

## Complementary power Darlington transistors

### Features

- Good  $h_{FE}$  linearity
- High  $f_T$  frequency
- Monolithic Darlington configuration with integrated antiparallel collector-emitter diode

### Application

- Audio amplifiers
- Linear and switching industrial equipment

### Description

The devices are manufactured in planar base island technology with monolithic Darlington configuration.

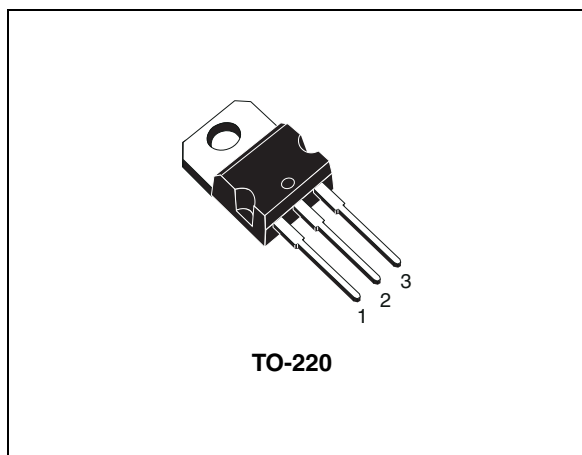


Figure 1. Internal schematic diagram

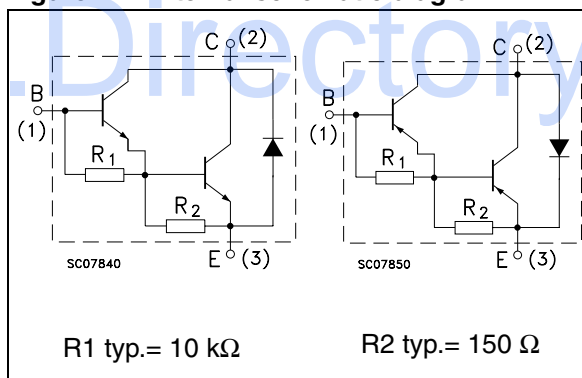


Table 1. Device summary

Order code	Marking	Package	Packaging
BDX53B	BDX53B	TO-220	Tube
BDX53C	BDX53C		
BDX54B	BDX54B		
BDX54C	BDX54C		

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value			Unit
		NPN	BDX53B	BDX53C	
		PNP	BDX54B	BDX54C	
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	80	100		V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	80	100		V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5			V
$I_C$	Collector current	8			A
$I_{CM}$	Collector peak current (repetitive)	12			A
$I_B$	Base current	0.2			mA
$P_{TOT}$	Total dissipation at $T_C = 25^\circ\text{C}$	60			W
$T_{stg}$	Storage temperature	-65 to 150			$^\circ\text{C}$
$T_J$	Max. operating junction temperature	150			$^\circ\text{C}$

*Note:* For PNP types voltage and current values are negative.

## 2 Electrical characteristics

( $T_{CASE}=25^{\circ}C$  unless otherwise specified)

**Table 3. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{CE(sus)}^{(1)}$	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = 100\text{ mA}$ for BDX53B - BDX54B for BDX53C - BDX54C	80 100			V V
$I_{CBO}$	Collector cut-off current ( $I_E = 0$ )	$V_{CB} = 80\text{ V}$ for BDX53B - BDX54B			0.2	mA
		$V_{CB} = 100\text{ V}$ for BDX53C - BDX54C			0.2	mA
$I_{CEO}$	Collector cut-off current ( $I_B = 0$ )	$V_{CE} = 40\text{ V}$ for BDX53B - BDX54B			0.5	mA
		$V_{CE} = 50\text{ V}$ for BDX53C - BDX54C			0.5	mA
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			2	mA
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 3\text{ A}; I_B = 12\text{ mA}$			2	V
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 3\text{ A}; I_B = 12\text{ mA}$			2.5	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 3\text{ A}; V_{CE} = 3\text{ V}$	750			
$V_F^{(1)}$	Diode forward voltage	$I_F = 3\text{ A};$		1.8	2.5	V
		$I_F = 8\text{ A};$		2.5		V

1. Pulsed: pulse duration = 300  $\mu$ s, duty cycle 1.5%

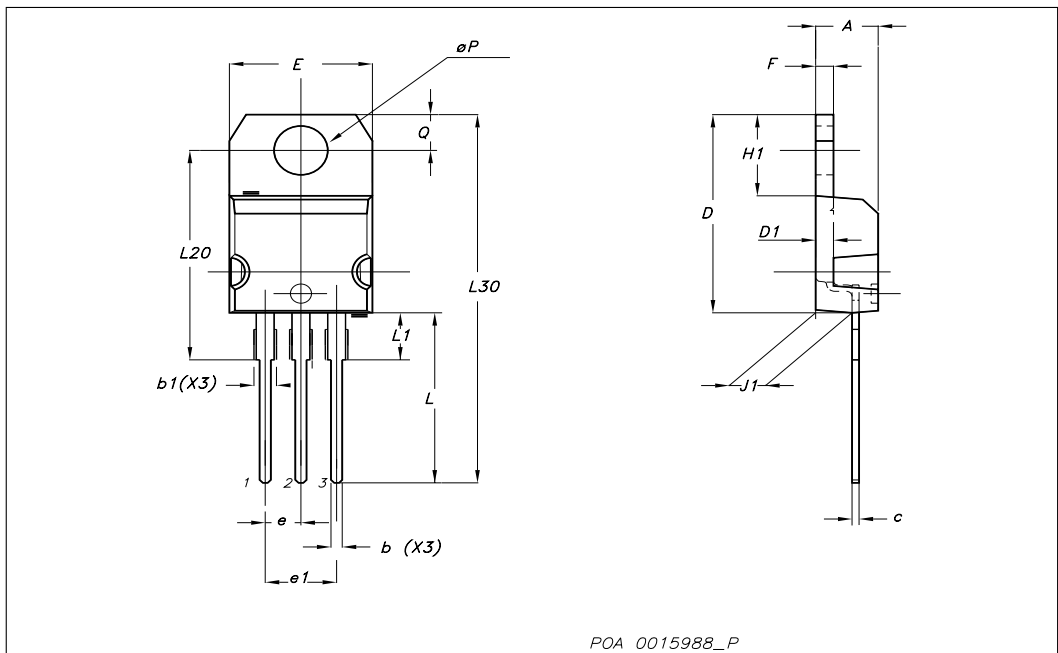
**Note:** For PNP types voltage and current values are negative.

### 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-220 mechanical data

Dim	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.051
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



## 4 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
09-Sep-2004	3	
23-Oct-2007	4	Technology change from epibase to planar (PCN APM-PWR/07/2417 and APM-PWR/07/2615)

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