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

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2SC2734

Silicon NPN Epitaxial

RENESAS

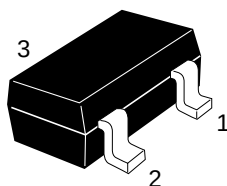
ADE-208-1074 (Z)
1st. Edition
Mar. 2001

Application

- UHF frequency converter
- Local oscillator, wide band amplifier

Outline

MPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "GC".

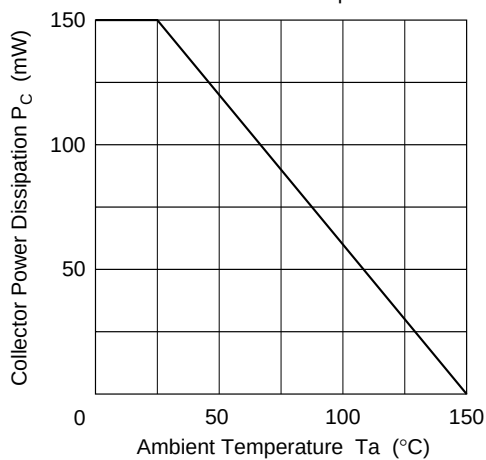
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	11	V
Emitter to base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

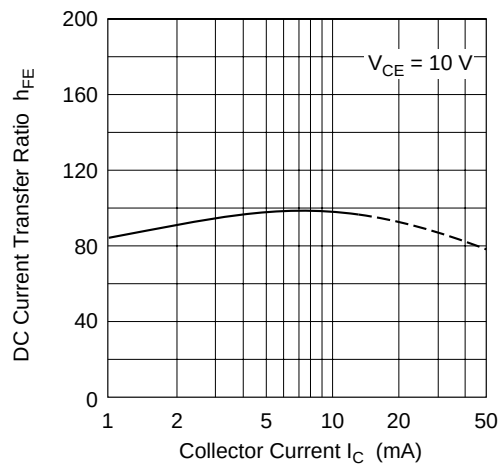
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	20	—	—	V	$I_C = 10\ \mu A$, $I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	11	—	—	V	$I_C = 1\ mA$, $R_{BE} =$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	3	—	—	V	$I_E = 10\ \mu A$, $I_C = 0$
Collector cutoff current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 10\ V$, $I_E = 0$
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}	20	90	200		$V_{CE} = 10\ V$, $I_C = 5\ mA$
Gain bandwidth product	f_T	1.4	3.5	—	GHz	$V_{CE} = 10\ V$, $I_C = 10\ mA$
Collector output capacitance	C_{ob}	—	0.9	1.5	pF	$V_{CB} = 10\ V$, $I_E = 0$, $f = 1\ MHz$
Conversion gain	CG	—	15	—	dB	$V_{CC} = 6\ V$, $I_C = 2\ mA$, $f = 900\ MHz$, $f_{OSC} = 930\ MHz\ (0dBm)$, $f_{out} = 30\ MHz$
Noise figure	NF	—	9	—	dB	$V_{CC} = 6\ V$, $I_C = 2\ mA$, $f = 900\ MHz$, $f_{OSC} = 930\ MHz\ (0dBm)$, $f_{out} = 30\ MHz$
Oscillating output voltage	V_{OSC}	—	140	—	mV	$V_{CC} = 6\ V$, $I_C = 5\ mA$, $f = 930\ MHz$

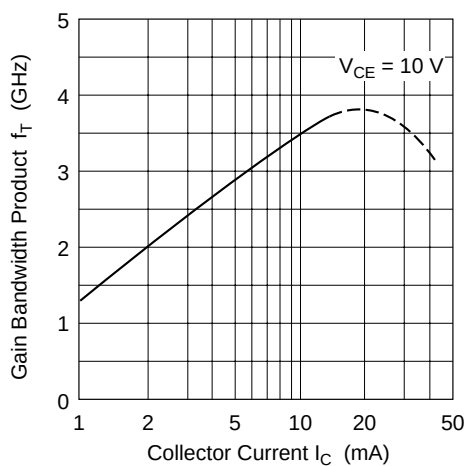
Maximum Collector Dissipation Curve



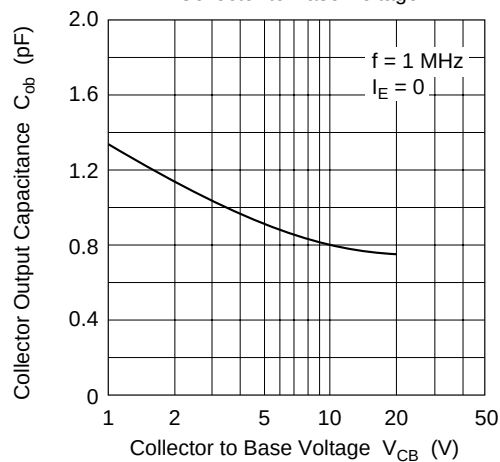
DC Current Transfer Ratio vs. Collector Current



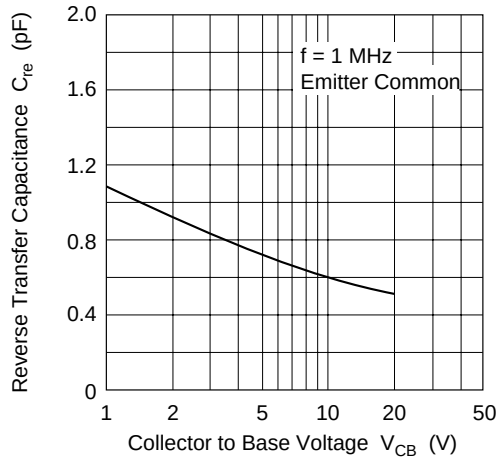
Gain Bandwidth Product vs. Collector Current



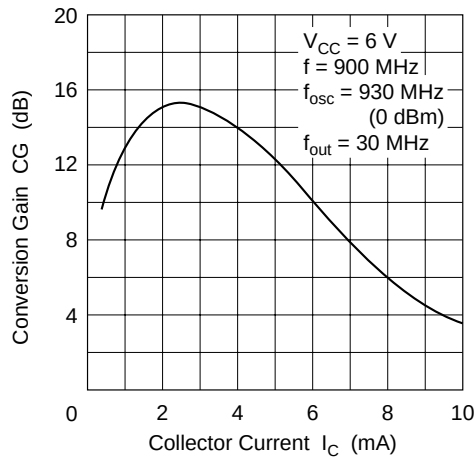
Collector Output Capacitance vs. Collector to Base Voltage



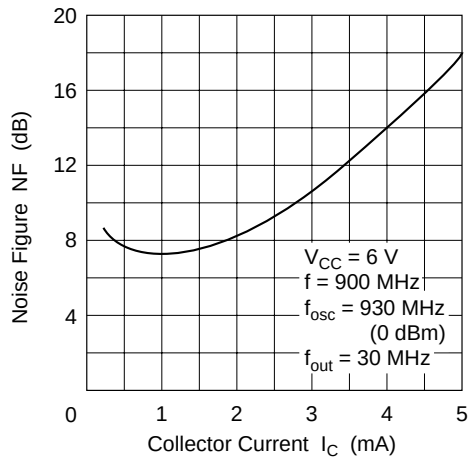
Reverse Transfer Capacitance vs.
Collector to Base Voltage



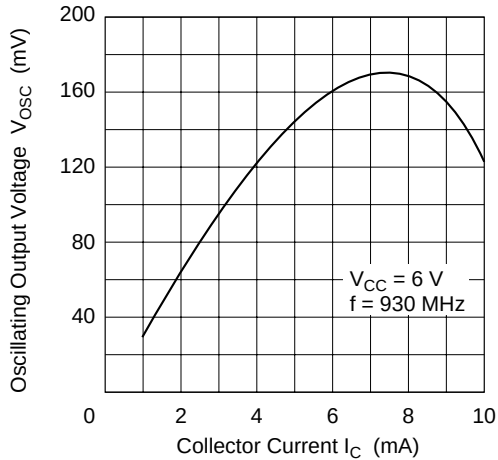
Conversion Gain vs. Collector Current

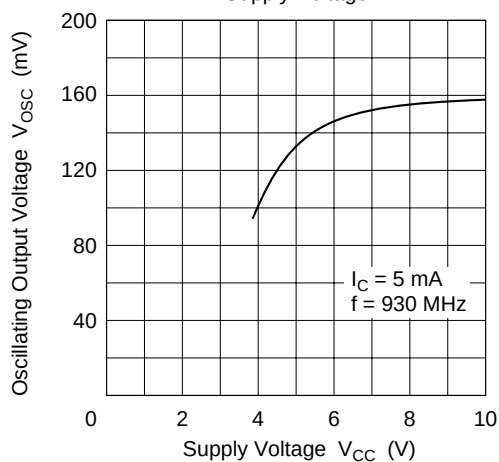


Noise Figure vs. Collector Current

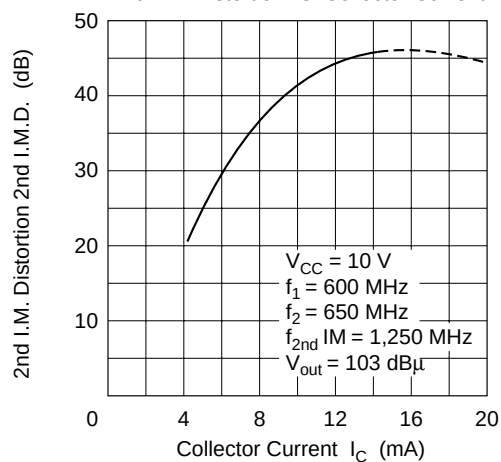


Oscillating Output Voltage vs.
Collector Current

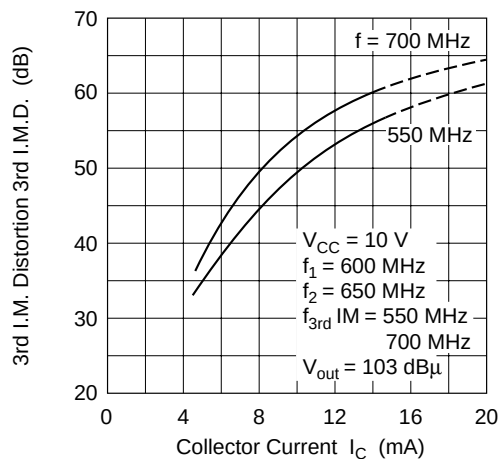


Oscillating Output Voltage vs.
Supply Voltage

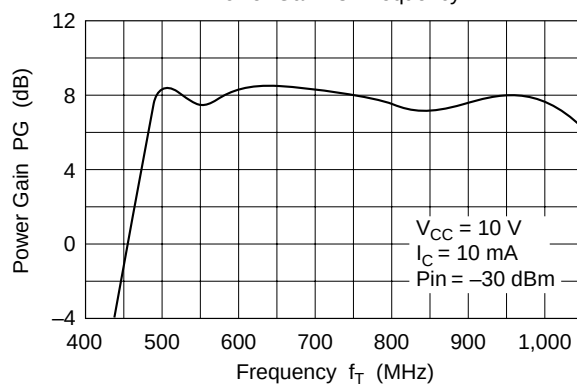
2nd I.M. Distortion vs. Collector Current



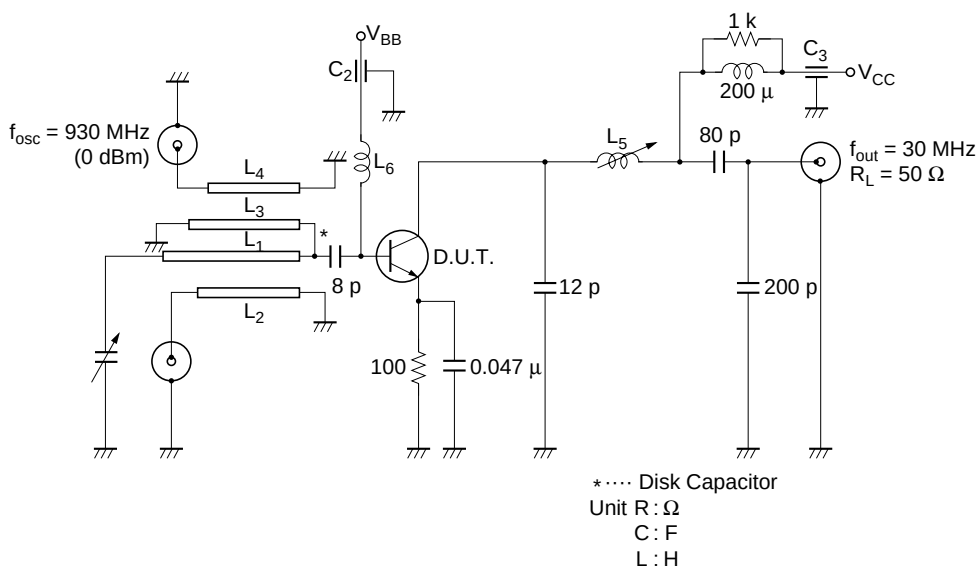
3rd I.M. Distortion vs. Collector Current



Power Gain vs. Frequency



Conversion Gain, Noise Figure Test Circuit

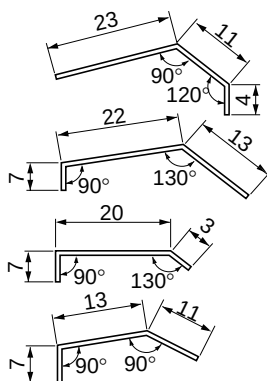


L_1 : $\phi 1$ mm Enameled Copper wire

L_2 : $\phi 1$ mm Enameled Copper wire

L_3 : $\phi 1$ mm Enameled Copper wire

L_4 : $\phi 1$ mm Enameled Copper wire



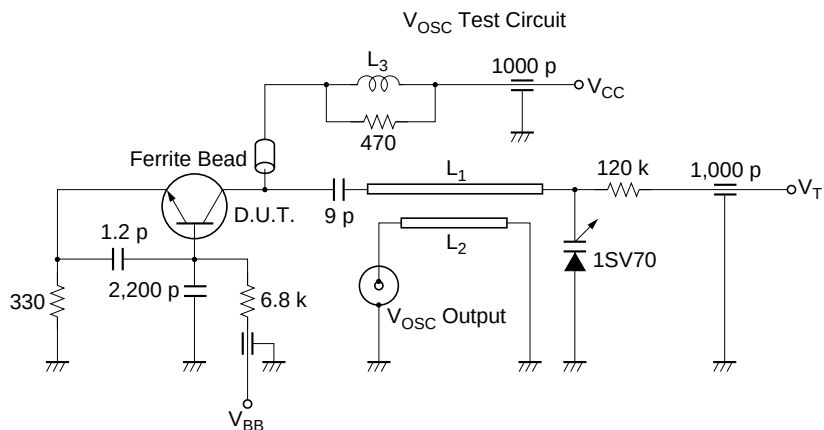
Unit : mm

L_5 : Bobbin $\phi 5$ mm inside dia, $\phi 0.2$ mm 20 Turns Enameled Copper wire

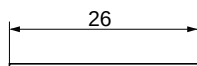
L_6 : $\phi 0.5$ mm Enameled Copper wire 1 Turn inside dia $\phi 6$ mm

C_1 : 20 pF max. Air Trimmer Condenser

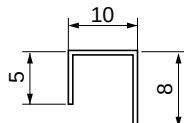
C_2, C_3 : 1000 pF Air Core Capacitor



L_1 : $\phi 1$ mm Enameled Copper wire

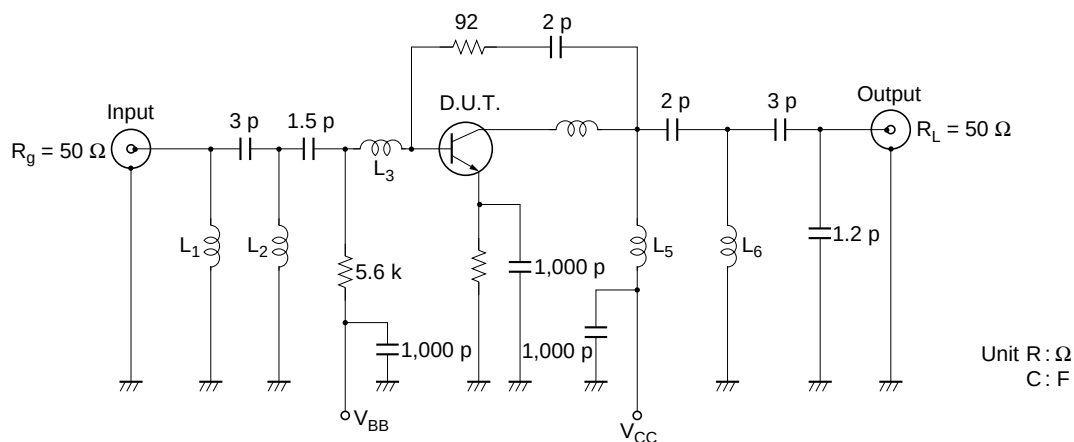


L_2 : $\phi 0.8$ mm Enameled Copper wire



L_3 : $\phi 0.3$ mm Enameled Copper wire, 10 Turns with 470 Ω Resistor

Circuit Example-UHF Wide Bandwidth Amplifier (f = 500 MHz to 950 MHz)



L_1 : $\phi 0.5$ mm Copper wire 5 Turns inside dia $\phi 3$ mm

L_2 : $\phi 0.5$ mm Copper wire 2 Turns inside dia $\phi 2$ mm

L_3 : $\phi 0.5$ mm Copper wire 2 Turns inside dia $\phi 2$ mm

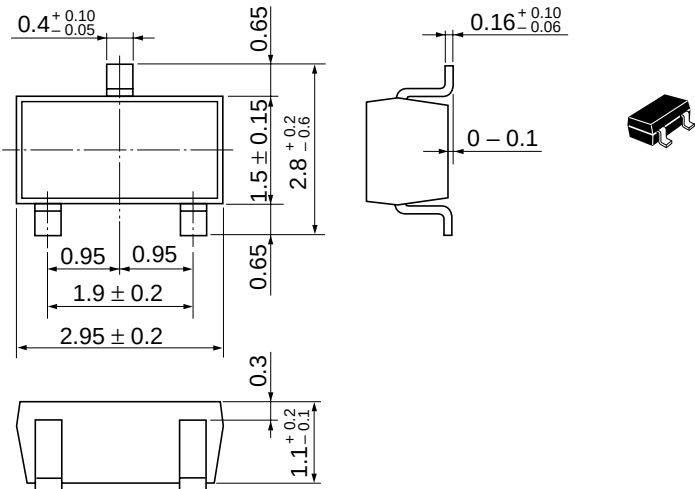
L_4 : $\phi 0.5$ mm Copper wire 1.5 Turns inside dia $\phi 2$ mm

L_5 : $\phi 0.5$ mm Copper wire 4 Turns inside dia $\phi 2$ mm

L_6 : $\phi 0.5$ mm Copper wire 3 Turns inside dia $\phi 2$ mm

Package Dimensions

As of January, 2001
Unit: mm



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

Cautions

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