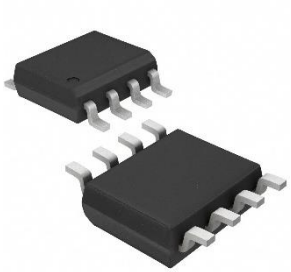
HX37325-S/HX27325-S
Dual channel 2A ultra high speed power switch drive

HX37325-S/HX27325-S is a power switch driver chip. It has a matching up and down time, and is used to charge and discharge the grid electrode with the power rate on and off. The HX37325-S/HX27325-S has a high latch resistance over its rated power and voltage range. The HX37325-S/HX27325-S chip is not damaged even when the ground pin has a noise spike of up to 5V (either polarity). The chip can withstand up to 500mA of reverse current forced back to its output without causing damage or logic confusion. In addition, all terminals of the HX37325-S/ HX27325-S are fully protected by electrostatic discharge (ESD) up to 2.0kV.



SOP-8

Device Information		
Part Number	**Encapsulation**	**Classification**
HX37325-S	SOIC8	Consumer category
HX27325-S	SOIC8	Industry

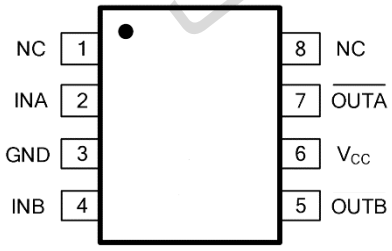
Peculiarity

- Latch protection: can withstand reverse current of 0.5A
- Input logic protection: capable of protecting input signals as low as -10V
- Low output imped ance
- Single chip integrated dual driver
- Peak output current: 2A
- Scope of work: 4.5V~25V
- The maximum input negative pressure can reach -5V
- High capacitance load driving capability: Under a 1nF load, the switching time is less than 25ns, and the rise/fall time is matched
- Propagation delay: 40ns
- Wide temperature range: -40 ℃~125 ℃
- Chip on/off delay characteristics: Ton/Off=70ns/70ns
- Compliant with RoSH standards
- Package type: SOIC8/DFN8

Apply

- Switching power supply, switching converter
- line driver
- Pulse Transformer Drive
- Drive MOSFETs and IGBTs
- motor control
- pulse generator
- power switch
- DC-DC conventer
- Class D switching amplifier

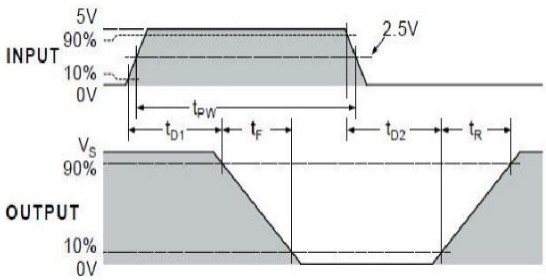
Chip Pin Descr Iption		
NUMBER	**NAME**	FUNCTION
1	NC	Empty pin
2	INA	**Channel A input terminal**
3	GND	**Pin ground**
4	INB	**Channel B input terminal**
5	OUTB	Channel B output
6	V_{CC}	powe supply
7	$\overline{OUTA}$	Channel A output
8	NC	Empty pin



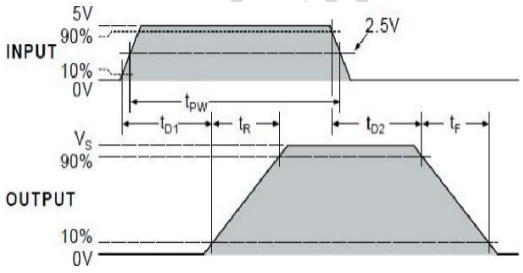
Product Specification				
SYMBOL	DEFINITION	MIN	MAX	UNIT
V_{CC}	Supply voltage		25	V
V_{IN}	Logic input voltage(INA/INB)	-10	V_{CC}+0.3	
ESD Rating				
E_{SD}	Human body discharge mode		2000	V
	Machine discharge mode		500	
Rated Power				
P_D	SOIC Package power (TA ≤70°C)		470	mW
Caloric Information				
T_J	Junction temperature		+150	°C
T_S	Storage temperature	-45	+150	
Recommended Scope of Work				
V_{CC}	Supply voltage	4.5	20	V
T_C	Ambient temperature	-40	125	°C

Electrical characteristics without special instructions TA= 25℃, 4.5V ≤VCC≤18V					
SYMBOL	DEFINITION	MIN	TYP	MAX	UNIT
V_{IH}	Logic High level "1" input voltage	2.4			V
V_{IL}	Logic Low "0" input voltage			0.8	V
I_{IN}	Input current(0V≤V_{IN}≤V_{CC})			200	μA
V_{OH}	High level output voltage drop	V_{CC}–0.025			V
V_{OL}	Low output voltage drop			0.025	V
R_{OH}	High level state, output resistance(V_{CC}=18V,I_O=100mA)		4	8	Ω
R_{OL}	Low level state, output resistance(V_{CC}=18V,I_O=100mA)		2	4	Ω
I_{PK}	Peak output current		2		A
I_{REV}	Latch protection withstands reverse current (Working cycle≤2%,t≤300us,V_{CC}=18V)		>0.5		A
t_R	Rise time(V_{CC}=18V,C_{LOAD}=100pF)			30	ns
t_F	Descent time(V_{CC}=18V,C_{LOAD}=100pF)			30	ns
t_{ON}	Open transmission delay(V_{CC} =18V,C_{LOAD}=100pF)			70	ns
t_{OFF}	Turn off the transmission delay(V_{CC}=18V,C_{LOAD}=100pF)			70	ns
I_{Q1}	Supply current(V_{INA}=V_{INB}=High logic)			6	mA
I_{Q0}	Supply current(V_{INA}=V_{INB}=Low logic)			1	mA

Input/output (A-channel inversion) waveform diagram

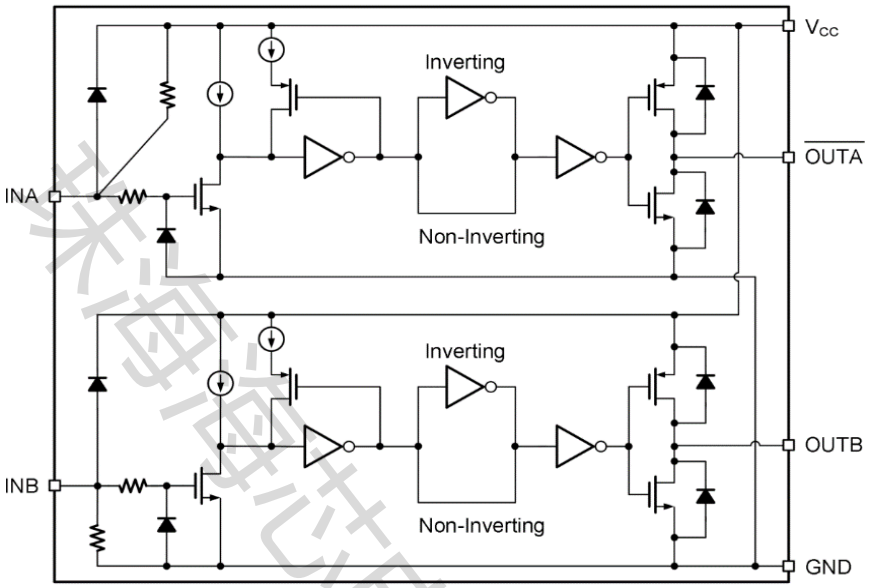


Input/output (B channel in-phase) waveform



Explain

Functional Block Diagram



Chip working logic

The signal input ports (INA, INB) of HX37325-S/HX27325-S adopt a level triggered mode, which means that when the voltage value meets the logic requirements, the chip will work normally, as shown in the table.

Input-output logic table

INPUT		OUTPUT	
INA	INB	OUTA/	OUTB
L	L	H	L
H	H	L	H
L	H	H	H
H	L	L	L

Note: H represents high level; L represents low level

Signal input port

HX37325-S/HX27325-S is a chip with two independent signal input ports for receiving control signals from the main control. These two ports are designed with high reliability, and even if a reverse current of 500mA is forced back to its output, it will not cause damage or logic confusion. The signal input port can directly process -10V voltage, and even under the influence of large noise waveforms, the chip can still operate safely, increasing stability.

It is not recommended to adjust the output waveform by adjusting the waveform slope or delay of the input port during the design process. If it is necessary to adjust the rise and fall time of the power end, it is recommended to add additional resistance between the output end and the power end.

The signal input port of HX37324-S/HX27324-S has a pull-up resistor to GND. Suggest short circuiting this port to GND when not in use.

Output port

The HX37325-S/HX27325-S has the following features:

- The output of channel A is in reverse phase with the input signal, and the output of channel B is in phase with the input signal. It is suitable for driving P-type or N-type MOSFETs.
- Each output port provides a pull-up or pull-down current with a peak of 2A, with high speed and high current characteristics, suitable for driving MOSFETs in high frequency application designs.

HX37325-S/HX27325-S is suitable for driving P or N type MOSFETs, where the A-channel output is in reverse phase with the input signal and the B-channel output is in phase with the input signal. Each output port provides high speed, high current with a peak of 2A, suitable for driving MOSFETs in high frequency application designs.

Application Information

The high-speed and high current characteristics of HX37325-S/HX27325-S make it suitable for applications such as high-frequency power supplies. It is commonly used to drive MOSFETs at the power end because the PWM output stage power of the main control IC is often insufficient to drive MOSFETs, requiring a high-power driver stage chip to provide stable gate voltage to ensure MOSFET operates in a stable state.

The following are suggestions for the application of HX37325-S/HX27325-S:

1.Ensuring the stable operation of chips is crucial in high-frequency and high-power application environments. Therefore, larger capacitance electrolytic capacitors can be used in the design to stabilize the VCC voltage. To cope with high-frequency characteristics, capacitors with low ESR/ESL (such as ceramic capacitors or surface mount capacitors) can be used in parallel. In terms of physical layout, capacitors should be placed as close as possible to both ends of VCC and GND.

2. The output port is also part of the power circuit. In order to ensure the smoothness of the output waveform, the output port should be as close as possible to the MOSFET gate of the power end. In addition, additional resistors can be designed at the output end to make the working waveform smoother.

The following is a PCB layout guide for high-speed low side door drivers:

1. Connect the low ESR/ESL capacitor tightly between the VCC and GND pins of the IC to support VDD flow during MOSFET turn-on.

2. Grounding considerations:

-The primary goal of designing grounding connections is to limit the MOSFET gate charging and discharging circuit to the smallest possible loop area, in order to reduce loop inductance and effectively avoid noise issues on the MOSFET gate. Meanwhile, the gate driver chip should be as close as possible to the MOSFET.

-Star point grounding is a good method to reduce noise coupling between current circuits. Connect the ground point of the driver to other circuit nodes such as the source of the power MOSFET and the ground of the PWM controller. The connection path should be as short as possible to reduce inductance and as wide as possible to reduce resistance.

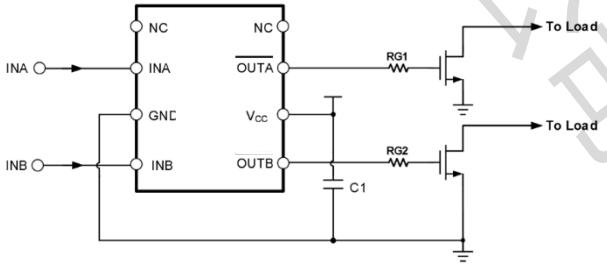
-Use a ground plane to shield noise and avoid interference from the rapid rise and fall time of OUT on the input signal. The ground plane cannot become a conduction path for any current circuit, and the ground plane must establish a ground potential with the star point. In addition to shielding noise, the grounding plane also helps with heat dissipation.

3. In a noisy environment, to prevent noise from causing output failures, you can connect unused pins to VDD or GND.

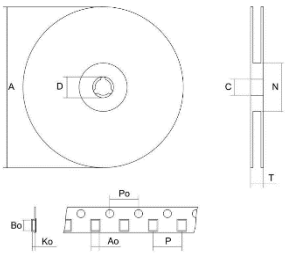
4. Separate the power loop from the signal loop, such as output and input signals.

Summary: In the application of HX37325-S/HX27325-S, it is recommended to take appropriate measures to ensure the stable operation of the chip, including using suitable capacitors to stabilize VCC voltage, being close to the output port and MOSFET gate, and paying attention to the grounding method in PCB layout and the separation of signal circuit and power circuit.

Inverting typical application circuit diagram



Package



Packing Method	Quantity
Tape and Reel	2500PCS/ Disk