2SB1002

Silicon PNP Epitaxial

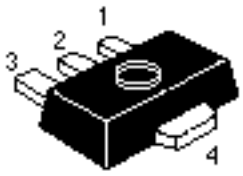
HITACHI

Application

- Low frequency power amplifier
- Complementary pair with 2SD1368

Outline

UPAK



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

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	–70	V
Collector to emitter voltage	V_{CEO}	–50	V
Emitter to base voltage	V_{EBO}	–6	V
Collector current	I_C	–1	A
Collector peak current	$i_{C(peak)}$ *1	–1.5	A
Collector power dissipation	P_C *2	1	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

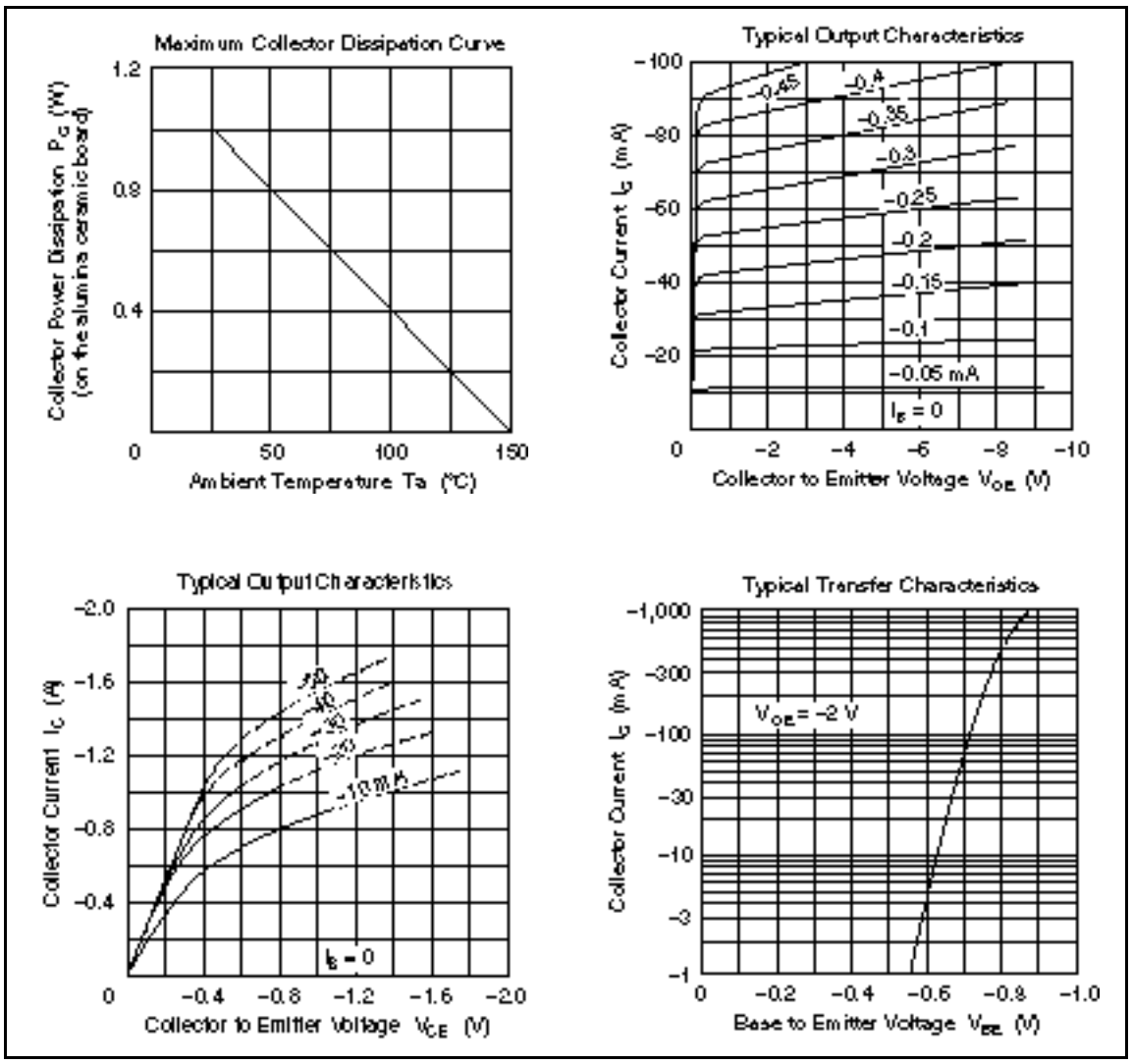
Notes: 1. PW ≤ 10 ms, Duty cycle ≤ 20%
2. Value on the alumina ceramic board (12.5 × 20 × 0.7 mm)

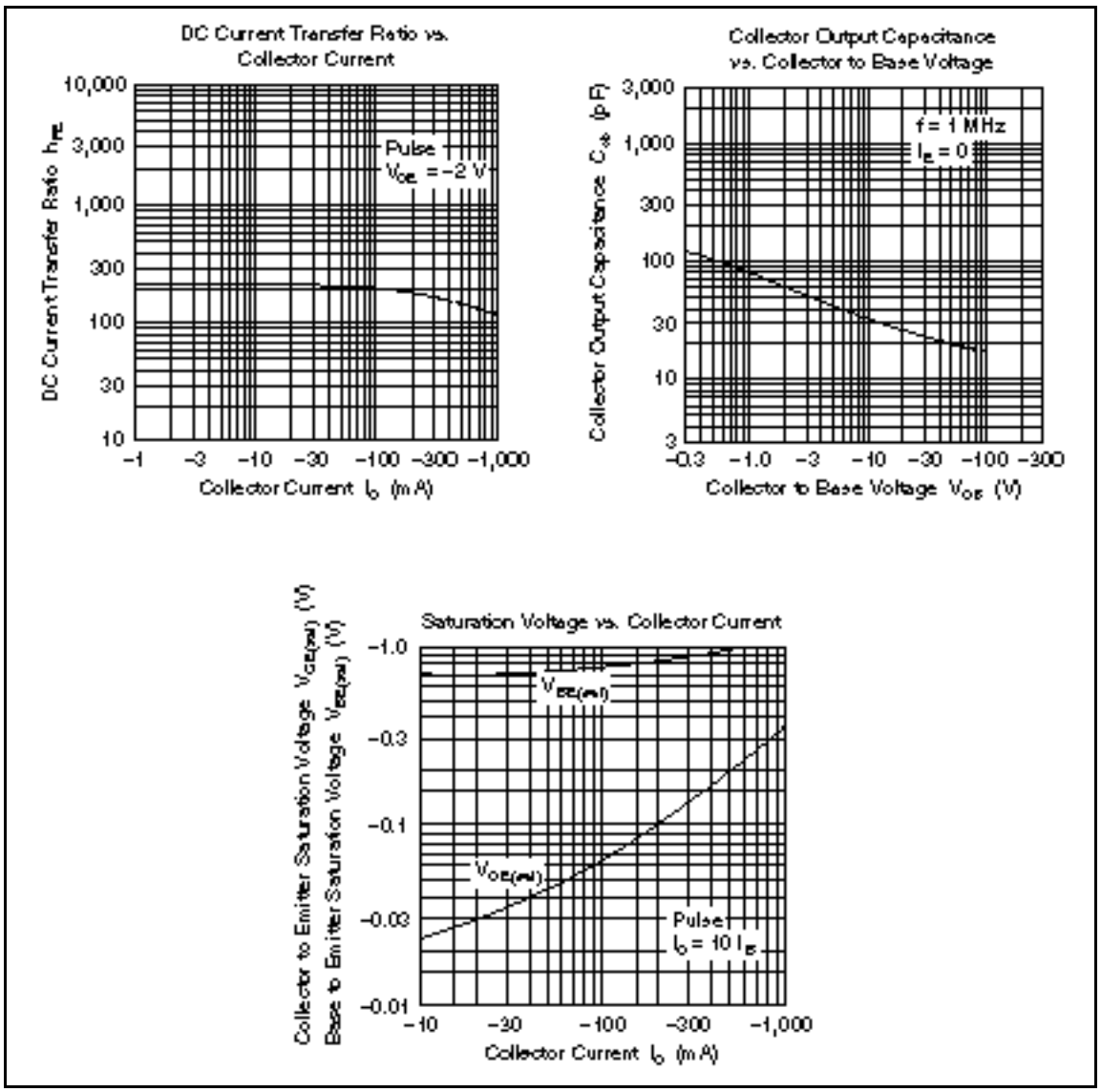
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	–70	—	—	V	I_C = –10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	–50	—	—	V	I_C = –1 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	–6	—	—	V	I_E = –10 µA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	–0.1	µA	V_{CB} = –50 V, I_E = 0
Emitter cutoff current	I_{EBO}	—	—	–0.1	µA	V_{EB} = –4 V, I_C = 0
DC current transfer ratio	h_{FE} *1	100	—	320		V_{CE} = –2 V, I_C = –0.1 A
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	–0.6	V	I_C = –1 A, I_B = –0.1 A (Pulse test)
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	–1.2	V	I_C = –1 A, I_B = –0.1 A (Pulse test)
Gain bandwidth product	f_T	—	150	—	MHz	V_{CE} = –2 V, I_C = –10 mA (Pulse test)
Collector output capacitance	Cob	—	35	—	pF	V_{CB} = –10 V, I_E = 0, f = 1 MHz

Note: 1. The 2SB1002 is grouped by h_{FE} as follows.

Mark	CH	CJ
h_{FE}	100 to 200	160 to 320


Maximum Collector Dissipation Curve
Collector Power Dissipation P_C (W) (on the alumina ceramic board)
1.2
0.8
0.4
0
50
100
150
Ambient Temperature Ta (°C)
Typical Output Characteristics
Collector Current I_C (mA)
−100
−80
−60
−40
−20
−0.45
−0.4
−0.35
−0.3
−0.25
−0.2
−0.15
−0.1
−0.05 mA
I_B = 0
0
−2
−4
−6
−8
−10
Collector to Emitter Voltage V_{CE} (V)
Typical Output Characteristics
Collector Current I_C (A)
−2.0
−1.6
−1.2
−0.8
−0.4
−40
−30
−20
−10 mA
I_B = 0
0
−0.4
−0.8
−1.2
−1.6
−2.0
Collector to Emitter Voltage V_{CE} (V)
Typical Transfer Characteristics
Collector Current I_C (mA)
−1,000
−300
−100
−30
−10
−3
−1
V_{CE} = −2 V
0
−0.2
−0.4
−0.6
−0.8
−1.0
Base to Emitter Voltage V_{BE} (V)


DC Current Transfer Ratio vs.
Collector Current
DC Current Transfer Ratio h_{FE}
10,000
3,000
1,000
300
100
30
10
Pulse
V_{CE} = −2 V
−1
−3
−10
−30
−100
−300
−1,000
Collector Current I_C (mA)
Collector Output Capacitance
vs. Collector to Base Voltage
Collector Output Capacitance C_{ob} (pF)
3,000
1,000
300
100
30
10
3
f = 1 MHz
I_E = 0
−0.3
−1.0
−3
−10
−30
−100
−300
Collector to Base Voltage V_{CB} (V)
Saturation Voltage vs. Collector Current
Collector to Emitter Saturation Voltage $V_{CE(sat)}$ (V)
Base to Emitter Saturation Voltage $V_{BE(sat)}$ (V)
−1.0
−0.3
−0.1
−0.03
−0.01
$V_{BE(sat)}$
$V_{CE(sat)}$
Pulse
I_C = 10 I_B
−10
−30
−100
−300
−1,000
Collector Current I_C (mA)

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