

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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# 2SB1409(L)/(S)

Silicon PNP Epitaxial

## RENESAS

ADE-208-877 (Z)

1st. Edition

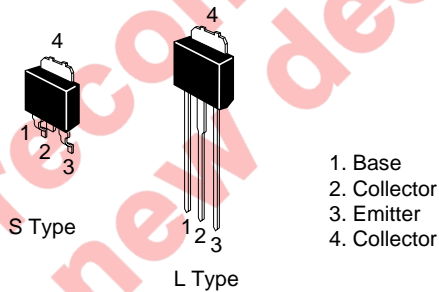
September 2000

### Application

Low frequency power amplifier complementary Pair with 2SD2123(L)/(S)

### Outline

DPAK



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

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	-180	V
Collector to emitter voltage	$V_{CEO}$	-160	V
Emitter to base voltage	$V_{EBO}$	-5	V
Collector current	$I_C$	-1.5	A
Collector peak current	$I_{C(peak)}$	-3	A
Collector power dissipation	$P_C^{*1}$	18	W
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

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

## Electrical Characteristics (Ta = 25°C)

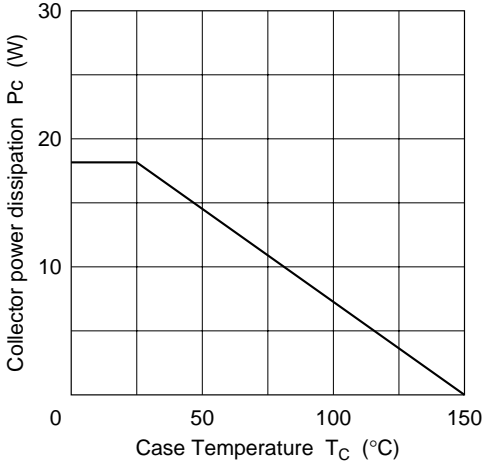
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	-180	—	—	V	$I_C = -1\text{ mA}$ , $I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	-160	—	—	V	$I_C = -10\text{ mA}$ , $R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	-5	—	—	V	$I_E = -1\text{ mA}$ , $I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	-10	$\mu\text{A}$	$V_{CB} = -160\text{ V}$ , $I_E = 0$
DC current transfer ratio	$h_{FE1}^{*1}$	60	—	200		$V_{CE} = -5\text{ V}$ , $I_C = -150\text{ mA}^{*2}$
	$h_{FE2}$	30	—	—		$V_{CE} = -5\text{ V}$ , $I_C = -500\text{ mA}^{*2}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	-1	V	$I_C = -500\text{ mA}$ , $I_B = -50\text{ mA}$
Base to emitter voltage	$V_{BE}$	—	—	-1.5	V	$V_{CE} = -5\text{ V}$ , $I_C = -150\text{ mA}$
Gain bandwidth product	$f_T$	—	240	—	MHz	$V_{CE} = -5\text{ V}$ , $I_C = -150\text{ mA}$
Collector output capacitance	$C_{ob}$	—	25	—	pF	$V_{CB} = -10\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$

Notes: 1. The 2SB1409(L)/(S) is grouped by  $h_{FE1}$  as follows.

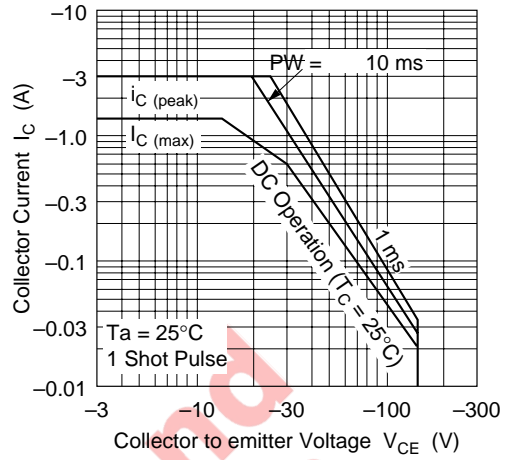
B	C
60 to 120	100 to 200

2. Pulse test.

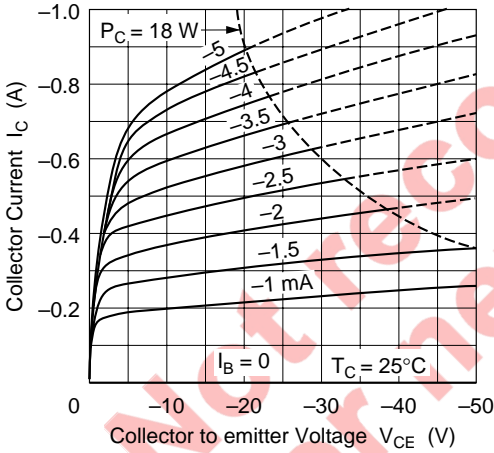
Maximum Collector Dissipation Curve



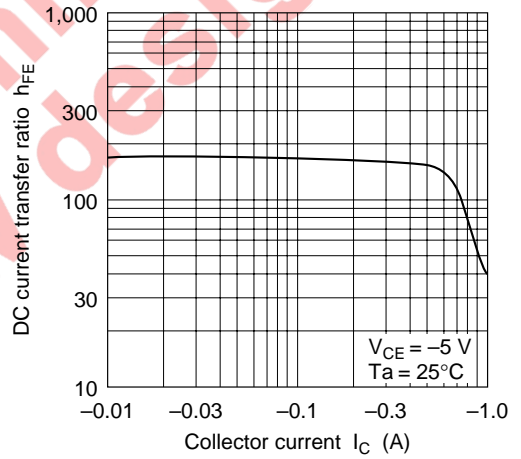
Area of Safe Operation

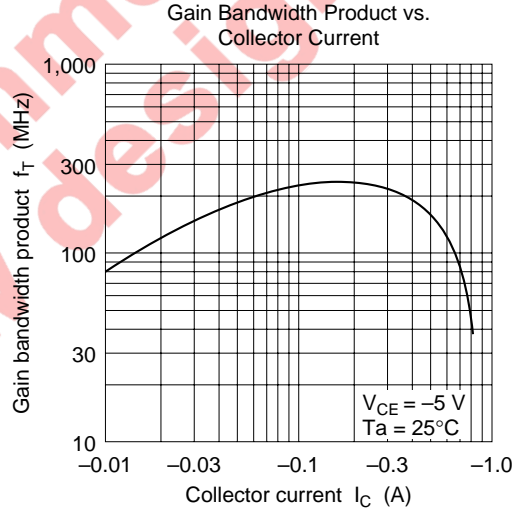
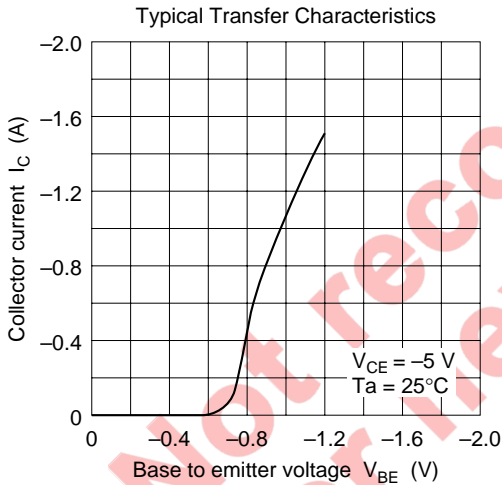
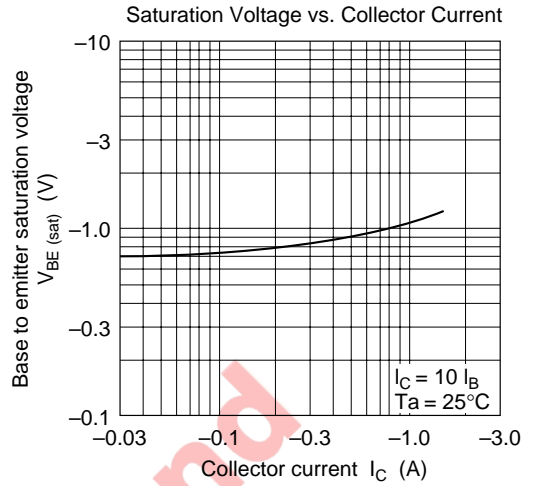
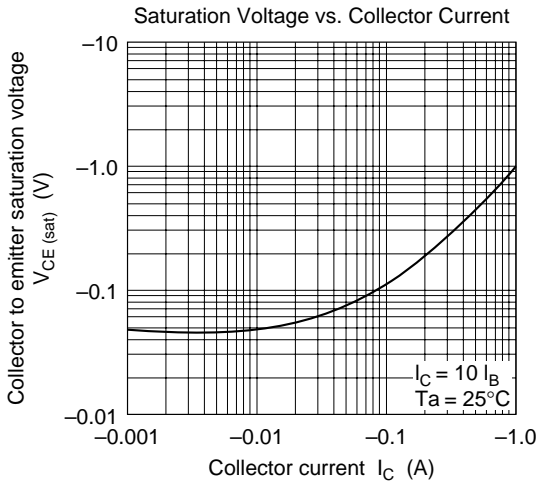


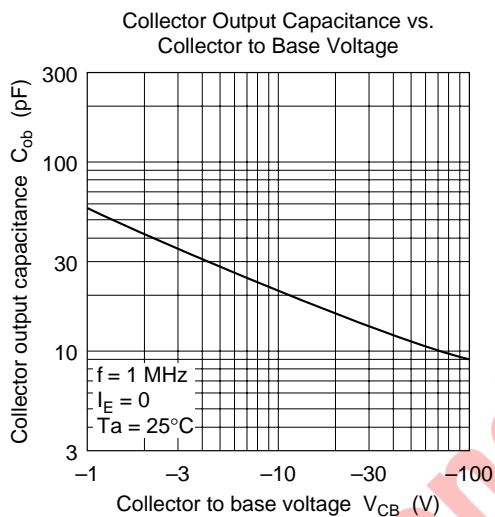
Typical Output Characteristics



DC Current Transfer Ratio vs. Collector Current







Not recommended  
for new design

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