

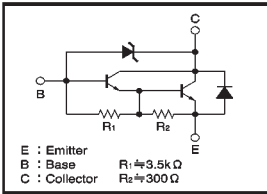
Medium Power Transistor (Motor, Relay or Solenoid drive) ($60\pm 10\text{V}$, 2A)

2SD2212 / 2SD2143 / 2SD1866 / 2SD1764

●Features

- 1) Built-in zener diode between collector and base.
- 2) Strong protection against reverse surges due to "L" loads.
- 3) Built-in resistor between base and emitter.
- 4) Built-in damper diode.

●Circuit diagram

●Absolute maximum ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CB0}	60 ± 10	V
Collector-emitter voltage	V_{CE0}	60 ± 10	V
Emitter-base voltage	V_{EB0}	6	V
Collector current	I_C	2	A (DC)
		3	A (Pulse) *1
		2	W *2
		10	W ($T_c=25^\circ\text{C}$)
Collector power dissipation	P_C	1	W *3
		20	W ($T_c=25^\circ\text{C}$)
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55\sim +150$	$^\circ\text{C}$

*1 Single pulse $P_w=100\text{ms}$ *2 When mounted on a $40\times 40\times 0.7\text{mm}$ ceramic board.
*3 Printed circuit board 1.7mm thick, collector plating 1cm^2 or larger.

●Packaging specifications and hFE

Type	2SD2212	2SD2143	2SD1866	2SD1764
Package	MPT3	CPT3	ATV	TO-220FP
hFE	$1\text{k}\sim 10\text{k}$	$1\text{k}\sim 10\text{k}$	$1\text{k}\sim 10\text{k}$	$1\text{k}\sim 10\text{k}$
Code	T100	TL	TV2	—
Basic ordering unit (pieces)	1000	2500	2500	500

●Electrical characteristics ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	50	—	70	V	$I_C=50\mu\text{A}$
Collector-emitter breakdown voltage	BV_{CEO}	50	—	70	V	$I_C=5\text{mA}$
Collector cutoff current	I_{CBO}	—	—	1.0	μA	$V_{CB}=40\text{V}$
Emitter cutoff current	I_{EBO}	—	—	3	mA	$V_{EB}=5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	$I_C/I_E=1\text{A/1mA}$ *
DC current transfer ratio	hFE	1000	—	10000	—	$V_{CE}=2\text{V}$, $I_C=1\text{A}$
Output capacitance	C_{ob}	—	25	—	pF	$V_{CB}=10\text{V}$, $I_E=0\text{A}$, $f=1\text{MHz}$

* Measured using pulse current.

(96-762-D84)

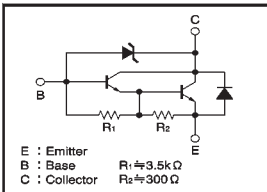
Medium Power Transistor (Motor, Relay or Solenoid drive) ($60\pm 10\text{V}$, 5A)

2SD1856

●Features

- 1) Built-in zener diode between collector and base.
- 2) Strong protection against reverse surges due to "L" loads.
- 3) Built-in resistor between base and emitter.
- 4) Built-in damper diode.

●Circuit diagram

●Absolute maximum ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CB0}	60 ± 10	V
Collector-emitter voltage	V_{CE0}	60 ± 10	V
Emitter-base voltage	V_{EB0}	6	V
Collector current	I_C	5	A (DC)
		10	A (Pulse) *
Collector power dissipation	P_C	2	W
		25	W ($T_c=25^\circ\text{C}$)
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55\sim +150$	$^\circ\text{C}$

* Single pulse $P_w=10\text{ms}$

●Packaging specifications and hFE

Type	2SD1856
Package	TO-220FP
hFE	$2\text{k}\sim 30\text{k}$
Code	—
Basic ordering unit (pieces)	500

●Electrical characteristics ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	50	—	70	V	$I_C=50\mu\text{A}$
Collector-emitter breakdown voltage	BV_{CEO}	50	—	70	V	$I_C=5\text{mA}$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB}=40\text{V}$
Emitter cutoff current	I_{EBO}	—	—	3	mA	$V_{EB}=5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	$I_C/I_E=2\text{A/2mA}$ *
DC current transfer ratio	hFE	2000	—	30000	—	$V_{CE}/I_C=3\text{V/2A}$ *
Output capacitance	C_{ob}	—	75	—	pF	$V_{CB}=10\text{V}$, $I_E=0\text{A}$, $f=1\text{MHz}$

* Measured using pulse current.

(94L-885-D87)