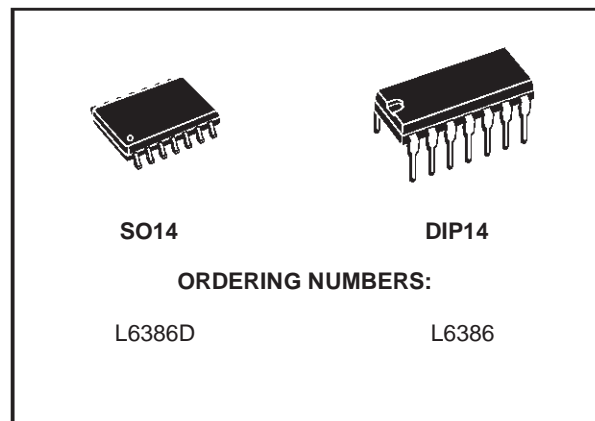




## HIGH-VOLTAGE HIGH AND LOW SIDE DRIVER

PRODUCT PREVIEW

- HIGH VOLTAGE RAIL UP TO 600V
- $dV/dt$  IMMUNITY  $\pm 50$  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

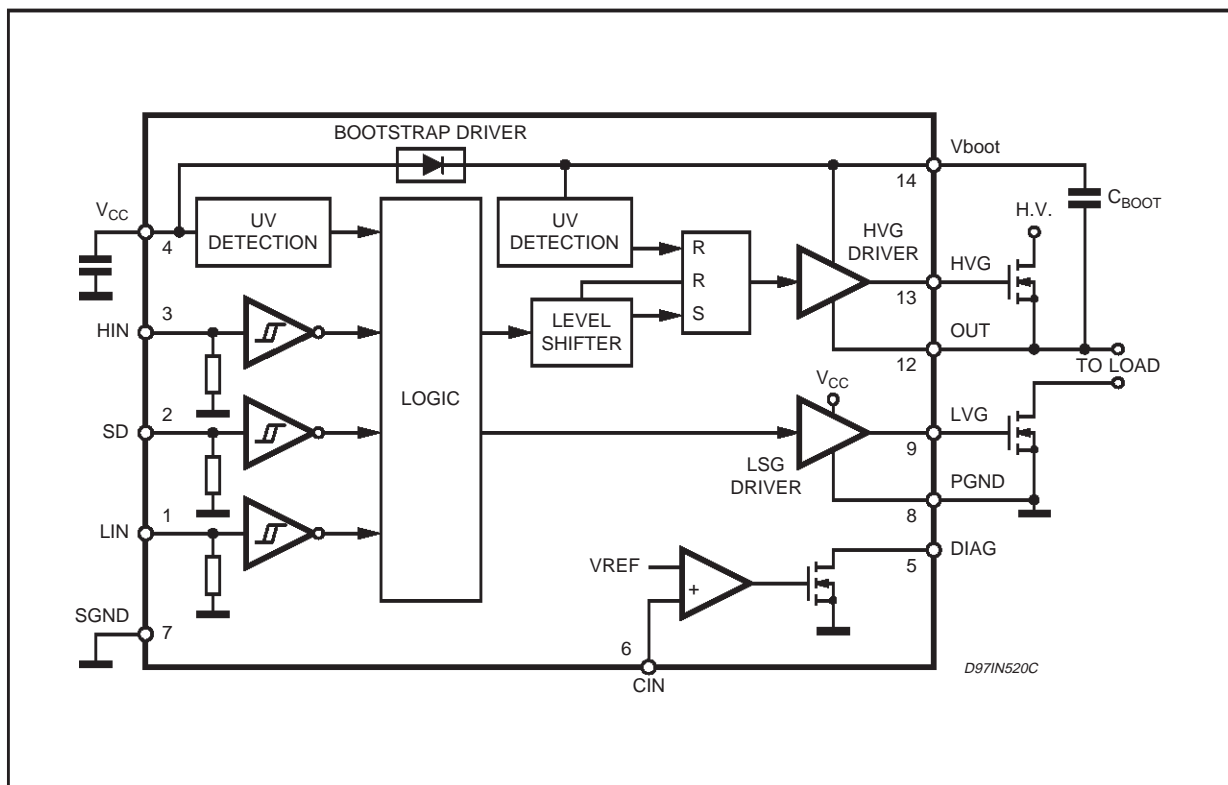


### DESCRIPTION

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) Sec-

tion 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

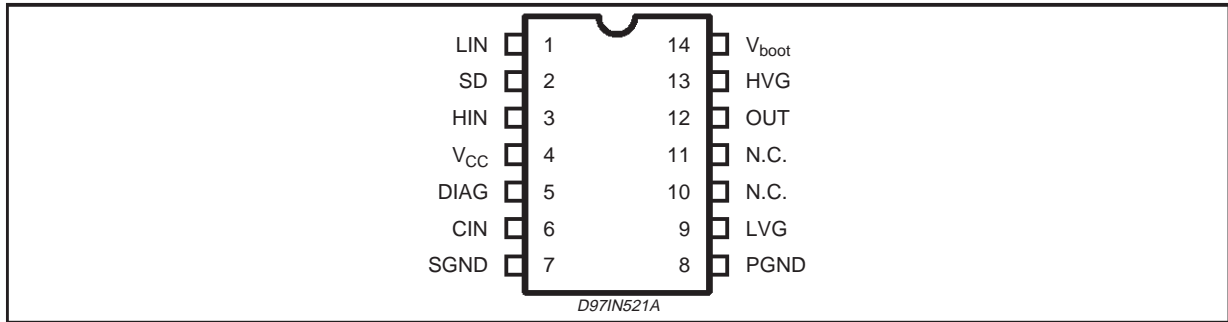


**ABSOLUTE MAXIMUM RATINGS**

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**



**THERMAL DATA**

Symbol	Parameter	SO14	DIP14	Unit
R <sub>th j-amb</sub>	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	13	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

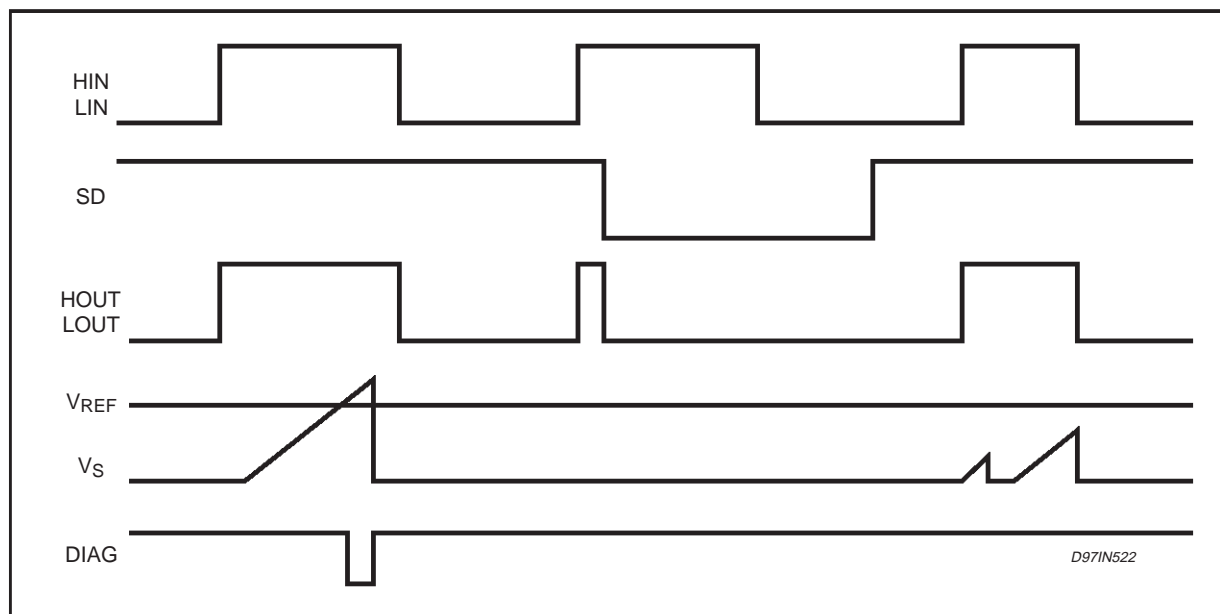
## DC Operation (Vcc = 15V; Tj = 25°C)

Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Low Supply Voltage Section</b>							
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
<b>Bootstrapped Supply Section</b>							
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
Iik		Leakage Current	Vout = Vboot = 600V			10	μA
Rdon		Bootstrap Diode on Resistance	Vcc ≥ 12.5V; Vin = 0V		200		Ω
<b>Driving Buffers Section</b>							
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
<b>Logic Inputs</b>							
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)

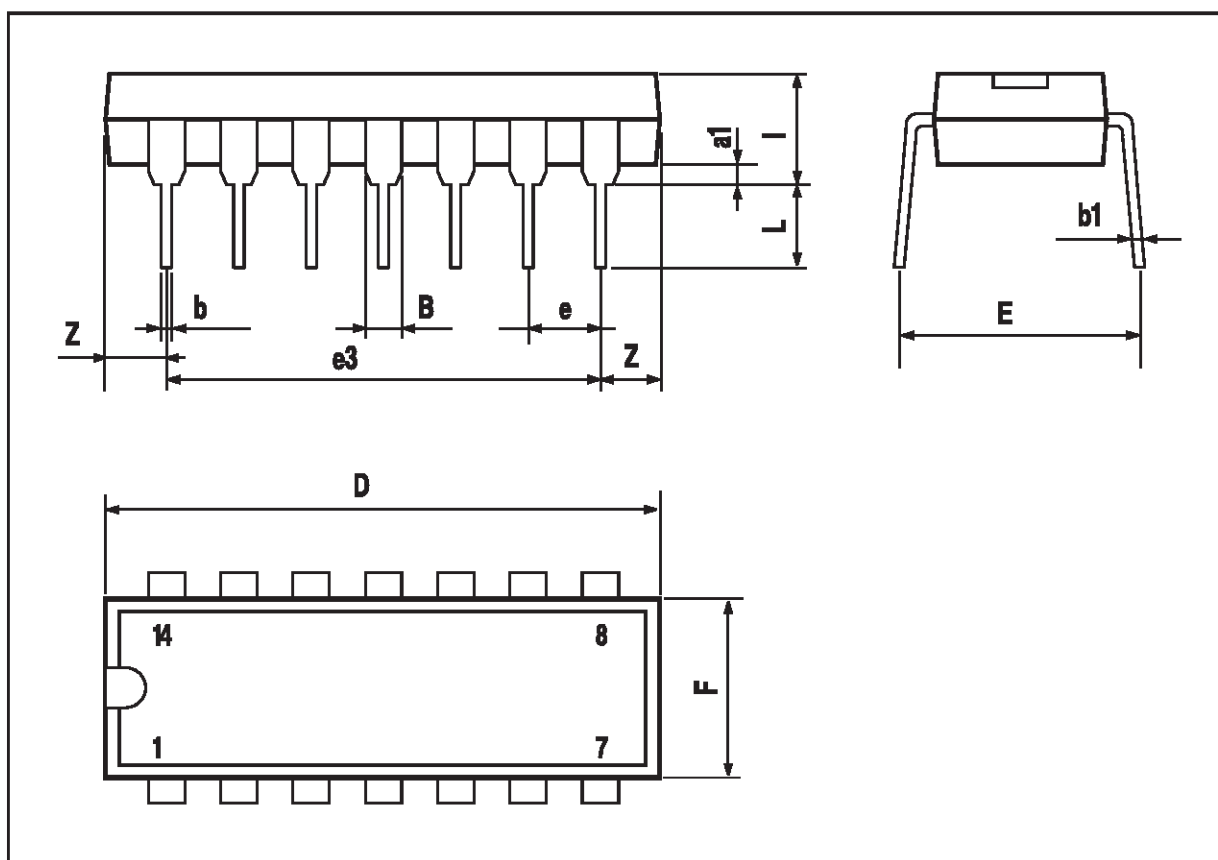
Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Sense Comparator</b>							
Vio		Input Offset Voltage		-10		10	mV
Iio	6	Input Bias Current	$V_{cin} \geq 0.5$		0.2		$\mu A$
Vol	2	Open Drain Low Level Output Voltage, $I_{od} = -2.5mA$				0.8	V
Vref		Comparator Reference voltage		0.460	0.5	0.540	V

## TIMING WAVEFORMS



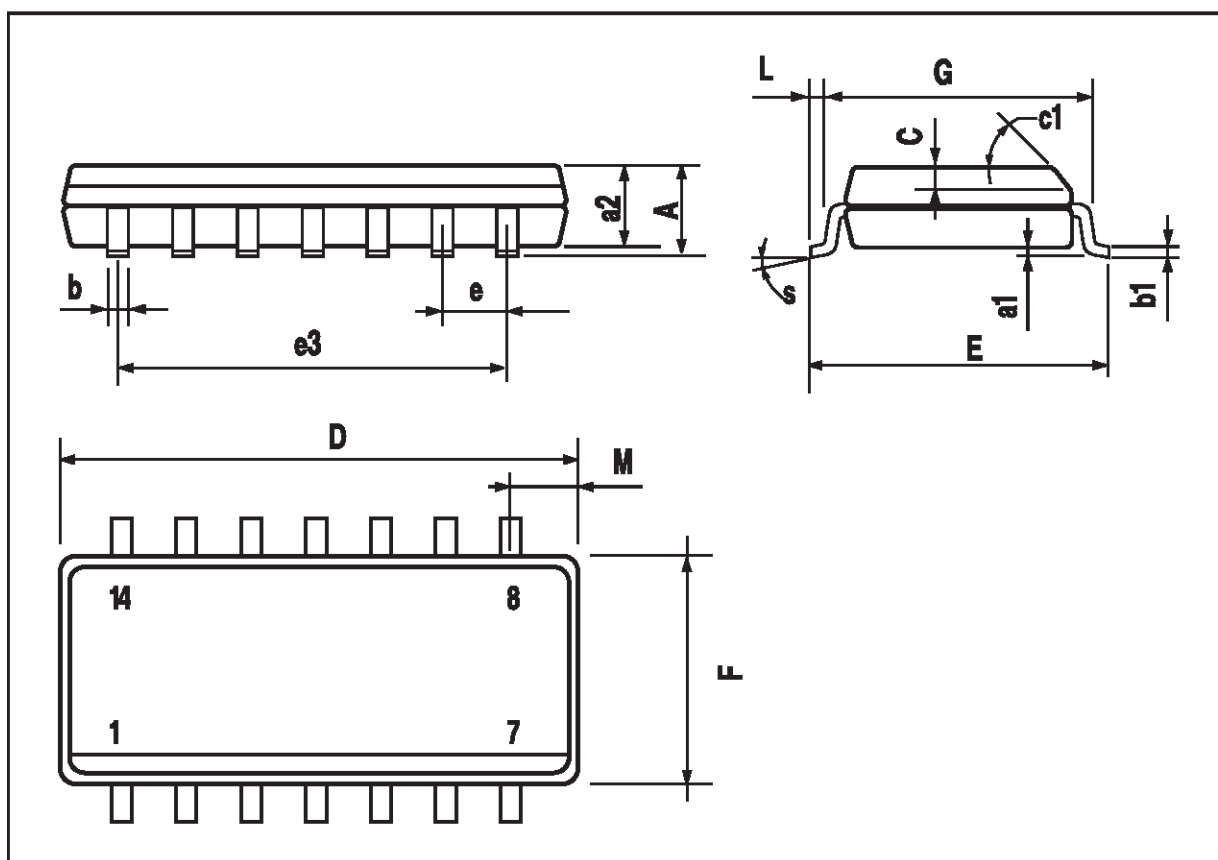
## DIP14 PACKAGE MECHANICAL DATA

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
l			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.)					



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