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

## 2SD2212 / 2SD2143 / 2SD1866

### ●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.

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

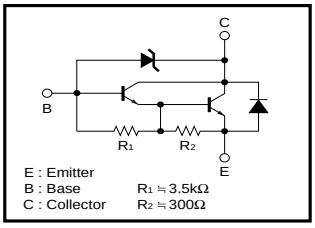
| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | 60±10 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 60±10 | V |
| Emitter-base voltage | | $V_{EBO}$ | 6 | V |
| Collector current | | $I_C$ | 2 | A (DC) |
| | | | 3 *1 | A (Pulse) |
| Collector power dissipation | 2SD2212 | $P_C$ | 0.5 | W |
| | | | 2 *2 | |
| | 2SD2143 | | 1 | W |
| | | | 10 | W (Tc=25°C) |
| | 2SD1866 | | 1 *3 | W |
| Junction temperature | | Tj | 150 | °C |
| Storage temperature | | Tstg | −55 to +150 | °C |

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

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

| Type | 2SD2212 | 2SD2143 | 2SD1866 |
|---|---|---|---|
| Package | MPT3 | CPT3 | ATV |
| $h_{FE}$ | 1k to 10k | 1k to 10k | 1k to 10k |
| Marking | DR | – | – |
| Code | T100 | TL | TV2 |
| Basic ordering unit (pieces) | 1000 | 2500 | 2500 |

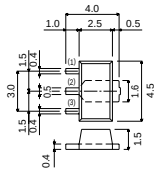
### ●Equivalent circuit




E : Emitter
B : Base
C : Collector
R1 ≒ 3.5kΩ
R2 ≒ 300Ω

### ●External dimensions (Unit : mm)

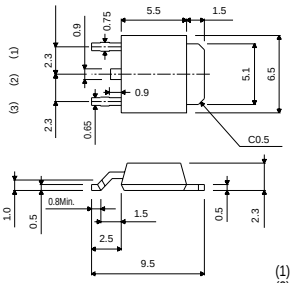
2SD2212




ROHM : MPT3
EIAJ : SC-62

(1) Base(Gate)
(2) Collector(Drain)
(3) Emitter(Source)

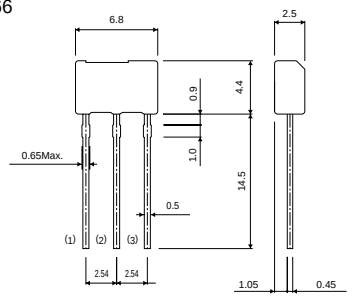
2SD2143




ROHM : CPT3
EIAJ : SC-63

(1) Base(Gate)
(2) Collector(Drain)
(3) Emitter(Source)

2SD1866




Taping specifications

ROHM : ATV

(1) Emitter
(2) Collector
(3) Base

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | $BV_{CBO}$ | 50 | – | 70 | V | $I_C$=50μA |
| Collector-emitter breakdown voltage | $BV_{CEO}$ | 50 | – | 70 | V | $I_C$=5mA |
| Collector cutoff current | $I_{CBO}$ | – | – | 1.0 | μA | $V_{CB}$=40V |
| Emitter cutoff current | $I_{EBO}$ | – | – | 3 | mA | $V_{EB}$=5V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | – | – | 1.5 | V | $I_C/I_B$=1A/1mA ＊ |
| DC current transfer ratio | $h_{FE}$ | 1000 | – | 10000 | – | $V_{CE}$=2V, $I_C$=1A |
| Transition frequency | $f_T$ | – | 80 | – | MHz | $V_{CE}$=5V, $I_E$= –0.1A, f=30MHz |
| Output capacitance | Cob | – | 25 | – | pF | $V_{CB}$=10V, $I_E$=0A, f=1MHz |

＊ Measured using pulse current.

## ●Electrical characteristics curves

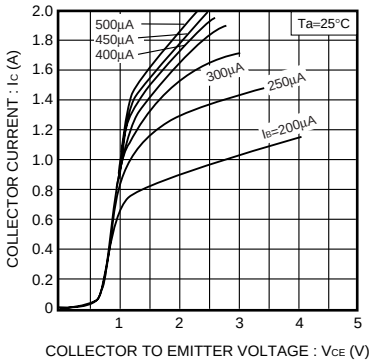



Fig.1 Groundede emitter output characteristics ( I )

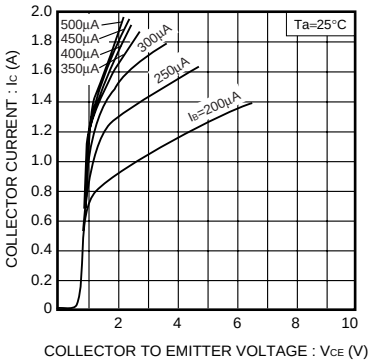



Fig.2 Grounded emitter output characteristics ( II )

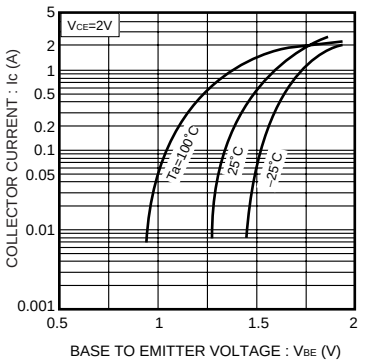



Fig.3 Grounded emitter propagation characteristics

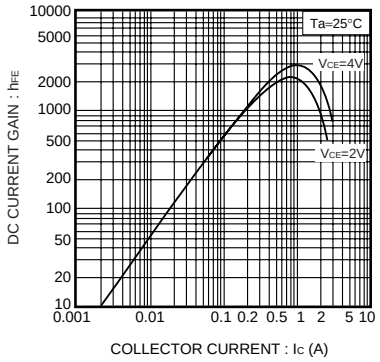



Fig.4 DC current gain vs. collector current ( I )

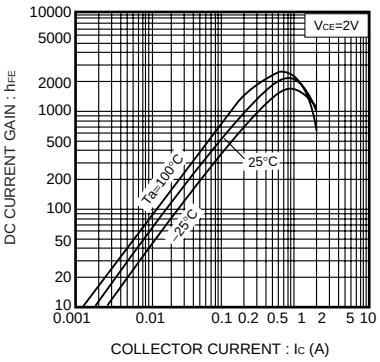



Fig.5 DC current gain vs. collector current ( II )

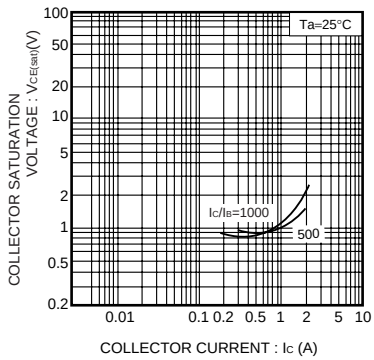



Fig.6 Collector-emitter saturation voltage vs. collector current

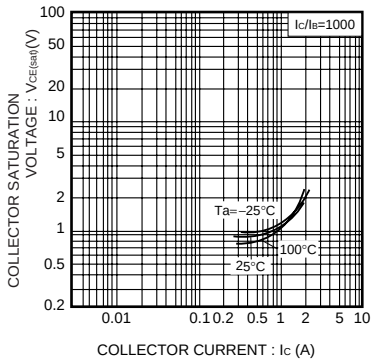



Fig.7 Collector-emitter saturation voltage vs. collector current

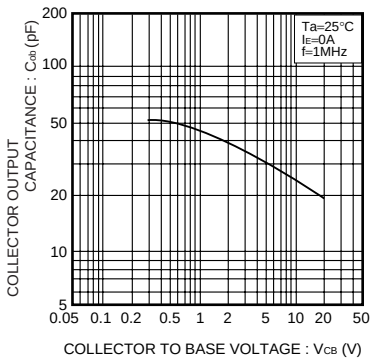



Fig.8 Collector output capacitance vs. collector-base voltage

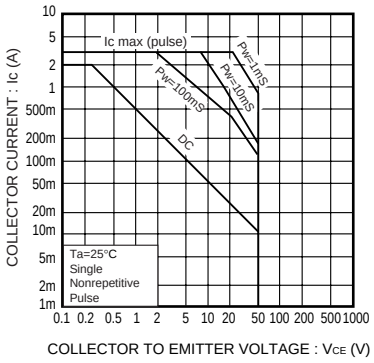



Fig.9 Safe operating area (A. S. O) 2SD2212 (MPT)

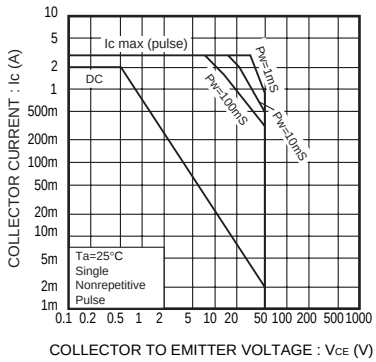



Fig.10 Safe operating area (A. S. O) 2SD2143 (CPT)

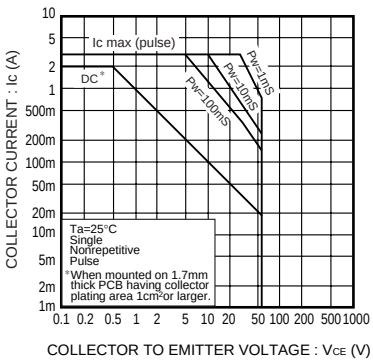



Fig.11 Safe operating area (A. S. O) 2SD1866 (ATV)

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