

# 2SD1993

## Silicon NPN epitaxial planer type

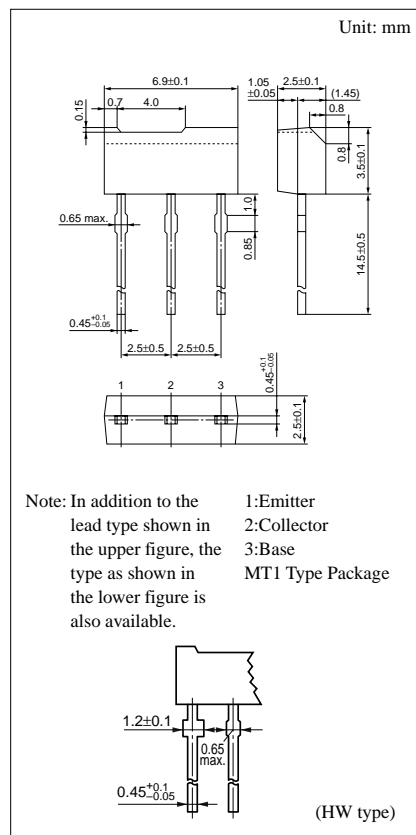
For low-frequency and low-noise amplification

### Features

- Low noise voltage NV.
- High forward current transfer ratio  $h_{FE}$ .
- Allowing supply with the radial taping.

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

| Parameter                    | Symbol    | Ratings    | Unit |
|------------------------------|-----------|------------|------|
| Collector to base voltage    | $V_{CBO}$ | 55         | V    |
| Collector to emitter voltage | $V_{CEO}$ | 55         | V    |
| Emitter to base voltage      | $V_{EBO}$ | 7          | V    |
| Peak collector current       | $I_{CP}$  | 200        | mA   |
| Collector current            | $I_C$     | 100        | mA   |
| Collector power dissipation  | $P_C$     | 400        | mW   |
| Junction temperature         | $T_j$     | 150        | °C   |
| Storage temperature          | $T_{stg}$ | -55 ~ +150 | °C   |

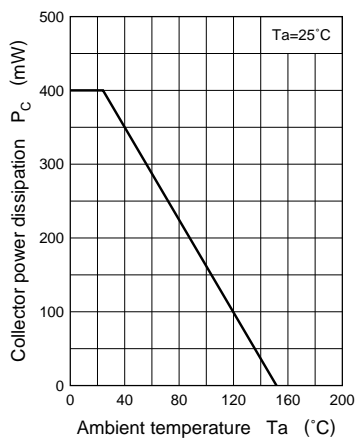
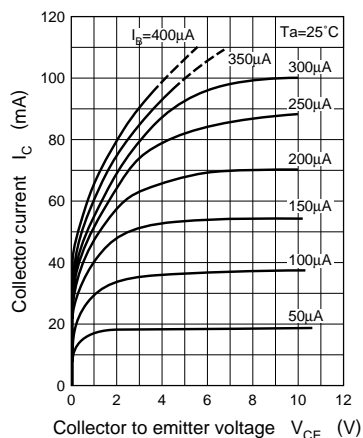
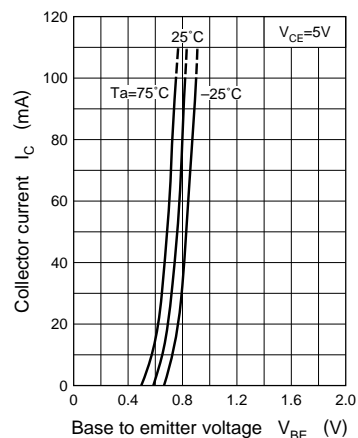
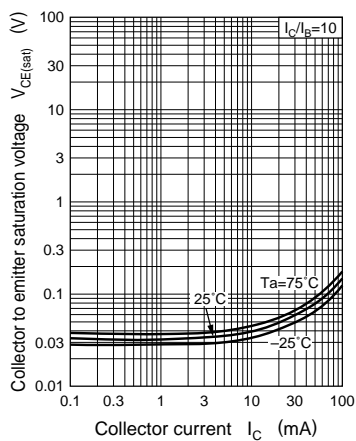
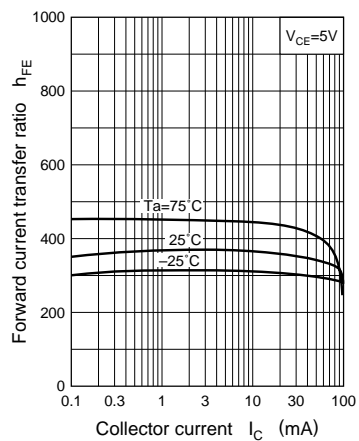
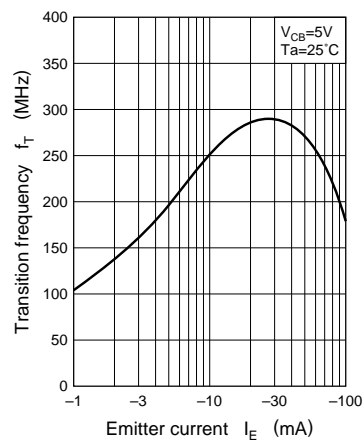
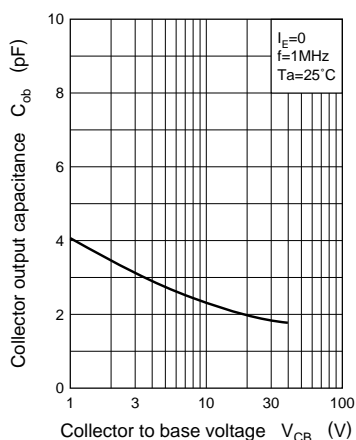
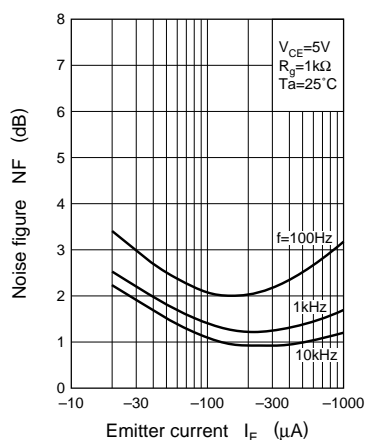
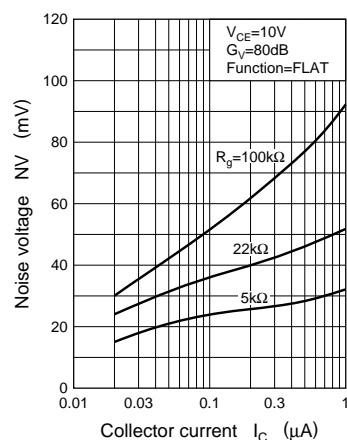


### Electrical Characteristics (Ta=25°C)

| Parameter                               | Symbol        | Conditions   | min | typ | max | Unit |
|---|---------------|--|-----|-----|-----|------|
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = 20V, I_E = 0$  |     |     | 100 | nA   |
|   | $I_{CEO}$     | $V_{CE} = 20V, I_B = 0$  |     |     | 1   | μA   |
| Collector to base voltage               | $V_{CBO}$     | $I_C = 10\mu A, I_E = 0$   | 55  |     |     | V    |
| Collector to emitter voltage            | $V_{CEO}$     | $I_C = 2mA, I_B = 0$   | 55  |     |     | V    |
| Emitter to base voltage                 | $V_{EBO}$     | $I_E = 10\mu A, I_C = 0$   | 7   |     |     | V    |
| Forward current transfer ratio          | $h_{FE}^*$    | $V_{CE} = 10V, I_C = 2mA$  | 210 |     | 650 |      |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 100mA, I_B = 10mA$  |     |     | 1.0 | V    |
| Transition frequency                    | $f_T$         | $V_{CB} = 10V, I_E = -2mA, f = 200MHz$   |     | 200 |     | MHz  |
| Noise voltage                           | NV            | $V_{CE} = 10V, I_C = 1mA, G_V = 80dB$<br>$R_g = 100k\Omega, \text{Function} = \text{FLAT}$ |     |     | 150 | mV   |

\* $h_{FE}$  Rank classification

| Rank     | R         | S         | T         |
|----------|-----------|-----------|-----------|
| $h_{FE}$ | 210 ~ 340 | 290 ~ 460 | 360 ~ 650 |

$P_C - T_a$  $I_C - V_{CE}$  $I_C - V_{BE}$  $V_{CE(sat)} - I_C$  $h_{FE} - I_C$  $f_T - I_E$  $C_{ob} - V_{CB}$  $NF - I_E$  $NV - I_C$ 

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