To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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2SC2736

Silicon NPN Epitaxial

RENESAS

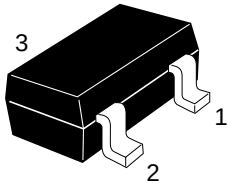
ADE-208-1076 (Z)
1st. Edition
Mar. 2001

Application

- UHF/VHF frequency converter
- Local oscillator

Outline

MPAK



1. Emitter
2. Base
3. Collector

Note: Marking is “TC”.

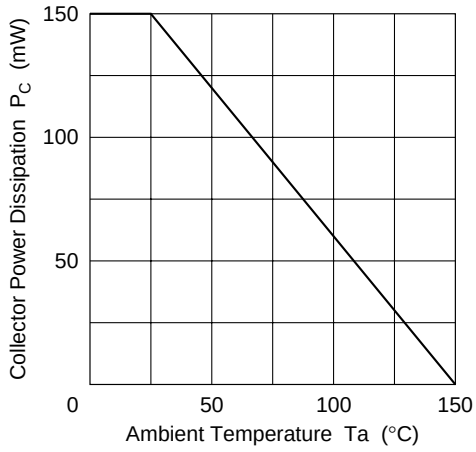
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	30	V
Collector to emitter voltage	V_{CEO}	20	V
Emitter to base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

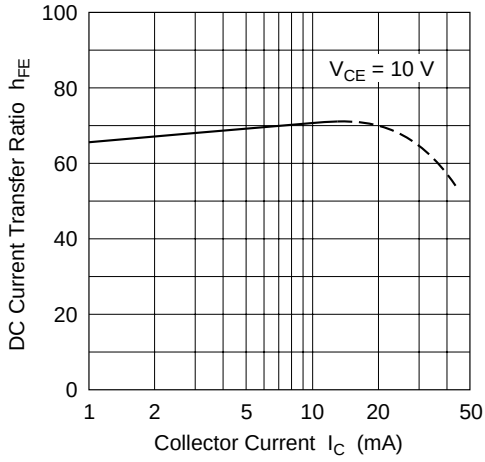
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	V	I_C = 10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	20	—	—	V	I_C = 1 mA, R_{BE} =
Emitter to base breakdown voltage	$V_{(BR)EBO}$	3	—	—	V	I_E = 10 µA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	500	nA	V_{CB} = 15 V, I_C = 0
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	0.7	V	I_C = 10 mA, I_B = 5 mA
DC current transfer ratio	h_{FE}	30	—	200		V_{CE} = 10 V, I_C = 5 mA
Collector output capacitance	Cob	—	—	1.0	pF	V_{CB} = 10 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	1400	2200	—	MHz	V_{CE} = 10 V, I_C = 5 mA
Conversion gain	CG_1	—	22.5	—	dB	V_{CC} = 12 V, I_C = 2 mA, f = 200 MHz, f_{OSC} = 230 MHz (0dBm)
	CG_2	—	10	—	dB	V_{CC} = 12 V, I_C = 2 mA, f = 900 MHz, f_{OSC} = 930 MHz (0dBm), f_{Out} = 30 MHz
Noise figure	NF	—	4.0	—	dB	V_{CC} = 12 V, I_C = 2 mA, f = 200 MHz, f_{OSC} = 230 MHz (0dBm)
Oscillating output voltage	V_{OSC1}	—	300	—	mV	V_{CC} = 12 V, I_C = 7 mA, f_{OSC} = 300 MHz
	V_{OSC2}	—	200	—	mV	V_{CC} = 12 V, I_C = 7 mA, f_{OSC} = 930 MHz

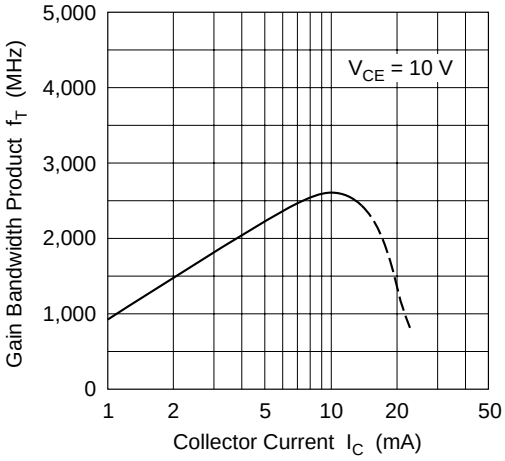
Maximum Collector Dissipation Curve



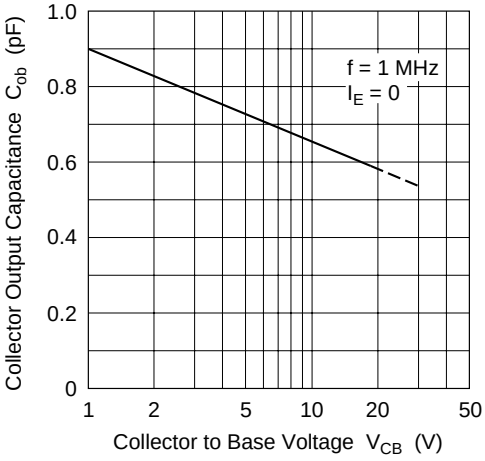
DC Current Transfer Ratio vs. Collector Current



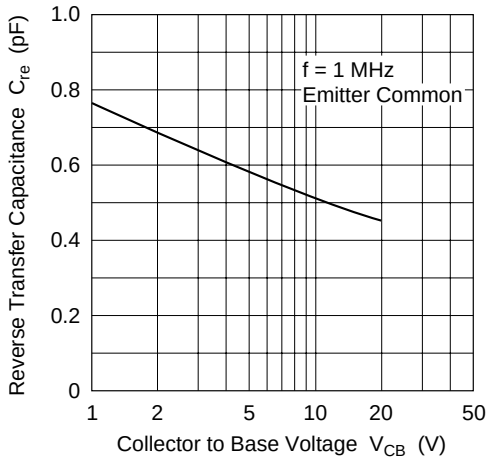
Gain Bandwidth Product vs. Collector Current



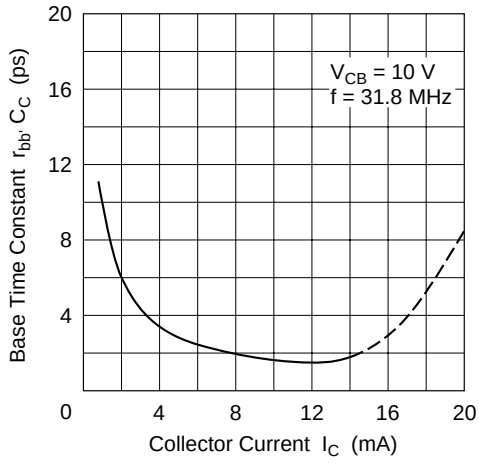
Collector Output Capacitance vs. Collector to Base Voltage



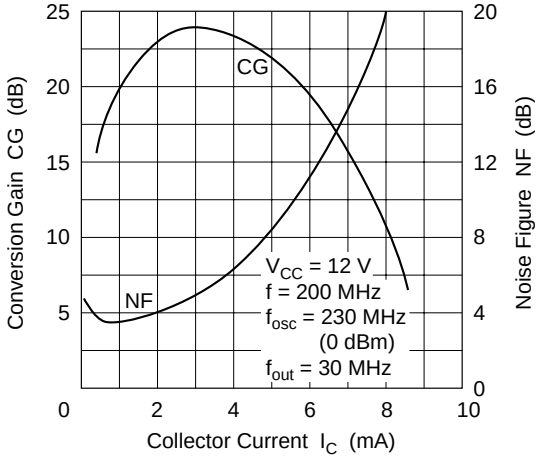
Reverse Transfer Capacitance vs. Collector to Base Voltage



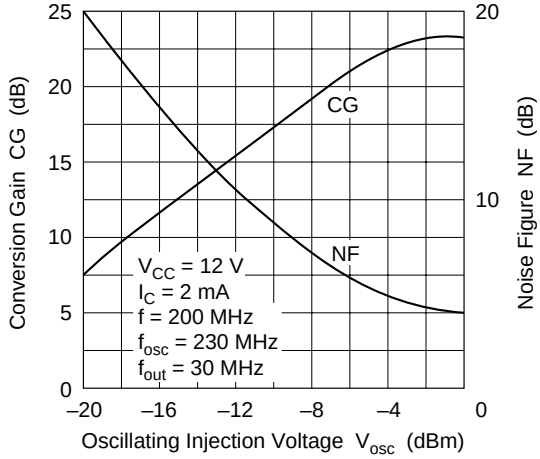
Base Time Constant vs. Collector Current



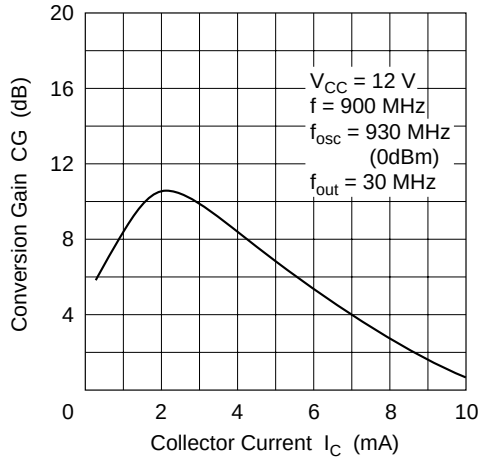
Conversion Gain, Noise Figure vs. Collector Current



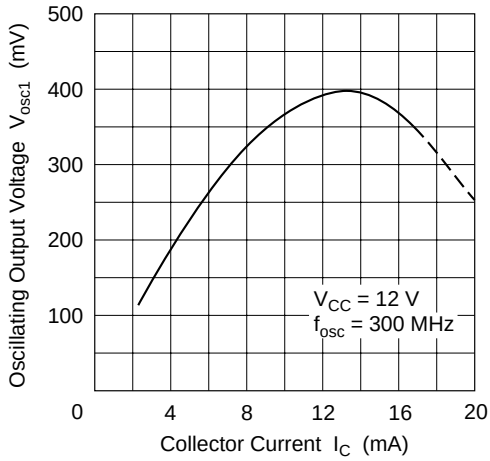
Conversion Gain, Noise Figure vs. Oscillating Injection Voltage



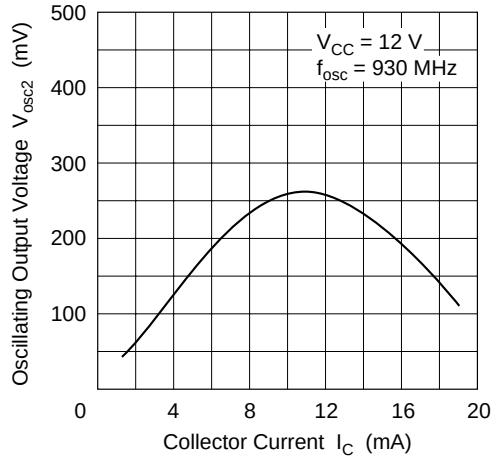
Conversion Gain vs. Collector Current



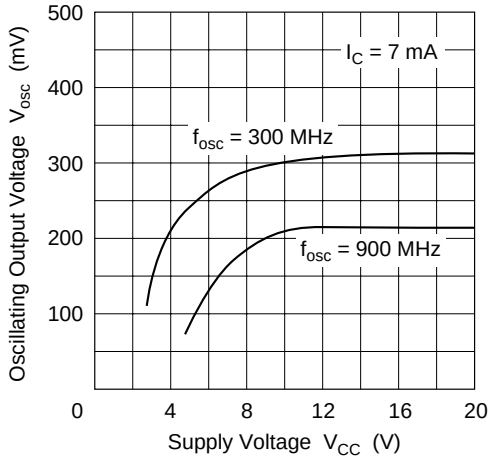
Oscillating Output Voltage vs. Collector Current



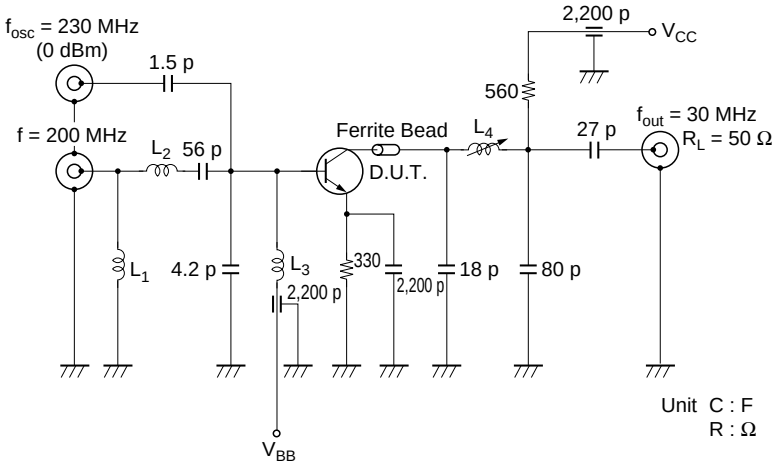
Oscillating Output Voltage vs. Collector Current



Oscillating Output Voltage vs. Supply Voltage



VHF Conversion Gain (CG_1) : Noise Figure Test Circuit



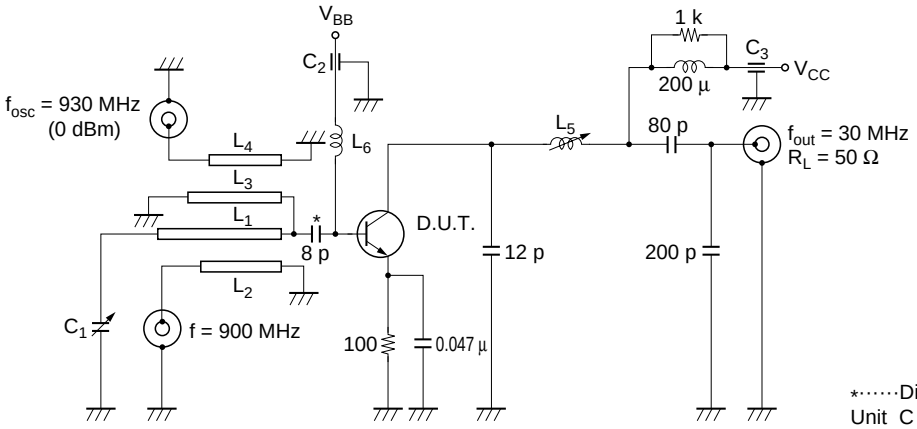
L_1 : ϕ0.5 mm Enameled Copper Wire
4 Turns inside dia ϕ5 mm

L_2 : ϕ0.5 mm Enameled Copper Wire
4 Turns inside dia ϕ4 mm

L_3 : ϕ0.2 mm Enameled Copper Wire
6 Turns inside dia ϕ3 mm

L_4 : Outside dia ϕ5 mm Bobbin,
ϕ0.2 mm Enameled Copper Wire
16 Turns Using Ferrite bead.

UHF Conversion Gain (CG_2) Test Circuit

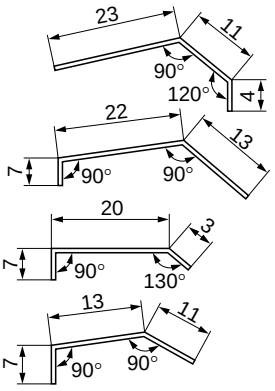


L_1 : ϕ1 mm Enameled Copper Wire

L_2 : ϕ1 mm Enameled Copper Wire

L_3 : ϕ1 mm Enameled Copper Wire

L_4 : ϕ1 mm Enameled Copper Wire



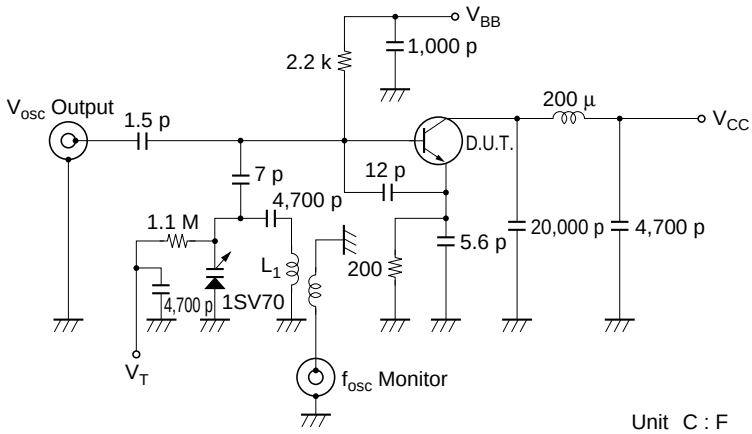
L_5 : Bobbin ϕ5 mm inside dia, ϕ0.2 mm Enameled Copper Wire 20 Turns

L_6 : ϕ0.5 mm Enameled Copper Wire 1 Turn inside dia ϕ6 mm

C_1 : 20 pF max Air Trimmer Condenser

C_2, C_3 : 1000 pF Air Core Capacitor

VHF Oscillating Output Voltage (V_{osc1}) Test Circuit

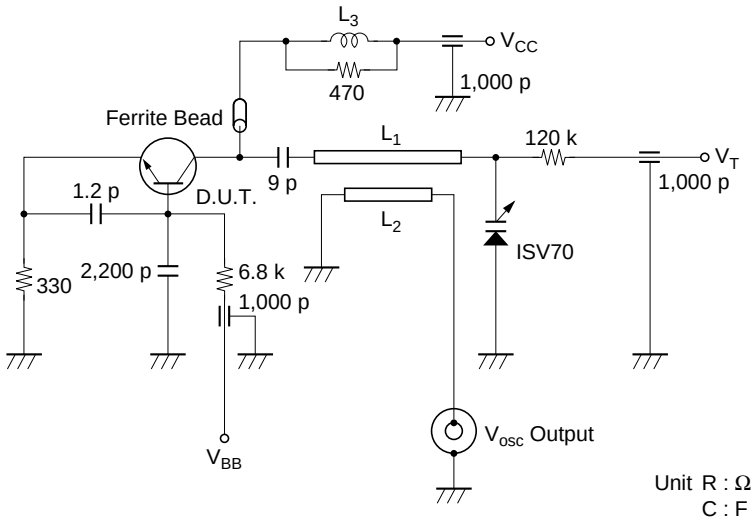


Unit C : F
R : Ω
L : H

L_1 : ϕ0.3 mm Enameled Copper Wire
3 Turns inside dia ϕ3 mm

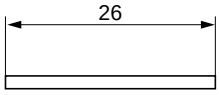
Test Frequency
f_{osc} = 300 MHz

UHF Oscillating Output Voltage (V_{osc2}) Test Circuit

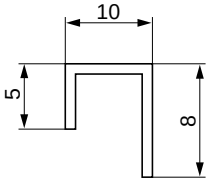


Unit R : Ω
C : F

L_1 : Polyurethane Coated Copper Wire



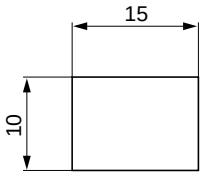
L_2 : Polyurethane Coated Copper Wire



(Unit : mm)

L_3 : ϕ0.3 mm Enameled Copper wire, 10 Turns with 470 Ω (1/4W)Resistor.

Dimensions of Cavity

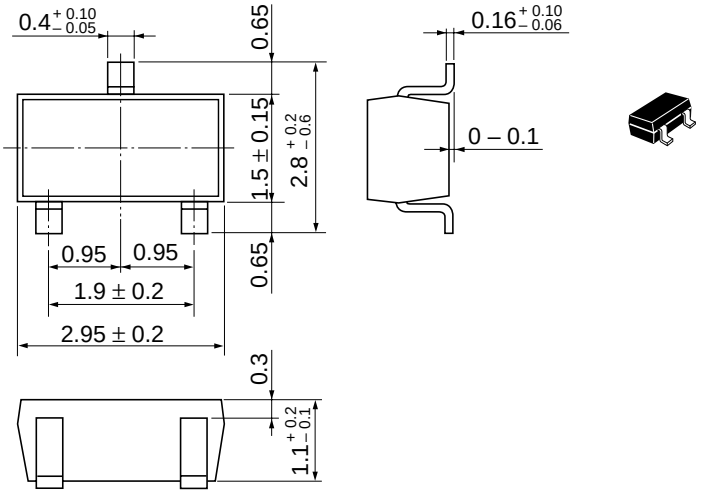


Test Frequency
f_{osc} = 930 MHz

Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	MPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.011 g

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Colophon 2.0

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