2SB1417, 2SB1417A

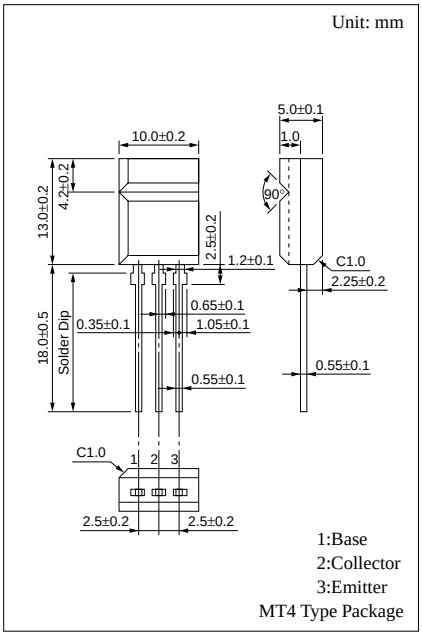
Silicon PNP epitaxial planar type

For power amplification

Complementary to 2SD2137 and 2SD2137A

Features

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



Absolute Maximum Ratings (T_C=25˚C)

Parameter		Symbol	Ratings	Unit
Collector to base voltage	2SB1417	V_{CBO}	–60	V
	2SB1417A		–80	
Collector to emitter voltage	2SB1417	V_{CEO}	–60	V
	2SB1417A		–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		2.0	
Junction temperature		T_j	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

Electrical Characteristics (T_C=25˚C)

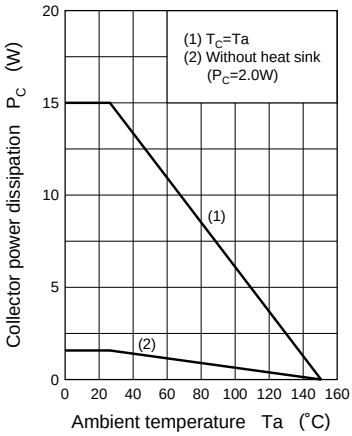
Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	2SB1417	I_{CES}	V_{CE} = –60V, V_{BE} = 0			–100	μA
	2SB1417A		V_{CE} = –80V, V_{BE} = 0			–100	
Collector cutoff current	2SB1417	I_{CEO}	V_{CE} = –30V, I_B = 0			–100	μA
	2SB1417A		V_{CE} = –60V, I_B = 0			–100	
Emitter cutoff current		I_{EBO}	V_{EB} = –6V, I_C = 0			–100	μA
Collector to emitter voltage	2SB1417	V_{CEO}	I_C = –30mA, I_B = 0	–60			V
	2SB1417A			–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}			1.0		μs
Fall time		t_f			0.2		μs

*h_{FE1} Rank classification

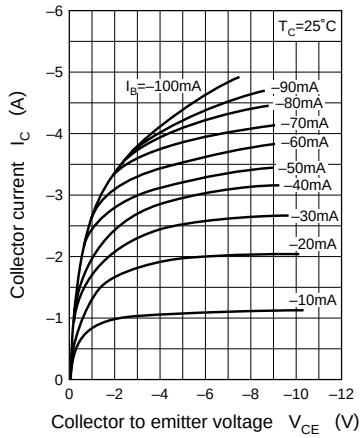
Rank	Q	P
h_{FE1}	70 to 150	120 to 250

Note: Ordering can be made by the common rank (PQ rank h_{FE1} = 70 to 250) in the rank classification.

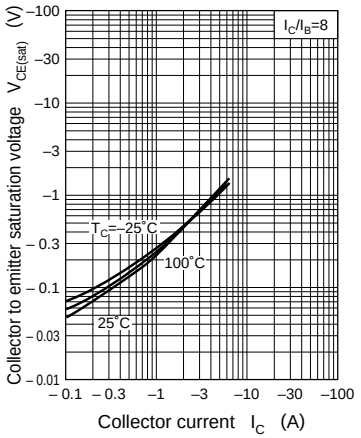
P_C — Ta



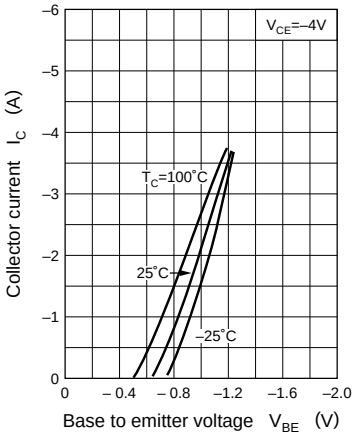
I_C — V_{CE}



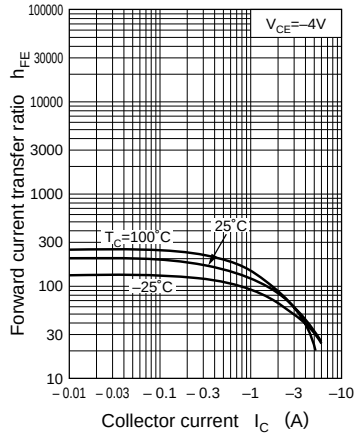
$V_{CE(sat)}$ — I_C



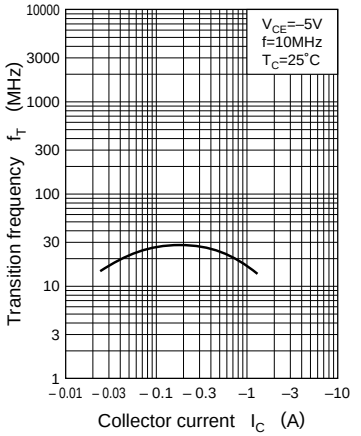
I_C — V_{BE}



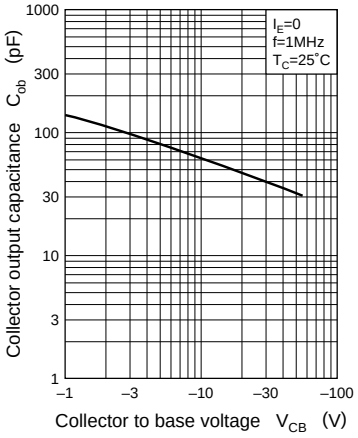
h_{FE} — I_C



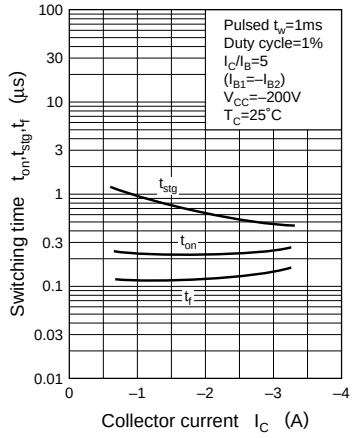
f_T — I_C



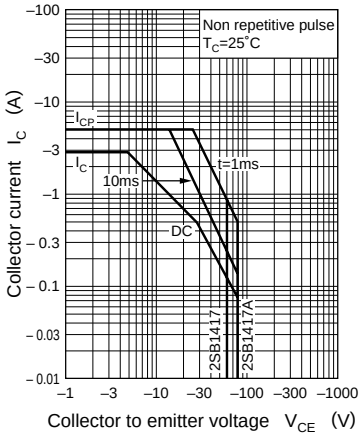
C_{ob} — V_{CB}



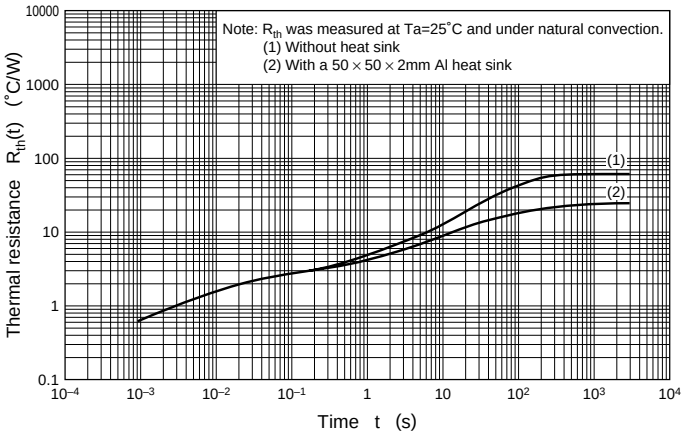
t_{on}, t_{stg}, t_f — I_C



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
(1)
(2)
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
10^{4}
Time t (s)