

Complementary power Darlington transistors

Features

- Monolithic Darlington configuration
- Integrated antiparallel collector-emitter diode

Applications

■ 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.

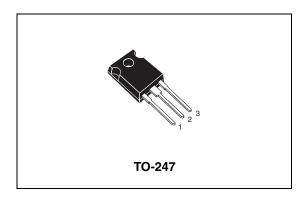


Figure 1. Internal schematic diagrams

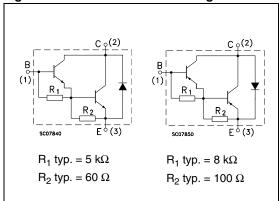


Table 1. Device summary

Part number	Marking	Polarity	Package	Packaging
TIP142	TIP142	NPN	TO-247	Tube
TIP147	TIP147	PNP	10-247	Tube

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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	Α
I _{CM}	Collector peak current	20	Α
I _B	Base current	0.5	Α
P _{TOT}	Total dissipation at T _{case} = 25 °C	125	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	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

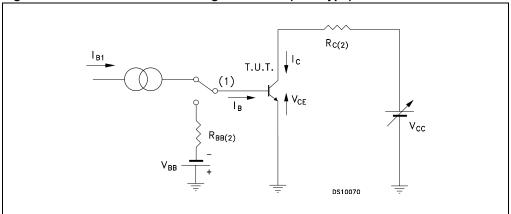
Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _{CBO}	Collector cut-off current (I _E = 0)	V _{CB} = 100 V				1	mA
I _{CEO}	Collector cut-off current (I _B = 0)	V _{CE} = 50 V				2	mA
I _{EBO}	Emitter cut-off current (I _C = 0)	V _{EB} = 5 V				2	mA
V _{CEO(sus)} ⁽¹⁾	Collector-emitter sustaining voltage (I _B = 0)	I _C = 30 mA		100			V
V _{CE(sat)} ⁽¹⁾	Collector-emitter saturation voltage	I _C = 5 A I _C = 10 A	_			2	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 I _C = 10 A		1000 500			
	Resistive load				_		
t _{on}	Turn-on time	I _C = 10 A			0.9		μs
t _{off}	Turn-off time	$I_{B1} = -I_{B2} = 40$	mA		4		μs

^{1.} Pulse test: pulse duration \leq 300 μ s, duty cycle \leq 2 %.

Note: For PNP type voltage and current are negative.

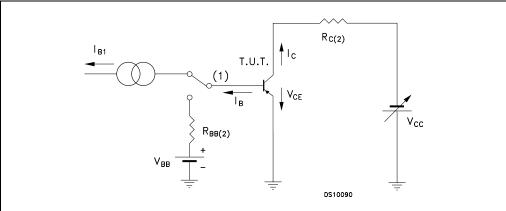
2.1 Test circuits

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

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3 Package mechanical data

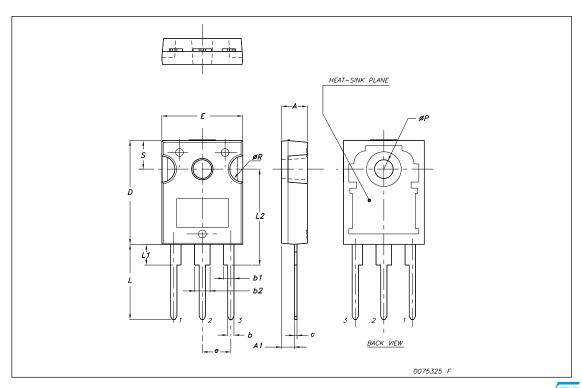
In order to meet environmental requirements, ST offers these devices in different grades of $\mathsf{ECOPACK}^{\mathbb{B}}$ packages, depending on their level of environmental compliance. $\mathsf{ECOPACK}^{\mathbb{B}}$ specifications, grade definitions and product status are available at: $\mathit{www.st.com}$. $\mathsf{ECOPACK}^{\mathbb{B}}$ is an ST trademark.



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TO-247 mechanical c	data
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Dim.		mm.	
Dilli.	Min.	Тур	Max .
Α	4.85		5.15
A1	2.20		2.60
b	1.0		1.40
b1	2.0		2.40
b2	3.0		3.40
С	0.40		0.80
D	19.85		20.15
Е	15.45		15.75
е		5.45	
L	14.20		14.80
L1	3.70		4.30
L2		18.50	
øΡ	3.55		3.65
øR	4.50		5.50
S		5.50	



TIP142, TIP147 Revision history

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
15-Oct-2007	6	Package change from SOT-93 to TO-247.
12-May-2010	7	Technology change from epitaxial base to planar base island.

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