

## NPN power Darlington transistor

### Features

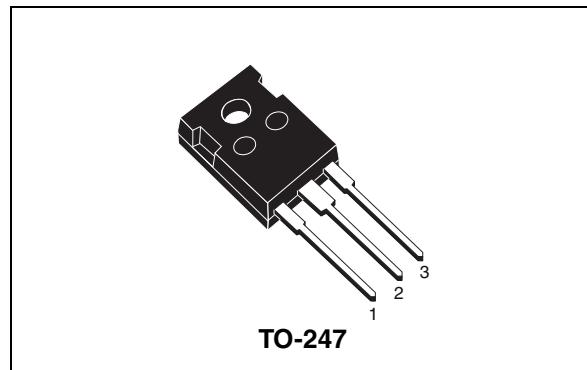
- High current capability
- Fast switching speed
- High DC current gain

### Applications

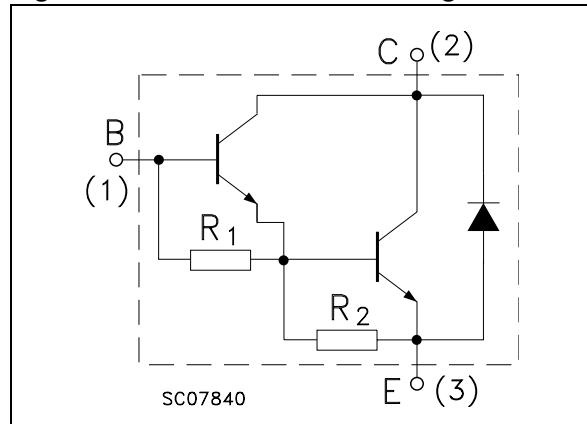
- Linear and switching industrial equipment

### 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 $T_c \leq 25^\circ\text{C}$	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	$^\circ\text{C/W}$

## 2 Electrical characteristics

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

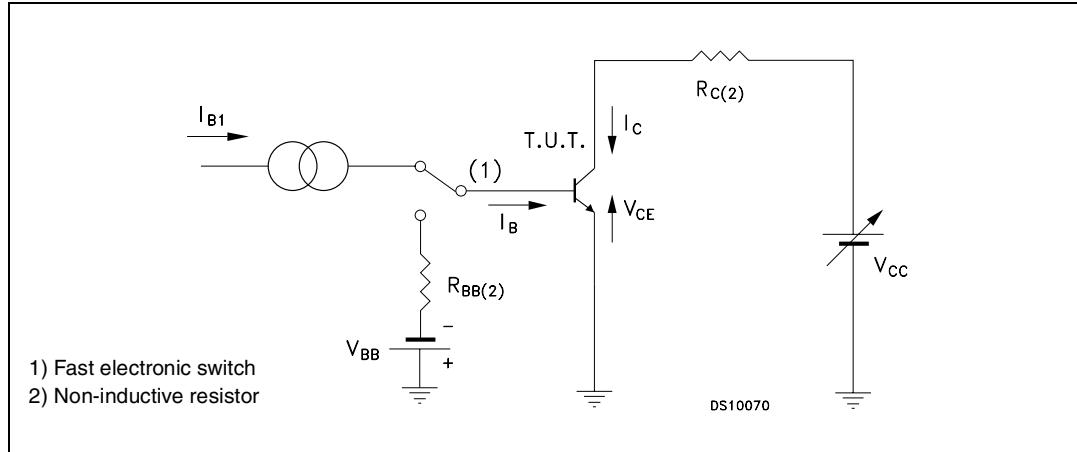
**Table 4. Electrical characteristics**

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

1. Pulsed duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$ .

## 2.1 Test circuit

Figure 2. Resistive load switching test circuit

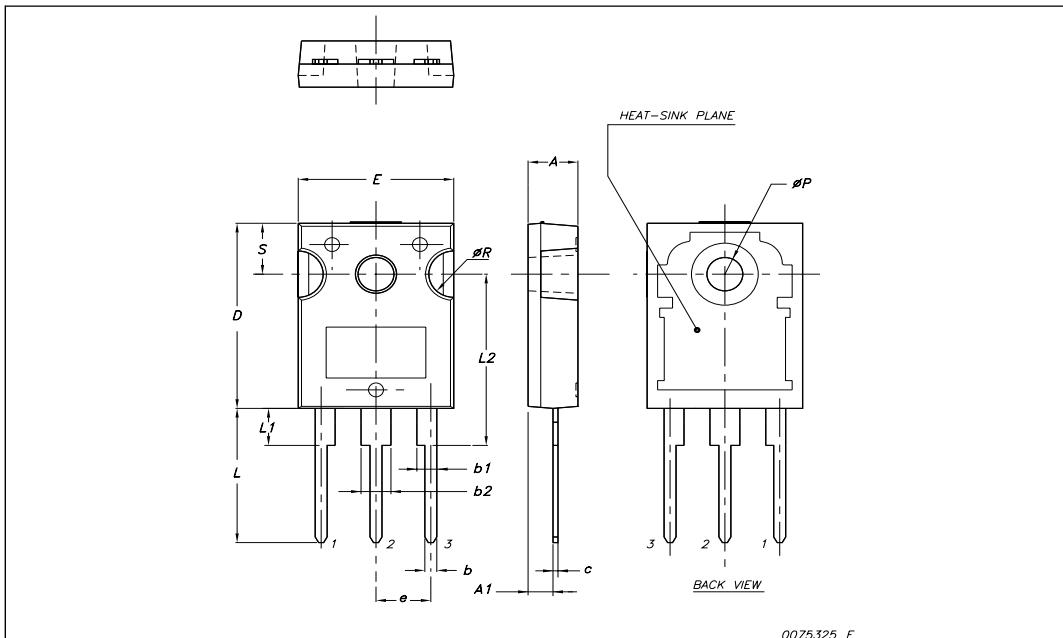


### 3 Package mechanical data

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](http://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	
$\phi P$	3.55		3.65
$\phi R$	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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