

# 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 / 2SD2400A / 2SD1763A.

●Packaging specifications and hfe

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

●Electrical characteristics (Ta=25°C)

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

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

\* Denotes hFE

●Electrical characteristics (Ta=25°C)

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

\* Measured using pulse current.

●Absolute maximum ratings (Ta=25°C)

| 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 | $P_C$     | 1      | W ( $T_C = 25^\circ C$ ) |            |
|                             |           | 10     |                          |            |
|                             |           | 1      | W *2                     |            |
|                             |           | 2      |                          |            |
| Junction temperature        |           | TJ     | 150                      | $^\circ C$ |
| Storage temperature         |           | Tstg   | -55 ~ +150               | $^\circ C$ |

\*1 Single pulse  $P_w = 100ms$

\*2 Printed circuit board 1.7mm thick, collector plating  $1cm^2$  or larger.

●Absolute maximum ratings (Ta=25°C)

| 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 | $P_C$     | 1      | W *2         |            |
|                             |           | 2      |              |            |
|                             |           | 1      | W *3         |            |
|                             |           | 10     |              |            |
|                             |           | 2      |              |            |
| Junction temperature        |           | TJ     | 150          | $^\circ C$ |
| Storage temperature         |           | Tstg   | -55 ~ +150   | $^\circ C$ |

\*1 Single pulse  $P_w = 100ms$

\*2 Printed circuit board 1.7mm thick, collector plating  $1cm^2$  or larger.

\*3 When mounted on a  $40 \times 40 \times 0.7mm$  ceramic board.

(96-744-C58)