

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5255

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

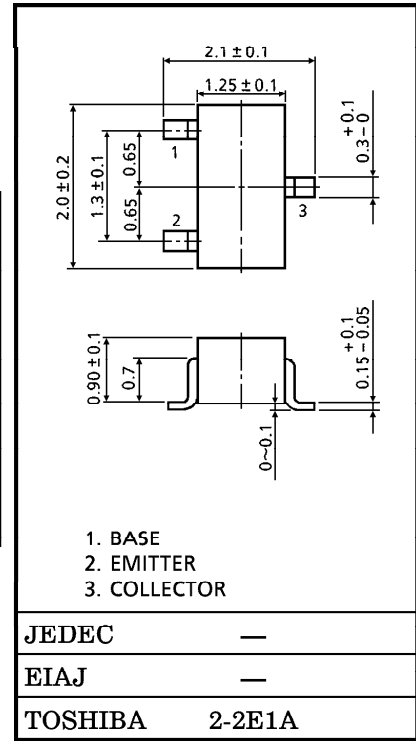
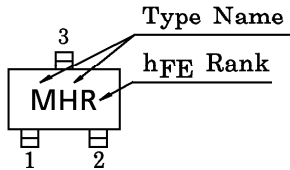
Unit in mm

- Low Noise Figure : NF=1.5dB (f=2GHz)
- High Gain : Gain=8.5dB (f=2GHz)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V <sub>CB0</sub>	15	V
Collector-Emitter Voltage	V <sub>CEO</sub>	7	V
Emitter-Base Voltage	V <sub>EB0</sub>	1.5	V
Collector Current	I <sub>C</sub>	40	mA
Base Current	I <sub>B</sub>	20	mA
Collector Power Dissipation	P <sub>C</sub>	100	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f <sub>T</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =20mA	9	12	—	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup> (1)	V <sub>CE</sub> =5V, I <sub>C</sub> =20mA, f=1GHz	11.5	14.5	—	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	V <sub>CE</sub> =5V, I <sub>C</sub> =20mA, f=2GHz	5.5	8.5	—	
Noise Figure	NF (1)	V <sub>CE</sub> =5V, I <sub>C</sub> =5mA, f=1GHz	—	1.1	—	dB
	NF (2)	V <sub>CE</sub> =5V, I <sub>C</sub> =5mA, f=2GHz	—	1.5	3	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

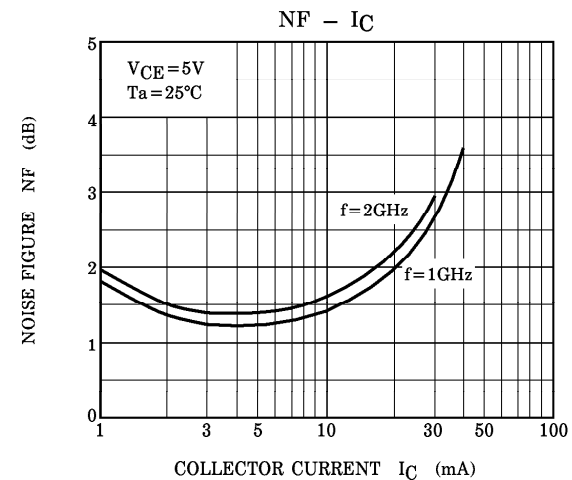
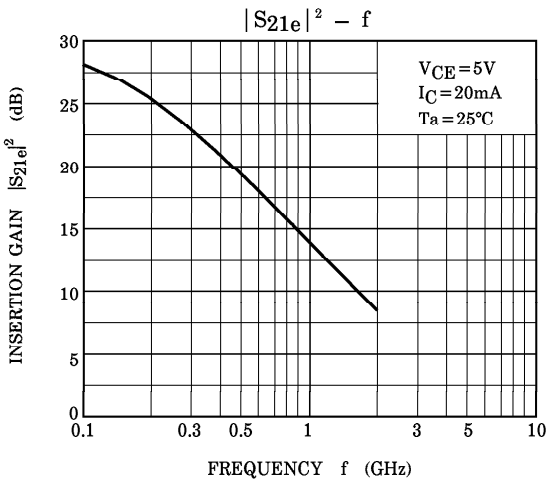
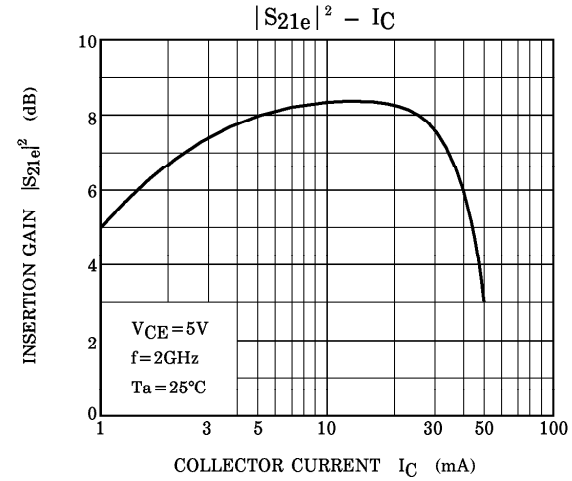
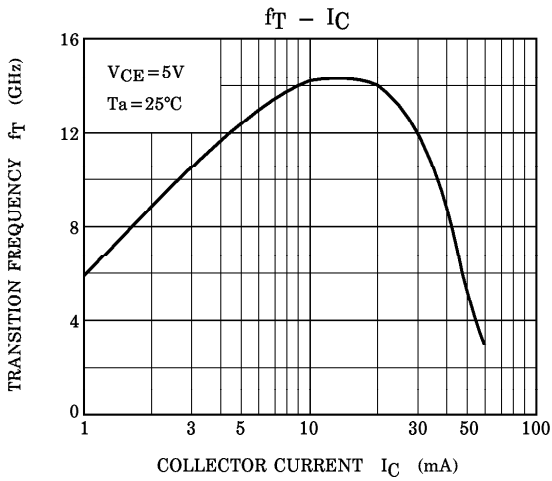
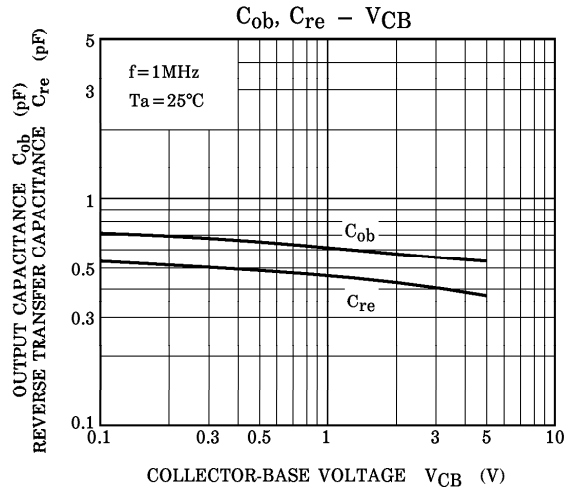
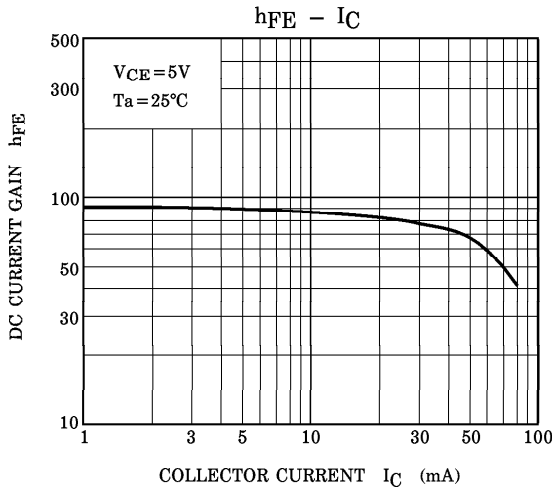
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0	—	—	1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> =1V, I <sub>C</sub> =0	—	—	1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> =5V, I <sub>C</sub> =20mA	50	—	160	—
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz (Note 2)	—	0.5	—	pF
Reverse Transfer Capacitance	C <sub>re</sub>		—	0.4	0.8	pF

(Note 1) : h<sub>FE</sub> Classification R : 50~100, O : 80~160

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

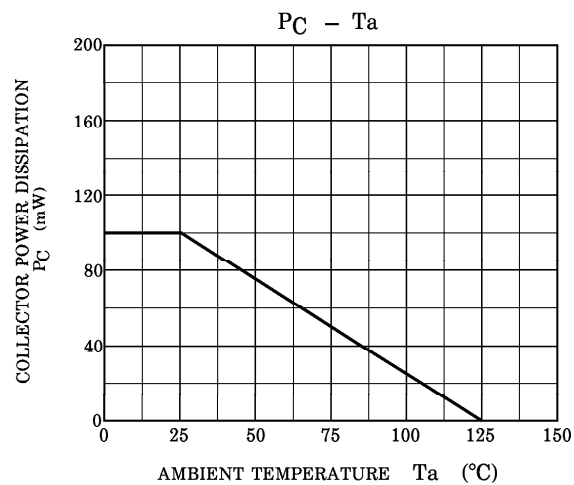
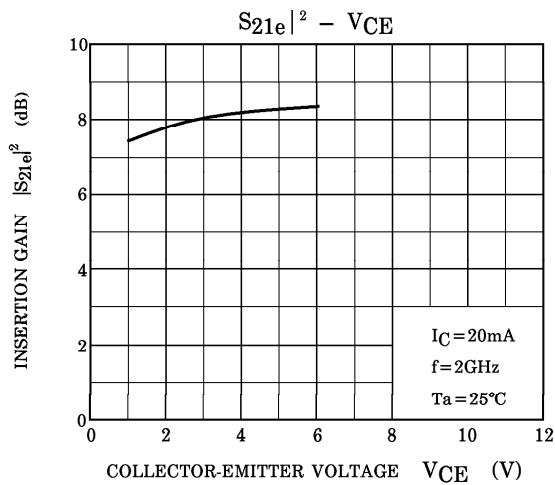
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S-PARAMETER  $Z_o = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 5\text{V}$ ,  $I_C = 5\text{mA}$

FREQUENCY (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.739	-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

$V_{CE} = 5\text{V}$ ,  $I_C = 20\text{mA}$

FREQUENCY (MHz)	S11		S21		S12		S22	
	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