TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

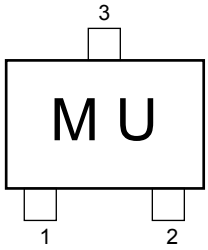
MT3S20TU

VHF-UHF Band Low-Noise, Low-Distortion Amplifier Applications

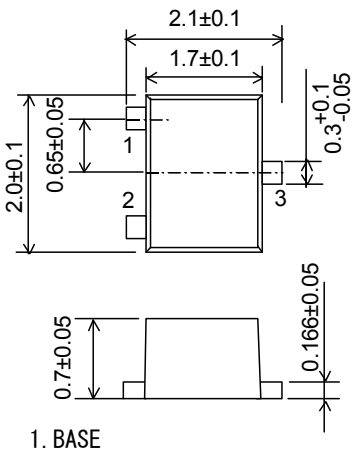
FEATURES

- Low Noise Figure:NF=1.45dB(Typ.) (@ f=1GHz)
- High Gain:$|S21e|^2$=12dB(Typ.) (@ f=1GHz)

Marking



Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

UFM

JEDEC	-
JEITA	-
TOSHIBA	2-2U1B

Weight: 6.6mg (typ.)

Absolute 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}	1.5	V
Collector current	I_C	80	mA
Base current	I_B	10	mA
Collector power dissipation	P_C(Note1)	900	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

Note.1 : The device is mounted on a ceramic board (25.4 mm x 25.4 mm x 0.8 mm (t))

Note.2 : 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_T	V_{CE}=5V,I_C=30mA	5	7	—	GHz
Insertion gain	$\|S21e\|^2$(1)	V_{CE}=5V,I_C=50mA,f=500MHz	—	17.5	—	dB
	$\|S21e\|^2$(2)	V_{CE}=5V,I_C=50mA,f=1GHz	10	12	—	
Noise figure	NF	V_{CE}=5V,I_C=20mA,f=1GHz	—	1.45	2	dB
3^{rd} order intermodulation distortion output intercept point	OIP3	V_{CE}=5V,I_C=50mA,f=500MHz, ⊿f=1MHz	26	30	—	dBmW

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB}=10V,I_E=0	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=1V,I_C=0	—	—	0.5	μA
DC current gain	h_{FE}	V_{CE}=5V,I_C=50mA	100	150	200	—
Reverse transfer capacitance	C_{re}	V_{CB}=5V,I_E=0, f=1MHz (Note3)	—	0.75	1	pF

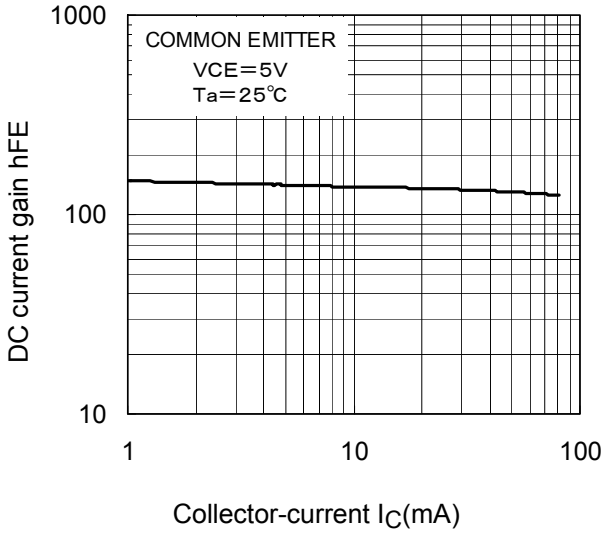
Note.3 : C_{re} is measured using a 3-terminal method with capacitance bridge

Caution:

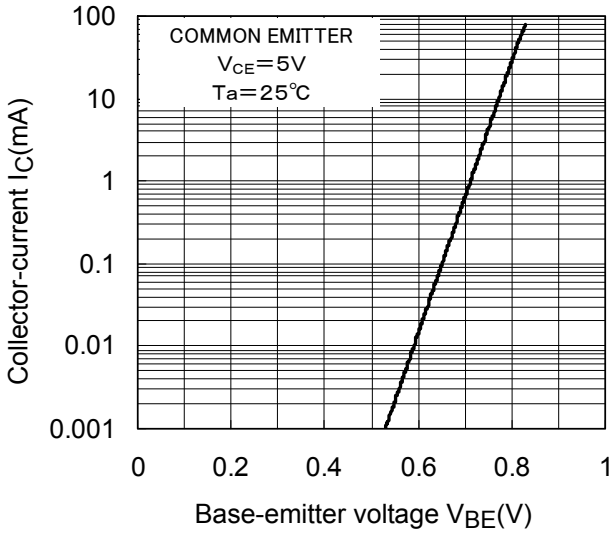
This device is sensitive to electrostatic discharge.

Please make enough tool and equipment earthed when you handle.

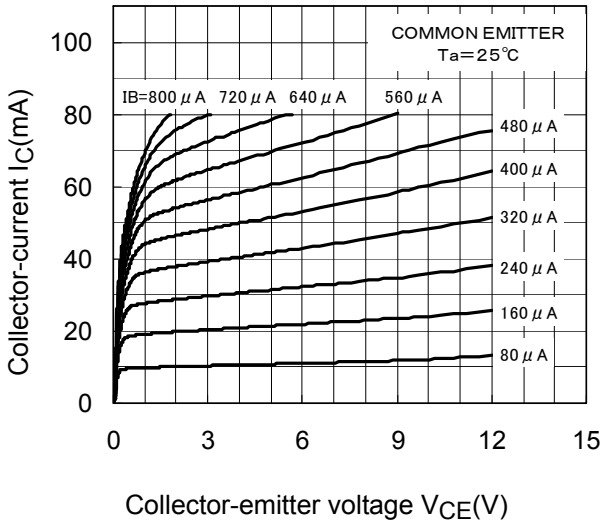
h_{FE}-I_C



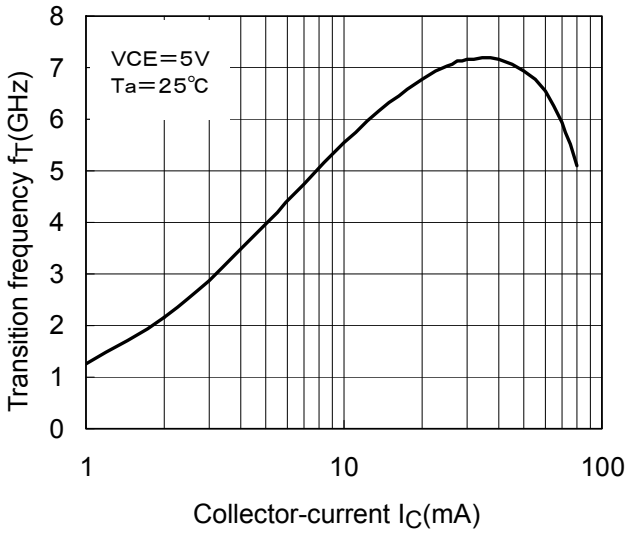
I_C-V_{BE}



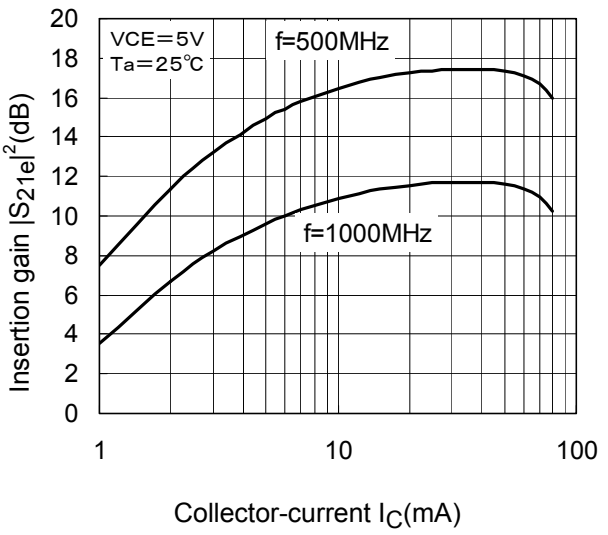
I_C-V_{CE}



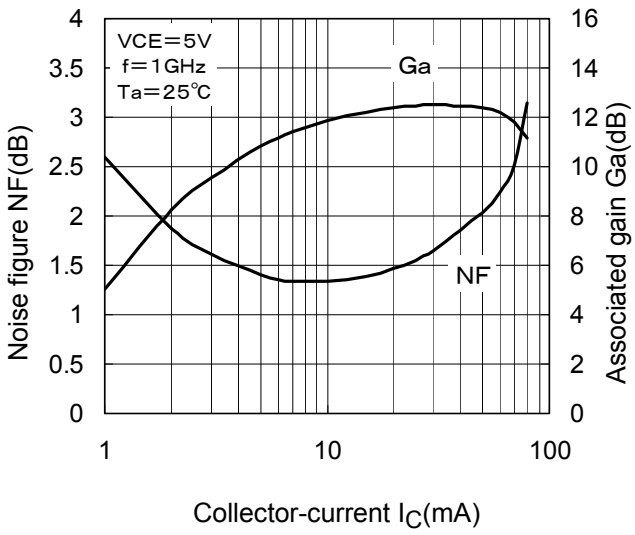
f_T-I_C



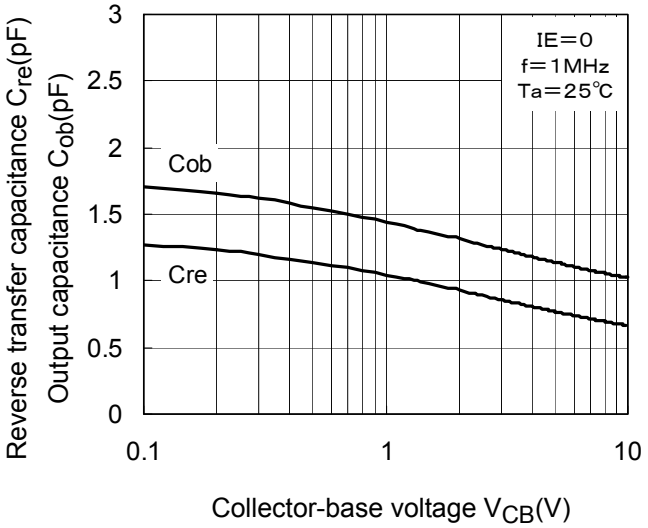
$|S_{21e}|^2$-I_C



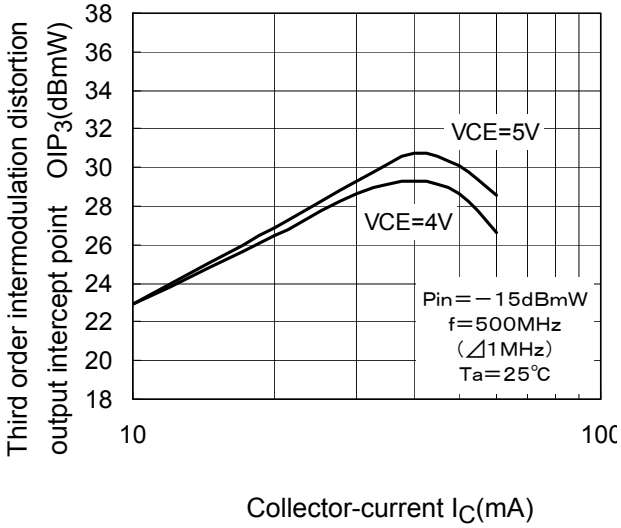
NF, Ga -I_C



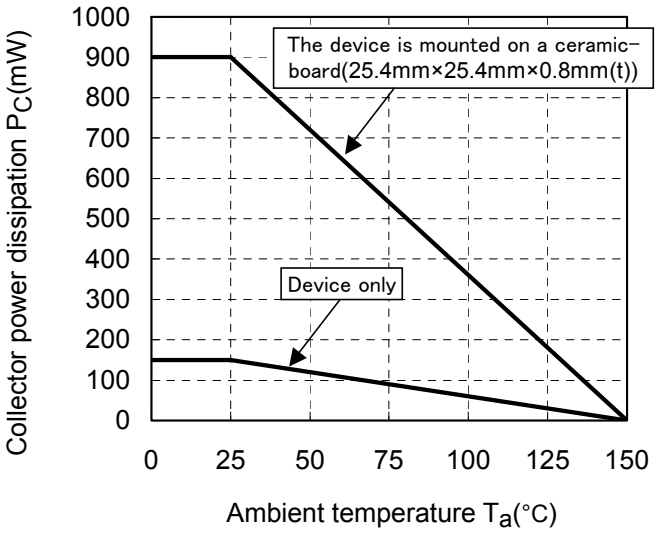
C_{re},C_{ob}-V_{CB}



OIP_3-I_C



P_C-T_a



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