



## NPN BDW83, BDW83A, BDW83B, BDW83C, BDW83D,

### NPN SILICON DARLINGTONS POWER TRANSISTORS

They are silicon epitaxial-base NPN power monolithic Darlington transistor mounted in Jedec TO-218 plastic package.

They are intended for use in power linear and switching applications.

The complementary are BDW84, BDW84A, BDW84B, BDW84C, BDW84D

Compliance to RoHS.

#### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Ratings                    |                           |        | Value       | Unit |
|-----------|----------------------------|---------------------------|--------|-------------|------|
| $V_{CEO}$ | Collector-Emitter Voltage  | $I_B = 0$                 | BDW83  | 45          | V    |
|           |                            |                           | BDW83A | 60          |      |
|           |                            |                           | BDW83B | 80          |      |
|           |                            |                           | BDW83C | 100         |      |
|           |                            |                           | BDW83D | 120         |      |
| $V_{CBO}$ | Collector- Emitter Voltage | $I_E = 0$                 | BDW83  | 45          | V    |
|           |                            |                           | BDW83A | 60          |      |
|           |                            |                           | BDW83B | 80          |      |
|           |                            |                           | BDW83C | 100         |      |
|           |                            |                           | BDW83D | 120         |      |
| $V_{EBO}$ | Emitter-Base Voltage       | $I_C = 0$                 |        | 5           | V    |
| $I_C$     | Collector Current          |                           |        | 15          | A    |
| $I_B$     | Base Current               |                           |        | 0.5         | A    |
| $P_t$     | Total Power Dissipation    | 25°C case temperatur      |        | 150         | W    |
|           |                            | 25°C free aire temperatur |        | 3.5         |      |
| $T_J$     | Junction Temperature       |                           |        | -65 to +150 | °C   |
| $T_{Stg}$ | Storage Temperature        |                           |        | -65 to +150 | °C   |

#### THERMAL CHARACTERISTICS

| Symbol     | Ratings                                 | Value | Unit |
|------------|-----------------------------------------|-------|------|
| $R_{thJC}$ | Junction to Case Thermal Resistance     | 0.83  | °C/W |
| $R_{thJA}$ | Junction to Free Air Thermal Resistance | 35.7  |      |

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### ELECTRICAL CHARACTERISTICS

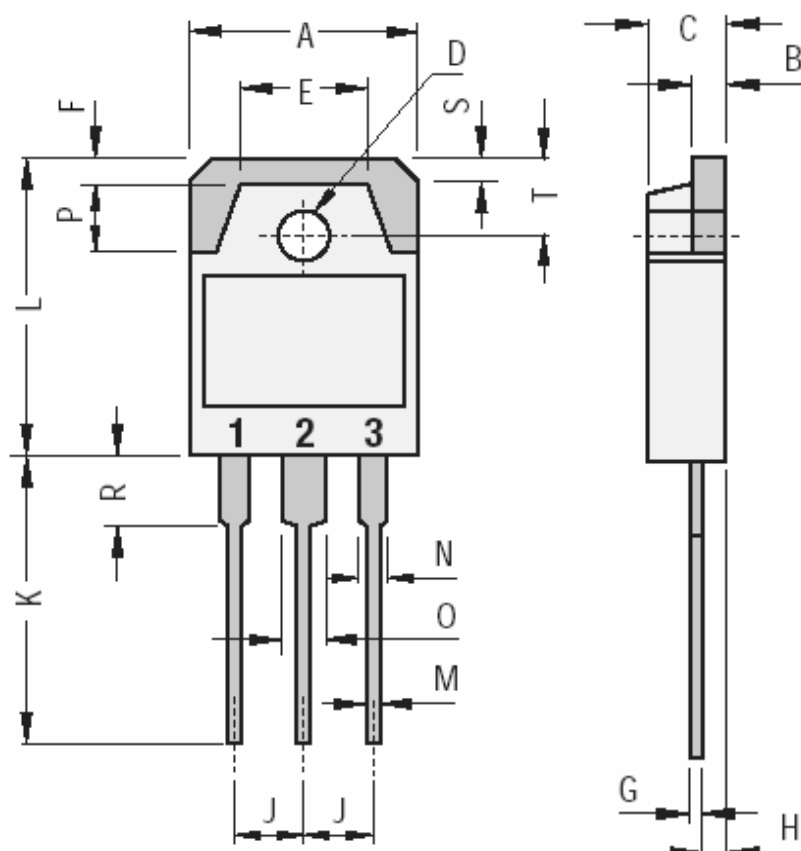
TC=25°C unless otherwise noted

| Symbol         | Ratings                                  | Test Condition(s)                                                                                                        |        | Min | Typ | Max  | Unit          |
|----------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------|-----|-----|------|---------------|
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage (*) | $I_C=30\text{ mA}$<br>$I_B=0$                                                                                            | BDW83  | 45  | -   | -    | V             |
|                |                                          |                                                                                                                          | BDW83A | 60  | -   | -    |               |
|                |                                          |                                                                                                                          | BDW83B | 80  | -   | -    |               |
|                |                                          |                                                                                                                          | BDW83C | 100 | -   | -    |               |
|                |                                          |                                                                                                                          | BDW83D | 120 | -   | -    |               |
| $I_{CEO}$      | Collector Cutoff Current                 | $I_B=0, V_{CE}=30\text{ V}$                                                                                              | BDW83  | -   | -   | 1    | mA            |
|                |                                          | $I_B=0, V_{CE}=30\text{ V}$                                                                                              | BDW83A |     |     |      |               |
|                |                                          | $I_B=0, V_{CE}=40\text{ V}$                                                                                              | BDW83B |     |     |      |               |
|                |                                          | $I_B=0, V_{CE}=50\text{ V}$                                                                                              | BDW83C |     |     |      |               |
|                |                                          | $I_B=0, V_{CE}=60\text{ V}$                                                                                              | BDW83D |     |     |      |               |
| $I_{CBO}$      | Collector Cutoff Current                 | $I_E=0, V_{CB}=45\text{ V}$                                                                                              | BDW83  | -   | -   | 0.5  | mA            |
|                |                                          | $I_E=0, V_{CB}=60\text{ V}$                                                                                              | BDW83A |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=80\text{ V}$                                                                                              | BDW83B |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=100\text{ V}$                                                                                             | BDW83C |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=120\text{ V}$                                                                                             | BDW83D |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=45\text{ V}$<br>$T_{case}=150^{\circ}\text{C}$                                                            | BDW83  | -   | -   | 5    |               |
|                |                                          | $I_E=0, V_{CB}=60\text{ V}$<br>$T_{case}=150^{\circ}\text{C}$                                                            | BDW83A |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=80\text{ V}$<br>$T_{case}=150^{\circ}\text{C}$                                                            | BDW83B |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=100\text{ V}$<br>$T_{case}=150^{\circ}\text{C}$                                                           | BDW83C |     |     |      |               |
|                |                                          | $I_E=0, V_{CB}=120\text{ V}$<br>$T_{case}=150^{\circ}\text{C}$                                                           | BDW83D |     |     |      |               |
| $I_{EBO}$      | Emitter Cutoff Current                   | $V_{EB}=5.0\text{ V}, I_C=0$                                                                                             |        | -   | -   | 2    | mA            |
| $h_{FE}$       | DC Current Gain (*)                      | $I_C=6\text{ A}, V_{CE}=3.0\text{ V}$                                                                                    |        | 750 | -   | 20 K | -             |
|                |                                          | $I_C=15\text{ A}, V_{CE}=3.0\text{ V}$                                                                                   |        | 100 | -   | -    |               |
| $V_{CE(SAT)}$  | Collector-Emitter saturation Voltage (1) | $I_C=6\text{ A}, I_B=12\text{ mA}$                                                                                       |        | -   | -   | 2.5  | V             |
|                |                                          | $I_C=15\text{ A}, I_B=150\text{ mA}$                                                                                     |        | -   | -   | 4    |               |
| $V_{BE(on)}$   | Base-Emitter Voltage (*)                 | $I_C=6\text{ A}, I_B=3\text{ A}$                                                                                         |        | -   | -   | 2.5  |               |
| $V_{EC}$       | Parallel Diode Forward Voltage           | $I_E=15\text{ A}, I_E=0$                                                                                                 |        | -   | -   | 3.5  | V             |
| $t_{on}$       | Turn-on time                             | $I_C=10\text{ A},$<br>$I_{B1}=-I_{B2}=40\text{ mA}$<br>$R_L=3\Omega; V_{BE(off)}=-4.2\text{ V}$<br>Duty Cycle $\leq 2\%$ |        | -   | 0.9 | -    | $\mu\text{s}$ |
| $t_{off}$      | Turn-off time                            |                                                                                                                          |        | -   | 7   | -    |               |

(\*) Pulse Duration = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2\%$

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### MECHANICAL DATA CASE TO3PN Non Isolated Plastic Package



| DIMENSIONS (mm) |       |       |
|-----------------|-------|-------|
|                 | Min.  | Max.  |
| A               | 15.20 | 16.00 |
| B               | 1.90  | 2.10  |
| C               | 4.60  | 5.00  |
| D               | 3.10  | 3.30  |
| E               |       | 9.60  |
| F               |       | 2.00  |
| G               | 0.35  | 0.55  |
| H               |       | 1.40  |
| J               | 5.35  | 5.55  |
| K               | 20.00 |       |
| L               | 19.60 | 20.20 |
| M               | 0.95  | 1.25  |
| N               |       | 2.00  |
| O               |       | 3.00  |
| P               |       | 4.00  |
| R               |       | 4.00  |
| S               |       | 1.80  |
| T               | 4.80  | 5.20  |

|         |           |
|---------|-----------|
| Pin 1 : | Base      |
| Pin 2 : | Collector |
| Pin 3 : | Emitter   |

The centre pin is in electrical contact with the mounting tab.

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