TOSHIBA Transistor GaAs NPN Epitaxial Mesa Type

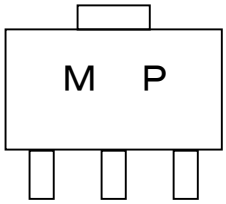
MT3S150P

VHF-UHF Low-Noise, Low-Distortion Amplifier Application

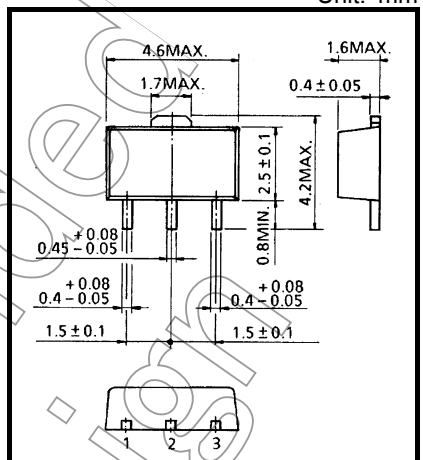
FEATURES

- Low Noise Figure: NF=0.95dB (@f=1 GHz)
- High Gain: $|S21e|^2$=11.5dB (@f=1 GHz)

Marking



Unit: mm



1. Base
2. Collector (heat sink)
3. Emitter

PW-Mini	
JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1A

Weight: 50 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	10	V
Collector-emitter voltage	V_{CEO}	8	V
Emitter-base voltage	V_{EBO}	3.0	V
Collector-current	I_C	90	mA
Base-current	I_B	7.5	mA
Collector power dissipation	P_C	300	mW
Collector power dissipation	P_C(Note 1)	650	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 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: The device is mounted on a ceramic board (250mm^2 X0.8 mm (t))

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE}=5V, I_C=50mA	13	17	—	GHz
Insertion gain	$\|S21e\|^2$(1)	V_{CE}=5V, I_C=50mA, f=500MHz	—	17	—	dB
	$\|S21e\|^2$(2)	V_{CE}=5V, I_C=50mA, f=1GHz	9.5	11.5	—	dB
Noise figure	NF(1)	V_{CE}=5V, I_C=10mA, f=500MHz	—	0.75	—	dB
	NF(2)	V_{CE}=5V, I_C=10mA, f=1GHz	—	0.95	1.5	dB
3rd order intermodulation distortion output intercept point	OIP3	V_{CE}=5V,I_C=50mA,f=100MHz, ⊿f=1MHz	—	35	—	dBmW

Electrical Characteristics (Ta = 25°C)

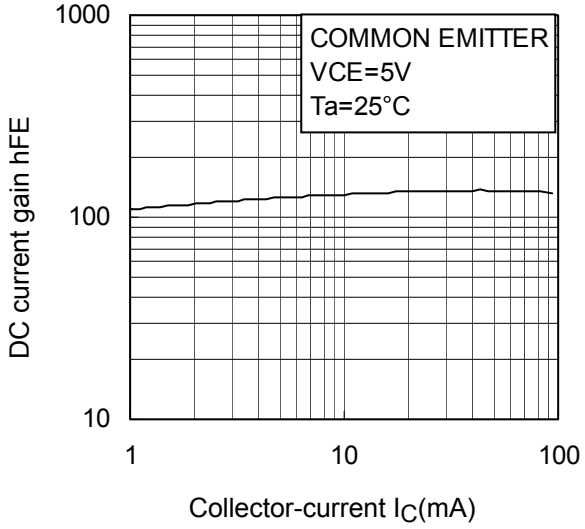
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB}=8V, I_E=0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=2V, I_C=0	—	—	1	μA
DC current gain	hFE	V_{CE}=5V, I_C=50mA	100	—	200	—
Output capacitance	C_{ob}	V_{CB}=5V, I_E=0, f=1MHz	—	1.15	—	pF
Reverse transfer capacitance	C_{re}	V_{CB}=5V, I_E=0, f=1MHz (Note 1)	—	0.85	—	pF

Note 1: C_{re} is measured using a 3-terminal method with capacitance bridge.

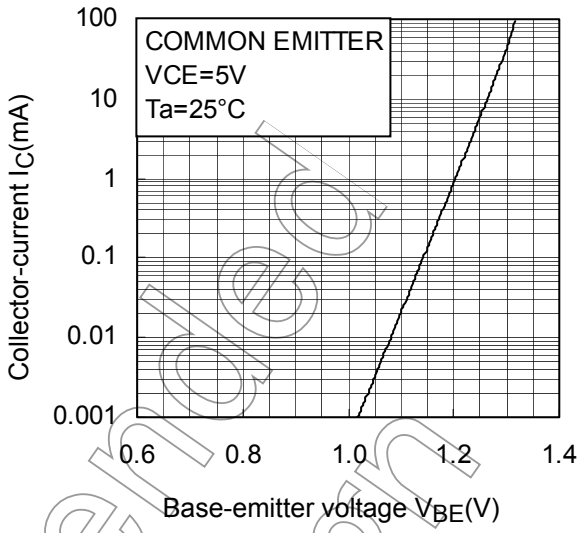
Caution: 1. This device is sensitive to electrostatic discharge.
Be sure to provide all tools and equipment with adequate grounding.

2. This device may be subject to damage from thermal stress. Observe the precautions below.
- Avoid using soldering irons for soldering under mass production.
- A device once removed from a printed circuit board by using a soldering iron should not be re-used for mass-produced equipment.
- If using soldering irons to perform soldering when conducting any kind of evaluation, be sure to complete the soldering within five seconds at a temperature of 270° C or less.

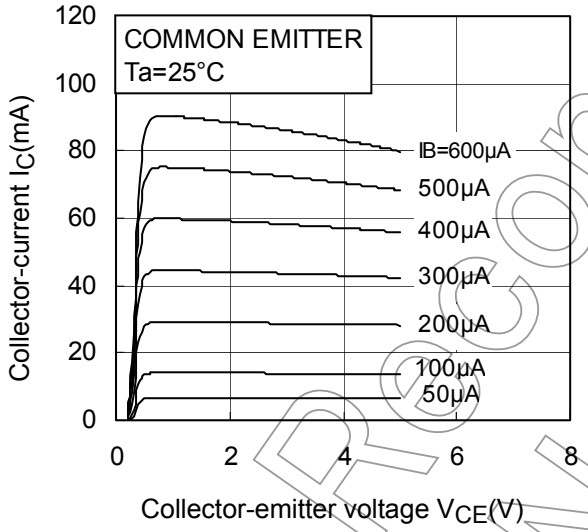
h_{FE}-I_C



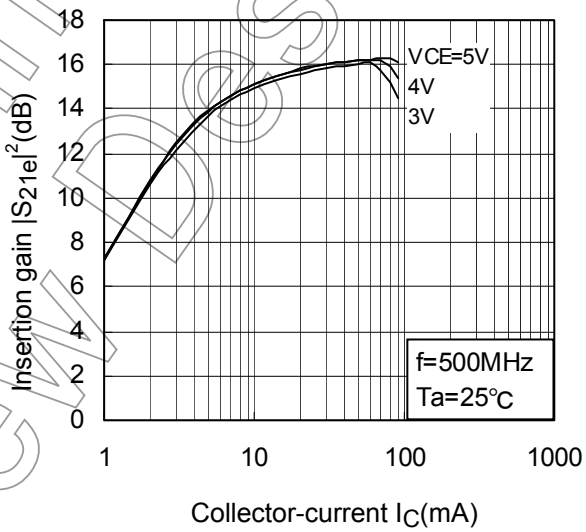
I_C-V_{BE}



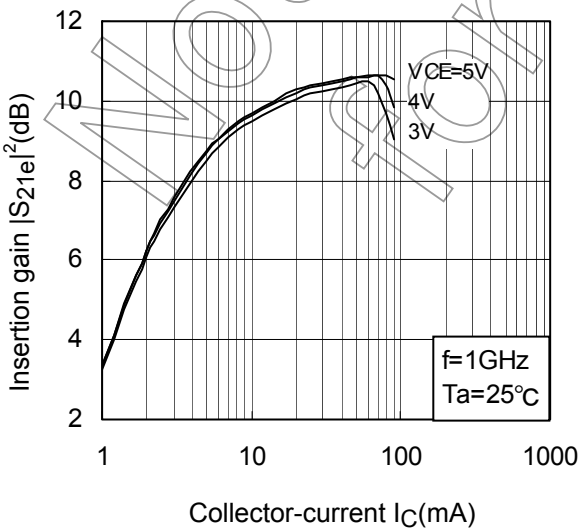
I_C-V_{CE}



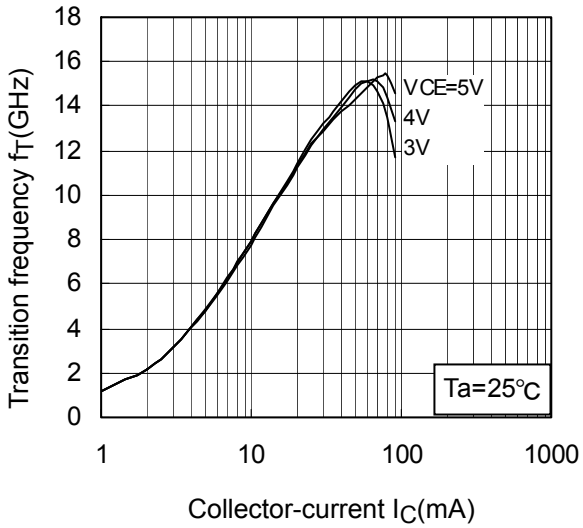
$|S_{21e}|^2$-I_C



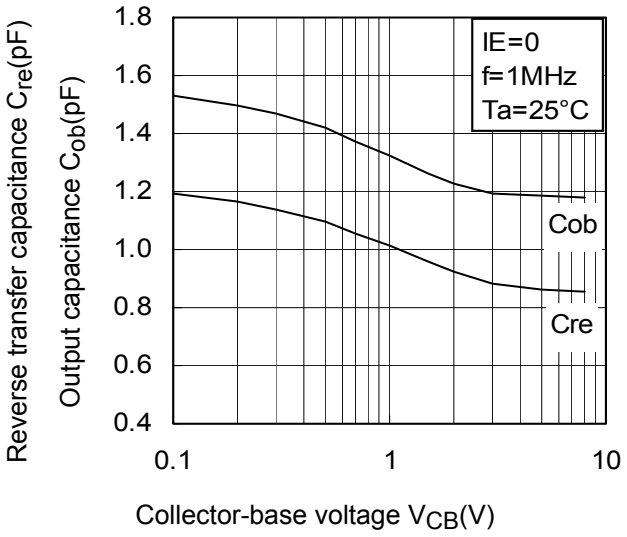
$|S_{21e}|^2$-I_C



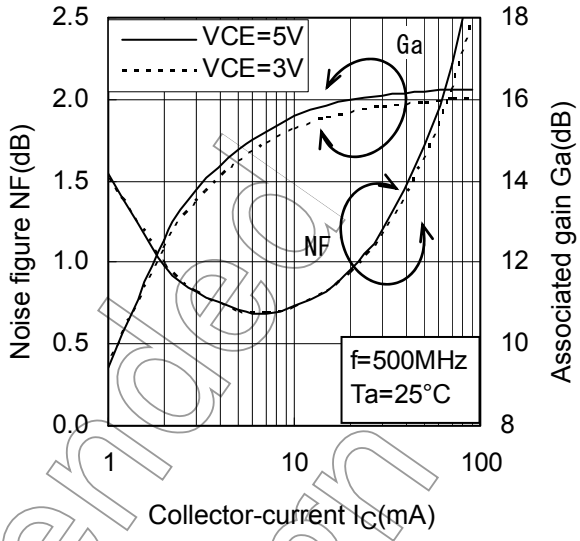
f_T-I_C



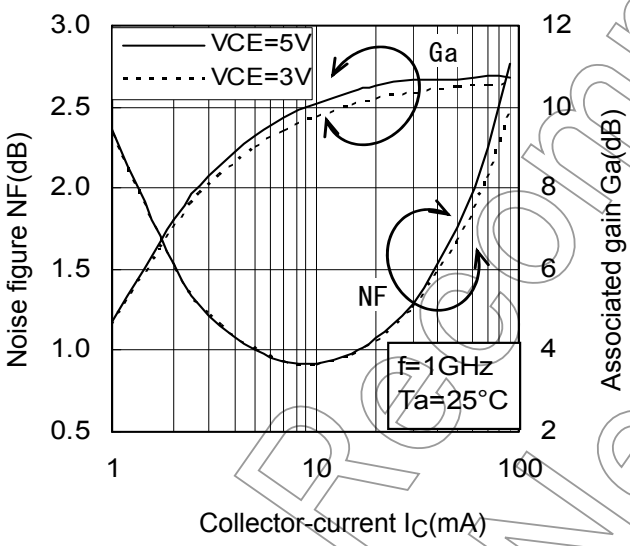
C_{re},C_{ob}-V_{CB}



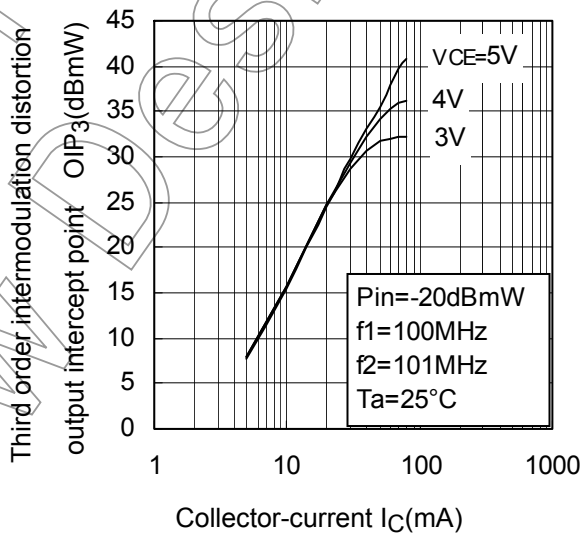
NF-I_C



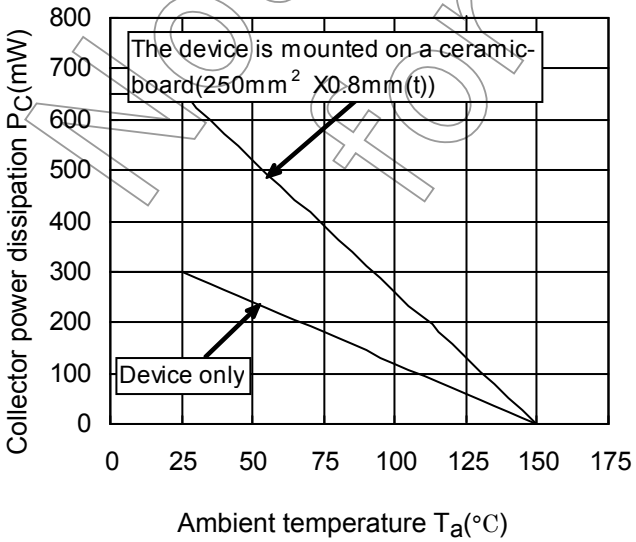
NF-I_C



OIP_3-I_C



P_C-T_a



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