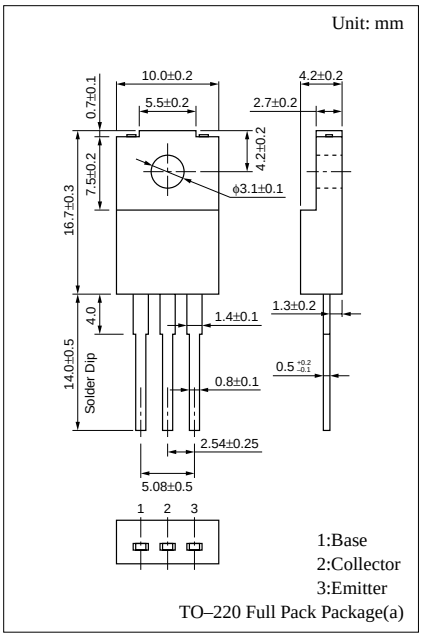
# 2SB1393, 2SB1393A

## Silicon PNP epitaxial planar type

For power amplification

Complementary to 2SD1985 and 2SD1985A




## Features

- Satisfactory linearity of foward current transfer ratio $h_{FE}$
- Low collector to emitter saturation voltage $V_{CE(sat)}$
- Full-pack package which can be installed to the heat sink with one screw

## Absolute Maximum Ratings ($T_C$=25˚C)

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Collector to base voltage | 2SB1393 | $V_{CBO}$ | –60 | V |
| | 2SB1393A | | –80 | |
| Collector to emitter voltage | 2SB1393 | $V_{CEO}$ | –60 | V |
| | 2SB1393A | | –80 | |
| Emitter to base voltage | | $V_{EBO}$ | –5 | V |
| Peak collector current | | $I_{CP}$ | –5 | A |
| Collector current | | $I_C$ | –3 | A |
| Collector power dissipation | $T_C$=25°C | $P_C$ | 25 | W |
| | Ta=25°C | | 2.0 | |
| Junction temperature | | $T_j$ | 150 | ˚C |
| Storage temperature | | $T_{stg}$ | –55 to +150 | ˚C |

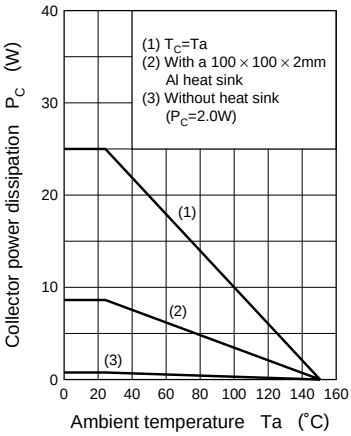
## Electrical Characteristics ($T_C$=25˚C)

| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cutoff current | 2SB1393 | $I_{CEO}$ | $V_{CE}$ = –30V, $I_B$ = 0 | | | –300 | μA |
| | 2SB1393A | | $V_{CE}$ = –60V, $I_B$ = 0 | | | –300 | |
| Collector cutoff current | 2SB1393 | $I_{CES}$ | $V_{CE}$ = –60V, $V_{BE}$ = 0 | | | –200 | μA |
| | 2SB1393A | | $V_{CE}$ = –80V, $V_{BE}$ = 0 | | | –200 | |
| Emitter cutoff current | | $I_{EBO}$ | $V_{EB}$ = –5V, $I_C$ = 0 | | | –1 | mA |
| Collector to emitter voltage | 2SB1393 | $V_{CEO}$ | $I_C$ = –30mA, $I_B$ = 0 | –60 | | | V |
| | 2SB1393A | | | –80 | | | |
| Forward current transfer ratio | | $h_{FE1}$* | $V_{CE}$ = –4V, $I_C$ = –1A | 70 | | 250 | |
| | | $h_{FE2}$ | $V_{CE}$ = –4V, $I_C$ = –3A | 10 | | | |
| Base to emitter voltage | | $V_{BE}$ | $V_{CE}$ = –4V, $I_C$ = –3A | | | –1.8 | V |
| Collector to emitter saturation voltage | | $V_{CE(sat)}$ | $I_C$ = –3A, $I_B$ = – 0.375A | | | –1.2 | V |
| Transition frequency | | $f_T$ | $V_{CE}$ = –5V, $I_C$ = – 0.1A, f = 1MHz | | 20 | | MHz |
| Turn-on time | | $t_{on}$ | $I_C$ = –1A, $I_{B1}$ = – 0.1A, $I_{B2}$ = 0.1A, $V_{CC}$ = –50V | | 0.5 | | μs |
| Storage time | | $t_{stg}$ | | | 1.2 | | μs |
| Fall time | | $t_f$ | | | 0.3 | | μs |

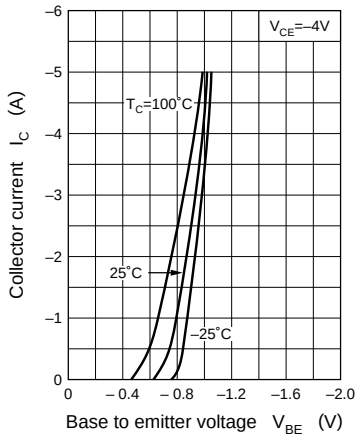
*$h_{FE1}$ Rank classification

| Rank | Q | P |
|---|---|---|
| $h_{FE1}$ | 70 to 150 | 120 to 250 |

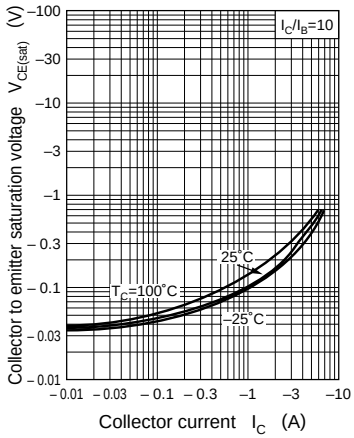
$P_C$ — Ta



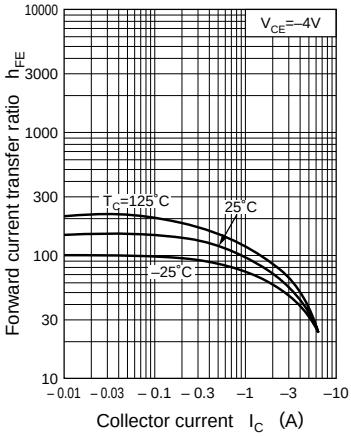

$I_C$ — $V_{BE}$



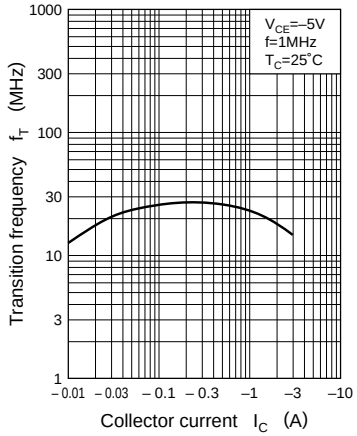

$V_{CE(sat)}$ — $I_C$



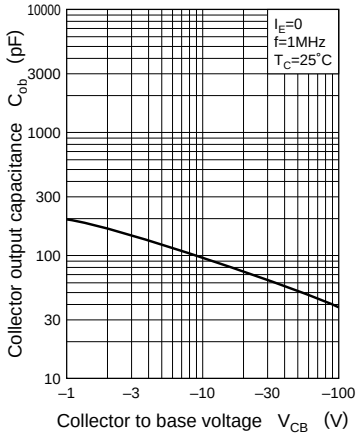

$h_{FE}$ — $I_C$



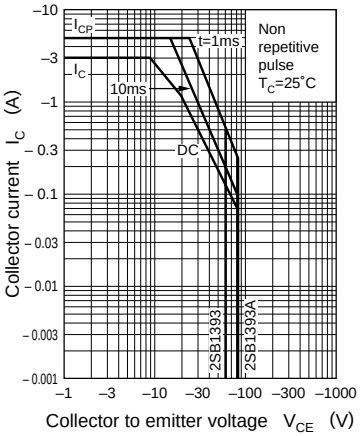

$f_T$ — $I_C$

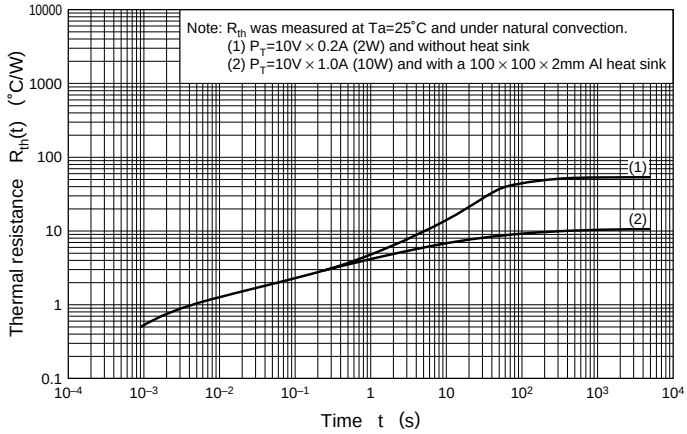



$C_{ob}$ — $V_{CB}$




Area of safe operation (ASO)




$R_{th(t)}$ — t