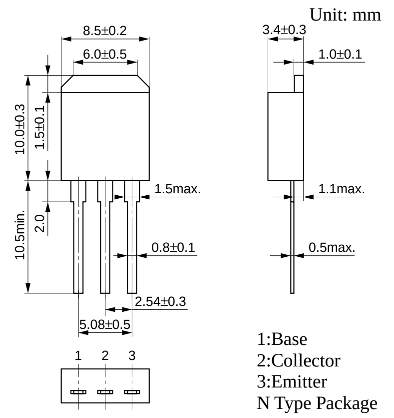
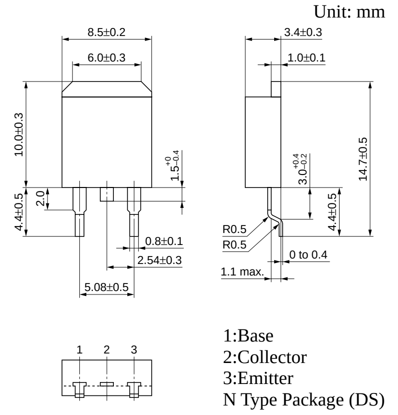
# 2SB933

## Silicon PNP epitaxial planar type

For power switching
Complementary to 2SD1256



1:Base
2:Collector
3:Emitter
N Type Package



1:Base
2:Collector
3:Emitter
N Type Package (DS)

## Features

- Low collector to emitter saturation voltage $V_{CE(sat)}$
- Satisfactory linearity of foward current transfer ratio $h_{FE}$
- Large collector current $I_C$
- N type package enabling direct soldering of the radiating fin to the printed circuit board, etc. of small electronic equipment.

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

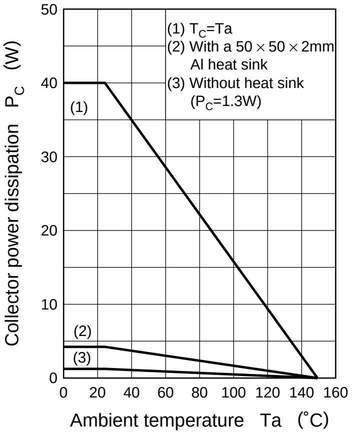
| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Collector to base voltage | | $V_{CBO}$ | –130 | V |
| Collector to emitter voltage | | $V_{CEO}$ | –80 | V |
| Emitter to base voltage | | $V_{EBO}$ | –7 | V |
| Peak collector current | | $I_{CP}$ | –10 | A |
| Collector current | | $I_C$ | –5 | A |
| Collector power dissipation | $T_C$=25°C | $P_C$ | 40 | W |
| | Ta=25°C | | 1.3 | |
| Junction temperature | | $T_j$ | 150 | ˚C |
| Storage temperature | | $T_{stg}$ | –55 to +150 | ˚C |

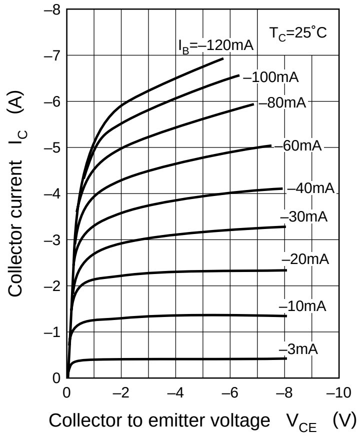
## Electrical Characteristics ($T_C$=25˚C)

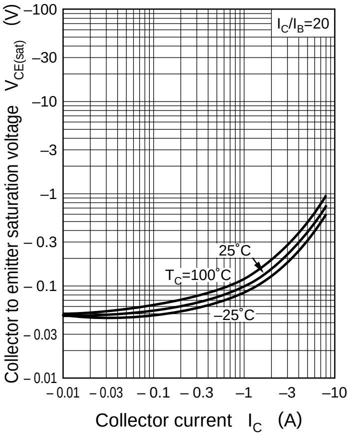
| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = –100V, $I_E$ = 0 | | | –10 | µA |
| Emitter cutoff current | $I_{EBO}$ | $V_{EB}$ = –5V, $I_C$ = 0 | | | –50 | µA |
| Collector to emitter voltage | $V_{CEO}$ | $I_C$ = –10mA, $I_B$ = 0 | –80 | | | V |
| Forward current transfer ratio | $h_{FE1}$ | $V_{CE}$ = –2V, $I_C$ = – 0.1A | 45 | | | |
| | $h_{FE2}^*$ | $V_{CE}$ = –2V, $I_C$ = –2A | 90 | | 260 | |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C$ = –4A, $I_B$ = – 0.2A | | | – 0.5 | V |
| Base to emitter saturation voltage | $V_{BE(sat)}$ | $I_C$ = –4A, $I_B$ = – 0.2A | | | –1.5 | V |
| Transition frequency | $f_T$ | $V_{CE}$ = –10V, $I_C$ = – 0.5A, f = 10MHz | | 30 | | MHz |
| Turn-on time | $t_{on}$ | $I_C$ = –2A, $I_{B1}$ = – 0.2A, $I_{B2}$ = 0.2A | | 0.13 | | µs |
| Storage time | $t_{stg}$ | | | 1.5 | | µs |
| Fall time | $t_f$ | | | 0.13 | | µs |

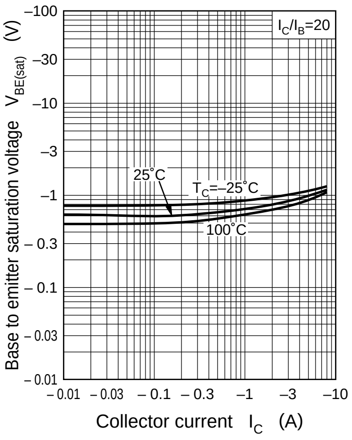
*$h_{FE2}$ Rank classification

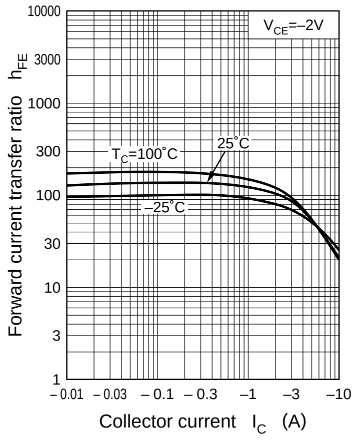
| Rank | Q | P |
|---|---|---|
| $h_{FE2}$ | 90 to 180 | 130 to 260 |

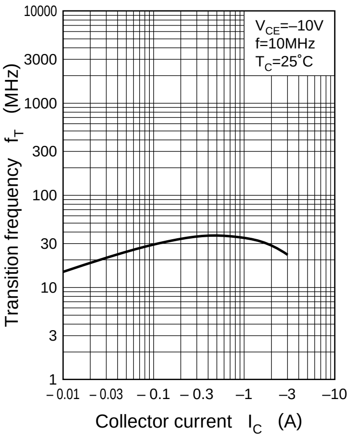

$P_C$ — Ta

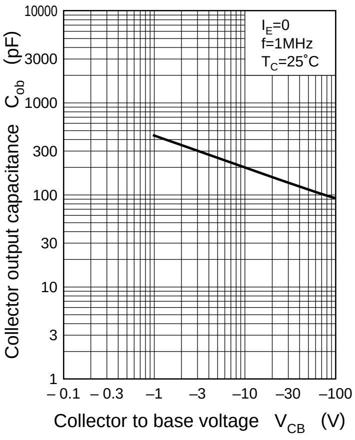

$I_C$ — $V_{CE}$

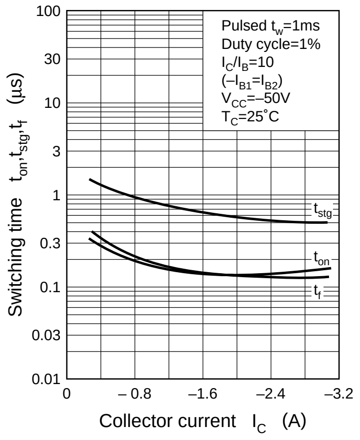

$V_{CE(sat)}$ — $I_C$

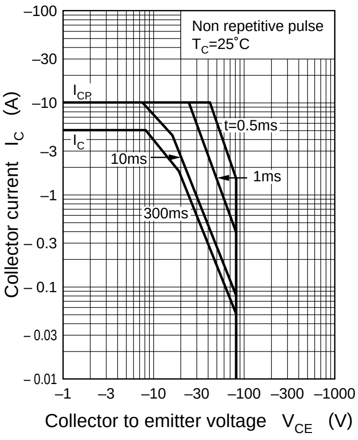

$V_{BE(sat)}$ — $I_C$


$h_{FE}$ — $I_C$

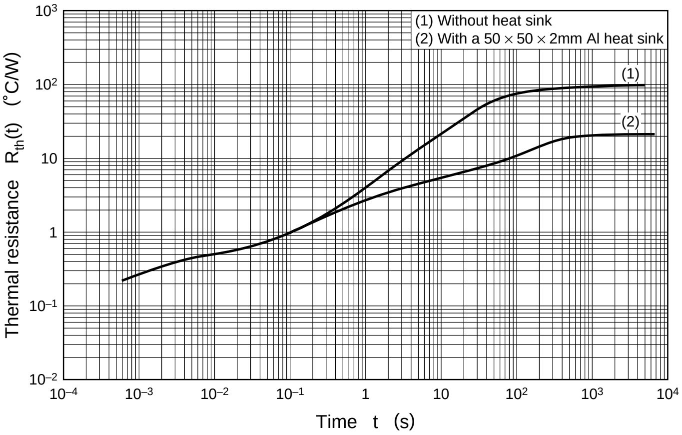

$f_T$ — $I_C$


$C_{ob}$ — $V_{CB}$


$t_{on}$, $t_{stg}$, $t_f$ — $I_C$


Area of safe operation (ASO)

$R_{th(t)}$ — t


(1) Without heat sink
(2) With a 50 × 50 × 2mm Al heat sink
(1)
(2)
Thermal resistance Rth(t) (°C/W)
10³
10²
10
1
10⁻¹
10⁻²
10⁻⁴
10⁻³
10⁻²
10⁻¹
1
10
10²
10³
10⁴
Time t (s)