
2SC2736

Silicon NPN Epitaxial

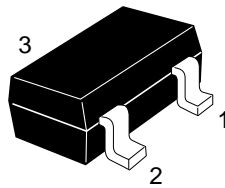
HITACHI

Application

- UHF/VHF frequency converter
- Local oscillator

Outline

MPAK



1. Emitter
2. Base
3. Collector

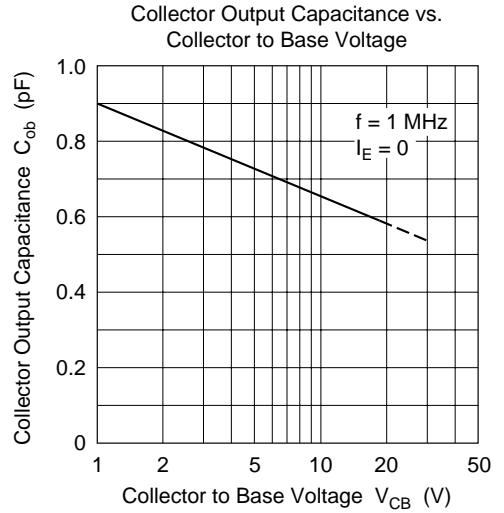
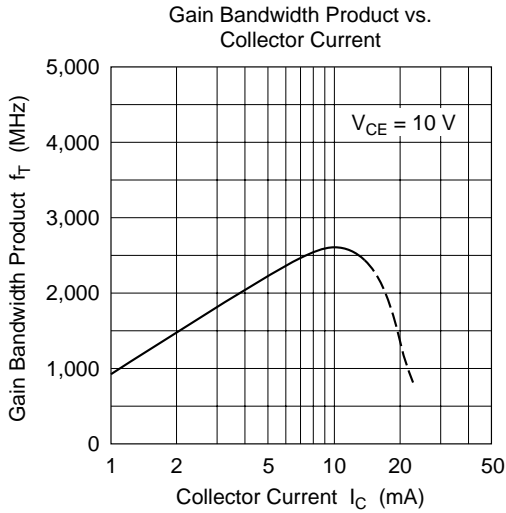
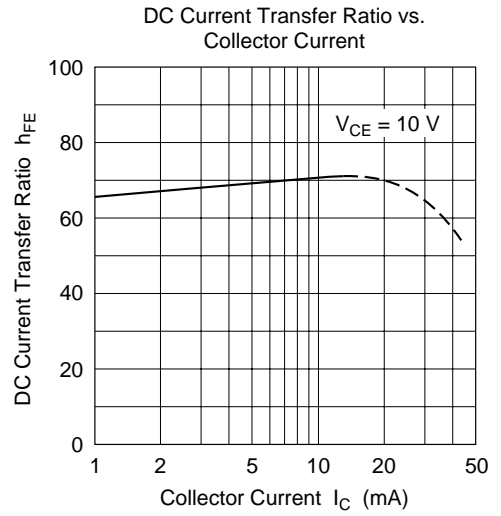
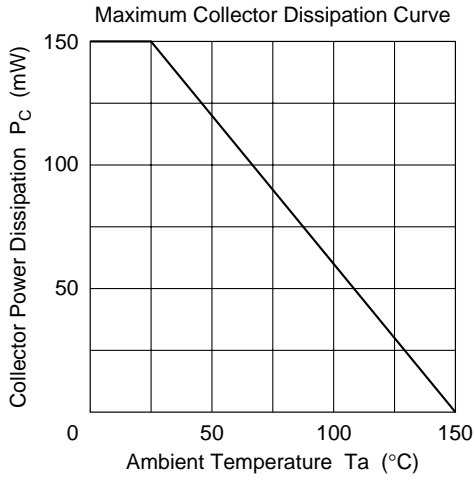
Absolute Maximum Ratings (Ta = 25°C)

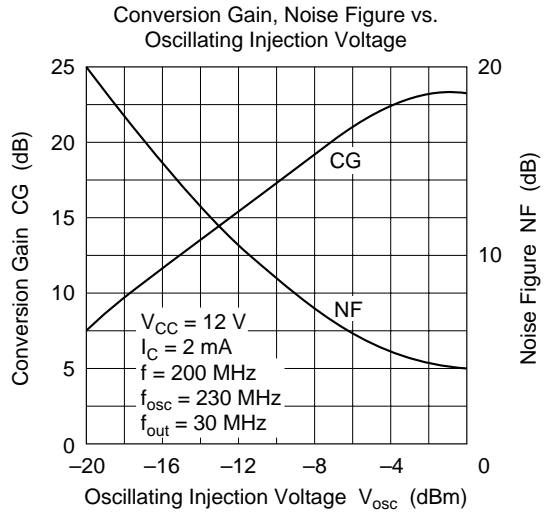
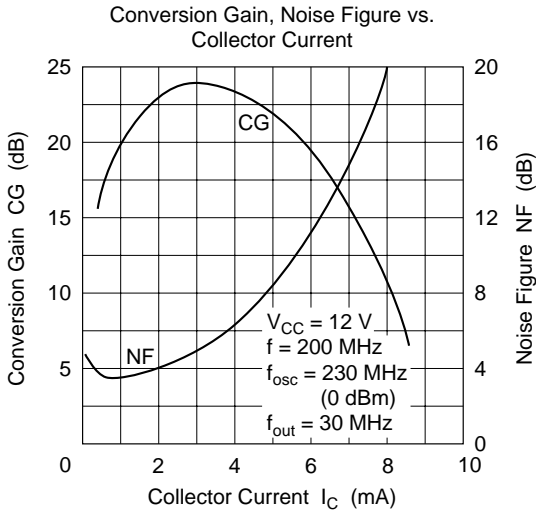
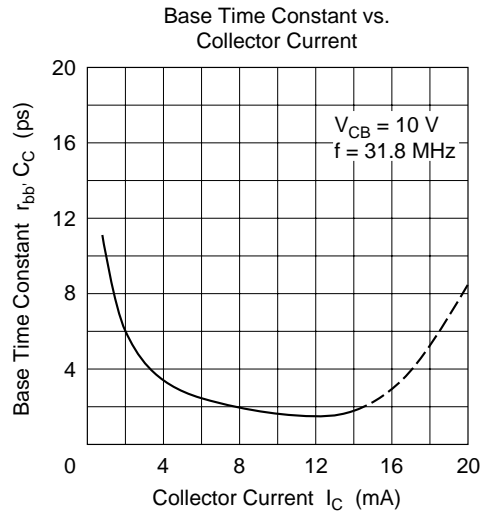
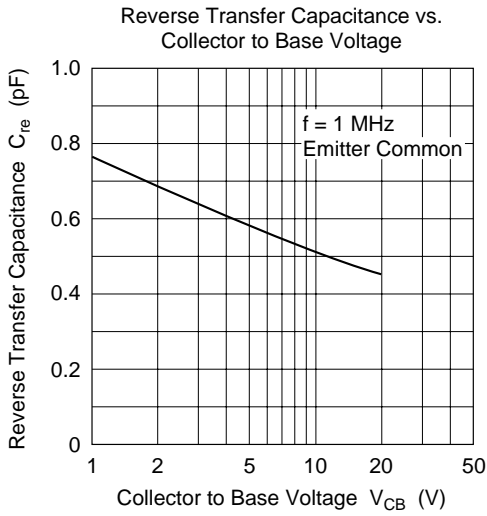
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	30	V
Collector to emitter voltage	V_{CEO}	20	V
Emitter to base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Electrical Characteristics (Ta = 25°C)

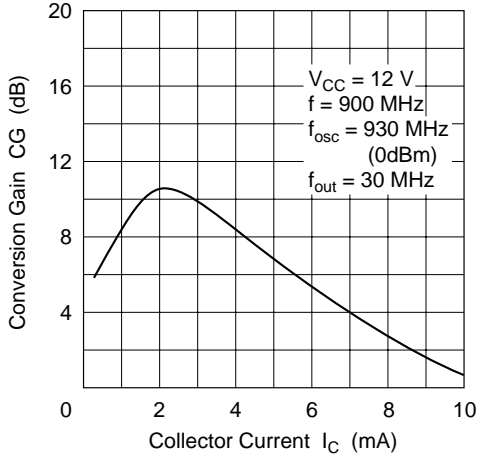
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	20	—	—	V	$I_C = 1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	3	—	—	V	$I_E = 10 \mu A, I_C = 0$
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	$V_{CC} = 12 \text{ V}, I_C = 7 \text{ mA},$ $f_{OSC} = 930 \text{ MHz}$

Note: Marking is "TC".

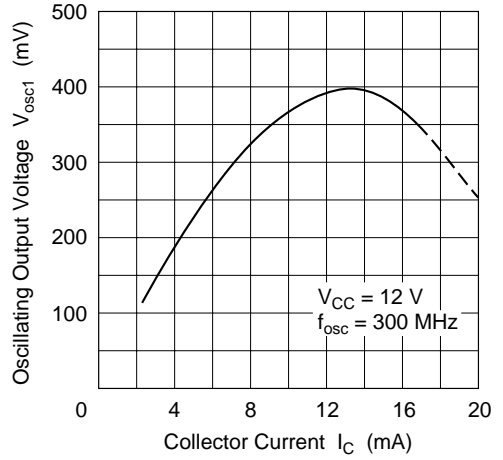




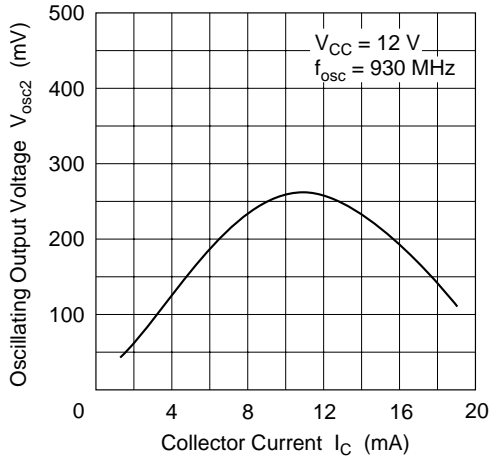
Conversion Gain vs. Collector Current



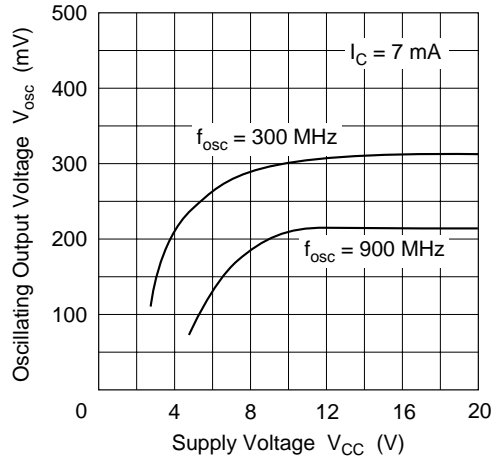
Oscillating Output Voltage vs. Collector Current



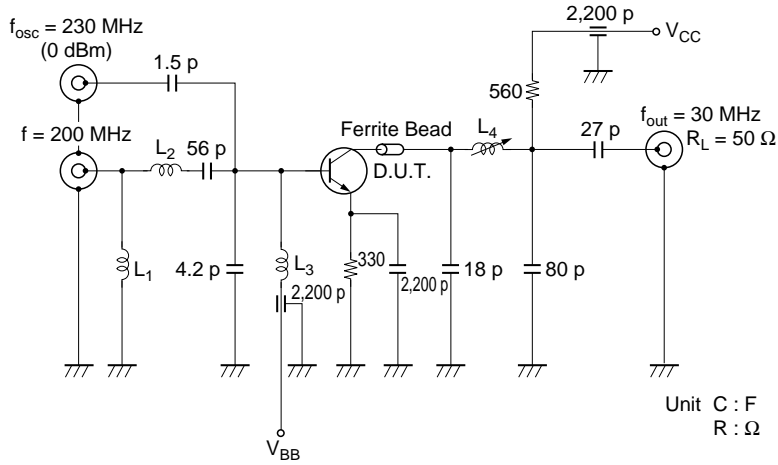
Oscillating Output Voltage vs. Collector Current



Oscillating Output Voltage vs. Supply Voltage



VHF Conversion Gain (CG_1) : Noise Figure Test Circuit



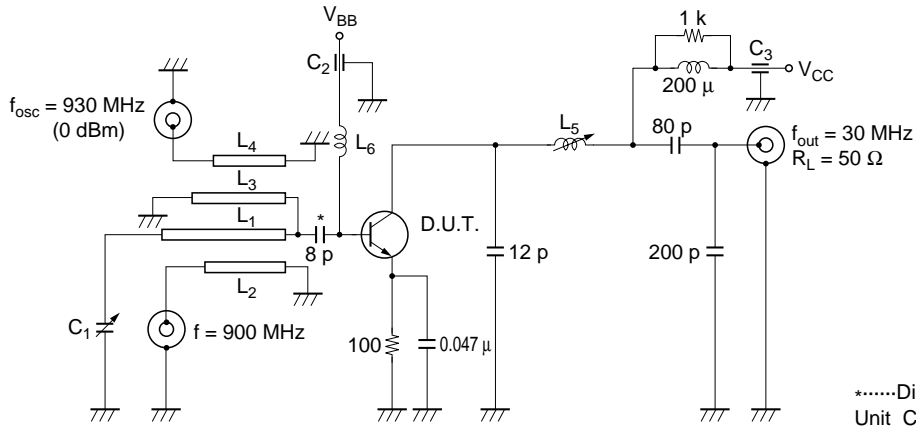
L_1 : $\phi 0.5 \text{ mm}$ Enameled Copper Wire
 4 Turns inside dia $\phi 5 \text{ mm}$

L_2 : $\phi 0.5 \text{ mm}$ Enameled Copper Wire
 4 Turns inside dia $\phi 4 \text{ mm}$

L_3 : $\phi 0.2 \text{ mm}$ Enameled Copper Wire
 6 Turns inside dia $\phi 3 \text{ mm}$

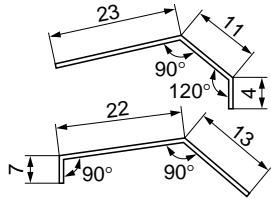
L_4 : Outside dia $\phi 5 \text{ mm}$ Bobbin,
 $\phi 0.2 \text{ mm}$ Enameled Copper Wire
 16 Turns Using Ferrite bead.

UHF Conversion Gain (CG₂) Test Circuit

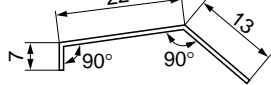


*.....Disk Capacitor
 Unit C : F
 R : Ω
 L : H

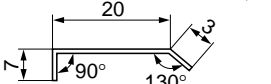
L₁ : φ1 mm Enameled Copper Wire



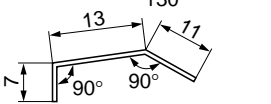
L₂ : φ1 mm Enameled Copper Wire



L₃ : φ1 mm Enameled Copper Wire



L₄ : φ1 mm Enameled Copper Wire



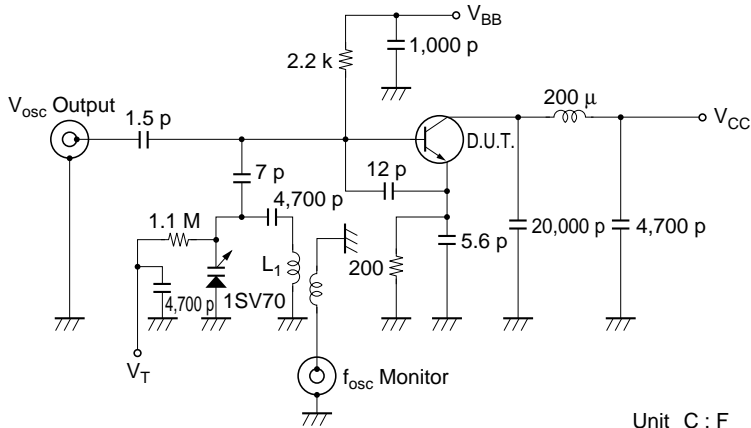
L₅ : Bobbin φ5 mm inside dia, φ0.2 mm Enameled Copper Wire 20 Turns

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

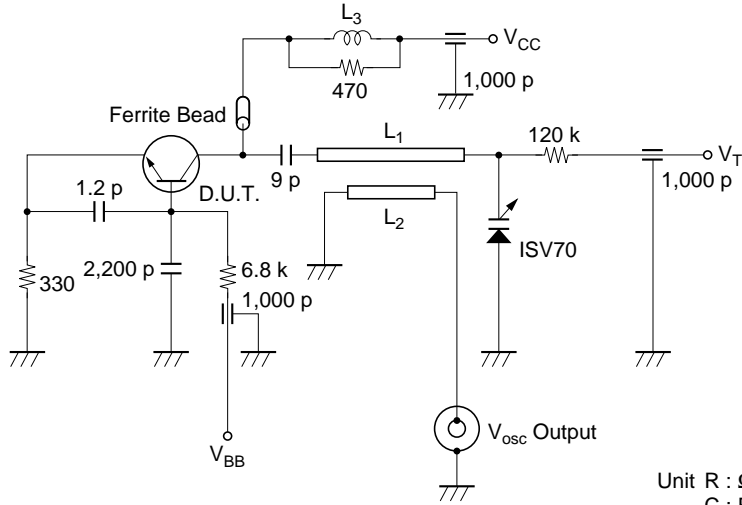


L_1 : $\phi 0.3$ mm Enameled Copper Wire
3 Turns inside dia $\phi 3$ mm

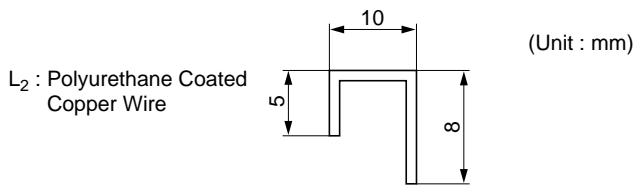
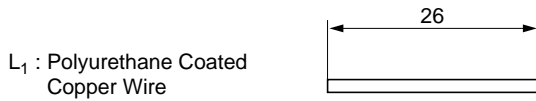
Test Frequency
 $f_{osc} = 300$ MHz

Unit C : F
R : Ω
L : H

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

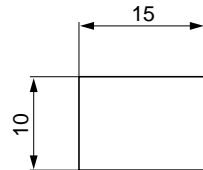


Unit R : Ω
C : F

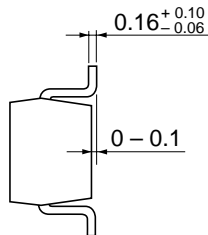
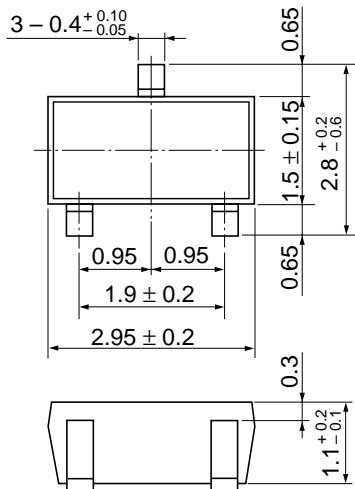


L_3 : $\phi 0.3$ mm Enameled Copper wire, 10 Turns with 470 Ω (1/4W) Resistor.

Dimensions of Cavity



Test Frequency
 $f_{osc} = 930$ MHz



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

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