# Power Transistor (−160V, −1.5A)

## 2SB1275 / 2SB1236A / 2SB1569A / 2SB1186A

### ●Features

1) High breakdown voltage. ($BV_{CEO}$=−160V)
2) Low collector output capacitance. (Typ. 30pF at $V_{CB}$=10V)
3) High transition frequency. ($f_T$=50MHz)
4) Complements the 2SD1918 / 2SD1857A / 2SC2400A / 2SD1763A.

### ●Packaging specifications and $h_{FE}$

| Type | 2SB1275 | 2SB1236A | 2SB1569A | 2SB1186A |
|---|---|---|---|---|
| Package | CPT3 | ATV | TO-220FN | TO-220FP |
| $h_{FE}$ | NP | PQ | E | DE |
| Code | TL | TV2 | — | — |
| Basic ordering unit (pieces) | 2500 | 2500 | 500 | 500 |

### ●Absolute maximum ratings (Ta=25℃)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | −160 | V |
| Collector-emitter voltage | | $V_{CEO}$ | −160 | V |
| Emitter-base voltage | | $V_{EBO}$ | −5 | V |
| Collector current | | $I_C$ | −1.5 | A (DC) |
| | | | −3 | A (Pulse) ✻1 |
| Collector power dissipation | 2SB1275 | $P_C$ | 1 | W (Tc=25℃) |
| | | | 10 | |
| | 2SB1236A | | 1 | W ✻2 |
| | 2SB1569A,2SB1186A | | 2 | W |
| | | | 20 | W (Tc=25℃) |
| Junction temperature | | Tj | 150 | ℃ |
| Storage temperature | | Tstg | −55～+150 | ℃ |

✻1 Single pulse Pw=100ms
✻2 Printed circuit board 1.7mm thick, collector plating 1cm² or larger.

### ●Electrical characteristics (Ta=25℃)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | | $BV_{CBO}$ | −160 | — | — | V | $I_C$=−50 μA |
| Collector-emitter breakdown voltage | | $BV_{CEO}$ | −160 | — | — | V | $I_C$=−1mA |
| Emitter-base breakdown voltage | | $BV_{EBO}$ | −5 | — | — | V | $I_E$=−50 μA |
| Collector cutoff current | | $I_{CBO}$ | — | — | −1 | μA | $V_{CB}$=−120V |
| Emitter cutoff current | | $I_{EBO}$ | — | — | −1 | μA | $V_{EB}$=−4V |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | — | — | −2 | V | $I_C$/$I_B$=−1A/−0.1A ✻ |
| Base-emitter saturation voltage | | $V_{BE(sat)}$ | — | — | −1.5 | V | $I_C$/$I_B$=−1A/−0.1A ✻ |
| DC current transfer ratio | 2SB1275 | $h_{FE}$ | 56 | — | 180 | — | $V_{CE}$=−5V, $I_C$=−1A |
| | 2SB1236A | | 82 | — | 270 | — | |
| | 2SB1569A | | 100 | — | 200 | — | |
| | 2SB1186A | | 60 | — | 200 | — | |
| Transition frequency | | fr | — | 50 | — | MHz | $V_{CE}$=−5V, $I_E$=0.1A, f=30MHz |
| Output capacitance | | Cob | — | 30 | — | pF | $V_{CB}$=−10V, $I_E$=0A, f=1MHz |

✻ Measured using pulse current.

(96-612-A58)

# Power Transistor (160V, 1.5A)

## 2SD2211 / 2SD1918 / 2SD1857A / 2SD2400A / 2SD1763A

### ●Features

1) High breakdown voltage. ($BV_{CEO}$=160V)
2) Low collector output capacitance. (Typ. 20pF at $V_{CB}$=10V)
3) High transition frequency. ($f_T$=80MHz)
4) Complements the 2SB1275 / 2SB1236A / 2SB1569A / 2SB1186A.

### ●Packaging specifications and $h_{FE}$

| Type | 2SD2211 | 2SD1918 | 2SD1857A | 2SD2400A | 2SD1763A |
|---|---|---|---|---|---|
| Package | MPT3 | CPT3 | ATV | TO-220FN | TO-220FP |
| $h_{FE}$ | Q | Q | PQ | E | DE |
| Marking | DQ✻ | — | — | — | — |
| Code | T100 | TL | TV2 | — | — |
| Basic ordering unit (pieces) | 1000 | 2500 | 2500 | 500 | 500 |

✻Denotes $h_{FE}$

### ●Absolute maximum ratings (Ta=25℃)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | 160 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 160 | V |
| Emitter-base voltage | | $V_{EBO}$ | 5 | V |
| Collector current | | $I_C$ | 1.5 | A (DC) |
| | | | 3 | A (Pulse) ✻1 |
| Collector power dissipation | 2SD1857A | $P_C$ | 1 | W ✻2 |
| | 2SD2211 | | 2 | W ✻3 |
| | 2SD1918 | | 1 | |
| | | | 10 | W (Tc=25℃) |
| | 2SD2400A,2SD1763A | | 2 | W |
| | | | 20 | W (Tc=25℃) |
| Junction temperature | | Tj | 150 | ℃ |
| Storage temperature | | Tstg | −55～+150 | ℃ |

✻1 Single pulse Pw=100ms
✻2 Printed circuit board 1.7mm thick, collector plating 1cm² or larger.
✻3 When mounted on a 40 x 40 x 0.7mm ceramic board.

### ●Electrical characteristics (Ta=25℃)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | | $BV_{CBO}$ | 160 | — | — | V | $I_C$=50 μA |
| Collector-emitter breakdown voltage | | $BV_{CEO}$ | 160 | — | — | V | $I_C$=1mA |
| Emitter-base breakdown voltage | | $BV_{EBO}$ | 5 | — | — | V | $I_E$=50 μA |
| Collector cutoff current | | $I_{CBO}$ | — | — | 1 | μA | $V_{CB}$=120V |
| Emitter cutoff current | | $I_{EBO}$ | — | — | 1 | μA | $V_{EB}$=4V |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | — | — | 2 | V | $I_C$/$I_B$=1A/0.1A ✻ |
| Base-emitter saturation voltage | | $V_{BE(sat)}$ | — | — | 1.5 | V | $I_C$/$I_B$=1A/0.1A ✻ |
| DC current transfer ratio | 2SD2211,2SD1918 | $h_{FE}$ | 120 | — | 390 | — | $V_{CE}$/$I_C$=5V/0.1A |
| | 2SD1857A | | 82 | — | 270 | — | |
| | 2SD2400A | | 100 | — | 200 | — | |
| | 2SD1763A | | 60 | — | 200 | — | |
| Transition frequency | | fr | — | 80 | — | MHz | $V_{CE}$=5V, $I_E$=−0.1A, f=30MHz |
| Output capacitance | | Cob | — | 20 | — | pF | $V_{CB}$=10V, $I_E$=0A, f=1MHz |

✻ Measured using pulse current.

(96-744-C58)