TIP142T
TIP147T

Complementary power Darlington transistors

Features

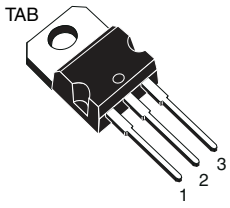
- Monolithic Darlington configuration
- Integrated antiparallel collector-emitter diode

Application

- Linear and switching industrial equipment

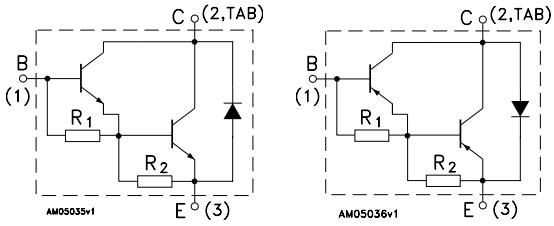
Description

The devices are manufactured in planar technology with “base island” layout and monolithic Darlington configuration. The resulting transistors show exceptional high gain performance coupled with very low saturation voltage.



TO-220

Figure 1. Internal schematic diagrams



R_1 typ. = 5 kΩ
R_2 typ. = 60 Ω

R_1 typ. = 8 kΩ
R_2 typ. = 100 Ω

Table 1. Device summary

Part number	Marking	Polarity	Package	Packaging
TIP142T	TIP142T	NPN	TO-220	Tube
TIP147T	TIP147T	PNP		

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	10	A
I_{CM}	Collector peak current	20	A
I_B	Base current	0.5	A
P_{TOT}	Total dissipation at T_{case} = 25 °C	90	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Note: For PNP type voltage and current are negative.

Table 3. Thermal data

Symbol	Parameter		Value	Unit
R_{thJC}	Thermal resistance junction-case	max	1.4	°C/W

2 Electrical characteristics

T_{case} = 25 °C; unless otherwise specified.

Table 4. Electrical characteristics

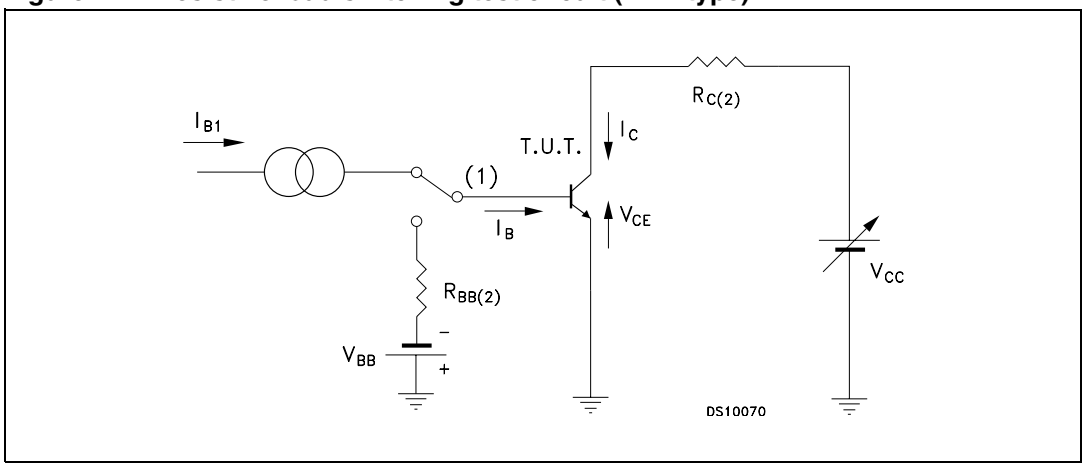
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = 100 V			1	mA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 50 V			2	mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			2	mA
$V_{CEO(sus)}$(1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 30 mA	100			V
$V_{CE(sat)}$(1)	Collector-emitter saturation voltage	I_C = 5 A I_B = 10 mA I_C = 10 A I_B = 40 mA			2 3	V V
$V_{BE(on)}$(1)	Base-emitter on voltage	I_C = 10 A V_{CE} = 4 V			3	V
h_{FE}(1)	DC current gain	I_C = 5 A V_{CE} = 4 V I_C = 10 A V_{CE} = 4 V	1000 500			
t_{on} t_{off}	Resistive load Turn-on time Turn-off time	I_C = 10 A R_L = 3 Ω I_{B1} = -I_{B2} = 40 mA		0.9 4		µs µs

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %.

Note: For PNP type voltage and current are negative.

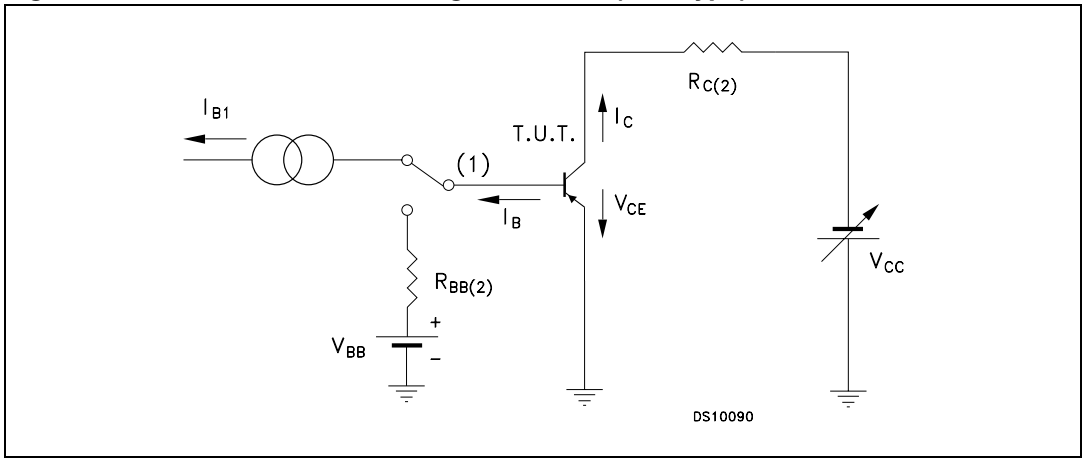
2.1 Test circuits

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



1. Fast electronic switch
2. Non-inductive resistor

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



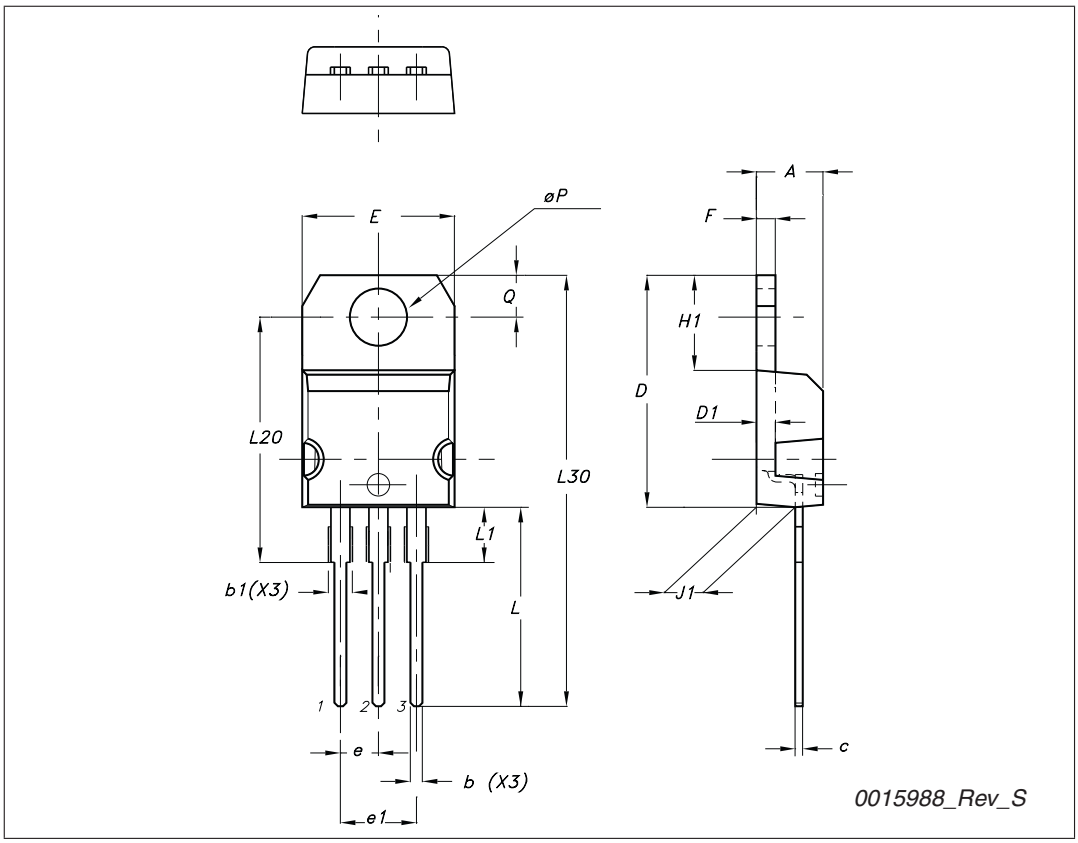
1. Fast electronic switch
2. Non-inductive resistor

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

TO-220 type A mechanical data

Dim	mm		
	Min	Typ	Max
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
∅P	3.75		3.85
Q	2.65		2.95



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Jun-2004	4	
20-May-2010	5	Technology change from epitaxial base to planar base island.