Thesys-Intechna

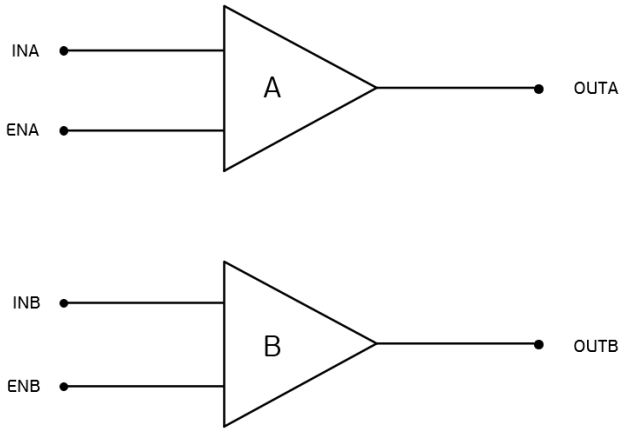
Dual Low-Side Ultrafast MOSFET Driver

DATA SHEET TI-DR-LS

FEATURES

- Wide operating voltage range: 7 V..40 V
- Extended operating temperature range: -40 °C to +150 °C
- Non-inverting path
- 4 A source/sink drive current
- Low On-Off Delay Time: 50 ns

FUNCTIONAL BLOCK DIAGRAM



HIGHLIGHTS

- Outputs may be connected in parallel for higher drive current
- Under voltage lock out on power supply
- Matched rise and fall times
- Low propagation delay time
- Low output impedance
- ESD – protection

APPLICATIONS

- Efficient power MOSFET and IGBT switching
- Switch mode power supplies
- Motor controls
- DC/DC converters
- Class-D switching amplifiers
- Pulse transformer driver

GENERAL DESCRIPTION

The dual high-speed gate drivers are especially well suited for driving the MOSFETs and IGBTs. Each of the two outputs can source and sink 4A of current while producing voltage rise and fall times of less than 10 ns. Low propagation delay and fast, matched rise and fall times make the driver ideal for high-frequency and high-power applications

LIST OF CONTENTS

DEVICE PARAMETERS

7V≤V_{CC} ≤40V, T = -40..125 ^{0}C, one channel unless otherwise noted.

Symbol	Parameter	Conditions	Min	Max	Unit
V_{IH}	Input Voltage, High	7V ≤V_{CC}≤18V	2.3	-	V
V_{IL}	Input Voltage, Low	7V ≤V_{CC} ≤18V	-	0.8	
I_{IN}	Input Current	0V ≤V_{IN} ≤V_{CC}	-	6	uA
V_{ENH}	High EN Input Voltage	7V ≤V_{CC} ≤18V	2.3	-	V
V_{ENL}	Low EN Input Voltage	7V ≤V_{CC} ≤18V	-	0.8	
V_{OH}	Output Voltage, High	-	V_{CC}-0.025	-	V
V_{OL}	Output Voltage, Low	-	-	0.025	
R_{OH}	Output Resistance, High State	V_{CC}=18V, I_{OUT}=-10mA	-	2.7	Omh
R_{OL}	Output Resistance, Low State	V_{CC}=18V, I_{OUT}=10mA	-	2.2	
I_{OH}[1], I_{OL}[1]	Short circuit sink/source current		4	-	A
$UVLO_H$[2]	V_{CC} Under Voltage Turn on threshold		6.5	6.9	V
$UVLO_L$[2]	V_{CC} Under Voltage Turn off threshold		6.1	6.4	V
$UVLO_G$[2]	V_{CC} Under Voltage Hysteresis		0.4	-	V
t_r	Rise Time	V_{CC}=18V, C_{LOAD}=1000pF	-	13	ns
t_f	Fall Time	V_{CC}=18V, C_{LOAD}=1000pF	-	12	
T_{ondly}	On-Time Propagation Delay	V_{CC}=18V, C_{LOAD}=1000pF	-	50	
T_{offdly}	Off-Time Propagation Delay	V_{CC}=18V, C_{LOAD}=1000pF	-	65	
T_{ENOH}	Enable to Output-High Delay Time	V_{CC}=18V	-	50	
T_{DOLO}	Disable to High Impedance State Delay Time	V_{CC}=18V	-	55	

DEVICE PARAMETERS (continued)

Symbol	Parameter	Conditions	Min	Max	Unit
R_{EN}	Enable Pull-Up Resistor	-	140	260	kOmh
I_{CC}	Power Supply Current	V_{CC}=35V, V_{IN}=3.5V	-	2.1	mA
		V_{CC}=35V, V_{IN}=0V	-	3.5	
		V_{CC}=35V, V_{IN}=V_{CC}	-	2.6	

Notes:
[1] Duration of output short-circuit mode τ=10us
[2] When UVLO in high, the output switching to the lower level of the output voltage, regardless of the state of the inputs on INA, INB, ENA, ENB.

PIN CONFIGURATION AND FUNCTIONAL DESCRIPTION

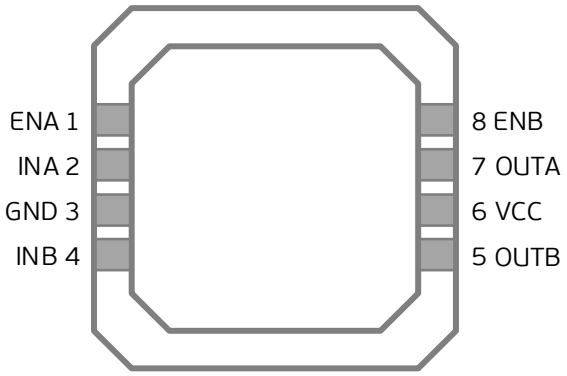


Figure 1. Pin configuration

№	Pin name	Description	Comments
1	ENA	Channel A Enable Input	Drive pin low to disable Channel A and force Channel A Output to a high impedance state
2	INA	Channel A Logic Input	
3	GND	Ground	Common ground reference for the device
4	INB	Channel B Logic Input	
5	OUTB	Channel B Output	Sources or sinks current to turn-on or turn-off a discrete MOSFET or IGBT
6	VCC	Supply Voltage	Provides power to the device
7	OUTA	Channel A Output	Sources or sinks current to turn-on or turn-off a discrete MOSFET or IGBT
8	ENB	Channel B Enable Input	Drive pin low to disable Channel A and force Channel A Output to a high impedance state

ABSOLUTE MAXIMUM RATINGS AND RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Recommended operating conditions		Absolute maximum ratings		Units
		Minimum	Maximum	Minimum	Maximum	
V_{CC}	Supply Voltage	7	35	-0.3	40	V
V_{INx}, V_{ENx}	Input Voltage	0	Vcc	-0.3	Vcc+0.3	V
I_{OUT}	Output Current	-4	+4	-4	+4	A
T_A	Operating Temperature Range	-40	+150	-60	+150	°C

ESD-PROTECTION

ESD-protection of not less than 2 kV level for HBM discharge is provided for all analog inputs and outputs of the differential driver.

EQUIVALENT CIRCUITS

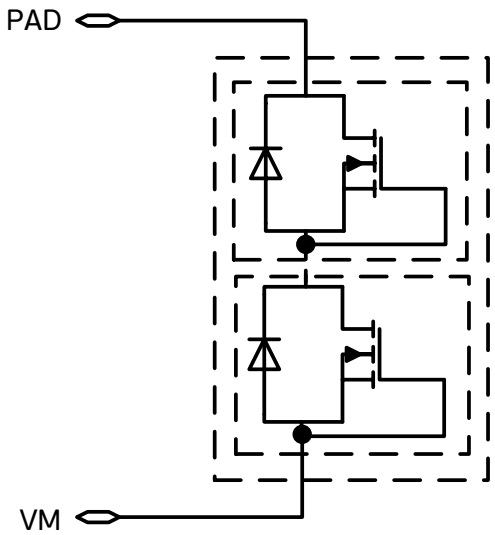
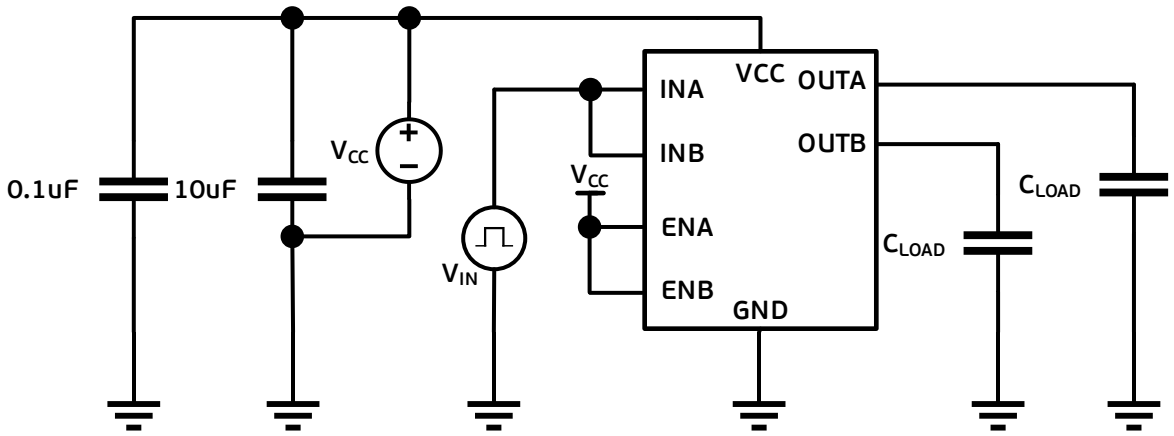


Figure 2. Analog input/output

TYPICAL APPLICATION CIRCUIT AND TRUTH TABLE



INX	ENX	OUTX
0	1 or open	0
1	1 or open	1
0	0	Z
1	0	Z

Figure 3. Typical application circuit and truth table

TIMING DIAGRAM

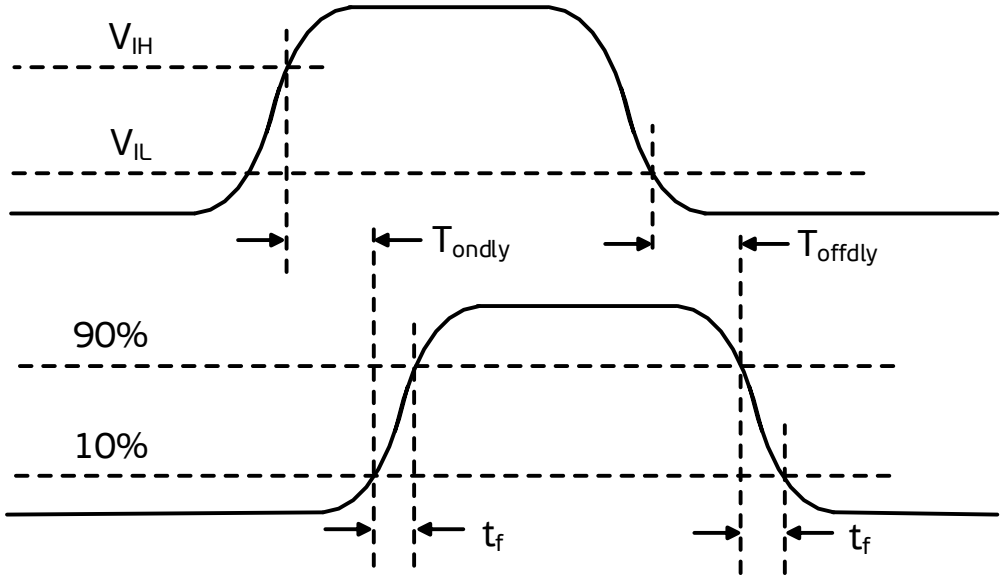


Figure 4. Timing diagram of the driver