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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SA1190, 2SA1191

Silicon PNP Epitaxial

RENESAS

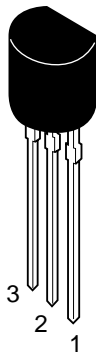
ADE-208-1012 (Z)
1st. Edition
Mar. 2001

Application

- Low frequency low noise amplifier
- Complementary pair with 2SC2855 and 2SC2856

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

2SA1190, 2SA1191

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

Item	Symbol	2SA1190	2SA1191	Unit
Collector to base voltage	V_{CBO}	-90	-120	V
Collector to emitter voltage	V_{CEO}	-90	-120	V
Emitter to base voltage	V_{EBO}	-5	-5	V
Collector current	I_{C}	-100	-100	mA
Emitter current	I_{E}	100	100	mA
Collector power dissipation	P_{C}	400	400	mW
Junction temperature	T_{j}	150	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	-55 to +150	$^\circ\text{C}$

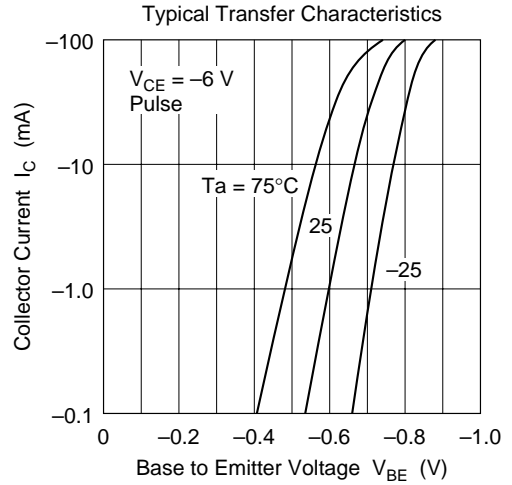
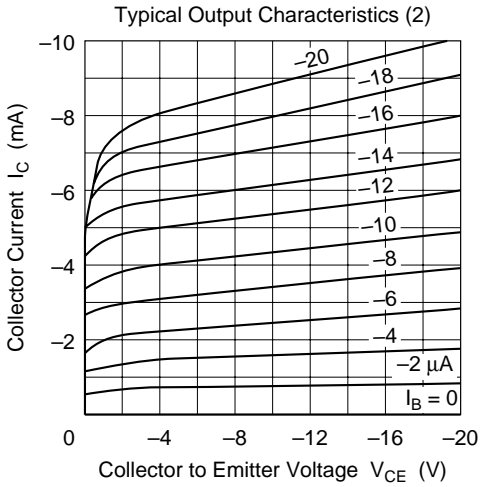
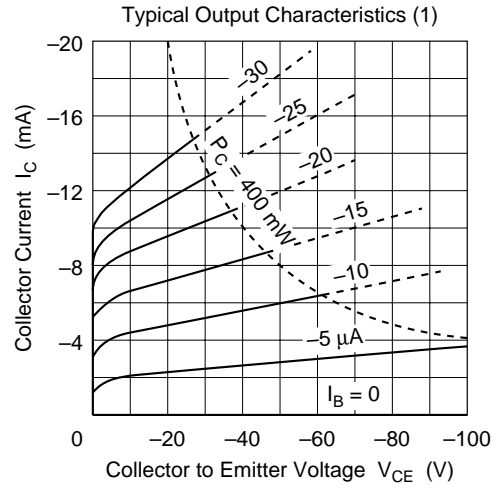
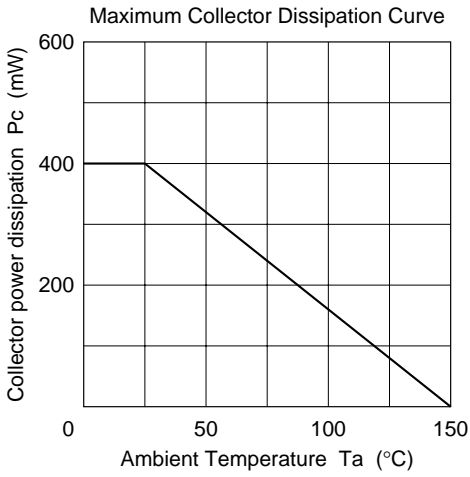
Electrical Characteristics (Ta = 25°C)

Item	Symbol	2SA1190			2SA1191			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	-90	—	—	-120	—	—	V	$I_C = -10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	-90	—	—	-120	—	—	V	$I_C = -1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	-5	—	—	-5	—	—	V	$I_E = -10 \mu A, I_C = 0$
Collector cutoff current	I_{CBO}	—	—	-0.1	—	—	-0.1	μA	$V_{CB} = -70 \text{ V}, I_E = 0$
Emitter cutoff current	I_{EBO}	—	—	-0.1	—	—	-0.1	μA	$V_{EB} = -2 \text{ V}, I_C = 0$
DC current transfer ratio	h_{FE}^{*1}	250	—	800	250	—	800		$V_{CE} = -12 \text{ V}, I_C = -2 \text{ mA}^{*2}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	-0.05	-0.15	—	-0.05	-0.15	V	$I_C = -10 \text{ mA}, I_B = -1 \text{ mA}^{*2}$
Base to emitter saturation voltage	$V_{BE(sat)}$	—	-0.7	-1.0	—	-0.7	-1.0	V	
Gain bandwidth product	f_T	—	130	—	—	130	—	MHz	$V_{CE} = -6 \text{ V}, I_C = -10 \text{ mA}$
Collector output capacitance	Cob	—	3.2	—	—	3.2	—	pF	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$
Noise figure	NF	—	0.15	1.5	—	0.15	1.5	dB	$V_{CE} = -6 \text{ V}, I_C = -0.1 \text{ mA}, R_g = 10 \text{ k}\Omega, f = 1 \text{ kHz}$
		—	0.2	2.0	—	0.2	2.0	dB	$V_{CE} = -6 \text{ V}, I_C = -0.1 \text{ mA}, R_g = 10 \text{ k}\Omega, f = 10 \text{ Hz}$
Noise voltage referred to input	e_n	—	0.7	—	—	0.7	—	nV/ $\sqrt{\text{Hz}}$	$V_{CB} = -6 \text{ V}, I_C = -10 \text{ mA}, R_g = 0, f = 1 \text{ kHz}$

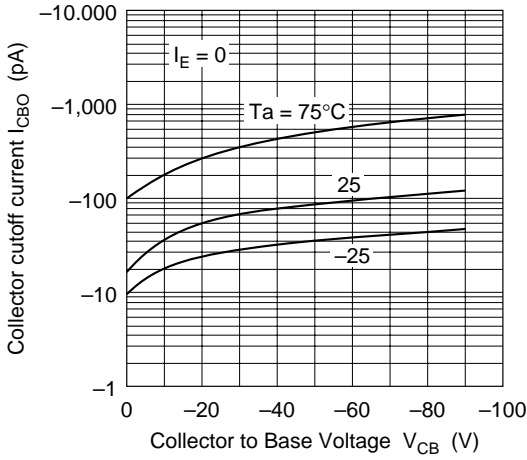
Notes: 1. The 2SA1190 and 2SA1191 are grouped by h_{FE} as follows.

2. Pulse test

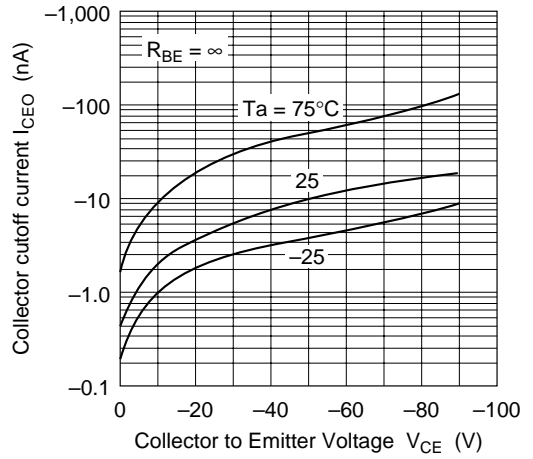
D	E
250 to 500	400 to 800



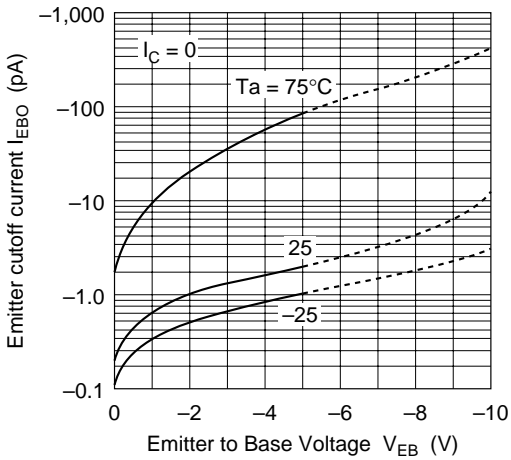
Collector Cutoff Current vs. Collector to Base Voltage



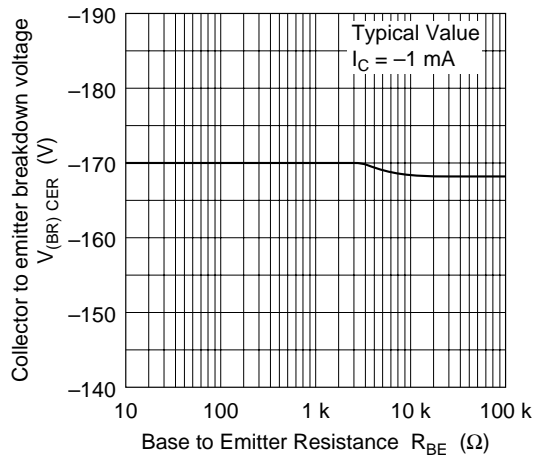
Collector Cutoff Current vs. Collector to Emitter Voltage

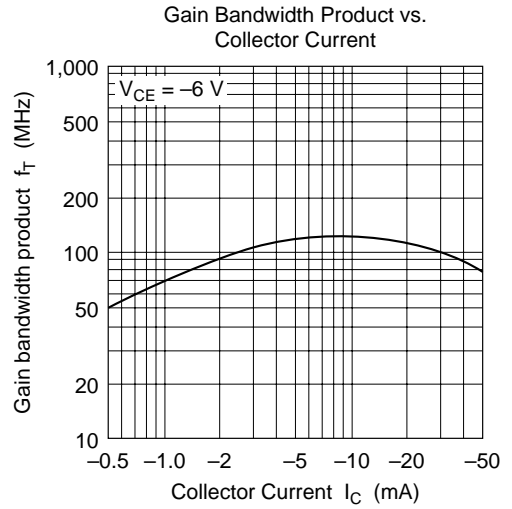
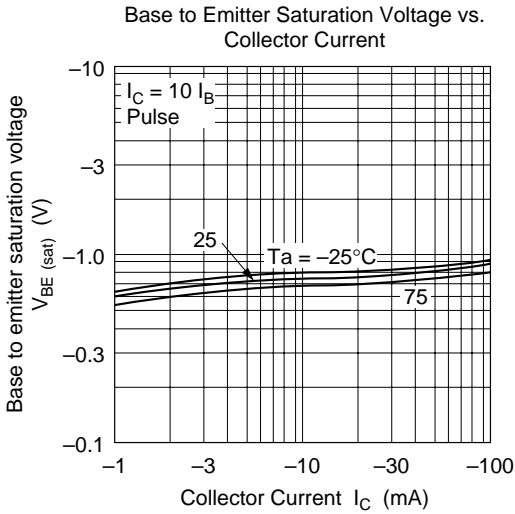
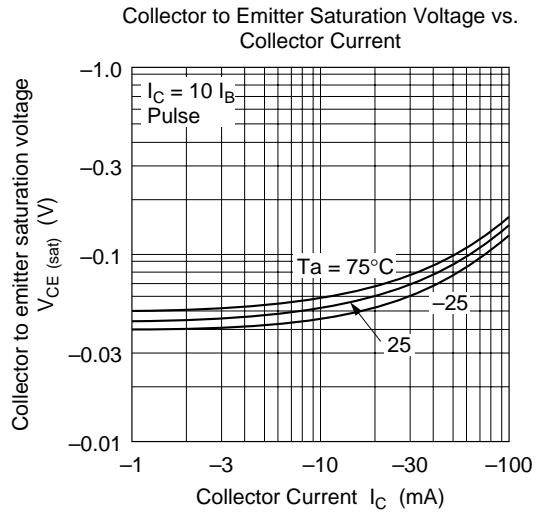
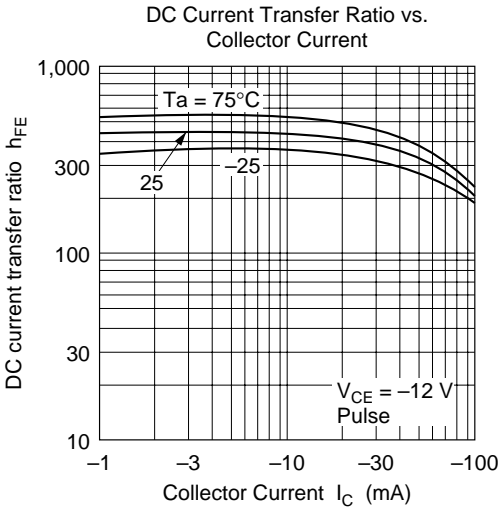


Emitter Cutoff Current vs. Emitter to Base Voltage

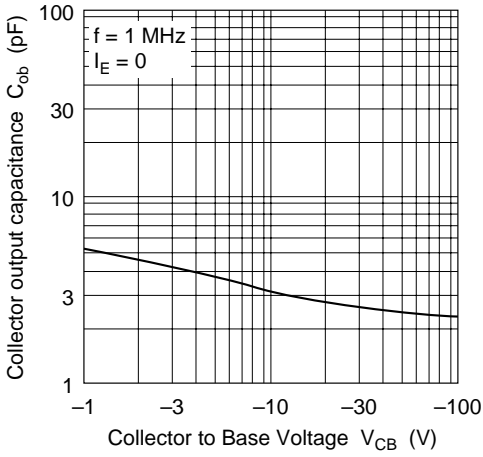


Collector to Emitter Breakdown Voltage vs. Base to Emitter Resistance

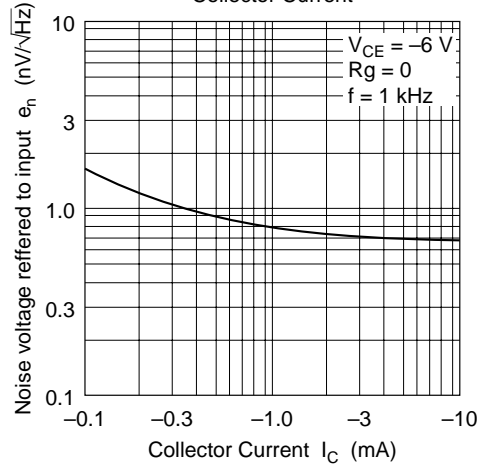




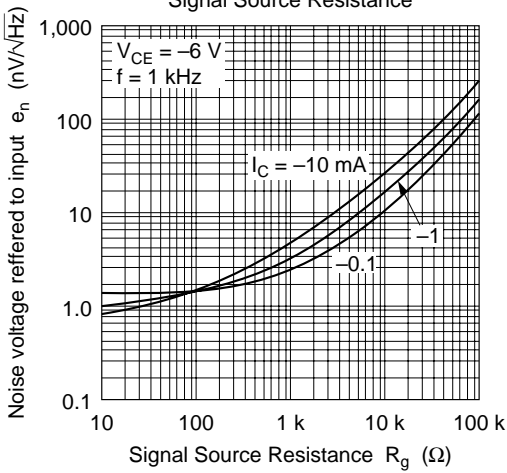
Collector Output Capacitance vs. Collector to Base Voltage



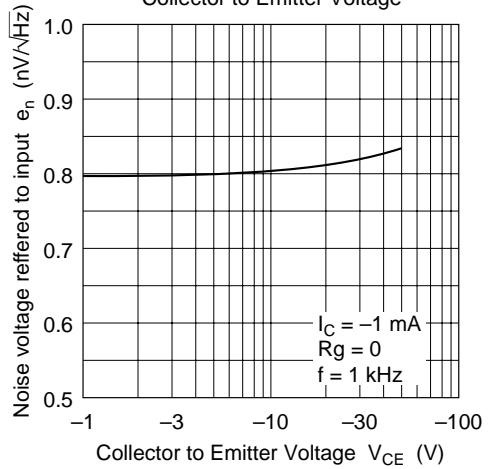
Noise Voltage Referred to Input vs. Collector Current

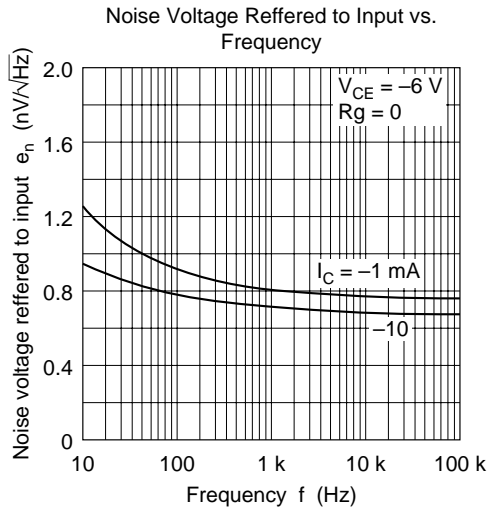


Noise Voltage Referred to Input vs. Signal Source Resistance



Noise Voltage Referred to Input vs. Collector to Emitter Voltage

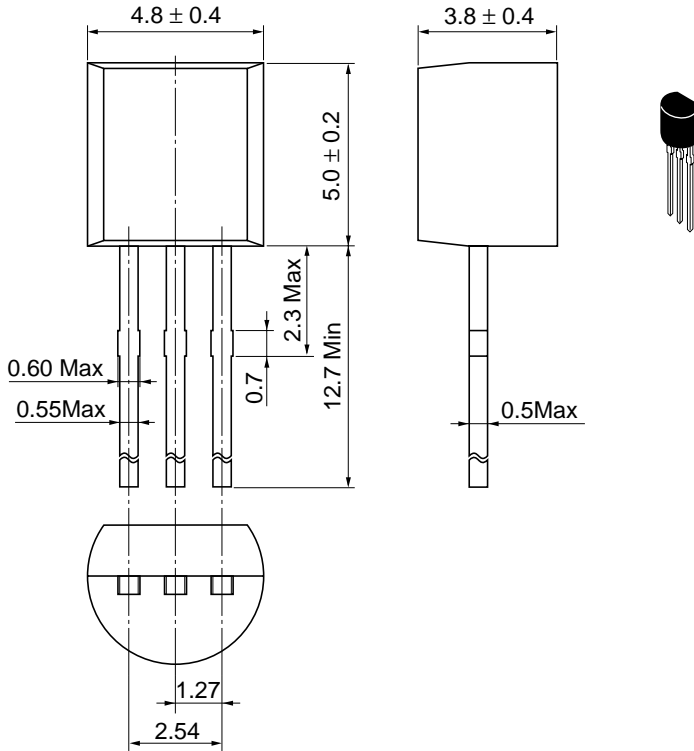




Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TO-92 (1)
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.25 g

Cautions

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