TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5095

VHF~UHF Band Low Noise Amplifier Applications

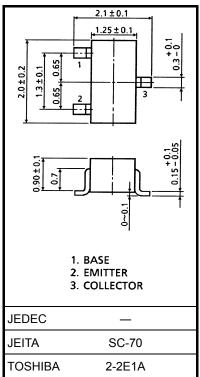
- Low noise figure, high gain.
- NF = 1.8dB, $|S_{21e}|^2 = 7.5$ dB (f = 2 GHz)

Absolute 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	Ι _Β	7	mA	
Collector current	ΙC	15	mA	
Collector power dissipation	P _C	100	mW	
Junction temperature	Tj	125	°C	
Storage temperature range	T _{stg}	–55 to 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: 0.006 g (typ.)

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit	
Transition frequency	f _T	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 7 \text{ mA}$	7	10	_	GHz	
Insertion gain	S _{21e} ² (1)	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 7 \text{ mA}, \text{ f} = 1 \text{ GHz}$	_	13	_	dB	
insertion gain	S _{21e} ² (2)	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 7 \text{ mA}, \text{ f} = 2 \text{ GHz}$	7.5	_	uв		
Noise figure	NF (1)	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 3 \text{ mA}, \text{ f} = 1 \text{ GHz}$		1.4	_	dB	
	NF (2)	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 3 \text{ mA}, \text{ f} = 2 \text{ GHz}$	_	1.8	3.0	UD	

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	$V_{CB} = 10 \text{ V}, \text{ I}_{E} = 0$	_	_	1	μA
Emitter cut-off current	I _{EBO}	$V_{EB} = 1 V, I_{C} = 0$	_	_	1	μA
DC current gain	h _{FE} (Note 1)	$V_{CE} = 6 \text{ V}, \text{ I}_{C} = 7 \text{ mA}$	50		160	
Output capacitance	C _{ob}	V _{CB} = 10 V, I _E = 0, f = 1 MHz (Note 2)	_	0.5	_	pF
Reverse transfer capacitance	C _{re}	$v_{CB} = 10 v, i_E = 0, i = 1 \text{ MHZ} (NOLE 2)$	_	0.4	0.85	pF

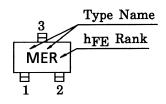
Note 1: hFE classification R: 50 to 100, O: 80 to 160

Note 2: Cre is measured by 3 terminal method with capacitance bridge.

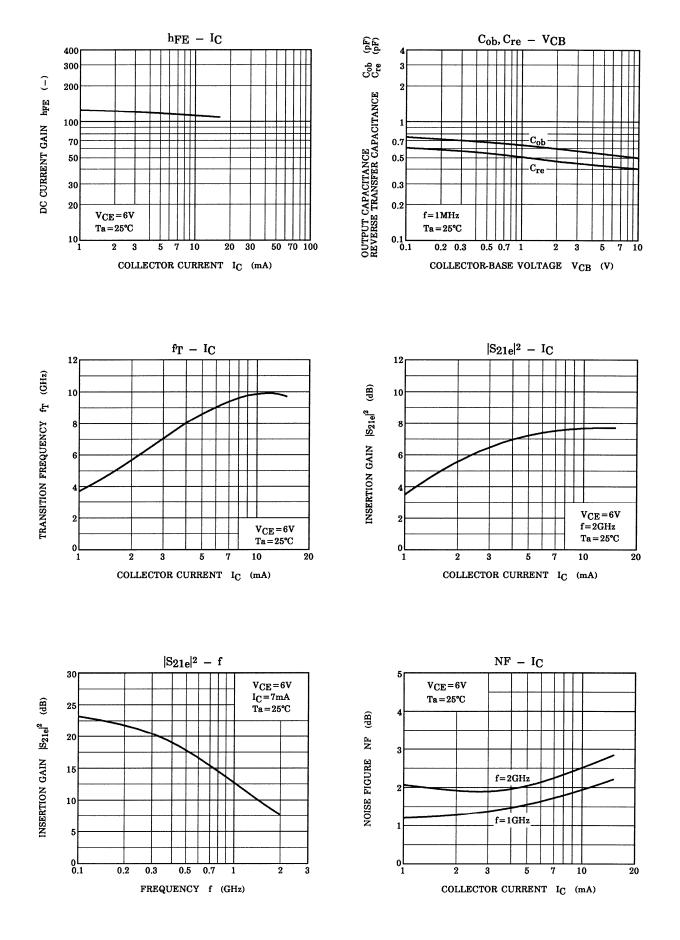
Start of commercial production 1993-10

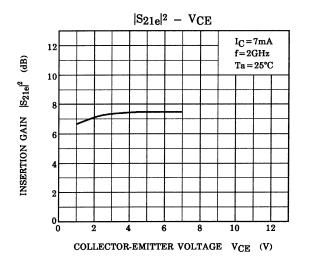
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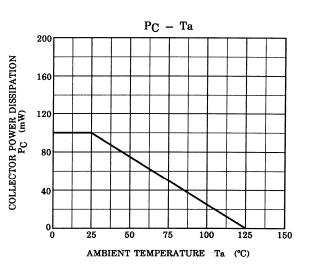
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$\label{eq:s-Parameter} \quad \textbf{Z}_{\textbf{O}} = \textbf{50} \ \Omega, \ \textbf{Ta} = \textbf{25}^{\circ}\textbf{C}$

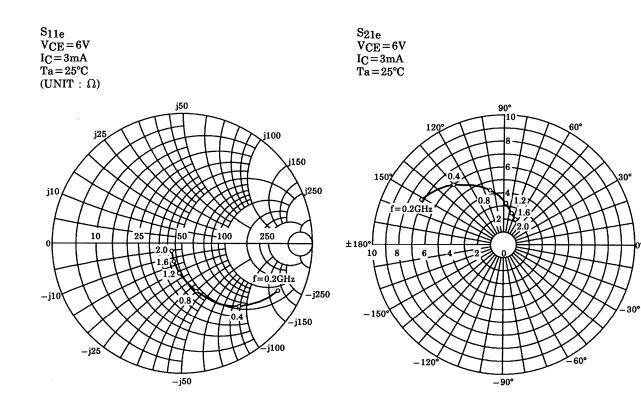
$V_{CE} = 6 V$, $I_C = 3 mA$

Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.835	-26.1	7.069	150.4	0.046	71.0	0.899	-19.3
400	0.665	-46.5	5.948	130.4	0.076	60.5	0.745	-30.3
600	0.501	-62.7	5.021	115.2	0.095	55.7	0.630	-35.9
800	0.386	-74.3	4.173	104.3	0.111	53.7	0.552	-38.5
1000	0.297	-83.7	3.592	95.6	0.124	53.2	0.500	-39.9
1200	0.226	-92.7	3.140	88.5	0.137	53.6	0.465	-41.1
1400	0.175	-101.9	2.808	82.3	0.152	54.1	0.442	-42.2
1600	0.130	-113.4	2.514	76.6	0.165	54.2	0.421	-43.8
1800	0.103	-128.0	2.293	71.7	0.179	53.9	0.405	-45.7
2000	0.081	-147.4	2.114	67.3	0.193	54.8	0.388	-47.4

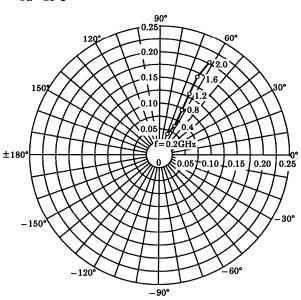
$V_{CE} = 6 V$, $I_C = 7 mA$

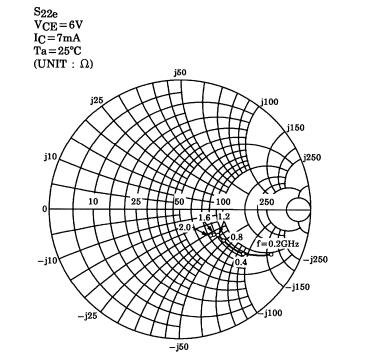
Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.668	-40.0	12.306	138.9	0.040	67.3	0.786	-27.0
400	0.427	-64.4	8.852	116.1	0.061	61.6	0.579	-35.0
600	0.280	-79.5	6.591	102.9	0.078	61.8	0.476	-35.9
800	0.193	-89.7	5.191	94.3	0.096	62.5	0.420	-35.0
1000	0.134	-99.3	4.288	87.8	0.112	63.2	0.390	-34.2
1200	0.088	-112.3	3.661	81.9	0.130	63.8	0.374	-34.0
1400	0.056	-129.8	3.232	76.9	0.150	63.4	0.366	-34.8
1600	0.035	-169.0	2.857	72.1	0.168	62.5	0.356	-36.6
1800	0.040	157.0	2.574	68.1	0.185	61.4	0.347	-39.0
2000	0.054	131.5	2.363	64.3	0.203	61.3	0.338	-40.2

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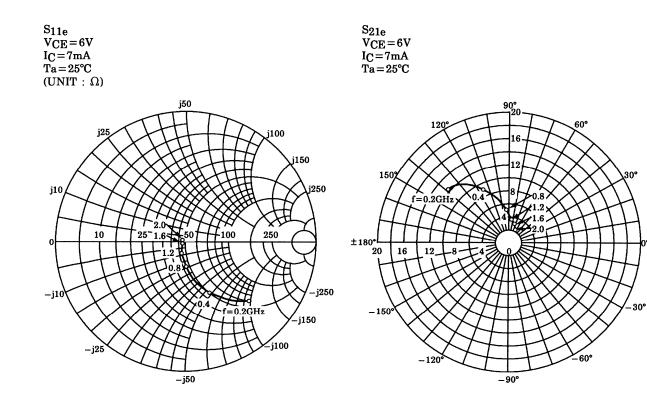




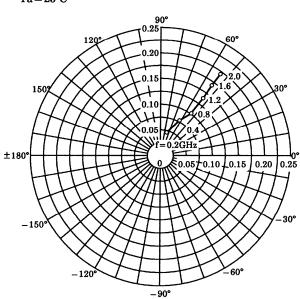


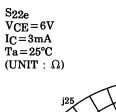


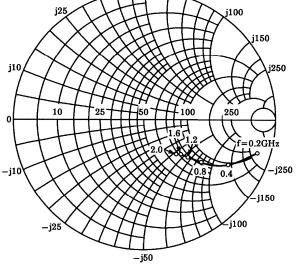
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