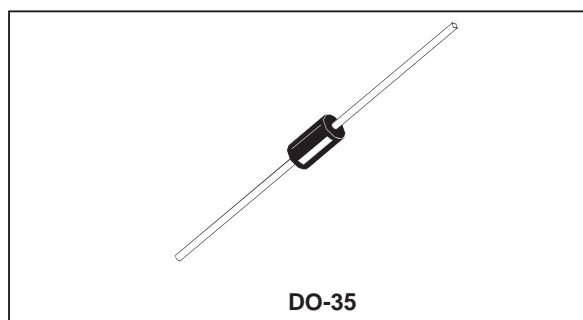


SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

Metal to silicon junction diode featuring high break-down, low turn-on voltage and ultrafast switching. Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range. Matched batches are available on request



ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
I_F	Forward Continuous Current*	$T_a = 25^\circ\text{C}$	15	mA
P_{tot}	Power Dissipation*	$T_a = 25^\circ\text{C}$	430	mW
T_{stg} T_j	Storage and Junction Temperature Range		- 65 to 200 - 65 to 200	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	$^\circ\text{C}$

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th(j-a)}$	Junction-ambient*	400	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_{BR}	$T_{amb} = 25^\circ\text{C}$	$I_R = 10\mu\text{A}$	70			V
V_F^{**}	$T_{amb} = 25^\circ\text{C}$	$I_F = 1\text{mA}$			0.41	V
	$T_{amb} = 25^\circ\text{C}$	$I_F = 15\text{mA}$			1	
I_R^{**}	$T_{amb} = 25^\circ\text{C}$	$V_R = 50\text{V}$			0.2	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_{amb} = 25^\circ\text{C}$	$V_R = 0\text{V}$	$f = 1\text{MHz}$			2	pF
τ	$T_{amb} = 25^\circ\text{C}$	$I_F = 5\text{mA}$	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length

** Pulse test: $t_p \leq 300\mu\text{s}$ $\delta < 2\%$.

Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

Fig. 1: Forward current versus forward voltage at low level (typical values).

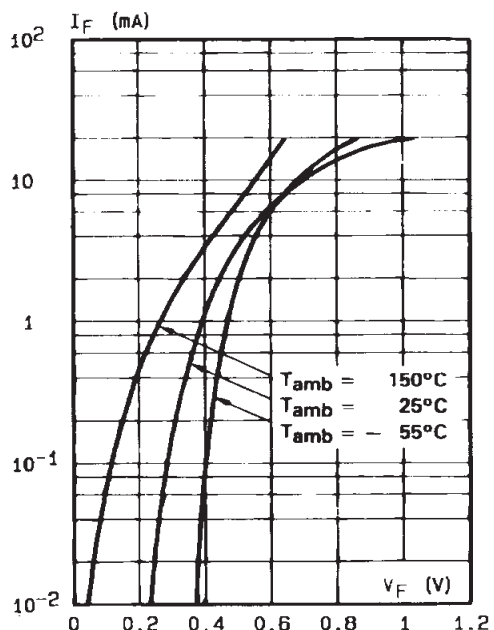


Fig. 2: Capacitance C versus reverse applied voltage V_R (typical values).

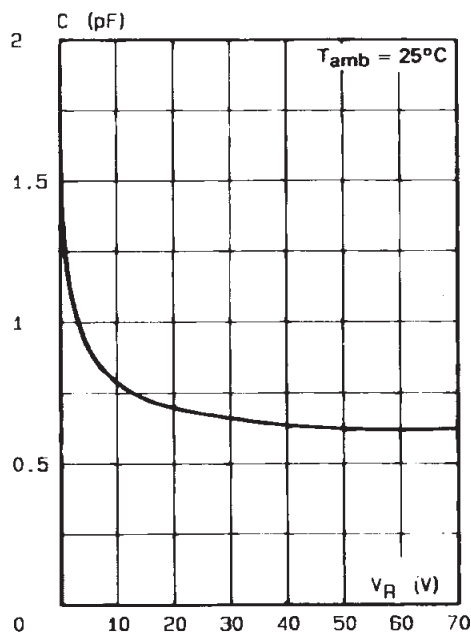


Fig. 3: Reverse current versus ambient temperature.

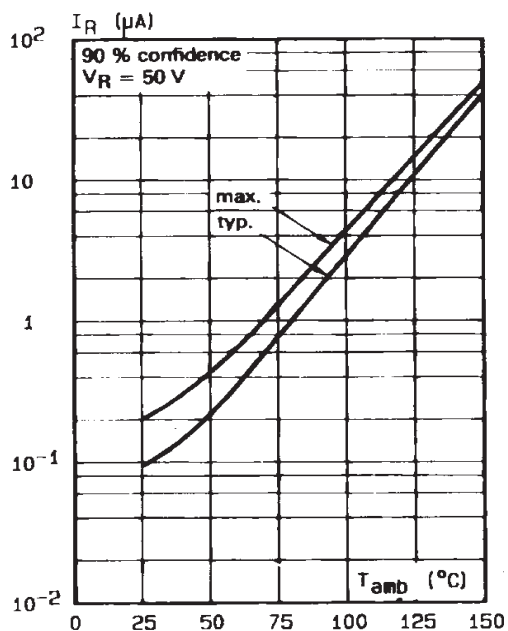
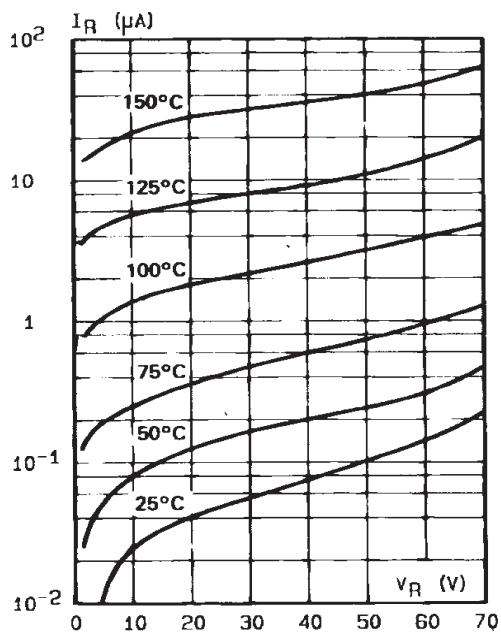
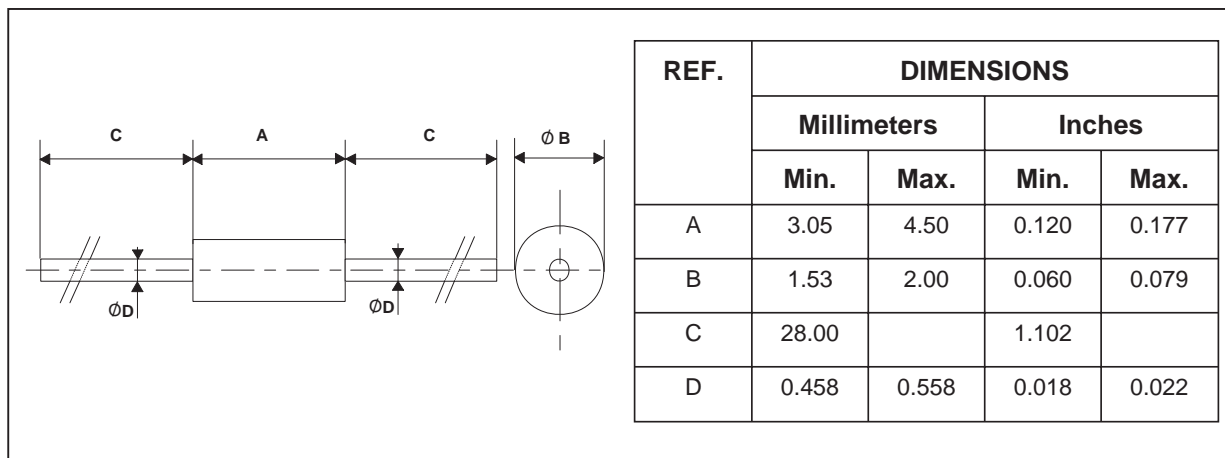


Fig. 4: Reverse current versus continuous reverse voltage (typical values).



PACKAGE MECHANICAL DATA

DO-35



Cooling method : by convection and conduction

Marking: clear, ring at cathode end.

Weight: 0.15g

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<http://www.st.com>

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.

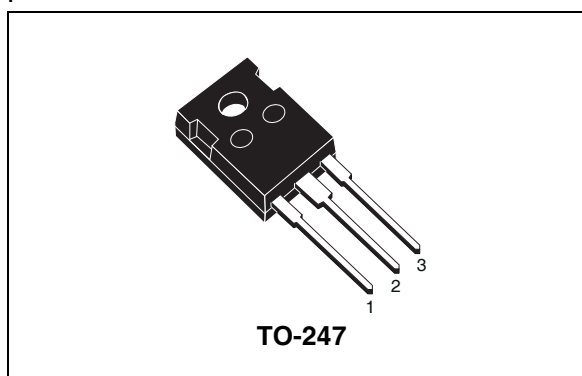


Figure 1. Internal schematic diagrams

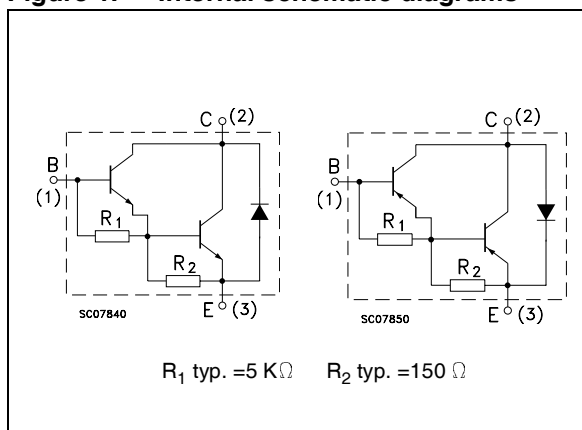


Table 1. Device summary

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	$^\circ\text{C}$
T_J	Max. operating junction temperature		150	$^\circ\text{C}$

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	$^\circ\text{C/W}$

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_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 100 \text{ V}$			1	mA
I_{CEO}	Collector cut-off current ($I_{\text{B}} = 0$)	$V_{\text{CE}} = 50 \text{ V}$			2	mA
I_{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 ($I_{\text{B}} = 0$)	$I_{\text{C}} = 30 \text{ mA}$	100			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_{on} t_{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		μs
	Turn-off time			4		μs

1. Pulsed duration = 300 μs , 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)

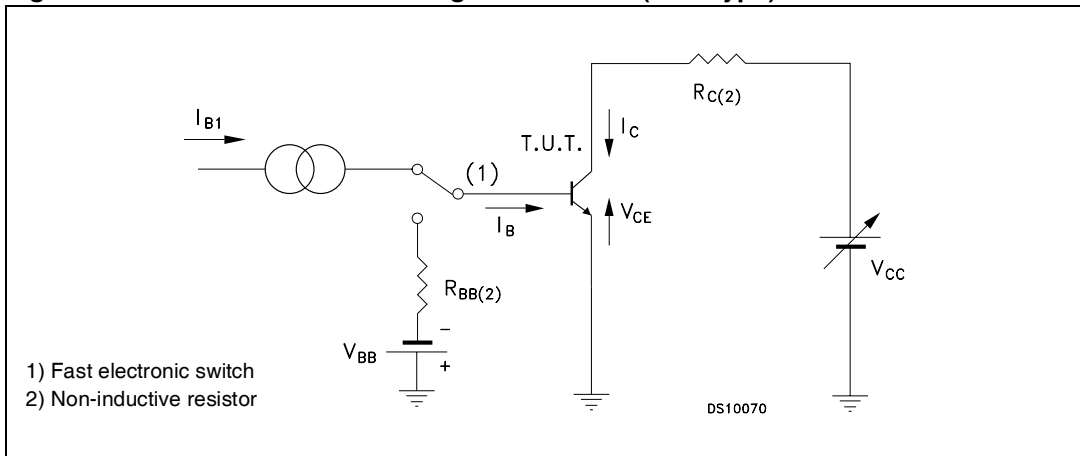
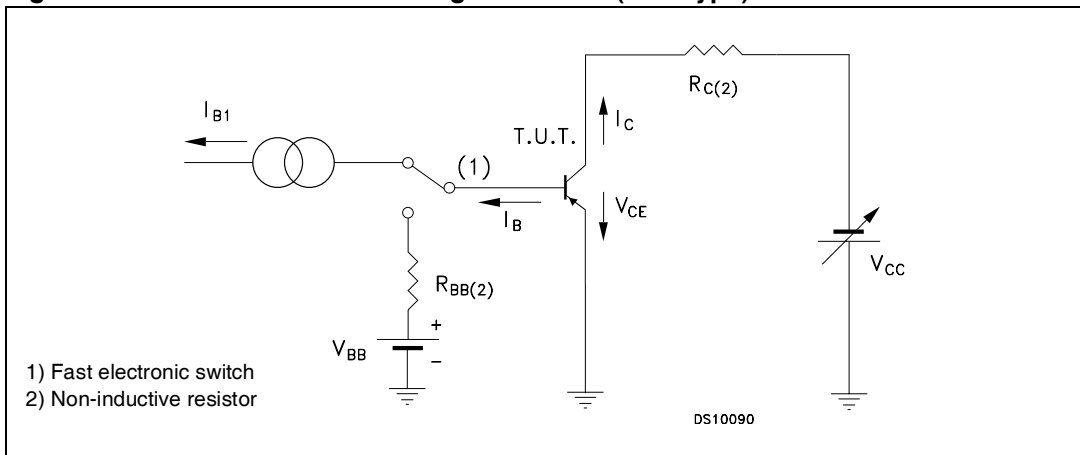


Figure 3. Resistive load switching test circuit (PNP type)

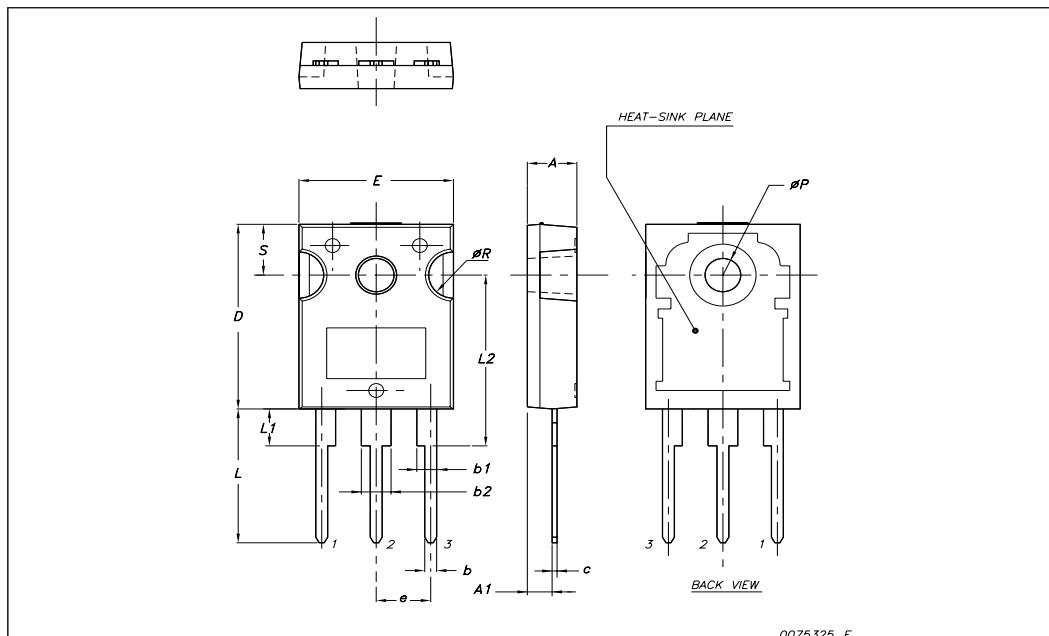


3 Package mechanical data

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

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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