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To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

Send any inquiries to http://www.renesas.com/inquiry.

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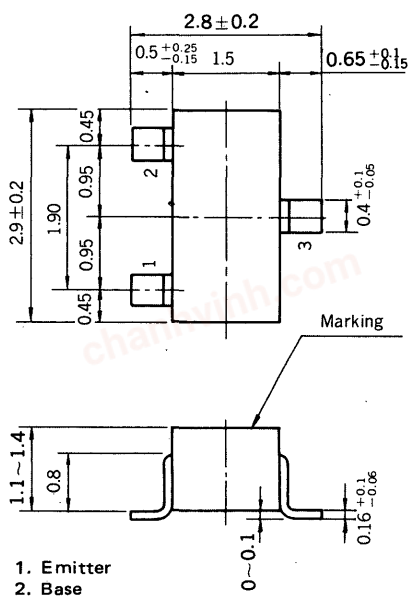
DATA SHEET

RENESAS

SILICON TRANSISTOR
2SC2223

HIGH FREQUENCY AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
MINI MOLD

PACKAGE DIMENSIONS
in millimeters



1. Emitter
2. Base
3. Collector

DESCRIPTION

The 2SC2223 is designed for use in small type equipments especially recommended for Hybrid Integrated Circuit and other applications.

FEATURES

- Micro package.
- High gain bandwidth product. f_T = 600 MHz TYP.
- Low output capacitance. C_{ob} = 1.0 pF TYP.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Maximum Voltages and Current			
Collector to Base Voltage	V_{CBO}	30	V
Collector to Emitter Voltage	V_{CEO}	20	V
Emitter to Base Voltage	V_{EBO}	4.0	V
Collector Current	I_C	20	mA
Maximum Power Dissipation			
Total Power Dissipation	P_T	150	mW
Maximum Temperatures			
Storage Temperature	T_{stg}	−55 to +125	°C
Junction Temperature	T_j	125	°C

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			100	nA	V_{CB} = 25 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			100	nA	V_{EB} = 3.0 V, I_C = 0
DC Current Gain	h_{FE}	40	90	180		V_{CE} = 6.0 V, I_C = 1.0 mA
Base to Emitter Voltage	V_{BE}		0.72		V	V_{CE} = 6.0 V, I_C = 1.0 mA
Collector Saturation Voltage	$V_{CE(sat)}$		0.1	0.3	V	I_C = 10 mA, I_B = 1.0 mA
Gain Bandwidth Product	f_T	400	600		MHz	V_{CE} = 6.0 V, I_E = −1.0 mA
Output Capacitance	C_{ob}		1.0		pF	V_{CB} = 6.0 V, I_E = 0, f = 1.0 MHz
Collector to Base Time Constant	C_c-$r_b'b$		12		ps	V_{CE} = 6.0 V, I_E = −1.0 mA, f = 31.9 MHz
Noise Figure	NF		3.0		dB	V_{CE} = 6.0 V, I_E = −1.0 mA, R_G = 50 Ω, f = 100 MHz See Test Circuit

Classification of h_{FE}

Marking	F12	F13	F14
h_{FE} Range	40 to 80	60 to 120	90 to 180

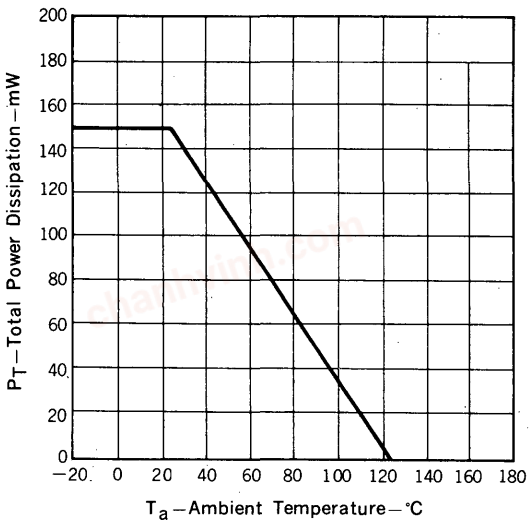
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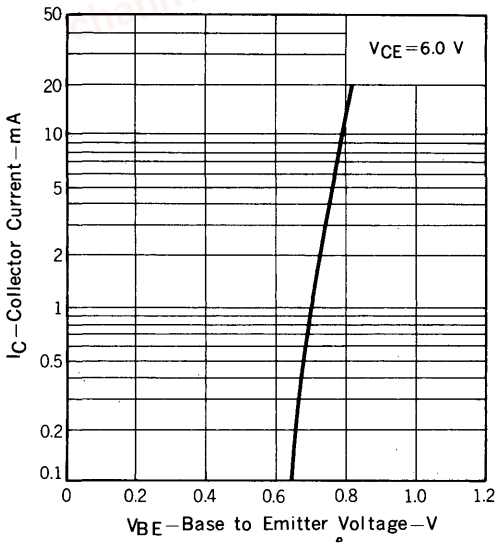
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TYPICAL CHARACTERISTICS (T_a = 25 °C unless otherwise noted)

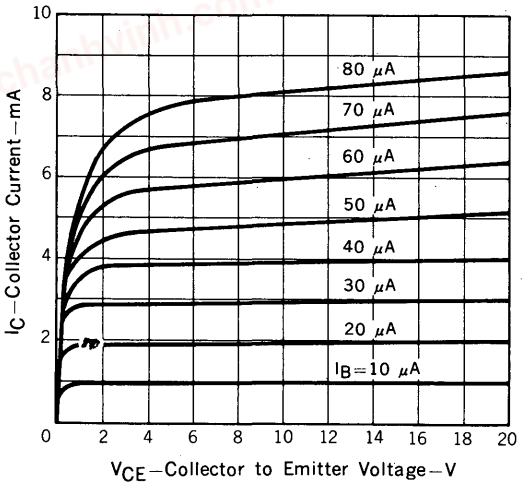
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



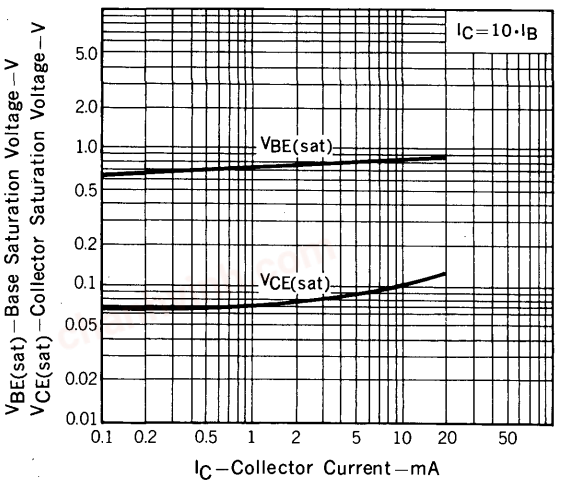
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



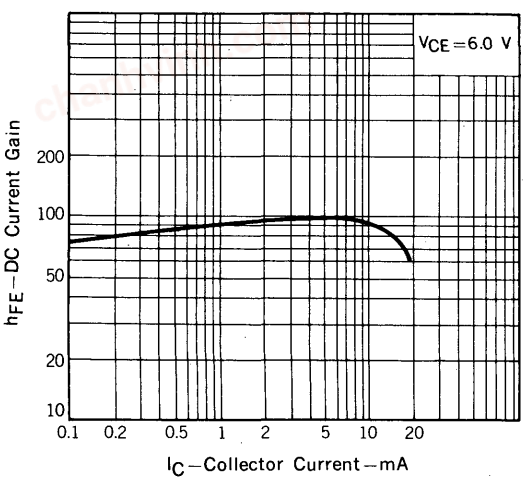
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



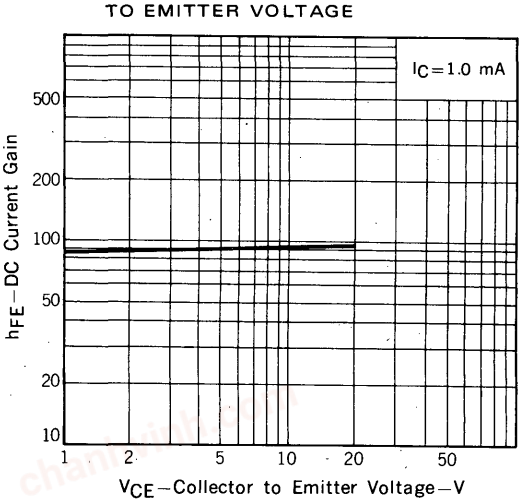
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



DC CURRENT GAIN vs. COLLECTOR CURRENT

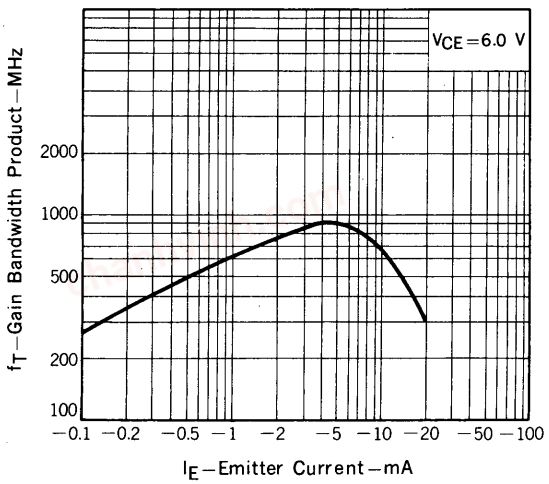


DC CURRENT GAIN vs. COLLECTOR TO EMITTER VOLTAGE

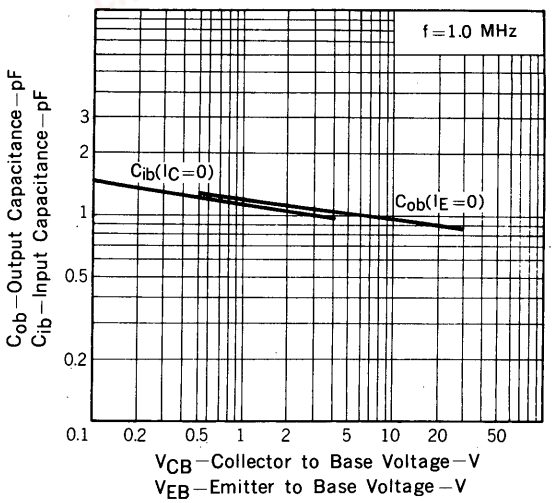


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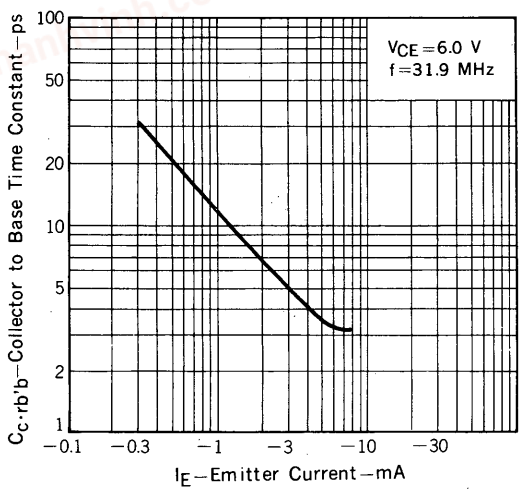
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



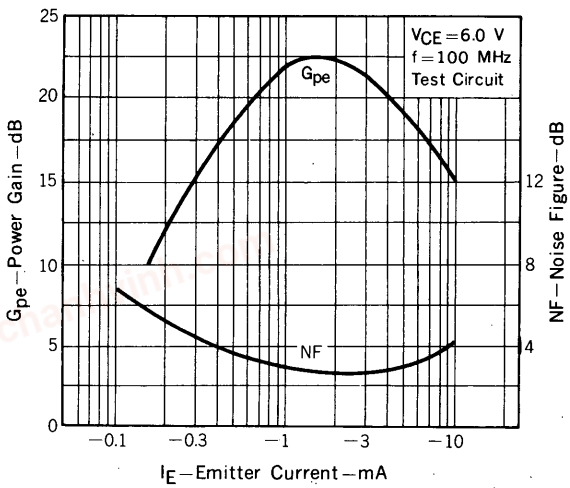
INPUT CAPACITANCE vs. EMITTER TO BASE VOLTAGE, OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



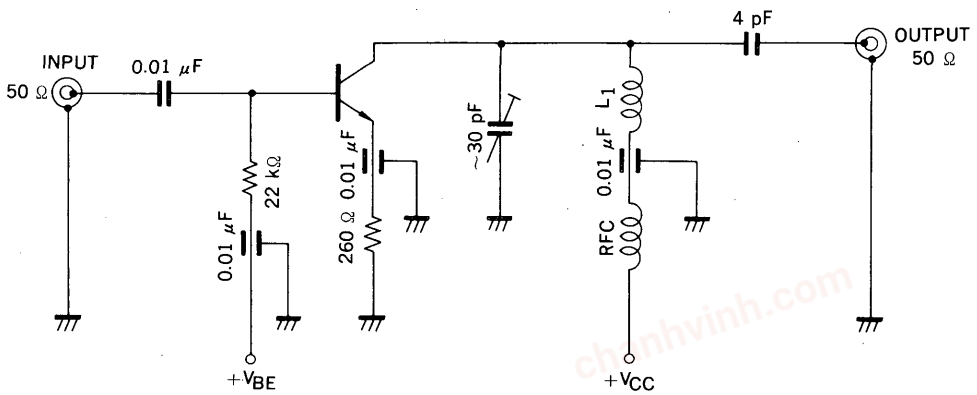
COLLECTOR TO BASE TIME CONSTANT vs. EMITTER CURRENT



POWER GAIN, NOISE FIGURE vs. EMITTER CURRENT



100 MHz G_{pe}, NF TEST CIRCUIT



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