

# 2SD1707

## Silicon NPN epitaxial planar type

For power switching

Complementary to 2SB1156

### ■ Features

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

### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

Parameter	Symbol	Rating	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	$I_{CP}$	30	A
Collector current	$I_C$	20	A
Collector power dissipation	$P_C$	$T_C = 25^\circ\text{C}$	100
		$T_a = 25^\circ\text{C}$	3
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

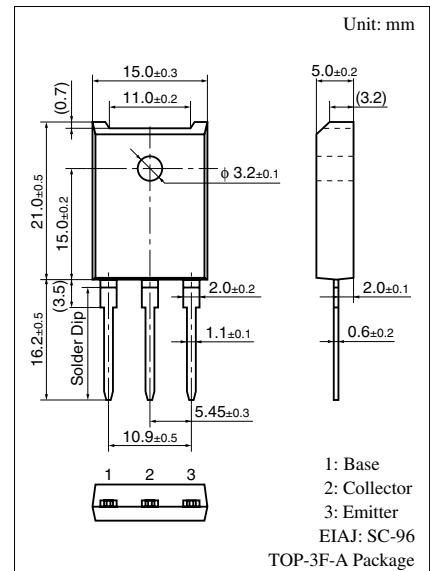
### ■ Electrical Characteristics $T_C = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$			10	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$			50	$\mu\text{A}$
Collector to emitter voltage	$V_{CEO}$	$I_C = 10\text{ mA}, I_B = 0$	80			V
Forward current transfer ratio	$h_{FE1}$	$V_{CE} = 2\text{ V}, I_C = 0.1\text{ A}$	45			
	$h_{FE2}^*$	$V_{CE} = 2\text{ V}, I_C = 3\text{ A}$	90		260	
	$h_{FE3}$	$V_{CE} = 2\text{ V}, I_C = 10\text{ A}$	30			
Collector to emitter saturation voltage	$V_{CE(sat)1}$	$I_C = 8\text{ A}, I_B = 0.4\text{ A}$			0.5	V
	$V_{CE(sat)2}$	$I_C = 20\text{ A}, I_B = 2\text{ A}$			1.5	V
Base to emitter saturation voltage	$V_{BE(sat)1}$	$I_C = 8\text{ A}, I_B = 0.4\text{ A}$			1.5	V
	$V_{BE(sat)2}$	$I_C = 20\text{ A}, I_B = 2\text{ A}$			2.5	V
Transition frequency	$f_T$	$V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}, f = 1\text{ MHz}$		20		MHz
Turn-on time	$t_{on}$	$I_C = 8\text{ A}, I_{B1} = 0.8\text{ A}, I_{B2} = -0.8\text{ A}, V_{CC} = 50\text{ V}$		0.5		$\mu\text{s}$
Storage time	$t_{stg}$			2.0		$\mu\text{s}$
Fall time	$t_f$			0.2		$\mu\text{s}$

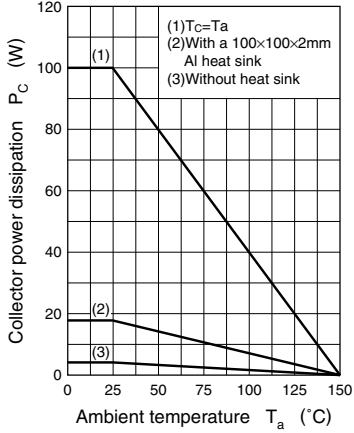
Note) \*: Rank classification

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

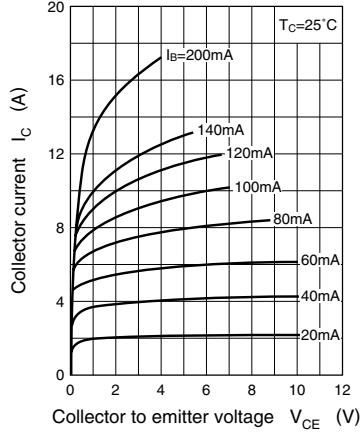
Ordering can be made by the common rank (PQ rank  $h_{FE2} = 90$  to 260) in the rank classification.



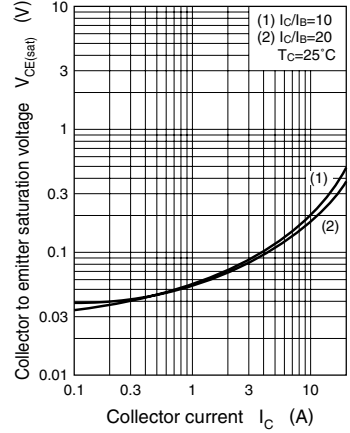
$P_C - T_a$



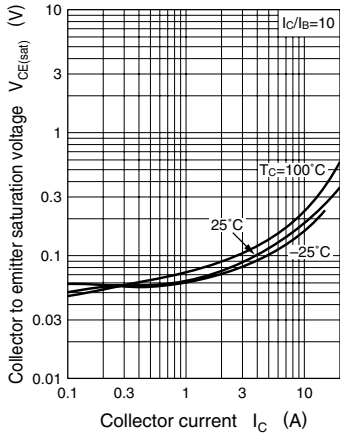
$I_C - V_{CE}$



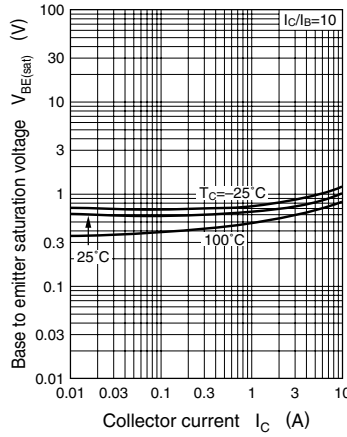
$V_{CE(sat)} - I_C$



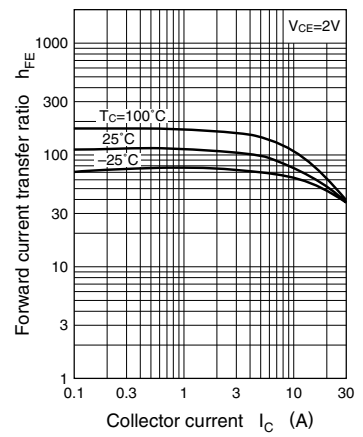
$V_{CE(sat)} - I_C$



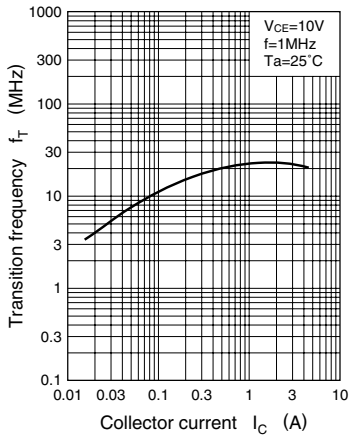
$V_{BE(sat)} - I_C$



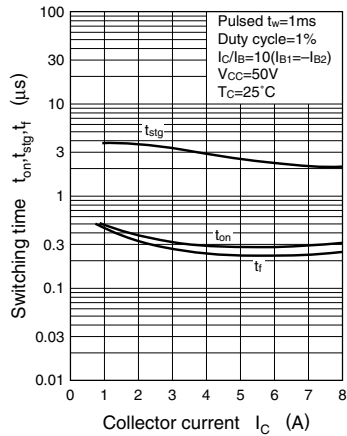
$h_{FE} - I_C$



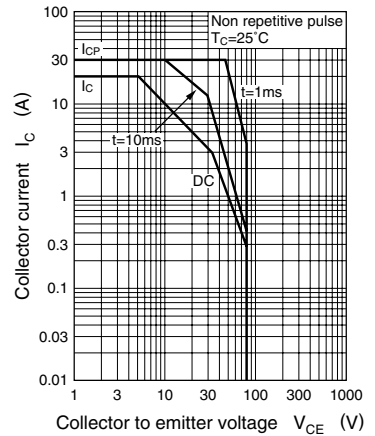
$f_T - I_C$



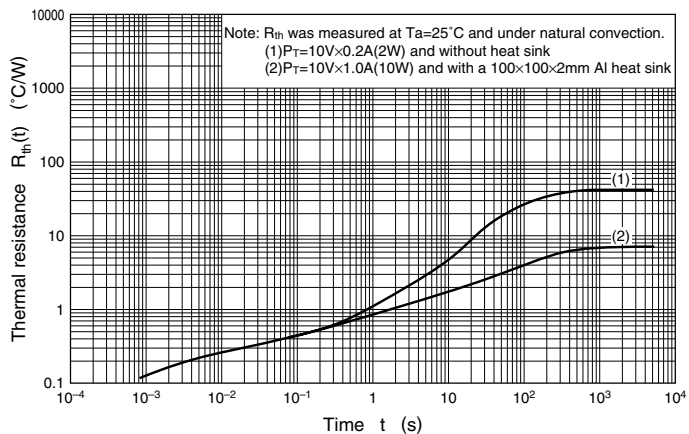
$t_{on}, t_{stg}, t_f - I_C$



Area of safe operation (ASO)



$$R_{th(t)} - t$$



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