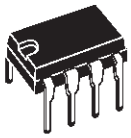
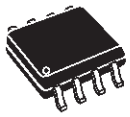
L6571A
L6571B

HIGH VOLTAGE HALF BRIDGE DRIVER WITH OSCILLATOR

- TECHNOLOGY: BCD "OFF-LINE"
- FLOATING SUPPLY VOLTAGE UP TO 600V
- GND REFERRED SUPPLY VOLTAGE UP TO 18V
- DRIVER CURRENT CAPABILITY:
  - SINK CURRENT = 270mA
  - SOURCE CURRENT = 170mA
- VERY LOW START UP CURRENT: 150µA
- VERY LOW OPERATING CURRENT: <2mA
- UNDERVOLTAGE LOCKOUT
- PROGRAMMABLE OSCILLATOR FREQUENCY
- dV/dt IMMUNITY UP TO ± 50V/ns



Minidip



SO8

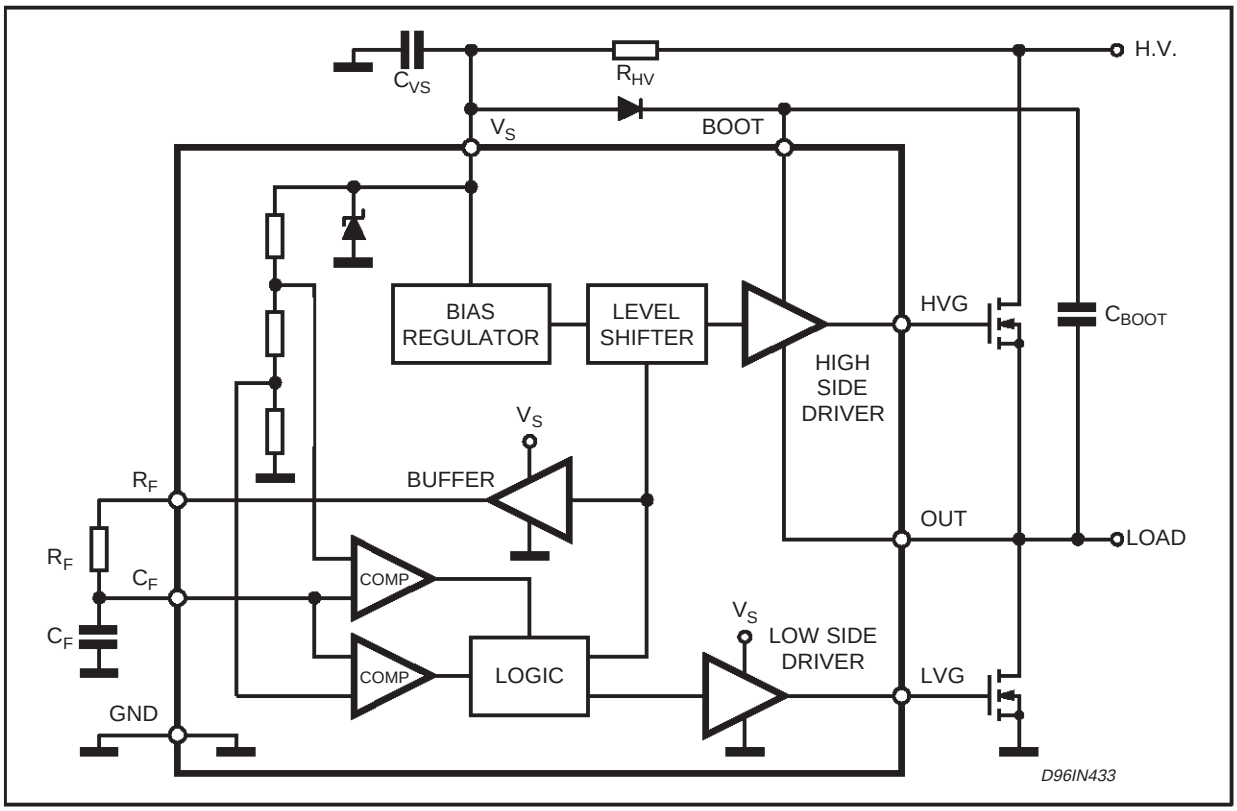
ORDERING NUMBERS:

L6571A	L6571AD
L6571B	L6571BD

DESCRIPTION

The device is a high voltage half bridge driver with built-in oscillator. The frequency of the oscillator can be programmed using external resistor and capacitor.
The output drivers are designed to drive external n-channel power MOSFET and IGBT. The internal logic assures a minimum dead time to avoid cross-conduction of the power devices.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
I_S (*)	Supply Current	25	mA
V_{CF}	Oscillator Resistor Voltage	18	V
V_{LVG}	Low Side Switch Gate Output	14.6	V
V_{OUT}	High Side Switch Source Output	-1 to V_{BOOT} - 18	V
V_{HVG}	High Side Switch Gate Output	-1 to V_{BOOT}	V
V_{BOOT}	Floating Supply Voltage	618	V
$V_{BOOT/OUT}$	Floating Supply vs OUT Voltage	18	V
dV_{BOOT}/dt	V_{BOOT} Slew Rate (Repetitive)	± 50	V/ns
dV_{OUT}/dt	V_{OUT} Slew Rate (Repetitive)	± 50	V/ns
T_{stg}	Storage Temperature	-40 to 150	°C
T_j	Junction Temperature	-40 to 150	°C
T_{amb}	Ambient Temperature (Operative)	-40 to 125	°C

(*)The device has an internal zener clamp between GND and V_S (typical 15.6V).
Therefore the circuit should not be driven by a DC low impedance power source.

Note: ESD immunity for pins 6, 7 and 8 is guaranteed up to 900 V (Human Body Model)

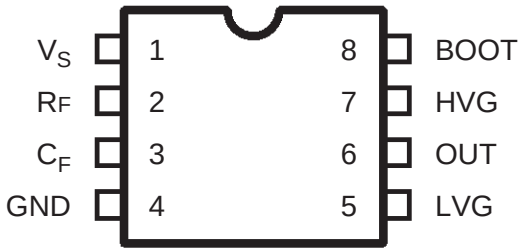
THERMAL DATA

Symbol	Parameter		Minidip	SO8	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	100	150	°C/W

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min.	Max.	Unit
V_S	Supply Voltage	10	V_{CL}	V
V_{BOOT}	Floating Supply Voltage	-	500	V
V_{OUT}	High Side Switch Source Output	-1	V_{BOOT} -V_{CL}	V
f_{out}	Oscillation Frequency		200	kHz

PIN CONNECTION



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ELECTRICAL CHARACTERISTICS (V_S = 12V; V_{BOOT} - V_{OUT} = 12V; T_j = 25°C; unless otherwise specified.)

Symbol	Pin	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{SUVP}	1	V_S Turn On Threshold		8.3	9	9.7	V
V_{SUVN}		V_S Turn Off Threshold		7.3	8	8.7	V
V_{SUVH}		V_S Hysteresis		0.7	1	1.3	V
V_{CL}		V_S Clamping Voltage	I_S = 5mA	14.6	15.6	16.6	V
I_{SU}		Start Up Current	$V_S < V_{SUVN}$		150	250	µA
I_q		Quiescent Current	$V_S > V_{SUVP}$		500	700	µA
I_{BOOTLK}	8	Leakage Current BOOT pin vs GND	V_{BOOT} = 580V			5	µA
I_{OUTLK}	6	Leakage Current OUT pin vs GND	V_{OUT} = 562V			5	µA
$I_{HVG\ SO}$	7	High Side Driver Source Current	V_{HVG} = 6V	110	175		mA
$I_{HVG\ SI}$		High Side Driver Sink Current	V_{HVG} = 6V	190	275		mA
$I_{LVG\ SO}$	5	Low Side Driver Source Current	V_{LVG} = 6V	110	175		mA
$I_{LVG\ SI}$		Low Side Driver Sink Current	V_{LVG} = 6V	190	275		mA
V_{RFON}	2	RF High Level Output Voltage	I_{RF} = 1mA	V_S -0.05		V_S -0.2	V
$V_{RF\ OFF}$		RF Low Level Output Voltage	I_{RF} = -1mA	50		200	mV
V_{CFU}	3	CF Upper Threshold		7.7	7.95	8.2	V
V_{CFL}		CF Lower Threshold		3.80	4.05	4.3	V
t_d		Internal Dead Time	**L6571A** **L6571B**	0.85 0.50	1.25 0.72	1.65 0.94	µs µs
D_C		Duty Cycle, Ratio Between Dead Time + Conduction Time of High Side and Low Side Drivers		0.45	0.5	0.55	
I_{AVE}	1	Average Current from Vs	No Load, fs = 60KHz		1.2	1.5	mA
fout	6	Oscillation Frequency	RT = 12k CT = 1nF	57	60	63	kHz

OSCILLATOR FREQUENCY

The frequency of the internal oscillator can be programmed using external resistor and capacitor. The nominal oscillator frequency can be calculated using the following equation:

$$f_{OSC} = \frac{1}{2 \cdot R_F \cdot C_F \cdot \ln 2} = \frac{1}{1.3863 \cdot R_F \cdot C_F}$$

where R_F and C_F are the external resistor and capacitor

Figure 2: WAVEFORMS

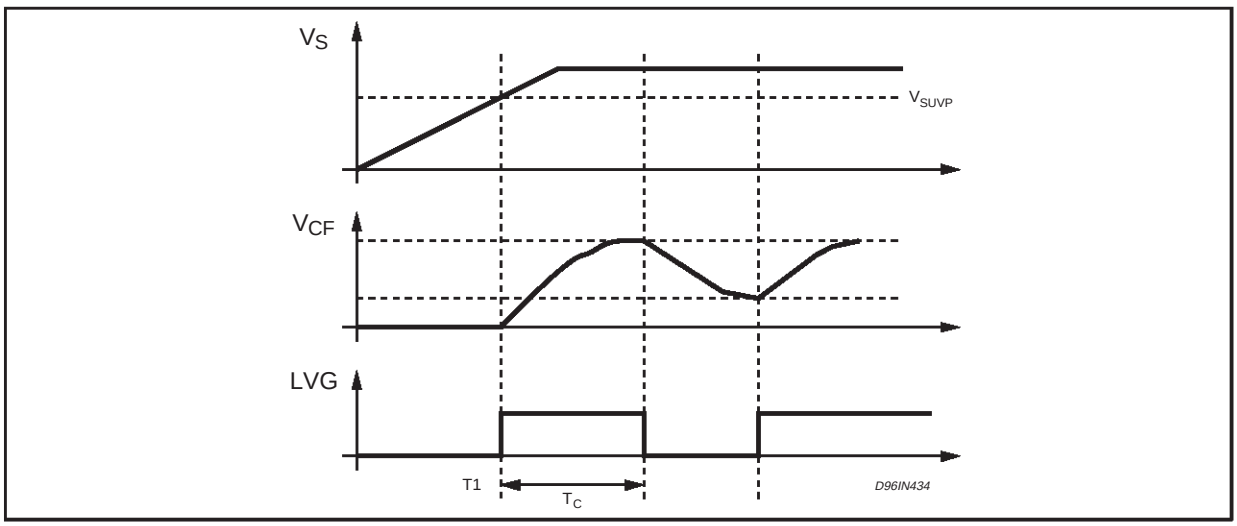


Figure 3: Typical Dead Time vs. Temperature Dependency (L6571A).

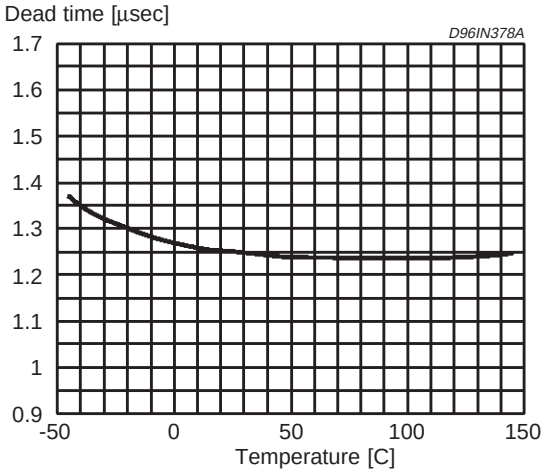


Figure 4: Typical Frequency vs Temperature Dependency

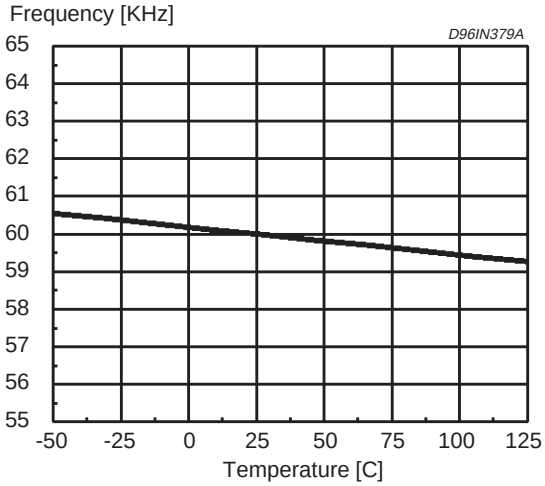


Figure 5: Typical and Theoretical Oscillator Frequency vs Resistor Value

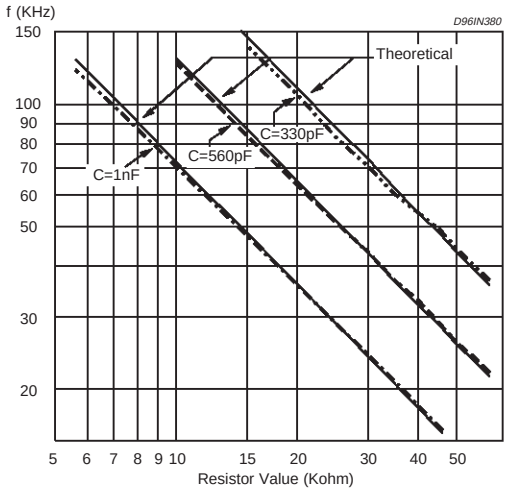
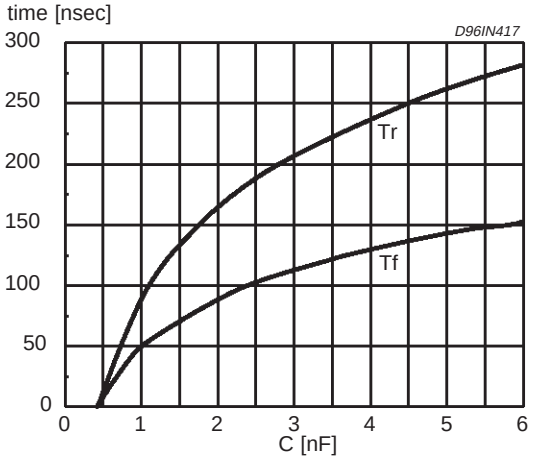
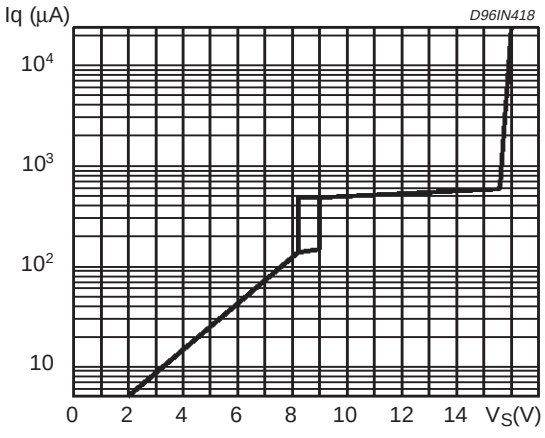


Figure 8: Typical Rise and Fall Times vs. Load Capacitance



For both high and low side buffers @25°C Tamb

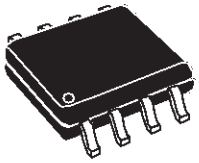
Figure 9: Quiescent Current vs. Supply Voltage.



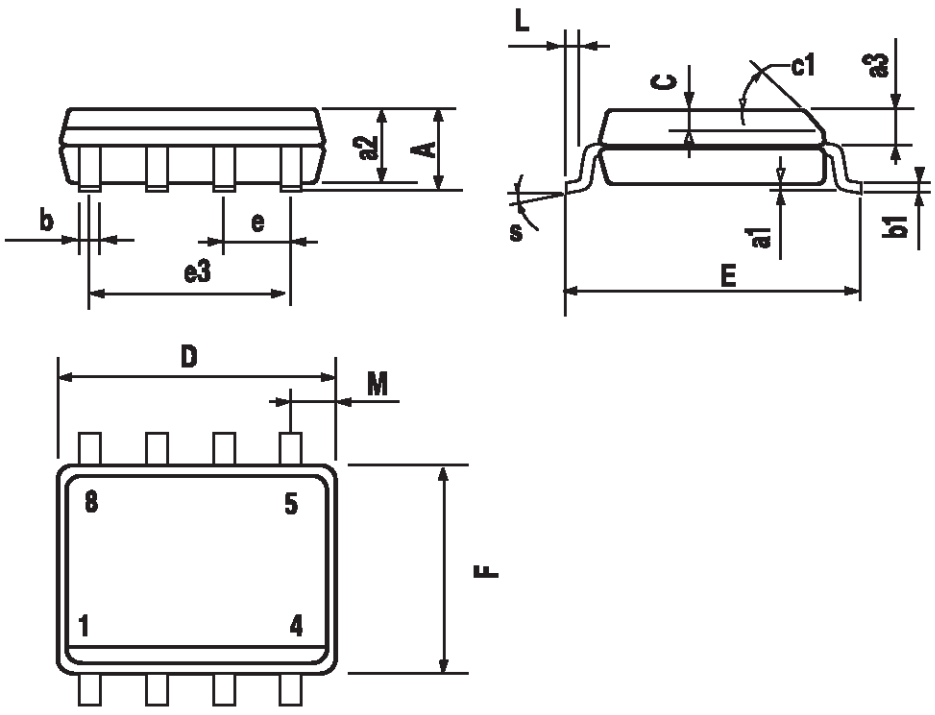
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D (1)	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F (1)	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

(1) D and F do not include mold flash or protrusions. Mold flash or potrusions shall not exceed 0.15mm (.006inch).

OUTLINE AND MECHANICAL DATA

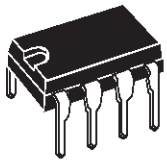


SO8



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

OUTLINE AND MECHANICAL DATA



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