
2SC460, 2SC461

Silicon NPN Epitaxial Planar

HITACHI

ADE-208-1046 (Z)

1st. Edition

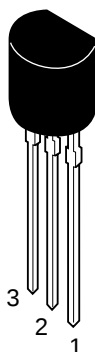
Mar. 2001

Application

- 2SC460 high frequency amplifier, mixer
- 2SC461 VHF amplifier, mixer

Outline

TO-92 (2)



1. Emitter
2. Collector
3. Base

2SC460, 2SC461

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	2SC460	2SC461	Unit
Collector to base voltage	V _{CBO}	30	30	V
Collector to emitter voltage	V _{CEO}	30	30	V
Emitter to base voltage	V _{EBO}	5	5	V
Collector current	I _C	100	100	mA
Collector power dissipation	P _C	200	200	mW
Junction temperature	T _j	150	150	°C
Storage temperature	T _{stg}	−55 to +150	−55 to +150	°C

Electrical Characteristics (Ta = 25°C)

Item	Symbol	2SC460			2SC461			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	30	—	—	V	$I_C = 10\ \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	30	—	—	30	—	—	V	$I_C = 1\ mA, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	5	—	—	5	—	—	V	$I_E = 10\ \mu A, I_C = 0$
Collector cutoff current	I_{CBO}	—	—	0.5	—	—	0.5	μA	$V_{CB} = 18\ V, I_E = 0$
Emitter cutoff current	I_{EBO}	—	—	0.5	—	—	0.5	μA	$V_{EB} = 2\ V, I_C = 0$
Base to emitter voltage	V_{BE}	—	0.63	0.75	—	0.63	0.75	V	$V_{CE} = 12\ V, I_C = 2\ mA$
DC current transfer ratio	h_{FE}^{*1}	35	—	200	35	—	200		$V_{CE} = 12\ V, I_C = 2\ mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	0.6	1.1	—	0.6	1.1	V	$I_C = 10\ mA, I_B = 1\ mA$
Gain bandwidth product	f_T	—	230	—	—	230	—	MHz	$V_{CE} = 12\ V, I_C = 2\ mA$
Collector output capacitance	C_{ob}	—	1.8	3.5	—	1.8	3.5	pF	$V_{CB} = 10\ V, I_E = 0, f = 1\ MHz$
10.7 MHz power gain	PG	26	29	—	—	—	—	dB	$V_{CE} = 6\ V, I_E = -1\ mA, f = 10.7\ MHz$
100 MHz power gain	PG	—	—	—	13	17	—	dB	$V_{CE} = 6\ V, I_E = -1\ mA, f = 100\ MHz$
Noise figure	NF	—	2.0	—	—	—	—	dB	$V_{CE} = 6\ V, I_E = -1\ mA, f = 1\ MHz, R_g = 500\ \Omega$

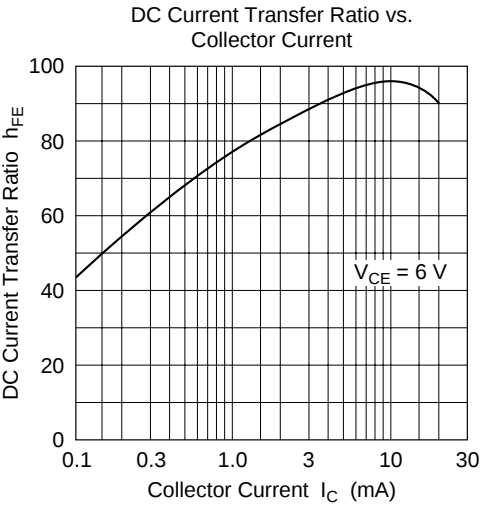
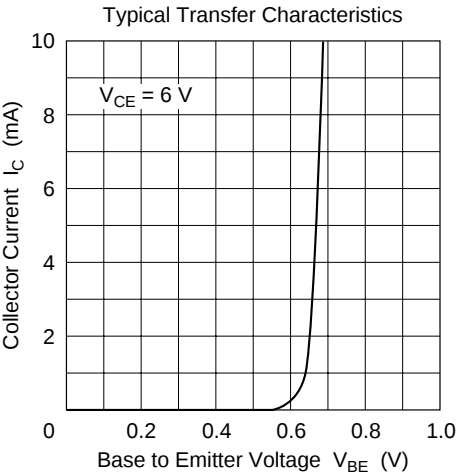
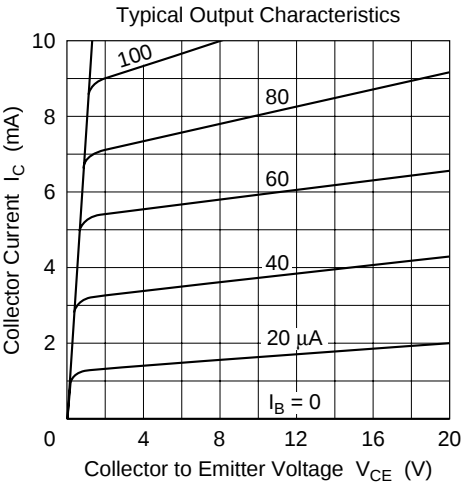
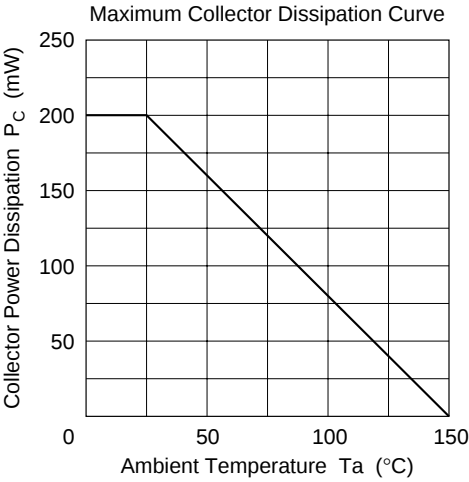
Note: 1. The 2SC460 and 2SC461 are grouped by h_{FE} as follows.

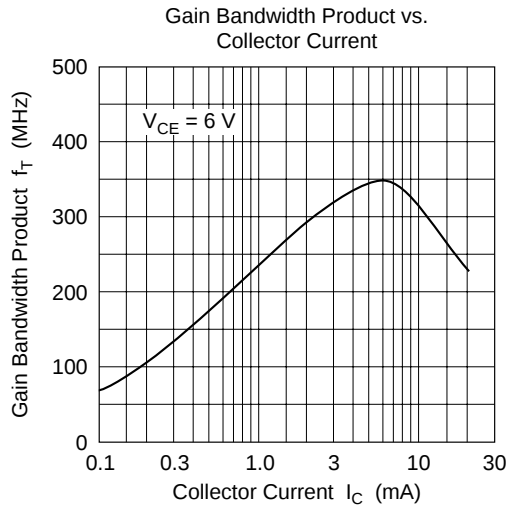
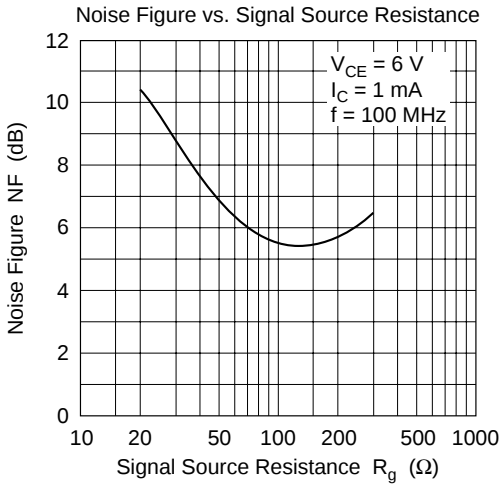
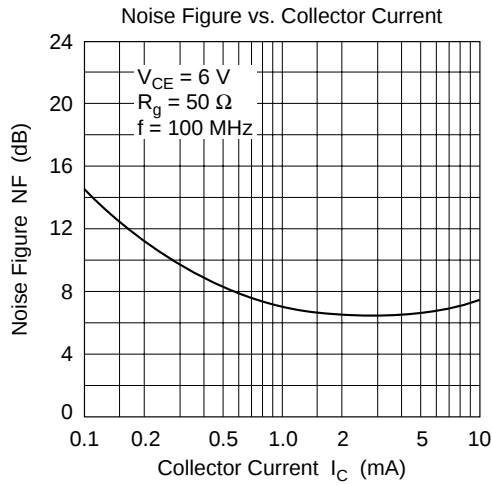
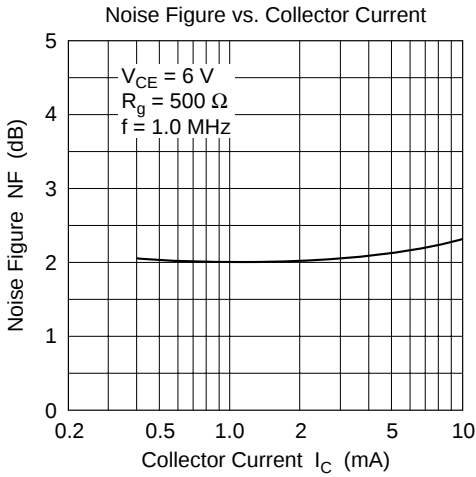
A	B	C
35 to 70	60 to 120	100 to 200

2SC460, 2SC461

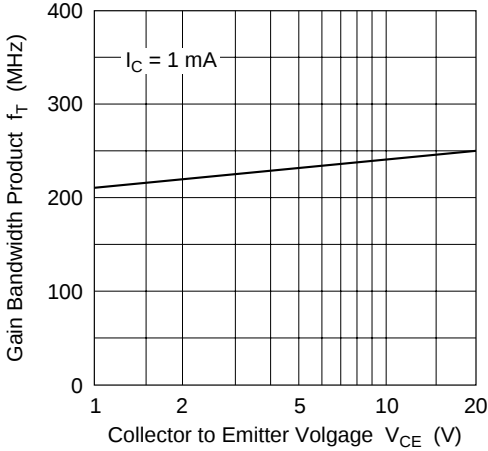
Small Signal y Parameters ($V_{CE} = 6\text{ V}$, $I_C = 1\text{ mA}$, Emitter Common)

Item	Symbol	f	2SC460A, 2S461A	2SC460B, 2SC461B	2SC460C, 2SC461C	Unit
Input admittance	y _{ie}	455 kHz	0.58 + j0.074	0.42 + j0.068	0.30 + j0.051	mS
		4.5 MHz	0.65 + j0.79	0.50 + j0.7	0.35 + j0.57	
		10.7 MHz	0.91 + j2.0	0.61 + j1.9	0.39 + j1.3	
		100 MHz	7.4 + j14	5.6 + j12	3.8 + j6.0	
Reverse transfer admittance	y _{re}	455 kHz	−j0.003	−j0.003	−j0.003	mS
		4.5 MHz	−j0.04	−j0.04	−j0.04	
		10.7 MHz	−j0.13	−j0.13	−j0.13	
		100 MHz	−j1.0	−j1.0	−j1.0	
Forward transfer admittance	y _{fe}	455 kHz	38 − j0.1	37 − j0.1	37 − j0.2	mS
		4.5 MHz	35 − j1.0	35 − j1.2	34 − j1.8	
		10.7 MHz	34 − j2.5	34 − j2.5	33 − j4.5	
		100 MHz	28 − j20	28 − j19	20 − j19	
Output admittance	y _{oe}	455 kHz	0.0098 + j0.009	0.013 + j0.009	0.016 + j0.012	mS
		4.5 MHz	0.02 + j0.09	0.023 + j0.092	0.03 + j0.10	
		10.7 MHz	0.11 + j0.4	0.11 + j0.4	0.12 + j0.4	
		100 MHz	0.40 + j1.7	0.50 + j2.0	0.83 + j2.0	

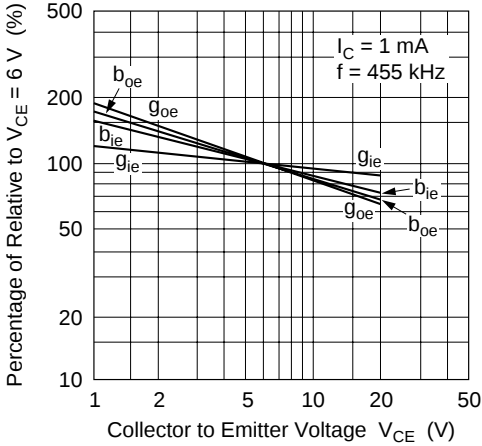




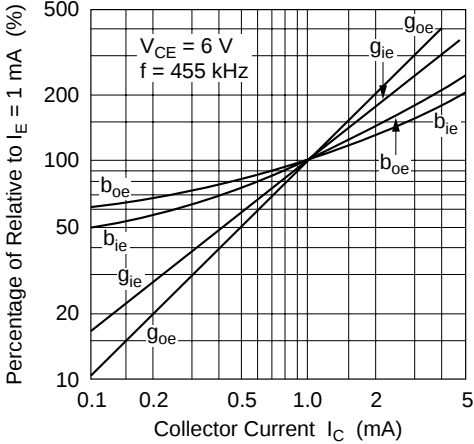
Gain Bandwidth Product vs.
Collector to Emitter Voltage



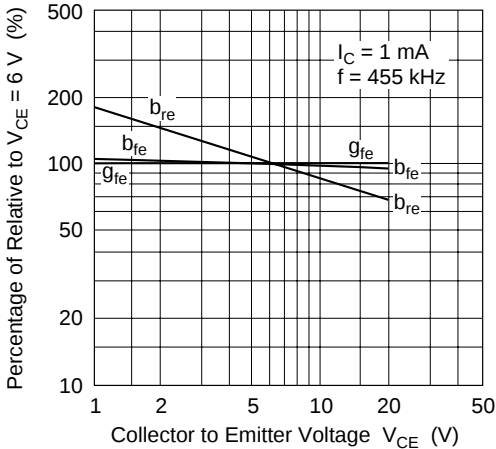
Input/Output Admittance vs.
Collector to Emitter Voltage



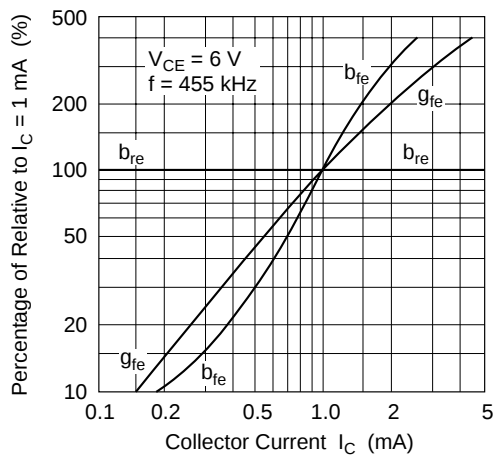
Input/Output Admittance vs.
Collector Current



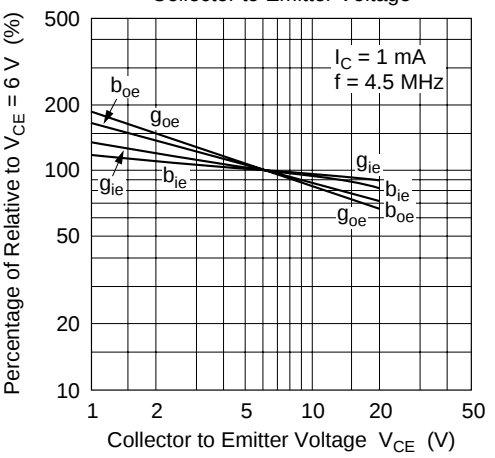
Transfer Admittance vs.
Collector to Emitter Voltage



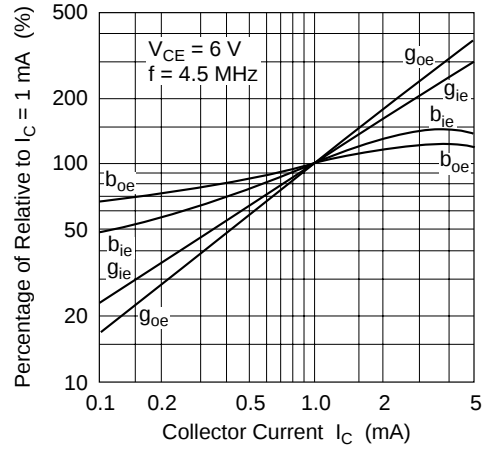
Transfer Admittance vs.
Collector Current



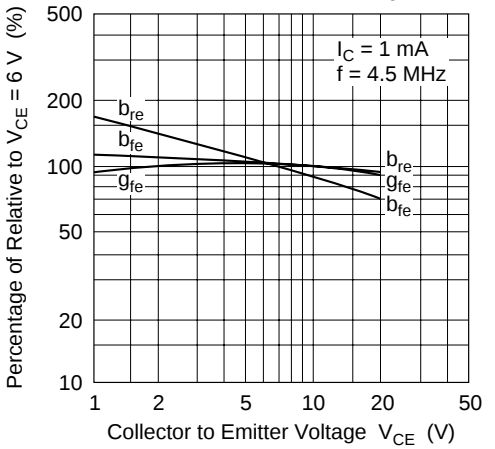
Input/Output Admittance vs.
Collector to Emitter Voltage

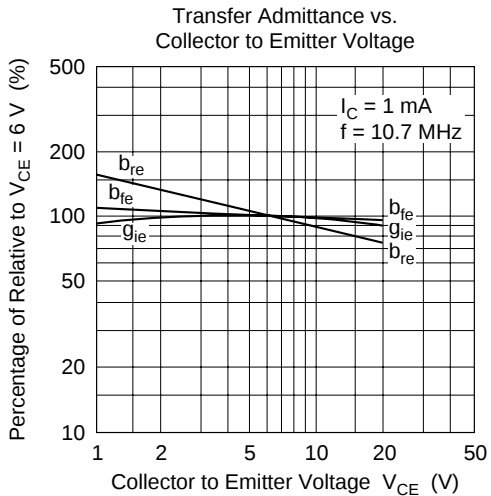
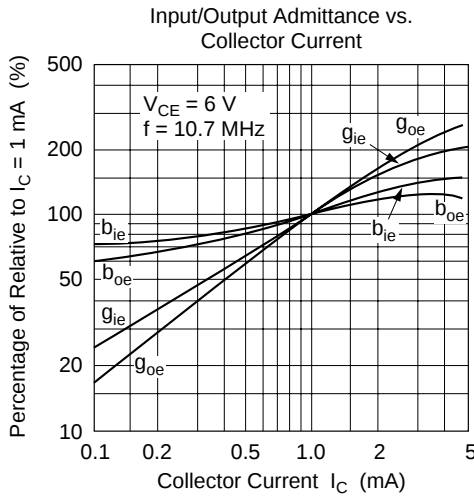
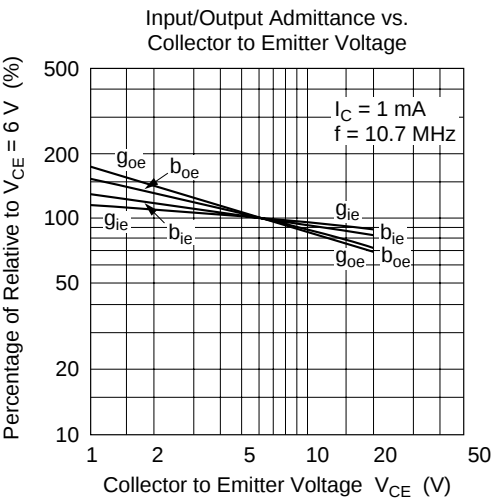
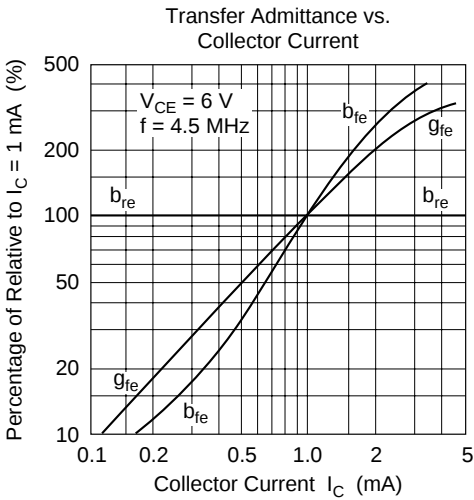


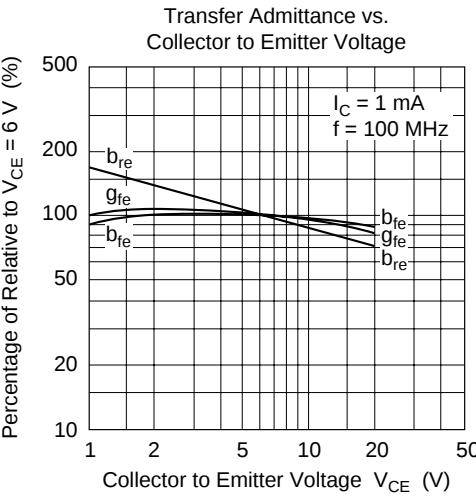
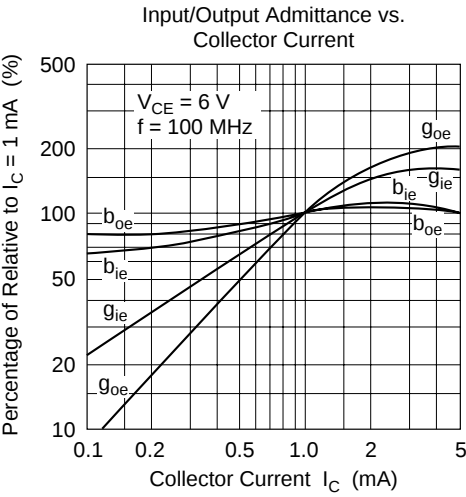
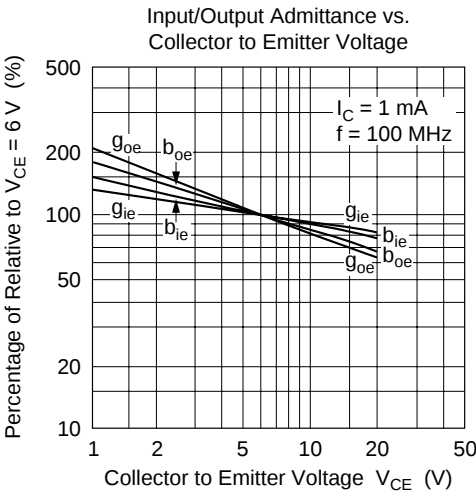
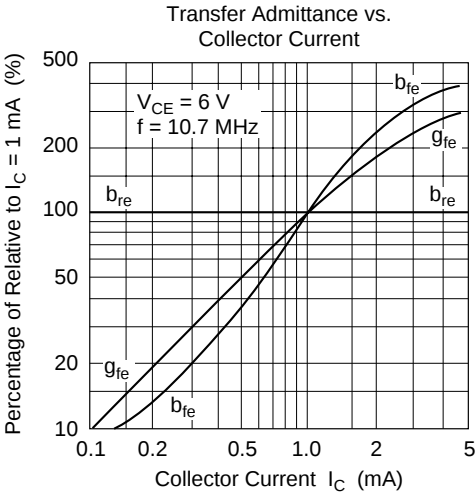
Input/Output Admittance vs.
Collector Current

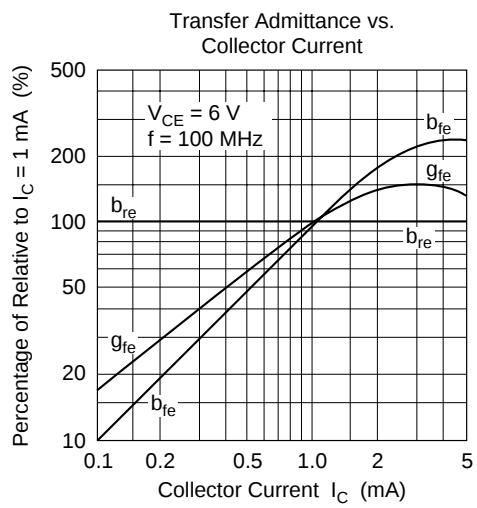


Transfer Admittance vs.
Collector to Emitter Voltage



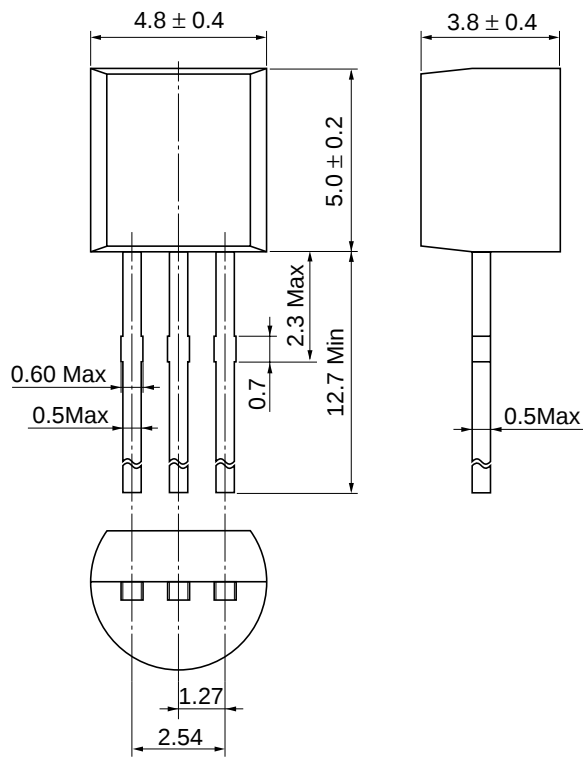






Package Dimensions

As of January, 2001
Unit: mm



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

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Hitachi, Ltd.

Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel: <65>-538-6533/538-8577
Fax: <65>-538-6933/538-3877
URL: <http://www.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel: <886>-(2)-2718-3666
Fax: <886>-(2)-2718-8180
Telex: 23222 HAS-TP
URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon,
Hong Kong
Tel: <852>-(2)-735-9218
Fax: <852>-(2)-730-0281
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