L6386

HIGH-VOLTAGE HIGH AND LOW SIDE DRIVER

PRODUCT PREVIEW

- HIGH VOLTAGE RAIL UP TO 600V
- dV/dt IMMUNITY +- 50 V/nsec iN FULL TEMPERATURE RANGE
- DRIVER CURRENT CAPABILITY:
  400 mA SOURCE,
  650 mA SINK
- SWITCHING TIMES 50/30 nsec RISE/FALL WITH 1nF LOAD
- CMOS/TTL SCHMITT TRIGGER INPUTS WITH HYSTERESIS AND PULL DOWN
- UNDER VOLTAGE LOCK OUT ON LOWER AND UPPER DRIVING SECTION
- INTEGRATED BOOTSTRAP DIODE

SO14 **DIP14**

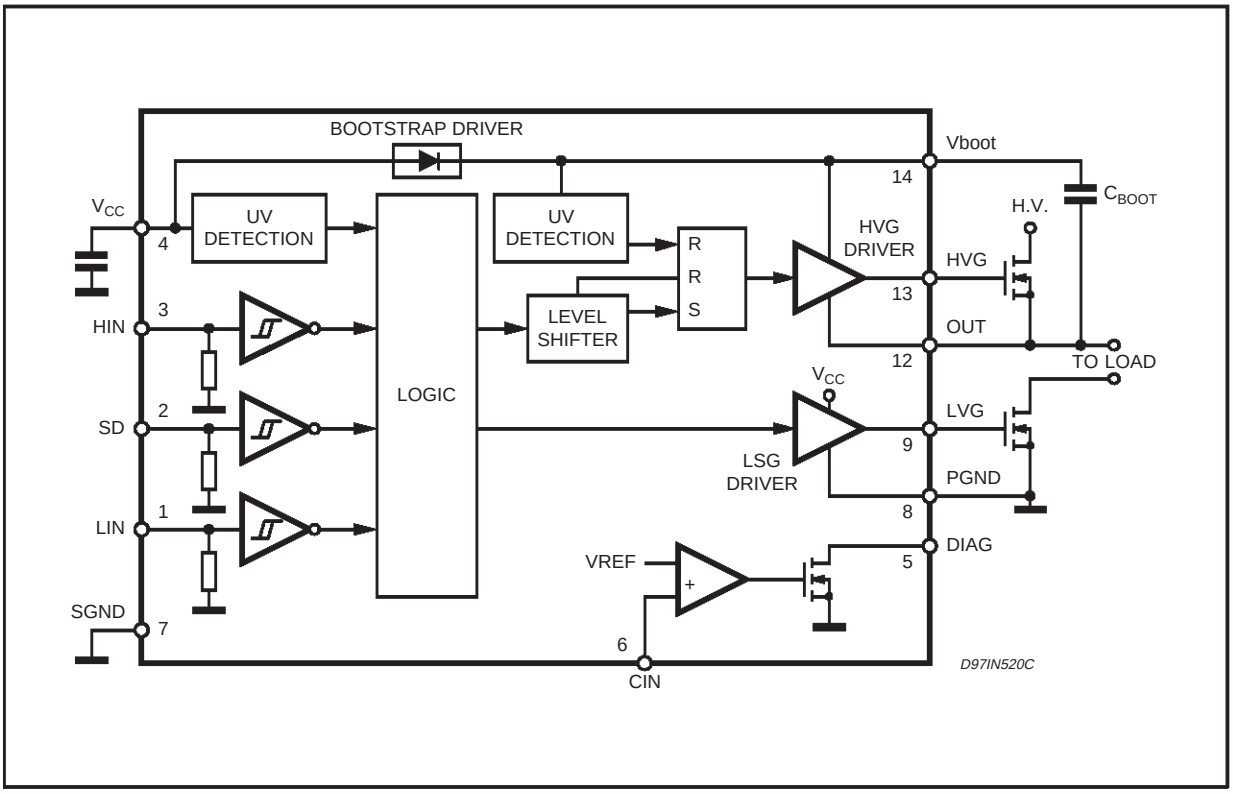
ORDERING NUMBERS:

L6386D L6386

DESCRIPTION

The L6386 is an high-voltage device, manufactured with the BCD "OFF-LINE" technology. It has a Driver structure that enables to drive N Channel Power MOS or IGBT. The Upper (Floating) Section is enabled to work with voltage Rail up to 600V. The Logic Inputs are CMOS/TTL compatible for ease of interfacing with controlling devices. Matched delays between Lower and upper Section simplifie high frequency operation.

BLOCK DIAGRAM

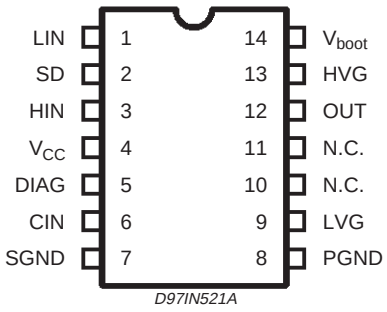


ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
Vout	Output Voltage	-1 to Vboot - 18	V
Vcc	Supply Voltage	- 0.3 to +18	V
Vboot	Floating Supply Voltage	-1 to 618	V
Vhvg	Upper Gate Output Voltage	- 1 to Vboot	V
Vlvg	Lower Gate Output Voltage	-0.3 to Vcc +0.3	V
Vi	Logic Input Voltage	-0.3 to Vcc +0.3	V
Vdiag	Open Drain Forced Voltage	tbd	V
Vin	Comparator Input Voltage	-0.3 to Vcc +0.3	V
dVout/dt	Allowed Output Slew Rate	50	V/ns
Ptot	Total Power Dissipation (Tj = 85 °C)	800	mW
Tj	Junction Temperature	150	°C
Ts	Storage Temperature	-40 to 150	°C

Note: ESD immunity for pins 12, 13 and 14 is guaranteed up to 900V (Human Body Model)

PIN CONNECTION



D97IN521A

THERMAL DATA

Symbol	Parameter	SO14	DIP14	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction to Ambient	165	100	°C/W

PIN DESCRIPTION

N.	Name	Type	Function
1	LIN	I	Lower Driver Logic Input
2	SD	I	Shut Down Logic Input
3	HIN	I	Upper Driver Logic Input
4	VCC	I	Low Voltage Supply
5	DIAG	O	Open Drain Diagnostic Output
6	CIN	I	Comparator Input
7	SGND		Ground
8	PGND		Power Ground
9	LVG	O	Low Side Driver Output
10, 11	N.C.		Not Connected
12	OUT	O	Upper Driver Floating Driver
13	HVG	O	High Side Driver Output
14	Vboot		Bootstrapped Supply Voltage

RECOMMENDED OPERATING CONDITIONS

Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Vout	12	Output Voltage		Note1		580	V
Vboot-Vout	14	Floating Supply Voltage		Note1		17	V
fsw		Switching Frequency	HVG,LVG load CL = 1nF			400	kHz
Vcc	4	Supply Voltage				17	V

Note 1: if the condition Vboot - Vout < 18V is guaranteed, Vout can range from -3 to 580V.

ELECTRICAL CHARACTERISTICS
AC Operation (Vcc = 15V; Tj = 25°C)

Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
ton	1.3 vs 9, 13	High/Low Side Driver Turn-On Propagation Delay	Vout = 0V		100		ns
toff		High/Low Side Driver Turn-Off Propagation Delay	Vout = 0V		105		ns
tsd	2 vs 9,13	Shut Down to High/Low Side Propagation Delay	Vout = 0V		105		ns
tr	13,9	Rise Time	CL = 1000pF		50		ns
tf	13,9	Fall Time	CL = 1000pF		30		ns

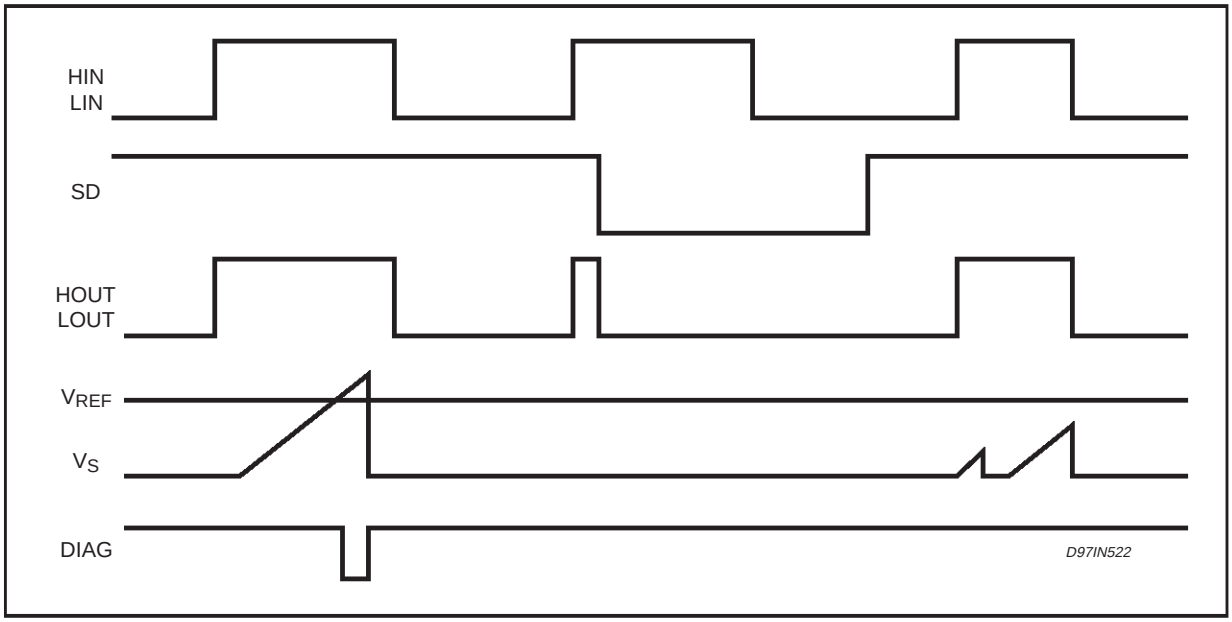
DC Operation (Vcc = 15V; Tj = 25°C)

Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Low Supply Voltage Section							
Vcc	4	Supply Voltage				17	V
Vccth1		Vcc UV Turn On Threshold		11.5	12	12.5	V
Vccth2		Vcc UV Turn Off Threshold		9.5	10	10.5	V
Vcchys		Vcc UV Hysteresis			2		V
Iqccu		Undervoltage Quiescent Supply Current	Vcc ≤ 11V		150		µA
Iqcc		Quiescent Current	Vcc = 15V		380	500	µA
Bootstrapped Supply Section							
Vboot	14	Bootstrapped Supply Voltage				17	V
Vbth1		Vboot UV Turn On Threshold		10.7	11.9	12.9	V
Vbth2		Vboot UV Turn Off Threshold		8.8	9.9	10.7	V
Vbhys		Vboot UV Hysteresis			2		V
Iqboot		Vboot Quiescent Current	Vout = Vboot			200	µA
Ilk		Leakage Current	Vout = Vboot = 600V			10	µA
Rdon		Bootstrap Diode on Resistance	Vcc ≥ 12.5V; Vin = 0V		200		Ω
Driving Buffers Section							
Iso	9, 13	High/Low Side Driver Short Circuit Source Current	VIN = Vih (tp < 10µs)	300	400		mA
Isi		High/Low Side Driver Short Circuit Sink Current		500	650		mA
Logic Inputs							
Vil	1,2,3	Low Level Logic Threshold Voltage				1.5	V
Vih		High Level Logic Threshold Voltage		3.6			V
Iih		High Level Logic Input Current	VIN = 15V		50	70	µA
Iil		Low Level Logic Input Current	VIN = 0V			1	µA

DC OPERATION (continued)

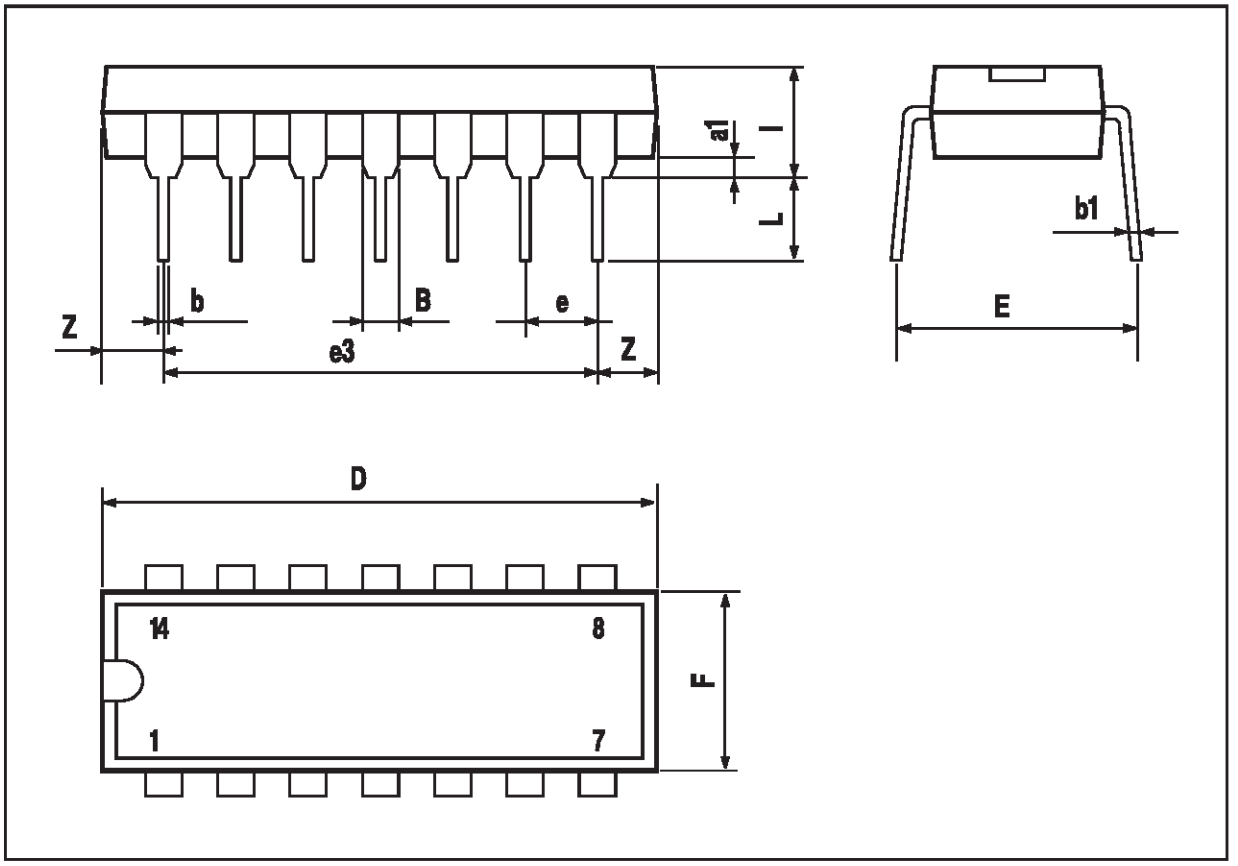
Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Sense Comparator							
Vio		Input Offset Voltage		-10		10	mV
Iio	6	Input Bias Current	Vcin ≥ 0.5		0.2		µA
Vol	2	Open Drain Low Level Output Voltage, Iod = -2.5mA				0.8	V
Vref		Comparator Reference voltage		0.460	0.5	0.540	V

TIMING WAVEFORMS



DIP14 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	1.39		1.65	0.055		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		15.24			0.600	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z	1.27		2.54	0.050		0.100



SO14 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.009
a2			1.6			0.063
b	0.35		0.46	0.014		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.020	
c1	45° (typ.)					
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.150		0.050
M			0.68			0.027
S	8° (max.)