

To all our customers

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

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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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# 2SA1031, 2SA1032

Silicon PNP Epitaxial

**RENESAS**

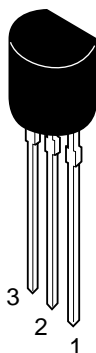
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## Application

- Low frequency low noise amplifier
- Complementary pair with 2SC458 (LG) and 2SC2310

## Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

## 2SA1031, 2SA1032

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

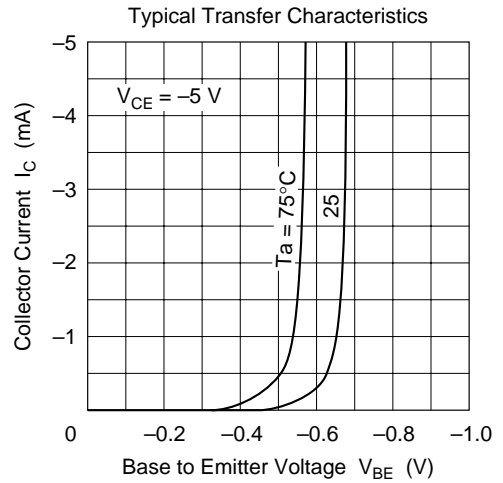
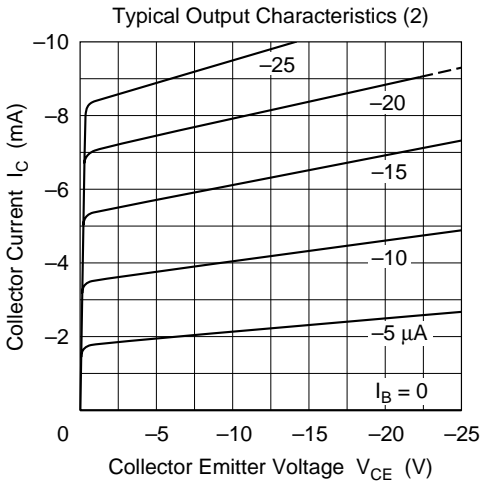
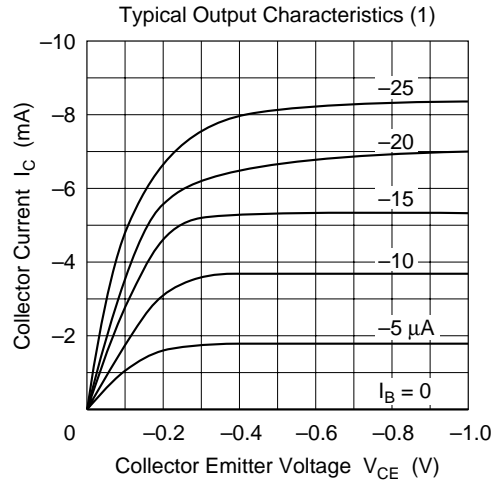
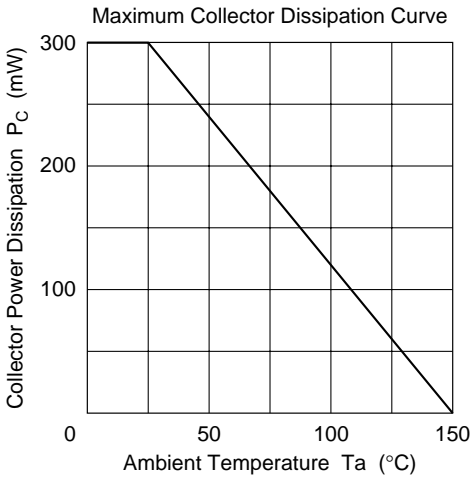
Item	Symbol	2SA1031	2SA1032	Unit
Collector to base voltage	$V_{\text{CBO}}$	-30	-55	V
Collector to emitter voltage	$V_{\text{CEO}}$	-30	-50	V
Emitter to base voltage	$V_{\text{EBO}}$	-5	-5	V
Collector current	$I_{\text{C}}$	-100	-100	mA
Emitter current	$I_{\text{E}}$	100	100	mA
Collector power dissipation	$P_{\text{C}}$	300	300	mW
Junction temperature	$T_{\text{j}}$	150	150	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$	-55 to +150	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (Ta = 25°C)

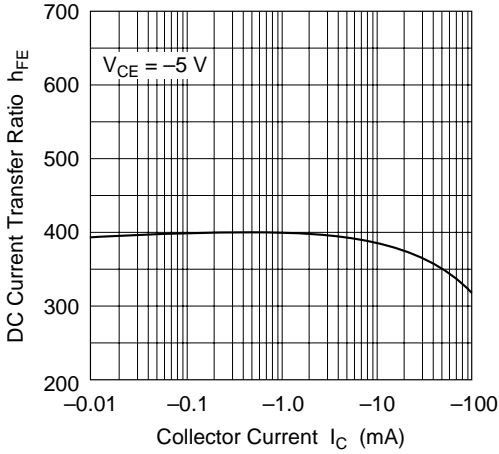
Item	Symbol	2SA1031			2SA1032			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	-30	—	—	-55	—	—	V	$I_C = -10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	-30	—	—	-50	—	—	V	$I_C = -1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	-5	—	—	-5	—	—	V	$I_E = -10 \mu A, I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	-0.5	—	—	-0.5	$\mu A$	$V_{CB} = -18 \text{ V}, I_E = 0$
Emitter cutoff current	$I_{EBO}$	—	—	-0.5	—	—	-0.5	$\mu A$	$V_{EB} = -2 \text{ V}, I_C = 0$
DC current transfer ratio	$h_{FE}^{*1}$	100	—	500	100	—	320		$V_{CE} = -12 \text{ V}, I_C = -2 \text{ mA}$
Base to emitter voltage	$V_{BE}$	—	—	-0.8	—	—	-0.8	V	$V_{CE} = -12 \text{ V}, I_C = -2 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	-0.2	—	—	-0.2	V	$I_C = -10 \text{ mA}, I_B = -1 \text{ mA}$
Gain bandwidth product	$f_T$	200	280	—	200	280	—	MHz	$V_{CE} = -12 \text{ V}, I_C = -2 \text{ mA}$
Collector output capacitance	Cob	—	3.3	4.0	—	3.3	4.0	pF	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$
Noise figure	NF	—	—	5	—	—	5	dB	$V_{CE} = -6 \text{ V}, I_C = -0.1 \text{ mA}, R_g = 500 \Omega, f = 120 \text{ Hz}$

Note: 1. The 2SA1031 and 2SA1032 are grouped by  $h_{FE}$  as follows.

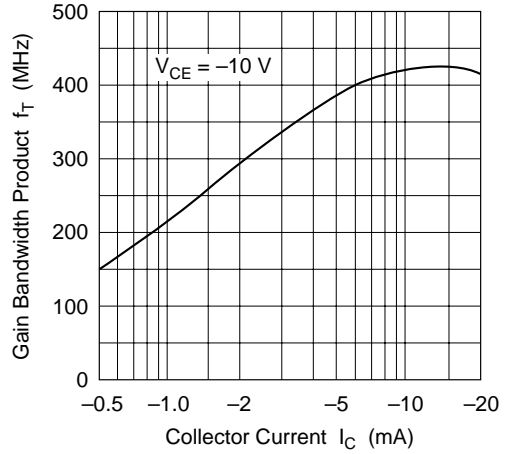
	B	C	D
2SA1031	100 to 200	160 to 320	250 to 500
2SA1032	100 to 200	160 to 320	—



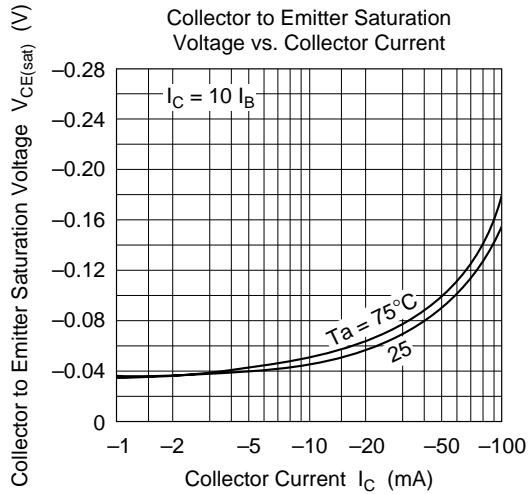
DC Current Transfer Ratio vs. Collector Current



Gain Bandwidth Product vs. Collector Current



Collector to Emitter Saturation Voltage vs. Collector Current



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