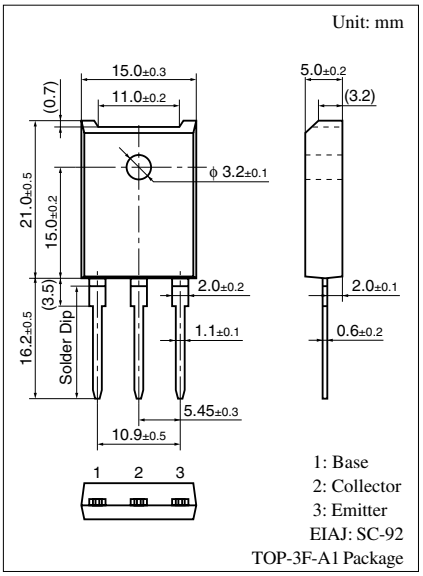
2SD1705

Silicon NPN epitaxial planar type

For power switching
Complementary to 2SB1154



■ 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 $T_C = 25°C$

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}	20	A
Collector current		I_C	10	A
Collector power dissipation	$T_C = 25°C$	P_C	70	W
	$T_a = 25°C$		3	
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	−55 to +150	°C

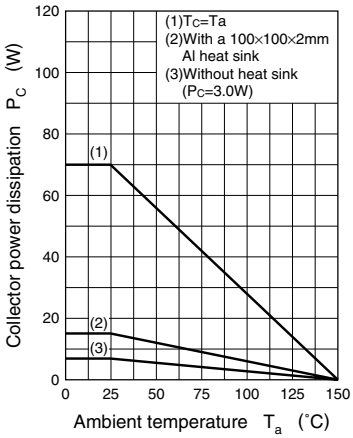
■ Electrical Characteristics $T_C = 25°C$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 100 V, I_E = 0			10	μA
Emitter cutoff current	I_{EBO}	V_{EB} = 5 V, I_C = 0			50	μA
Collector to emitter voltage	V_{CEO}	I_C = 10 mA, I_B = 0	80			V
Forward current transfer ratio	h_{FE1}	V_{CE} = 2 V, I_C = 0.1 A	45			
	h_{FE2} *	V_{CE} = 2 V, I_C = 3 A	90		260	
	h_{FE3}	V_{CE} = 2 V, I_C = 6 A	30			
Collector to emitter saturation voltage	$V_{CE(sat)1}$	I_C = 6 A, I_B = 0.3 A			0.5	V
	$V_{CE(sat)2}$	I_C = 10 A, I_B = 1 A			1.5	V
Base to emitter saturation voltage	$V_{BE(sat)1}$	I_C = 6 A, I_B = 0.3 A			1.5	V
	$V_{BE(sat)2}$	I_C = 10 A, I_B = 1 A			2.5	V
Transition frequency	f_T	V_{CE} = 10 V, I_C = 0.5 A, f = 1 MHz		20		MHz
Turn-on time	t_{on}	I_C = 6 A, I_{B1} = 0.6 A, I_{B2} = − 0.6 A,		0.5		μs
Storage time	t_{stg}	V_{CC} = 50 V		2.0		μs
Fall time	t_f			0.2		μs

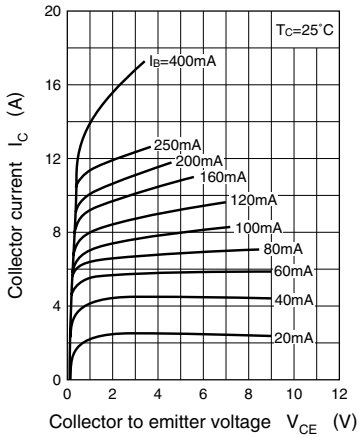
Note) ∗: Rank classification

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

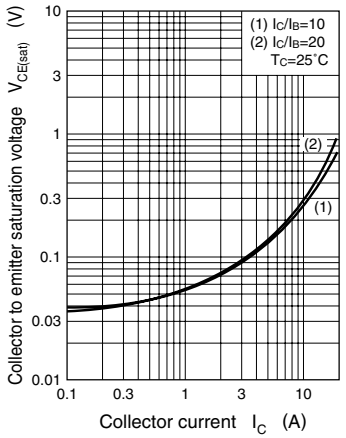
P_C — T_a



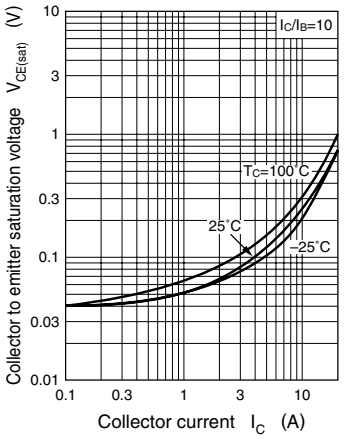
I_C — V_{CE}



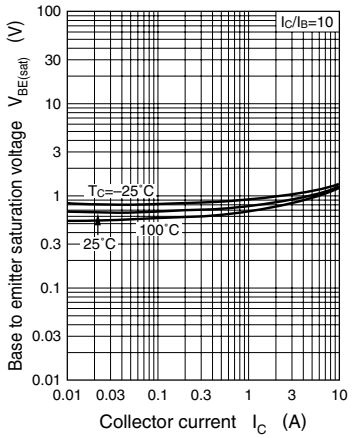
$V_{CE(sat)}$ — I_C



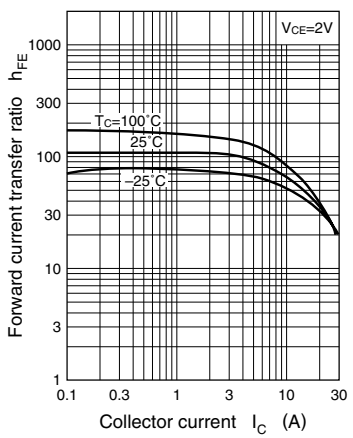
$V_{CE(sat)}$ — I_C



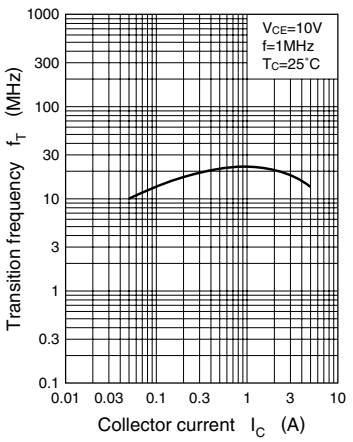
$V_{BE(sat)}$ — I_C



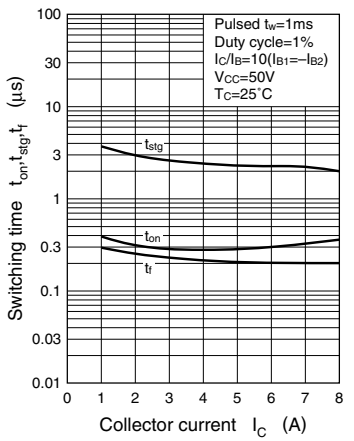
h_{FE} — I_C



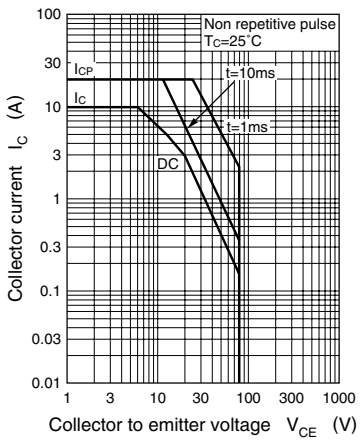
f_T — I_C



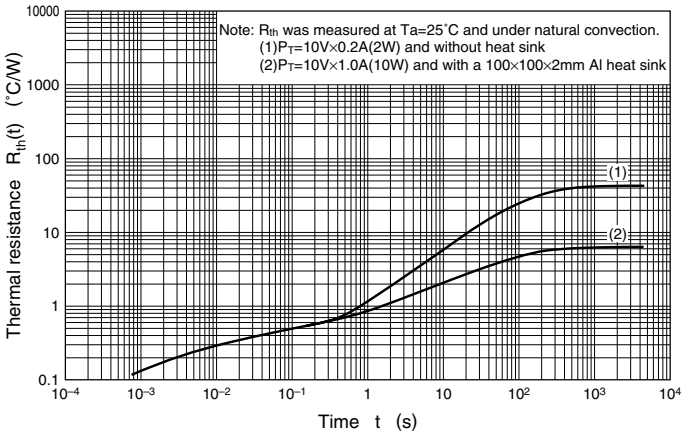
t_{on}, t_{stg}, t_f — I_C



Area of safe operation (ASO)



$R_{th(t)}$ — t


Note: Rth was measured at Ta=25°C and under natural convection.
(1)PT=10V×0.2A(2W) and without heat sink
(2)PT=10V×1.0A(10W) and with a 100×100×2mm Al heat sink
Thermal resistance Rth(t) (°C/W)
10000
1000
100
10
1
0.1
(1)
(2)
10−4
10−3
10−2
10−1
1
10
10²
10³
10⁴
Time t (s)

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