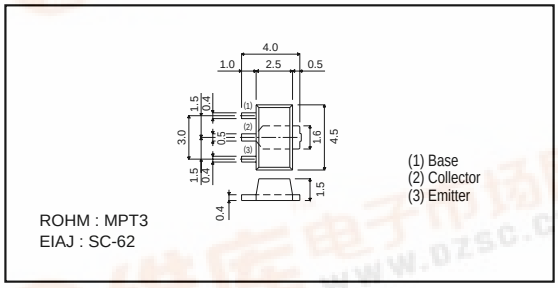
Medium Power Transistor (Motor, Relay drive) (90 $^{+20}_{-10}$, 2A)

2SD2170

●Features

1) Built-in zener diode between collector and base.
2) Zener diode has low dispersion.
3) Strong protection against reverse power surges due to "L" loads.
4) Darlington connection for high DC current gain.
5) Built-in resistor between base and emitter.
6) Built-in damper diode.

●External dimensions (Unit : mm)



●Absolute maximum ratings (Ta=25°C)

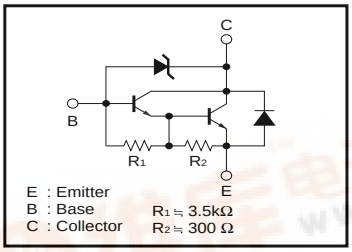
Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	90 $^{+20}_{-10}$	V
Collector-emitter voltage	V_{CEO}	90 $^{+20}_{-10}$	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	2	A (DC)
		3	A (Pulse)
Collector power dissipation	P_C	0.5 ∗1	W
		2 ∗2	
Junction temperature	Tj	150	°C
Storage temperature	Tstg	−55 to +150	°C

∗1 Single pulse Pw=10ms,Duty=1/2
∗2 When mounted on a 40 x 40 x 0.7 mm ceramic board.

●Packaging specifications and h_{FE}

Type	2SD2170
Package	MPT3
h_{FE}	1k to 10k
Marking	DM
Code	T100
Basic ordering unit (pieces)	1000

●Equivalent circuit



●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
Collector-base breakdown voltage	BV_{CBO}	80	–	110	V	I_C=50μA	
Collector-emitter breakdown voltage	BV_{CEO}	80	–	110	V	I_C=1mA	
Collector cutoff current	I_{CBO}	–	–	10	μA	V_{CB}=70V	
Emitter cutoff current	I_{EBO}	–	–	3	mA	V_{EB}=5V	
Collector-emitter saturation voltage	$V_{CE(sat)}$	–	–	1.5	V	I_C/I_B=1A/1mA	∗1
DC current transfer ratio	h_{FE}	1000	–	10000	–	V_{CE}=2V , I_C=1A	∗1
Transition frequency	f_T	–	80	–	MHz	V_{CE}=5V , I_E=−0.1A , f=30MHz	∗2
Output capacitance	Cob	–	25	–	pF	V_{CB}=10V , I_E=0A , f=1MHz	

∗1 Measure using pulse current. ∗2 Transition frequency of the device.

●**Electrical characteristic curves**

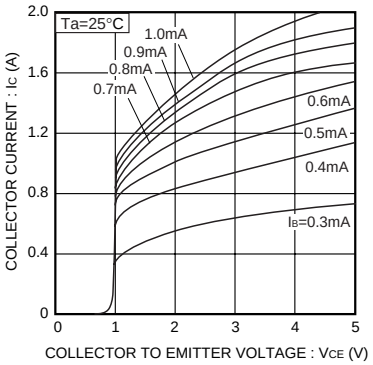


Fig.1 Grounded emitter output characteristics

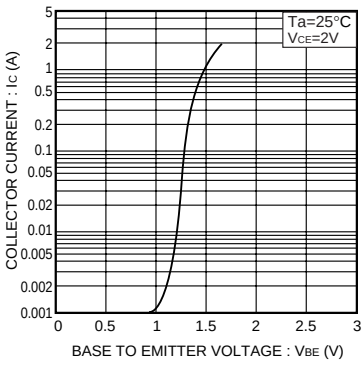


Fig.2 Grounded emitter propagation characteristics

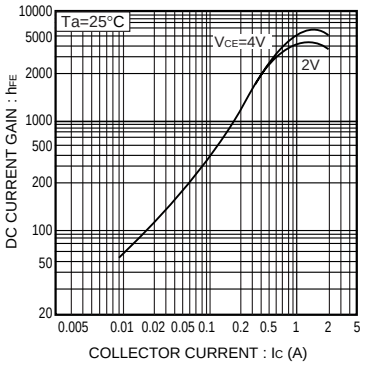


Fig.3 DC current gain vs. collector current

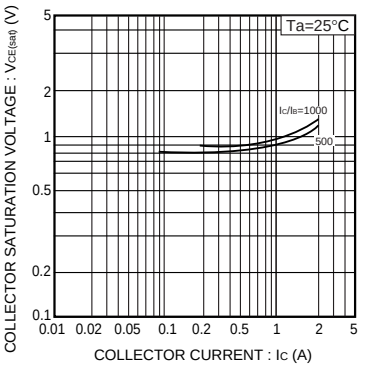


Fig.4 Collector-emitter saturation voltage vs. collector current

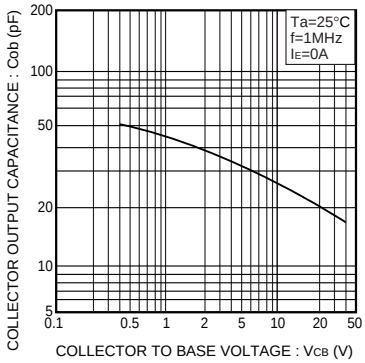


Fig.5 Collector output capacitance vs. collector-base voltage

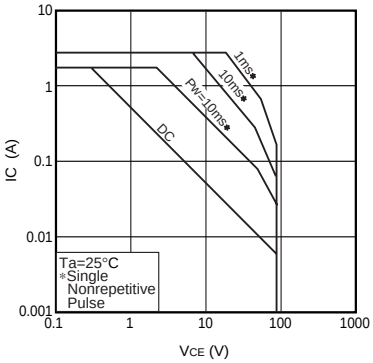


Fig.6 Safe operating area

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