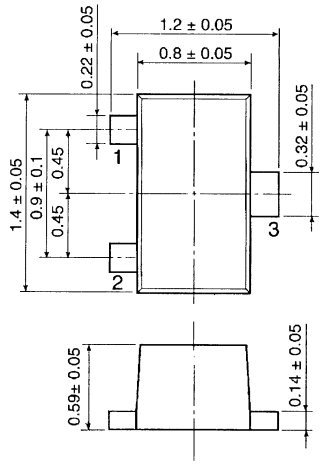
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANER TYPE

MT3S41T

VCO OSCILLETOR STAGE
UHF LOW NOISE AMPLIFIER APPLICATION

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

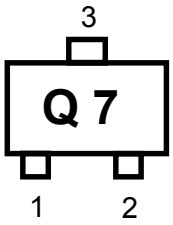
TESM	
JEDEC	—
JEITA	—
TOSHIBA	2-1B1A

Weight:0.0022g (typ.)

FEATURES

- Low Noise Figure :NF=1.2dB (@f=2GHz)
- High Gain:$|S21e|^2$=10dB (@f=2GHz)

Marking



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-Base voltage	V_{CBO}	8	V
Collector-Emitter voltage	V_{CEO}	4.5	V
Emitter-Base voltage	V_{EBO}	1.5	V
Collector-Current	I_C	80	mA
Base-Current	I_B	40	mA
Collector Power dissipation	P_C	100	mW
Junction temperature	T_j	150	°C
Storage temperature Range	T_{stg}	−55~150	°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).

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition Frequency	fT	V_{CE}=3V, I_C=20mA, f=2GHz	11	15	-	GHz
Insertion Gain	$\|S21e\|^2$(1)	V_{CE}=3V, I_C=20mA, f=1GHz	13.5	15.5	-	dB
	$\|S21e\|^2$(2)	V_{CE}=3V, I_C=20mA, f=2GHz	8	10	-	dB
Noise Figure	NF(1)	V_{CE}=3V, I_C=5mA, f=1GHz	-	0.8	-	dB
	NF(2)	V_{CE}=3V, I_C=5mA, f=2GHz	-	1.2	1.8	dB

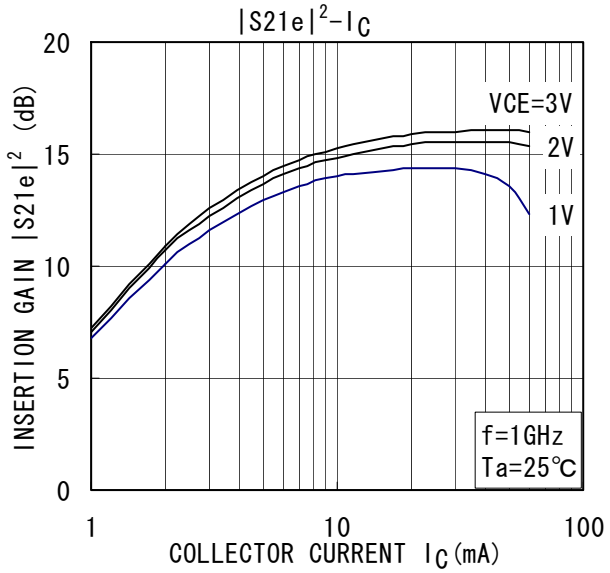
Electrical Characteristics (Ta = 25°C)

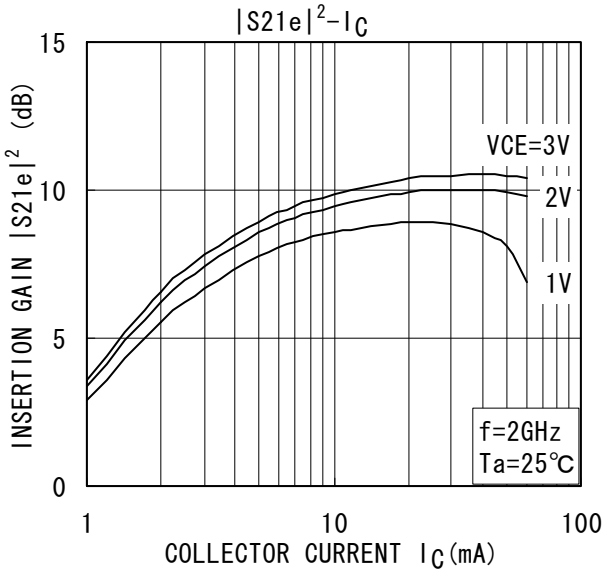
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}=8V, I_E=0	-	-	1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB}=1V, I_C=0	-	-	1	μA
DC Current Gain	hFE	V_{CE}=3V, I_C=20mA	70	-	140	-
Output Capacitance	C_{ob}	V_{CB}=1V, I_E=0, f=1MHz	-	0.9	1.4	pF
Reverse Transistor Capacitance	C_{re}	V_{CB}=1V, I_E=0, f=1MHz (Note 1)	-	0.55	0.9	pF

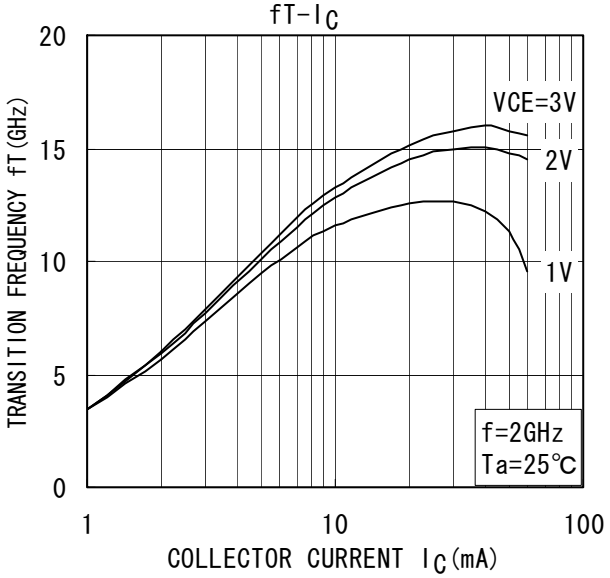
Note 1: Cre is measured by 3 terminal method with capacitance bridge.

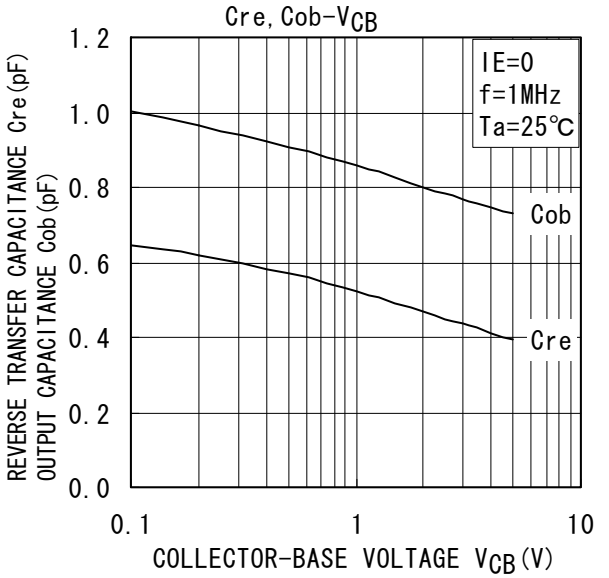
Caution: This device is sensitive to electrostatic discharge.

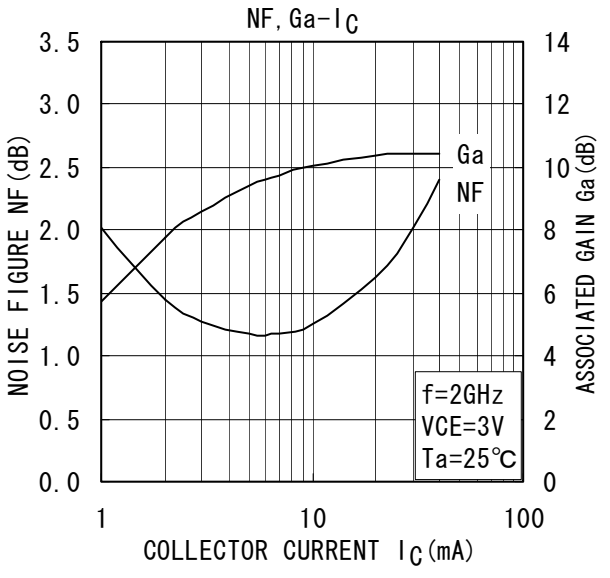
Please make enough tool and equipment earthed when you handle.

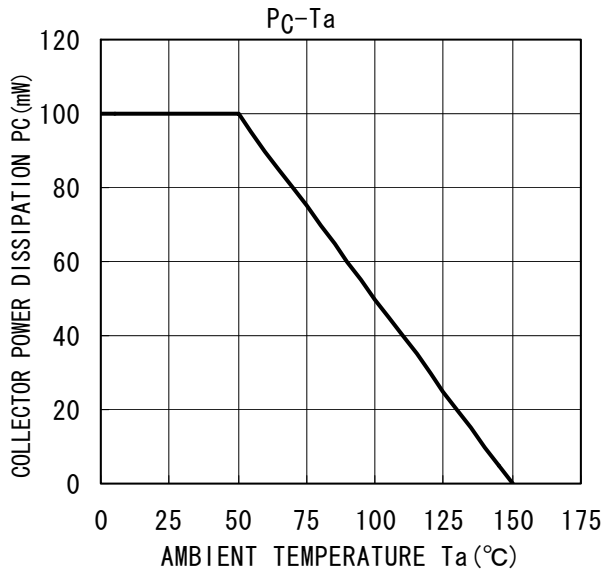

|S21e|²-IC
INSERTION GAIN |S21e|² (dB)
COLLECTOR CURRENT IC (mA)
VCE=3V
2V
1V
f=1GHz
Ta=25°C
20
15
10
5
0
1
10
100


|S21e|²-IC
INSERTION GAIN |S21e|² (dB)
COLLECTOR CURRENT IC (mA)
VCE=3V
2V
1V
f=2GHz
Ta=25°C
15
10
5
0
1
10
100


fT-IC
TRANSITION FREQUENCY fT (GHz)
COLLECTOR CURRENT IC (mA)
VCE=3V
2V
1V
f=2GHz
Ta=25°C
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°C
Cob
Cre
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1
10


NF, Ga-IC
NOISE FIGURE NF (dB)
ASSOCIATED GAIN Ga (dB)
COLLECTOR CURRENT IC (mA)
Ga
NF
f=2GHz
VCE=3V
Ta=25°C
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
14
12
10
8
6
4
2
0
1
10
100


PC-Ta
COLLECTOR POWER DISSIPATION PC (mW)
AMBIENT TEMPERATURE Ta (°C)
120
100
80
60
40
20
0
0
25
50
75
100
125
150
175

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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