

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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# 2SD1135

Silicon NPN Triple Diffused

## RENESAS

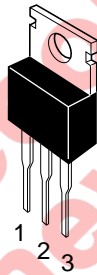
ADE-208-906 (Z)  
1st. Edition  
September 2000

### Application

Low frequency power amplifier complementary pair with 2SB859

### Outline

TO-220AB



1. Base
2. Collector (Flange)
3. Emitter

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

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	100	V
Collector to emitter voltage	$V_{CEO}$	80	V
Emitter to base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	4	A
Collector peak current	$I_{C(peak)}$	8	A
Collector power dissipation	$P_C^{*1}$	40	W
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-45 to +150	°C

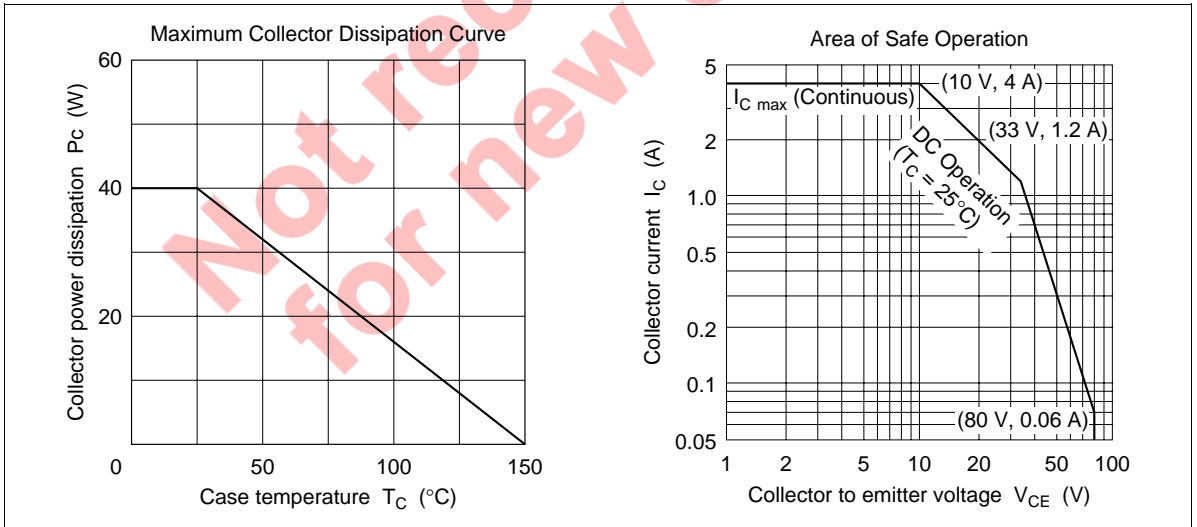
Note: 1. Value at  $T_c = 25^\circ\text{C}$ .

## Electrical Characteristics (Ta = 25°C)

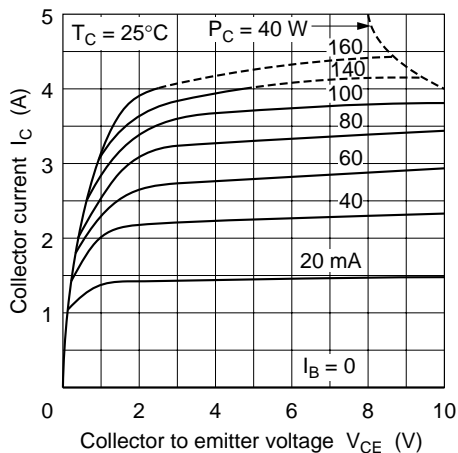
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	80	—	—	V	$I_C = 50 \text{ mA}$ , $R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	5	—	—	V	$I_E = 10 \text{ }\mu\text{A}$ , $I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.1	mA	$V_{CB} = 80 \text{ V}$ , $I_E = 0$
DC current transfer ratio	$h_{FE1}^{*1}$	60	—	200		$V_{CE} = 5 \text{ V}$ , $I_C = 1 \text{ A}^{*2}$
	$h_{FE2}$	35	—	—		$V_{CE} = 5 \text{ V}$ , $I_C = 0.1 \text{ A}^{*2}$
Base to emitter voltage	$V_{BE}$	—	—	1.5	V	$V_{CE} = 5 \text{ V}$ , $I_C = 1 \text{ A}^{*2}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	2	V	$I_C = 2 \text{ A}$ , $I_B = 0.2 \text{ A}^{*2}$
Gain bandwidth product	$f_T$	—	10	—	MHz	$V_{CE} = 5 \text{ V}$ , $I_C = 0.5 \text{ A}^{*2}$
Collector output capacitance	$C_{ob}$	—	40	—	pF	$V_{CB} = 20 \text{ V}$ , $I_E = 0$ , $f = 1 \text{ MHz}$

Notes: 1. The 2SD1135 is grouped by  $h_{FE1}$  as follows.  
 2. Pulse test.

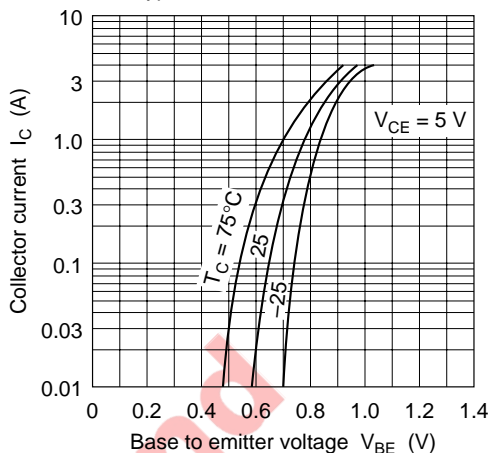
B	C
60 to 120	100 to 200



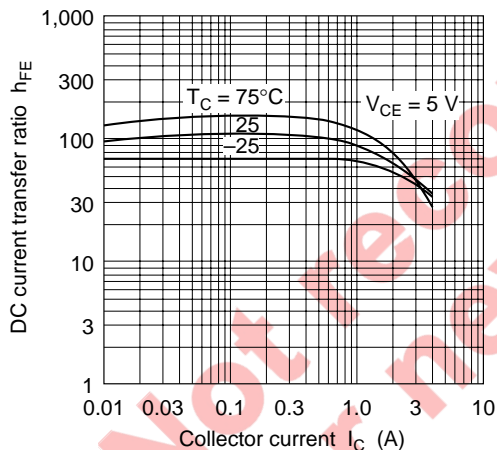
Typical Output Characteristics



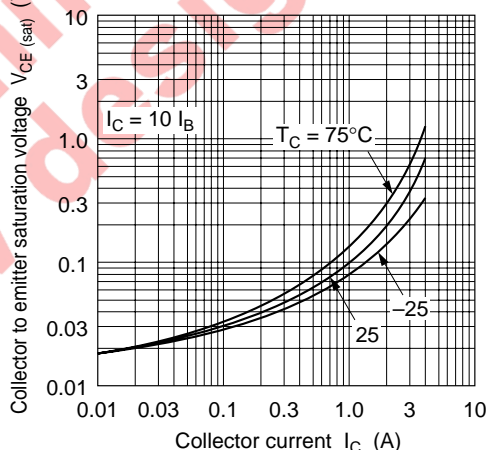
Typical Transfer Characteristics



DC Current Transfer Ratio vs. Collector Current



Collector to Emitter Saturation Voltage vs. Collector Current



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