MSG36E41

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

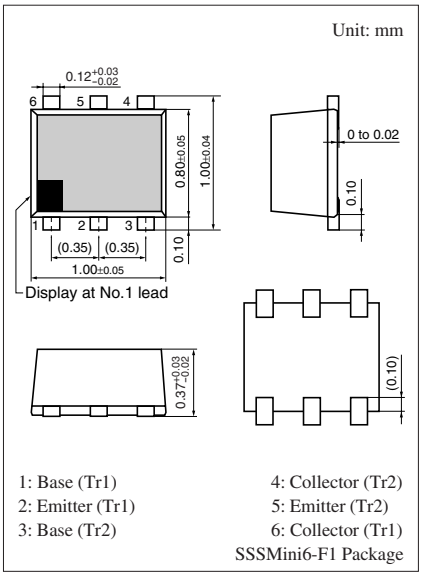
■ Basic Part Number

- MSG33004 + MSG33001

■ Absolute Maximum Ratings $T_a = 25°C$

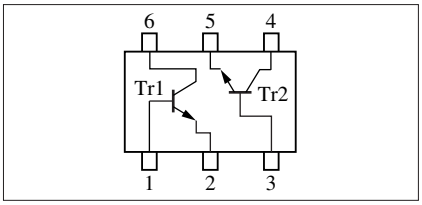
Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	9	V
	Collector-emitter voltage (Base open)	V_{CEO}	6	V
	Emitter-base voltage (Collector open)	V_{EBO}	1	V
	Collector current	I_C	100	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	9	V
	Collector-emitter voltage (Base 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	°C
	Storage temperature	T_{stg}	−55 to +125	°C

Note) ∗: Copper plate at the collector is 5.0 cm^2 on substrate at 10 mm × 12 mm × 0.8 mm.



Marking Symbol: 6D

Internal Connection



■ Electrical Characteristics $T_a = 25°C \pm 3°C$

- Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = 9 V, I_E = 0			1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 6 V, I_B = 0			1	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = 1 V, I_C = 0			1	µA
Forward current transfer ratio	h_{FE}	V_{CE} = 3 V, I_C = 15 mA	100		220	—
Transition frequency *	f_T	V_{CE} = 3 V, I_C = 30 mA, f = 2 GHz		17		GHz
Forward transfer gain *	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 30 mA, f = 2 GHz	6.0	9.0		dB
Noise figure *	NF	V_{CE} = 3 V, I_C = 15 mA, f = 2 GHz		1.4	2.0	dB
Collector output capacitance (Common base, input open circuited) *	C_{ob}	V_{CB} = 3 V, I_E = 0, f = 1 MHz		0.6	0.9	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

■ Electrical Characteristics (continued) $T_a = 25°C \pm 3°C$

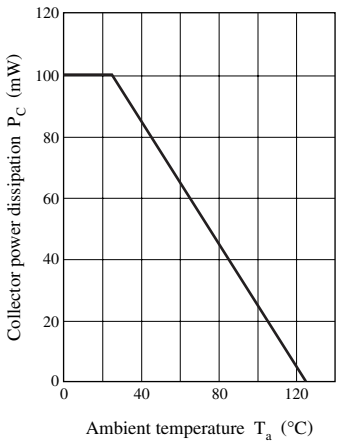
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = 9 V, I_E = 0			1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 6 V, I_B = 0			1	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = 1 V, I_C = 0			1	µA
Forward current transfer ratio	h_{FE}	V_{CE} = 3 V, I_C = 3 mA	100		220	—
Transition frequency *	f_T	V_{CE} = 3 V, I_C = 10 mA, f = 2 GHz		19		GHz
Forward transfer gain *	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 10 mA, f = 2 GHz	9.0	11.0		dB
Noise figure *	NF	V_{CE} = 3 V, I_C = 3 mA, f = 2 GHz		1.4	2.0	dB
Collector output capacitance (Common base, input open circuited) *	C_{ob}	V_{CB} = 3 V, I_E = 0, f = 1 MHz		0.3	0.6	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

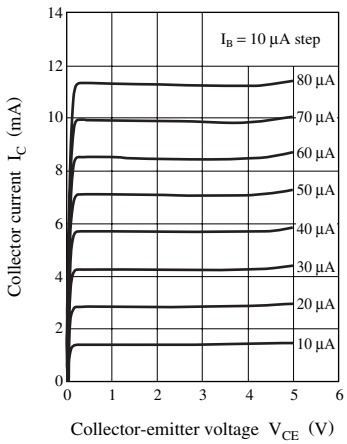
Common characteristics chart

P_C — T_a

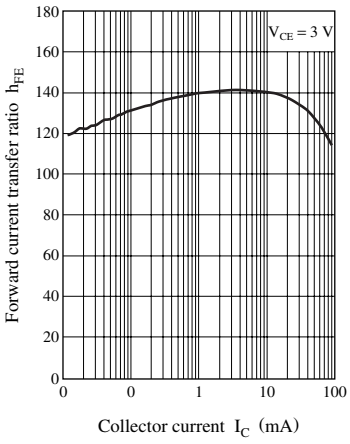


Characteristics charts of Tr1

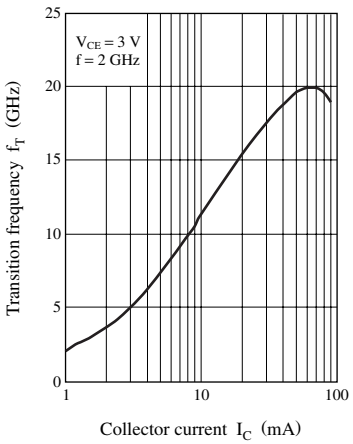
I_C — V_{CE}



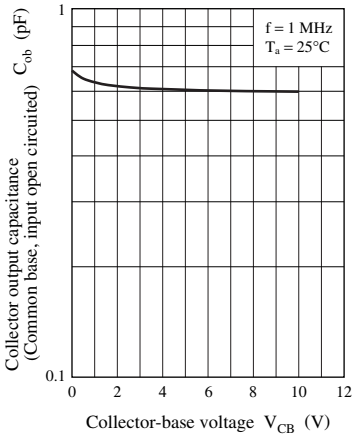
h_{FE} — I_C



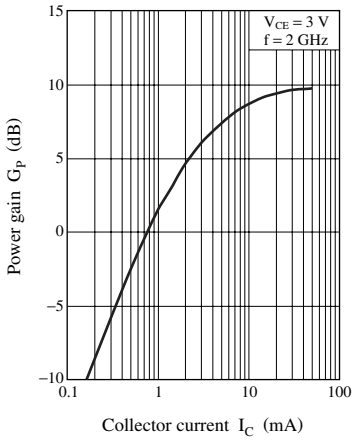
f_T — I_C



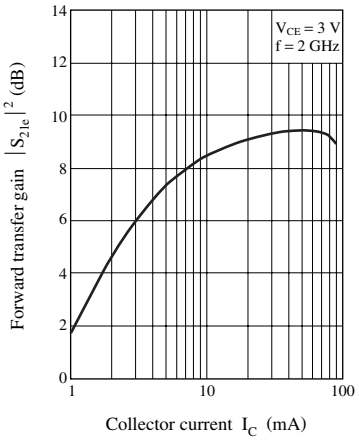
C_{ob} — V_{CB}



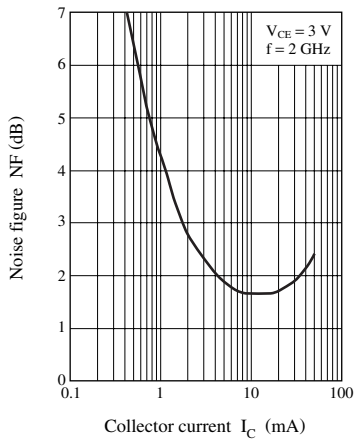
G_P — I_C



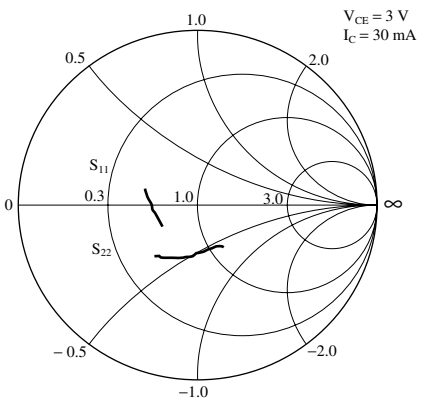
$|S_{21e}|^2$ — I_C



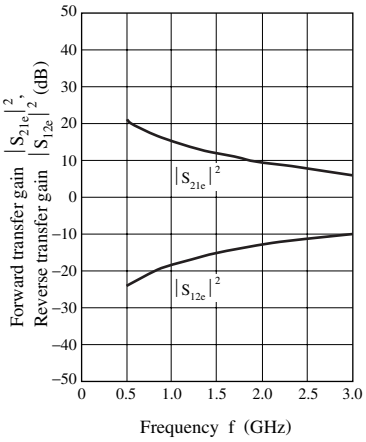
NF — I_C



S_{11} , S_{22}

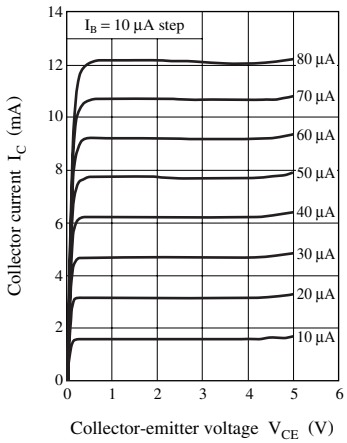


$|S_{21e}|^2$, $|S_{12e}|^2$ — f

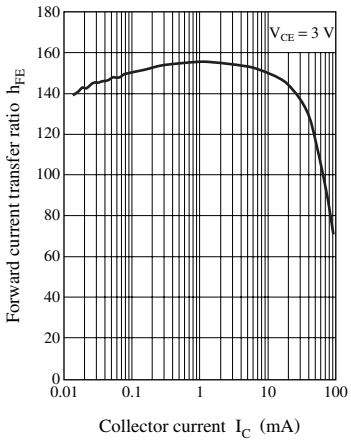


Characteristics charts of Tr2

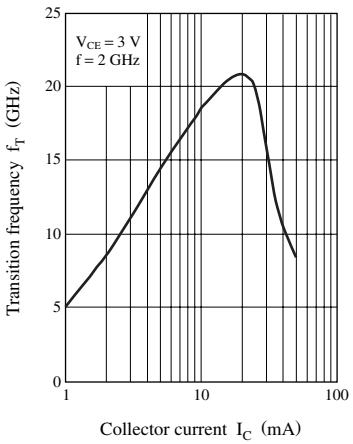
I_C — V_{CE}



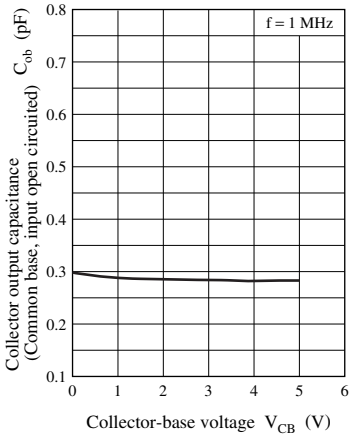
h_{FE} — I_C



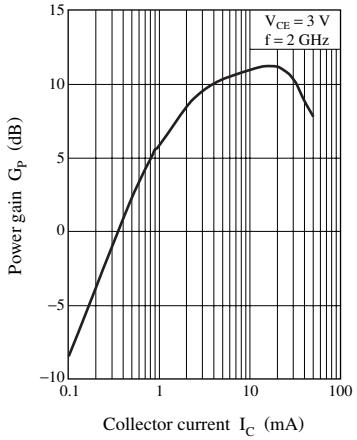
f_T — I_C



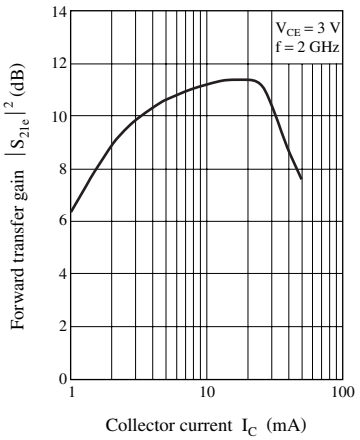
C_{ob} — V_{CB}



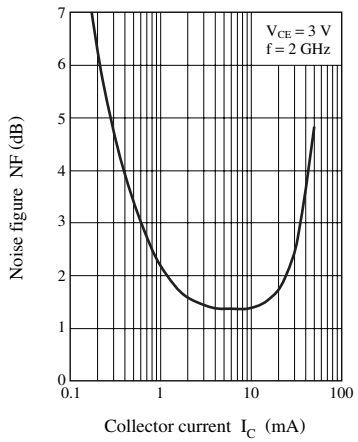
G_P — I_C



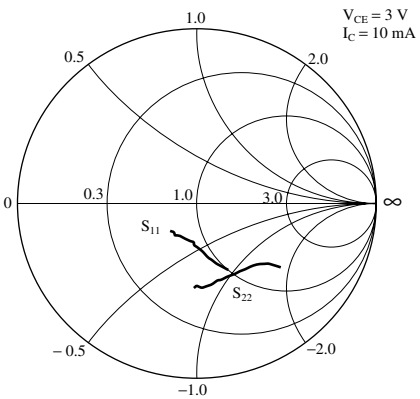
$|S_{21e}|^2$ — I_C



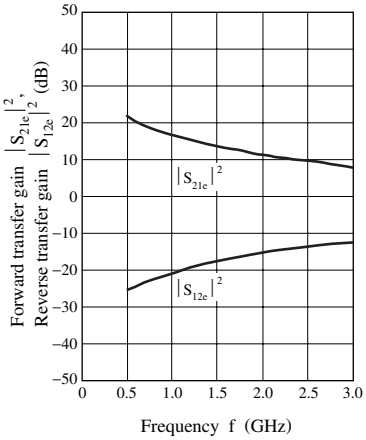
NF — I_C



S_{11} , S_{22}



$|S_{21e}|^2$, $|S_{12e}|^2$ — f



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