

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5098

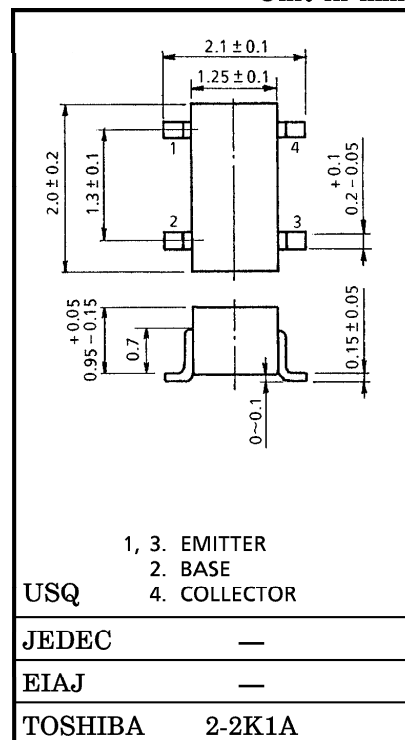
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

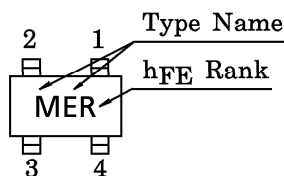
- Low Noise Figure, High Gain.
- $NF=1.8dB, |S_{21e}|^2=10dB (f=2GHz)$

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	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	7	mA
Collector Current	I _C	15	mA
Collector Power Dissipation	P _C	100	mW
Junction Temperature	T _j	125	°C
Storage Temperature Range	T _{stg}	-55~125	°C



MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f _T	V _{CE} = 6V, I _C = 7mA	7	10	—	GHz
Insertion Gain	S _{21e} ² (1)	V _{CE} = 6V, I _C = 7mA, f = 1GHz	12.5	15.5	—	dB
	S _{21e} ² (2)	V _{CE} = 6V, I _C = 7mA, f = 2GHz	7	10	—	
Noise Figure	NF (1)	V _{CE} = 6V, I _C = 3mA, f = 1GHz	—	1.3	2.5	dB
	NF (2)	V _{CE} = 6V, I _C = 3mA, f = 2GHz	—	1.8	3.0	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

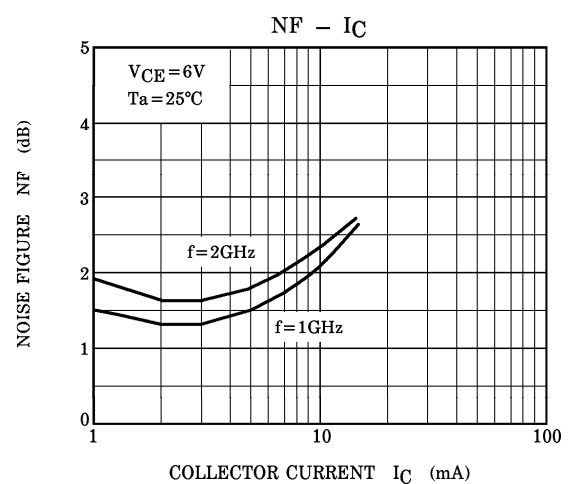
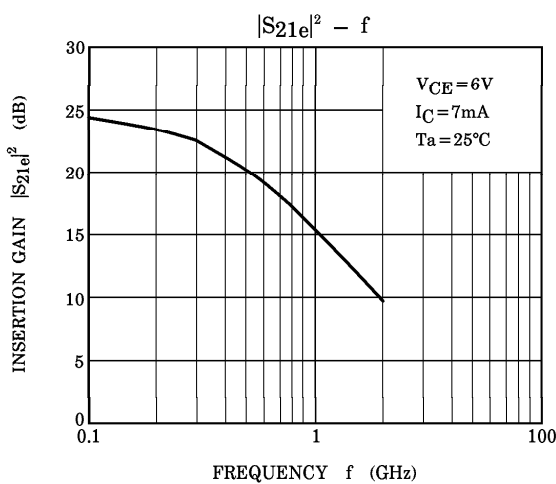
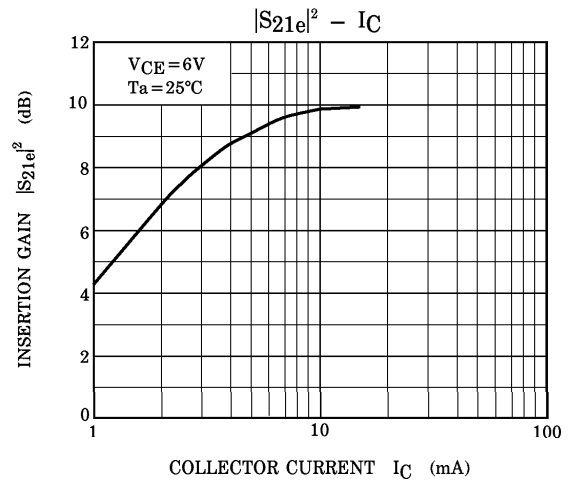
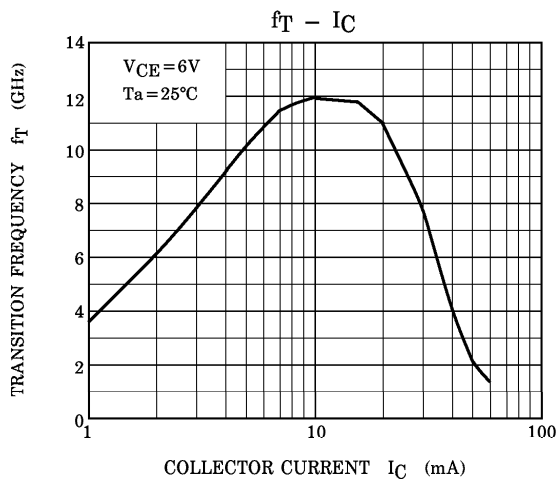
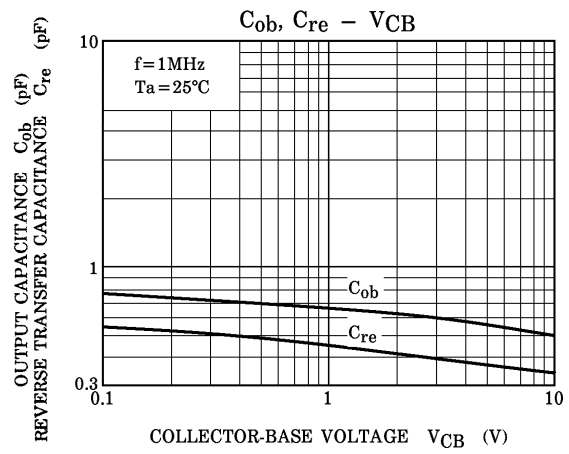
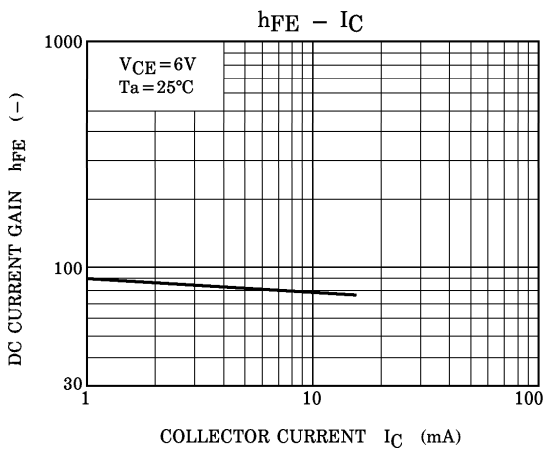
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I _{CBO}	V _{CB} = 10V, I _E = 0	—	—	1	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1V, I _C = 0	—	—	1	μA
DC Current Gain	h _{FE} (Note 1)	V _{CE} = 6V, I _C = 7mA	50	—	160	—
Output Capacitance	C _{ob}	V _{CB} = 10V, I _E = 0, f = 1MHz	—	0.5	0.9	pF
Reverse Transfer Capacitance	C _{re}		(Note 2)	—	0.34	0.75

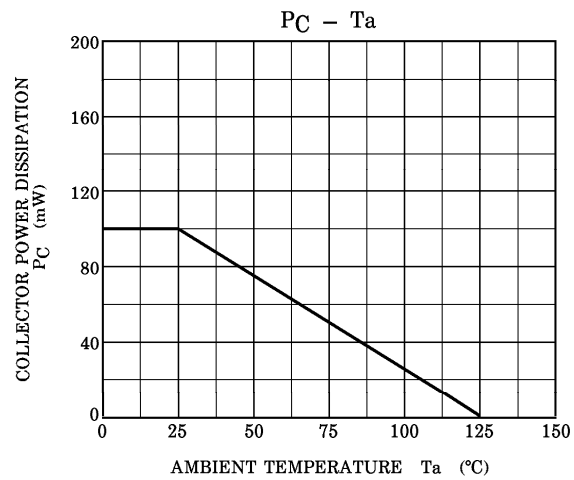
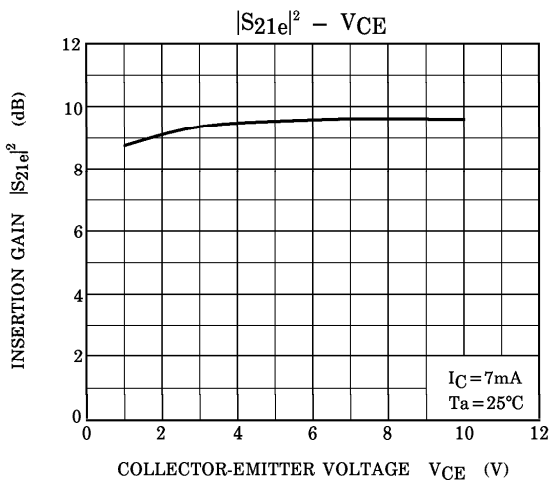
(Note 1) h_{FE} Classification R : 50~100, O : 80~160

(Note 2) C_{re} is measured by 3 terminal method with capacitance bridge.

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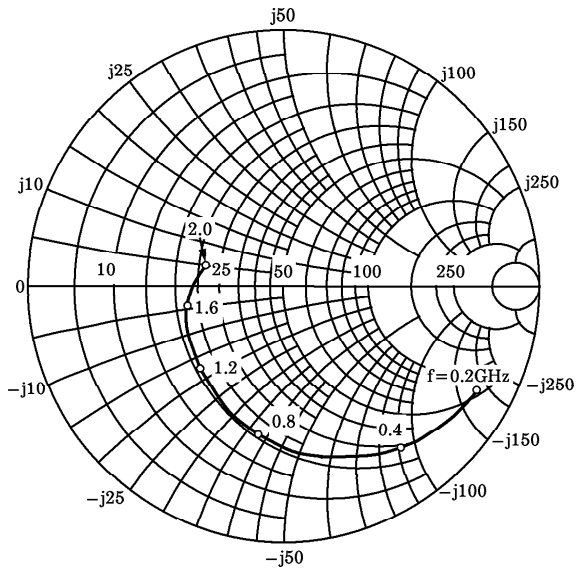
S-Parameter $Z_0 = 50\Omega$, $T_a = 25^\circ\text{C}$
 $V_{CE} = 5\text{V}$, $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.870	-27.8	8.387	159.6	0.041	76.0	0.962	-20.1
400	0.791	-54.0	7.700	141.8	0.074	63.5	0.876	-38.7
600	0.692	-77.8	6.701	125.7	0.097	54.2	0.774	-54.4
800	0.599	-99.2	5.798	112.6	0.113	47.9	0.677	-67.7
1000	0.518	-118.1	4.928	102.0	0.122	43.8	0.596	-78.6
1200	0.462	-135.9	4.239	93.5	0.129	40.7	0.524	-87.8
1400	0.406	-151.0	3.692	86.5	0.132	39.7	0.463	-95.9
1600	0.376	-166.0	3.256	80.5	0.137	39.6	0.420	-102.4
1800	0.334	179.9	2.897	75.9	0.143	39.9	0.382	-107.7
2000	0.305	166.3	2.623	71.3	0.147	40.7	0.350	-111.0

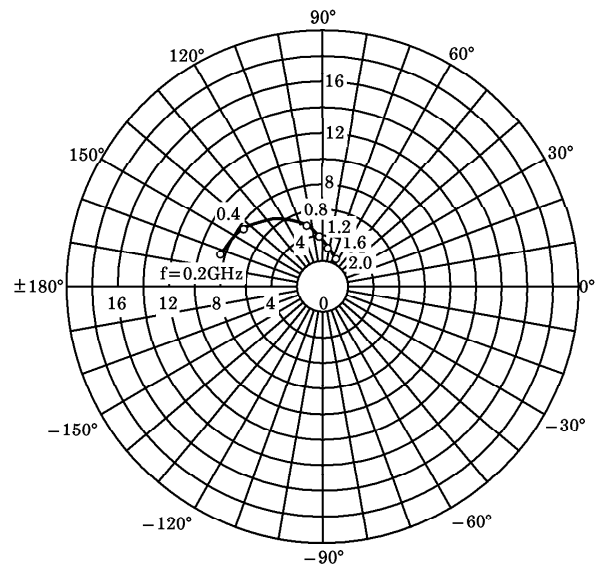
$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.737	-42.4	14.597	150.5	0.037	70.4	0.900	-28.4
400	0.625	-77.4	11.757	128.3	0.060	58.8	0.735	-50.2
600	0.521	-105.4	9.204	112.6	0.074	52.5	0.600	-65.3
800	0.455	-128.8	7.420	101.5	0.085	50.0	0.503	-77.3
1000	0.412	-147.7	6.078	92.9	0.093	49.5	0.433	-86.9
1200	0.388	-165.4	5.105	86.1	0.100	49.3	0.376	-95.4
1400	0.370	179.0	4.377	80.9	0.108	50.4	0.330	-102.8
1600	0.360	165.6	3.855	76.2	0.116	51.4	0.295	-108.7
1800	0.348	151.3	3.441	72.3	0.126	52.3	0.265	-113.4
2000	0.333	137.7	3.114	68.4	0.135	53.2	0.238	-115.5

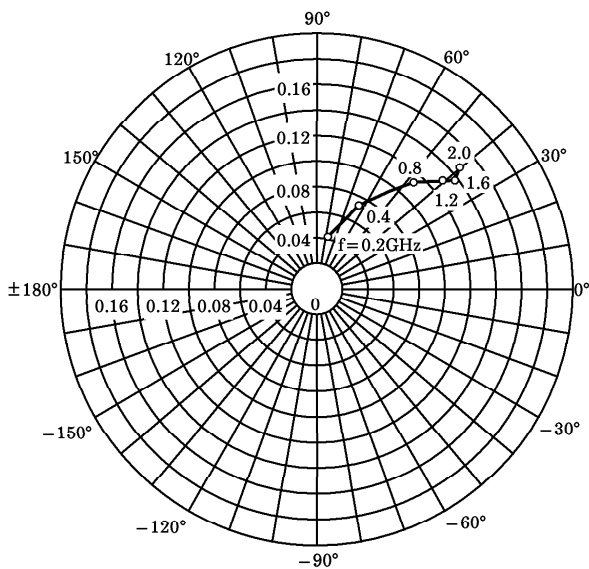
S_{11e}
 V_{CE} = 6V
 I_C = 3mA
 T_a = 25°C
 (Unit : Ω)



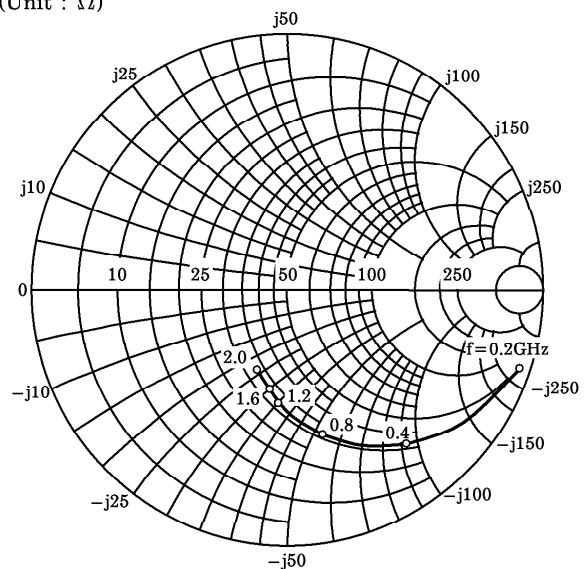
S_{21e}
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 I_C = 3mA
 T_a = 25°C



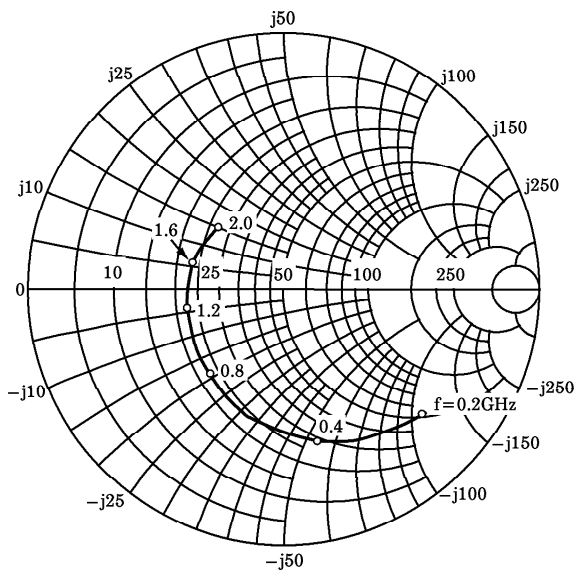
S_{12e}
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 I_C = 3mA
 T_a = 25°C



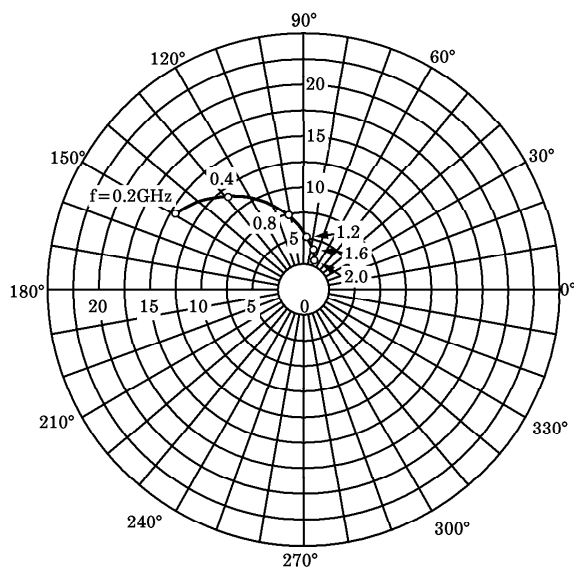
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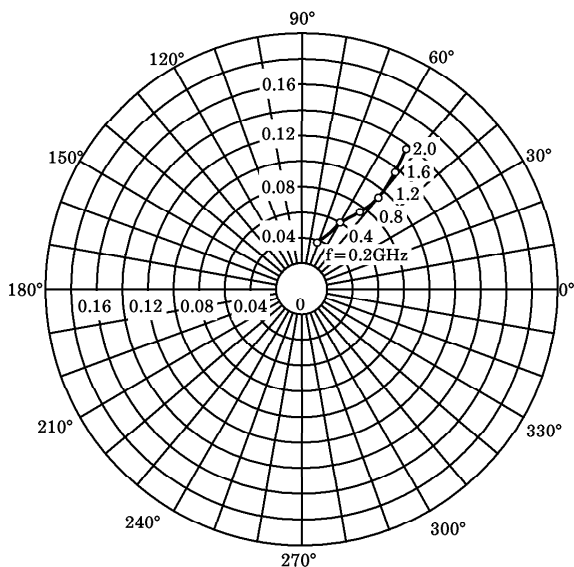
S_{11e}
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