

## Complementary power Darlington transistors

### Features

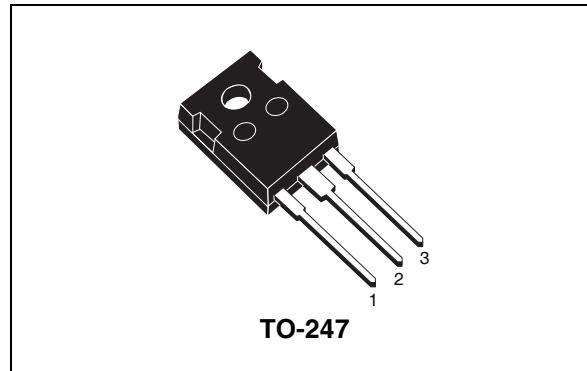
- Monolithic Darlington configuration
- Integrated antiparallel collector-emitter diode

### Applications

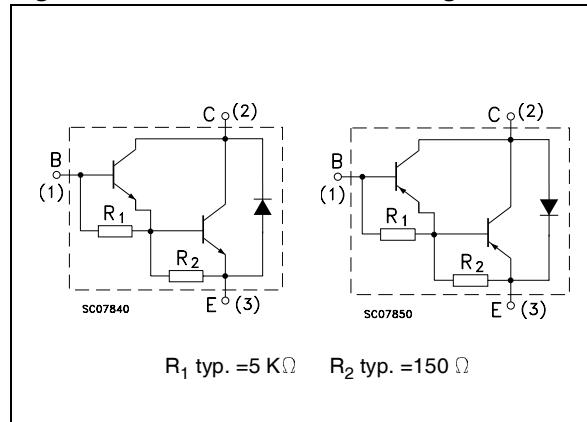
- Linear and switching industrial equipment

### Description

The TIP142 is an Epitaxial-base NPN power transistor in monolithic Darlington configuration, mounted in TO-247 plastic package. It is intended for use in power linear and switching applications. The PNP complementary type is TIP147.



**Figure 1. Internal schematic diagrams**



**Table 1. Device summary**

Part number	Marking	Package	Packaging
TIP142	TIP142	TO-247	Tube
TIP147	TIP147		

# 1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter		Value	Unit
		NPN	TIP142	
		PNP	TIP147	
$V_{CBO}$	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		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	°C
$T_J$	Max. operating junction temperature		150	°C

For PNP type voltage and current are negative.

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case	max	1 °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 ( $I_E = 0$ )	$V_{CB} = 100 \text{ V}$			1	mA
$I_{CEO}$	Collector cut-off current ( $I_B = 0$ )	$V_{CE} = 50 \text{ V}$			2	mA
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 5 \text{ V}$			2	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = 30 \text{ mA}$	100			V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 5 \text{ A} \quad I_B = 10 \text{ mA}$ $I_C = 10 \text{ A} \quad I_B = 40 \text{ mA}$			2 3	V V
$V_{BE(on)}^{(1)}$	Base-emitter on voltage	$I_C = 10 \text{ A} \quad V_{CE} = 4 \text{ V}$			3	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 5 \text{ A} \quad V_{CE} = 4 \text{ V}$ $I_C = 10 \text{ A} \quad V_{CE} = 4 \text{ V}$	1000 500			
$t_{on}$ $t_{off}$	Resistive load Turn-on time Turn-off time	$I_C = 10 \text{ A} \quad R_L = 3 \Omega$ $I_{B1} = -I_{B2} = 40 \text{ mA}$		0.9 4		$\mu\text{s}$ $\mu\text{s}$

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

For PNP type voltage and current are negative.

## 2.1 Test circuits

Figure 2. Resistive load switching test circuit (NPN type)

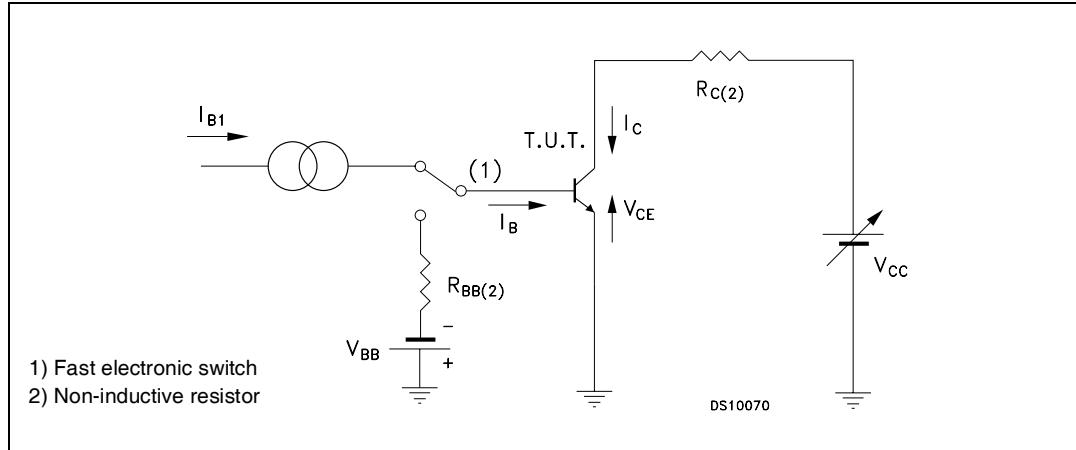
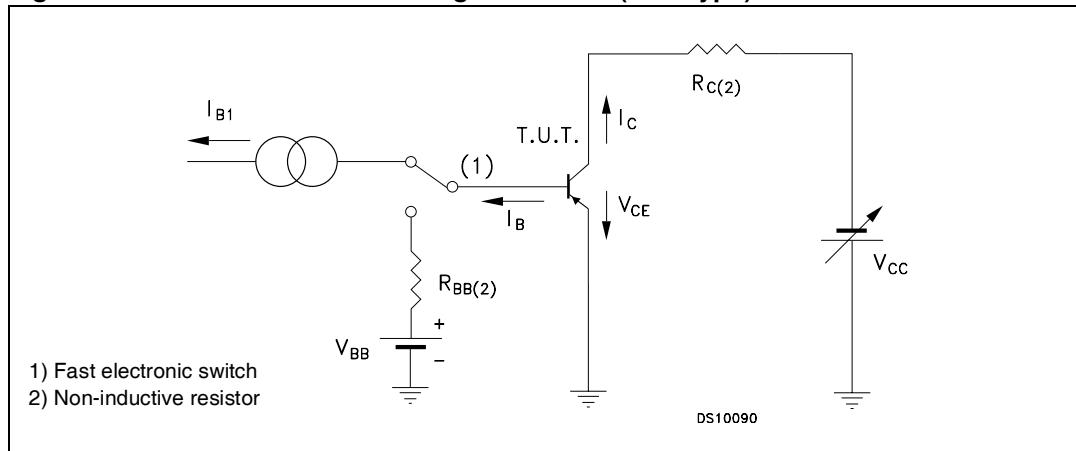


Figure 3. Resistive load switching test circuit (PNP type)

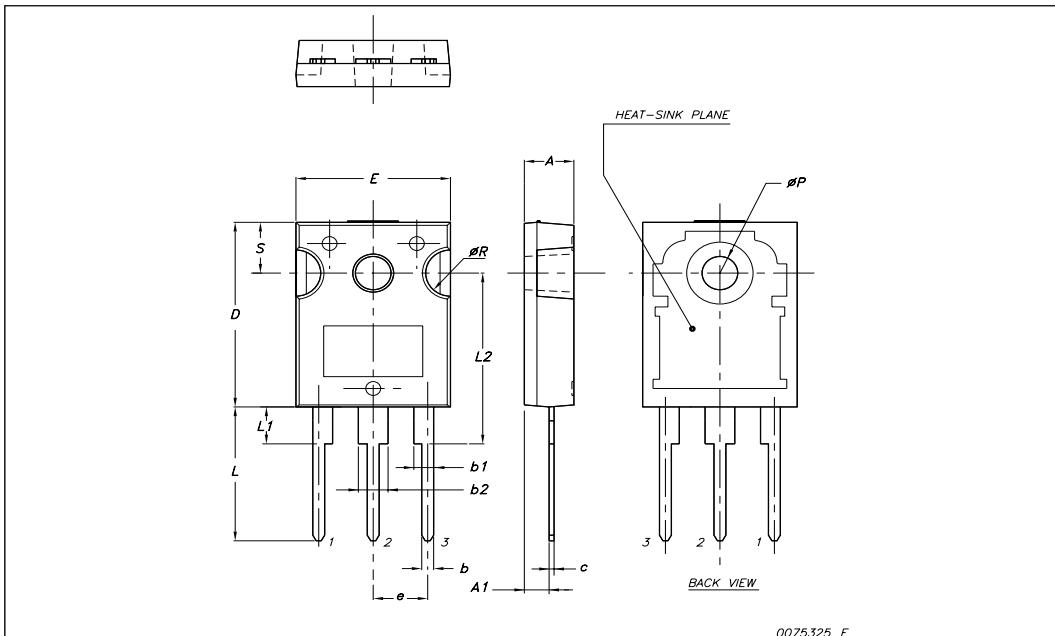


### 3 Package mechanical data

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	
øP	3.55		3.65
øR	4.50		5.50
S		5.50	



## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
04-Mar-2000	5	
15-Oct-2007	6	Package change from SOT-93 to TO-247.

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