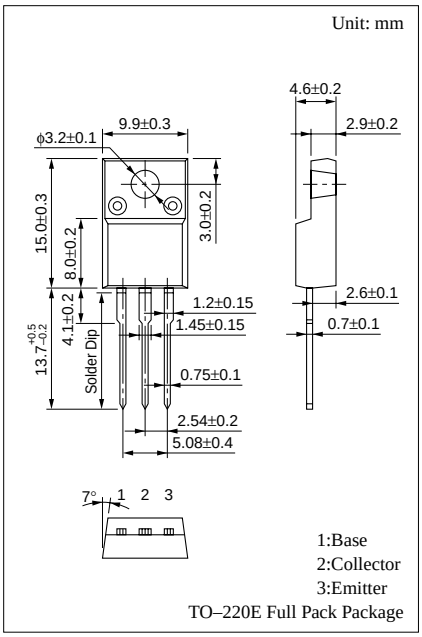
2SB1604, 2SB1604A

Silicon PNP epitaxial planar type

For low-voltage switching



Features

- Low collector to emitter saturation voltage $V_{CE(sat)}$
- High-speed switching
- Full-pack package with outstanding insulation, 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	2SB1604	V_{CBO}	–40	V
	2SB1604A		–50	
Collector to emitter voltage	2SB1604	V_{CEO}	–20	V
	2SB1604A		–40	
Emitter to base voltage		V_{EBO}	–5	V
Peak collector current		I_{CP}	–20	A
Collector current		I_C	–10	A
Collector power dissipation	T_C=25°C	P_C	40	W
	Ta=25°C		2	
Junction temperature		T_j	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

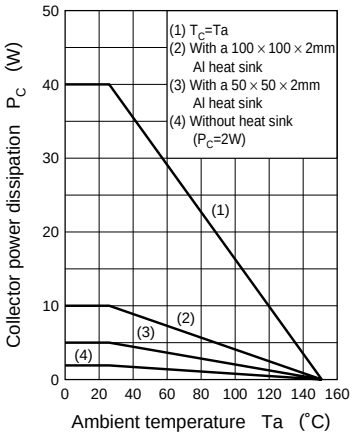
Electrical Characteristics (T_C=25˚C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current		I_{CBO}	V_{CB} = –40V, I_E = 0			–50	μA
Emitter cutoff current		I_{EBO}	V_{EB} = –5V, I_C = 0			–50	μA
Collector to emitter voltage	2SB1604	V_{CEO}	I_C = –10mA, I_B = 0	–20			V
	2SB1604A			–40			
Forward current transfer ratio		h_{FE1}	V_{CE} = –2V, I_C = – 0.1A	45			
		h_{FE2}*	V_{CE} = –2V, I_C = –3A	90		260	
Collector to emitter saturation voltage		$V_{CE(sat)}$	I_C = –10A, I_B = – 0.33A			– 0.6	V
Base to emitter saturation voltage		$V_{BE(sat)}$	I_C = –10A, I_B = – 0.33A			–1.5	V
Transition frequency		f_T	V_{CE} = –10V, I_C = – 0.5A, f = 10MHz		100		MHz
Collector output capacitance		C_{ob}	V_{CB} = –10V, I_E = 0, f = 1MHz		400		pF
Turn-on time		t_{on}	I_C = –3A, I_{B1} = – 0.1A, I_{B2} = 0.1A		0.1		μs
Storage time		t_{stg}			0.5		μs
Fall time		t_f			0.1		μs

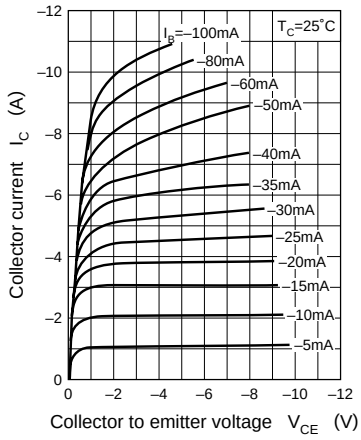
*h_{FE2} Rank classification

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

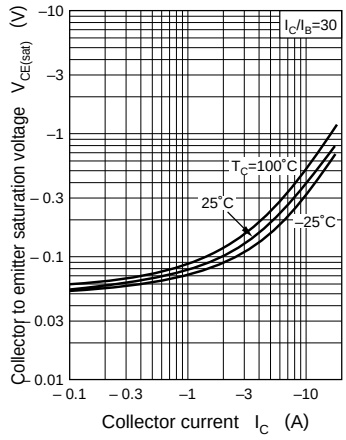
P_C — Ta



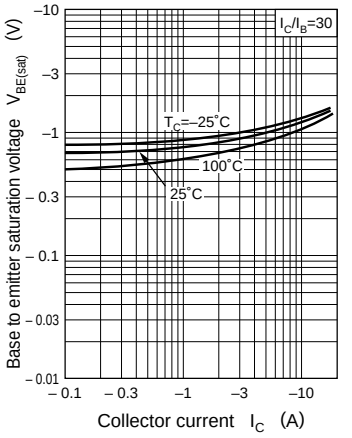
I_C — V_{CE}



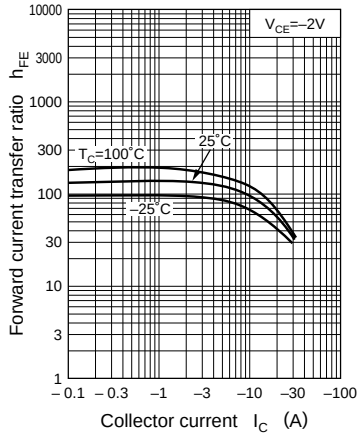
$V_{CE(sat)}$ — I_C



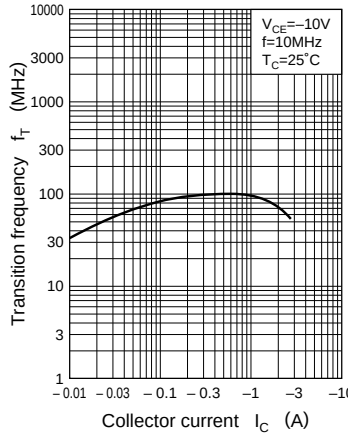
$V_{BE(sat)}$ — I_C



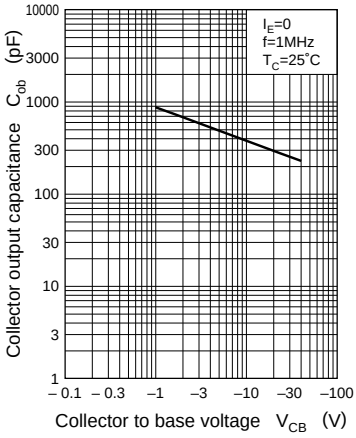
h_{FE} — I_C



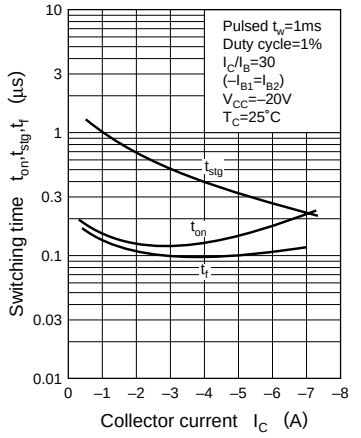
f_T — I_C



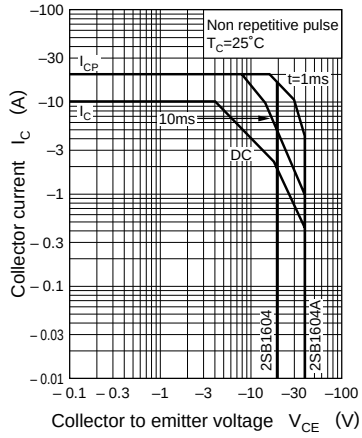
C_{ob} — V_{CB}



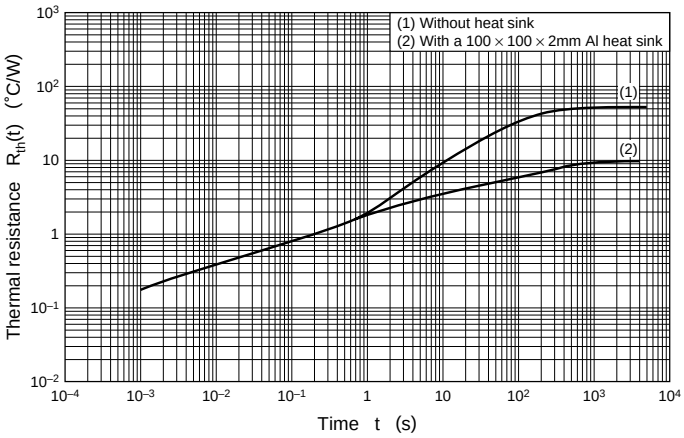
t_{on}, t_{stg}, t_f — I_C



Area of safe operation (ASO)



$R_{th(t)}$ — t


(1) Without heat sink
(2) With a 100 × 100 × 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)