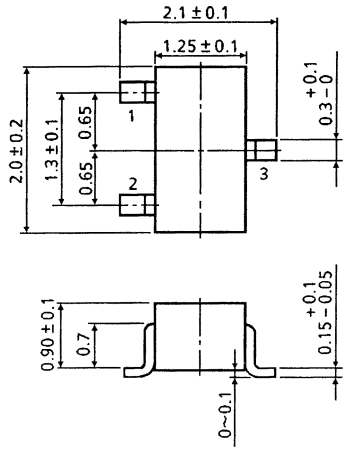
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5463

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 12dB (f = 1 GHz)

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

USM

JEDEC	—
JEITA	—
TOSHIBA	2-2E1A

Weight: 0.006 g (typ.)

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
Collector current	I_C	60	mA
Base current	I_B	30	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 8 V, I_C = 15 mA	5	7	—	GHz
Insertion gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 8 V, I_C = 15 mA, f = 500 MHz	—	17.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 8 V, I_C = 15 mA, f = 1 GHz	8	12	—	
Noise figure	NF (1)	V_{CE} = 8 V, I_C = 5 mA, f = 500 MHz	—	1	—	dB
	NF (2)	V_{CE} = 8 V, I_C = 5 mA, f = 1 GHz	—	1.1	2	

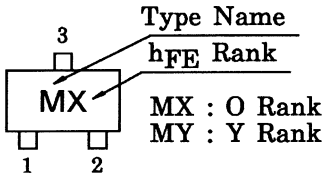
Electrical Characteristics (Ta = 25°C)

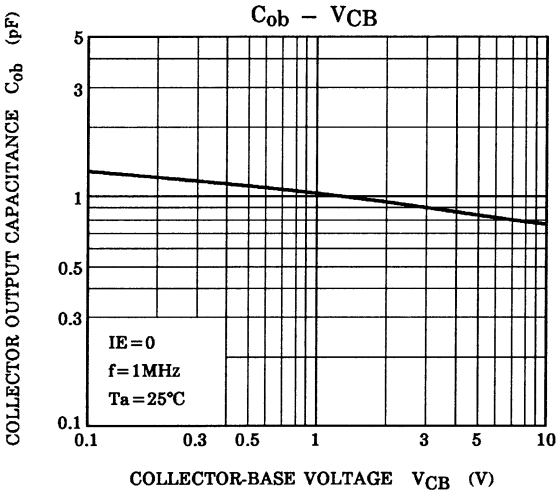
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1 V, I_C = 0	—	—	1	μA
DC current gain	h_{FE} (Note 1)	V_{CE} = 8 V, I_C = 15 mA	80	—	240	
Output capacitance	C_{ob}	V_{CB} = 8 V, I_E = 0, f = 1 MHz (Note 2)	—	0.8	—	pF
Reverse transfer capacitance	C_{re}		—	0.55	—	pF

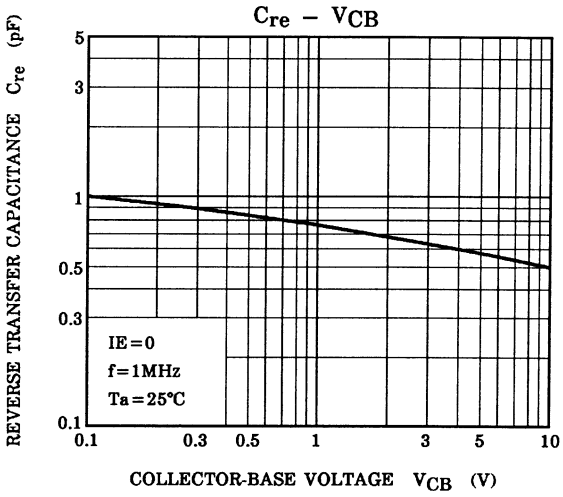
Note 1: h_{FE} classification O: 80~100, Y: 120~240

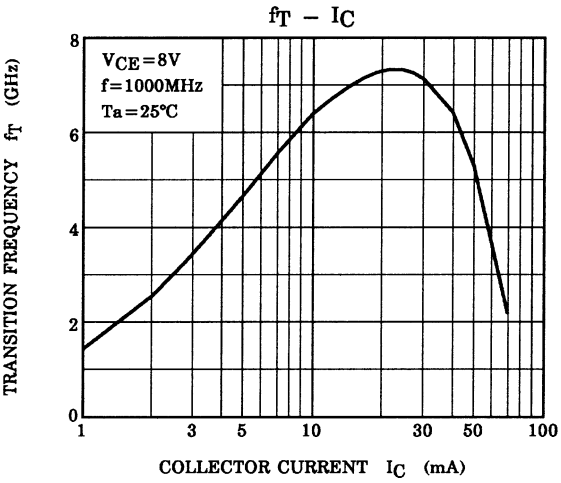
Note 2: C_{re} is measured by 3 terminal method with capacitance bridge.

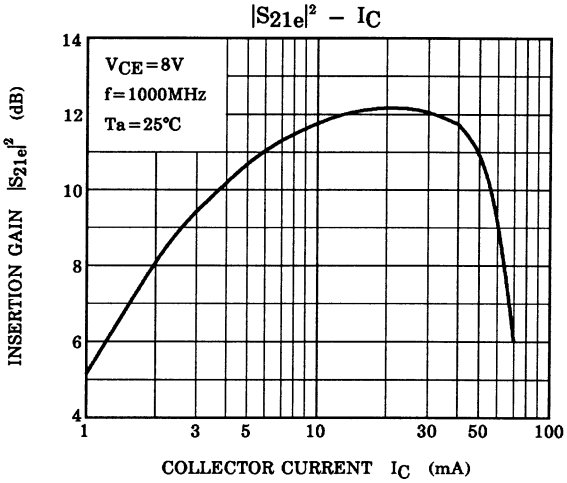
Marking

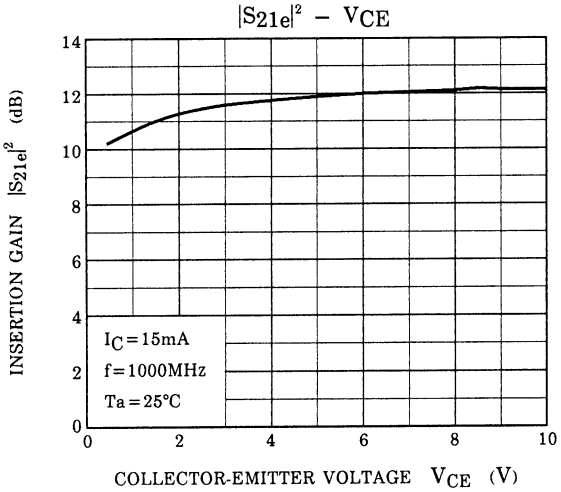


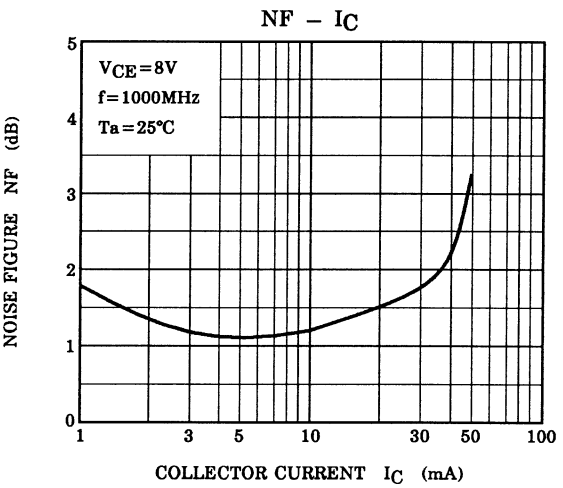

C_{ob} – V_{CB}
COLLECTOR OUTPUT CAPACITANCE C_{ob} (pF)
5
3
1
0.5
0.3
0.1
IE = 0
f = 1MHz
Ta = 25°C
0.1
0.3
0.5
1
3
5
10
COLLECTOR-BASE VOLTAGE V_{CB} (V)


C_{re} – V_{CB}
REVERSE TRANSFER CAPACITANCE C_{re} (pF)
5
3
1
0.5
0.3
0.1
IE = 0
f = 1MHz
Ta = 25°C
0.1
0.3
0.5
1
3
5
10
COLLECTOR-BASE VOLTAGE V_{CB} (V)


f_T – I_C
TRANSITION FREQUENCY f_T (GHz)
8
6
4
2
0
V_{CE} = 8V
f = 1000MHz
Ta = 25°C
1
3
5
10
30
50
100
COLLECTOR CURRENT I_C (mA)


$|S_{21e}|^2$ – I_C
INSERTION GAIN $|S_{21e}|^2$ (dB)
14
12
10
8
6
4
V_{CE} = 8V
f = 1000MHz
Ta = 25°C
1
3
5
10
30
50
100
COLLECTOR CURRENT I_C (mA)


$|S_{21e}|^2$ – V_{CE}
INSERTION GAIN $|S_{21e}|^2$ (dB)
14
12
10
8
6
4
2
0
I_C = 15mA
f = 1000MHz
Ta = 25°C
0
2
4
6
8
10
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


NF – I_C
NOISE FIGURE NF (dB)
5
4
3
2
1
0
V_{CE} = 8V
f = 1000MHz
Ta = 25°C
1
3
5
10
30
50
100
COLLECTOR CURRENT I_C (mA)

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