BU941
BU941P

High voltage ignition coil driver NPN power Darlington transistors

Features

- Very rugged Bipolar technology
- High operating junction temperature
- Integrated antiparallel collector-emitter diode

Applications

- High ruggedness electronic ignitions

Description

The devices are bipolar Darlington transistors manufactured using Multi-Epitaxial Planar technology. They have been properly designed to be used in automotive environment as electronic ignition power actuators.

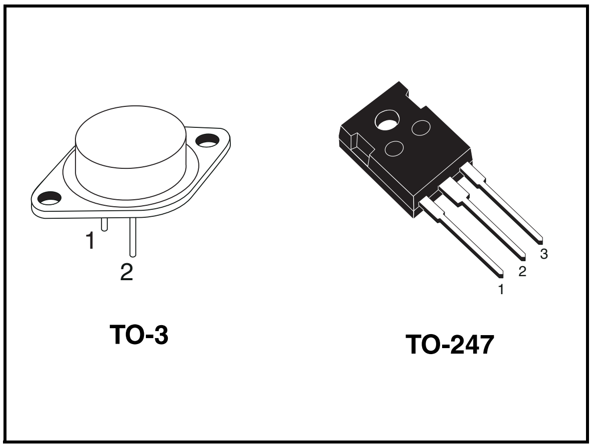


Figure 1. Internal schematic diagrams

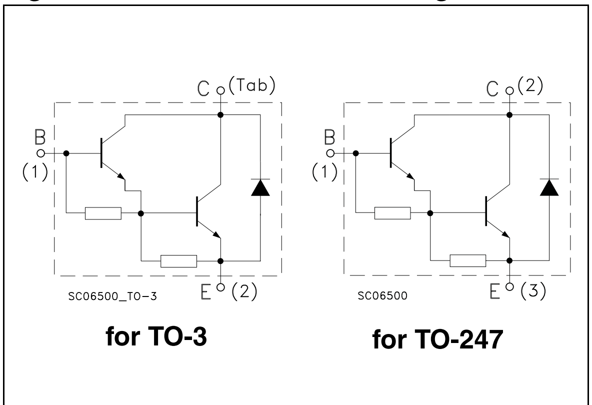


Table 1. Device summary

Order codes	Marking	Package	Packaging
BU941	BU941	TO-3	Tray
BU941P	BU941P	TO-247	Tube

Content

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		BU941	BU941P	
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	500		V
V_{CEO}	Collector-emitter voltage (I_B = 0)	400		V
V_{EBO}	Emitter-base voltage (I_C = 0)	5		V
I_C	Collector current	15		A
I_{CM}	Collector peak current	30		A
I_B	Base current	1		A
I_{BM}	Base peak current	5		A
P_{TOT}	Total dissipation at T_c = 25 °C	180	155	W
T_{stg}	Storage temperature	-65 to 200	-65 to 175	°C
T_J	Max. operating junction temperature	200	175	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max.	0.97	°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_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 500 V V_{CE} = 500 V T_C = 125 °C			100 0.5	µA mA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 450 V V_{CE} = 450 V T_C = 125 °C			100 0.5	µA mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			20	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA L = 10 mH V_{clamp} = 400 V see *Figure 12*	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 8 A I_B = 100 mA I_C = 10 A I_B = 250 mA I_C = 12 A I_B = 300 mA			1.6 1.8 2	V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 8 A I_B = 100 mA I_C = 10 A I_B = 250 mA I_C = 12 A I_B = 300 mA			2.2 2.5 2.7	V V V
h_{FE} (1)	DC current gain	I_C = 5 A V_{CE} = 10 V	300			
V_F	Diode forward voltage	I_F = 10 A			2.5	V
	Functional test	V_{CC} = 24 V L = 7 mH V_{clamp} = 400 V see *Figure 9*	10			A
t_s t_f	Inductive Load Storage time Fall time	I_C = 7 A V_{clamp} = 300 V I_B = 70 mA L = 7 mH V_{BE} = 0 R_{BE} = 47 Ω V_{CC} = 12 V see *Figure 11*		15 0.5		µs µs

1. Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

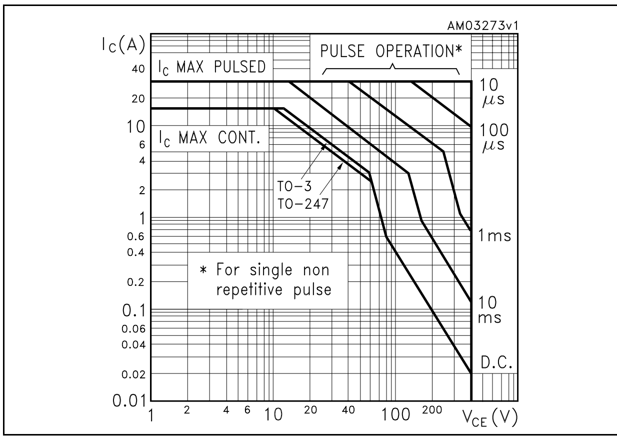


Figure 3. DC current gain

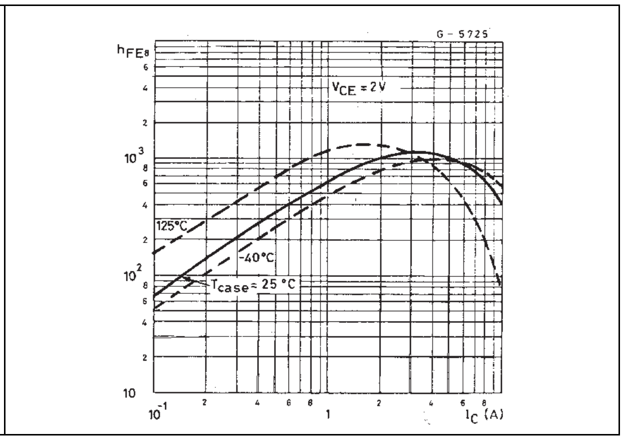


Figure 4. DC current gain

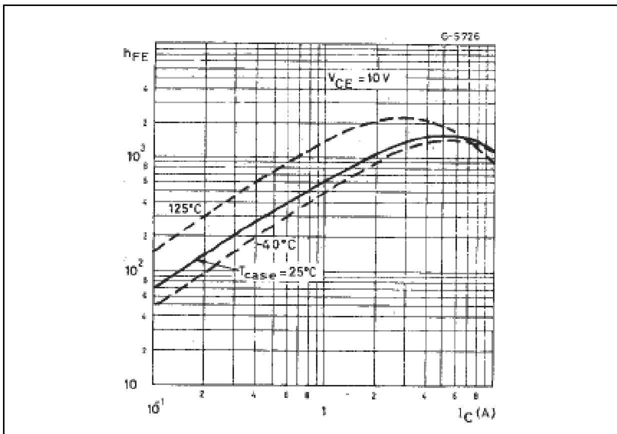


Figure 5. Collector-emitter saturation voltage

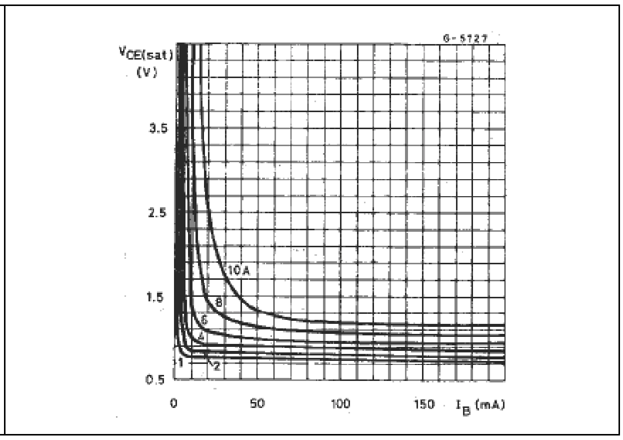


Figure 6. Collector-emitter saturation voltage

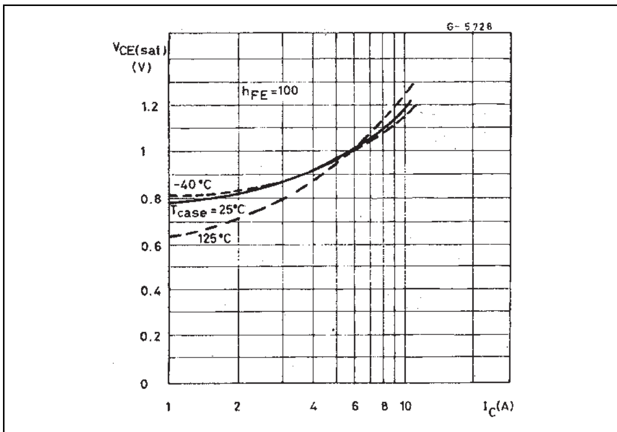


Figure 7. Base-emitter saturation voltage

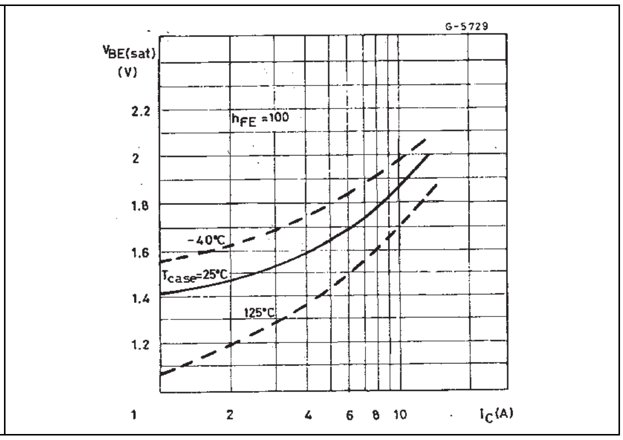
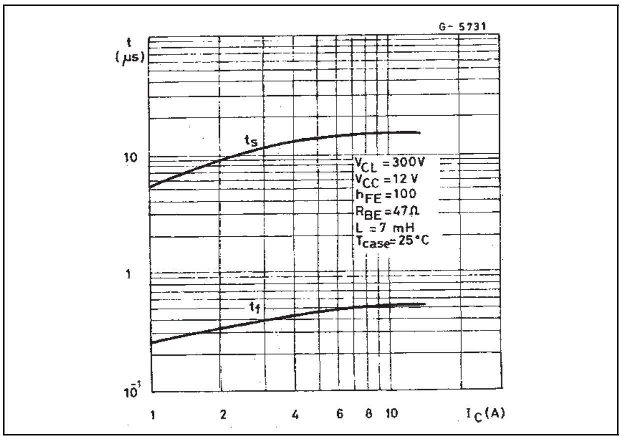


Figure 8. Switching time inductive load



3 Test circuits

Figure 9. Functional test circuit

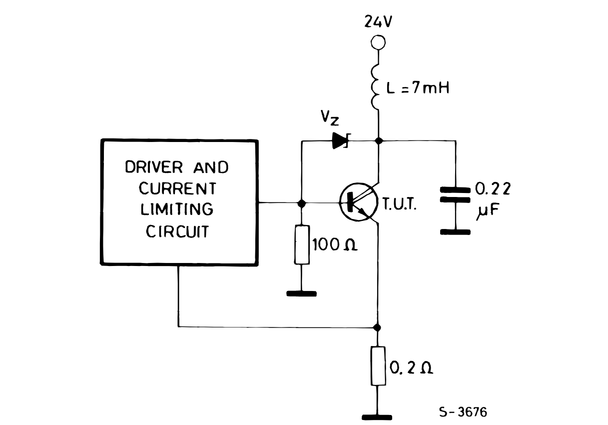


Figure 10. Functional test wafeforms

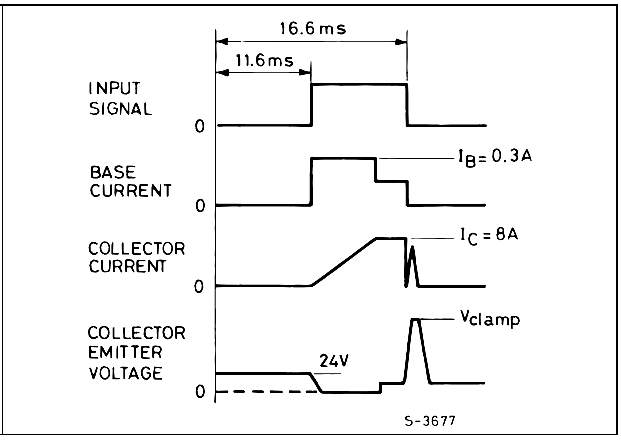


Figure 11. Switching time test circuit

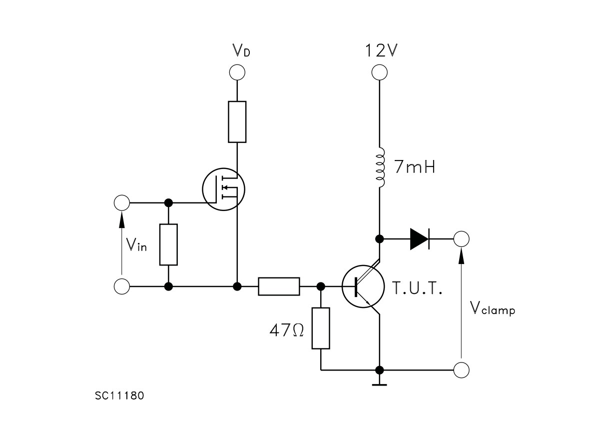
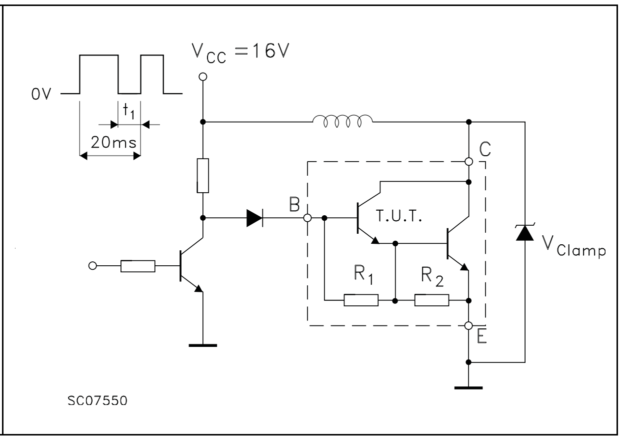


Figure 12. Sustaining voltage test circuit

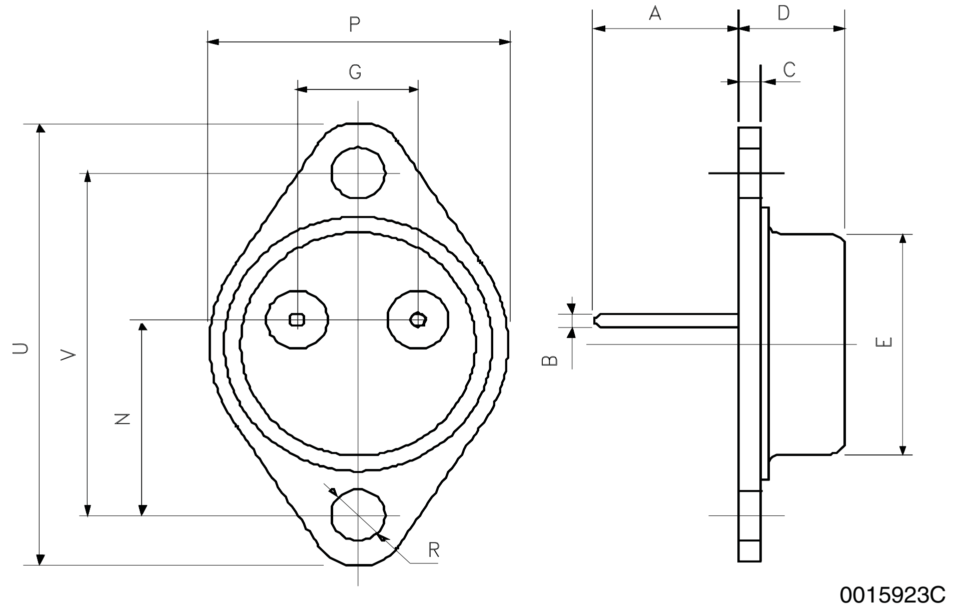


4 Package mechanical data

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

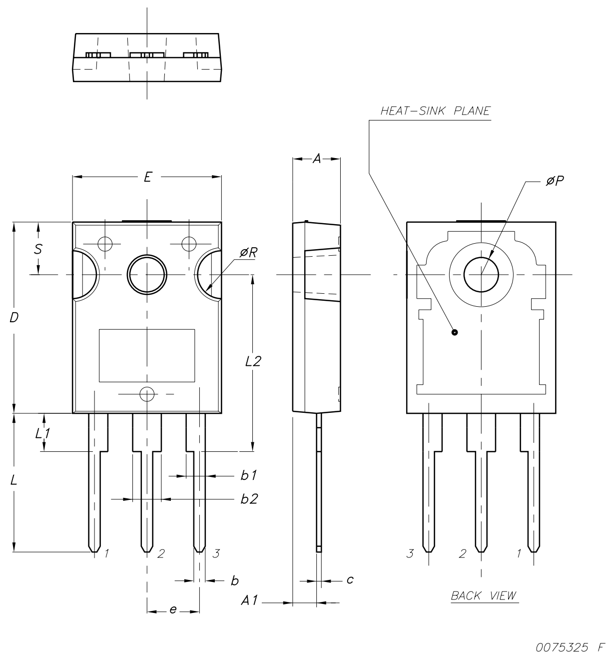
TO-3 mechanical data

DIM.	mm.		
	min.	typ	max.
A	11.00		13.10
B	0.97		1.15
C	1.50		1.65
D	8.32		8.92
E	19.00		20.00
G	10.70		11.10
N	16.50		17.20
P	25.00		26.00
R	4.00		4.09
U	38.50		39.30
V	30.00		30.30



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	



5 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Jun-2004	2	
18-Nov-2008	3	Package changed from TO-218 to TO-247 for BU941P.