

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANER TYPE

**MT3S45T**

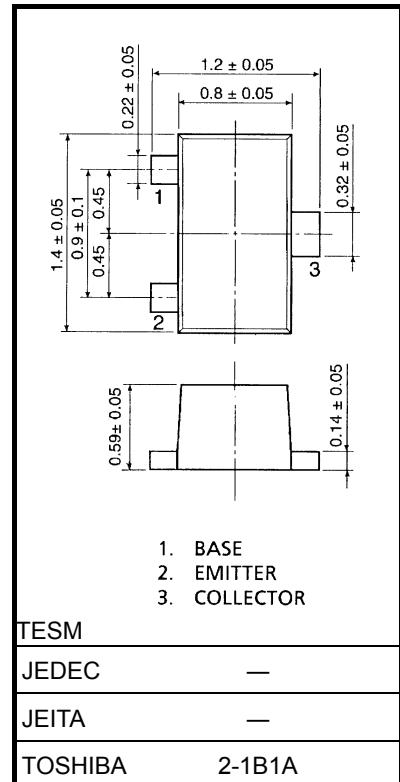
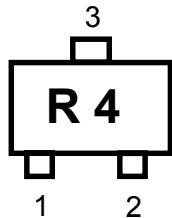
VCO OSCILLETOR STAGE

UHF LOW NOISE AMPLIFIER APPLICATION

Unit: mm

**FEATURES**

- Low Noise Figure : $NF=1.1\text{dB}$  (@ $f=2\text{GHz}$ )
- High Gain: $|S21e|^2=12.0\text{dB}$  (@ $f=2\text{GHz}$ )

**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	$I_C$	30	mA
Base-Current	$I_B$	15	mA
Collector Power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature Range	$T_{stg}$	-55~150	°C

TESM

JEDEC —

JEITA —

TOSHIBA 2-1B1A

Weight:0.0022g (typ.)

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	f <sub>T</sub>	V <sub>CE</sub> =3V, I <sub>C</sub> =20mA, f=2GHz	13.5	18	-	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup> (1)	V <sub>CE</sub> =3V, I <sub>C</sub> =20mA, f=1GHz	-	17.5	-	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	V <sub>CE</sub> =3V, I <sub>C</sub> =20mA, f=2GHz	9.5	12	-	dB
Noise Figure	NF(1)	V <sub>CE</sub> =3V, I <sub>C</sub> =6mA, f=1GHz	-	0.9	-	dB
	NF(2)	V <sub>CE</sub> =3V, I <sub>C</sub> =6mA, f=2GHz	-	1.1	1.6	dB

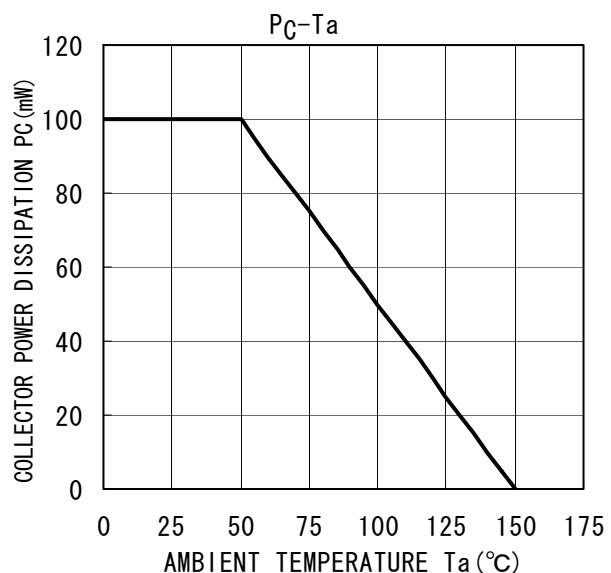
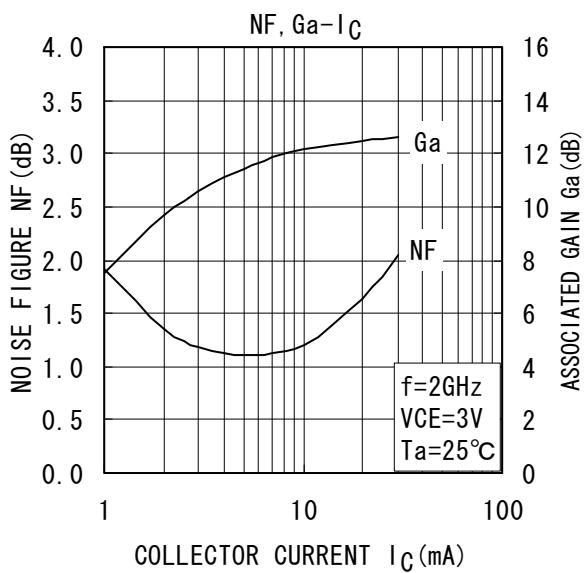
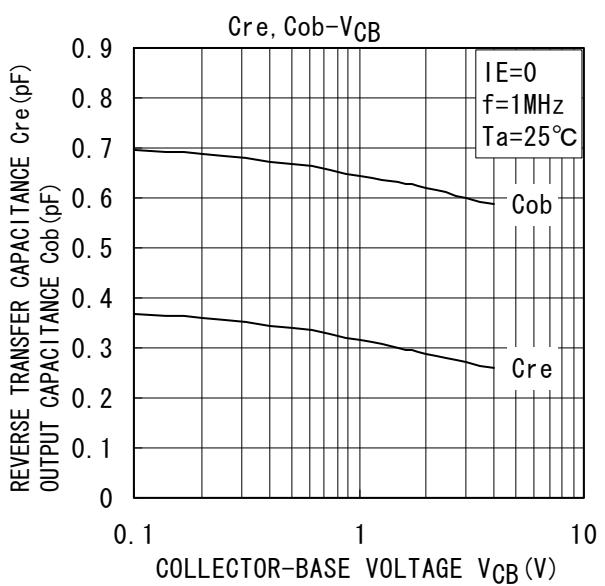
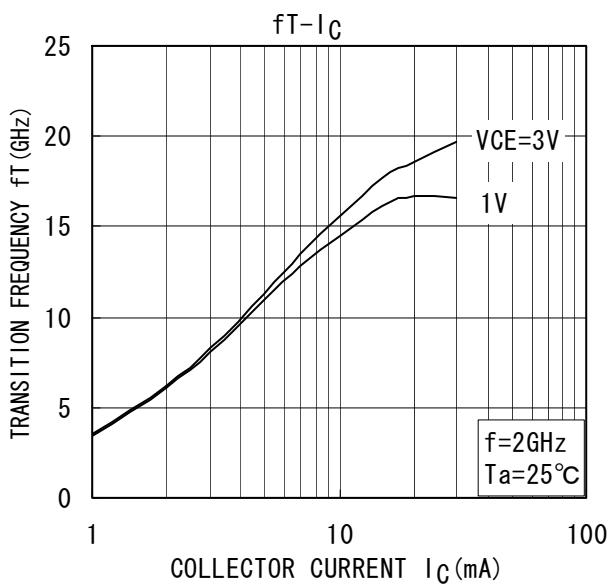
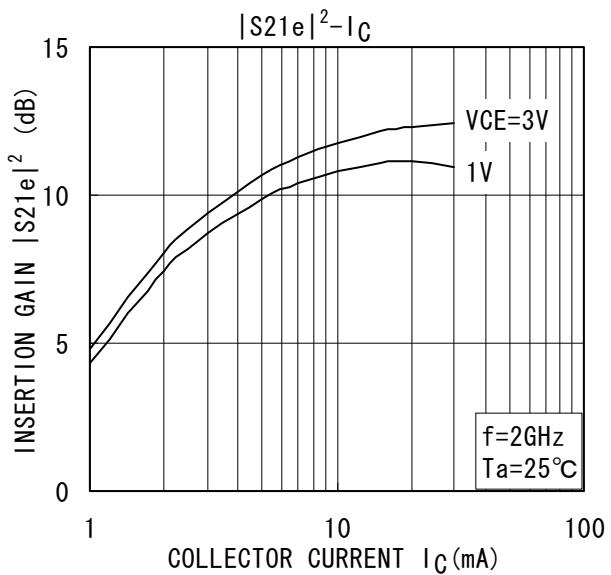
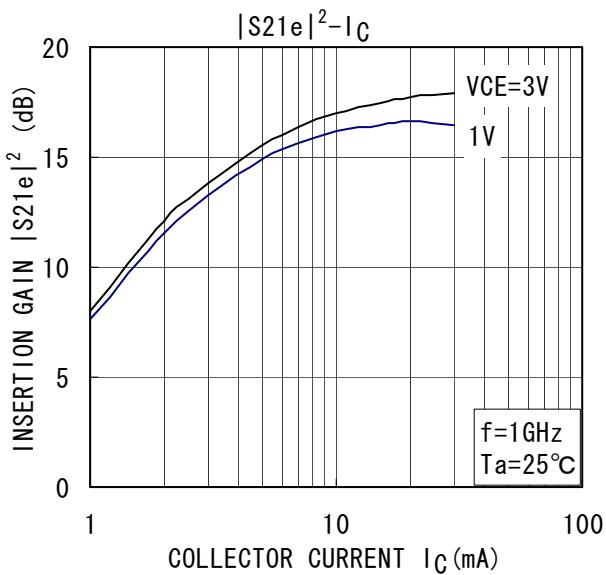
**Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> =8V, 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>	V <sub>CE</sub> =3V, I <sub>C</sub> =10mA	70	-	140	-
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =1V, I <sub>E</sub> =0, f=1MHz	-	0.66	1.10	pF
Reverse Transistor Capacitance	C <sub>re</sub>	V <sub>CB</sub> =1V, I <sub>E</sub> =0, f=1MHz (Note 1)	-	0.33	0.55	pF

**Note 1:** C<sub>re</sub> 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.



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20070701-EN GENERAL

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