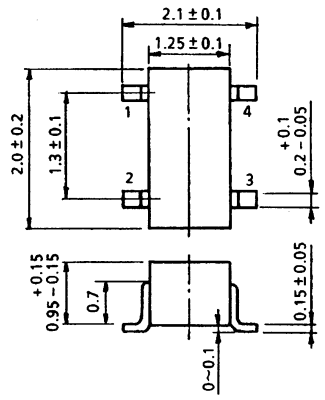
TOSHIBA TRANSISTOR SILICON-GERMANIUM NPN EPITAXIAL PLANER TYPE

MT4S200U

UHF-SHF Low Noise Amplifier Application

Unit: mm



1.Collector
2.Emitter
3.Base
4.Emitter

USQ

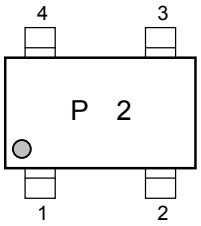
JEDEC	—
JEITA	—
TOSHIBA	2-2K1E

Weight: 0.006 g (typ.)

FEATURES

- Low Noise Figure :NF=1.7dB (@f=5.8GHz)
- High Gain:$|S21e|^2$=9.5dB (@f=5.8GHz)

Marking



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-Base voltage	V_{CBO}	8	V
Collector-Emitter voltage	V_{CEO}	4	V
Emitter-Base voltage	V_{EBO}	1.2	V
Collector-Current	I_C	35	mA
Base-Current	I_B	5	mA
Collector Power dissipation	Pc	100	mW
Collector Power dissipation	$P_{C(Note\ 1)}$	140	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).

Note 1: Ta=25degC (When mounted on a 1.6mm(t) glass epoxy PCB)

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition Frequency	f_T	V_{CE}=3V, I_C=15mA	—	30	—	GHz
Insertion Gain	$\|S21e\|^2$(1)	V_{CE}=3V, I_C=15mA,f=2GHz	15.0	17.5	—	dB
	$\|S21e\|^2$(2)	V_{CE}=3V, I_C=15mA, f=5.8GHz	—	9.5	—	dB
Noise Figure	NF(1)	V_{CE}=3V, I_C=5mA, f=2GHz	—	0.75	1.0	dB
	NF(2)	V_{CE}=3V, I_C=5mA, f=5.8GHz	—	1.7	—	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=15mA	100	—	260	-
Output Capacitance	C_{ob}	V_{CB}=3V, I_E=0, f=1MHz	—	0.25	0.5	pF
Reverse Transfer Capacitance	C_{re}	V_{CB}=3V, I_E=0, f=1MHz (Note 1)	—	0.074	0.18	pF

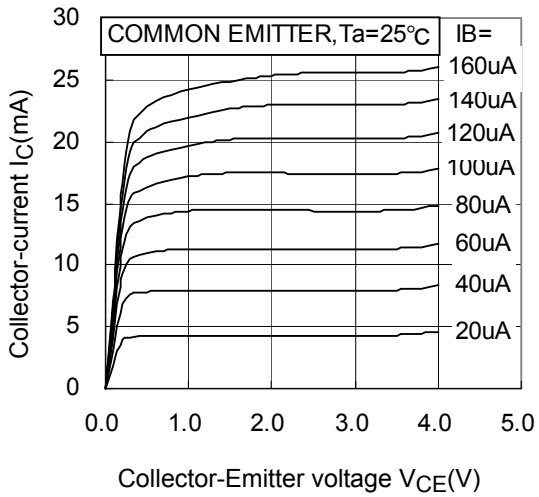
Note 1: Cre is measured by 3 terminal method with capacitance bridge.

Caution:

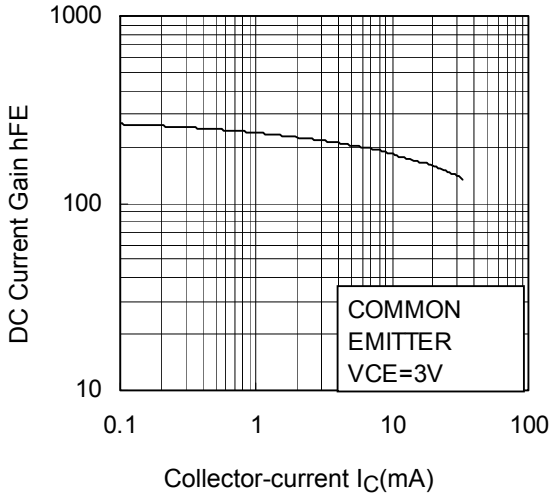
This device is sensitive to electrostatic discharge due to applied the high frequency transistor process of fT=60GHz class is used for this product.

Please make enough tool and equipment earthed when you handle.

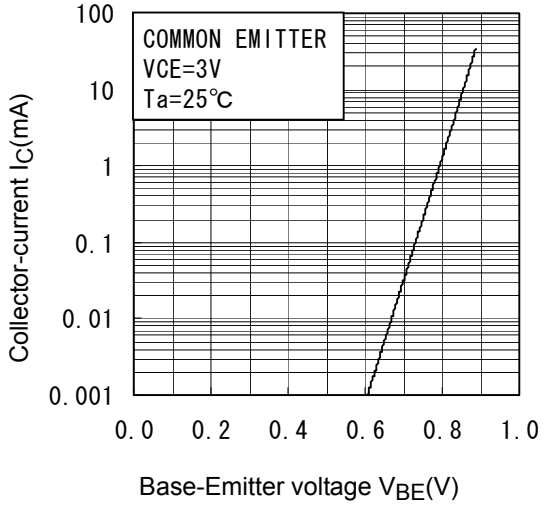
I_C-V_{CE}



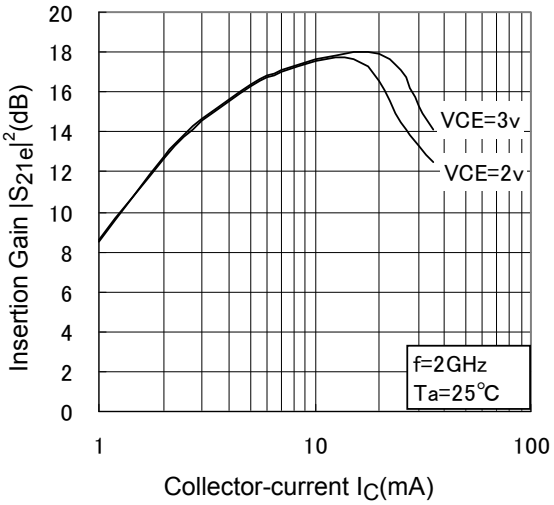
h_{FE}-I_C



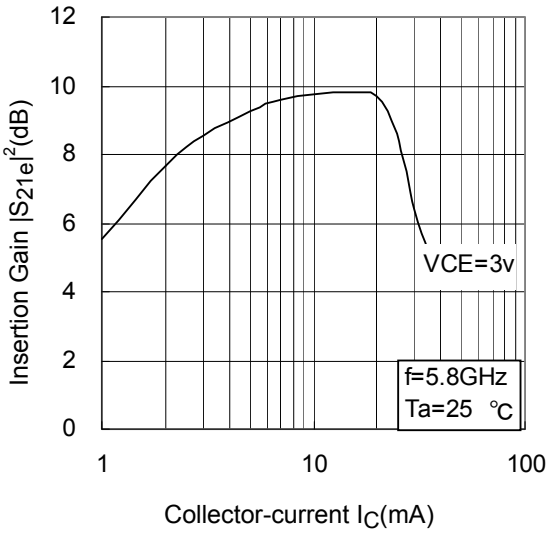
I_C-V_{BE}



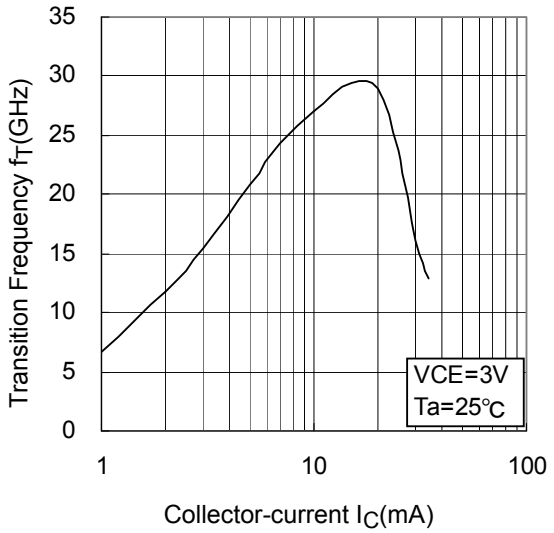
$|S_{21e}|^2$-I_C 2GHz

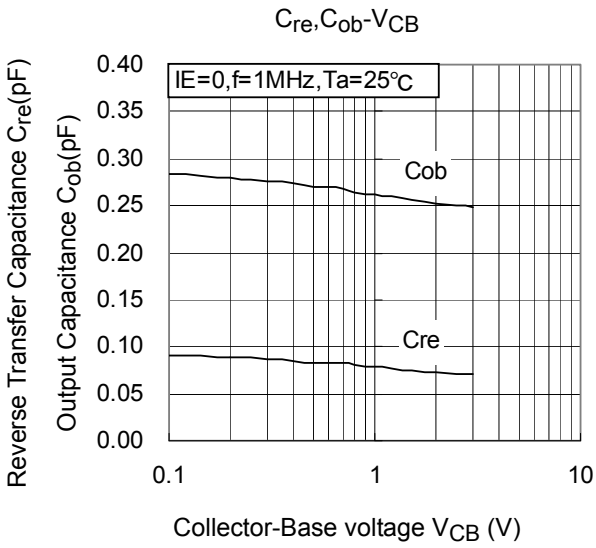


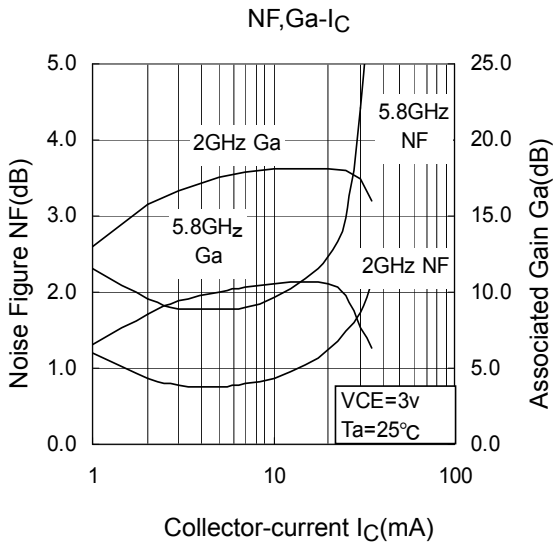
$|S_{21e}|^2$-I_C 5.8GHz



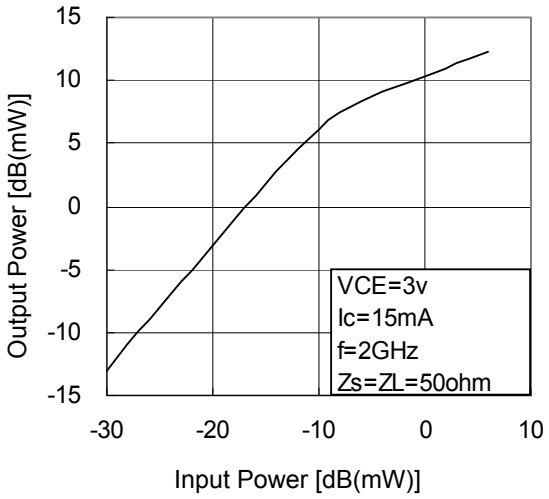
f_T-I_C



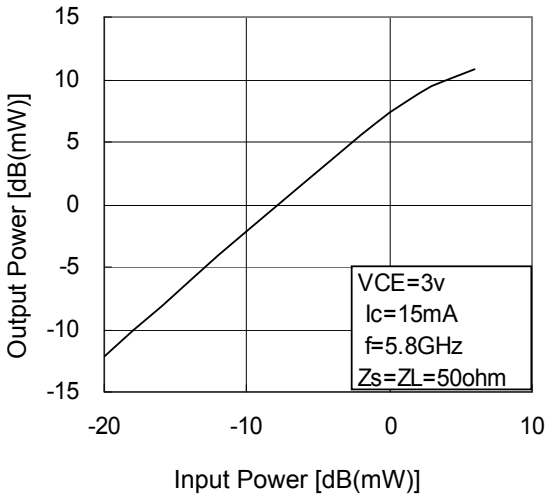




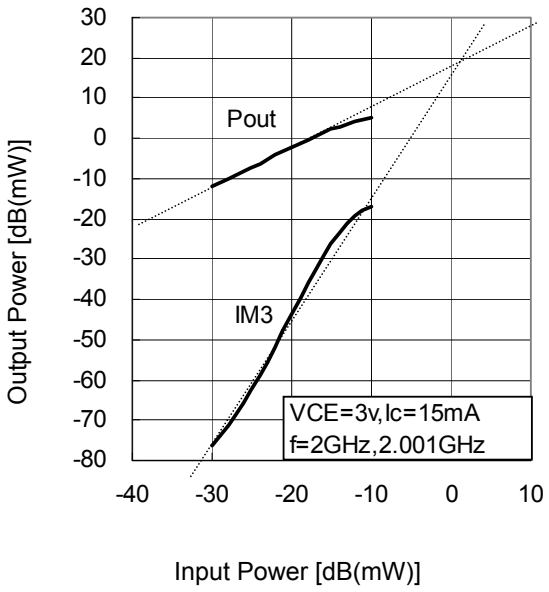
Output Power vs Input Power



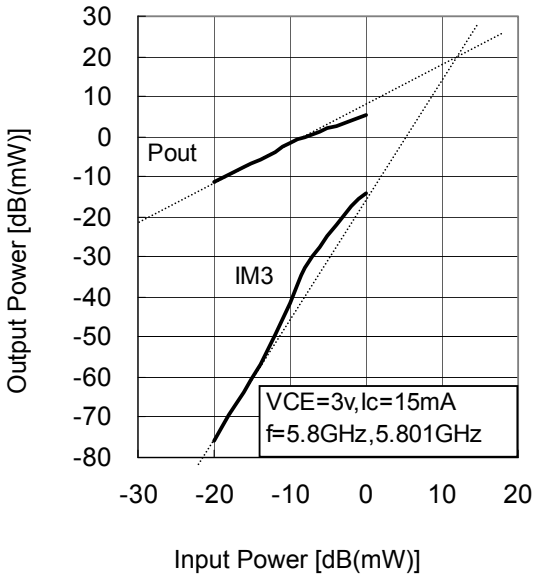
Output Power vs Input Power



IM3 (2GHz)



IM3 (5.8GHz)



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20070701-EN GENERAL

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