



# VB921ZVFI VB921ZVSP

## HIGH VOLTAGE IGNITION COIL DRIVER POWER I.C.

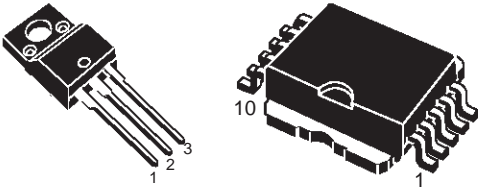
### ADVANCED DATA

TYPE	$V_{cl}$	$I_{cl}$	$V_{cg(sat)}$
VB921ZVFI	340V	7.5A	2.5V
VB921ZVSP			

- NO EXTERNAL COMPONENT REQUIRED
- INTEGRATED HIGH VOLTAGE CLAMP
- COIL CURRENT LIMIT INTERNALLY SET
- HIGH RUGGEDNESS

### DESCRIPTION

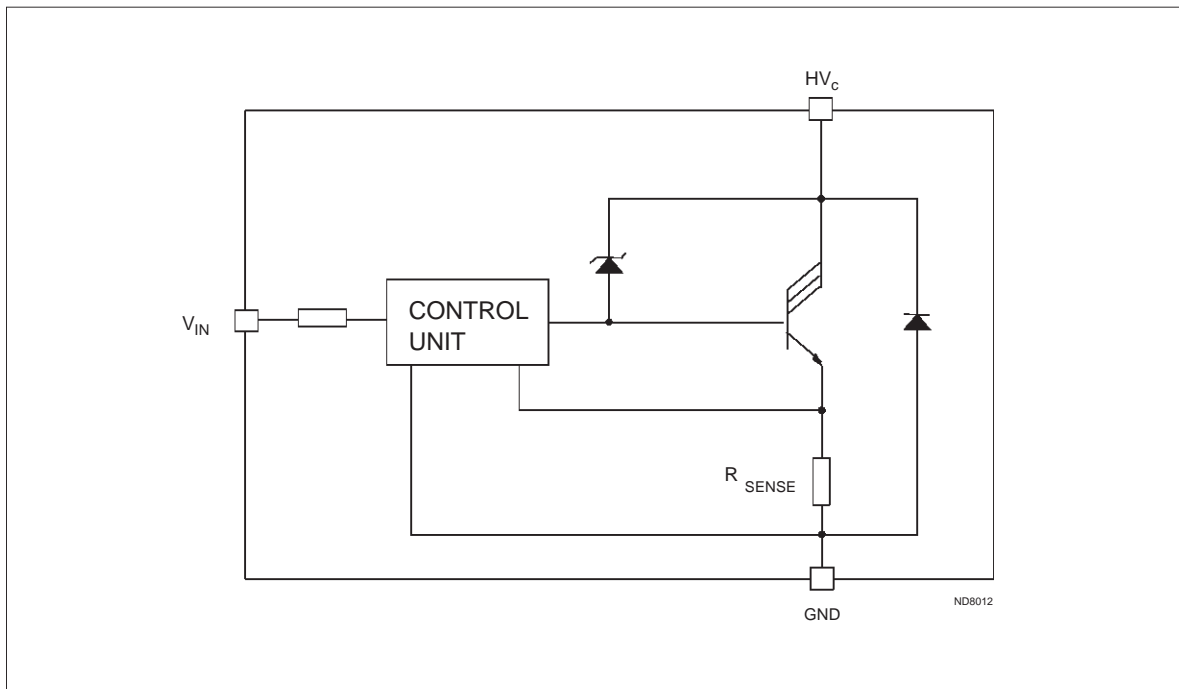
The VB921ZVFI, VB921ZVSP is a monolithic high voltage integrated circuit made using the STMicroelectronics VIPower™ technology, which combines a vertical current flow power transistor with a coil current limiting circuit and a collector voltage clamping. The device is particularly suitable for application in high performance electronic car ignition, where coil current limitation and voltage clamping are required.



**ISOWATT220**      **PowerSO-10™**

**ORDER CODES:**  
ISOWATT220      VB921ZVFI  
POWERSO-10™      VB921ZVSP

### BLOCK DIAGRAM



## VB921ZVFI / VB921ZVSP

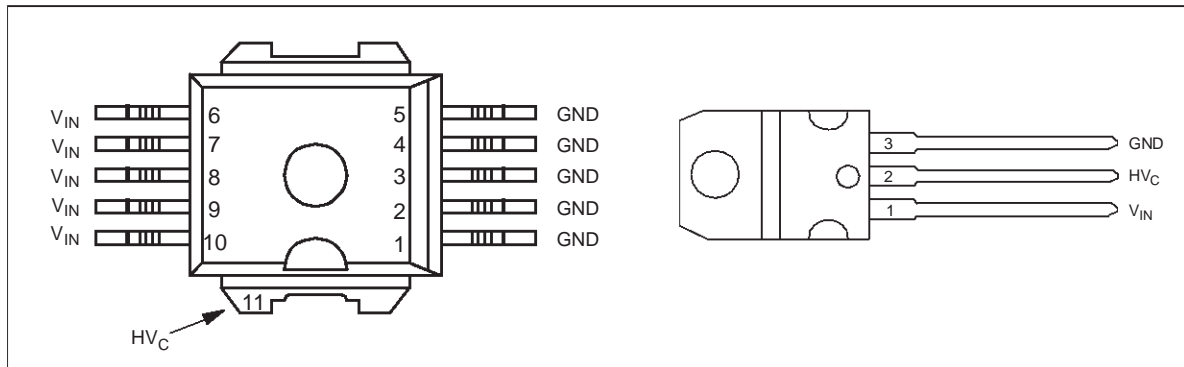
### ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value		Unit
		ISOWATT220	PowerSO-10	
$HV_C$	Collector Voltage	Internally limited		V
$I_C$	Collector Current	Internally limited		A
$V_{IN}$	Maximum Input Voltage	8		V
$I_{IN}$	Input current	10		mA
$P_{tot}$	Total dissipation at $T_C=25^\circ\text{C}$	40	100	W
$T_j$	Junction operating temperature	- 40 to 150		$^\circ\text{C}$
$T_{stg}$	Storage temperature	- 40 to 150		$^\circ\text{C}$

### THERMAL DATA

Symbol	Parameter	Value		Unit
		ISOWATT220	PowerSO-10	
$R_{thj-case}$	Thermal resistance junction-case (MAX)	3.12	1.25	$^\circ\text{C}/\text{W}$
$R_{thj-amb}$	Thermal resistance junction-ambient (MAX)	62.5	62.5	$^\circ\text{C}/\text{W}$

### CONNECTION DIAGRAM (TOP VIEW)



### ELECTRICAL CHARACTERISTICS ( $V_{CC}=12\text{V}$ ; $T_{case}=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$V_{IN}$	Input Voltage		4.2		5.5	V
$I_{IN}$	Input Current	$V_{IN}=4.2\text{V}$ ; $I_C=5\text{A}$ (See test circuit) $V_{IN}=5\text{V}$ ; $I_C=5\text{A}$			5 10	mA mA
$I_{cgo}$	Collector Cut-off Current	$V_{IN}=0\text{V}$ ; $HV_C=250\text{V}$			250	$\mu\text{A}$
$V_{cl} (*)$	High voltage clamp	$-40^\circ\text{C} < T_j < 125^\circ\text{C}$	340		440	V
$I_{cl} (*)$	Coil Current Limit	$V_{IN}=4.2\text{V}$ ; $-40^\circ\text{C} < T_j < 125^\circ\text{C}$ $V_{IN}=5\text{V}$ ; $-40^\circ\text{C} < T_j < 125^\circ\text{C}$ (See note 1)	6 6.5		7.5	A A
$V_{cg(sat)}$	Power Stage Saturation Voltage	$I_C=5\text{A}$ ; $I_{IN}=10\text{mA}$			2.5	V
$V_f (**)$	Diode Forward Voltage	$I_f=10\text{A}$			3.5	V
$\Delta I_{cl}$	Coil current variation in respect to $V_{IN}=5\text{V}$	$V_{IN}=4.5 \div 5.5\text{V}$			200	mA

(\*) Coil data: primary resistance  $R_C=0.4 \div 0.8\Omega$ , primary inductance  $L_C=6 \div 8\text{mH}$

(\*\*) Pulsed: pulse duration= 300 $\mu\text{s}$ , duty cycle=1.5%

NOTE 1:  $I_{cl}$  is also controlled in respect to the variation of  $V_{IN}$  between 4.5 and 5.5V

FIGURE 1: Delay-off time Vs Temperature

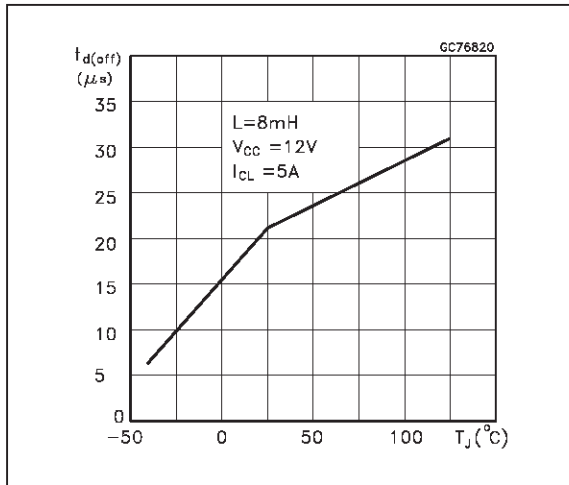


FIGURE 2: Input current Vs Temperature

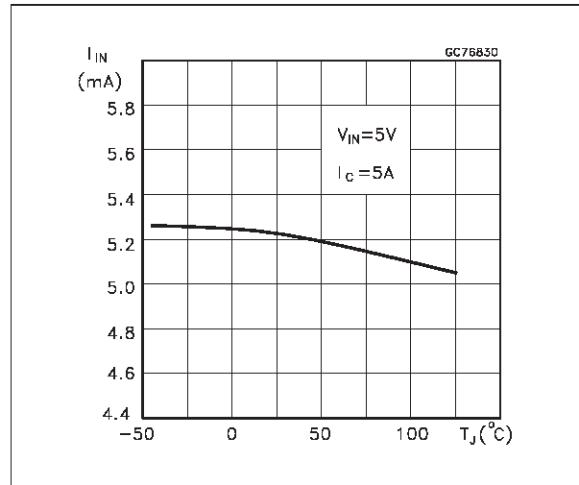


FIGURE 3: Saturation Voltage VS Collector Current

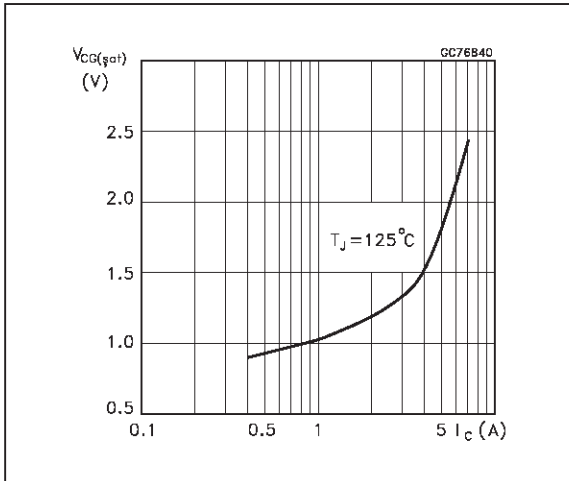


FIGURE 4: Diode Forward Voltage VS Temperature

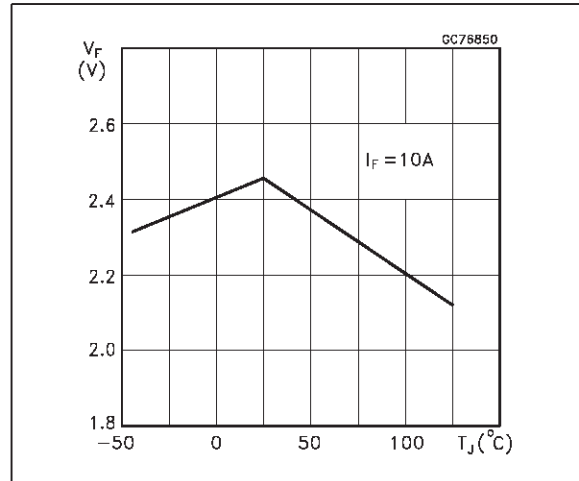


FIGURE 5: Coil Current Limit Vs Temperature

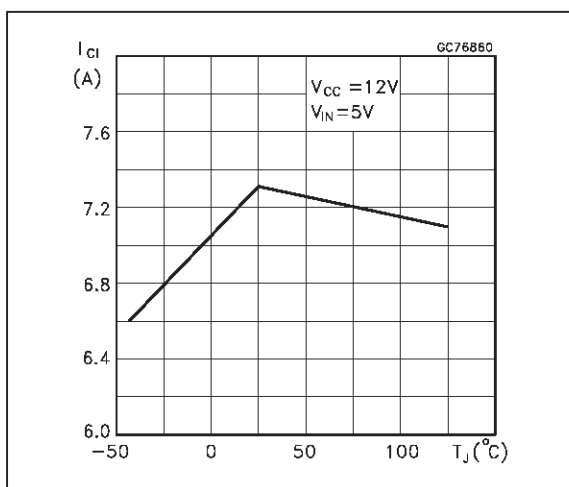


FIGURE 6: Clamping Voltage VS Temperature

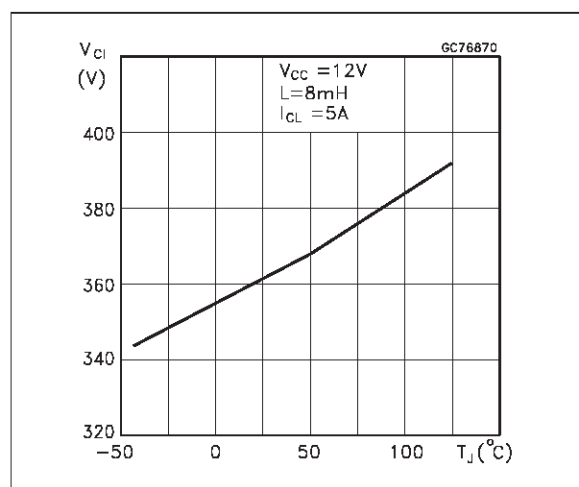
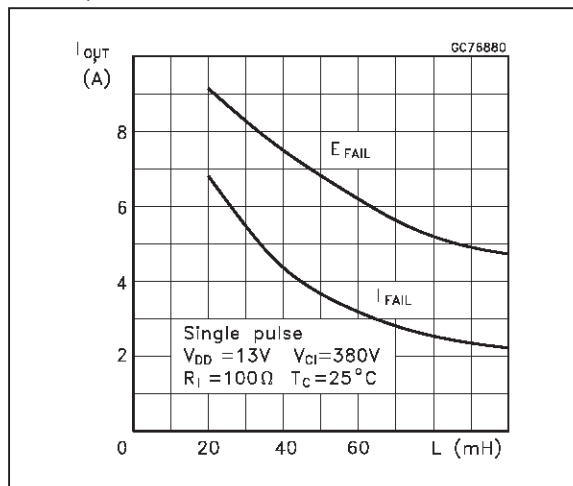
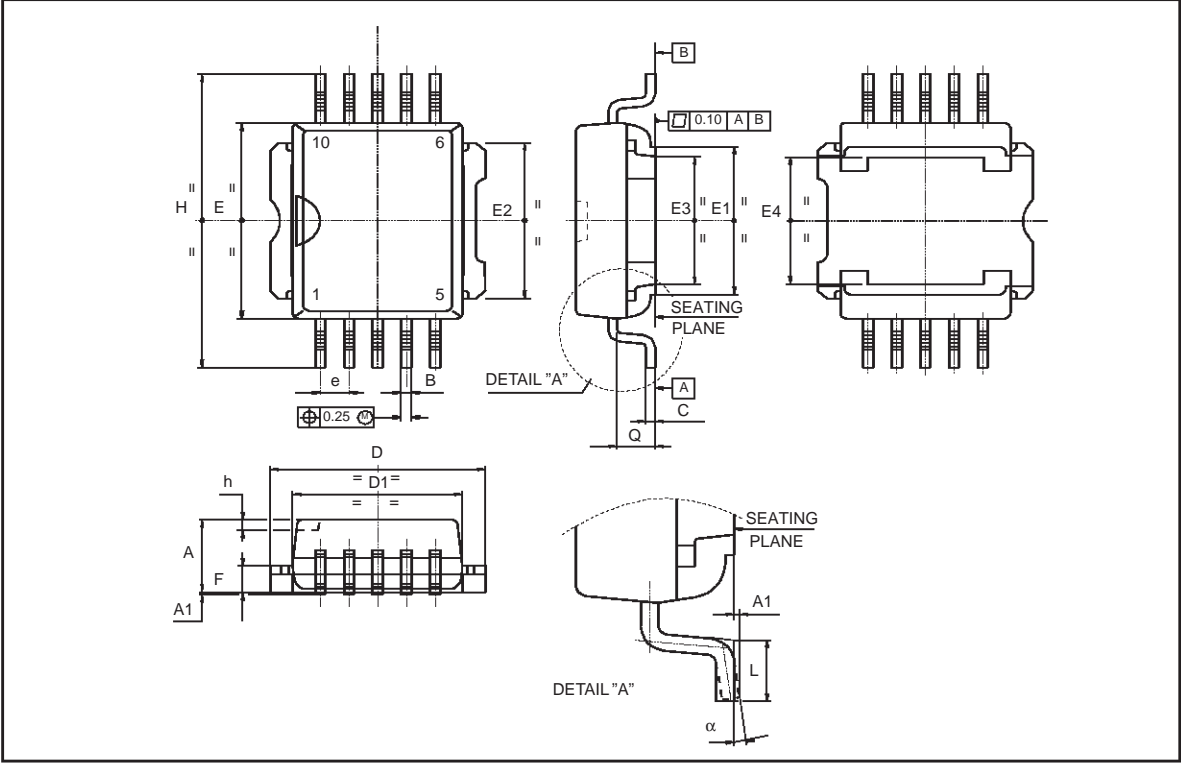


FIGURE 7: Maximum Energy and Output Current Unclamped



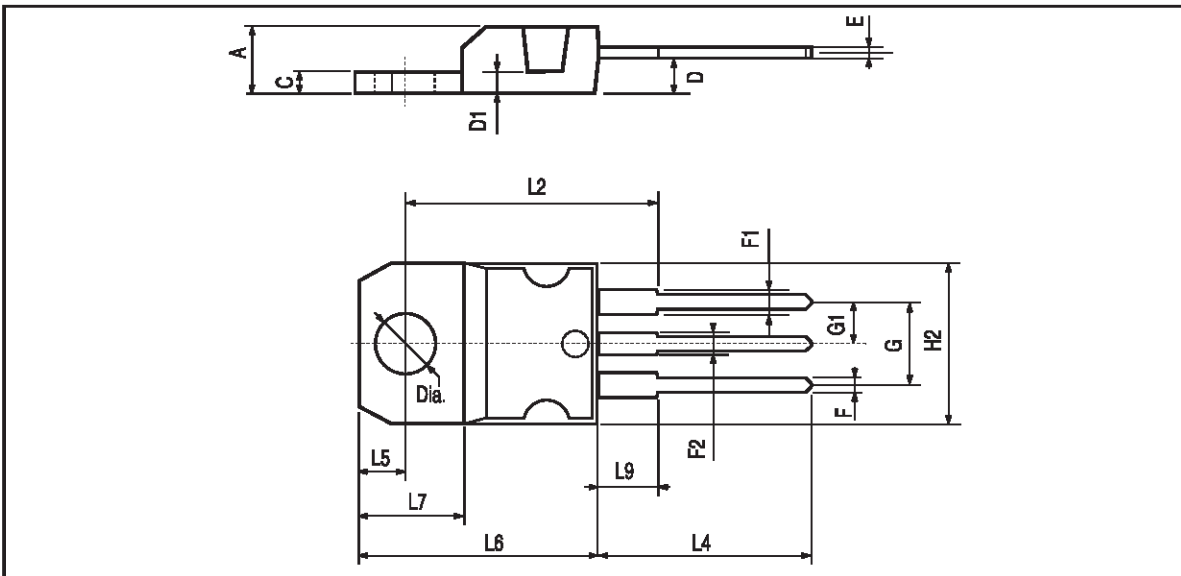
**PowerSO-10™ MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	3.35		3.65	0.132		0.144
A1	0.00		0.10	0.000		0.004
B	0.40		0.60	0.016		0.024
c	0.35		0.55	0.013		0.022
D	9.40		9.60	0.370		0.378
D1	7.40		7.60	0.291		0.300
E	9.30		9.50	0.366		0.374
E1	7.20		7.40	0.283		0.291
E2	7.20		7.60	0.283		300
E3	6.10		6.35	0.240		0.250
E4	5.90		6.10	0.232		0.240
e		1.27			0.050	
F	1.25		1.35	0.049		0.053
H	13.80		14.40	0.543		0.567
h		0.50			0.002	
Q		1.70			0.067	
α	0°		8°			



**TO-220 MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137	0.154	
DIA.	3.75		3.85	0.147		0.151



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in ITALY- All Rights Reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco -  
The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.