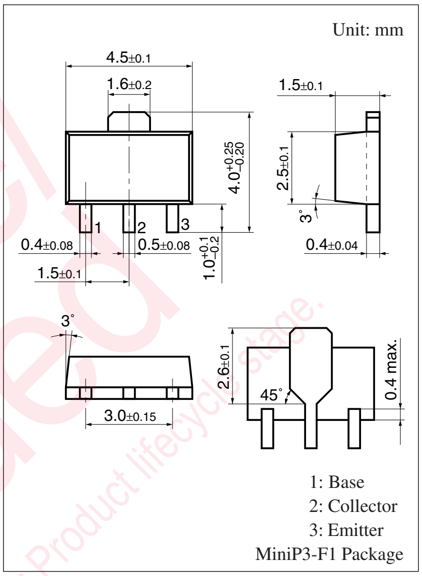
2SD1511

Silicon NPN epitaxial planar type darlington

For low-frequency output amplification

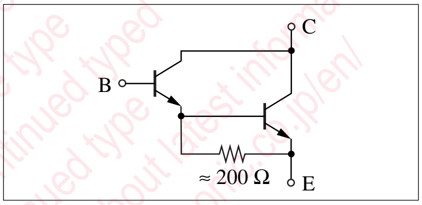


■ Features

- Forward current transfer ratio h_{FE} is designed high, which is appropriate to the driver circuit of motors and printer hammer: h_{FE} = 4 000 to 20 000.
- A shunt resistor is omitted from the driver.
- Mini power type package, allowing downsizing of the equipment and automatic insertion through the tape packing and the magazine packing.

Marking Symbol: P

Internal Connection



■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V_{CBO}	100	V
Collector-emitter voltage (Base open)	V_{CEO}	80	V
Emitter-base voltage (Collector open)	V_{EBO}	5	V
Collector current	I_C	1	A
Peak collector current	I_{CP}	1.5	A
Collector power dissipation *	P_C	1	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Note) *: Printed circuit board: Copper foil area of 1 cm^2 or more, and the board thickness of 1.7 mm for the collector portion

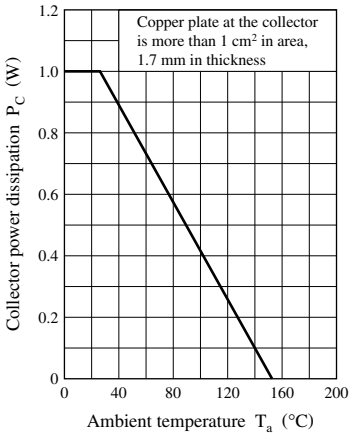
■ Electrical Characteristics T_a = 25°C ± 3°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	I_C = 100 µA, I_E = 0	100			V
Collector-emitter voltage (Base open)	V_{CEO}	I_C = 1 mA, I_B = 0	80			V
Emitter-base voltage (Collector open)	V_{EBO}	I_E = 100 µA, I_C = 0	5			V
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = 25 V, I_E = 0			100	nA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = 4 V, I_C = 0			100	nA
Forward current transfer ratio *1, 2	h_{FE}	V_{CE} = 10 V, I_C = 1 A	4 000		40 000	—
Collector-emitter saturation voltage *1	$V_{CE(sat)}$	I_C = 1 A, I_B = 1 mA			1.8	V
Base-emitter saturation voltage *1	$V_{BE(sat)}$	I_C = 1 A, I_B = 1 mA			2.2	V
Transition frequency	f_T	V_{CB} = 10 V, I_E = −50 mA, f = 200 MHz		150		MHz

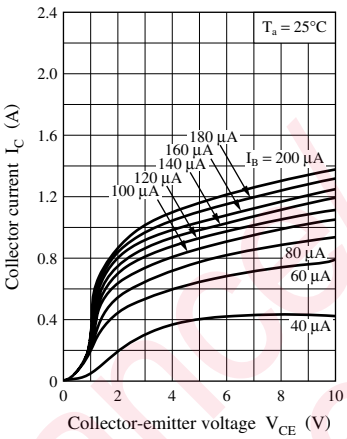
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.
2. *1: Pulse measurement
*2: Rank classification

Rank	Q	R	S
h_{FE}	4 000 to 10 000	8 000 to 20 000	16 000 to 40 000

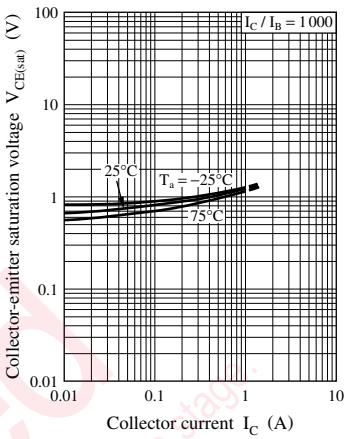
P_C — T_a



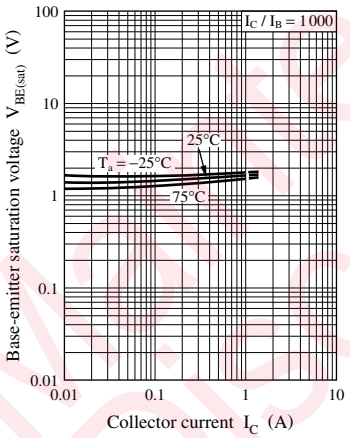
I_C — V_{CE}



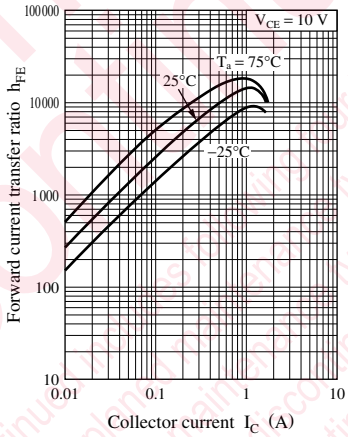
$V_{CE(sat)}$ — I_C



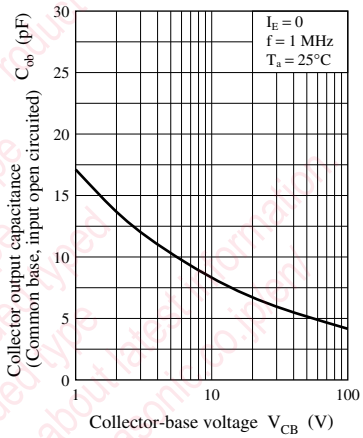
$V_{BE(sat)}$ — I_C



h_{FE} — I_C



C_{ob} — V_{CB}



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