# 2SD1420

Silicon NPN Epitaxial

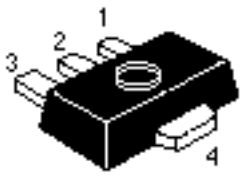
HITACHI

## Application

Low frequency power amplifier

## 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 | $V_{CBO}$ | 180 | V |
| Collector to emitter voltage | $V_{CEO}$ | 120 | V |
| Emitter to base voltage | $V_{EBO}$ | 5 | V |
| Collector current | $I_C$ | 1.5 | A |
| Collector peak current | $i_{C(peak)}$ *[1] | 3 | A |
| Collector power dissipation | $P_C$ *[2] | 1 | W |
| Junction temperature | Tj | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

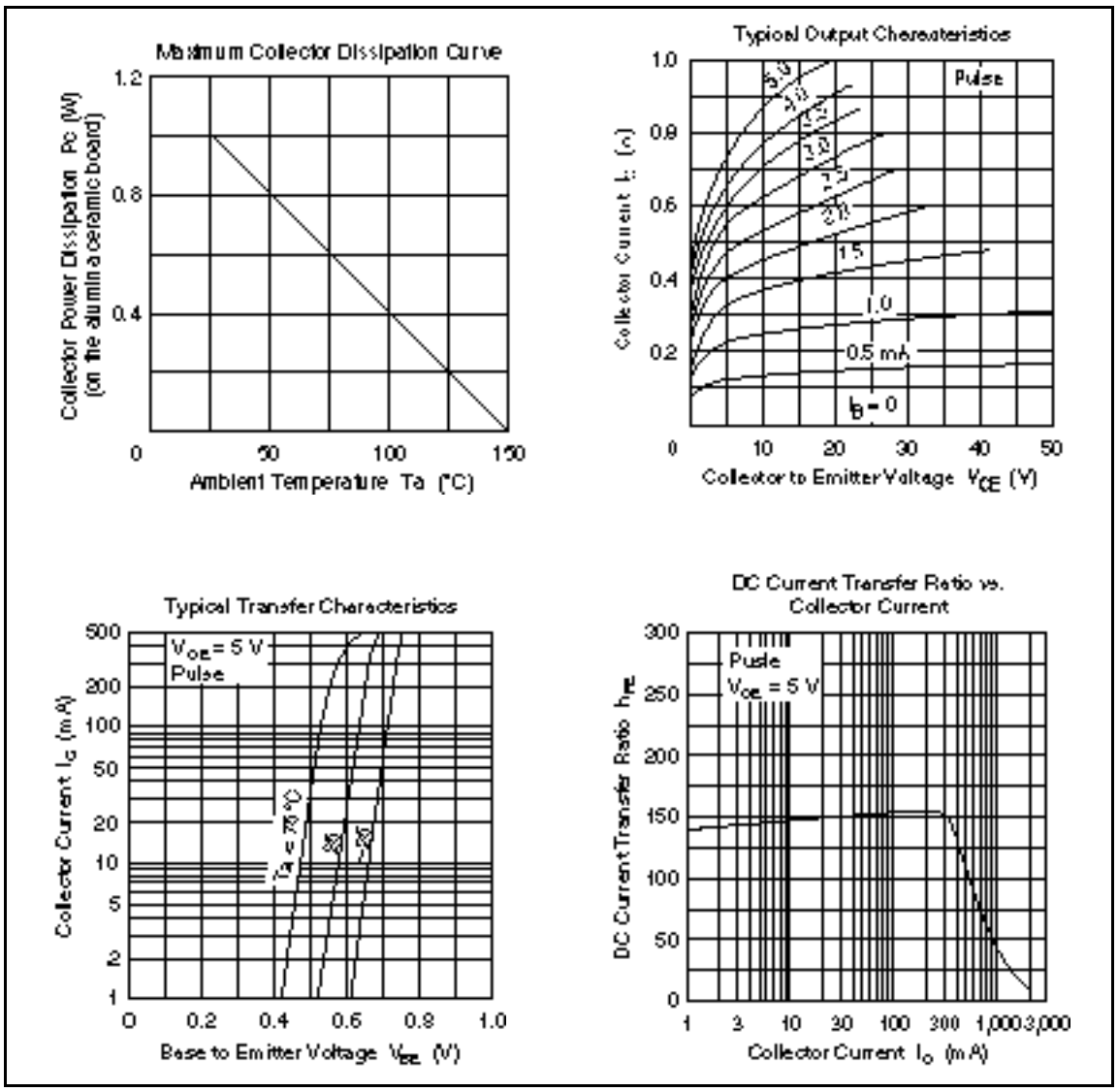
Notes: 1. PW ≤ 10 ms, Duty cycle ≤ 20%
2. Value on the alumina ceramic board (12.5 x 20 x 0.7 mm)

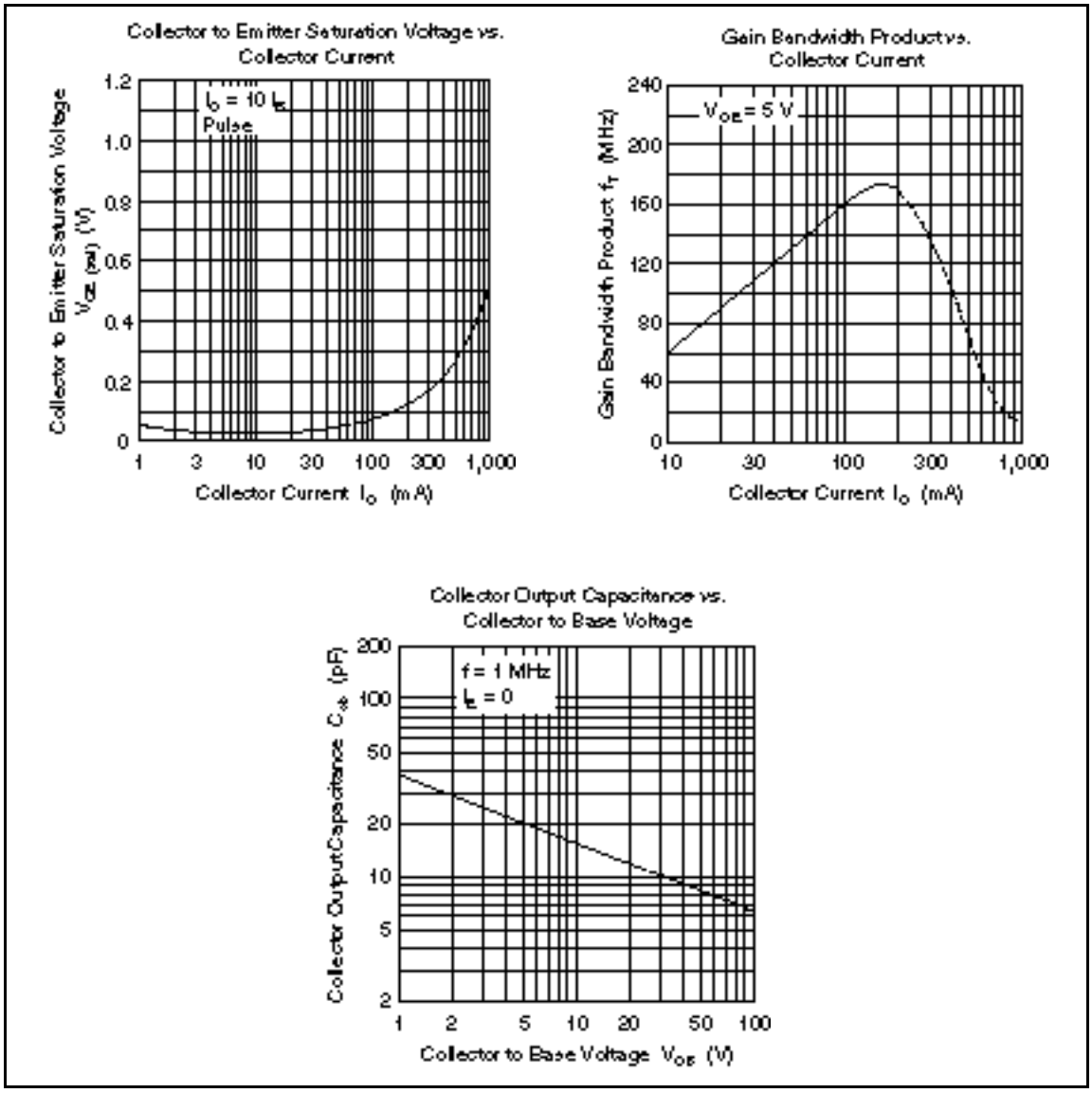
## Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 180 | — | — | V | $I_C$ = 1 mA, $I_E$ = 0 |
| Collector to emitter breakdown voltage | $V_{(BR)CEO}$ | 120 | — | — | V | $I_C$ = 10 mA, $R_{BE}$ = ∞ |
| Emitter to base breakdown voltage | $V_{(BR)EBO}$ | 5 | — | — | V | $I_E$ = 1 mA, $I_C$ = 0 |
| Collector cutoff current | $I_{CBO}$ | — | — | 10 | µA | $V_{CB}$ = 160 V, $I_E$ = 0 |
| DC current transfer ratio | $h_{FE1}$ *[1] | 60 | — | 320 | | $V_{CE}$ = 5 V, $I_C$ = 0.15 A |
| | $h_{FE2}$ | 30 | — | — | | $V_{CE}$ = 5 V, $I_C$ = 0.5 A |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | — | — | 1.0 | V | $I_C$ = 0.5 A, $I_B$ = 50 mA, Pulse |
| Base to emitter voltage | $V_{BE}$ | — | — | 0.9 | V | $V_{CE}$ = 5 V, $I_C$ = 0.15 A, Pulse |

Note: 1. The 2SD1420 is grouped by $h_{FE1}$ as follows.

| Mark | EA | EB | EC |
|---|---|---|---|
| $h_{FE1}$ | 60 to 120 | 100 to 200 | 160 to 320 |


Maximum Collector Dissipation Curve
Collector Power Dissipation Pc (W)
(on the alumina ceramic board)
1.2
0.8
0.4
0
50
100
150
Ambient Temperature Ta (°C)
Typical Output Characteristics
Pulse
1.5
1.0
0.5 mA
$I_B = 0$
10
20
30
40
50
Collector to Emitter Voltage $V_{CE}$ (V)
Typical Transfer Characteristics
$V_{CE}$ = 5 V
Pulse
Ta = 75 °C
25
−25
Collector Current $I_C$ (mA)
500
200
100
50
20
10
5
2
1
0.2
0.4
0.6
0.8
1.0
Base to Emitter Voltage $V_{BE}$ (V)
DC Current Transfer Ratio vs.
Collector Current
Pusle
$V_{CE}$ = 5 V
DC Current Transfer Ratio $h_{FE}$
300
250
200
150
100
50
0
1
3
10
30
100
300
1,000
3,000
Collector Current $I_C$ (mA)


Collector to Emitter Saturation Voltage vs.
Collector Current
$I_B$ = 10 $I_E$
Pulse
Collector to Emitter Saturation Voltage $V_{CE}$ (sat) (V)
1.2
1.0
0.8
0.6
0.4
0.2
0
1
3
10
30
100
300
1,000
Collector Current $I_C$ (mA)
Gain Bandwidth Product vs.
Collector Current
$V_{CE}$ = 5 V
Gain Bandwidth Product $f_T$ (MHz)
240
200
160
120
80
40
0
10
30
100
300
1,000
Collector Current $I_C$ (mA)
Collector Output Capacitance vs.
Collector to Base Voltage
f = 1 MHz
$I_E$ = 0
Collector Output Capacitance $C_{ob}$ (pF)
200
100
50
20
10
5
2
1
2
5
10
20
50
100
Collector to Base Voltage $V_{CB}$ (V)

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