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# 2SB649, 2SB649A

Silicon PNP Epitaxial

# HITACHI

ADE-208-856 (Z)  
1st. Edition  
Sep. 2000

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## Application

Low frequency power amplifier complementary pair with 2SD669/A

## Outline

TO-126 MOD



1. Emitter
2. Collector
3. Base

# 2SB649, 2SB649A

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

Item	Symbol	Ratings		Unit
		2SB649	2SB649A	
Collector to base voltage	$V_{CBO}$	-180	-180	V
Collector to emitter voltage	$V_{CEO}$	-120	-160	V
Emitter to base voltage	$V_{EBO}$	-5	-5	V
Collector current	$I_C$	-1.5	-1.5	A
Collector peak current	$I_{C(peak)}$	-3	-3	A
Collector power dissipation	$P_C$	1	1	W
	$P_C^{*1}$	20	20	W
Junction temperature	$T_j$	150	150	°C
Storage temperature	$T_{stg}$	-55 to +150	-55 to +150	°C

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

**Electrical Characteristics (Ta = 25°C)**

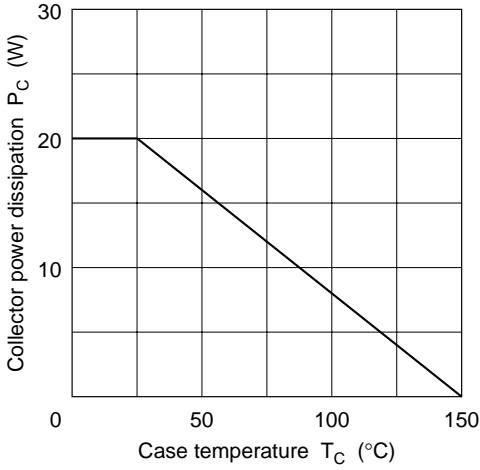
Item	Symbol	2SB649			2SB649A			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	-180	—	—	-180	—	—	V	$I_C = -1 \text{ mA}, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	-120	—	—	-160	—	—	V	$I_C = -10 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	-5	—	—	-5	—	—	V	$I_E = -1 \text{ mA}, I_C = 0$
Collector cutoff current	$I_{CBO}$	—	—	-10	—	—	-10	$\mu\text{A}$	$V_{CB} = -160 \text{ V}, I_E = 0$
DC current transfer ratio	$h_{FE1}^{*1}$	60	—	320	60	—	200		$V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}$
	$h_{FE2}$	30	—	—	30	—	—		$V_{CE} = -5 \text{ V}, I_C = -500 \text{ mA}^{*2}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	-1	—	—	-1	V	$I_C = -500 \text{ mA}, I_B = -50 \text{ mA}$
Base to emitter voltage	$V_{BE}$	—	—	-1.5	—	—	-1.5	V	$V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}$
Gain bandwidth product	$f_T$	—	140	—	—	140	—	MHz	$V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}$
Collector output capacitance	Cob	—	27	—	—	27	—	pF	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$

Notes: 1. The 2SB649 and 2SB649A are grouped by  $h_{FE1}$  as follows.

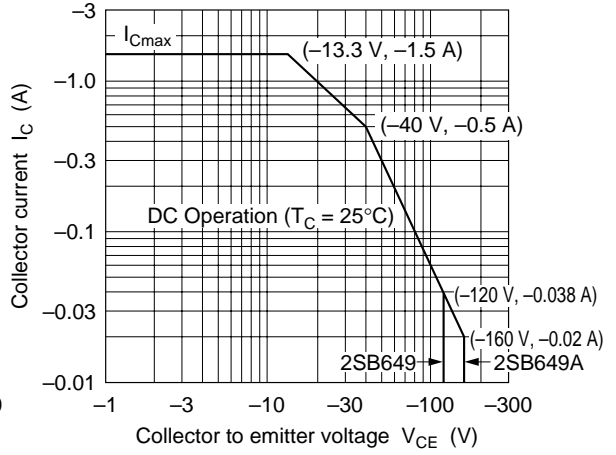
2. Pulse test

	B	C	D
2SB649	60 to 120	100 to 200	160 to 320
2SB649A	60 to 120	100 to 200	—

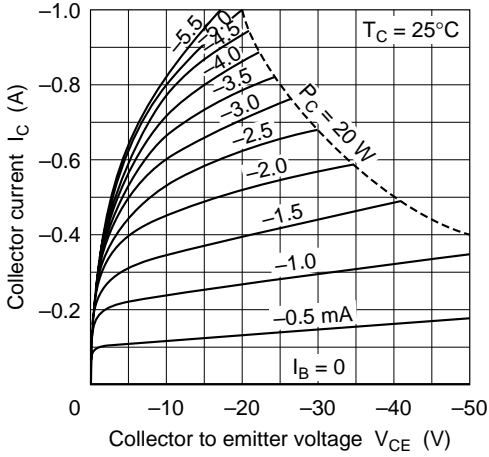
Maximum Collector Dissipation Curve



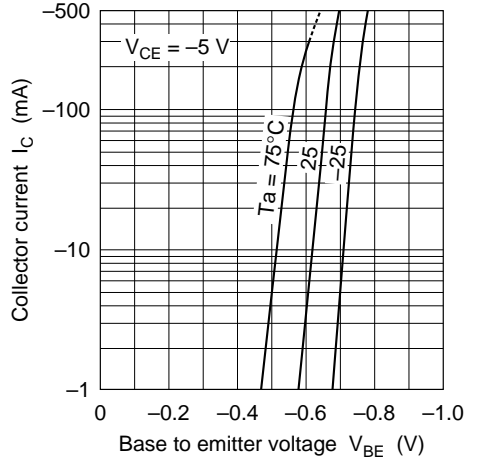
Area of Safe Operation



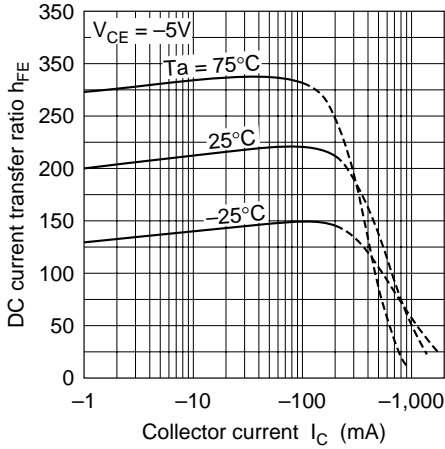
Typical Output Characteristics



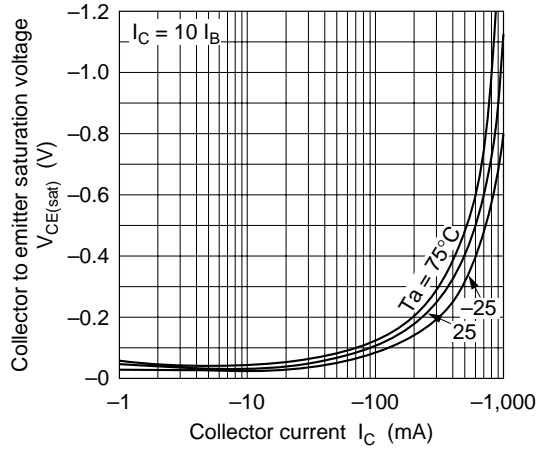
Typical Transfer Characteristics



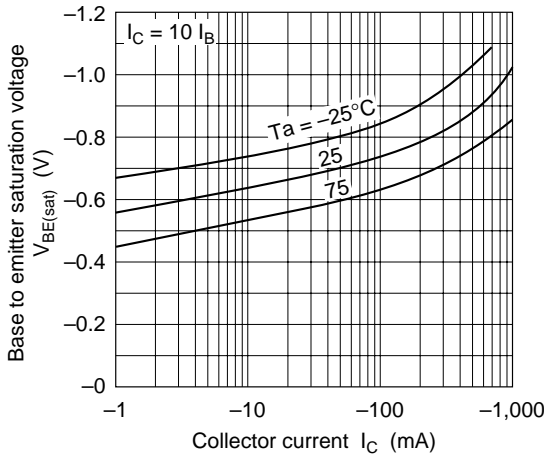
DC Current Transfer Ratio vs. Collector Current



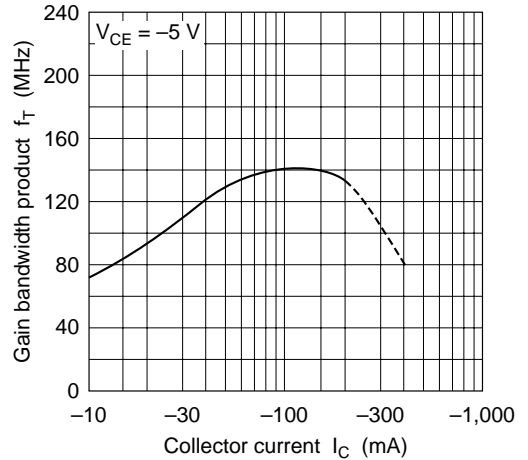
Collector to Emitter Saturation Voltage vs. Collector Current

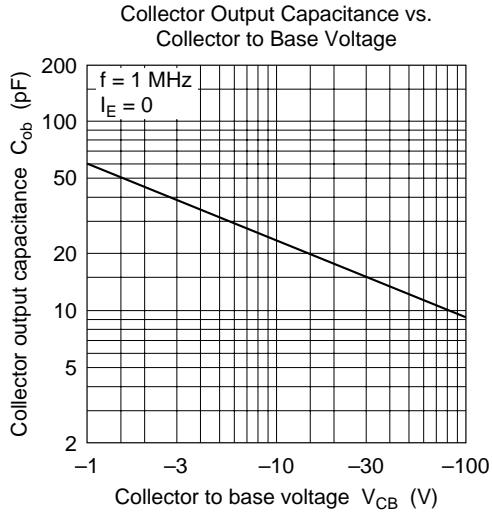


Base to Emitter Saturation Voltage vs. Collector Current



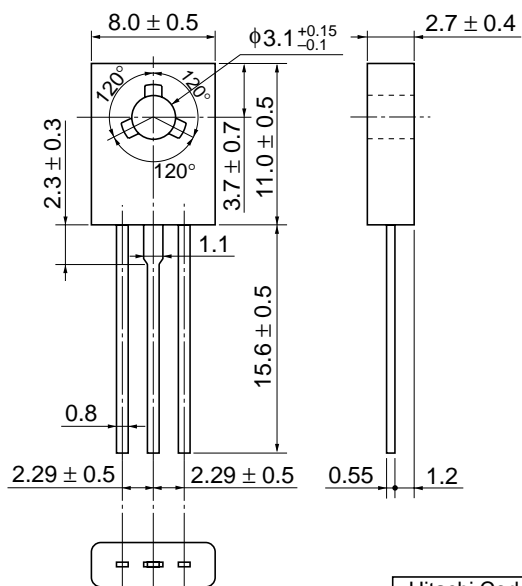
Gain Bandwidth Product vs. Collector Current





## Package Dimensions

Unit: mm



Hitachi Code	TO-126 Mod
JEDEC	—
EIAJ	—
Mass (reference value)	0.67 g

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