



# VB921ZVFI VB921ZVSP

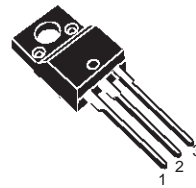
## HIGH VOLTAGE IGNITION COIL DRIVER POWER I.C.

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

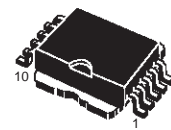
- NO EXTERNAL COMPONENT REQUIRED
- INTEGRATED HIGH VOLTAGE CLAMP
- COIL CURRENT LIMIT INTERNALLY SET
- HIGH RUGGEDNESS

### DESCRIPTION

The VB921ZVFI, VB921ZVSP is a monolithic high voltage integrated circuit made using the STMicroelectronics VIPower™ M1-2 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



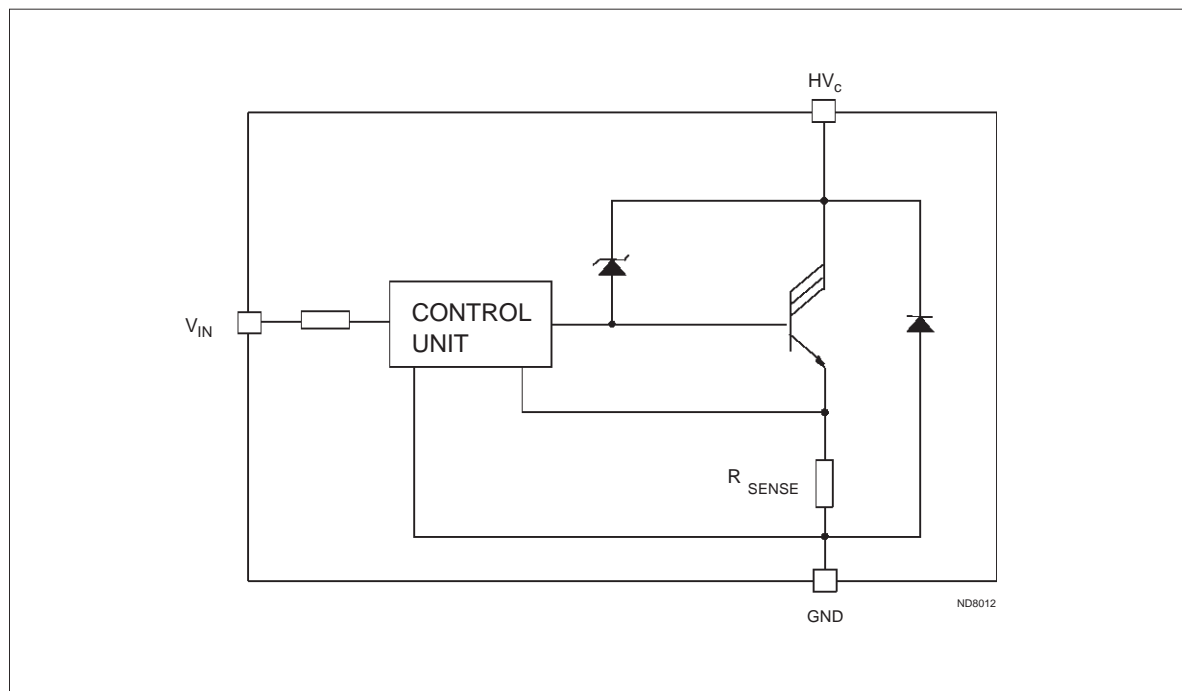
PowerSO-10™

### ORDER CODES:

ISOWATT220  
POWERSO-10™

VB921ZVFI  
VB921ZVSP

### BLOCK DIAGRAM



## VB921ZVFI / VB921ZVSP

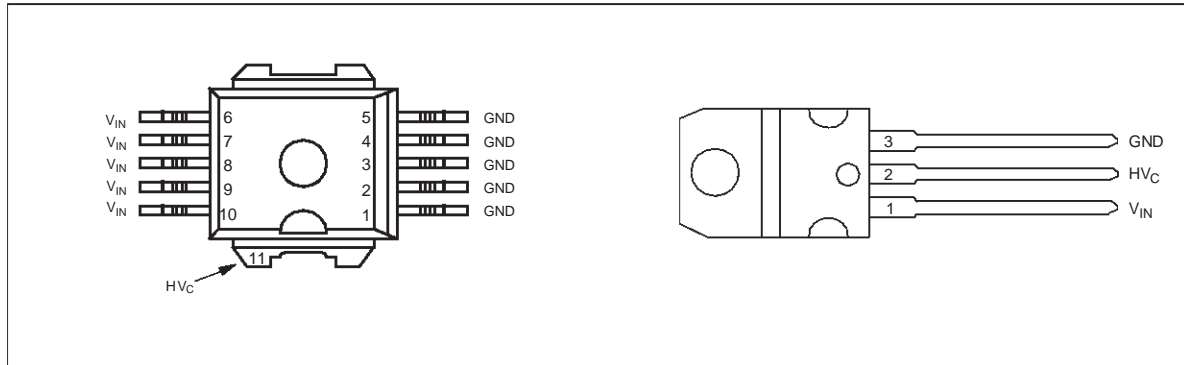
### ABSOLUTE MAXIMUM RATING

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	$^\circ\text{C/W}$
$R_{thj-amb}$	Thermal resistance junction-ambient (MAX)	62.5	62.5	$^\circ\text{C/W}$

### 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

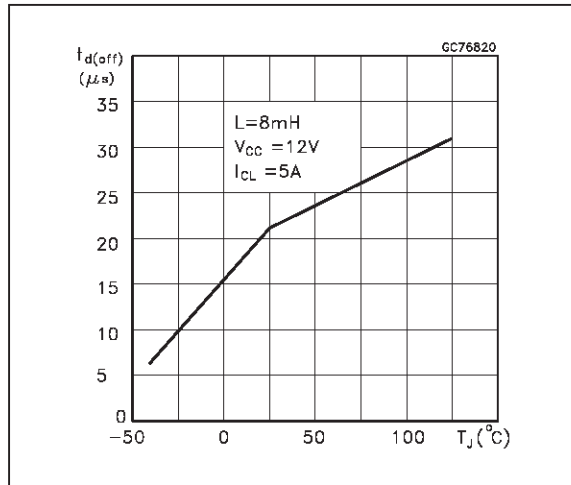


FIGURE 2: Input current Vs Temperature

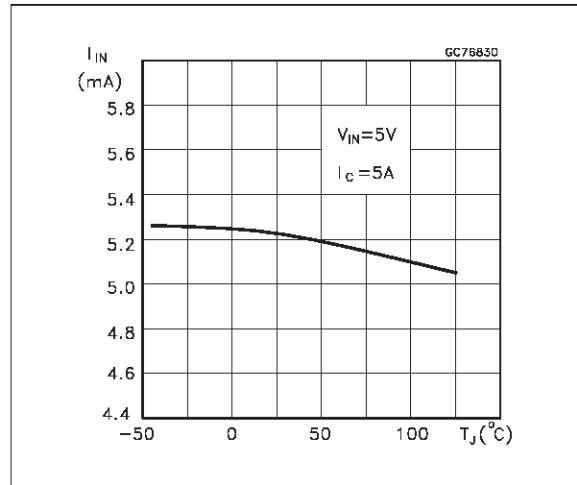


FIGURE 3: Saturation Voltage VS Collector Current

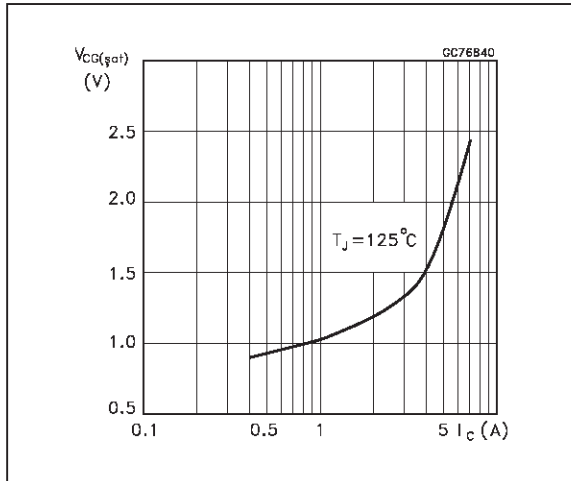


FIGURE 4: Diode Forward Voltage VS Temperature

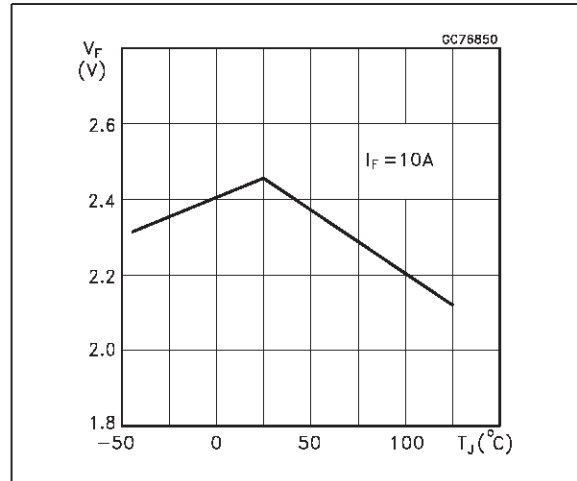


FIGURE 5: Coil Current Limit Vs Temperature

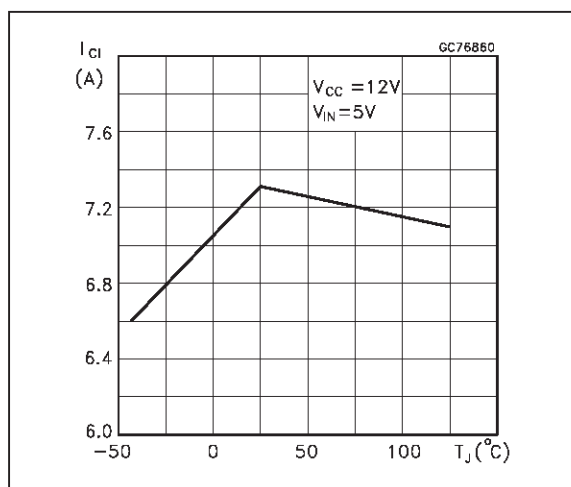
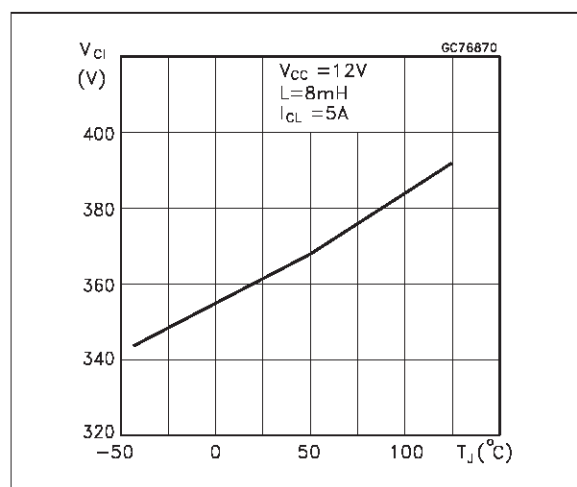
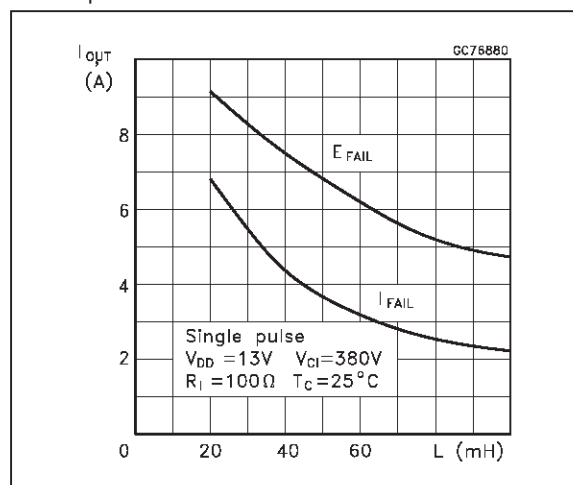


FIGURE 6: Clamping Voltage VS Temperature

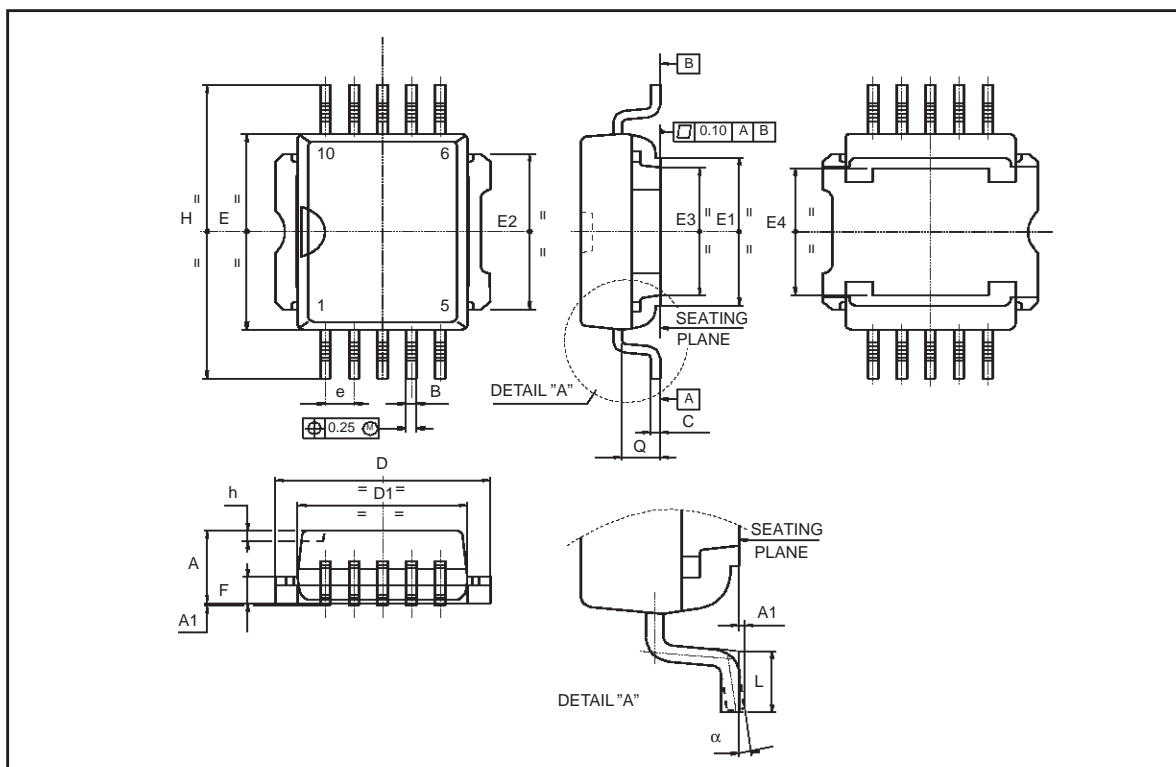


**FIGURE 7:** Maximum Energy and Output Current Unclamped



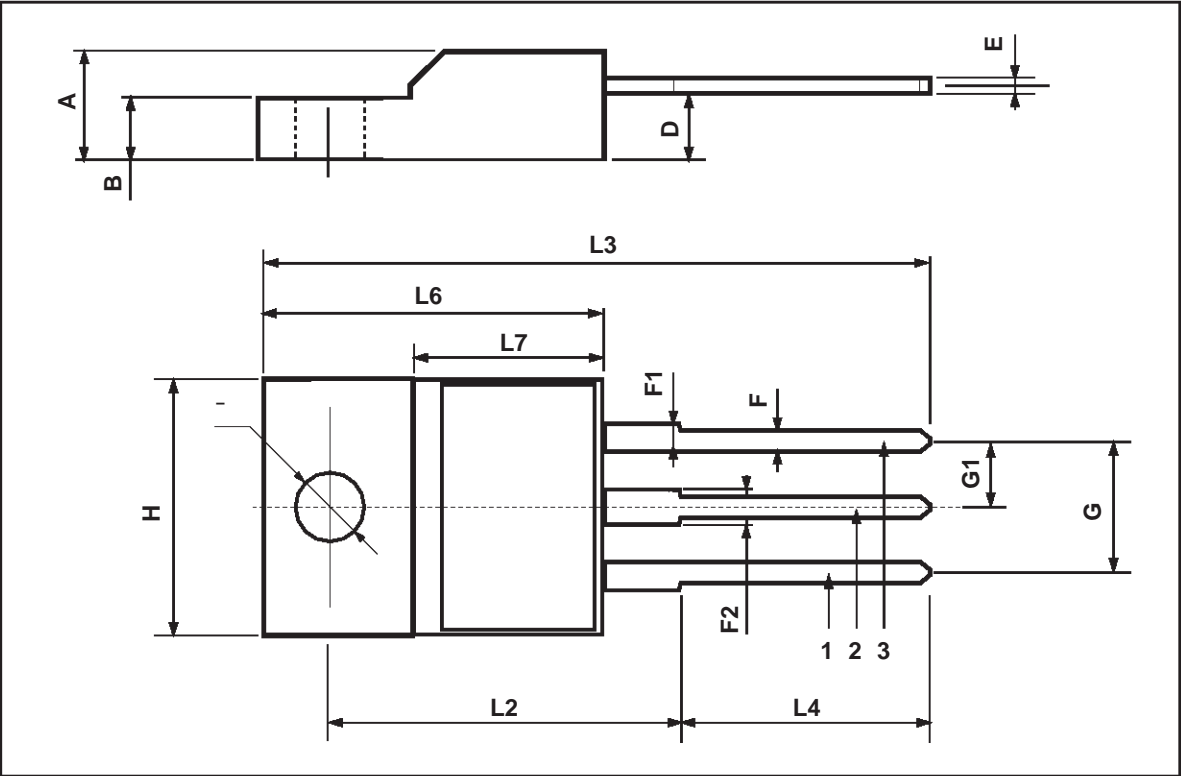
# PowerSO-10™ MECHANICAL DATA

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	
$\alpha$	0°		8°			



ISOWATT220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.4		0.7	0.015		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
	3		3.2	0.118		0.126



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