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## 600V 2A Half-Bridge Driver

### DESCRIPTION

ZMCS5613 is SOI-based process, high voltage power MOSFET and IGBT driver with independent high and low side referenced output channels.

ZMCS5613 logic inputs are compatible with standard CMOS or LSTTL outputs, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify use in high frequency applications.

### APPLICATIONS

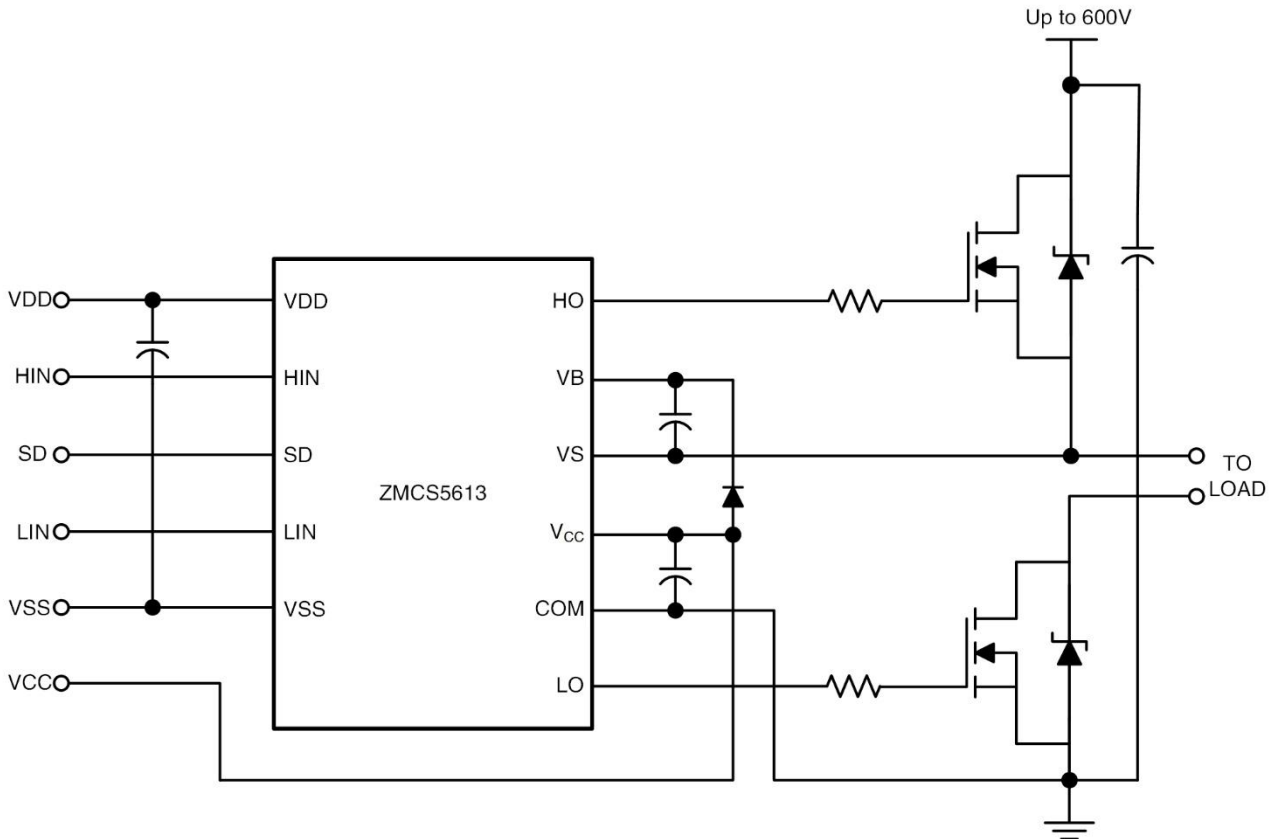
- Power MOSFET or IGBT Drivers
- Half-bridge Driver
- Full -bridge Driver

- Small and Medium Power Motor Drivers

### FEATURES

- Fully operational to +600V
- High and low side floating isolation
- Supply input range from 10 to 20V
- Signal input compatible with 3.3V, 5V, 15V
- Matched propagation output delay
- Internal undervoltage lockout
- Outputs in phase with inputs
- Output Current  $\pm 2A$
- SOP16 Package

### Typical Application Circuit

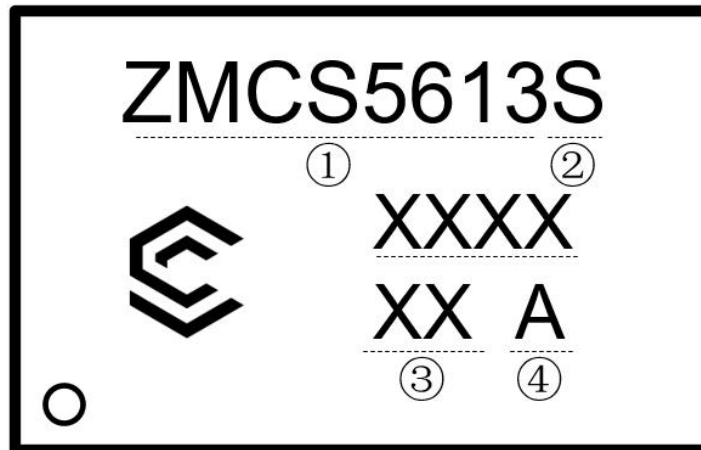


## Ordering Information

Tube	Tape and reel	Form factor	Packing
ZMCS5613S	ZMCS5613S	SOP16	Taping/barrel

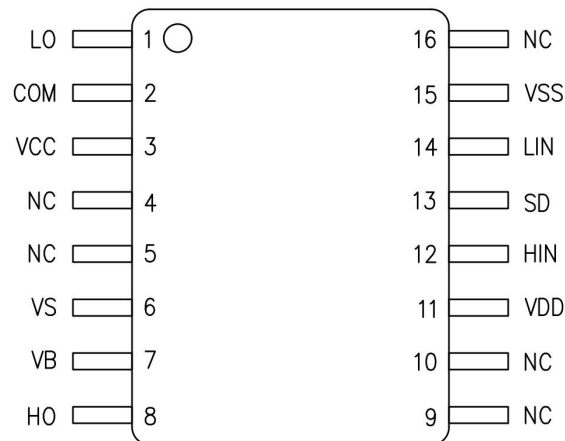
## Product identification information:

- ① Product model
- ② Form factor: "S" represented SOP16
- ③ The batch number of the product
- ④ Product internal control mark



SOP16 schematic diagram of the package

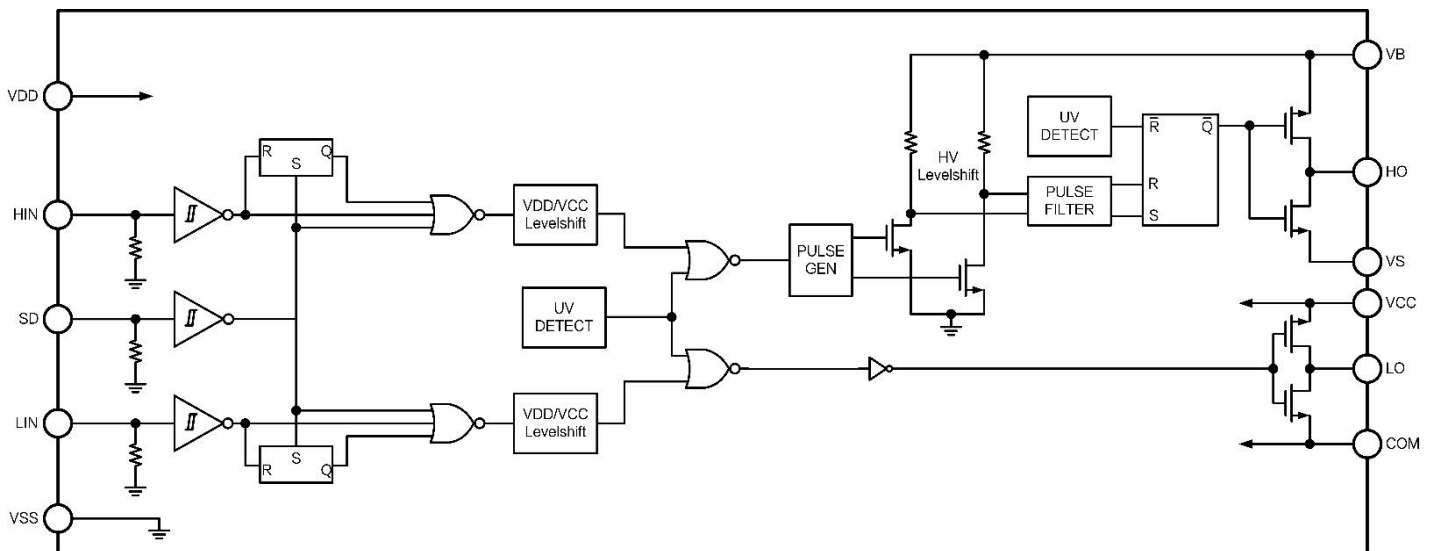
## Pin Functions



Pin	Name	Description
1	LO	High and low side floating isolation
2	COM	Low side return
3	VCC	Low side supply (Main supply)
4	NC	No connection

5	NC	No connection
6	VS	High side floating supply return
7	VB	High side floating supply
8	HO	High side gate drive output
9	NC	No connection
10	NC	No connection
11	VDD	Logic supply
12	HIN	Logic input for high side gate driver output (HO)
13	SD	Logic input for shutdown
14	LIN	Logic input for low side gate driver output (LO)
15	VSS	Logic ground
16	NC	No connection

## Block Diagram



## Absolute Maximum Ratings <sup>(1)</sup>

$V_B$ Voltage..... $V_S + 10V \sim V_S + 20V$	$V_{CC}$ Voltage..... $10V \sim 20V$
$V_S$ Voltage..... $-5V \sim 600V$	$V_{com}$ Voltage..... $-5V \sim 5V$
$V_{HO}$ Output Voltage..... $V_S \sim V_B$	Junction Temperature..... $150^\circ C$
$V_{LO}$ Output Voltage..... $0V \sim V_{CC}$	Storage Temperature..... $-55^\circ C \sim +150^\circ C$
Logic Input Voltage..... $V_{SS} \sim V_{DD}$	ESD Rating Human Body Model..... $\pm 2KV$

(1) Exceeding the maximum operating range can cause permanent damage to the chip. These are stress ratings only and

do not imply that the chip functions beyond the specified conditions under these or any other conditions. Working at limit values for long periods of time may affect the reliability of the chip.

(2) When  $V_{DD} < 5V$ , the minimum  $V_{SS}$  offset is limited to  $-V_{DD}$ .

## Operating Ratings<sup>(1)</sup>

Parameter	Min	Max	Units
Operating Junction Temperature	-40	125	°C

(1) Recommended operating conditions refer to the conditions under which the chip operates normally. For accurate specifications and test conditions, please refer to Electrical Characteristics.

## Dynamic Parameter

Unless otherwise specified:  $V_{BIAS}(V_{CC}, V_{BS}, V_{DD}) = 15V$ ,  $C_L = 1000pF$ ,  $V_{SS} = COM$ ,  $T = 25^\circ C$ .

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Turn-on propagation delay	ton		135	220	ns	VS=0
Turn-off propagation delay	toff		130	220	ns	VS=600V
Shutdown propagation delay	tSD				ns	
Turn-on rise time	tr		20	30	ns	
Turn-off fall time	tf		15	25	ns	
Delay matching (HS & LS turn-on/of)	MT			30	ns	

## Electrical Characteristics

Unless otherwise specified :  $V_{BIAS} (V_{CC}, V_{BS}) = 15V$ ,  $T = 25^\circ C$ .

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Logic "1" input voltage	VIH	VCC=10V~20V	3.5			V
Logic "0" input voltage	VIL				2.5	V

High level output voltage, VBIAS - VO	VOH	IO=2mA			1.4	V
Low level output voltage, VO	VOL				0.15	V
Offset supply leakage current	ILK	VB=VS=600V			10	uA
Quiescent VBS supply current	IQBS	VIN=0V 或 5V		60	100	uA
Quiescent VCC supply current	IQCC			90	150	uA
Quiescent VDD supply current	IQDD			40	70	uA
Logic "1" input bias current	IIN+	HIN=5V LIN =5V		5	8	uA
Logic "0" input bias current	IIN-	HIN=0V LIN =0V			1	uA
VCC supply undervoltage positive going threshold	VCCUV+		7.5	8.4	9.7	V
VCC supply undervoltage negative going threshold	VCCUV-		7.0	8.0	9.4	V
Output high short circuit pulsed current	IO+	VO=0V,VIN=VIH		2.5		A
Output low short circuit pulsed current	IO-	VO=15V,VIN=VIL		2.5		A

## Timing Diagrams

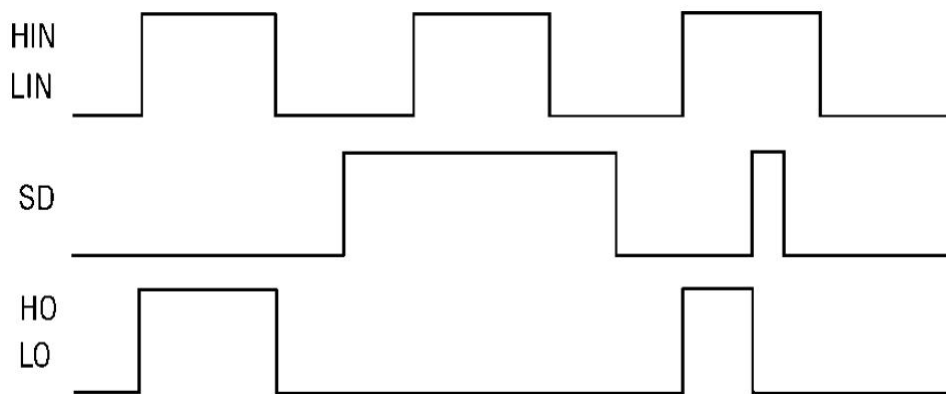


Figure 1: Input/Output Timing Diagram

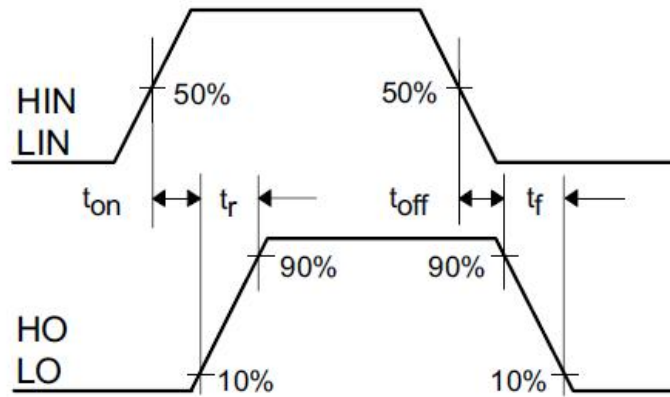


Figure 2: Switching Time Waveform Definition

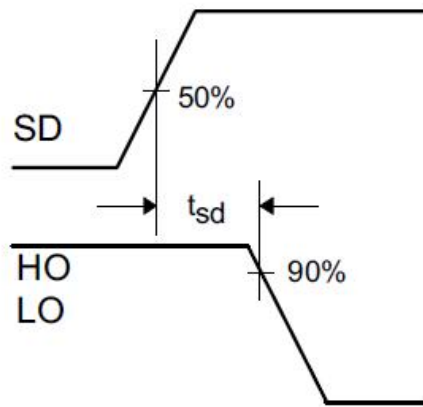
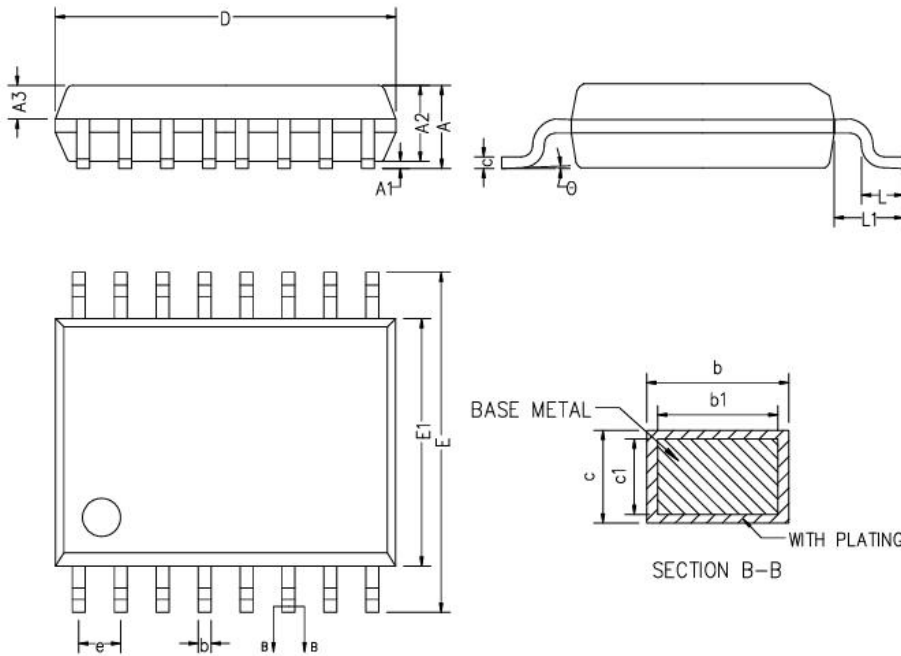


Figure 3: Shutdown Waveform Definitions

## Pod Diagram

### SOP16



SYMBOLS	MILLIMETERS		
	MIN	NOM	MAX
A	—	—	2.65
A1	0.10	—	0.30
A2	2.25	2.30	2.35
A3	0.97	1.02	1.07
b	0.35	—	0.43
b1	0.34	0.37	0.40
c	0.25	—	0.29
c1	0.24	0.25	0.26
D	10.20	10.30	10.40
E	10.10	10.30	10.50
E1	7.40	7.50	7.60
e	1.27BSC		
L	0.55	—	0.85
L1	1.40REF		
θ	0°	—	8°

## Important Notice:

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