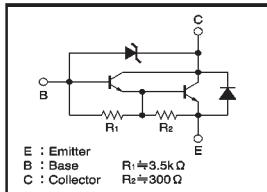


# Medium Power Transistor (Motor, Relay or Solenoid drive) (60±10V, 2A)

## 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****Electrical characteristics (Ta=25°C)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CBO</sub>	50	—	70	V	I <sub>c</sub> =50μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	50	—	70	V	I <sub>c</sub> =5mA
Collector cutoff current	I <sub>CEO</sub>	—	—	1.0	μA	V <sub>ce</sub> =40V
Emitter cutoff current	I <sub>EOB</sub>	—	—	3	mA	V <sub>eb</sub> =5V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	—	—	1.5	V	I <sub>c</sub> /I <sub>e</sub> =1A/1mA
DC current transfer ratio	h <sub>FE</sub>	1000	—	10000	—	V <sub>ce</sub> =2V, IC=1A
Output capacitance	C <sub>ob</sub>	—	25	—	pF	V <sub>ce</sub> =10V, IE=0A, f=1MHz

\* Measured using pulse current.

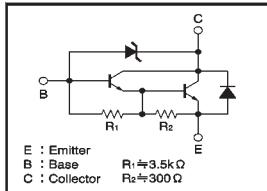
(96-762-D84)

# Medium Power Transistor (Motor, Relay or Solenoid drive) (60±10V, 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****Electrical characteristics (Ta=25°C)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CBO</sub>	50	—	70	V	I <sub>c</sub> =50μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	50	—	70	V	I <sub>c</sub> =5mA
Collector cutoff current	I <sub>CEO</sub>	—	—	10	μA	V <sub>ce</sub> =40V
Emitter cutoff current	I <sub>EOB</sub>	—	—	3	mA	V <sub>eb</sub> =5V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	—	—	1.5	V	I <sub>c</sub> /I <sub>e</sub> =2A/2mA
DC current transfer ratio	h <sub>FE</sub>	2000	—	30000	—	V <sub>ce</sub> /I <sub>c</sub> =3V/2A
Output capacitance	C <sub>ob</sub>	—	75	—	pF	V <sub>ce</sub> =10V, I <sub>e</sub> =0A, f=1MHz

\* Measured using pulse current.

(94L-885-D87)