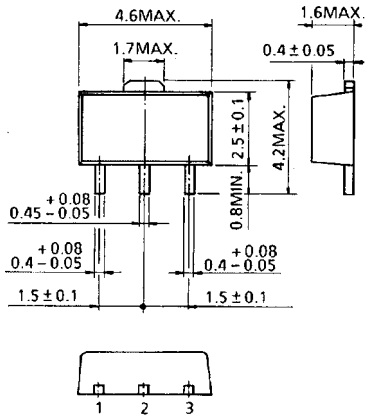
TOSHIBA Transistor GaAs NPN Epitaxial Mesa Type

MTG3S01AP

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

Unit:mm



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

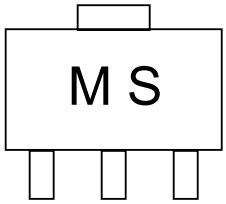
JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1A

Weight:0.05g

FEATURES

- Low Noise Figure: NF=1.0dB (@f=1GHz)
- High Gain: $|S21e|^2$=11.0dB (@f=1GHz)

Marking



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	9	V
Collector-emitter voltage	V_{CEO}	7	V
Emitter-base voltage	V_{EBO}	3	V
Collector-current	I_C	90	mA
Base-current	I_B	7.5	mA
Collector power dissipation	Pc(Note1,2)	300	mW
	P_C(Note2)	630	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

Note 1: Reference Pad Dimension.
Note 2: The device is mounted on a glass-epoxy printed circuit board (645mm^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	12	15	—	GHz
Insertion gain	$\|S21e\|^2$(1)	V_{CE}=5V, I_C=50mA, f=500MHz	—	16.5	—	dB
	$\|S21e\|^2$(2)	V_{CE}=5V, I_C=50mA, f=1GHz	9.5	11.0	—	dB
Noise figure	NF(1)	V_{CE}=5V, I_C=10mA, f=500MHz Zs=ZL=50Ω	—	0.7	—	dB
	NF(2)	V_{CE}=5V, I_C=10mA, f=1GHz Zs=ZL=50Ω	—	1.0	1.5	dB
	NF(3)	V_{CE}=5V, I_C=50mA, f=1GHz Zs=ZL=50Ω	—	1.3	—	dB
3rd order intermodulation distortion output intercept point	OIP3	V_{CE}=5V,I_C=50mA,f=100MHz, ⊿f=1MHz	—	34	—	dBmW

Electrical Characteristics (Ta = 25°C)

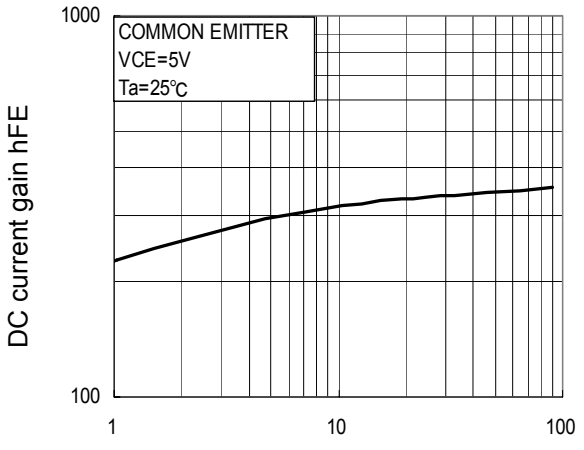
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB}=8V, I_E=0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=2V, I_C=0	—	—	1	μA
DC current gain	hFE	V_{CE}=5V, I_C=50mA	230	—	450	-
Output capacitance	C_{ob}	V_{CB}=5V, I_E=0, f=1MHz	—	1.18	—	pF
Reverse transfer capacitance	C_{re}	V_{CB}=5V, I_E=0, f=1MHz (Note 1)	—	0.87	—	pF

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

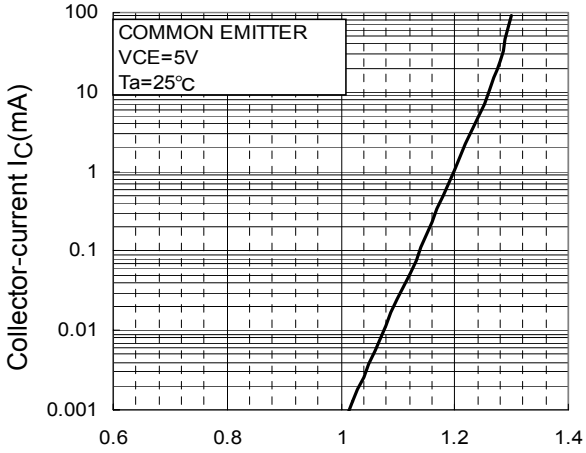
Caution: 1. This device is sensitive to electrostatic discharge.
Be sure to provide all tools and equipment with adequate grounding.

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 ten seconds at a temperature of 260° C or less.

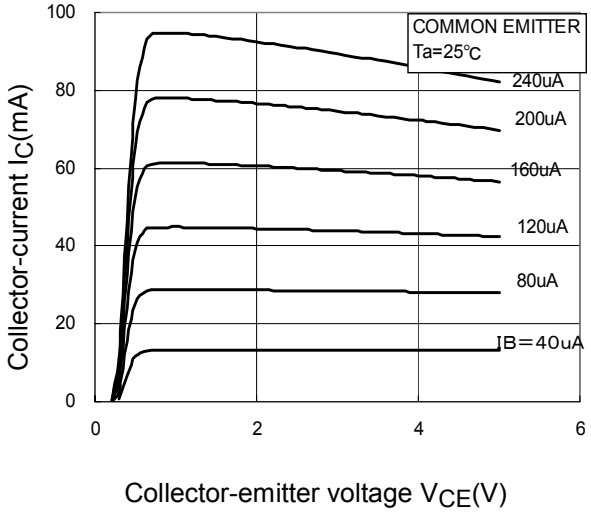
h_{FE}-I_C



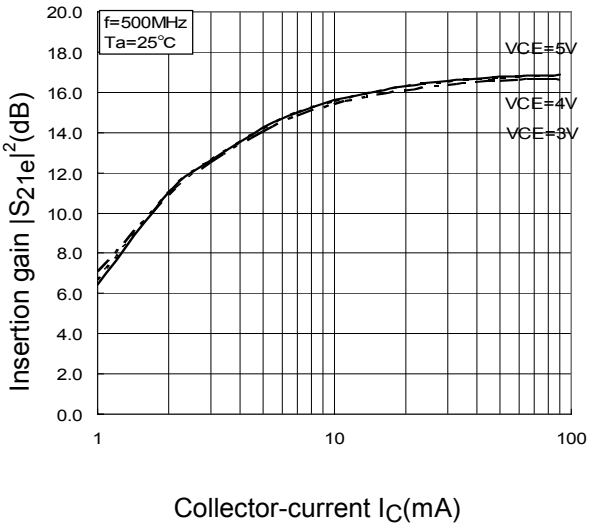
I_C-V_{BE}



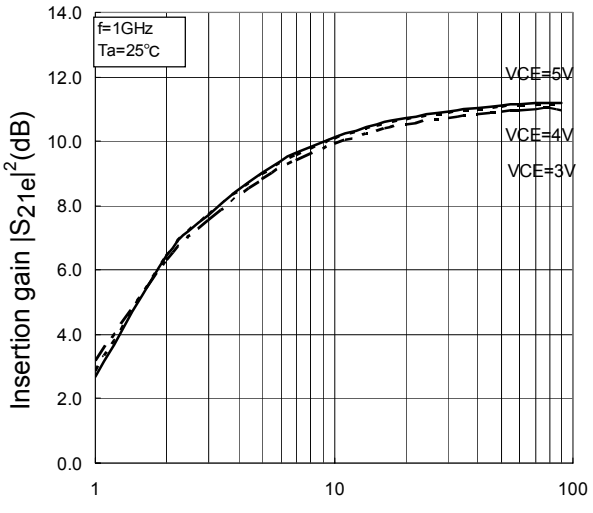
I_C-V_{CE}



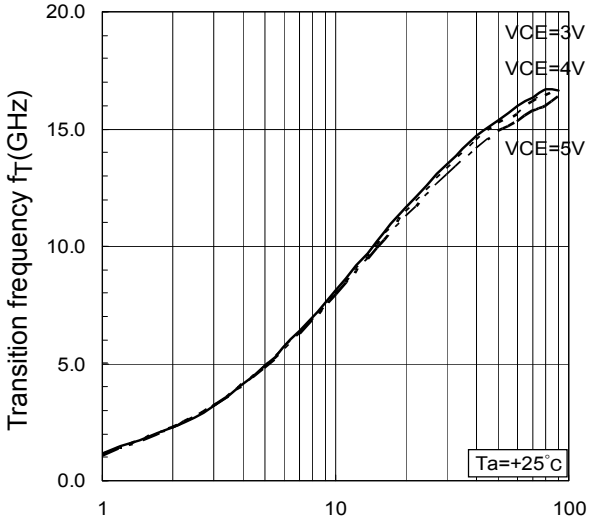
$|S_{21e}|^2$-I_C



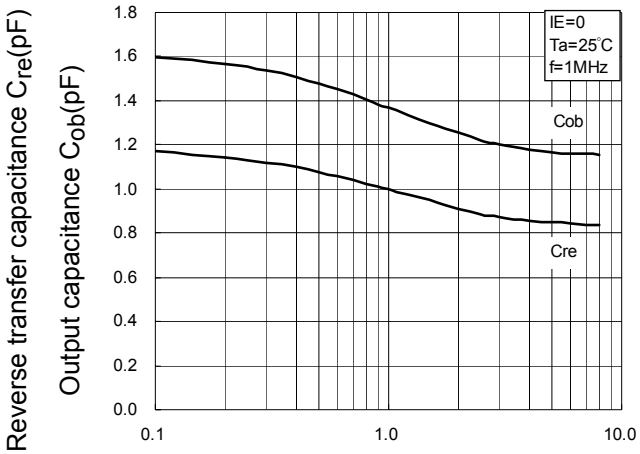
$|S_{21e}|^2$-I_C



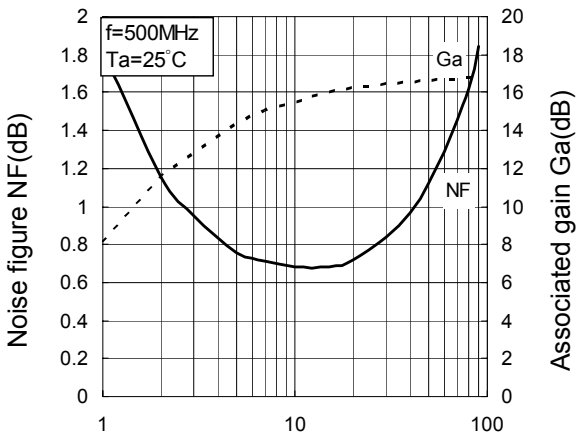
f_T-I_C



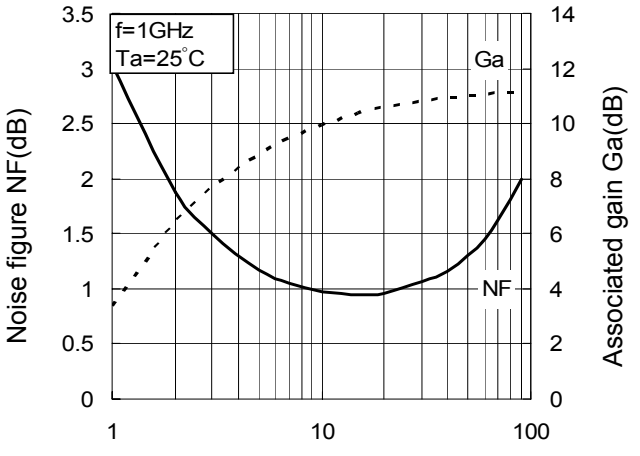
C_{re},C_{ob}-V_{CB}



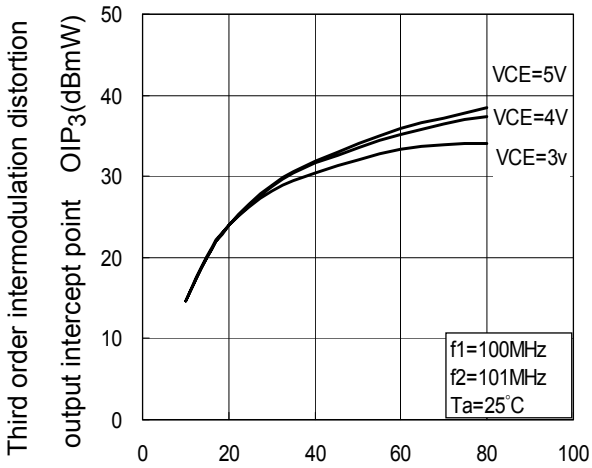
NF-I_C



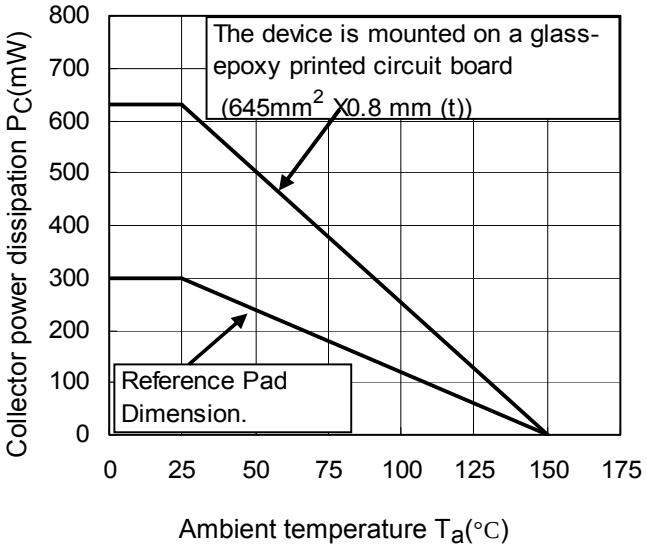
NF-I_C



OIP_3-I_C



P_C-T_a



RESTRICTIONS ON PRODUCT USE

060116EAC

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- GaAs(Gallium Arsenide) is used in this product. The dust or vapor is harmful to the human body. Do not break, cut, crush or dissolve chemically.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.