

# MSG36D42

## SiGe HBT type

For low-noise RF amplifier

### ■ Features

- Compatible between high breakdown voltage and high cutoff frequency
- Low-noise, high-gain amplification
- Two elements incorporated into one package (Each transistor is separated)
- SSSMini type package, reduction of the mounting area and assembly cost

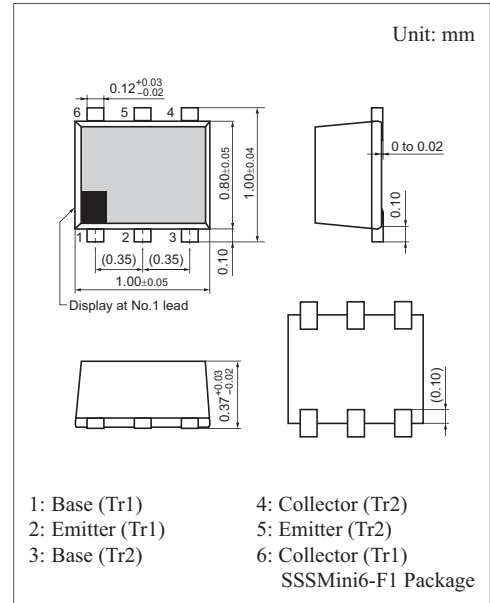
### ■ Basic Part Number

- MSG330D4 + MSG33002

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

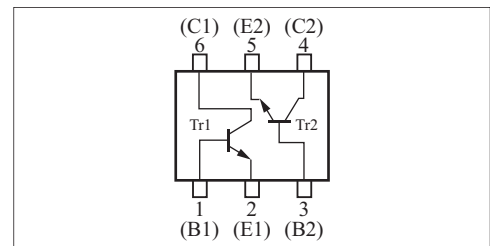
	Parameter	Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	9	V
	Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	6	V
	Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	1	V
	Collector current	$I_{\text{C}}$	100	mA
Tr2	Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	9	V
	Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	6	V
	Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	1	V
	Collector current	$I_{\text{C}}$	60	mA
Overall	Total power dissipation *	$P_{\text{T}}$	125	mW
	Junction temperature	$T_{\text{j}}$	125	$^\circ\text{C}$
	Storage temperature	$T_{\text{stg}}$	-55 to +125	$^\circ\text{C}$

Note) Copper plate at the collector is  $5.0 \text{ mm}^2$  on substrate at  $10 \text{ mm} \times 12 \text{ mm} \times 0.8 \text{ mm}$ .



Marking Symbol: 6E

Internal Connection



### ■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

#### • Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	$I_{\text{CBO}}$	$V_{\text{CB}} = 9 \text{ V}, I_{\text{E}} = 0$			1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)	$I_{\text{CEO}}$	$V_{\text{CE}} = 6 \text{ V}, I_{\text{B}} = 0$			1	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{\text{EBO}}$	$V_{\text{EB}} = 1 \text{ V}, I_{\text{C}} = 0$			1	$\mu\text{A}$
Forward current transfer ratio	$h_{\text{FE}}$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 15 \text{ mA}$	100		220	—
Transition frequency *	$f_{\text{T}}$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 30 \text{ mA}, f = 2 \text{ GHz}$		14		GHz
Forward transfer gain *	$ S_{21e} ^2$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 30 \text{ mA}, f = 2 \text{ GHz}$	3.0	6.0		dB
Noise figure *	NF	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 15 \text{ mA}, f = 2 \text{ GHz}$		1.6	2.2	dB
Collector output capacitance (Common base, input open circuited) *	$C_{\text{ob}}$	$V_{\text{CB}} = 3 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$		1.0	1.3	pF

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. Observe precautions for handling. Electrostatic sensitive devices.

3. \*: Verified by random sampling

#### • Tr2

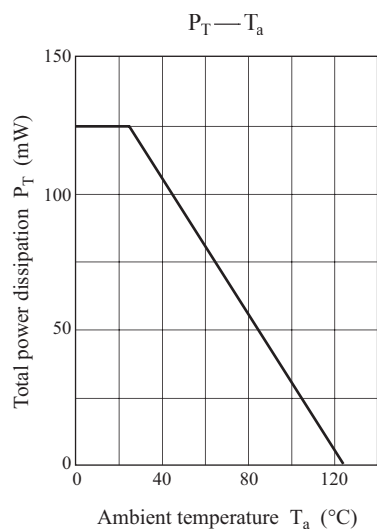
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	$I_{\text{CBO}}$	$V_{\text{CB}} = 9 \text{ V}, I_{\text{E}} = 0$			1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)	$I_{\text{CEO}}$	$V_{\text{CE}} = 6 \text{ V}, I_{\text{B}} = 0$			1	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{\text{EBO}}$	$V_{\text{EB}} = 1 \text{ V}, I_{\text{C}} = 0$			1	$\mu\text{A}$
Forward current transfer ratio	$h_{\text{FE}}$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 6 \text{ mA}$	100		220	—
Transition frequency *	$f_{\text{T}}$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 20 \text{ mA}, f = 2 \text{ GHz}$		19		GHz
Forward transfer gain *	$ S_{21e} ^2$	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 20 \text{ mA}, f = 2 \text{ GHz}$	7.5	10.5		dB
Noise figure *	NF	$V_{\text{CE}} = 3 \text{ V}, I_{\text{C}} = 6 \text{ mA}, f = 2 \text{ GHz}$		1.4	2.0	dB
Collector output capacitance (Common base, input open circuited) *	$C_{\text{ob}}$	$V_{\text{CB}} = 3 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$		0.3	0.6	pF

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

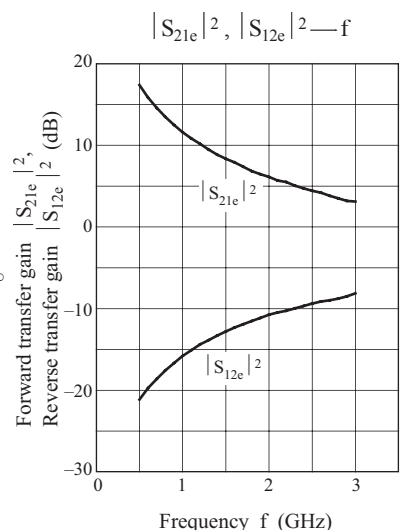
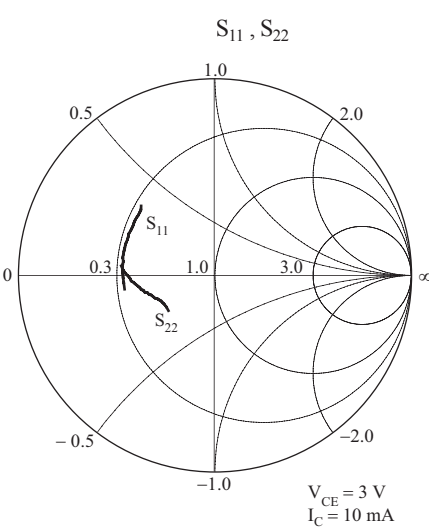
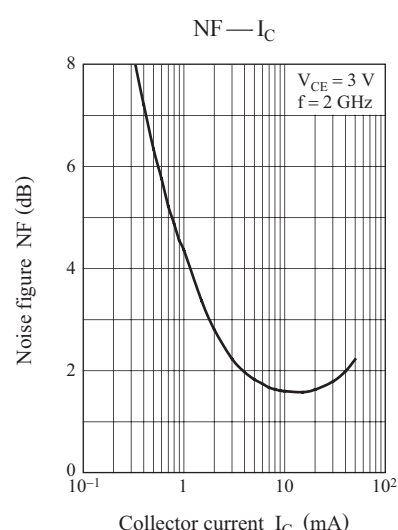
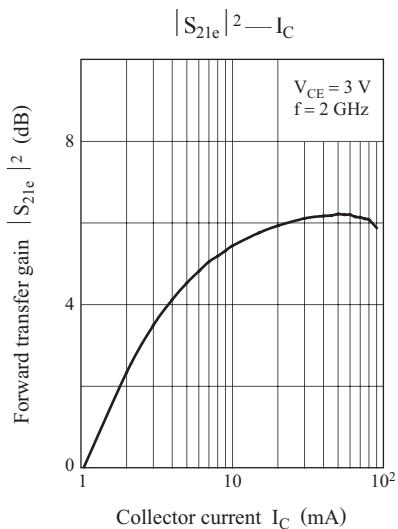
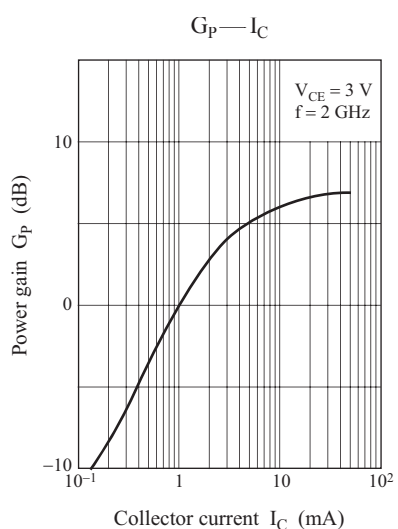
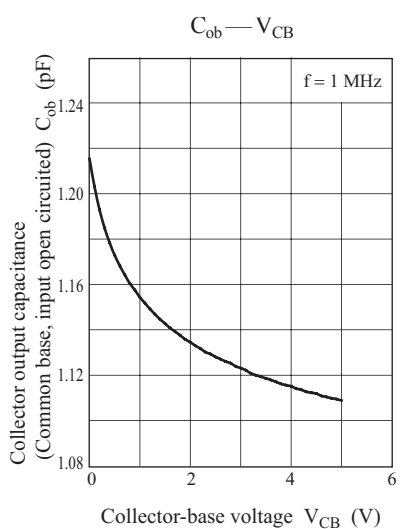
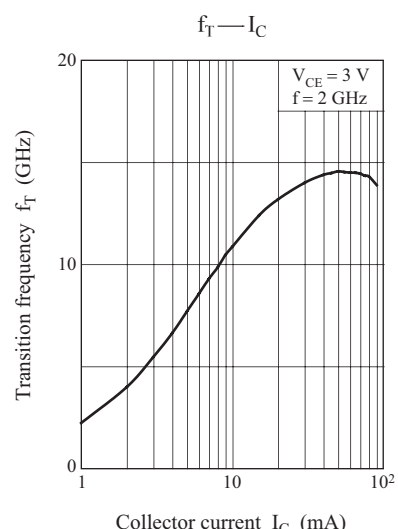
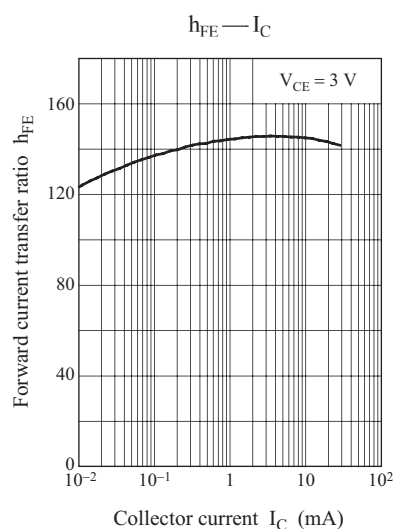
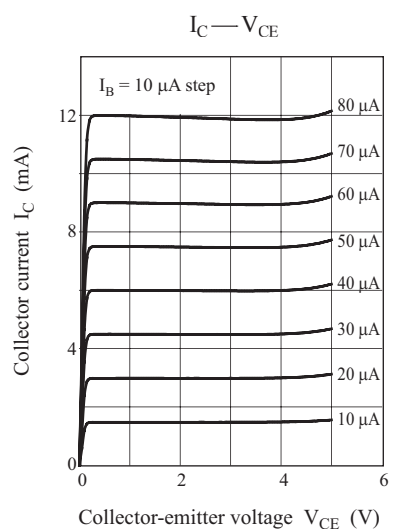
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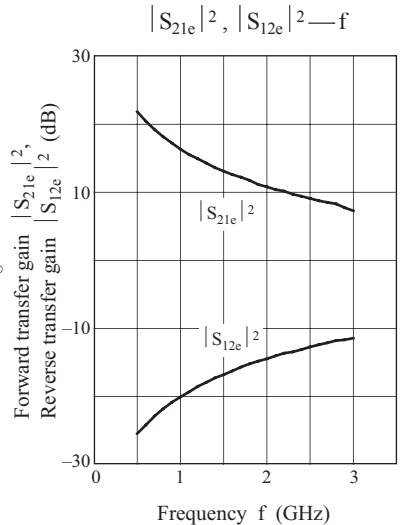
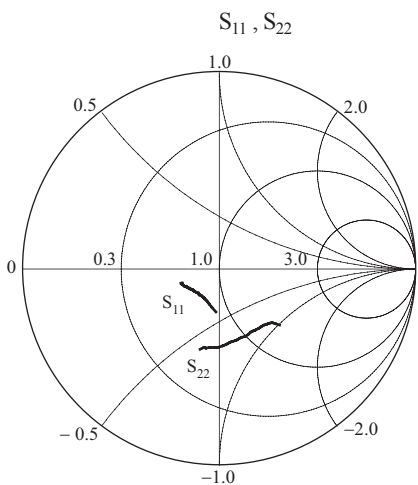
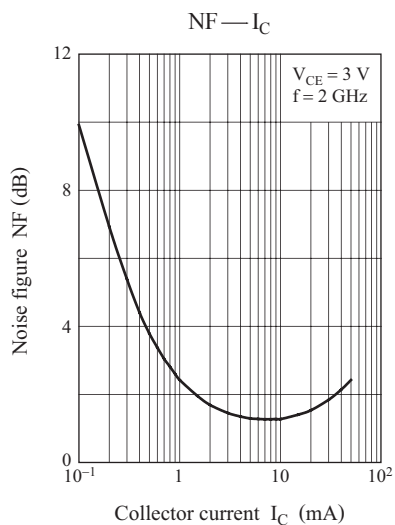
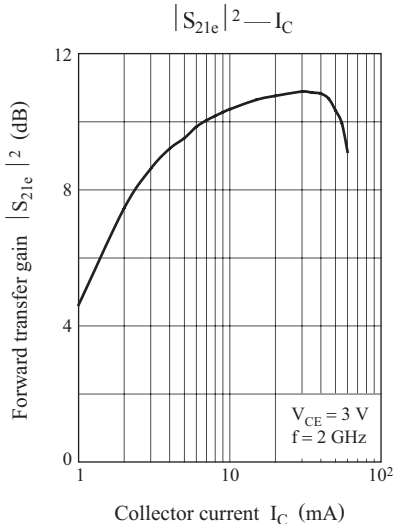
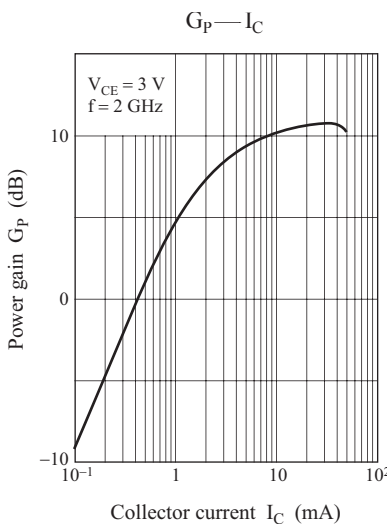
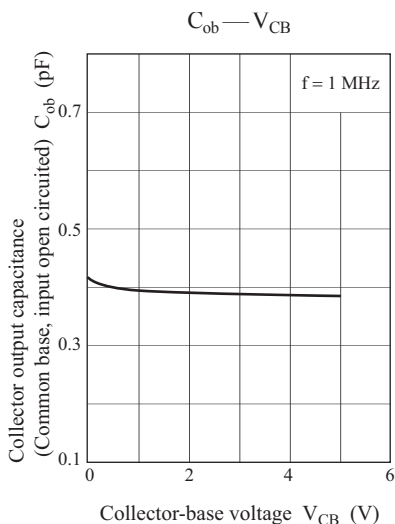
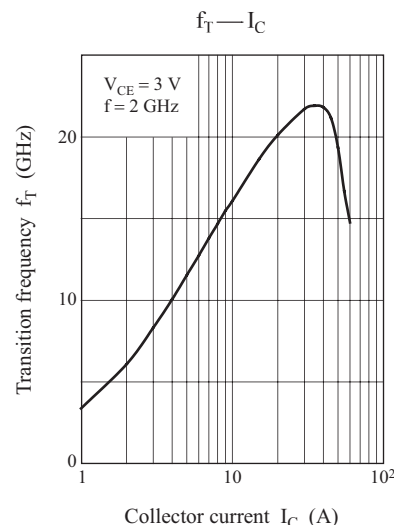
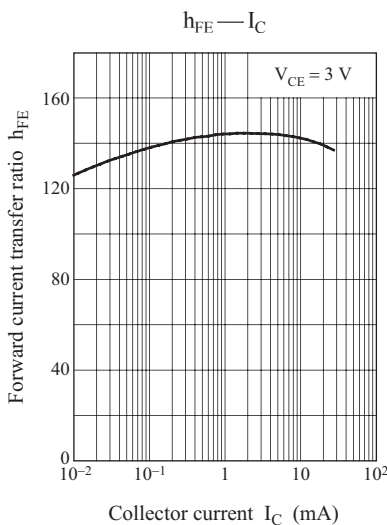
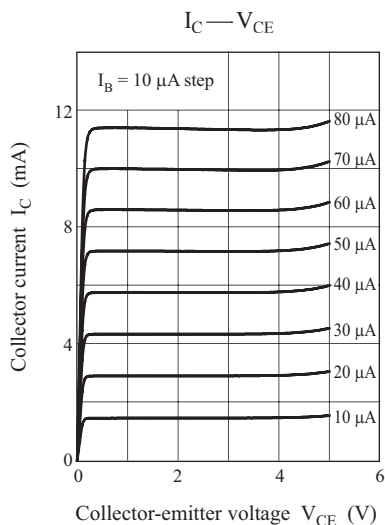
#### Common characteristics chart



Characteristics charts of Tr1



Characteristics charts of Tr2



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