TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5084

VHF~UHF Band Low Noise Amplifier Applications

• Low noise figure, high gain.

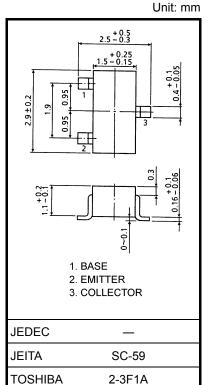
• NF = 1.1dB, $|S_{21e}|^2 = 11dB$ (f = 1 GHz)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit	
Collector-base voltage	V_{CBO}	20	V	
Collector-emitter voltage	V _{CEO}	12	V	
Emitter-base voltage	V _{EBO}	3	V	
Base current	Ι _Β	40	mA	
Collector current	Ic	80	mA	
Collector power dissipation	PC	150	mW	
Junction temperature	Tj	125	°C	
Storage temperature range	T _{stg}	-55~125	°C	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



Weight: 0.012 g (typ.)

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Symbol Test Condition		Тур.	Max	Unit
Transition frequency	f _T	V _{CE} = 10 V, I _C = 20 mA	5	7	_	GHz
Insertion gain	S _{21e} ² (1)	V _{CE} = 10 V, I _C = 20 mA, f = 500 MHz	_	16.5	_	dB
insertion gain	S _{21e} ² (2)	V _{CE} = 10 V, I _C = 20 mA, f = 1 GHz	11	_	ub l	
Noise figure	NF (1)	V _{CE} = 10 V, I _C = 5 mA, f = 500 MHz	_	1	_	dB
Noise ligure	NF (2)	V _{CE} = 10 V, I _C = 5 mA, f = 1 GHz	_	1.1	2	ub

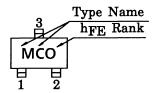
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	V _{CB} = 10 V, I _E = 0	_	_	1	μА
Emitter cut-off current	I _{EBO}	V _{EB} = 1 V, I _C = 0	_	_	1	μА
DC current gain	h _{FE} (Note 1)	V _{CE} = 10 V, I _C = 20 mA	80	_	240	
Output capacitance	C _{ob}	V _{CB} = 10 V, I _E = 0, f = 1 MHz (Note 2)	_	1.0	_	pF
Reverse transfer capacitance	C _{re}	$V_{CB} = V_{CB} = V$	_	0.65	1.15	pF

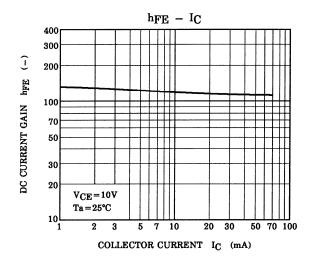
Note 1: hFE classification O: 80~160, Y: 120~240

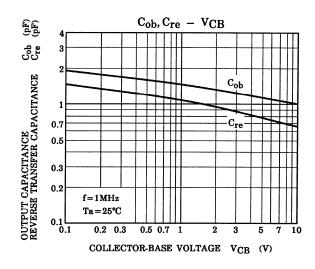
Note 2: C_{re} is measured by 3 terminal method with capacitance bridge.

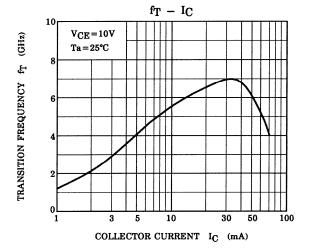
Marking

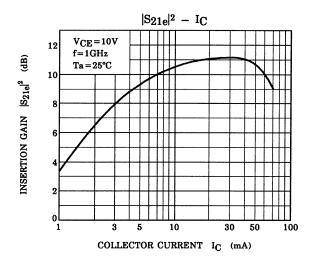


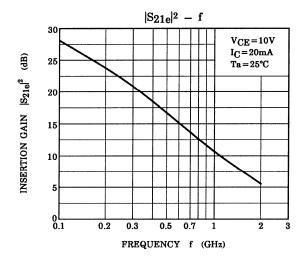
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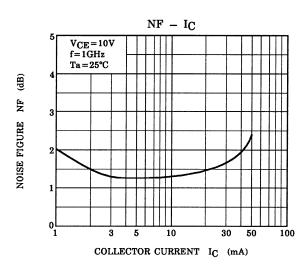




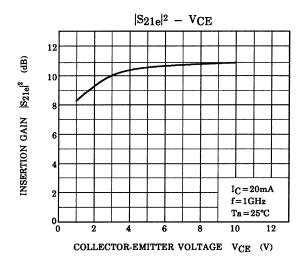


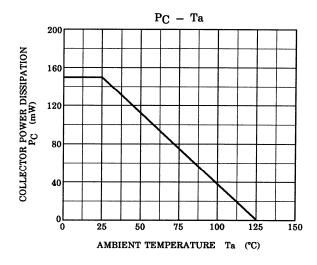






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S-Parameter $Z_O = 50 \Omega$, Ta = 25°C

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

Frequency	S	11	S	21	S1	12	S2	22
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.628	-77.1	9.254	126.5	0.051	53.3	0.695	-31.0
400	0.471	-122.1	6.027	103.3	0.067	48.4	0.509	-34.9
600	0.417	-149.1	4.341	90.3	0.077	51.9	0.441	-35.2
800	0.404	-167.3	3.381	81.2	0.090	56.9	0.412	-36.0
1000	0.402	178.1	2.798	73.3	0.104	62.0	0.398	-37.7
1200	0.412	166.6	2.393	66.7	0.122	66.4	0.390	-40.3
1400	0.427	156.6	2.108	60.4	0.145	69.1	0.385	-44.3
1600	0.440	147.3	1.881	54.8	0.170	69.8	0.376	-48.8
1800	0.455	140.0	1.713	49.4	0.194	70.2	0.373	-54.3
2000	0.482	132.6	1.586	44.6	0.223	71.3	0.367	-60.0

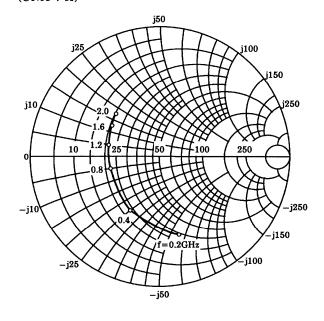
$V_{CE} = 10 \text{ V}, I_C = 20 \text{ mA}$

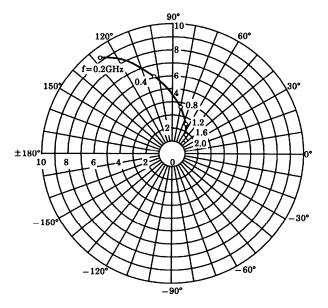
Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.340	-122.7	15.443	107.4	0.034	62.7	0.415	-40.5
400	0.299	-158.7	8.266	92.4	0.056	69.3	0.293	-34.2
600	0.293	-178.0	5.664	84.0	0.080	71.7	0.265	-30.4
800	0.294	169.0	4.334	77.3	0.104	72.1	0.255	-29.9
1000	0.299	157.9	3.528	71.2	0.129	72.0	0.252	-30.6
1200	0.310	149.5	3.002	66.0	0.155	71.4	0.254	-32.5
1400	0.321	142.0	2.629	61.0	0.183	69.7	0.255	-36.1
1600	0.332	134.9	2.336	56.3	0.209	67.6	0.248	-40.6
1800	0.341	129.5	2.121	51.7	0.234	65.6	0.242	-45.9
2000	0.366	124.3	1.958	47.3	0.260	64.6	0.236	-51.7

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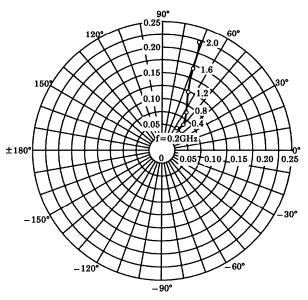
 $\begin{array}{l} S_{11e} \\ V_{CE} = 10V \\ I_{C} = 5mA \\ Ta = 25^{\circ}C \\ (UNIT:\Omega) \end{array}$





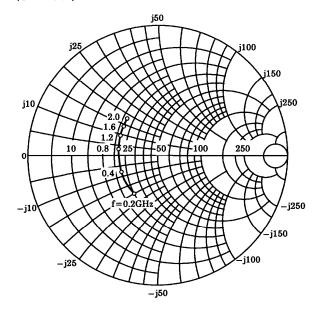


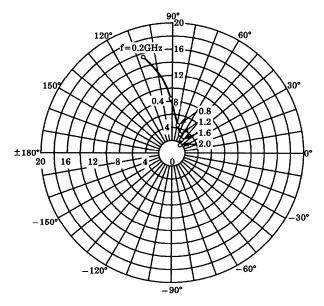
 $\begin{array}{l} S_{12e} \\ V_{CE} = 10V \\ I_{C} = 5 \text{mA} \\ Ta = 25 ^{\circ}\text{C} \end{array}$



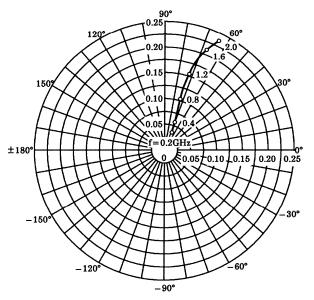
 $\begin{array}{l} S_{11e} \\ V_{CE} = 10V \\ I_{C} = 20mA \\ Ta = 25^{\circ}C \\ (UNIT:\Omega) \end{array}$





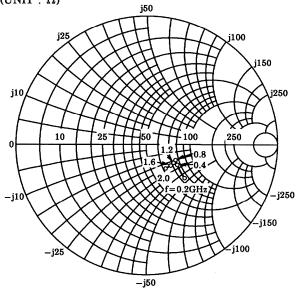


 $\begin{array}{l} S_{12e} \\ V_{CE} = 10V \\ I_{C} = 20 mA \\ Ta = 25 ^{\circ}C \end{array}$



 $\begin{array}{l} S_{22e} \\ V_{CE} = 10V \\ I_{C} = 20 mA \\ T_{a} = 25 ^{\circ}C \\ (UNIT:\Omega) \end{array}$

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Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru_4 moschip.ru_9