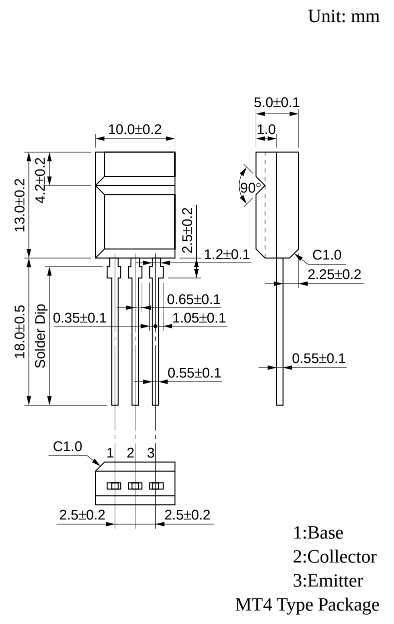
# 2SD2137, 2SD2137A

## Silicon NPN triple diffusion planar type

For power amplification

Complementary to 2SB1417 and 2SB1417A



## Features

- High forward current transfer ratio $h_{FE}$ which has satisfactory linearity
- Low collector to emitter saturation voltage $V_{CE(sat)}$
- Allowing supply with the radial taping

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

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Collector to base voltage | 2SD2137 | $V_{CBO}$ | 60 | V |
| | 2SD2137A | | 80 | |
| Collector to emitter voltage | 2SD2137 | $V_{CEO}$ | 60 | V |
| | 2SD2137A | | 80 | |
| Emitter to base voltage | | $V_{EBO}$ | 6 | V |
| Peak collector current | | $I_{CP}$ | 5 | A |
| Collector current | | $I_C$ | 3 | A |
| Collector power dissipation | $T_C$=25°C | $P_C$ | 15 | W |
| | Ta=25°C | | 2 | |
| Junction temperature | | $T_j$ | 150 | ˚C |
| Storage temperature | | $T_{stg}$ | –55 to +150 | ˚C |

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

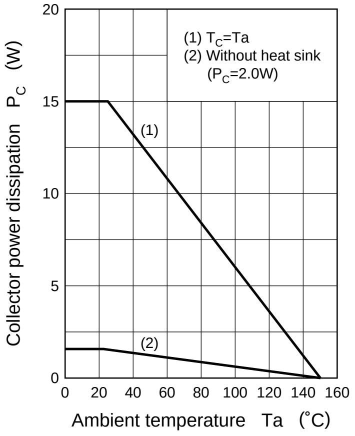
| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cutoff current | 2SD2137 | $I_{CES}$ | $V_{CE}$ = 60V, $V_{BE}$ = 0 | | | 100 | µA |
| | 2SD2137A | | $V_{CE}$ = 80V, $V_{BE}$ = 0 | | | 100 | |
| Collector cutoff current | 2SD2137 | $I_{CEO}$ | $V_{CE}$ = 30V, $I_B$ = 0 | | | 100 | µA |
| | 2SD2137A | | $V_{CE}$ = 60V, $I_B$ = 0 | | | 100 | |
| Emitter cutoff current | | $I_{EBO}$ | $V_{EB}$ = 6V, $I_C$ = 0 | | | 100 | µA |
| Collector to emitter voltage | 2SD2137 | $V_{CEO}$ | $I_C$ = 30mA, $I_B$ = 0 | 60 | | | V |
| | 2SD2137A | | | 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, $I_C$ = 0.2A, f = 10MHz | | 30 | | MHz |
| Turn-on time | | $t_{on}$ | $I_C$ = 1A, $I_{B1}$ = 0.1A, $I_{B2}$ = – 0.1A, $V_{CC}$ = 50V | | 0.3 | | µs |
| Storage time | | $t_{stg}$ | | | 2.5 | | µs |
| Fall time | | $t_f$ | | | 0.2 | | µs |

*$h_{FE1}$ Rank classification

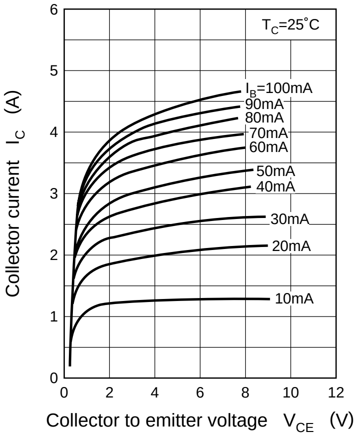
| Rank | Q | P |
|---|---|---|
| $h_{FE1}$ | 70 to 150 | 120 to 250 |

Note: Ordering can be made by the common rank (PQ rank $h_{FE}$ = 70 to 250) in the rank classification.

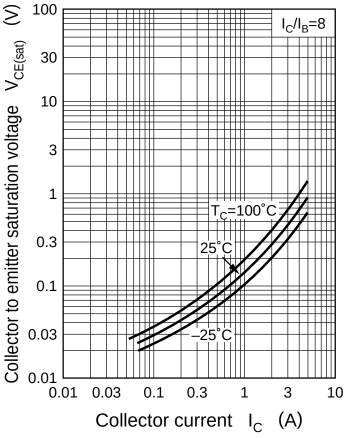
$P_C$ — Ta



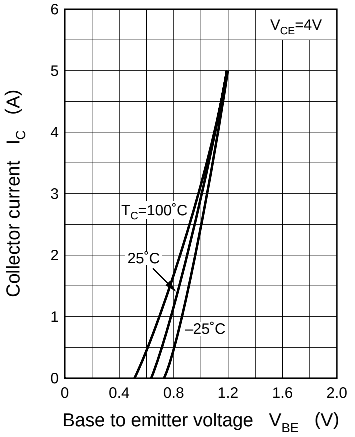
$I_C$ — $V_{CE}$



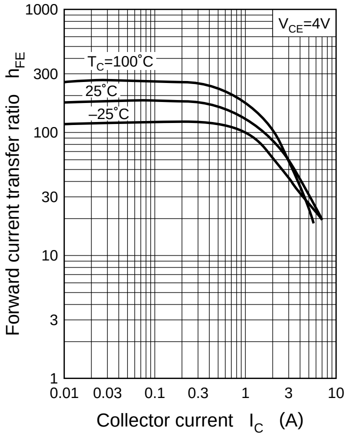
$V_{CE(sat)}$ — $I_C$



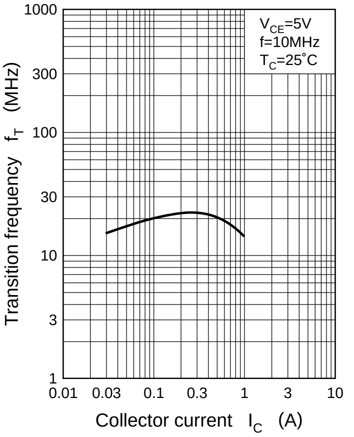
$I_C$ — $V_{BE}$



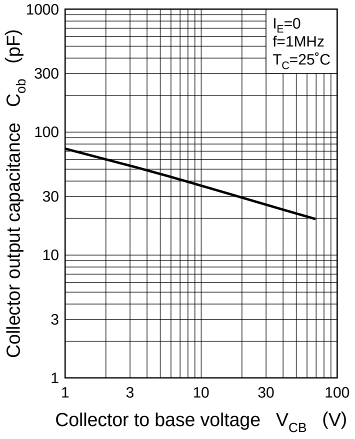
$h_{FE}$ — $I_C$



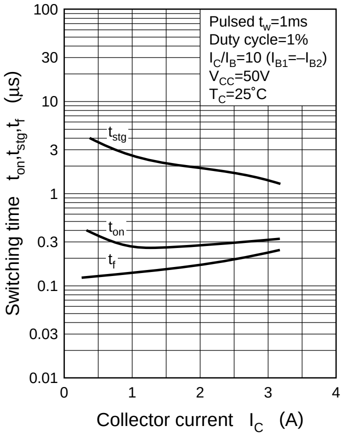
$f_T$ — $I_C$



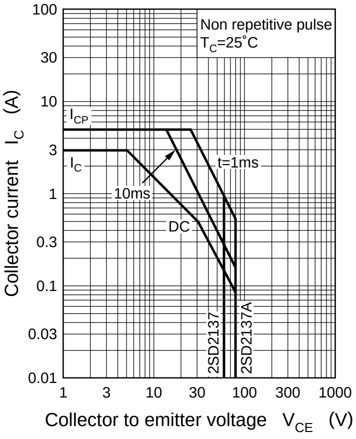
$C_{ob}$ — $V_{CB}$



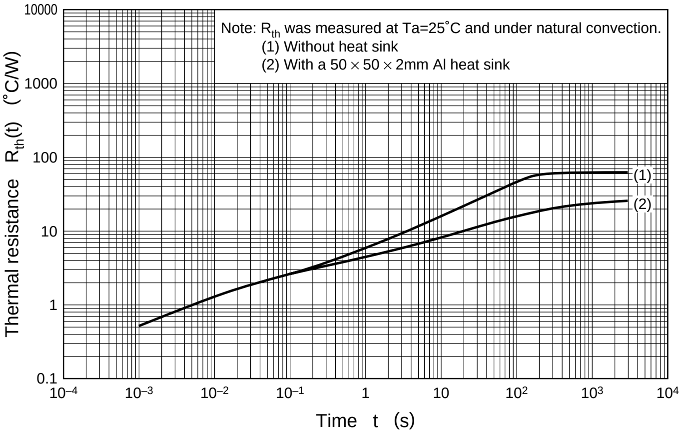
$t_{on}$, $t_{stg}$, $t_f$ — $I_C$



Area of safe operation (ASO)



$R_{th(t)}$ — t


Note: $R_{th}$ was measured at Ta=25˚C and under natural convection.
(1) Without heat sink
(2) With a 50 × 50 × 2mm Al heat sink
Thermal resistance $R_{th}(t)$ (˚C/W)
10000
1000
100
10
1
0.1
$10^{-4}$
$10^{-3}$
$10^{-2}$
$10^{-1}$
1
10
$10^{2}$
$10^{3}$
$10^{4}$
Time t (s)
(1)
(2)