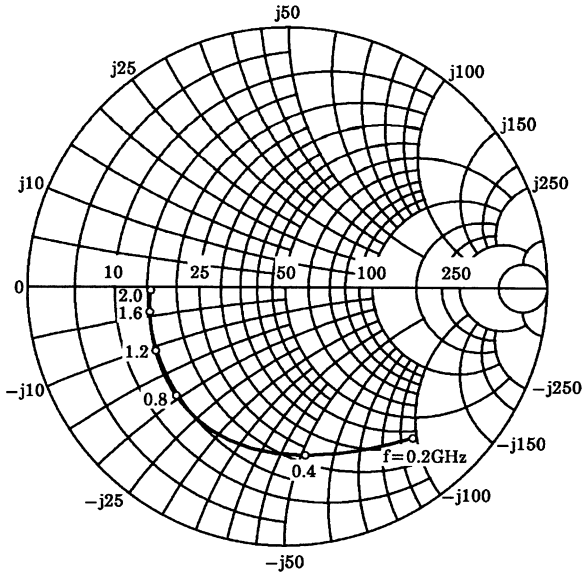
V_{CE} = 8 V, I_C = 5 mA

Frequency	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.760	–47.2	10.933	146.8	0.043	63.8	0.859	–27.2
400	0.651	–83.8	8.697	125.2	0.068	50.1	0.671	–42.8
600	0.629	–112.6	6.938	111.4	0.079	43.6	0.545	–51.3
800	0.590	–132.4	5.621	102.2	0.085	41.6	0.463	–56.5
1000	0.579	–148.9	4.645	94.4	0.091	41.0	0.413	–60.8
1200	0.559	–157.4	3.953	89.1	0.095	41.7	0.382	–64.5
1400	0.547	–166.0	3.457	84.5	0.099	43.3	0.362	–68.1
1600	0.521	–170.2	3.052	80.5	0.103	45.3	0.350	–71.8
1800	0.512	–174.5	2.752	76.9	0.107	47.2	0.344	–75.2
2000	0.536	–177.5	2.534	73.6	0.113	49.3	0.341	–78.7

V_{CE} = 8 V, I_C = 20 mA

Frequency	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.551	–93.3	22.441	127.0	0.030	55.6	0.622	–46.5
400	0.511	–132.8	13.552	107.5	0.040	52.6	0.393	–59.9
600	0.517	–151.6	9.551	98.0	0.049	55.2	0.299	–65.0
800	0.514	–163.6	7.326	92.1	0.057	58.7	0.250	–68.7
1000	0.520	–172.3	5.966	87.3	0.067	60.8	0.225	–72.2
1200	0.527	–178.0	4.961	84.0	0.077	62.7	0.211	–75.6
1400	0.526	–176.6	4.322	80.6	0.086	64.1	0.206	–80.0
1600	0.528	–172.9	3.820	77.5	0.096	65.4	0.203	–84.1
1800	0.534	–169.3	3.428	74.3	0.105	66.3	0.203	–87.4
2000	0.529	–166.7	3.132	71.6	0.115	67.0	0.209	–91.1

S_{11e}
V_{CE} = 8V
I_C = 5mA
Ta = 25°C
(UNIT : Ω)



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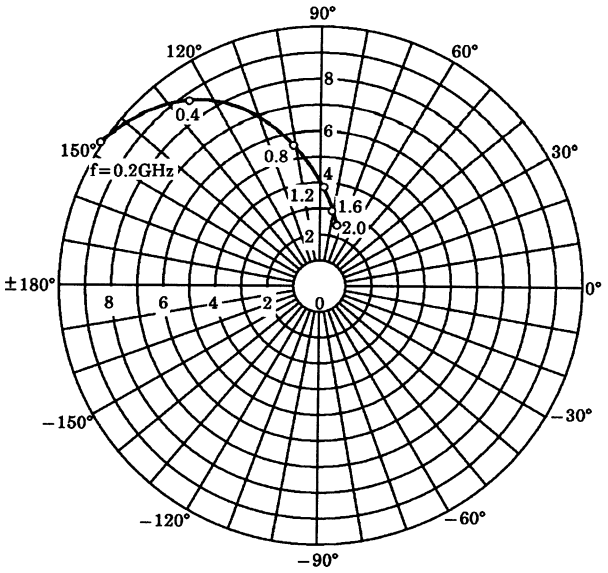
Ta = 25°C



S_{12e}
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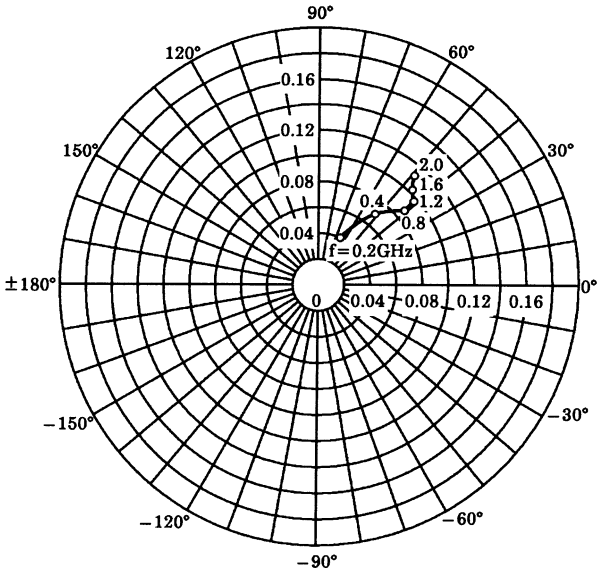

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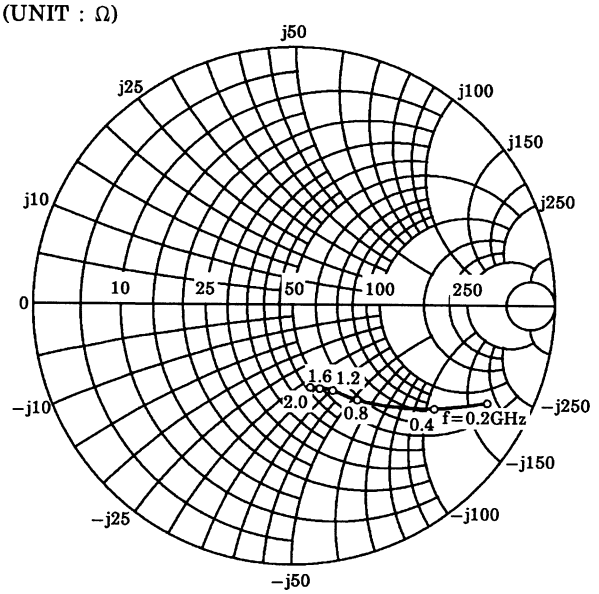

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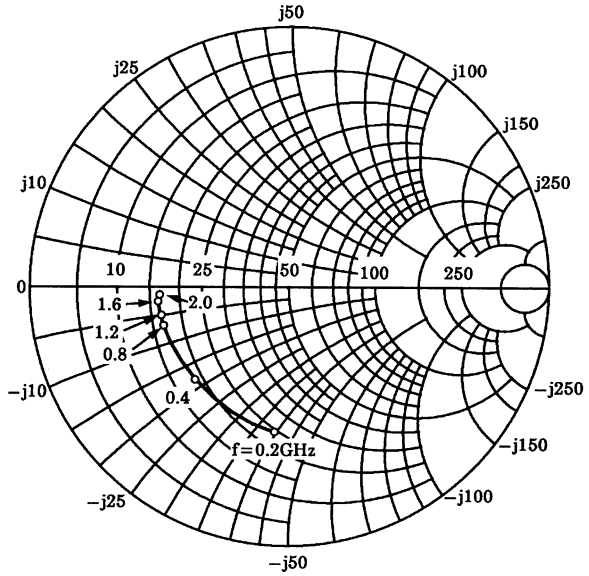
V_{CE} = 8V
I_C = 20mA
Ta = 25°C
(UNIT : Ω)



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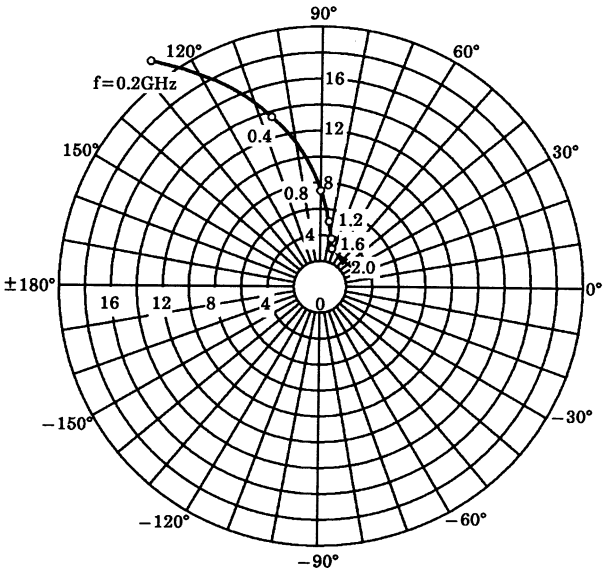

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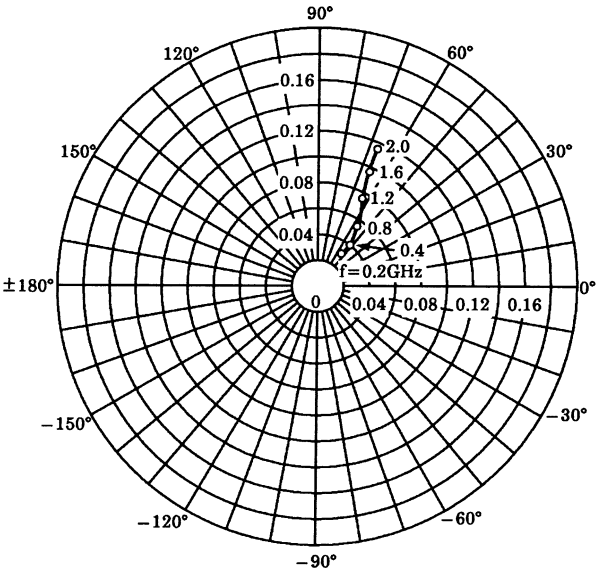

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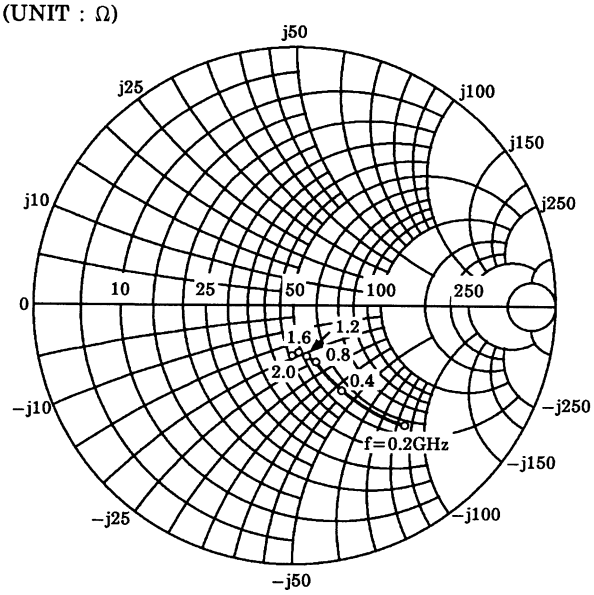

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