

To all our customers

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

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Keep safety first in your circuit designs!

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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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# 2SC1213, 2SC1213A

Silicon NPN Epitaxial

**RENESAS**

ADE-208-1048 (Z)  
1st. Edition  
Mar. 2001

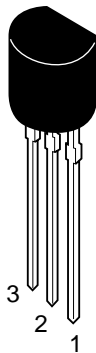
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## Application

- Low frequency amplifier
- Complementary pair with 2SA673 and 2SA673A

## Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

# 2SC1213, 2SC1213A

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

Item	Symbol	2SC1213	2SC1213A	Unit
Collector to base voltage	$V_{CBO}$	35	50	V
Collector to emitter voltage	$V_{CEO}$	35	50	V
Emitter to base voltage	$V_{EBO}$	4	4	V
Collector current	$I_C$	500	500	mA
Collector power dissipation	$P_C$	400	400	mW
Junction temperature	$T_j$	150	150	°C
Storage temperature	$T_{stg}$	-55 to +150	-55 to +150	°C

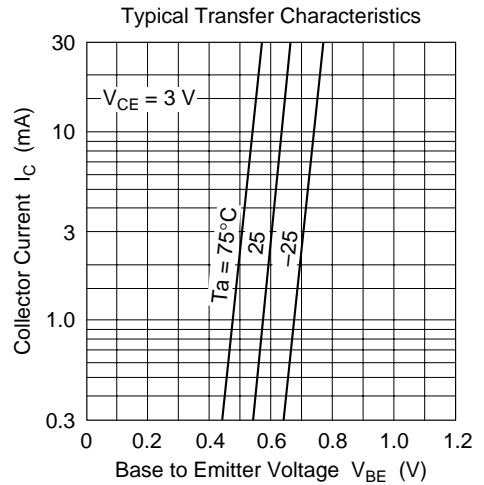
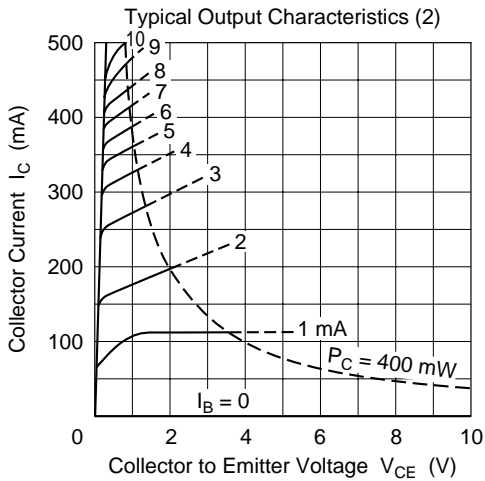
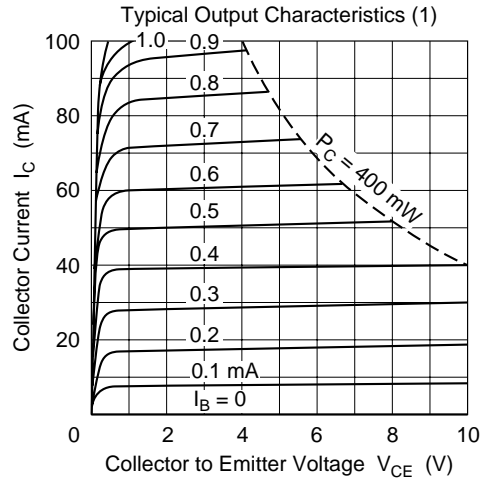
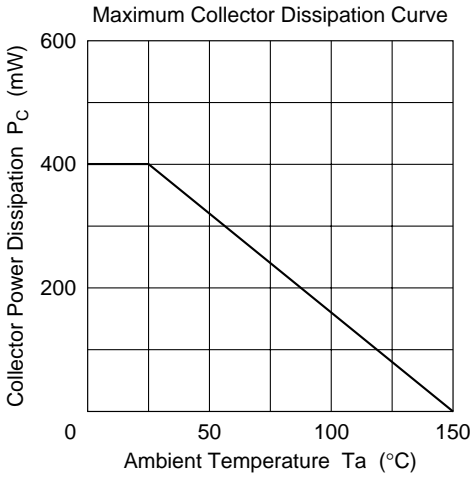
## Electrical Characteristics (Ta = 25°C)

Item	Symbol	2SC1213			2SC1213A			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	35	—	—	50	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	35	—	—	50	—	—	V	$I_C = 1 \text{ mA}, R_{BE} =$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	4	—	—	4	—	—	V	$I_E = 10 \mu A, I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.5	—	—	0.5	$\mu A$	$V_{CB} = 20 \text{ V}, I_E = 0$
DC current transfer ratio	$h_{FE}^{*1}$	60	—	320	60	—	320		$V_{CE} = 3 \text{ V}, I_C = 10 \text{ mA}$
	$h_{FE}$	10	—	—	10	—	—		$V_{CE} = 3 \text{ V},$ $I_C = 500 \text{ mA}^{*2}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	0.2	0.6	—	0.2	0.6	V	$I_C = 150 \text{ mA},$ $I_B = 15 \text{ mA}^{*2}$
Base to emitter voltage	$V_{BE}$	—	0.64	—	—	0.64	—	V	$V_{CE} = 3 \text{ V}, I_C = 10 \text{ mA}$

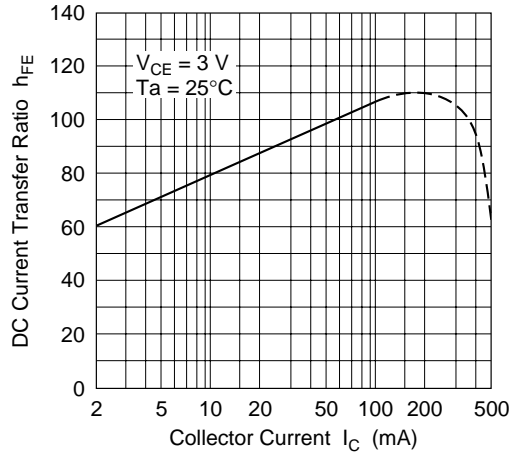
Notes: 1. The 2SC1213 and 2SC1213A are grouped by  $h_{FE}$  as follows.

2. Pulse test

B	C	D
60 to 120	100 to 200	160 to 320



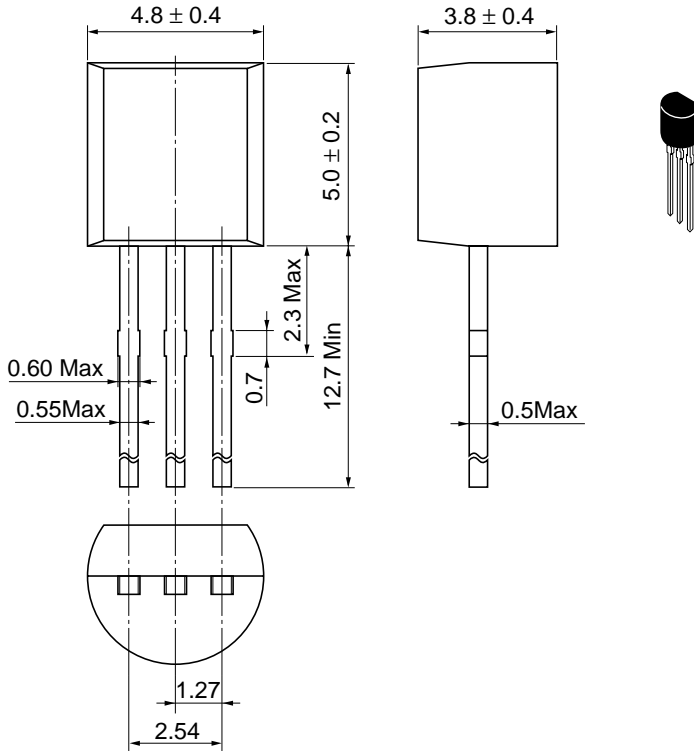
DC Current Transfer Ratio vs.  
Collector Current



Package Dimensions

As of January, 2001

Unit: mm



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

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