

## High-Side & Low-Side Gate Drive IC

### General description

The ID2006 is a high voltage, high speed power MOSFET driver with independent high and low side referenced output channels based on P\_SUB P\_EPI process. The floating channel can be used to drive an N-channel power MOSFET in the high side configuration which operates up to 200 V. Logic inputs are compatible with standard CMOS or LSTTL output, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction.

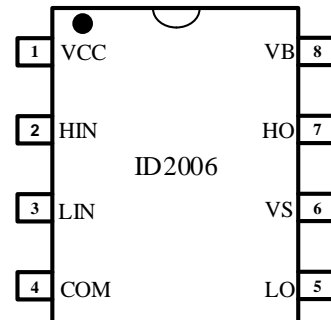
### Features

- Fully operational to +200 V
- 3.3V and 5V input logic compatible
- dV/dt Immunity  $\pm 50$  V/nsec
- Gate drive supply range from 6 V to 18 V
- Typically Source / Sink current capability 1 A/1 A
- Typically -9V negative Vs bias capability

### Application

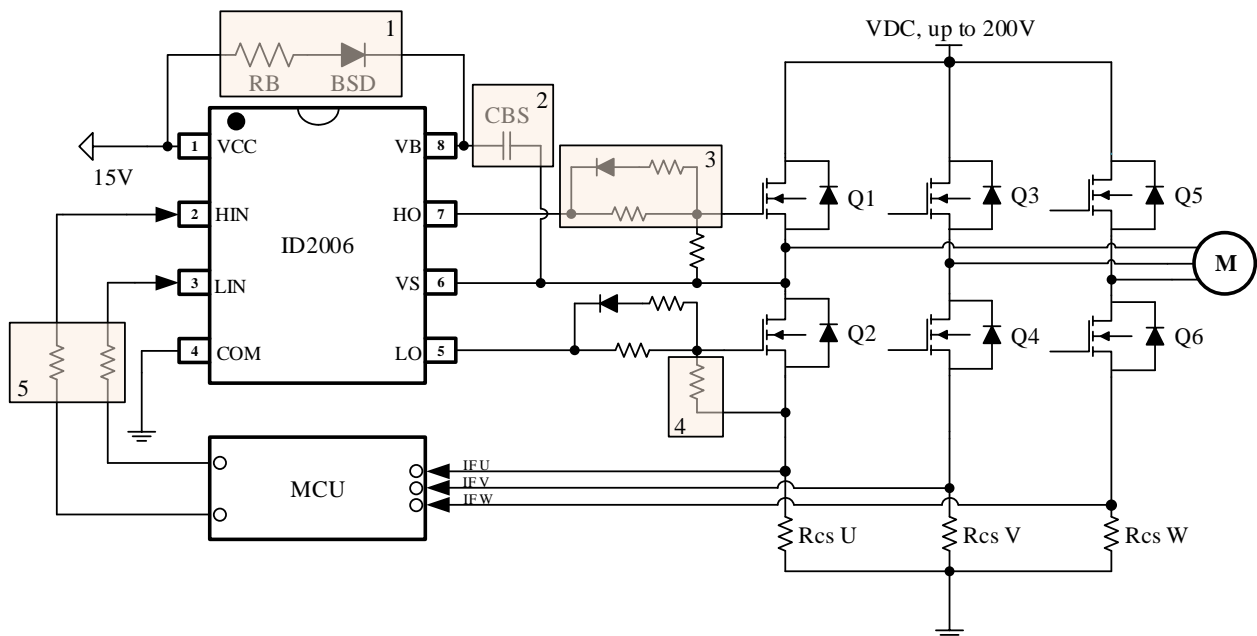
- Small and medium- power motor driver
- Power MOSFETS driver
- Half-Bridge Power Converters
- Full-Bridge Power Converters
- Any Complementary Drive Converters

### Package/Order Information



Order code	Package
ID2006SEC-R1	SOP8

### Typical Circuit



Note 1: RB value suggest 10 ohms, ultra fast recovery or schottky diode should be used as BSD

Note 2: CBS value according to PWM control condition

Note 3: Driver circuit should be adjust according to the MOSFETs be used

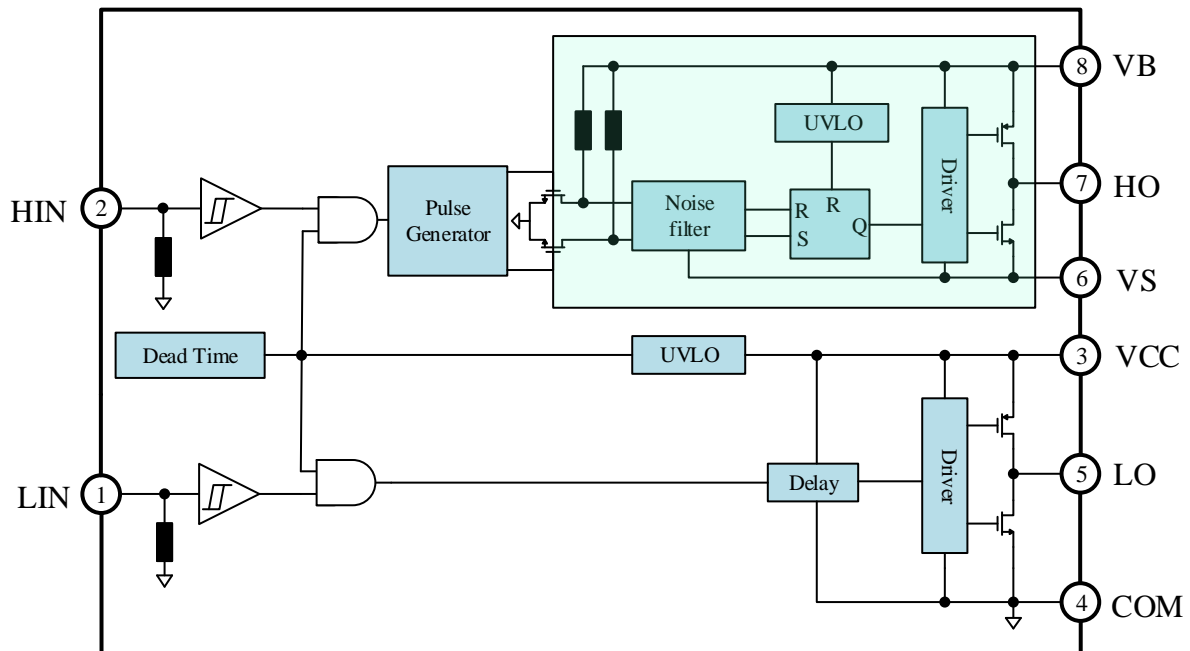
Note 4: Pull down resistor between Gate and Source of MOSFETs, 10k ohms is suggested

Note 5: Resistors between HIN/LIN and MCU, recommended value is 100 to 1k ohms

## Pin Definitions

Pin Name	Pin Number	Pin Function Description
V <sub>CC</sub>	1	Low side and main power supply
HIN	2	Logic input for high side gate driver output (HO)
LIN	3	Logic input for low side gate driver output (LO)
COM	4	Ground
LO	5	Low side gate drive output, out of phase with LIN
V <sub>S</sub>	6	High side floating supply return or bootstrap return
HO	7	High side gate drive output, in phase with HIN
V <sub>B</sub>	8	High side floating supply

## Block Diagram



## Absolute Maximum Ratings

Exceeding these ratings may damage the device.

The absolute maximum ratings are stress ratings only at  $T_A=25\text{ }^\circ\text{C}$ , unless otherwise specified.

Symbol	Definition	MIN.	MAX.	Units
$V_B$	High side floating supply	-0.3	220	V
$V_S$	High side floating supply return	$V_B - 20$	$V_B + 0.3$	
$V_{HO}$	High side gate drive output	$V_S - 0.3$	$V_B + 0.3$	
$V_{CC}$	Low side and main power supply	-0.3	20	
$V_{LO}$	Low side gate drive output	-0.3	$V_{CC} + 0.3$	
$V_{IN}$	Logic input of HIN & LIN	-0.3	$V_{CC} + 0.3$	
ESD	HBM Model	1.5	--	kV
	CDM Model	500	--	V
$P_D$	Package Power Dissipation @ $T_A \leq 25^\circ\text{C}$	--	0.625	W
$R_{thJA}$	Thermal Resistance Junction to Ambient	--	200	$^\circ\text{C}/\text{W}$
$T_J$	Junction Temperature	--	150	$^\circ\text{C}$
$T_S$	Storage Temperature	-55	150	
$T_L$	Lead Temperature (Soldering, 10 seconds)	--	300	

## Recommended Operating Conditions

Symbol	Definition	MIN.	MAX.	Units
$V_B$	High side floating supply	$V_S + 6$	$V_S + 18$	V
$V_S$	High side floating supply return	-9	200	
$V_{HO}$	High side gate drive output voltage	$V_S$	$V_B$	
$V_{CC}$	Low side supply	6	18	
$V_{LO}$	Low side gate drive output voltage	0	$V_{CC}$	
$V_{IN}$	logic input voltage (HIN & LIN)	0	$V_{CC}$	
$T_A$	Ambient temperature	-40	125	$^\circ\text{C}$

## Dynamic Electrical Characteristics

$V_{BIAS} (V_{CC}, V_{BS}) = 15V$ ,  $C_L = 1000$  pF and  $T_A = 25$  °C unless otherwise specified.

Symbol	Definition	MIN.	TYP.	MAX.	Units
$t_{ON}$	High & low side turn on propagation delay	--	150	250	ns
$t_{OFF}$	High & low side turn off propagation delay	--	110	250	
MT	Delay matching time ( $t_{ON}$ , $t_{OFF}$ )	--	--	50	
DT	Dead time	--	300	--	
$t_R$	Turn on rising time	--	60	100	
$t_F$	Turn off falling time	--	60	100	

## Static Electrical Characteristics

$V_{BIAS} (V_{CC}, V_{BS}) = 15V$ ,  $C_L = 1000$  pF and  $T_A = 25$  °C unless otherwise specified.

Symbol	Definition	MIN.	TYP.	MAX.	Units
$I_{LK}$	High-side floating supply leakage current	--	--	50	$\mu A$
$I_{QBS}$	Quiescent $V_{BS}$ supply current	--	70	120	
$I_{QCC}$	Quiescent $V_{CC}$ supply current	--	200	280	
$UV_{CCT}$	$V_{CC}$ supply under-voltage trigger voltage	4.4	5.0	5.6	V
$V_{UVCCHY}$	$V_{CC}$ supply under-voltage hysteresis	--	0.3	--	
$UV_{BST}$	$V_{BS}$ supply under-voltage trigger voltage	3.2	3.8	4.4	
$V_{UVBSHY}$	$V_{BS}$ supply under-voltage hysteresis	--	0.3	--	
$V_{OH}$	High level output voltage drop, $V_{BIAS} - V_o$	--	--	0.2	V
$V_{OL}$	Low level output voltage drop, $V_o$	--	--	0.1	
$I_{O+}$	Output High short circuit pulsed current	--	1	--	A
$I_{O-}$	Output low short circuit pulsed current	--	1	--	
$V_{IH}$	High level input threshold voltage	2.5	--	--	V
$V_{IL}$	Low level input threshold voltage	--	--	0.8	
$I_{IN+}$	Logic "1" input bias current (HIN "1" & LIN "1")	--	10	20	$\mu A$
$I_{IN-}$	Logic "0" input bias current (HIN "0" & LIN "0")	--	15	30	

## Function Timing Diagram

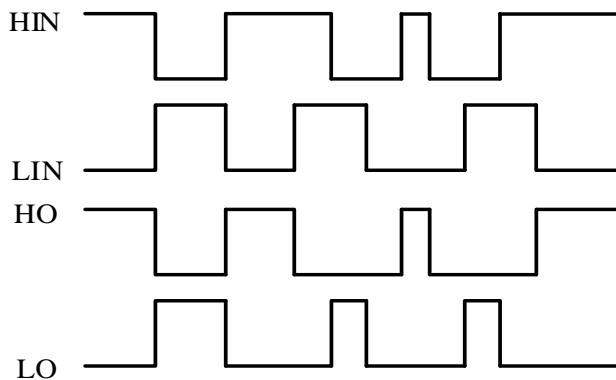


Fig.1 Input and output timing waveform

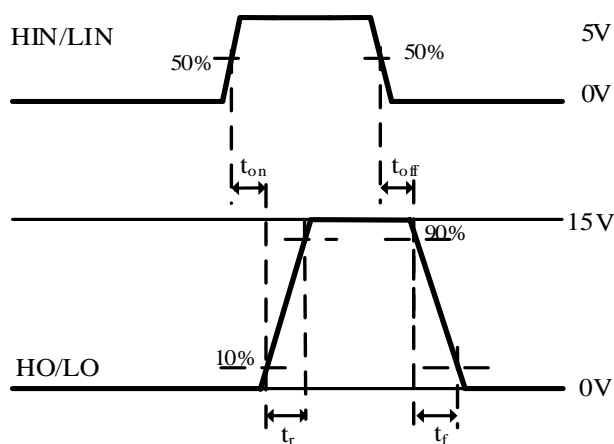


Fig.2 Propagation and Rise/Fall time definition

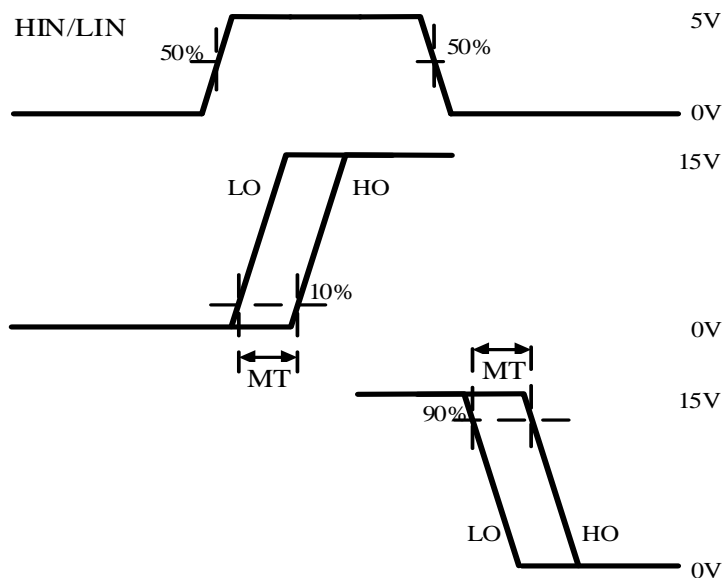
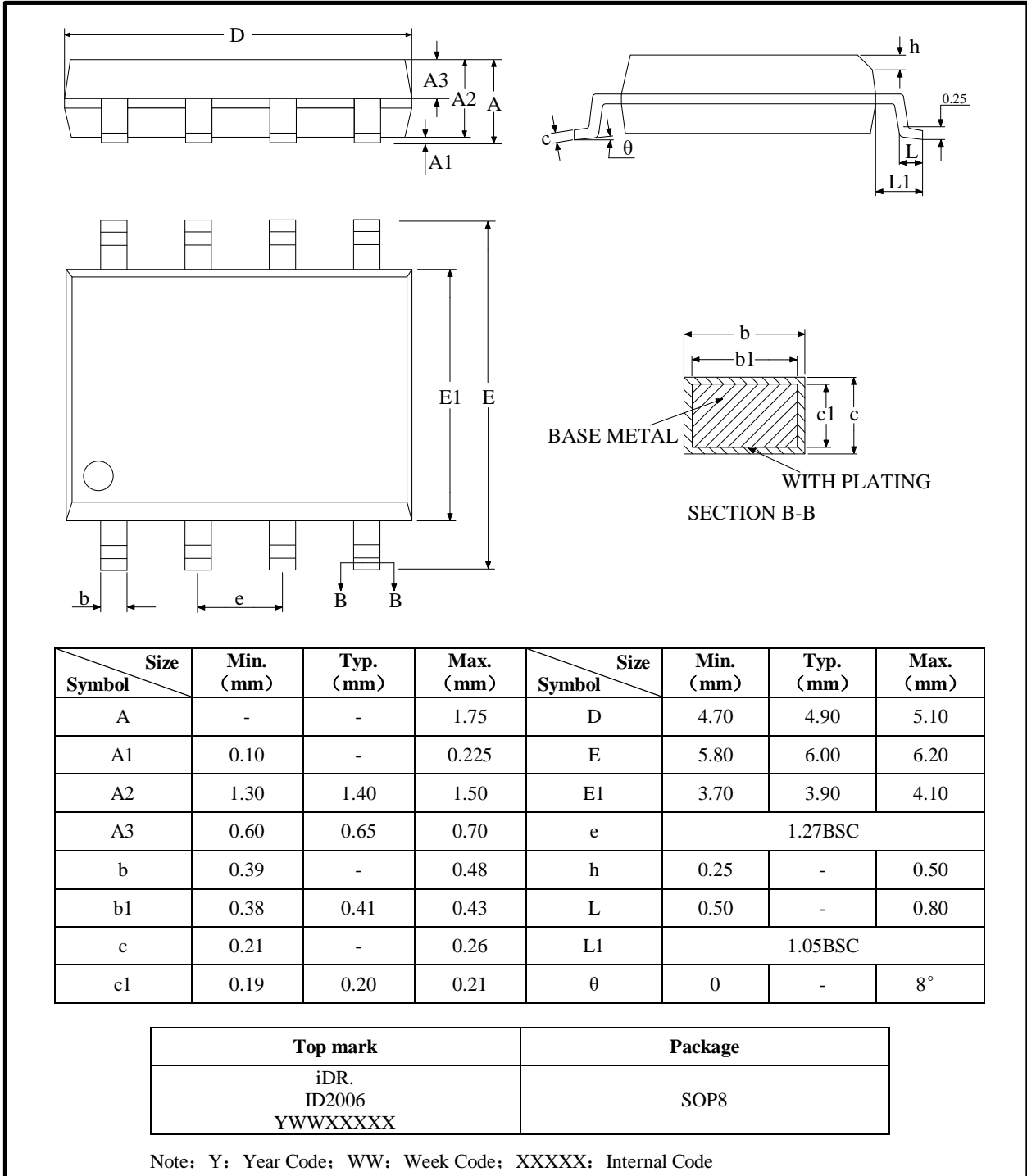


Fig.3 Delay matching definition

## Package Information

### SOP8 Package Outlines and Dimensions



Notes:

1. This drawing is subjected to change without notice.
2. Body dimensions do not include mold flash or protrusion.

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## Important Notice

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