

NPN power Darlington transistor

Datasheet — production data

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.

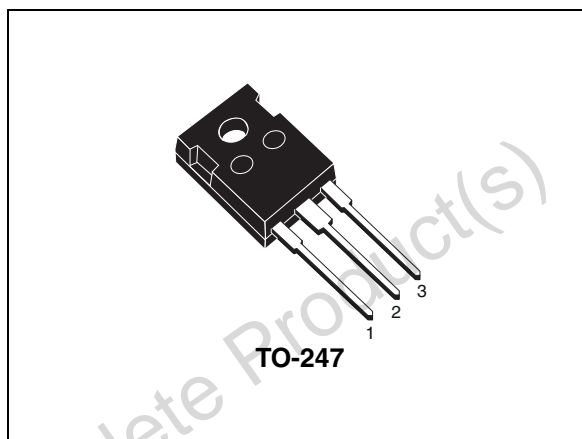


Figure 1. Internal schematic diagram

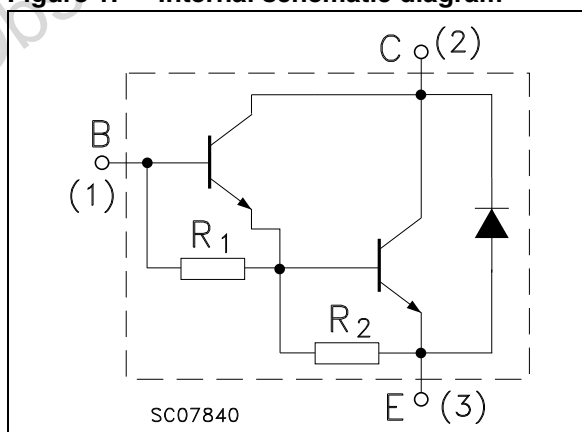


Table 1. Device summary

| 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 $T_C \leq 25\text{ °C}$ | 130 | W |
| T_{stg} | Storage temperature | -65 to 150 | °C |
| T_J | Max. operating junction temperature | 150 | °C |

Table 3. Thermal data

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

2 Electrical characteristics

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

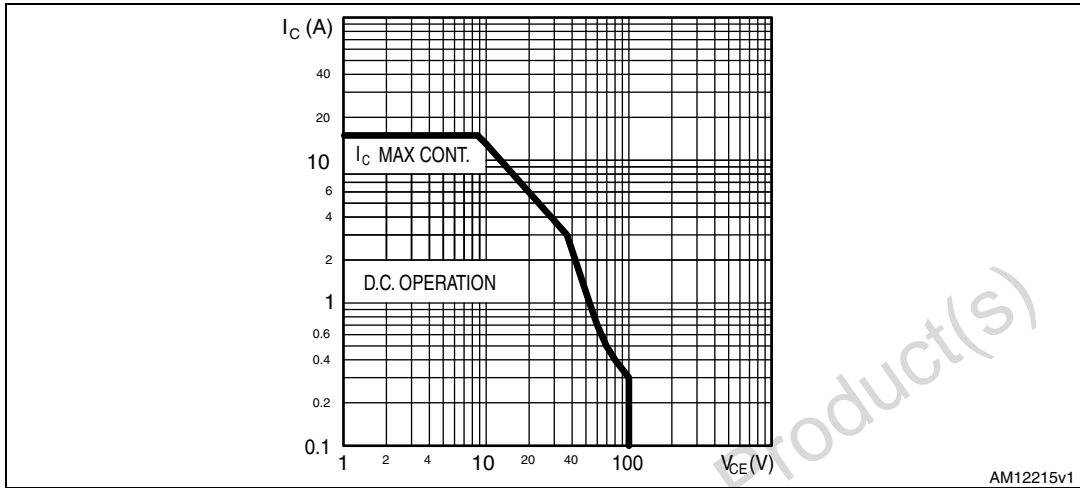
Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|--|------------|----------|----------|--------------------------------|
| I_{CBO} | Collector cut-off current ($I_{\text{E}} = 0$) | $V_{\text{CB}} = 100 \text{ V}$ $V_{\text{CB}} = 100 \text{ V}$ $T_{\text{C}} = 150^{\circ}\text{C}$ | | | 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 | $I_{\text{C}} = 6 \text{ A}$ $I_{\text{B}} = 12 \text{ mA}$ $I_{\text{C}} = 15 \text{ A}$ $I_{\text{B}} = 150 \text{ mA}$ | | | 2.5 4 | V V |
| $V_{\text{BE(on)}}^{(1)}$ | Base-emitter on voltage | $I_{\text{C}} = 6 \text{ A}$ $V_{\text{CE}} = 3 \text{ V}$ | | | 2.5 | V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 6 \text{ A}$ $V_{\text{CE}} = 3 \text{ V}$ $I_{\text{C}} = 15 \text{ A}$ $V_{\text{CE}} = 3 \text{ V}$ | 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 | $V_{\text{CC}} = 30 \text{ V}$ $I_{\text{C}} = 10 \text{ A}$ $I_{\text{B1}} = -I_{\text{B2}} = 40 \text{ mA}$ | | 0.9 6 | | μs μs |

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

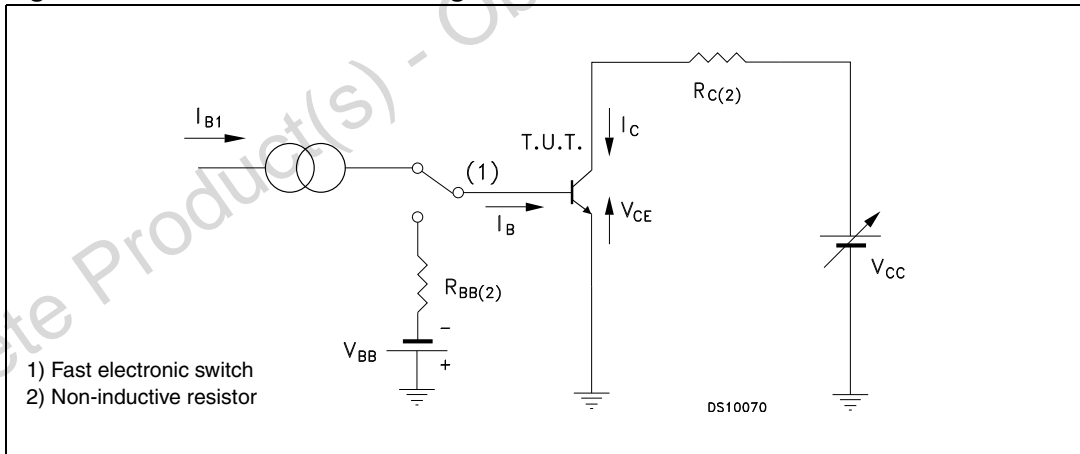
3 Electrical characteristics (curve)

Figure 2. Safe operating area



3.1 Test circuit

Figure 3. Resistive load switching test circuit



4 Package mechanical data

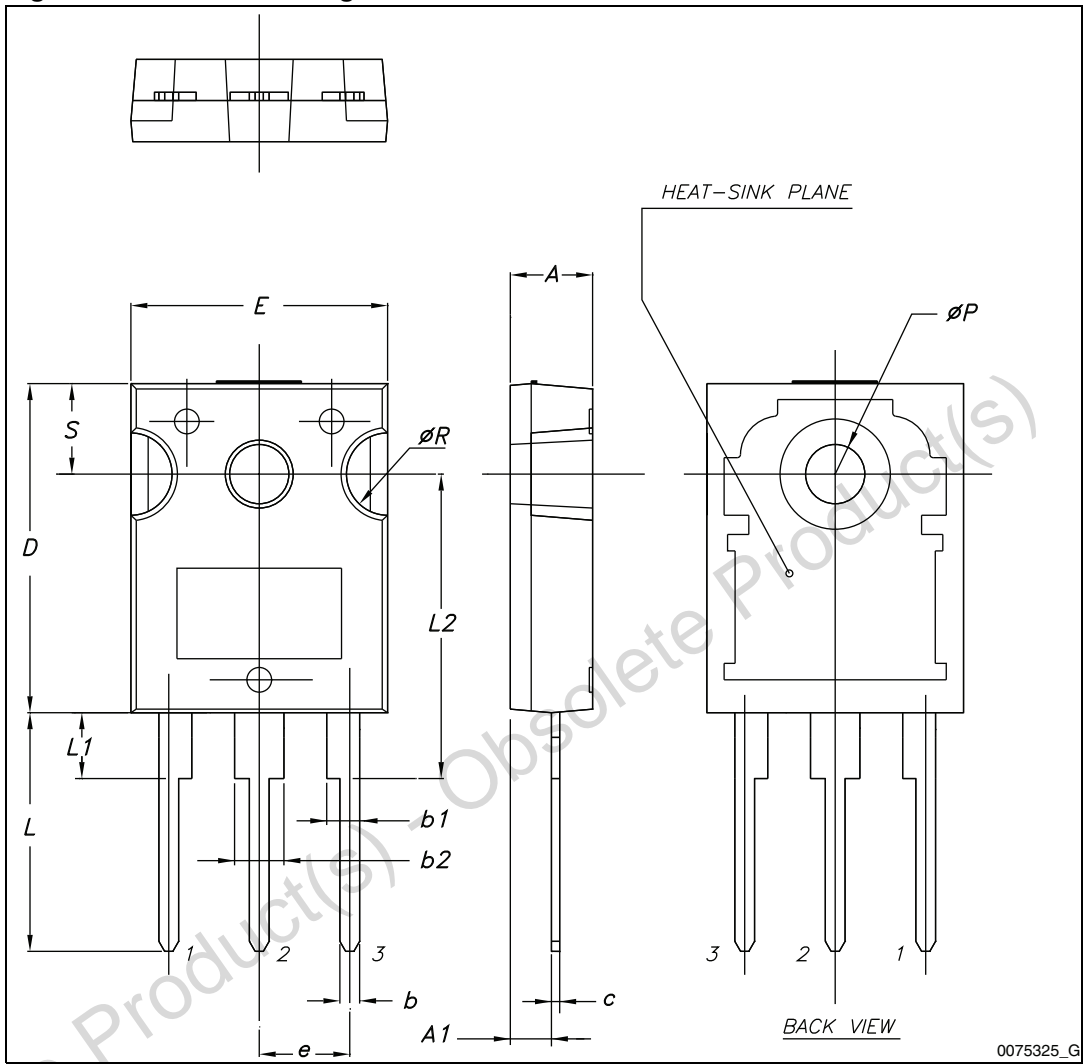
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Table 5. TO-247 mechanical data

| 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 | 5.30 | 5.45 | 5.60 |
| L | 14.20 | | 14.80 |
| L1 | 3.70 | | 4.30 |
| L2 | | 18.50 | |
| ØP | 3.55 | | 3.65 |
| ØR | 4.50 | | 5.50 |
| S | 5.30 | 5.50 | 5.70 |

Figure 4. TO-247 drawing



0075325_G

5 Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 02-Jan-2000 | 4 | |
| 16-Nov-2007 | 5 | Package change from TO-218 to TO-247. |
| 02-May-2012 | 6 | – Added: <i>Figure 2: Safe operating area</i> – Updated: mechanical data |

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