

NPN power Darlington transistor

Features

- High current capability
- Fast switching speed
- High DC current gain

Applications

- Linear and switching industrial equipment

Description

The BDW83C is an epitaxial-base NPN power monolithic Darlington transistor mounted in TO-247 plastic package. It is intended for use in power linear and switching applications.

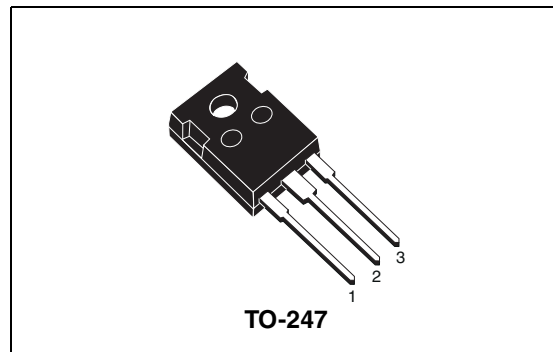


Figure 1. Internal schematic diagram

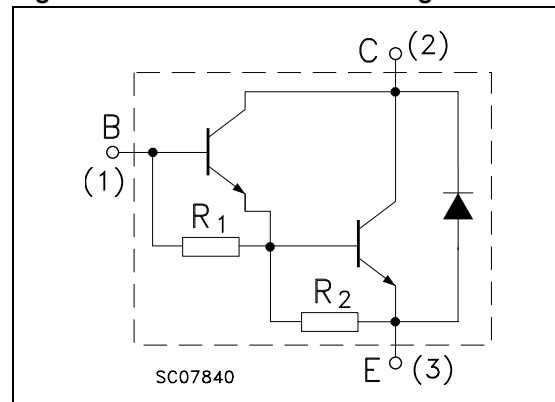


Table 1. Device summary

| Order code | Marking | Package | Packaging |
|------------|---------|---------|-----------|
| BDW83C | BDW83C | TO-247 | Tube |

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|--|------------|------------------|
| V_{CBO} | Collector-base voltage ($I_E = 0$) | 100 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 100 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 5 | V |
| I_C | Collector current | 15 | A |
| I_{CM} | Collector peak current ($t_p < 5\text{ms}$) | 40 | A |
| I_B | Base current | 0.5 | A |
| P_{TOT} | Total dissipation at $T_c \leq 25\text{ }^\circ\text{C}$ | 130 | W |
| T_{stg} | Storage temperature | -65 to 150 | $^\circ\text{C}$ |
| T_J | Max. operating junction temperature | 150 | $^\circ\text{C}$ |

Table 3. Thermal data

| Symbol | Parameter | Value | Unit |
|----------------|---|-------|---------------------------|
| $R_{thj-case}$ | Thermal resistance junction-case max | 0.96 | $^\circ\text{C}/\text{W}$ |

2 Electrical characteristics

($T_{\text{case}} = 25^{\circ}\text{C}$; unless otherwise specified)

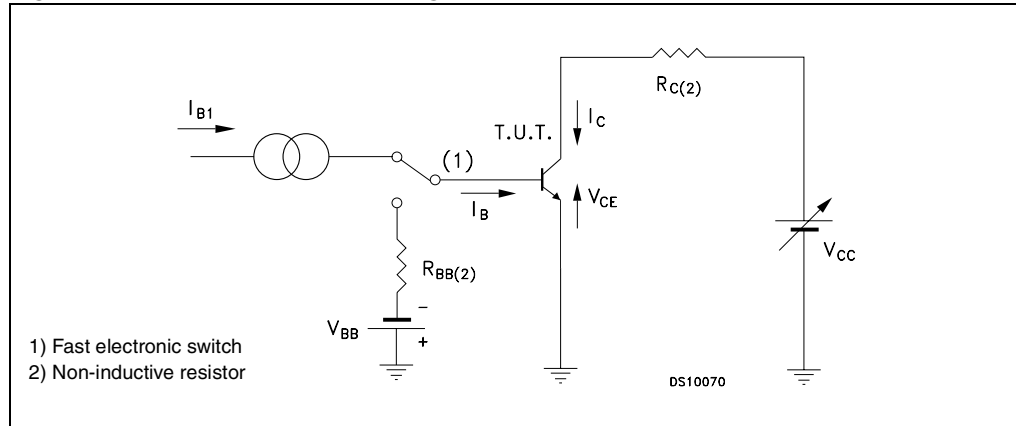
Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|--|------------|----------|----------|--------------------------------|
| I_{CBO} | Collector cut-off current ($I_{\text{E}} = 0$) | $V_{\text{CB}} = 100 \text{ V}$ $V_{\text{CB}} = 100 \text{ V} \quad T_{\text{C}} = 150^{\circ}\text{C}$ | | | 500 5 | μA mA |
| I_{CEO} | Collector cut-off current ($I_{\text{B}} = 0$) | $V_{\text{CE}} = 40 \text{ V}$ | | | 1 | mA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = 5 \text{ V}$ | | | 2 | mA |
| $V_{\text{CEO(sus)}}^{(1)}$ | Collector-emitter sustaining voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 30 \text{ mA}$ | 100 | | | V |
| $V_{\text{CE(sat)}}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 6 \text{ A} \quad I_{\text{B}} = 12 \text{ mA}$ $I_{\text{C}} = 15 \text{ A} \quad I_{\text{B}} = 150 \text{ mA}$ | | | 2.5 4 | V V |
| $V_{\text{BE(on)}}^{(1)}$ | Base-emitter on voltage | $I_{\text{C}} = 6 \text{ A} \quad V_{\text{CE}} = 3 \text{ V}$ | | | 2.5 | V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 6 \text{ A} \quad V_{\text{CE}} = 3 \text{ V}$ $I_{\text{C}} = 15 \text{ A} \quad V_{\text{CE}} = 3 \text{ V}$ | 750 100 | | 20000 | |
| V_{F} | Diode forward voltage | $I_{\text{F}} = 10 \text{ A}$ | | | 4 | V |
| t_{on} t_{off} | Resistive load Turn-on time Turn-off time | $V_{\text{CC}} = 30 \text{ V} \quad I_{\text{C}} = 10 \text{ A}$ $I_{\text{B1}} = -I_{\text{B2}} = 40 \text{ mA}$ | | 0.9 6 | | μs μs |

1. Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$.

2.1 Test circuit

Figure 2. Resistive load switching test circuit

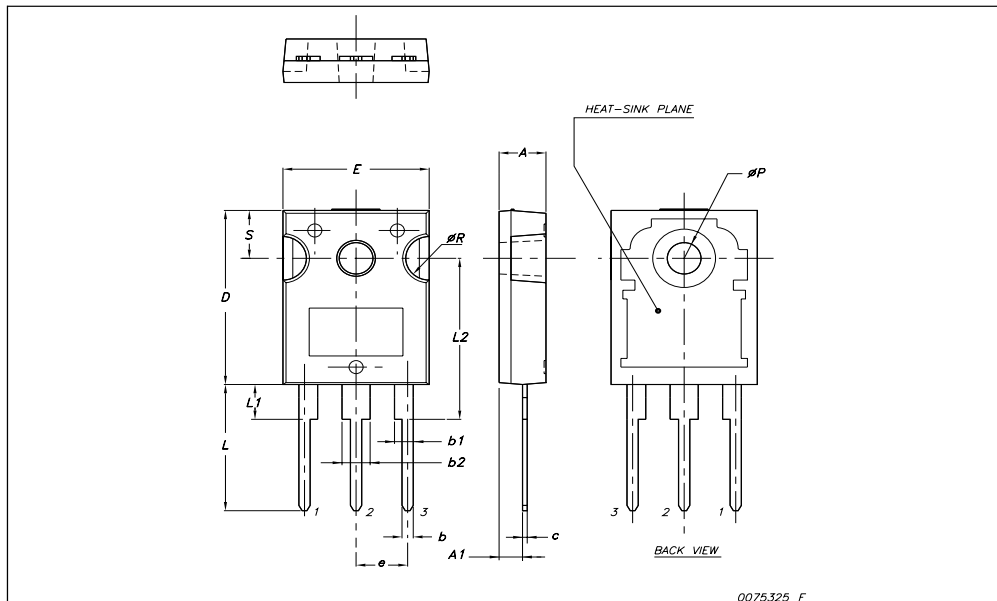


3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

TO-247 Mechanical data

| Dim. | mm. | | |
|------|-------|-------|-------|
| | Min. | Typ | Max. |
| A | 4.85 | | 5.15 |
| A1 | 2.20 | | 2.60 |
| b | 1.0 | | 1.40 |
| b1 | 2.0 | | 2.40 |
| b2 | 3.0 | | 3.40 |
| c | 0.40 | | 0.80 |
| D | 19.85 | | 20.15 |
| E | 15.45 | | 15.75 |
| e | | 5.45 | |
| L | 14.20 | | 14.80 |
| L1 | 3.70 | | 4.30 |
| L2 | | 18.50 | |
| øP | 3.55 | | 3.65 |
| øR | 4.50 | | 5.50 |
| S | | 5.50 | |



4 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------------------------------|
| 02-Jan-2000 | 4 | |
| 16-Nov-2007 | 5 | Package change from TO-218 to TO-247. |

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