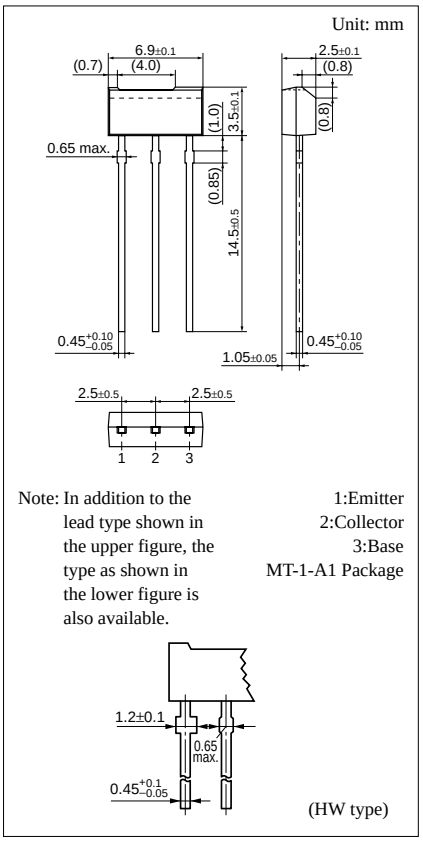
# 2SD1993

## Silicon NPN epitaxial planer type

For low-frequency and low-noise amplification




### Features

- Low noise voltage NV.
- High foward 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 |

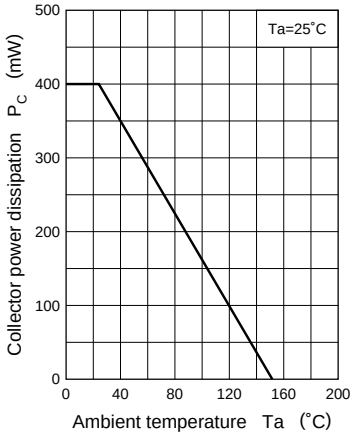
### Electrical Characteristics (Ta=25˚C)

| 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 | $V_{CBO}$ | $I_C$ = 10µA, $I_E$ = 0 | 55 | | | V |
| Collector to emitter voltage | $V_{CEO}$ | $I_C$ = 2mA, $I_B$ = 0 | 55 | | | V |
| Emitter to base voltage | $V_{EBO}$ | $I_E$ = 10µA, $I_C$ = 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>$R_g$ = 100kΩ, Function = FLAT | | | 150 | mV |

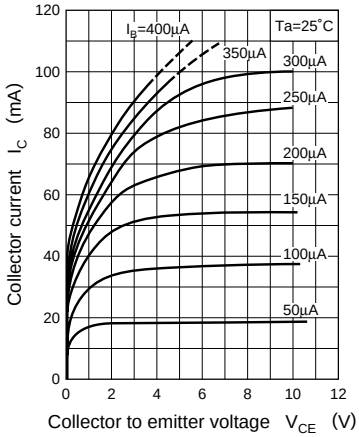
*$h_{FE}$ Rank classification

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

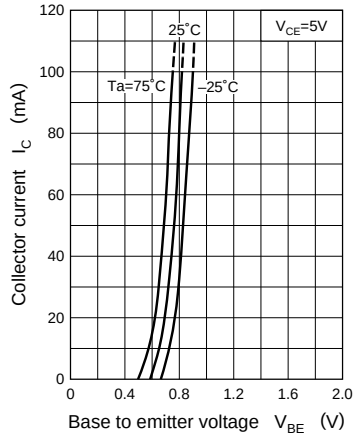
$P_C$ — Ta



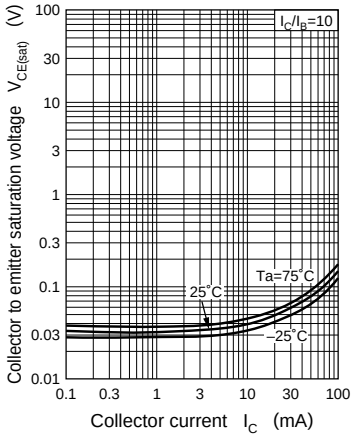

$I_C$ — $V_{CE}$



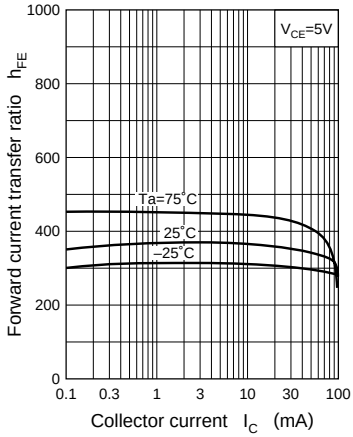

$I_C$ — $V_{BE}$



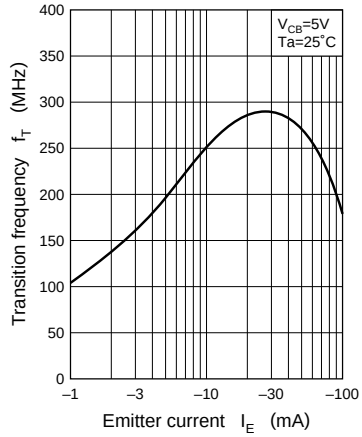

$V_{CE(sat)}$ — $I_C$



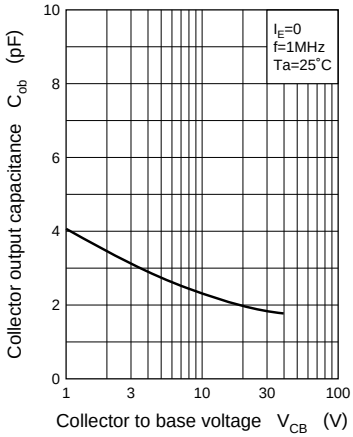

$h_{FE}$ — $I_C$



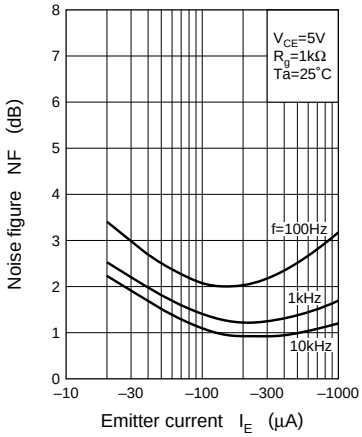

$f_T$ — $I_E$



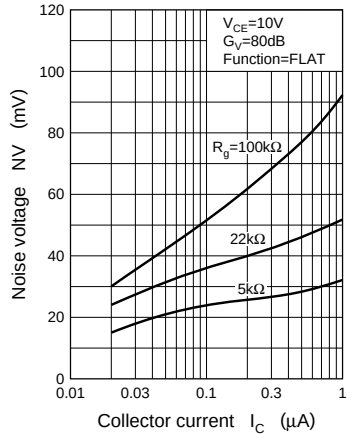

$C_{ob}$ — $V_{CB}$




NF — $I_E$




NV — $I_C$



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