

# Medium Power Transistor (Motor or Relay drive)

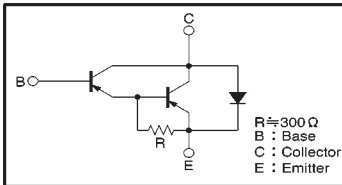
## (-80V, -4A)

### 2SB1616

#### ●Features

- 1) Darlington connection for a high  $h_{FE}$ .
- 2) Built-in resistor between base and emitter.
- 3) Built-in damper diode.
- 4) Complements the 2SD2478.

#### ●Circuit diagram



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	$BV_{CEO}$	-80	—	—	V	$I_C = -1\text{mA}$
Collector-base breakdown voltage	$BV_{CBO}$	-80	—	—	V	$I_C = -50\mu\text{A}$
Emitter-base breakdown voltage	$BV_{EBO}$	-7	—	—	V	$I_E = -50\mu\text{A}$
Collector cutoff current	$I_{CBO}$	—	—	-10	$\mu\text{A}$	$V_{CE} = -80\text{V}$
Emitter cutoff current	$I_{EBO}$	—	—	-10	$\mu\text{A}$	$V_{EB} = -5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	-1.5	—	V	$I_C/I_E = -2\text{A}/-4\text{mA}$ *1
DC current transfer ratio	$h_{FE}$	1000	—	10000	—	$V_{CE}/I_C = -3\text{V}/-2\text{A}$ *1
Transition frequency	$f_T$	—	20	—	MHz	$V_{CE} = 5\text{V}$ , $I_E = -50\text{mA}$ , $f = 5\text{MHz}$ *2
Output capacitance	$C_{ob}$	—	22	—	pF	$V_{CB} = -10\text{V}$ , $I_E = 0\text{A}$ , $f = 1\text{MHz}$

\*1 Measured using pulse current.

\*2 Transition frequency of the device.

(SPEC-B426)

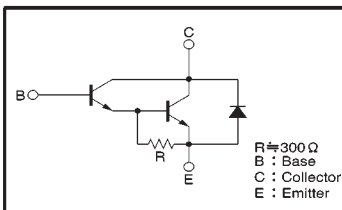
# Power Transistor (80V, 4A)

### 2SD2478

#### ●Features

- 1) Darlington connection for a high  $h_{FE}$ .
- 2) Built-in resistor between base and emitter.
- 3) Built-in damper diode.
- 4) Complements the 2SB1616.

#### ●Circuit diagram



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	80	—	—	V	$I_C = 50\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CEO}$	80	—	—	V	$I_C = -1\text{mA}$
Collector cutoff current	$I_{CBO}$	—	—	100	$\mu\text{A}$	$V_{CB} = 80\text{V}$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu\text{A}$	$V_{EB} = 5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	-1.5	—	V	$I_C/I_E = 2\text{A}/4\text{mA}$ *1
DC current transfer ratio	$h_{FE}$	1000	—	10000	—	$V_{CE}/I_C = 3\text{V}/2\text{A}$ *1
Transition frequency	$f_T$	—	40	—	MHz	$V_{CE} = -5\text{V}$ , $I_E = 0.5\text{A}$ , $f = 10\text{MHz}$ *2
Output capacitance	$C_{ob}$	—	35	—	pF	$V_{CB} = 10\text{V}$ , $I_E = 0\text{A}$ , $f = 1\text{MHz}$

\*1 Measured using pulse current.

\*2 Transition frequency of the device.

(94L-1129-D426)

#### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	-80	V
Collector-emitter voltage	$V_{CEO}$	-80	V
Emitter-base voltage	$V_{EBO}$	-7	V
Collector current	$I_C$	-4	A
	$I_{CP}$	-6	A (Pulse) *
Collector power dissipation	$P_C$	2	W (Ta=25°C)
		30	W (Tc=25°C)
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{stg}$	-55~+150	°C

\* Single pulse.  $P_w = 100\text{ms}$ 

#### ●Packaging specifications and hFE

Type	2SB1616
Package	TO-220FP
$h_{FE}$	1k~10k
Code	—
Basic ordering unit (pieces)	500

#### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	80	V
Collector-emitter voltage	$V_{CEO}$	80	V
Emitter-base voltage	$V_{EBO}$	7	V
Collector current	$I_C$	4	A (DC)
	$I_{CP}$	6	A (t=100ms)
Collector power dissipation	$P_C$	2	W
		30	W (Tc=25°C)
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{stg}$	-55~+150	°C

#### ●Packaging specifications and hFE

Type	2SD2478
Package	TO-220FP
$h_{FE}$	1k~10k
Code	—
Basic ordering unit (pieces)	500

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