
2SC2736

Silicon NPN Epitaxial

HITACHI

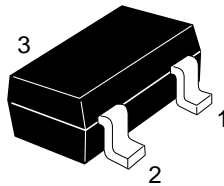
ADE-208-1076 (Z)
1st. Edition
Mar. 2001

Application

- UHF/VHF frequency converter
- Local oscillator

Outline

MPAK



1. Emitter
2. Base
3. Collector

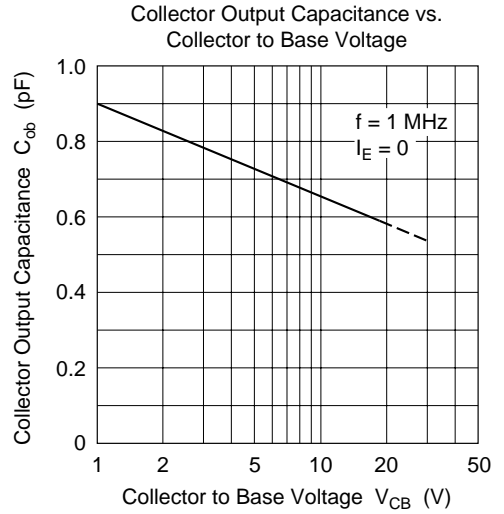
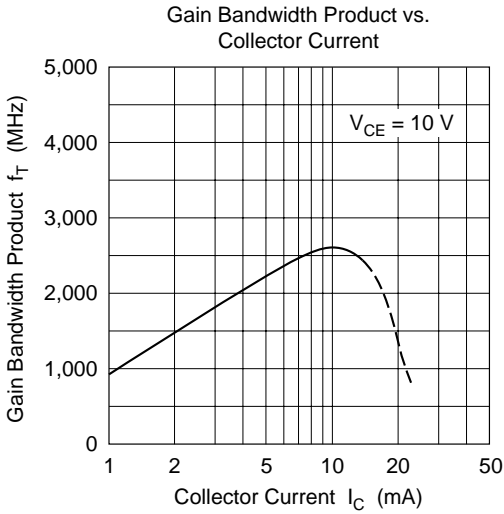
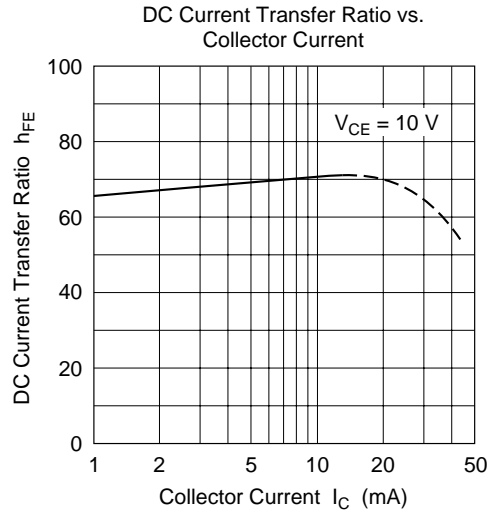
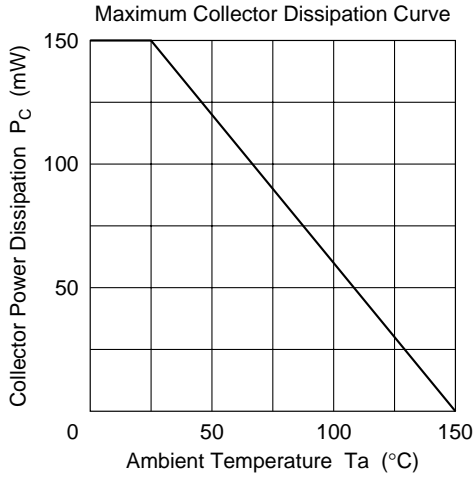
Note: Marking is "TC".

Absolute Maximum Ratings (Ta = 25°C)

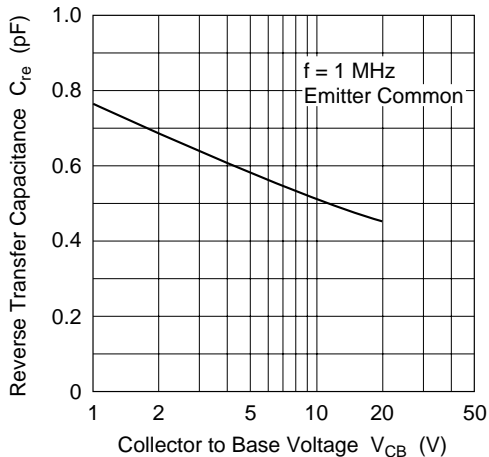
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	30	V
Collector to emitter voltage	V_{CEO}	20	V
Emitter to base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Electrical Characteristics (Ta = 25°C)

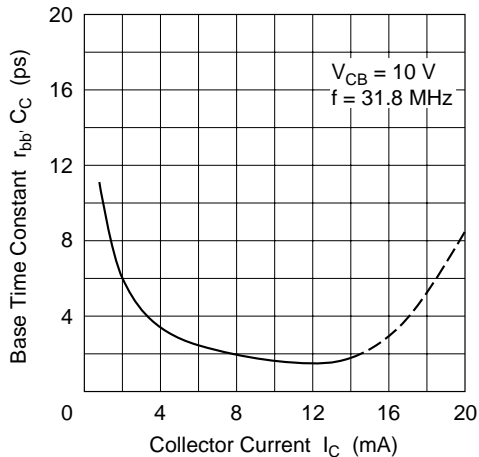
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	20	—	—	V	$I_C = 1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	3	—	—	V	$I_E = 10 \mu A,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



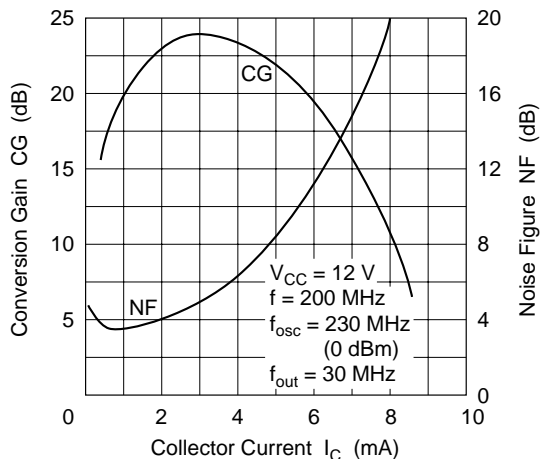
Reverse Transfer Capacitance vs. Collector to Base Voltage



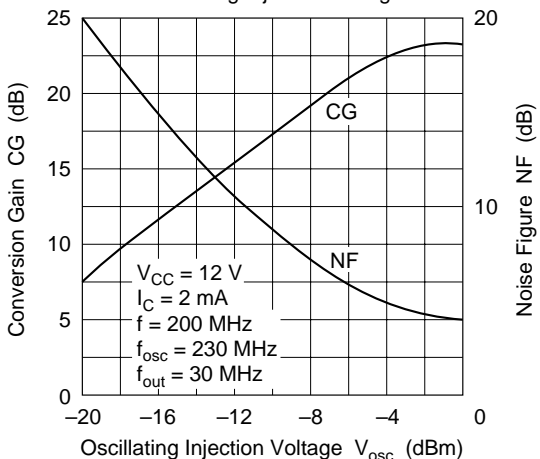
Base Time Constant vs. Collector Current



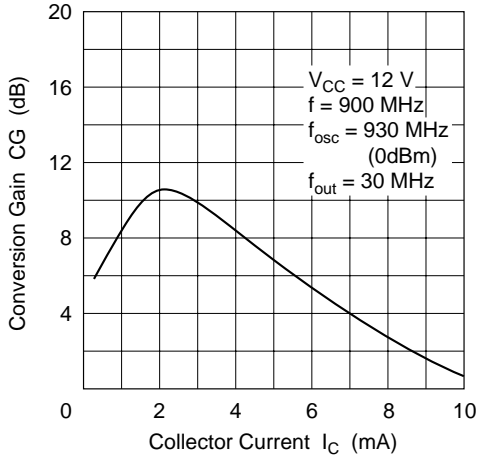
Conversion Gain, Noise Figure vs. Collector Current



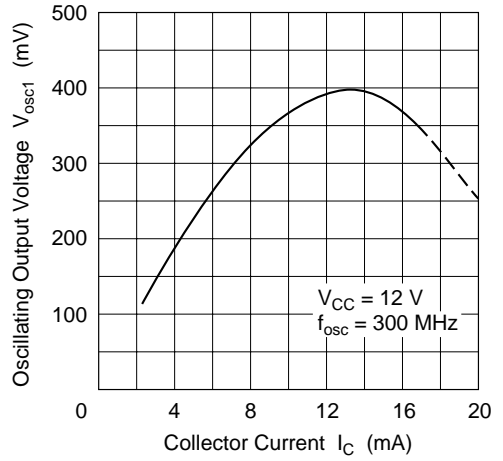
Conversion Gain, Noise Figure vs. Oscillating Injection Voltage



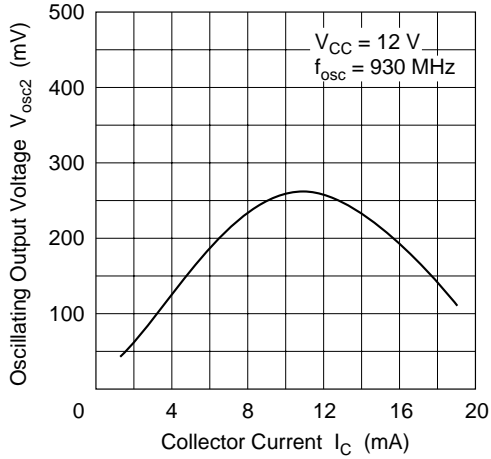
Conversion Gain vs. Collector Current



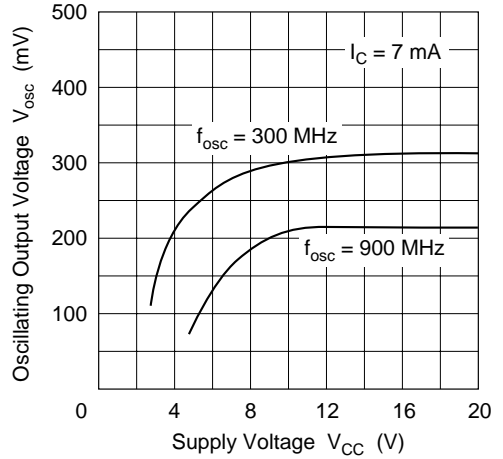
Oscillating Output Voltage vs. Collector Current



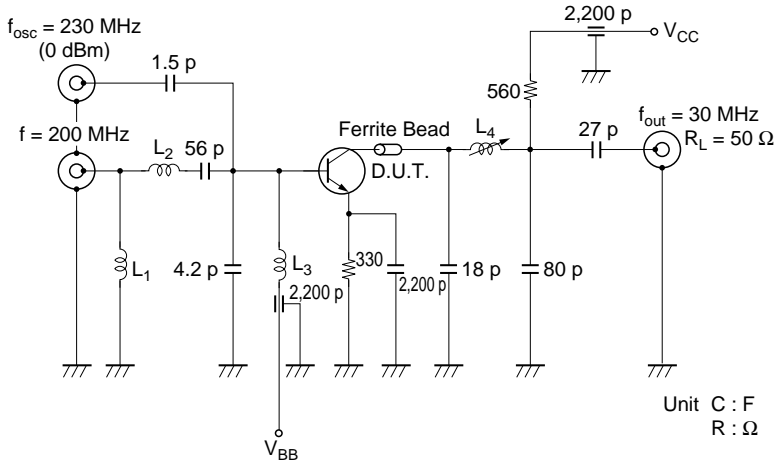
Oscillating Output Voltage vs. Collector Current



Oscillating Output Voltage vs. Supply Voltage

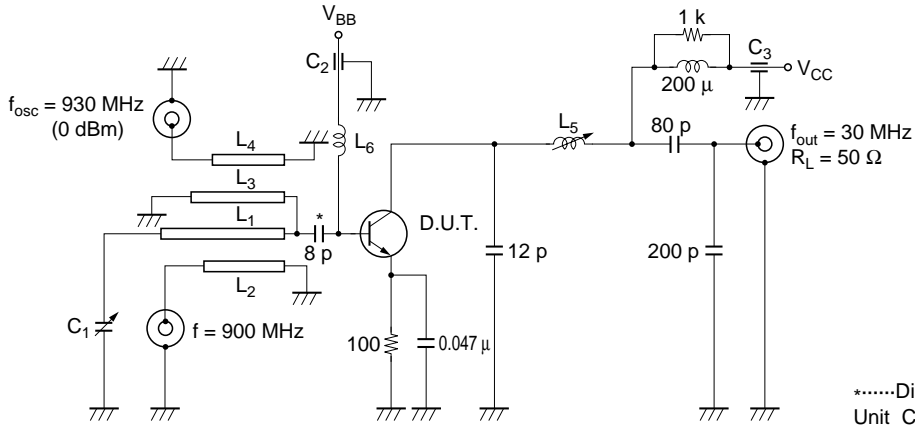


VHF Conversion Gain (CG_1) : Noise Figure Test Circuit



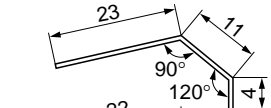
- L₁ : $\phi 0.5 \text{ mm}$ Enameled Copper Wire
4 Turns inside dia $\phi 5 \text{ mm}$
- L₂ : $\phi 0.5 \text{ mm}$ Enameled Copper Wire
4 Turns inside dia $\phi 4 \text{ mm}$
- L₃ : $\phi 0.2 \text{ mm}$ Enameled Copper Wire
6 Turns inside dia $\phi 3 \text{ mm}$
- L₄ : Outside dia $\phi 5 \text{ mm}$ Bobbin,
 $\phi 0.2 \text{ mm}$ Enameled Copper Wire
16 Turns Using Ferrite bead.

UHF Conversion Gain (CG₂) Test Circuit

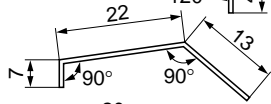


*.....Disk Capacitor
 Unit C : F
 R : Ω
 L : H

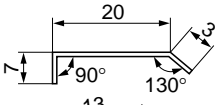
L₁ : φ1 mm Enameled Copper Wire



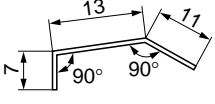
L₂ : φ1 mm Enameled Copper Wire



L₃ : φ1 mm Enameled Copper Wire



L₄ : φ1 mm Enameled Copper Wire



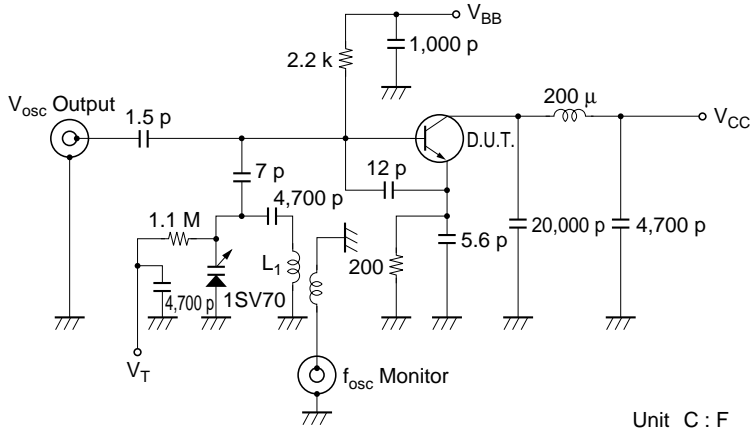
L₅ : Bobbin φ5 mm inside dia, φ0.2 mm Enameled Copper Wire 20 Turns

L₆ : φ0.5 mm Enameled Copper Wire 1 Turn inside dia φ6 mm

C₁ : 20 pF max Air Trimmer Condenser

C₂, C₃ : 1000 pF Air Core Capacitor

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

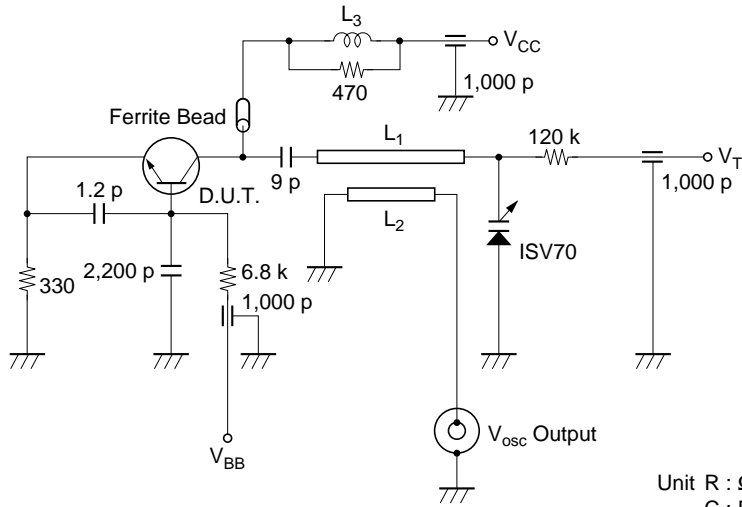


L_1 : $\phi 0.3$ mm Enameled Copper Wire
3 Turns inside dia $\phi 3$ mm

Test Frequency
 $f_{osc} = 300$ MHz

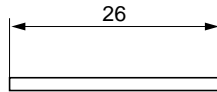
Unit C : F
R : Ω
L : H

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

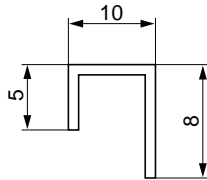


Unit R : Ω
C : F

L_1 : Polyurethane Coated
Copper Wire



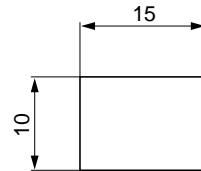
L_2 : Polyurethane Coated
Copper Wire



(Unit : mm)

L_3 : $\phi 0.3$ mm Enameled Copper
wire, 10 Turns with
 470Ω (1/4W) Resistor.

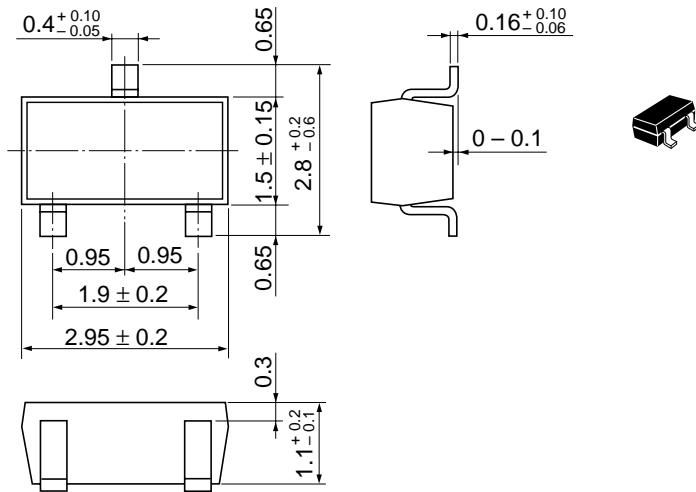
Dimensions of Cavity



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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