

# MT3S19

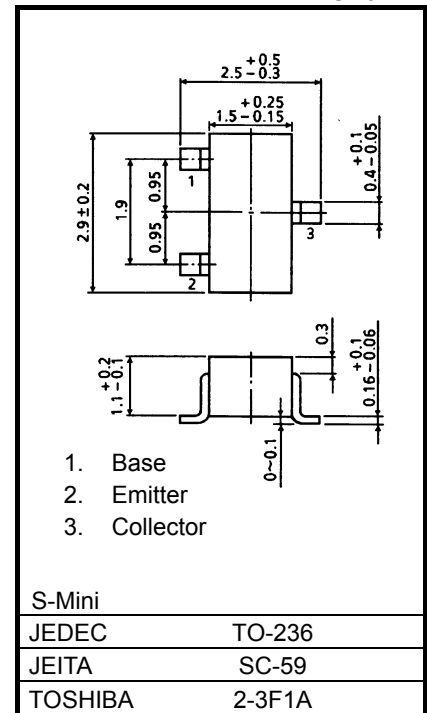
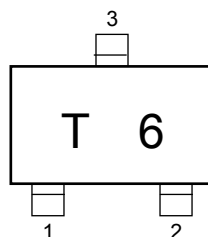
VHF-UHF Low-Noise, Low-Distortion Amplifier Applications

Unit: mm

## Features

- Low-Noise Figure:  $NF=1.5$  dB (typ.) (@  $f=1$  GHz)
- High Gain:  $|S_{21e}|^2=12.5$  dB (typ.) (@  $f=1$  GHz)

## Marking



Weight: 0.012 g (typ.)

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	12	V
Collector-emitter voltage	$V_{CEO}$	6	V
Emitter-base voltage	$V_{EBO}$	2	V
Collector-current	$I_C$	80	mA
Base-current	$I_B$	10	mA
Collector power dissipation	$P_C$	180	mW
	$P_{C(\text{Note 1})}$	800	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{\text{stg}}$	-55 to 150	$^\circ\text{C}$

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	$f_T$	$V_{CE}=5\text{ V}, I_C=50\text{ mA}$	10	12	—	GHz
Insertion gain	$ S_{21e} ^2(1)$	$V_{CE}=5\text{ V}, I_C=50\text{ mA}, f=500\text{ MHz}$	—	18	—	dB
	$ S_{21e} ^2(2)$	$V_{CE}=5\text{ V}, I_C=50\text{ mA}, f=1\text{ GHz}$	10.5	12.5	—	
Noise figure	NF	$V_{CE}=5\text{ V}, I_C=20\text{ mA}, f=1\text{ GHz}$	—	1.5	1.9	dB
3 <sup>rd</sup> order intermodulation distortion output intercept point	OIP <sub>3</sub>	$V_{CE}=5\text{ V}, I_C=50\text{ mA}, f=500\text{ MHz}, \angle f=1\text{ MHz}$	29.5	33.5	—	dBmW

**Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB}=6\text{ V}, I_E=0\text{ mA}$	—	—	100	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB}=1\text{ V}, I_C=0\text{ mA}$	—	—	100	nA
DC current gain	$h_{FE}$	$V_{CE}=5\text{ V}, I_C=50\text{ mA}$	100	160	250	—
Reverse transfer capacitance	$C_{re}$	$V_{CB}=5\text{ V}, I_E=0\text{ mA}, f=1\text{ MHz (Note 3)}$	—	0.7	0.95	pF

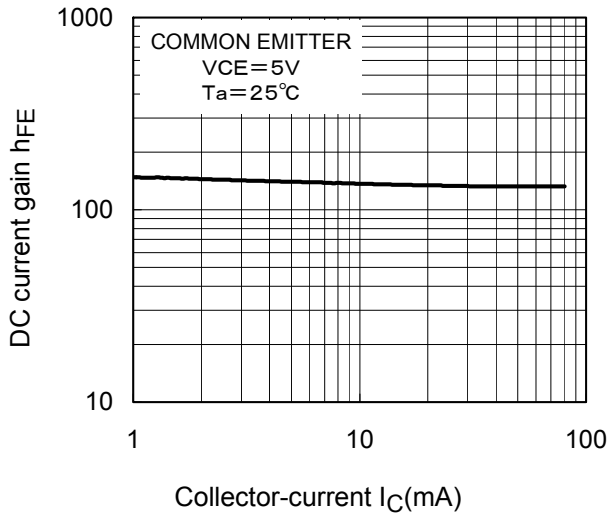
Note 3:  $C_{re}$  is measured using a 3-terminal method with capacitance bridge

**Caution:**

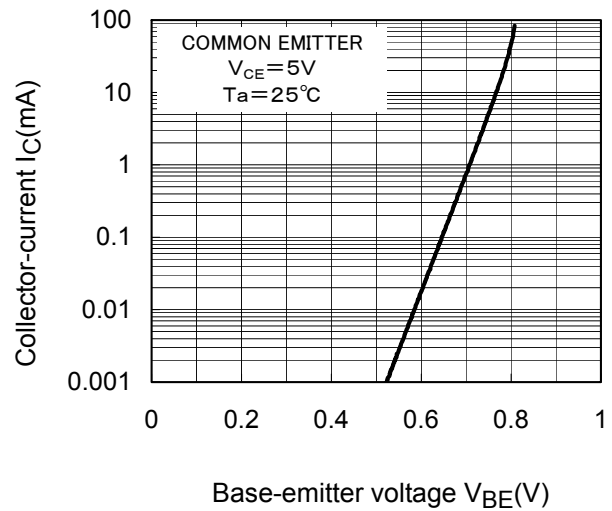
This device is sensitive to electrostatic discharge.

Please make tool and equipment earthed enough when you handle.

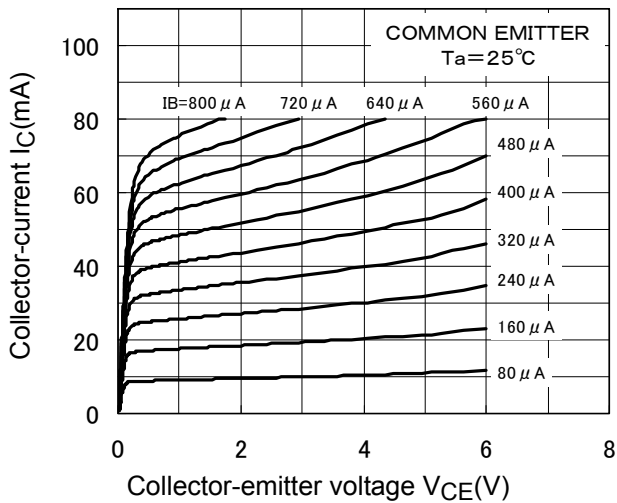
### $h_{FE}-I_C$



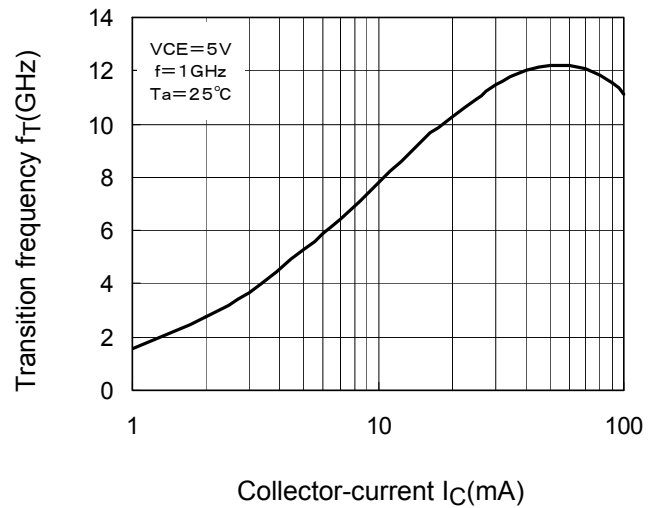
### $I_C-V_{BE}$



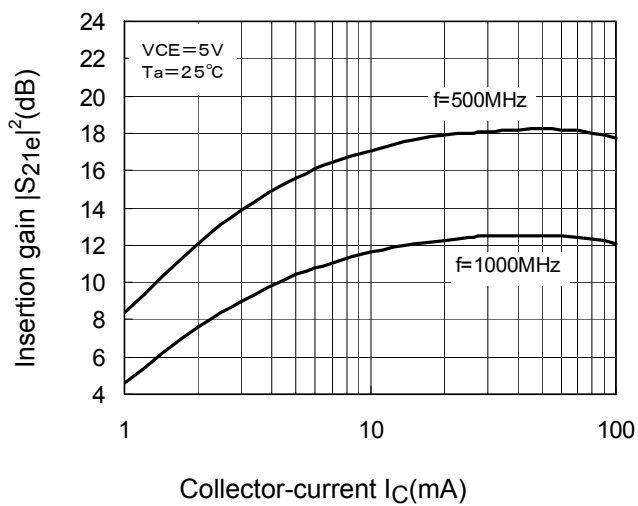
### $I_C-V_{CE}$



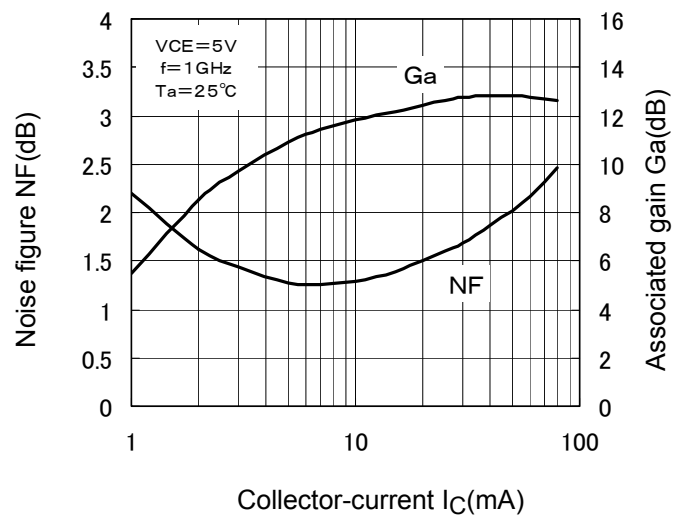
### $f_T-I_C$



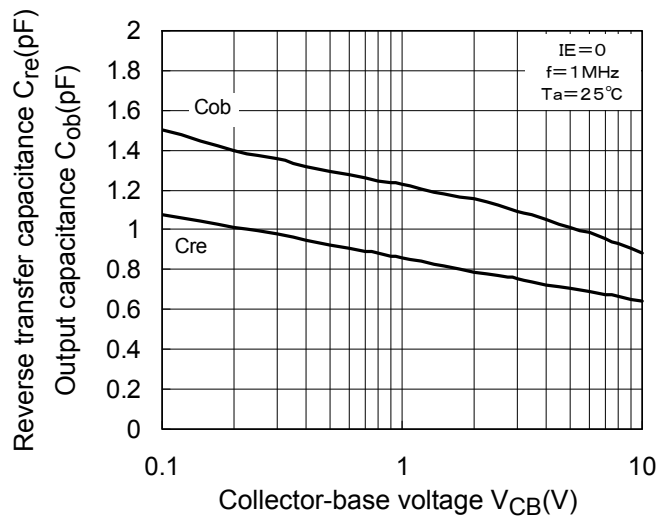
### $|S_{21e}|^2-I_C$



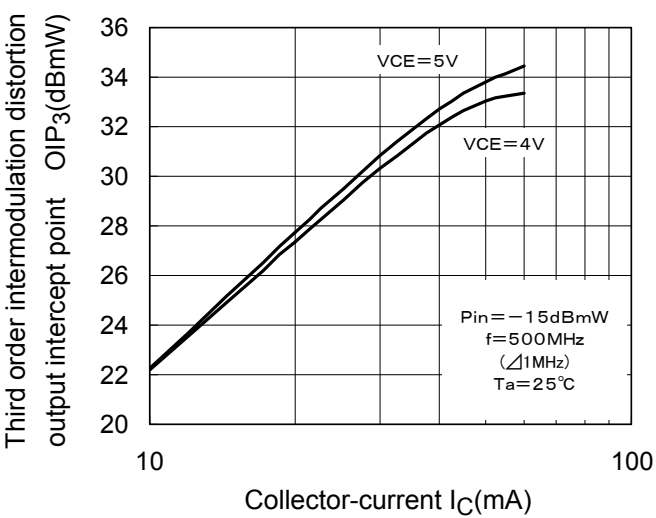
### NF, Ga - $I_C$



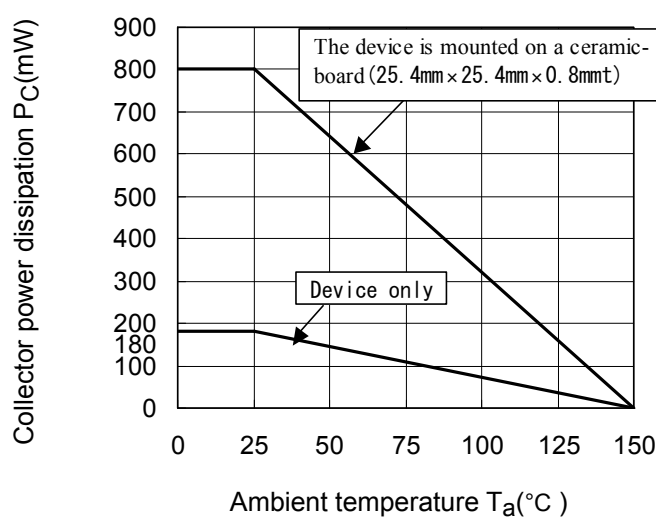
$C_{re}, C_{ob}-V_{CB}$



$OIP_3-I_C$



$P_C-T_a$



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