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# 2SC1342

Silicon NPN Epitaxial Planar

# HITACHI

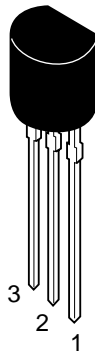
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## Application

- VHF amplifier, mixer
- Local oscillator

## Outline

TO-92 (2)



1. Emitter
2. Collector
3. Base

## Absolute Maximum Ratings (Ta = 25°C)

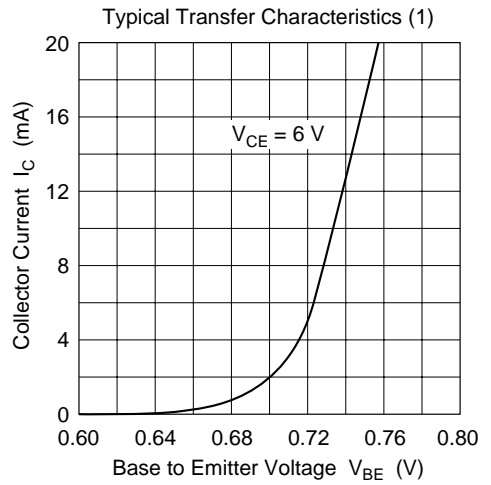
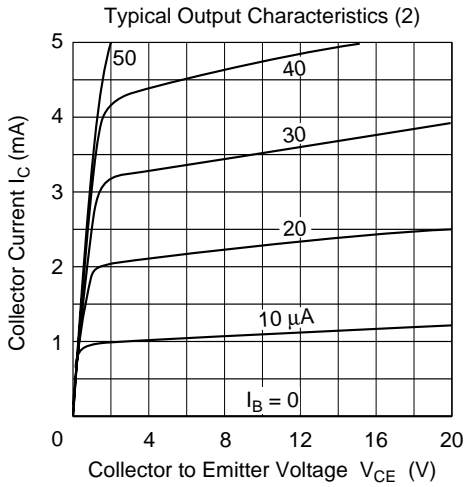
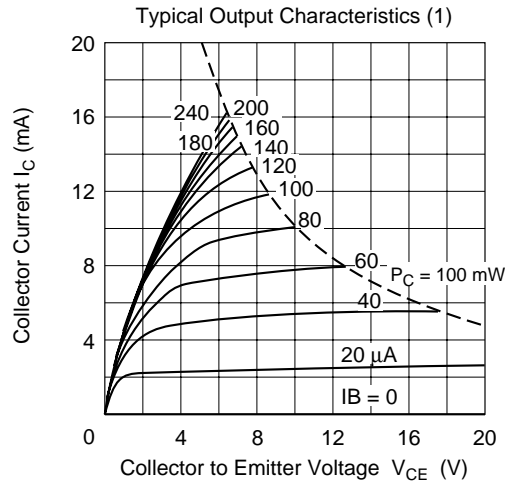
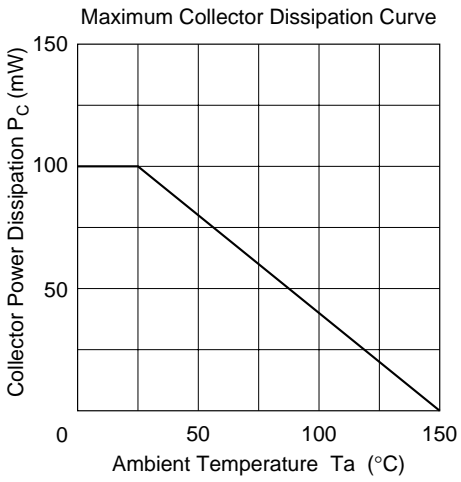
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	30	V
Collector to emitter voltage	$V_{CEO}$	20	V
Emitter to base voltage	$V_{EBO}$	4	V
Collector current	$I_C$	30	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

## Electrical Characteristics (Ta = 25°C)

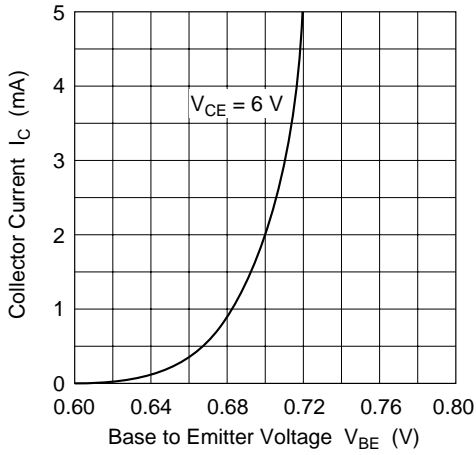
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	20	—	—	V	$I_C = 1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	4	—	—	V	$I_E = 10 \mu A, I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.5	$\mu A$	$V_{CB} = 10 \text{ V}, I_E = 0$
DC current transfer ratio	$h_{FE}^{*1}$	35	—	200		$V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	0.8	1.2	V	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$
Collector output capacitance	$C_{ob}$	—	1.1	1.5	pF	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$
Base time constant	$r_{bb'} \cdot C_C$	—	20	35	ps	$V_{CB} = 6 \text{ V}, I_C = 1 \text{ mA}, f = 31.8 \text{ MHz}$
Gain bandwidth product	$f_T$	150	320	—	MHz	$V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$
Noise figure	NF	—	5.5	8.5	dB	$V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}, f = 100 \text{ MHz}, R_g = 50 \Omega$
Reverse transfer capacitance	$C_{re}$	—	0.9	1.2	pF	$V_{CE} = 10 \text{ V}, I_E = -1 \text{ mA}, f = 1 \text{ MHz}$
Power gain	PG	13	17	—	dB	$V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}, f = 100 \text{ MHz}, R_g = 100 \Omega, R_L = 550 \Omega, \text{Unneutralized}$

Note: 1. The 2SC1342 is grouped by  $h_{FE}$  as follows.

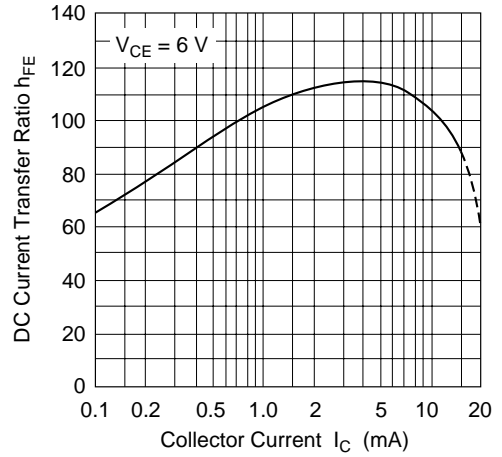
A	B	C
35 to 70	60 to 120	100 to 200



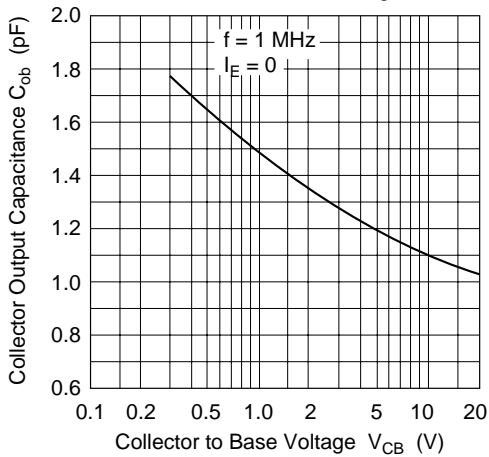
Typical Transfer Characteristics (2)



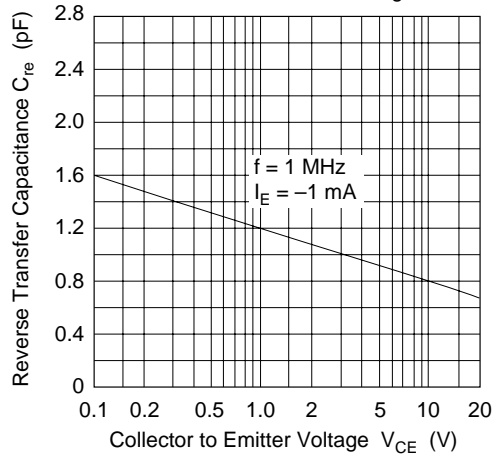
DC Current Transfer Ratio vs. Collector Current

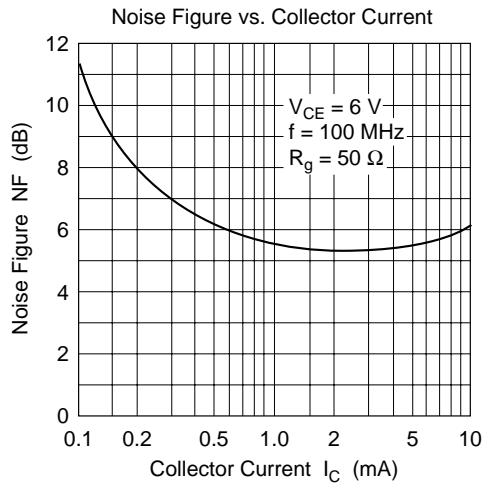
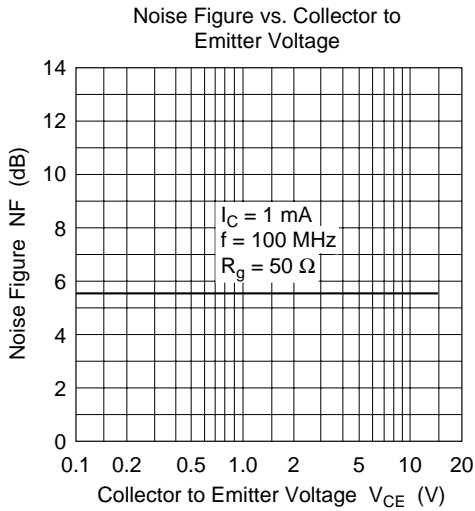
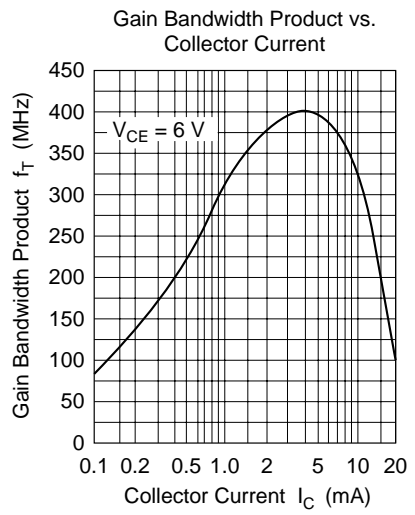
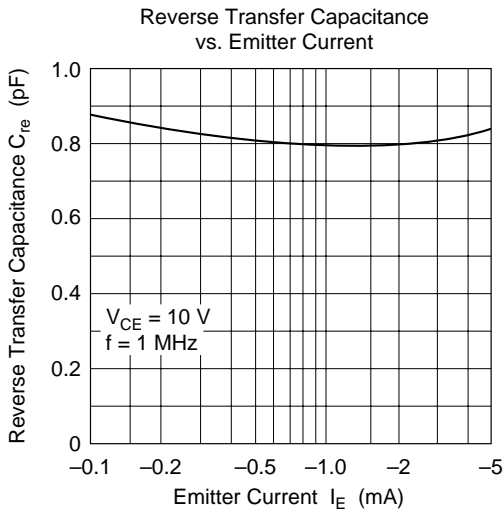


Collector Output Capacitance vs. Collector to Base Voltage

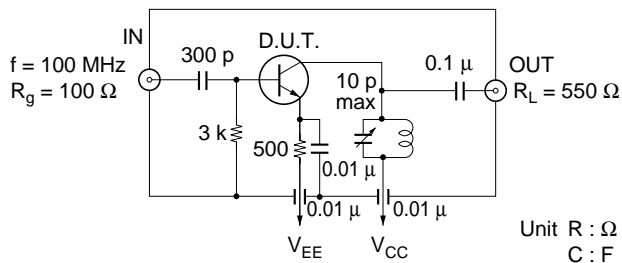


Reverse Transfer Capacitance vs. Collector to Emitter Voltage



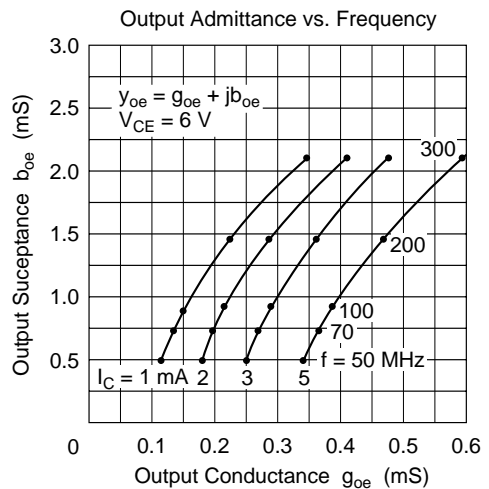
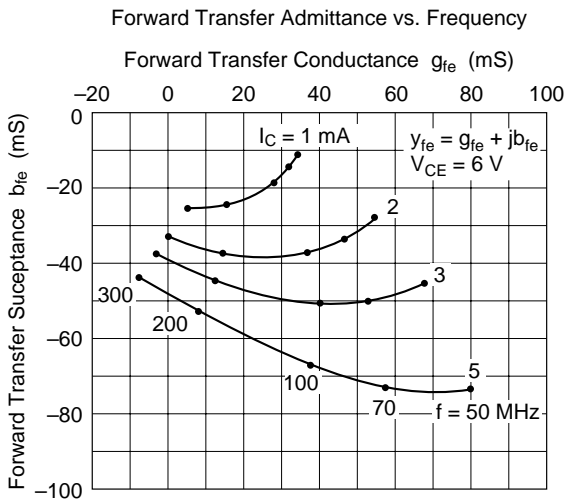
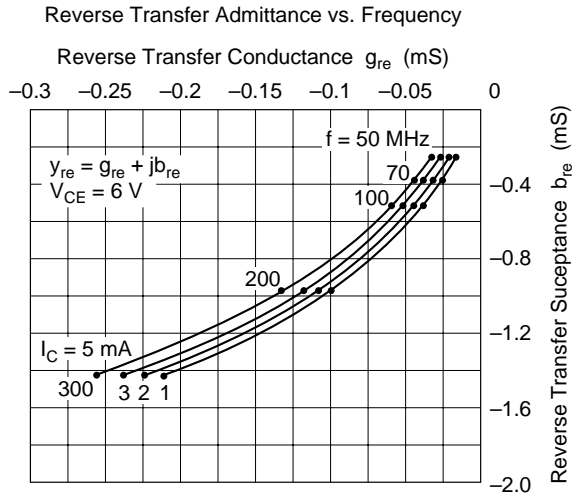
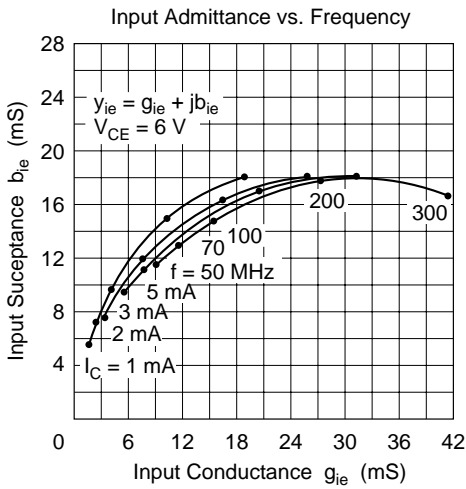


Power Gain Test Circuit

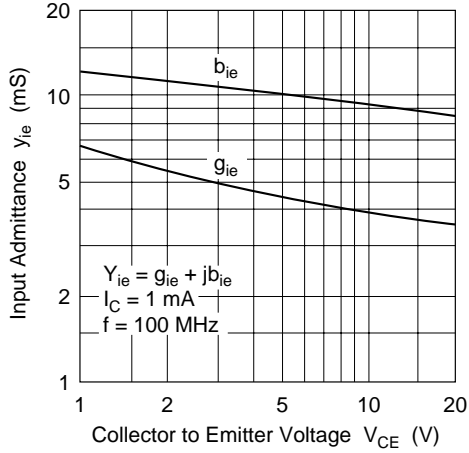


Small Signal y Parameters ( $V_{CE} = 6V, I_C = 1\text{ mA}$ , Emitter Common  $T_a = 25^\circ\text{C}$ )

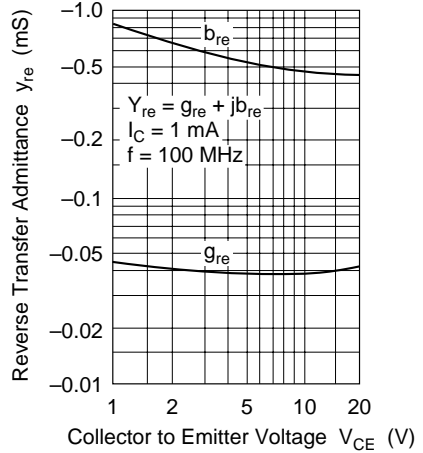
Item	Symbol	f = 50 MHz	f = 100 MHz	f = 200 MHz	Unit
Input admittance	$y_{ie}$	$1.8 + j5.5$	$4.3 + j9.9$	$11.5 + j15.25$	mS
Reverse transfer admittance	$y_{re}$	$-0.022 - j0.26$	$-0.04 - j0.52$	$-0.105 - j0.96$	
Forward transfer admittance	$y_{fe}$	$34 - j12$	$28 - j19$	$15.5 - j25$	
Output admittance	$y_{oe}$	$0.1 + j0.5$	$0.15 + j0.9$	$0.21 + j1.45$	



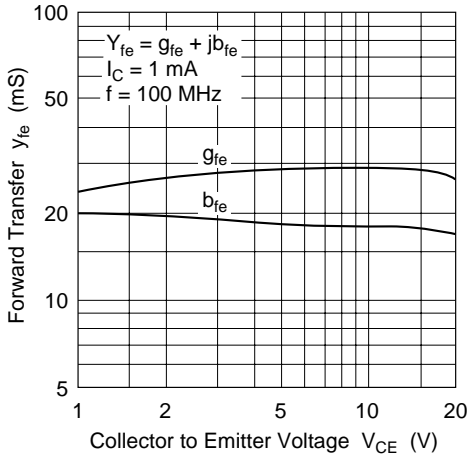
Input Admittance vs. Collector to Emitter Voltage



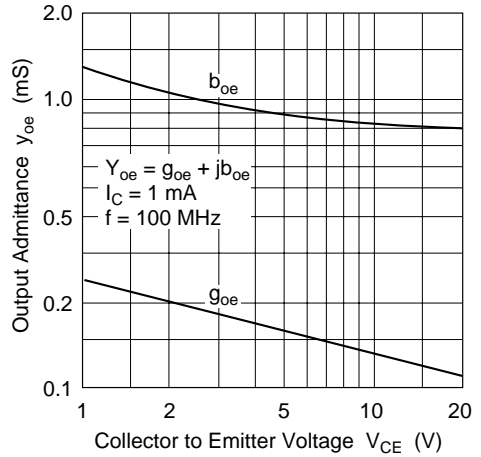
Reverse Transfer Admittance vs. Collector to Emitter Voltage

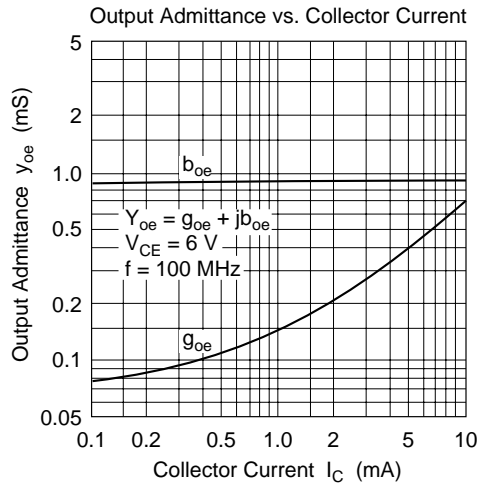
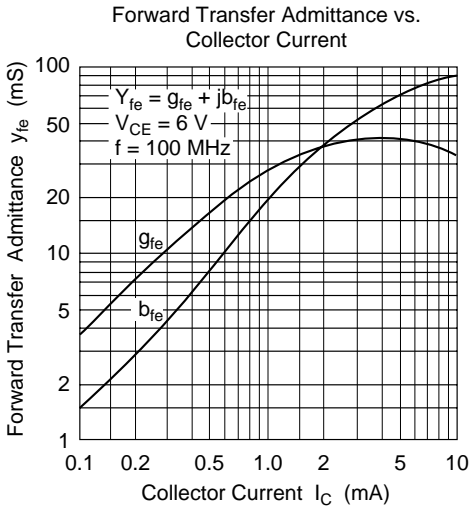
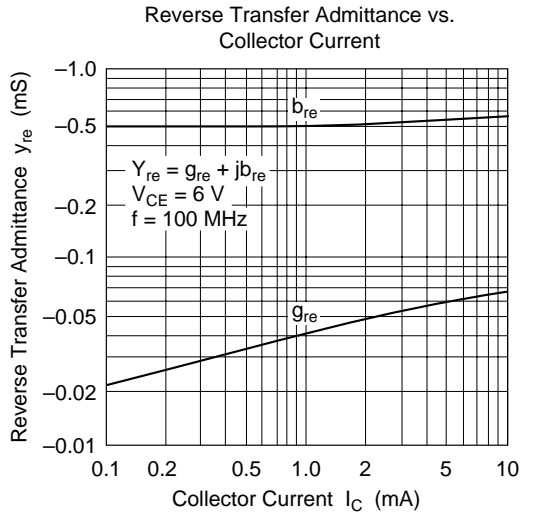
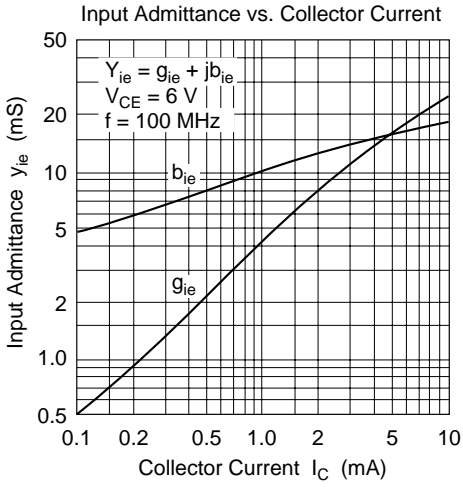


Forward Transfer Admittance vs. Collector to Emitter Voltage

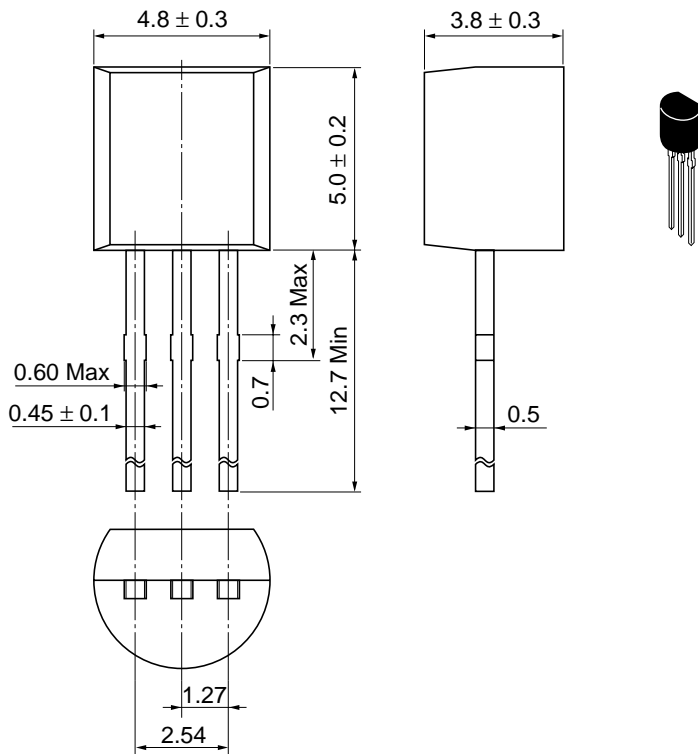


Output Admittance vs. Collector to Emitter Voltage









Hitachi Code	TO-92 (2)
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.25 g

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