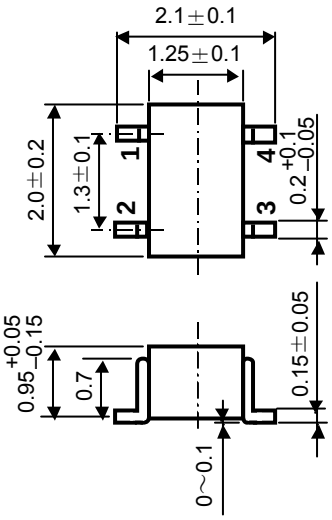
TOSHIBA TRANSISTOR SILICON-GERMANIUM NPN EPITAXIAL PLANER TYPE

MT4S100U

UHF LOW NOISE AMPLIFIER APPLICATION

Unit: mm



1.BASE
2.EMITTER
3.COLLECTOR
4.EMITTER

USQ

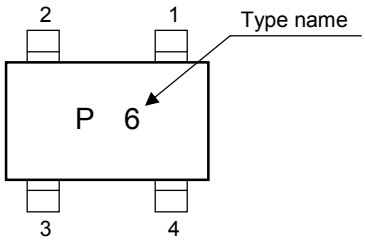
JEDEC	—
JEITA	—
TOSHIBA	2-2K1E

Weight: 0.006 g (typ.)

FEATURES

- Low Noise Figure :NF=0.72dB (@f=2GHz)
- High Gain:$|S21e|^2$=16.0dB (@f=2GHz)

Marking



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-Base voltage	V_{CBO}	6	V
Collector-Emitter voltage	V_{CEO}	3	V
Emitter-Base voltage	V_{EBO}	1.2	V
Collector-Current	I_C	15	mA
Base-Current	I_B	7	mA
Collector Power dissipation	P_C	45	mW
Junction temperature	T_j	150	°C
Storage temperature Range	T_{stg}	−55~150	°C

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition Frequency	fT	V_{CE}=2V, I_C=10mA, f=2GHz	18	22	-	GHz
Insertion Gain	$\|S21e\|^2$	V_{CE}=2V, I_C=10mA, f=2GHz	13.5	16	-	dB
Noise Figure	NF	V_{CE}=2V, I_C=5mA, f=2GHz	-	0.72	1.0	dB

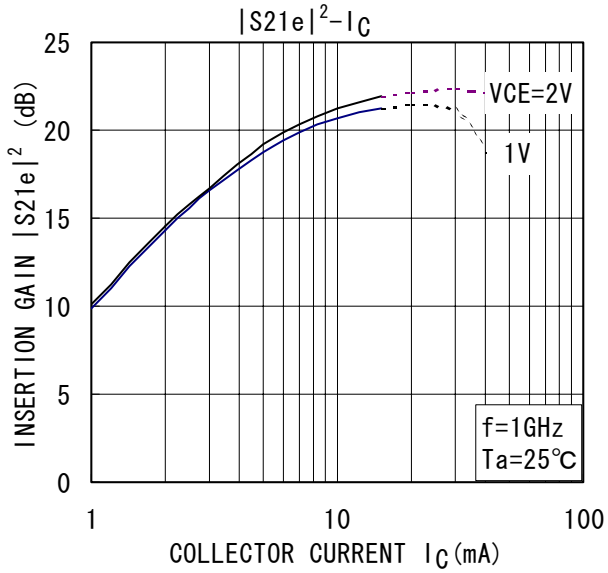
Electrical Characteristics (Ta = 25°C)

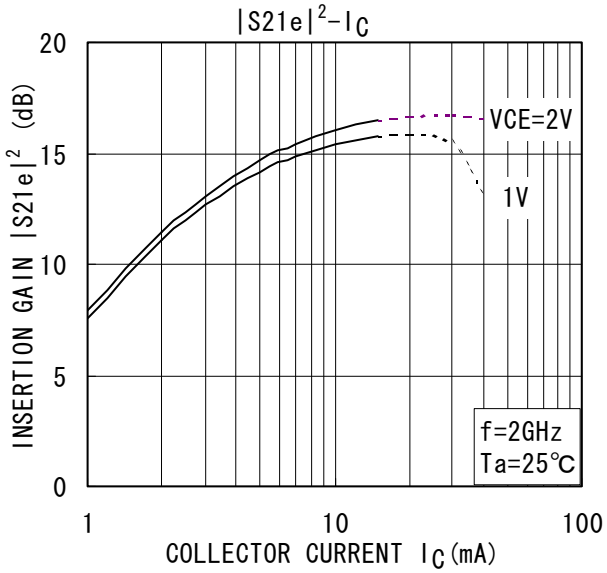
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}=6V, I_E=0	-	-	1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB}=1V, I_C=0	-	-	1	μA
DC Current Gain	hFE	V_{CE}=2V, I_C=10mA	200	-	400	-
Output Capacitance	C_{ob}	V_{CB}=2V, I_E=0, f=1MHz	-	0.41	0.6	pF
Reverse Transistor Capacitance	C_{re}	V_{CB}=2V, I_E=0, f=1MHz (Note 1)	-	0.14	0.2	pF

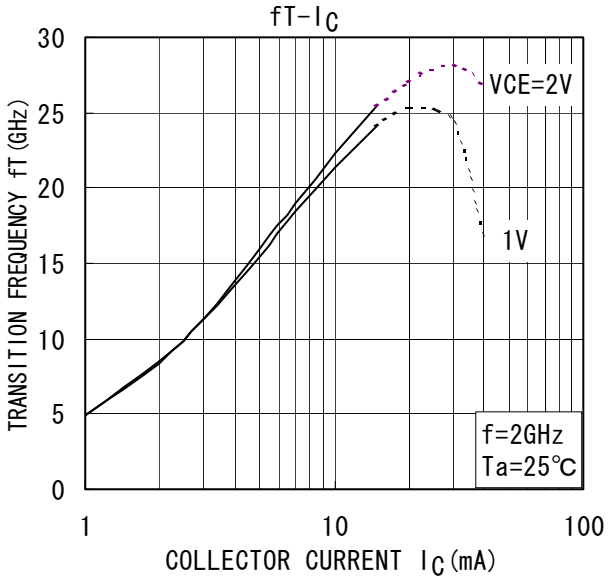
Note 1: Cre is measured by 3 terminal method with capacitance bridge.

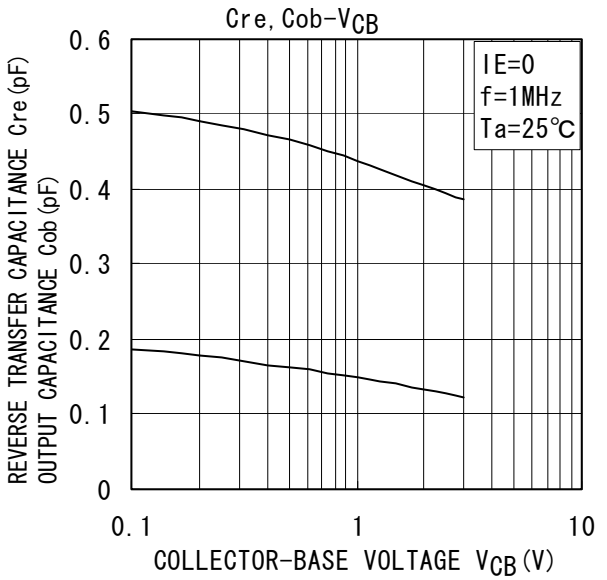
Caution: This device is sensitive to electrostatic discharge.

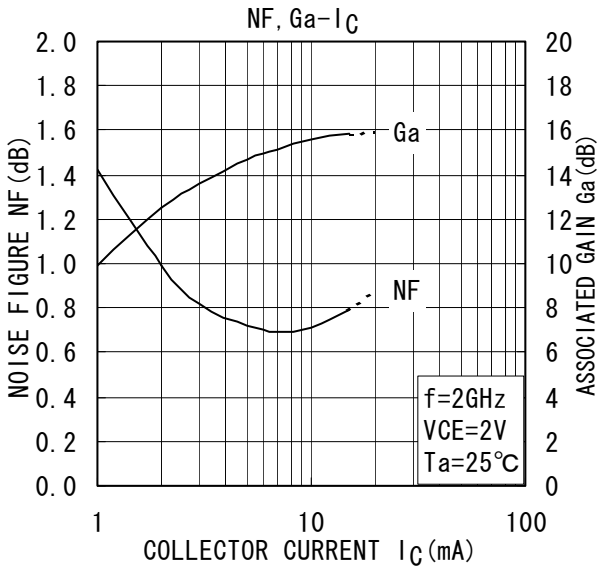
Please make enough tool and equipment earthed when you handle.

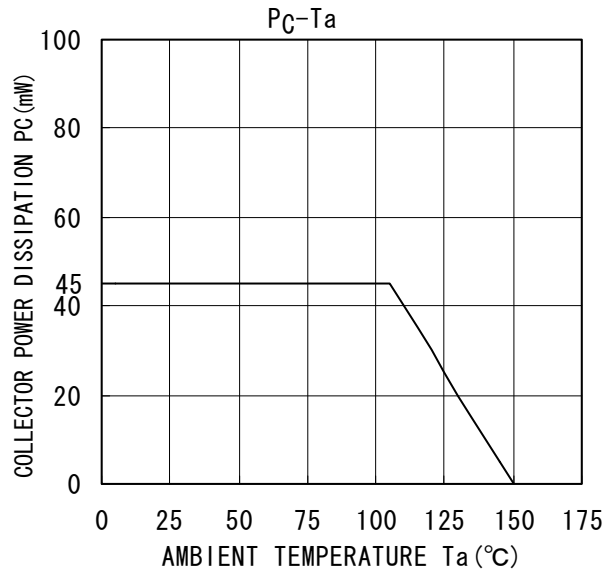

|S21e|²-IC
INSERTION GAIN |S21e|² (dB)
COLLECTOR CURRENT IC (mA)
VCE=2V
1V
f=1GHz
Ta=25℃
25
20
15
10
5
0
1
10
100


|S21e|²-IC
INSERTION GAIN |S21e|² (dB)
COLLECTOR CURRENT IC (mA)
VCE=2V
1V
f=2GHz
Ta=25℃
20
15
10
5
0
1
10
100


fT-IC
TRANSITION FREQUENCY fT (GHz)
COLLECTOR CURRENT IC (mA)
VCE=2V
1V
f=2GHz
Ta=25℃
30
25
20
15
10
5
0
1
10
100


Cre, Cob-VCB
REVERSE TRANSFER CAPACITANCE Cre (pF)
OUTPUT CAPACITANCE Cob (pF)
COLLECTOR-BASE VOLTAGE VCB (V)
IE=0
f=1MHz
Ta=25℃
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10


NF, Ga-IC
NOISE FIGURE NF (dB)
ASSOCIATED GAIN Ga (dB)
COLLECTOR CURRENT IC (mA)
Ga
NF
f=2GHz
VCE=2V
Ta=25℃
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
20
18
16
14
12
10
8
6
4
2
0
1
10
100


PC-Ta
COLLECTOR POWER DISSIPATION PC (mW)
AMBIENT TEMPERATURE Ta (℃)
100
80
60
45
40
20
0
0
25
50
75
100
125
150
175

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