

# MT3S20TU

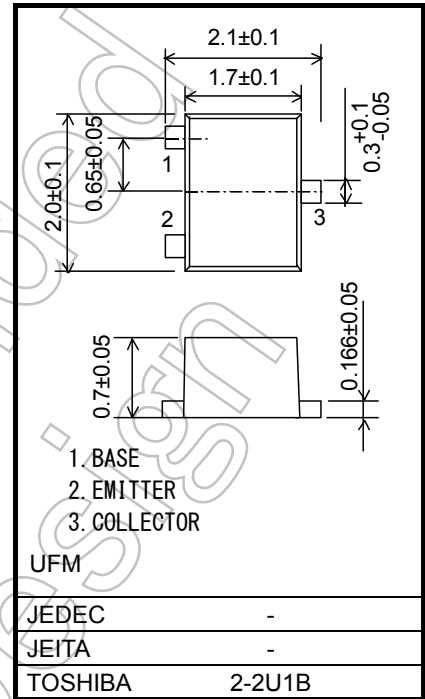
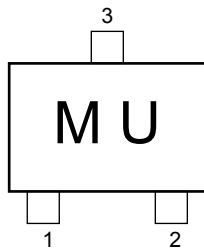
VHF-UHF Band Low-Noise, Low-Distortion Amplifier Applications

Unit: mm

## FEATURES

- Low Noise Figure: NF = 1.45dB (typ.) (@ f=1GHz)
- High Gain:  $|S_{21e}|^2 = 12\text{dB}$  (typ.) (@ f=1GHz)

## Marking



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).

Start of commercial production  
2008-02

**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	$ S_{21e} ^2(1)$	$V_{CE} = 5V, I_C = 50mA, f = 500MHz$	—	17.5	—	dB
	$ S_{21e} ^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 <sup>rd</sup> order intermodulation distortion output intercept point	OIP3	$V_{CE} = 5V, I_C = 50mA, f = 500MHz, \Delta f = 1MHz$	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	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 1V, I_C = 0$	—	—	0.5	$\mu A$
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

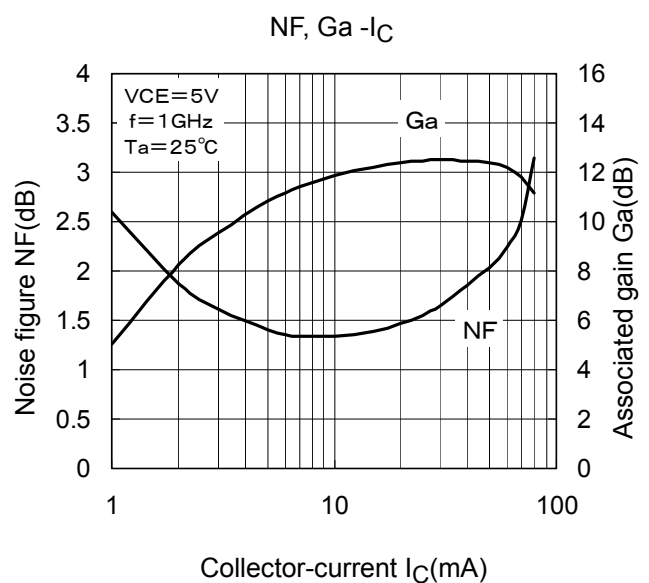
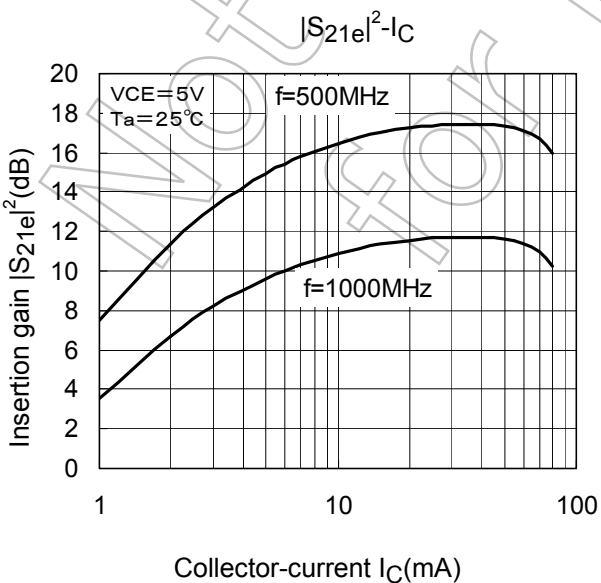
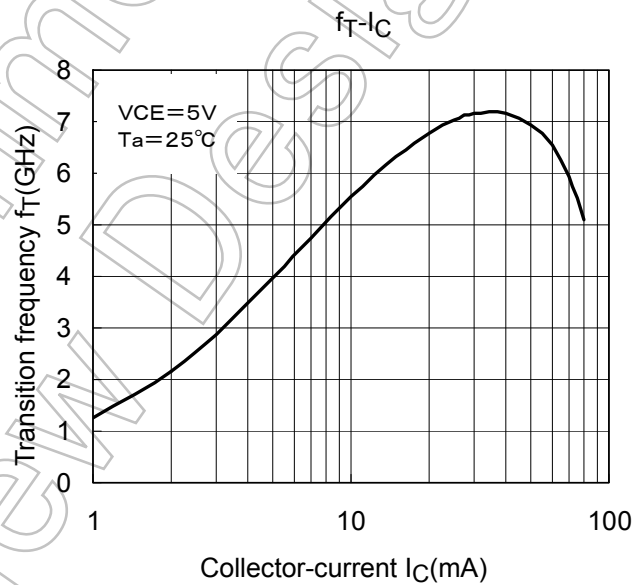
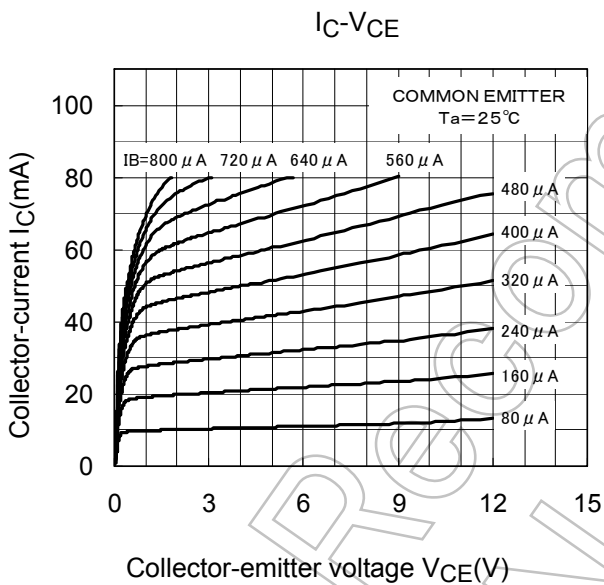
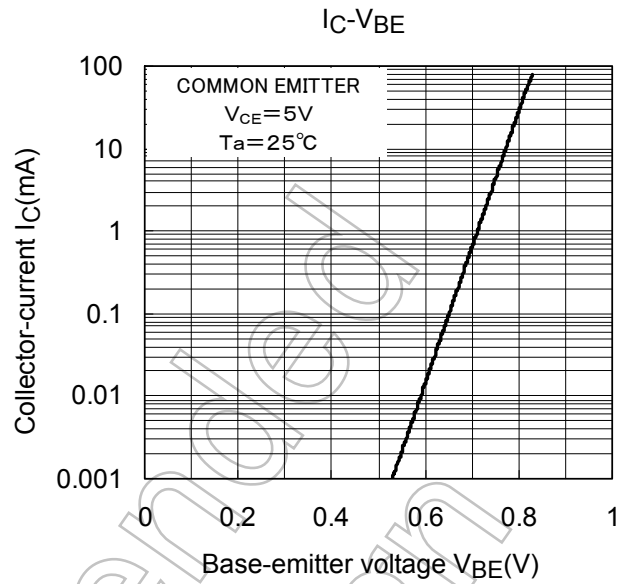
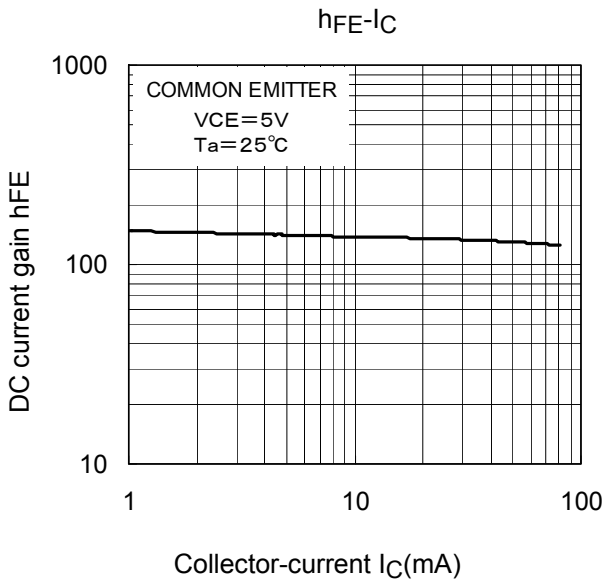
Note.3 :  $C_{re}$  is measured using a 3-terminal method with capacitance bridge

**Caution:**

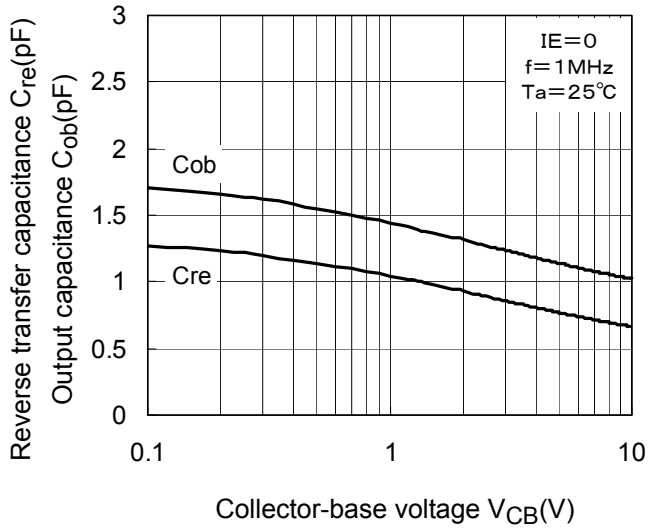
This device is sensitive to electrostatic discharge.

Please make enough tool and equipment earthed when you handle.

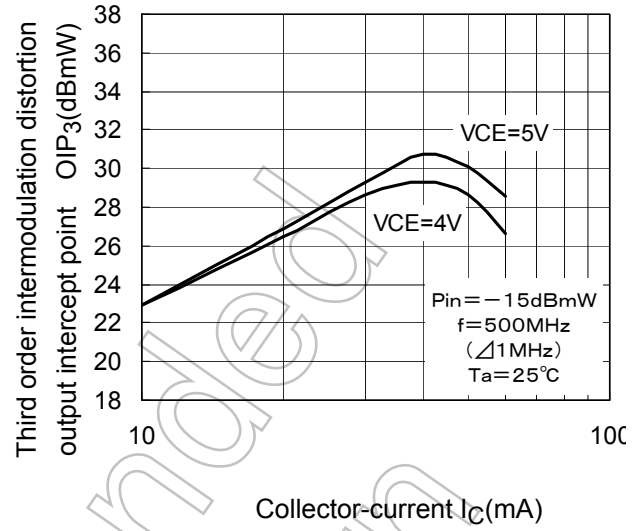
Not Recommended for New Design



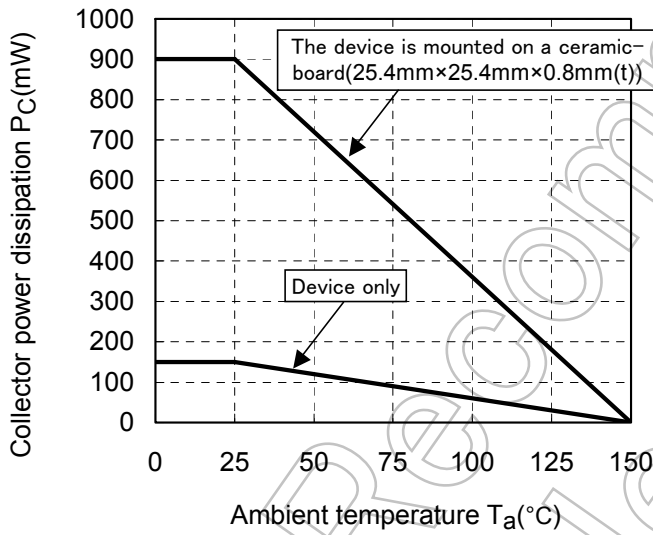
$C_{re}, C_{ob} - V_{CB}$



OIP<sub>3</sub>-I<sub>C</sub>



$P_C - T_a$



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