TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# 2SC5255

### VHF~UHF Band Low Noise Amplifier Applications

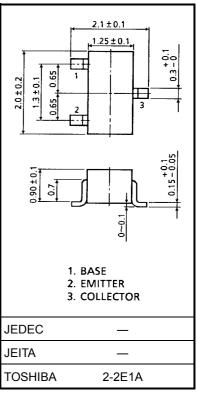
Unit: mm

• Low noise figure: NF = 1.5dB (f = 2 GHz)

• High gain: Gain = 8.5dB (f = 2 GHz)

### Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit	
Collector-base voltage	$V_{CBO}$	15	V	
Collector-emitter voltage	V <sub>CEO</sub>	7	V	
Emitter-base voltage	V <sub>EBO</sub>	1.5	٧	
Collector current	I <sub>C</sub>	40	mA	
Base current	Ι <sub>Β</sub>	20	mA	
Collector power dissipation	PC	100	mW	
Junction temperature	Tj	125	°C	
Storage temperature range	T <sub>stg</sub>	-55~125	°C	



Weight: 0.006 g (typ.)

## Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit		
Transition frequency	f <sub>T</sub>	$V_{CE} = 5 \text{ V}, I_{C} = 20 \text{ mA}$	9	12	_	GHz		
Insertion gain	S <sub>21e</sub>   <sup>2</sup> (1)	$V_{CE} = 5 \text{ V}, I_{C} = 20 \text{ mA}, f = 1 \text{ GHz}$	11.5	14.5		dB		
mseriion gain	S <sub>21e</sub>   <sup>2</sup> (2)	$V_{CE} = 5 \text{ V}, I_{C} = 20 \text{ mA}, f = 2 \text{ GHz}$	5.5	8.5				
Noise figure	NF (1)	$V_{CE} = 5 \text{ V}, I_{C} = 5 \text{ mA}, f = 1 \text{ GHz}$		1.1		dB		
	NF (2)	$V_{CE} = 5 \text{ V}, I_{C} = 5 \text{ mA}, f = 2 \text{ GHz}$		1.5	3	ub		

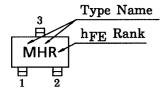
### **Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	$V_{CB} = 10 \text{ V}, I_{E} = 0$	_	_	1	μА
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	_	_	1	μА
DC current gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 20 mA	50	_	160	
Output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0, f = 1 MHz (Note 2)	_	0.5	_	pF
Reverse transfer capacitance	C <sub>re</sub>	VCB = 2  V, IE = 0, I = 1  IMIDZ (Note 2)	_	0.4	0.8	pF

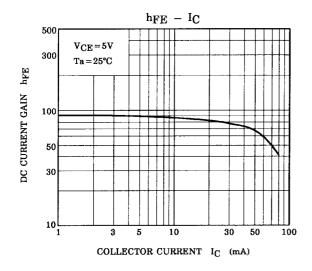
Note 1: hFE classification R: 50~100, O: 80~160

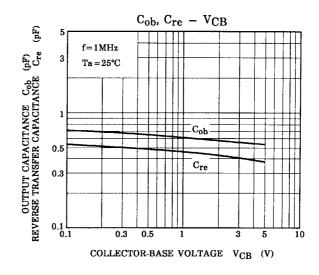
Note 2: C<sub>re</sub> is measured by 3 terminal method with capacitance bridge.

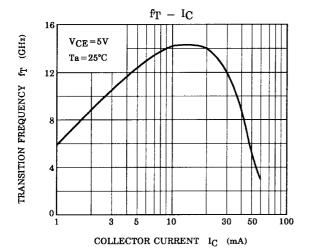
# Marking

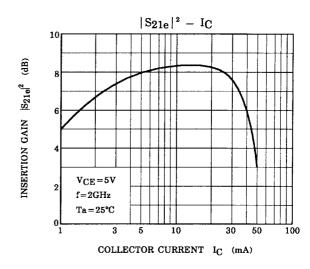


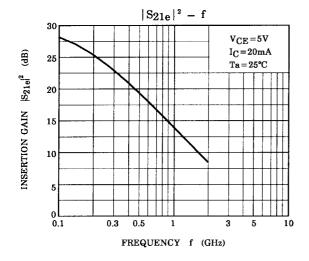
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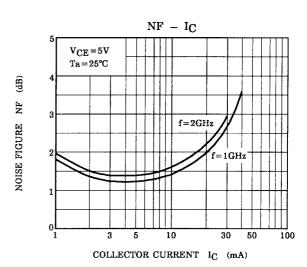


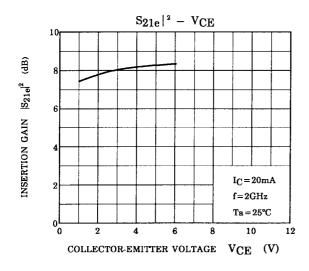


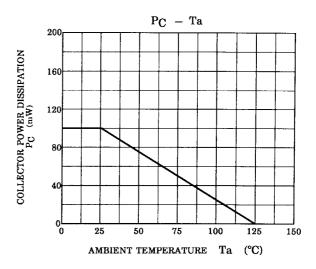












# S-Parameter $Z_0 = 50 \Omega$ , Ta = 25°C

### $V_{CE} = 5 V$ , $I_C = 5 mA$

Frequency	S	11	S2	21	S1	12	S	22
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.739	-36.1	11.765	147.6	0.041	74.9	0.866	-25.5
400	0.579	-64	9.129	125.5	0.069	67.8	0.701	-41.9
600	0.454	-84.9	7.039	111	0.09	66.2	0.581	-51.6
800	0.375	-102.5	5.703	100.4	0.11	66.5	0.501	-58.5
1000	0.316	-116.3	4.713	92.5	0.128	67	0.442	-64.8
1200	0.272	-130.2	4.022	85.8	0.147	67.4	0.398	-70
1400	0.247	-144.6	3.492	80	0.166	68.2	0.361	-74.8
1600	0.216	-158.8	3.094	75.4	0.186	68.3	0.332	-78.8
1800	0.194	-173	2.765	71.1	0.208	68.5	0.308	-82.1
2000	0.173	175.4	2.508	67	0.228	68.6	0.288	-84

### $\mbox{V}_{\mbox{CE}} = 5$ V, $\mbox{I}_{\mbox{C}} = 20$ mA

Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.407	-61.6	18.832	126.4	0.031	73.9	0.671	-34.0
400	0.271	-92.4	11.34	106.5	0.053	74.7	0.496	-41.9
600	0.211	-113.2	7.947	96.4	0.075	76.6	0.425	-45.8
800	0.19	-131.4	6.139	89.3	0.097	77.3	0.386	-50.1
1000	0.179	-146.5	4.975	83.6	0.12	77.3	0.355	-55.2
1200	0.172	-164	4.193	78.6	0.142	77	0.331	-59.8
1400	0.169	-175.6	3.627	74.3	0.166	76.5	0.311	-64.3
1600	0.165	168.7	3.215	70.4	0.189	76	0.292	-68.2
1800	0.16	155.5	2.866	66.7	0.213	75.2	0.278	-71.1
2000	0.157	143.6	2.587	63.4	0.236	74.2	0.267	-72.7

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