

MSG36E31

SiGe HBT type

For low-noise RF amplifier

■ Features

- Compatible between high breakdown voltage and high cut-off frequency
- Low noise, high-gain amplification
- Two elements incorporated into one package (Each transistor is separated)
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- MSG33003 + MSG33001

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

	Parameter	Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	9	V
	Collector-emitter voltage (Base open)	V_{CEO}	6	V
	Emitter-base voltage (Collector open)	V_{EBO}	1	V
	Collector current	I_{C}	100	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	9	V
	Collector-emitter voltage (Base open)	V_{CEO}	6	V
	Emitter-base voltage (Collector open)	V_{EBO}	1	V
	Collector current	I_{C}	30	mA
Overall	Total power dissipation *	P_{T}	125	mW
	Junction temperature	T_{j}	125	$^\circ\text{C}$
	Storage temperature	T_{stg}	-55 to +125	$^\circ\text{C}$

Note) *: Copper plate at the collector is 5.0 cm² on substrate at 10 mm × 12 mm × 0.8 mm.

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

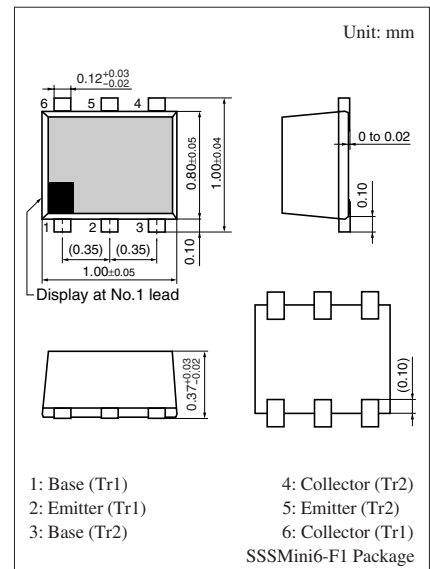
- Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = 9\text{ V}, I_{\text{E}} = 0$			1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = 6\text{ V}, I_{\text{B}} = 0$			1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = 1\text{ V}, I_{\text{C}} = 0$			1	μA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 10\text{ mA}$	100		220	—
Transition frequency *	f_{T}	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 30\text{ mA}, f = 2\text{ GHz}$		19		GHz
Forward transfer gain *	$ S_{21e} ^2$	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 30\text{ mA}, f = 2\text{ GHz}$	7.0	10.0		dB
Noise figure *	NF	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 10\text{ mA}, f = 2\text{ GHz}$		1.4	2.0	dB
Collector output capacitance (Common base, input open circuited) *	C_{ob}	$V_{\text{CB}} = 3\text{ V}, I_{\text{E}} = 0, f = 1\text{ MHz}$		0.5	0.8	pF

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

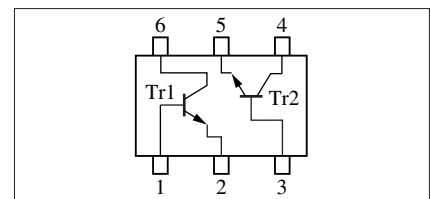
2. Observe precautions for handling. Electrostatic sensitive devices.

3. *: Verified by random sampling



Marking Symbol: 7D

Internal Connection



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

• Tr2

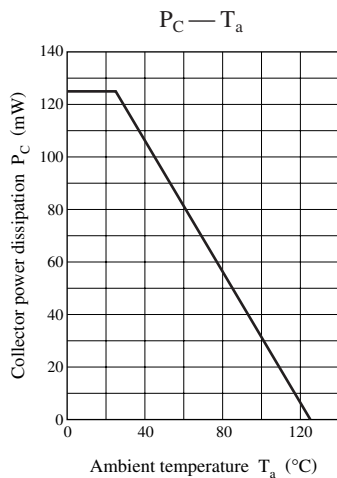
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = 9\text{ V}, I_{\text{E}} = 0$			1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = 6\text{ V}, I_{\text{B}} = 0$			1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = 1\text{ V}, I_{\text{C}} = 0$			1	μA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 3\text{ mA}$	100		220	—
Transition frequency *	f_{T}	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 10\text{ mA}, f = 2\text{ GHz}$		19		GHz
Forward transfer gain *	$ S_{21e} ^2$	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 10\text{ mA}, f = 2\text{ GHz}$	9.0	11.0		dB
Noise figure *	NF	$V_{\text{CE}} = 3\text{ V}, I_{\text{C}} = 3\text{ mA}, f = 2\text{ GHz}$		1.4	2.0	dB
Collector output capacitance (Common base, input open circuited) *	C_{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.

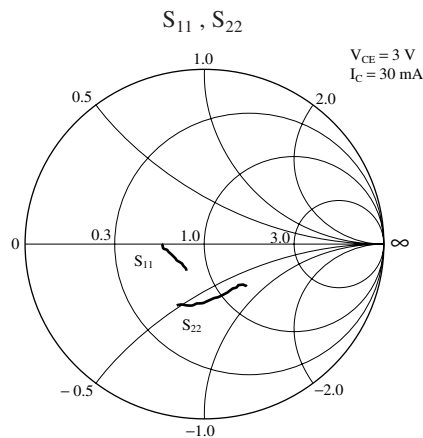
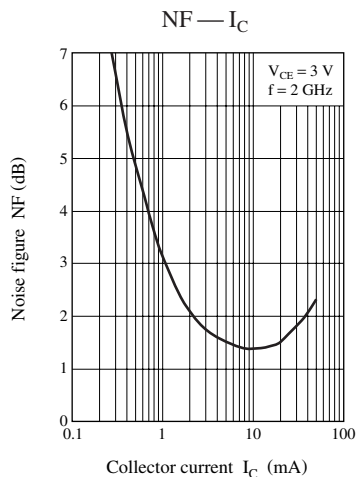
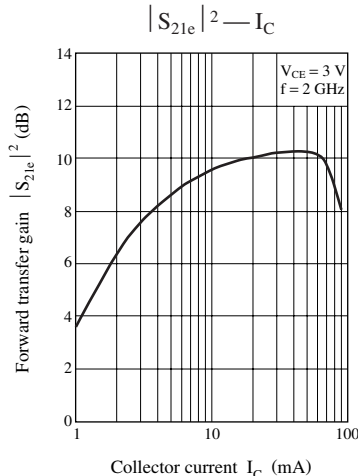
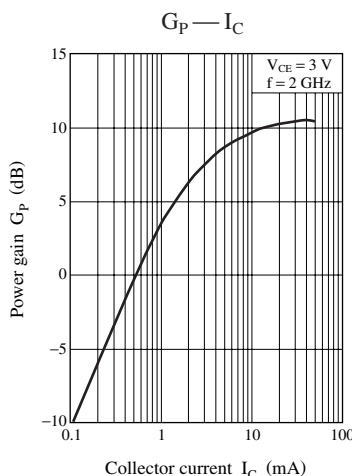
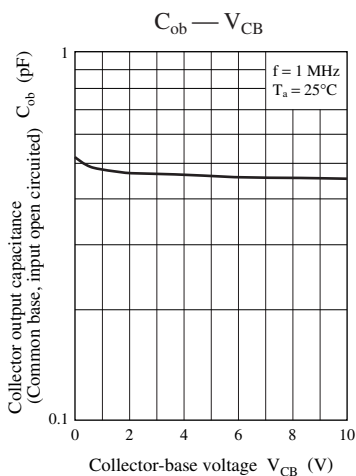
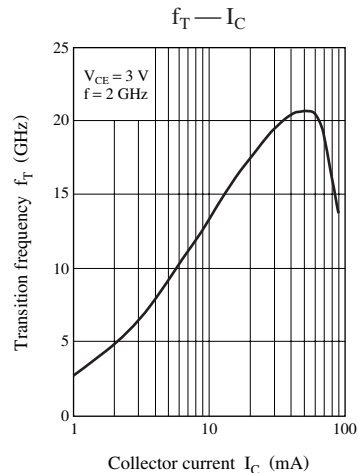
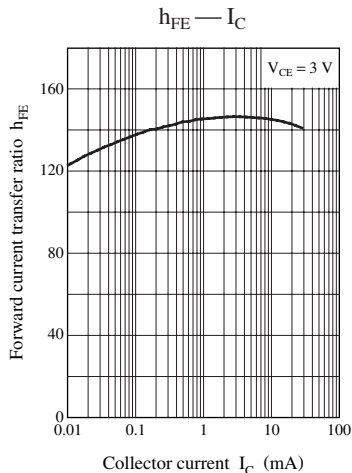
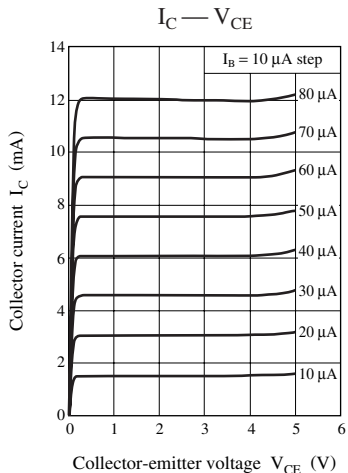
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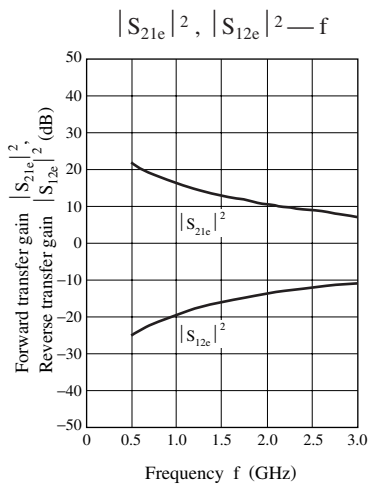
3. *: Verified by random sampling

Common characteristics chart

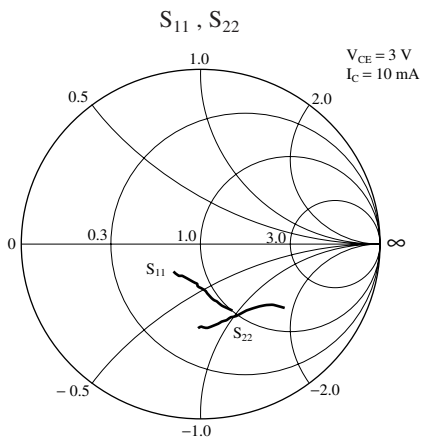
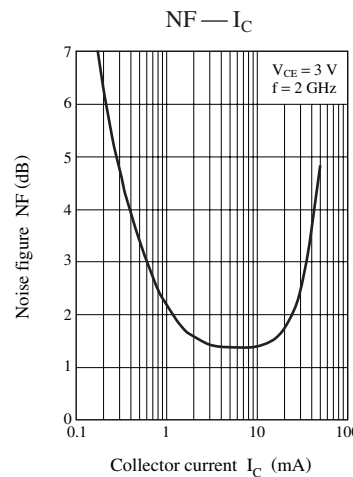
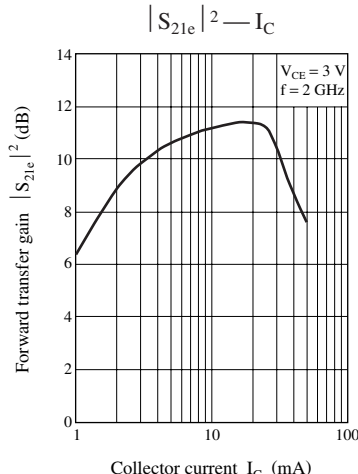
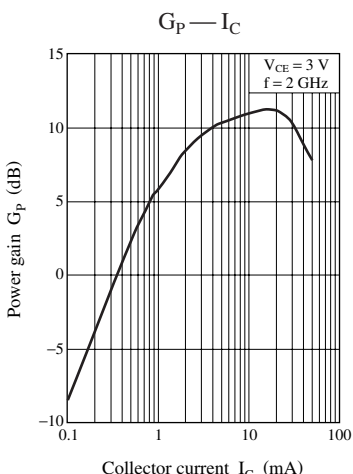
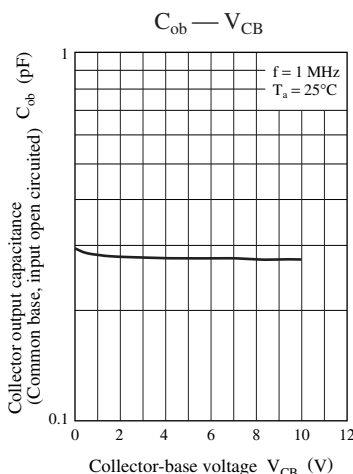
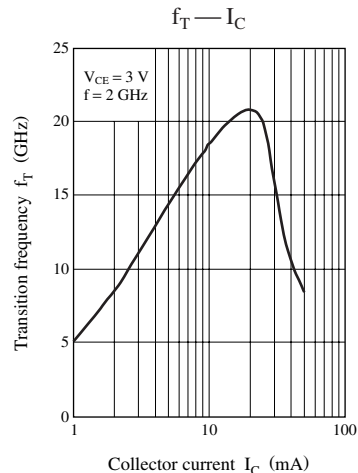
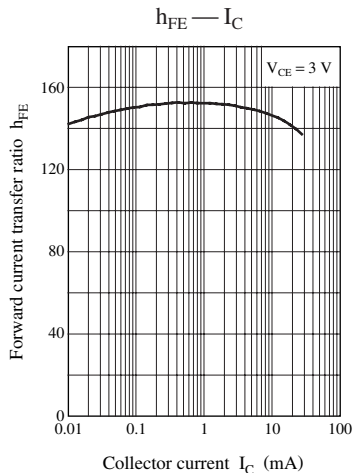
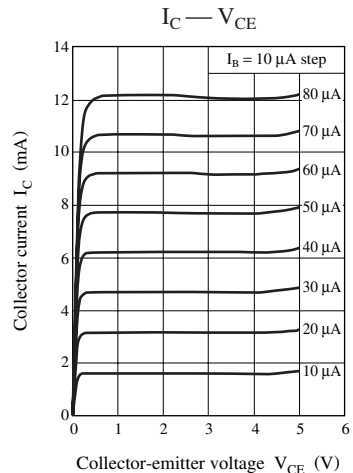


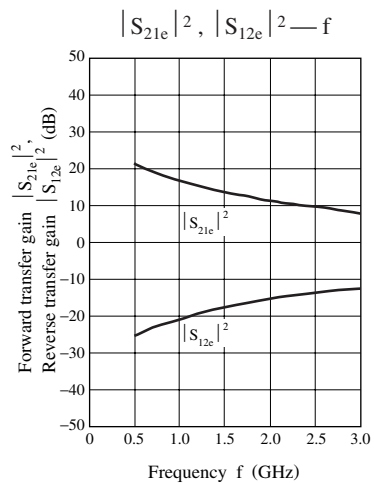
Characteristics charts of Tr1





Characteristics charts of Tr2





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