

## PNP power Darlington transistor

### Features

- Monolithic Darlington configuration
- Integrated antiparallel collector-emitter diode

### Application

- Linear and switching industrial equipment

### Description

The TIP145 is an Epitaxial-base PNP power transistor in monolithic Darlington configuration, mounted in TO-247 plastic package. It is intended for use in power linear and switching applications.

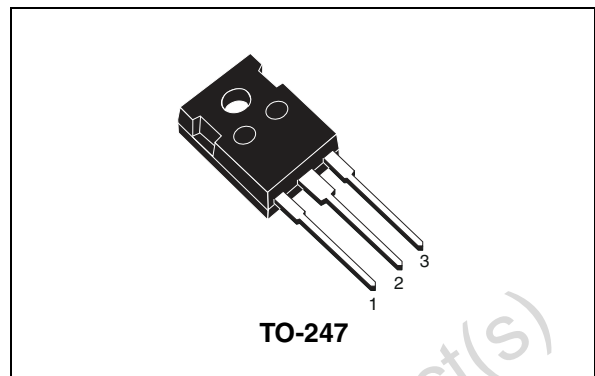


Figure 1. Internal schematic diagram

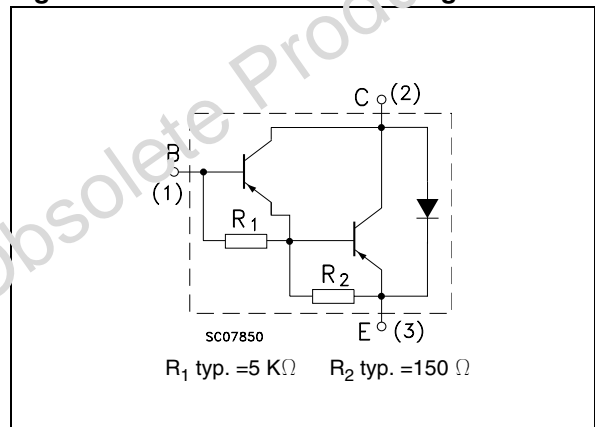


Table 1. Device summary

Order code	Marking	Package	Packaging
TIP145	TIP145	TO-247	Tube

# 1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	-60	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	-60	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	-5	V
$I_C$	Collector current	-10	A
$I_{CM}$	Collector peak current	-20	A
$I_B$	Base current	-0.5	A
$P_{TOT}$	Total dissipation at $T_{case} = 25^\circ\text{C}$	125	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 1	$^\circ\text{C}/\text{W}$

## 2 Electrical characteristics

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

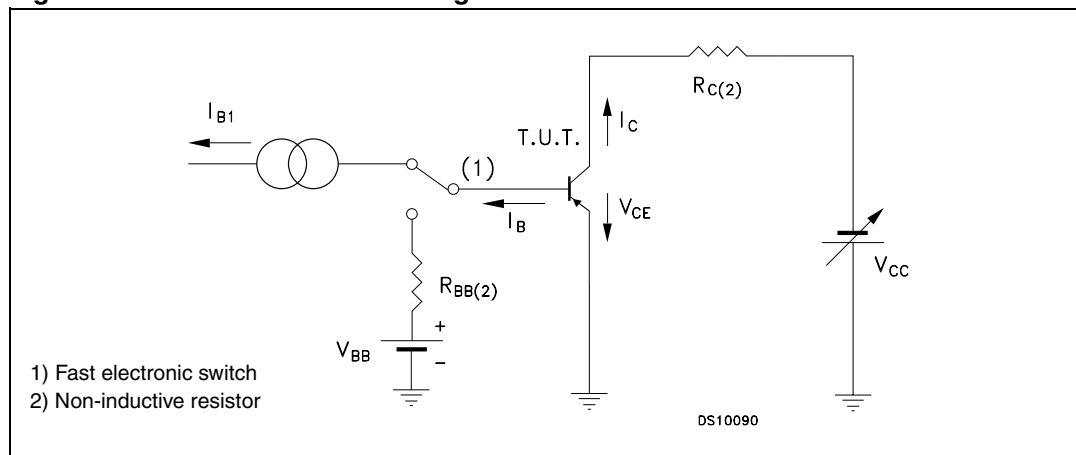
**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CBO}}$	Collector cut-off current ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = -60 \text{ V}$			-1	mA
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = -30 \text{ V}$			-2	mA
$I_{\text{EBO}}$	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 ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = -30 \text{ mA}$	-60			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -5 \text{ A}$ $I_{\text{B}} = -10 \text{ mA}$			-2	V
		$I_{\text{C}} = -10 \text{ A}$ $I_{\text{B}} = -40 \text{ mA}$			-3	V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter on voltage	$I_{\text{C}} = -10 \text{ A}$ $V_{\text{CE}} = -4 \text{ V}$			-3	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = -5 \text{ A}$ $V_{\text{CE}} = -4 \text{ V}$	1000			
		$I_{\text{C}} = -10 \text{ A}$ $V_{\text{CE}} = -4 \text{ V}$	500			
$t_{\text{on}}$ $t_{\text{off}}$	Resistive load Turn-on time	$I_{\text{C}} = -10 \text{ A}$ $R_{\text{L}} = 3 \Omega$ $I_{\text{B1}} = -I_{\text{B2}} = -40 \text{ mA}$		0.9		$\mu\text{s}$
	Turn-off time			4		$\mu\text{s}$

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

## 2.1 Test circuit

Figure 2. Resistive load switching test circuit



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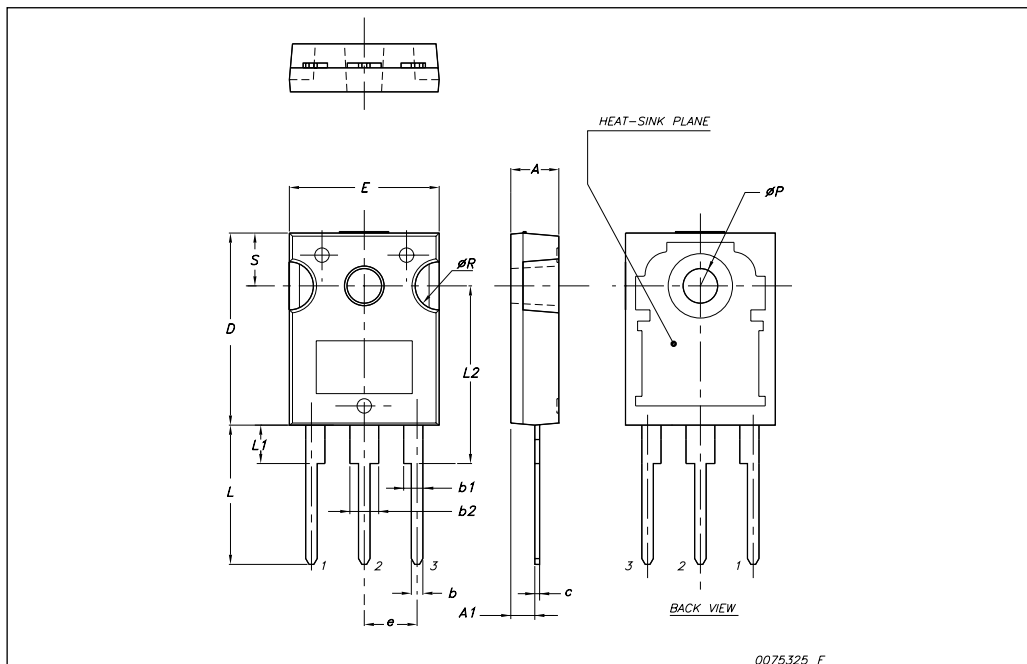
### 3 Package mechanical data

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)

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**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	



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## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
19-Oct-2007	1	Initial version
26-Oct-2007		Minor text changes
09-Nov-2007	3	Package change from SOT-93 to TO-247, according to: PCN APM-PWR/07/2362.

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