

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!

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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# 2SA1193(K)

Silicon PNP Epitaxial, Darlington

**RENESAS**

ADE-208-1013 (Z)

1st. Edition

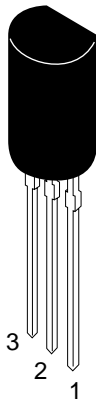
Mar. 2001

## Application

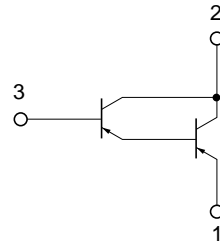
High gain amplifier

## Outline

TO-92MOD



1. Emitter
2. Collector
3. Base



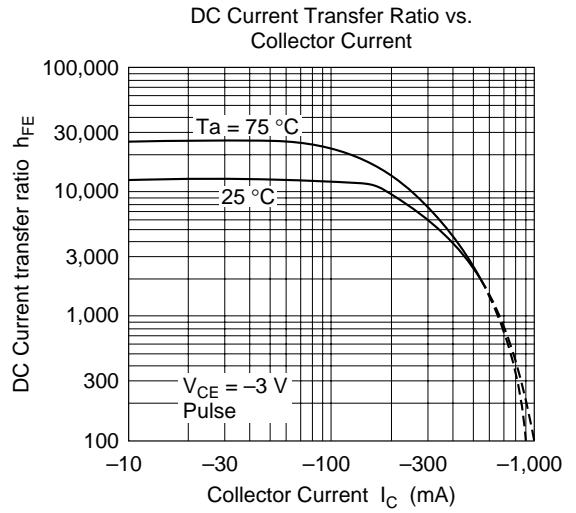
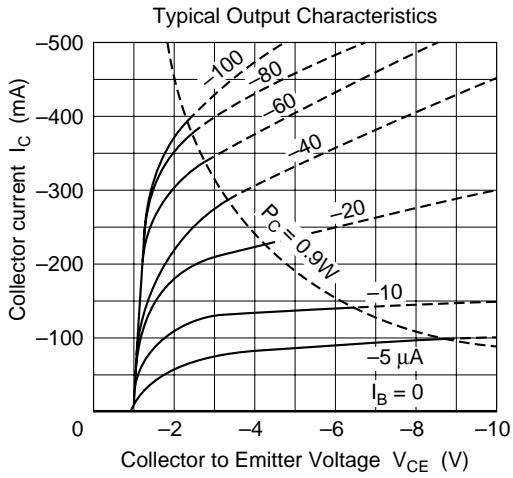
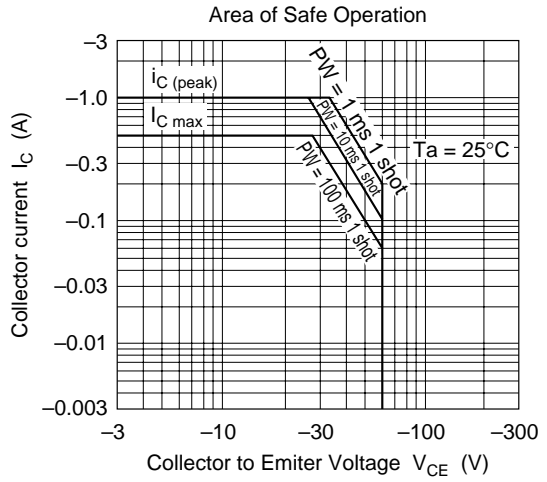
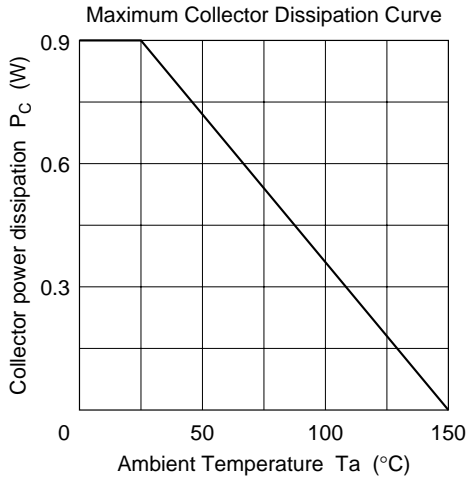
## Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	-60	V
Collector to emitter voltage	$V_{CEO}$	-60	V
Emitter to base voltage	$V_{EBO}$	-7	V
Collector current	$I_C$	-0.5	A
Collector peak current	$i_{C(peak)}$	-1.0	A
Collector power dissipation	$P_C$	0.9	W
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

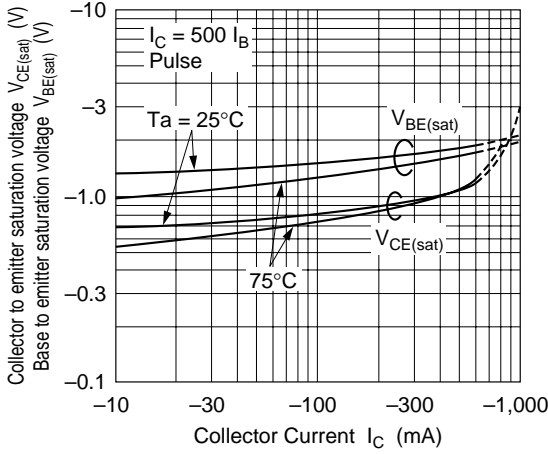
## Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	-60	—	—	V	$I_C = -1 \text{ mA}$ , $R_{BE} = \infty$
Collector cutoff current	$I_{CBO}$	—	—	-1.0	$\mu\text{A}$	$V_{CB} = -60 \text{ V}$ , $I_E = 0$
Emitter cutoff current	$I_{EBO}$	—	—	-1.0	$\mu\text{A}$	$V_{EB} = -7 \text{ V}$ , $I_C = 0$
DC current transfer ratio	$h_{FE}$	2000	—	—		$V_{CE} = -3 \text{ V}$ , $I_C = -250 \text{ mA}^{*1}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	-1.5	V	$I_C = -250 \text{ mA}$ , $I_B = -0.5 \text{ mA}^{*1}$
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	-2.0	V	
Turn on time	$t_{on}$	—	0.3	—	$\mu\text{s}$	$I_C = -250 \text{ mA}$
Turn off time	$t_{off}$	—	0.9	—	$\mu\text{s}$	$I_{B1} = -I_{B2} = -0.5 \text{ mA}$

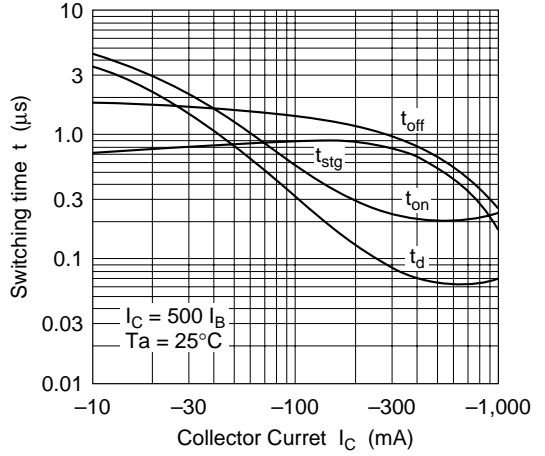
Note: 1. Pulse test



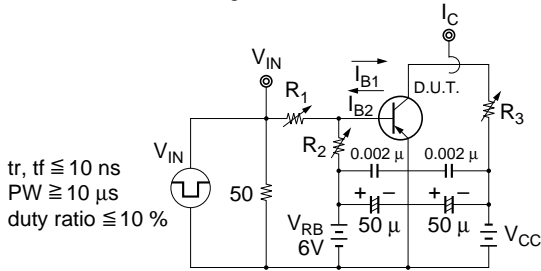
Saturation Voltage vs. Collector Current



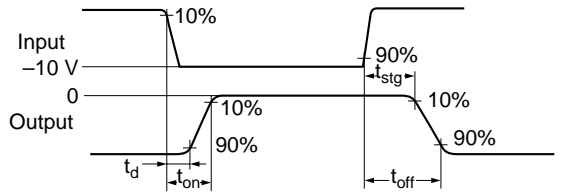
Switching Time vs. Collector Current



Switching Time Test Circuit

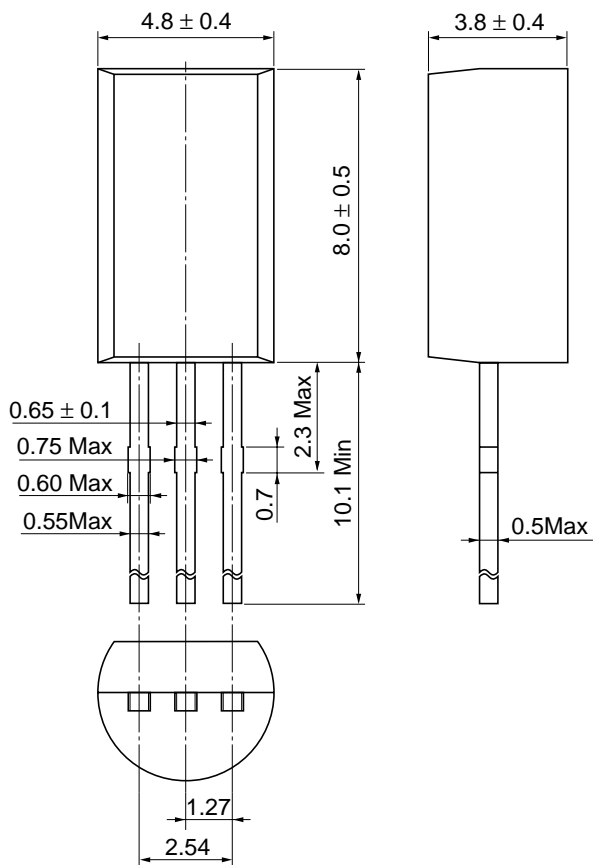


Response Waveform



Package Dimensions

As of January, 2001  
Unit: mm



Hitachi Code	TO-92 Mod
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.35 g

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