

BU941ZP BU941ZPFI

High voltage ignition coil driver NPN power Darlington transistors

Features

- Very rugged bipolar technology
- Built in clamping Zener
- High operating junction temperature
- Fully insulated package (U.L. compliant) for easy mounting

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.

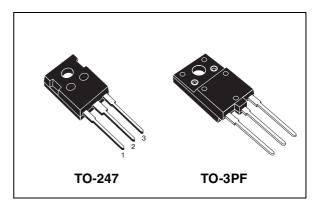


Figure 1. Internal schematic diagram

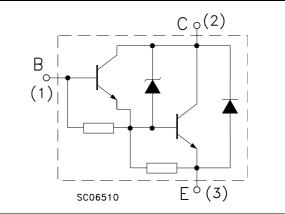


Table 1. Device summary

Order code	Marking	Packages	Packaging
BU941ZP	BU941ZP	TO-247	Tube
BU941ZPFI	BU941ZPFI	TO-3PF	Tube

57

1 Absolute maximum ratings

Table 2.	Absolute	maximum	ratings
	Absolute	maximum	ruungo

Symbol	Parameter	Va	Unit	
Symbol	Falameter	BU941ZP	BU941ZPFI	Onit
V _{CEO}	Collector-emitter voltage ($I_B = 0$)	3	50	V
V _{EBO}	Emitter-base voltage (I _C = 0)		5	V
Ι _C	Collector current 15		А	
I _{CM}	Collector peak current (t _p < 5ms) 30		А	
Ι _Β	Base current 1		А	
I _{BM}	Base peak current (t _p < 5ms)	5		А
P _{tot}	Total dissipation at $T_c \le 25 \text{ °C}$ 155 65		65	W
V _{isol}	Insulation withstand voltage (RMS) from all three leads to external heatsink		2500	V
T _{stg}	Storage temperature	-65 to 175	-65 to 175	°C
TJ	Max. operating junction temperature	175	175	°C

Table 3. Thermal data

Symbol	Parameter	TO-247	TO-3PF	Unit
R _{thj-case}	Thermal resistance junction-case max	0.97	2.3	°C/W

2 Electrical characteristics

($T_{case} = 25^{\circ}C$; unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CEO}	Collector cut-off current $(I_B = 0)$	V _{CE} = 300 V V _{CE} = 300 V T _j = 125 °C			100 0.5	μA mA
I _{EBO}	Emitter cut-off current $(I_{C} = 0)$	V _{EB} = 5 V			20	mA
V _{Clamp} ⁽¹⁾	Clamping voltage	I _C = 100 mA	350		500	V
V _{CE(sat)} ⁽¹⁾	Collector-emitter saturation voltage	$I_{C} = 8 A \qquad I_{B} = 100 \text{ mA}$ $I_{C} = 10 A \qquad I_{B} = 250 \text{ mA}$ $I_{C} = 12 A \qquad I_{B} = 300 \text{ mA}$			1.8 1.8 2	V V V
V _{BE(sat)} ⁽¹⁾	Collector-emitter base voltage	$I_{C} = 8 A \qquad I_{B} = 100 \text{ mA}$ $I_{C} = 10 A \qquad I_{B} = 250 \text{ mA}$ $I_{C} = 12 A \qquad I_{B} = 300 \text{ mA}$			2.2 2.5 2.7	V V V
h _{FE} ⁽¹⁾	DC current gain	I _C = 5 A V _{CE} = 10 V	300			
	Functional test	V _{CC} = 24 V L = 7 mH <i>Figure 13.</i>	10			A
t _s t _f	Inductive load Storage time Fall time	$\begin{split} V_{CC} &= 12 \ V & L = 7 \ mH \\ V_{BE(off)} &= 0 \ V & R_{BE} = 47 \ \Omega \\ V_{Clamp} &= 300 \ V & I_{C} = 7 \ A \\ I_{B1} &= 70 \ mA \end{split}$		15 0.5		μs μs
V _F	Diode forward voltage	I _F = 10 A			2.5	V

 Table 4.
 Electrical characteristics

1. Pulsed duration = 300 μ s, duty cycle \leq 1.5%.

57

2.1 Electrical characteristic (curves)

Figure 2. Safe operating area

Figure 3. Derating curve

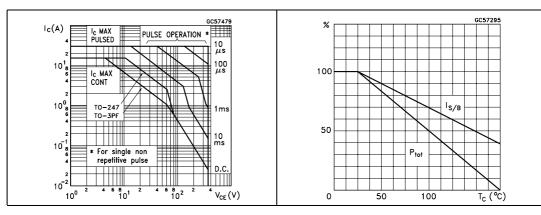


Figure 4. DC current gain

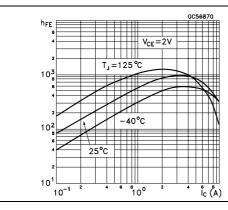
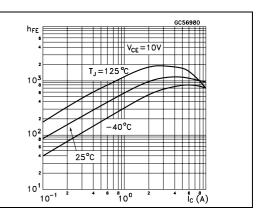
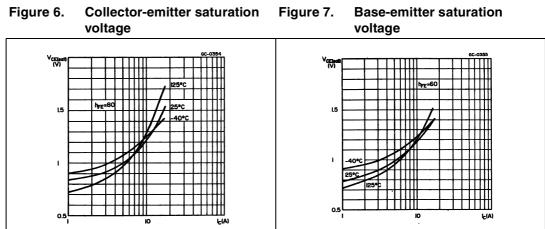


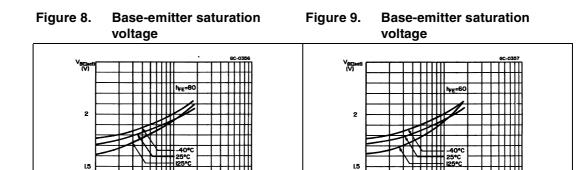
Figure 5. DC current gain



57



ic(A)



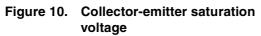
Ic(A)

1.5

T

1

ю



 \pm

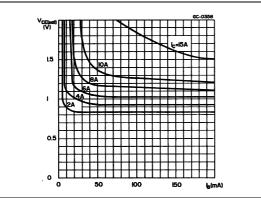
пп

ю

1.5

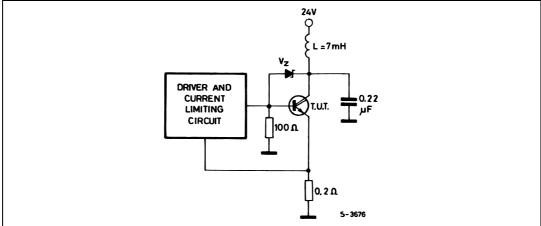
ı.

1



2.2 **Test circuit**

Figure 11. Functional test circuit



57

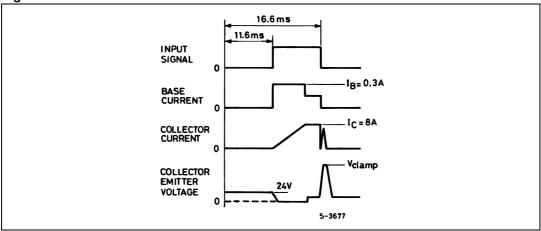
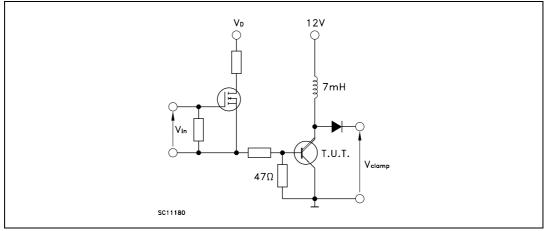




Figure 13. Switching time test circuit

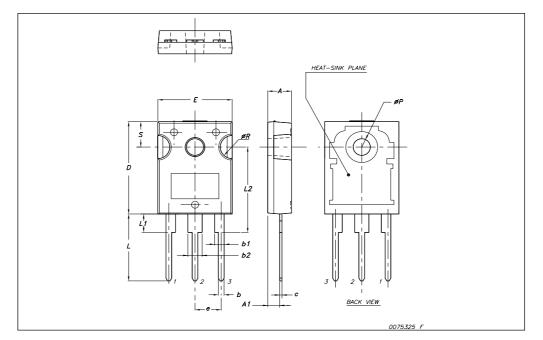


3 Package mechanical data

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

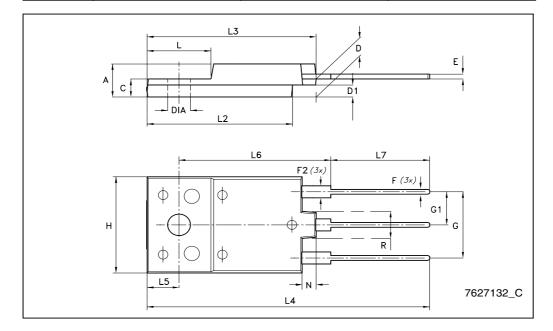


	TO-247 Mechanical data			
Dim.		mm.		
	Min.	Тур	Max.	
A	4.85		5.15	
A1	2.20		2.60	
b	1.0		1.40	
b1	2.0		2.40	
b2	3.0		3.40	
с	0.40		0.80	
D	19.85		20.15	
E	15.45		15.75	
е		5.45		
L	14.20		14.80	
L1	3.70		4.30	
L2		18.50		
øP	3.55		3.65	
øR	4.50		5.50	
S		5.50		





	TO-3PF mechanical data			
DIM.		mm.		
	min.	typ	max.	
A	5.30		5.70	
С	2.80		3.20	
D	3.10		3.50	
D1	1.80		2.20	
E	0.80		1.10	
F	0.65		0.95	
F2	1.80		2.20	
G	10.30		11.50	
G1		5.45		
н	15.30		15.70	
L	9.80	10	10.20	
L2	22.80		23.20	
L3	26.30		26.70	
L4	43.20		44.40	
L5	4.30		4.70	
L6	24.30		24.70	
L7	14.60		15	
N	1.80		2.20	
R	3.80		4.20	
Dia	3.40		3.80	



4 Revision history

Table 5.	Document	revision	history
----------	----------	----------	---------

Date	Revision	Changes
03-Feb-2005	6	
22-Jan-2008	7	Package change from TO-218 to TO-247 and from ISOWATT218 to TO-3PF.



Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2008 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

