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# 2SC2735

Silicon NPN Epitaxial

# HITACHI

ADE-208-1075 (Z)  
1st. Edition  
Mar. 2001

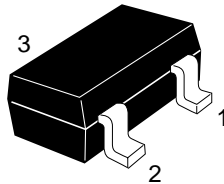
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## Application

UHF/VHF Local oscillator, frequency converter

## Outline

MPAK



1. Emitter
2. Base
3. Collector

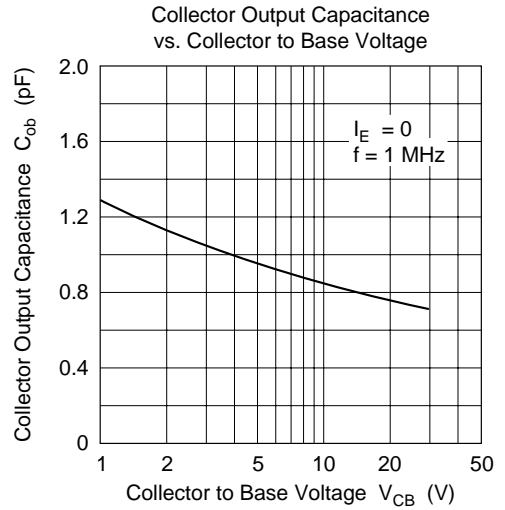
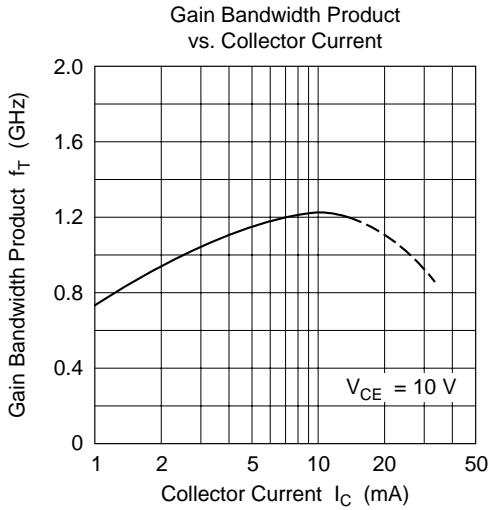
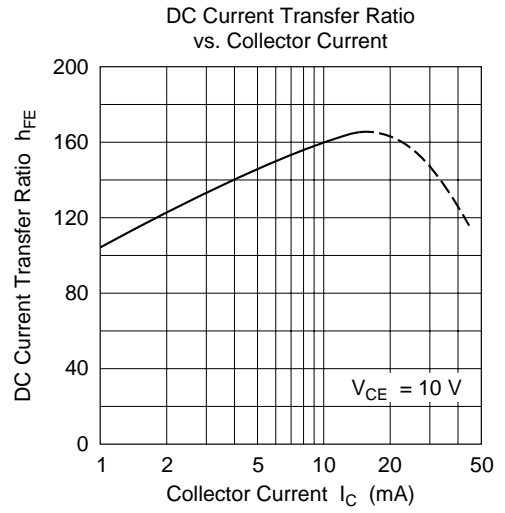
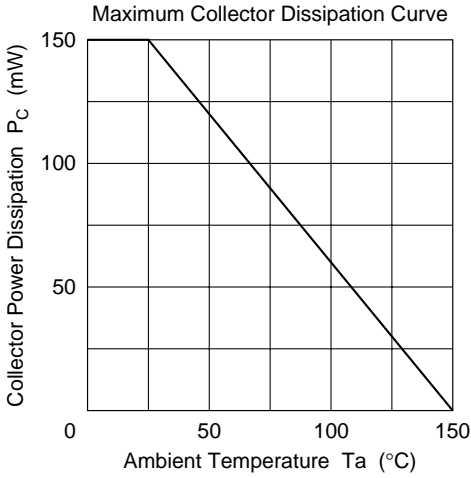
Note: Marking is "JC".

**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

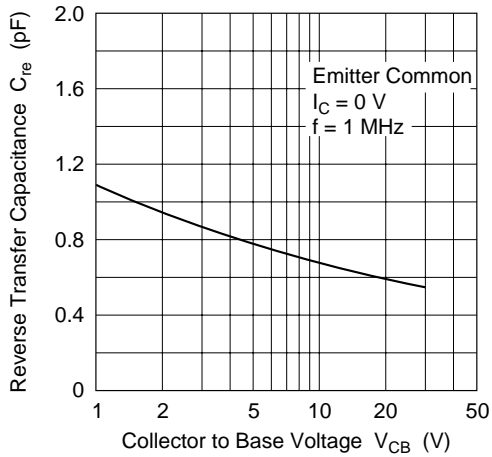
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{\text{CBO}}$	30	V
Collector to emitter voltage	$V_{\text{CEO}}$	20	V
Emitter to base voltage	$V_{\text{EBO}}$	3	V
Collector current	$I_{\text{C}}$	50	mA
Collector power dissipation	$P_{\text{C}}$	150	mW
Junction temperature	$T_{\text{j}}$	150	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ )

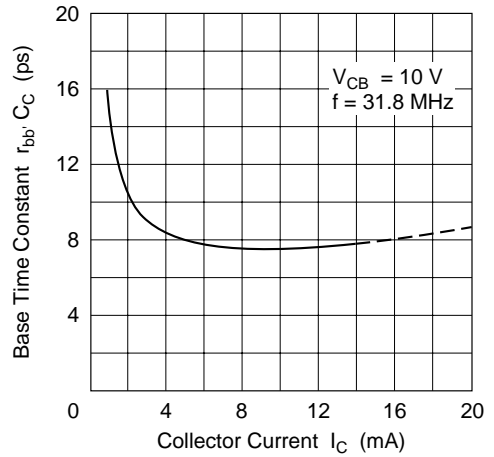
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(\text{BR})\text{CBO}}$	30	—	—	V	$I_{\text{C}} = 10 \mu\text{A}$ , $I_{\text{E}} = 0$
Collector to emitter breakdown voltage	$V_{(\text{BR})\text{CEO}}$	20	—	—	V	$I_{\text{C}} = 1 \text{ mA}$ , $R_{\text{BE}} = \infty$
Emitter to base breakdown voltage	$V_{(\text{BR})\text{EBO}}$	3	—	—	V	$I_{\text{E}} = 10 \mu\text{A}$ , $I_{\text{C}} = 0$
Collector cutoff current	$I_{\text{CBO}}$	—	—	0.5	$\mu\text{A}$	$V_{\text{CB}} = 10 \text{ V}$ , $I_{\text{C}} = 0$
Collector to emitter saturation voltage	$V_{\text{CE}(\text{sat})}$	—	—	1.0	V	$I_{\text{C}} = 20 \text{ mA}$ , $I_{\text{B}} = 4 \text{ mA}$
DC current transfer ratio	$h_{\text{FE}}$	40	—	—		$V_{\text{CE}} = 10 \text{ V}$ , $I_{\text{C}} = 10 \text{ mA}$
Collector output capacitance	$C_{\text{ob}}$	—	0.85	1.5	pF	$V_{\text{CB}} = 10 \text{ V}$ , $I_{\text{E}} = 0$ , $f = 1 \text{ MHz}$
Gain bandwidth product	$f_{\text{T}}$	600	1200	—	MHz	$V_{\text{CE}} = 10 \text{ V}$ , $I_{\text{C}} = 10 \text{ mA}$
Oscillating output voltage	$V_{\text{OSC1}}$	—	210	—	mV	$V_{\text{CC}} = 12 \text{ V}$ , $I_{\text{C}} = 7 \text{ mA}$ , $f_{\text{OSC}} = 300 \text{ MHz}$
	$V_{\text{OSC2}}$	—	130	—	mV	$V_{\text{CC}} = 12 \text{ V}$ , $I_{\text{C}} = 7 \text{ mA}$ , $f_{\text{OSC}} = 930 \text{ MHz}$
Conversion gain	CG	—	21	—	dB	$V_{\text{CC}} = 12 \text{ V}$ , $I_{\text{C}} = 2 \text{ mA}$ , $f = 200 \text{ MHz}$ , $f_{\text{OSC}} = 230 \text{ MHz}$ (0dBm)
Noise figure	NF	—	6.5	—	dB	$V_{\text{CC}} = 12 \text{ V}$ , $I_{\text{C}} = 2 \text{ mA}$ , $f = 200 \text{ MHz}$ , $f_{\text{OSC}} = 230 \text{ MHz}$ (0dBm)



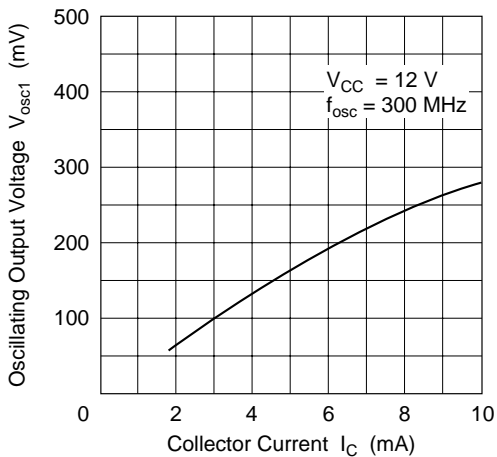
Reverse Transfer Capacitance vs. Collector to Base Voltage



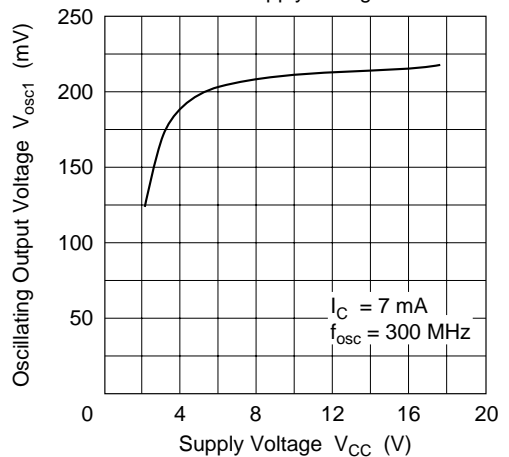
Base Time Constant vs. Collector Current



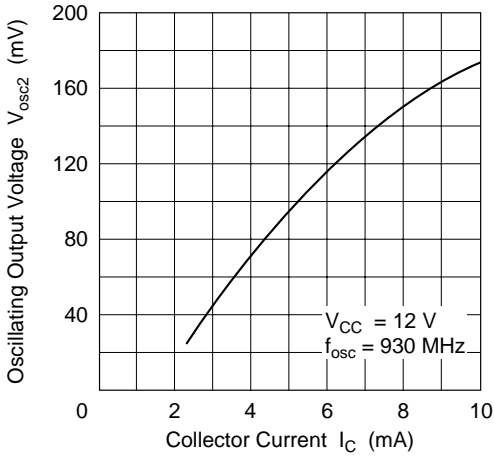
Oscillating Output Voltage vs. Collector Current



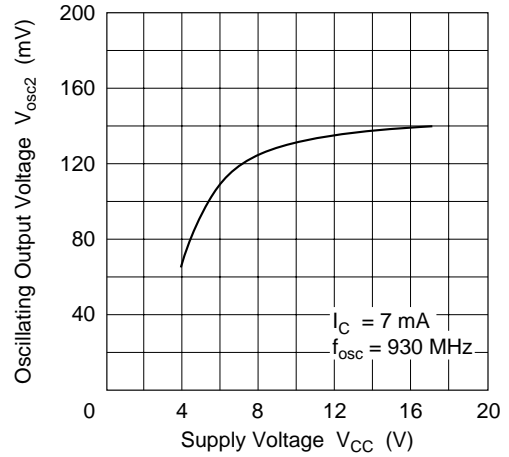
Oscillating Output Voltage vs. Supply Voltage



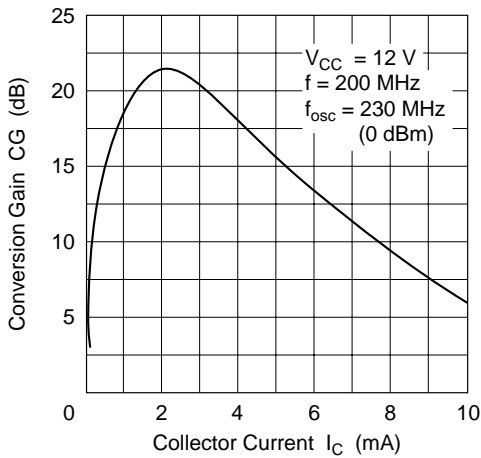
Oscillating Output Voltage vs. Collector Current



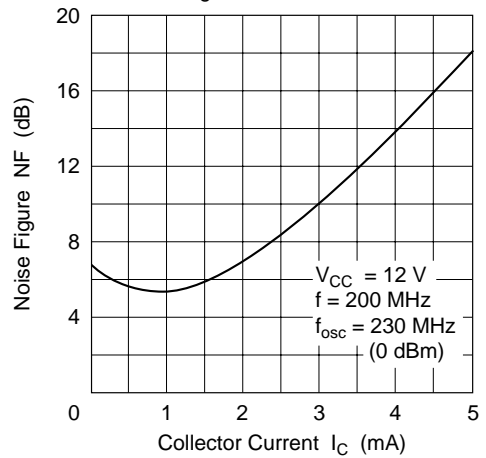
Oscillating Output Voltage vs. Supply Voltage



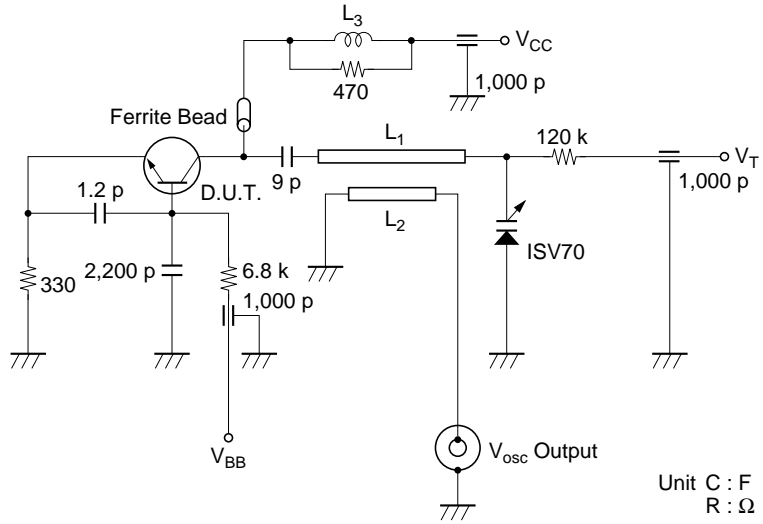
Conversion Gain vs. Collector Current



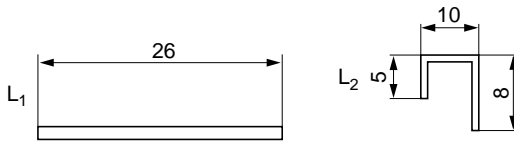
Noise Figure vs. Collector Current



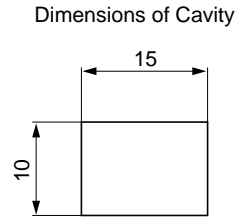
$V_{OSC2}$  UHF Oscillating Output Voltage Test Circuit



Unit C : F  
R :  $\Omega$



(Dimensions in mm)



(Dimensions in mm)

$L_1$  : Polyurethane Coated Copper Wire  $\phi$ 1.0 mm

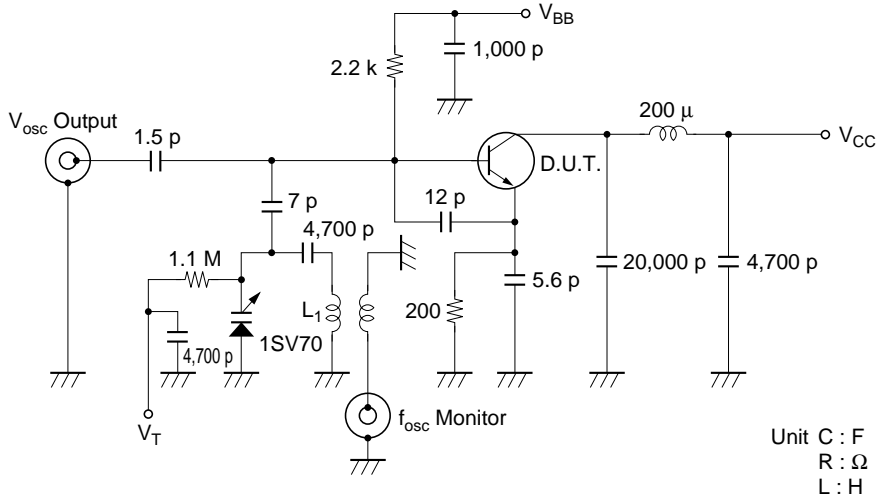
$L_2$  : Polyurethane Coated Copper Wire  $\phi$ 0.8 mm

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

Test Frequency :  $f_{osc} = 930$  MHz

Test Equipment : YHP 4271A Vector Voltmeter

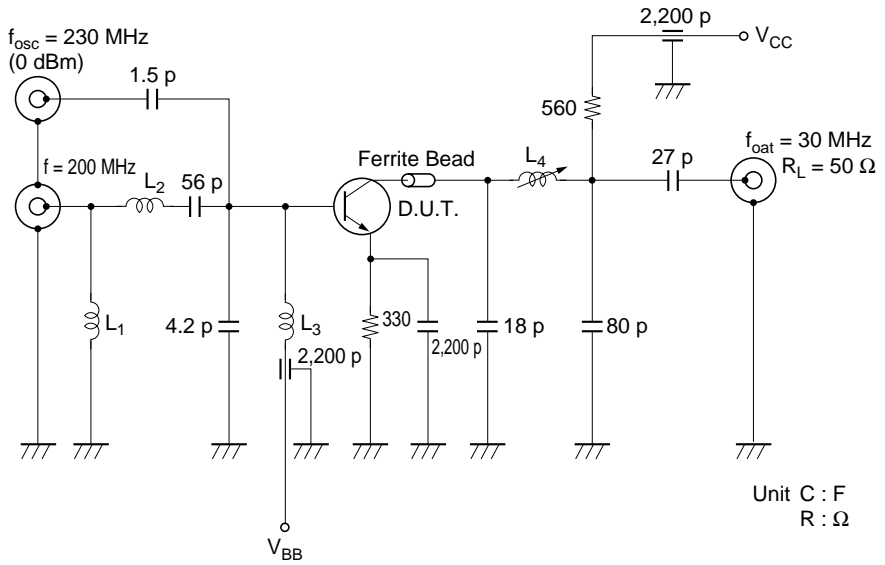
$V_{osc1}$  VHF Oscillating Output Voltage Test Circuit



$L_1$  : Inside dia  $\phi 3$  mm,  $\phi 3$  mm Enameled Copper Wire 12 Turns

Test Frequency :  $f_{osc} = 300$  MHz

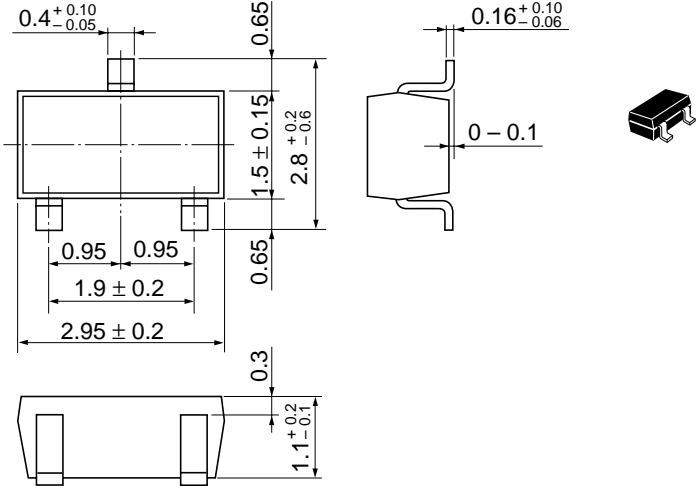
VHF Conversion Gain : Noise Figure Test Circuit



- $L_1$  : Inside dia  $\phi 5 \text{ mm}$ ,  $\phi 0.5 \text{ mm}$  Enameled Copper Wire 4 Turns
- $L_2$  : Inside dia  $\phi 4 \text{ mm}$ ,  $\phi 0.5 \text{ mm}$  Enameled Copper Wire 4 Turns
- $L_3$  : Inside dia  $\phi 3 \text{ mm}$ ,  $\phi 0.2 \text{ mm}$  Enameled Copper Wire 6 Turns
- $L_4$  : Outside dia  $\phi 5 \text{ mm}$  Bobbin,  $\phi 0.2 \text{ mm}$  Enameled Copper Wire 16 Turns, using Ferrite bead.

Package Dimensions

As of January, 2001  
Unit: mm



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

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