

芯伯乐®  
X I N B O L E

# Product Specification

XBLW IR2101S

High & Low Side Driver

WEB | [www.xinboleic.com](http://www.xinboleic.com)



## Description

IR2101S is half-bridge pre-driver IC and capable of driving a pair of power devices (IGBT/N-MOSFET).

IR2101S applies to typical bootstrap architecture with an external bootstrap diode for each phase. The UVLO prevents abnormal behaviors once VCC or VBS drops lower than the specific threshold voltage. The cross-conduction prevention protects the power devices from simultaneous turn-on due to noise or flicker of control logic.

## Features

- Floating high side up to +600V
- Gate drive supply ranging from 10V to 20V
- Under-voltage lockout protection
- Built-in cross-conduction prevention
- Compatible with 3.3V/5V logic
- Outputs in phase with inputs
- Lead-Free (ROHS Compliant)



SOP-8

## Application

- Motor control
- Air conditioning
- Washing machines
- Inverter Drive
- General purpose inverter
- High-power home appliances
- Hair Dryer

## Ordering Information

| Product Model     | Package Type | Marking | Packing | Packing Qty  |
|-------------------|--------------|---------|---------|--------------|
| XBLW IR2101STRPBF | SOP-8        | IR2101S | Tape    | 3000Pcs/Reel |

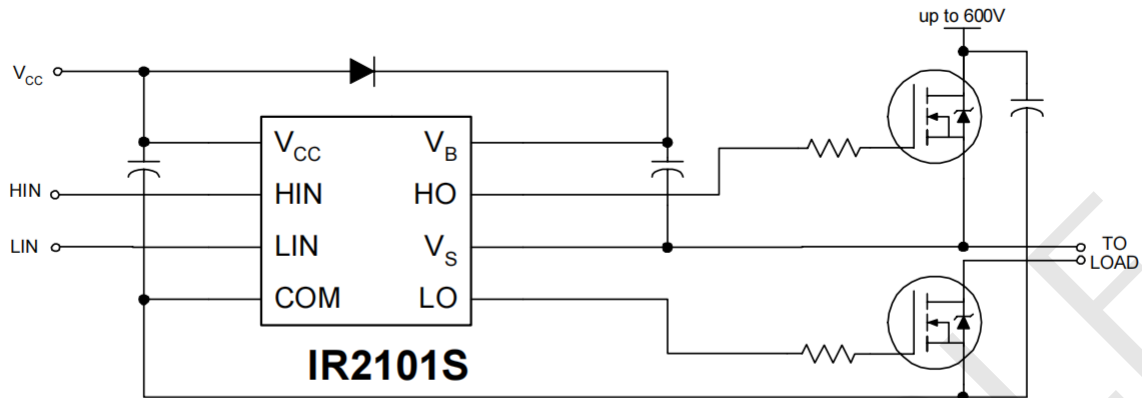


Figure 1. Typical configuration

### Pin Assignments & Definition

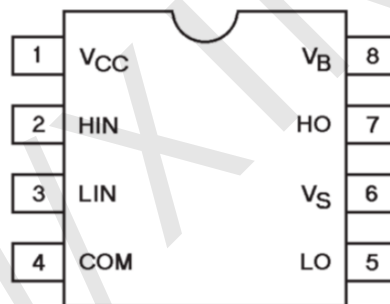


Figure 2. Pin Assignment (8-Lead SOIC)

| Pin # | Symbol          | Description   |
|-------|-----------------|---|
| 1     | V <sub>CC</sub> | Low side power supply                                       |
| 2     | HIN             | Logic input for high side gate driver output (HO), in phase |
| 3     | LIN             | Logic input for low side gate driver output (LO), in phase  |
| 4     | COM             | Low side return   |
| 5     | LO              | Low side gate driver output                                 |
| 6     | V <sub>S</sub>  | High side floating supply return                            |
| 7     | HO              | High side gate driver output                                |
| 8     | V <sub>B</sub>  | High side power supply                                      |

### Functional Block Diagram

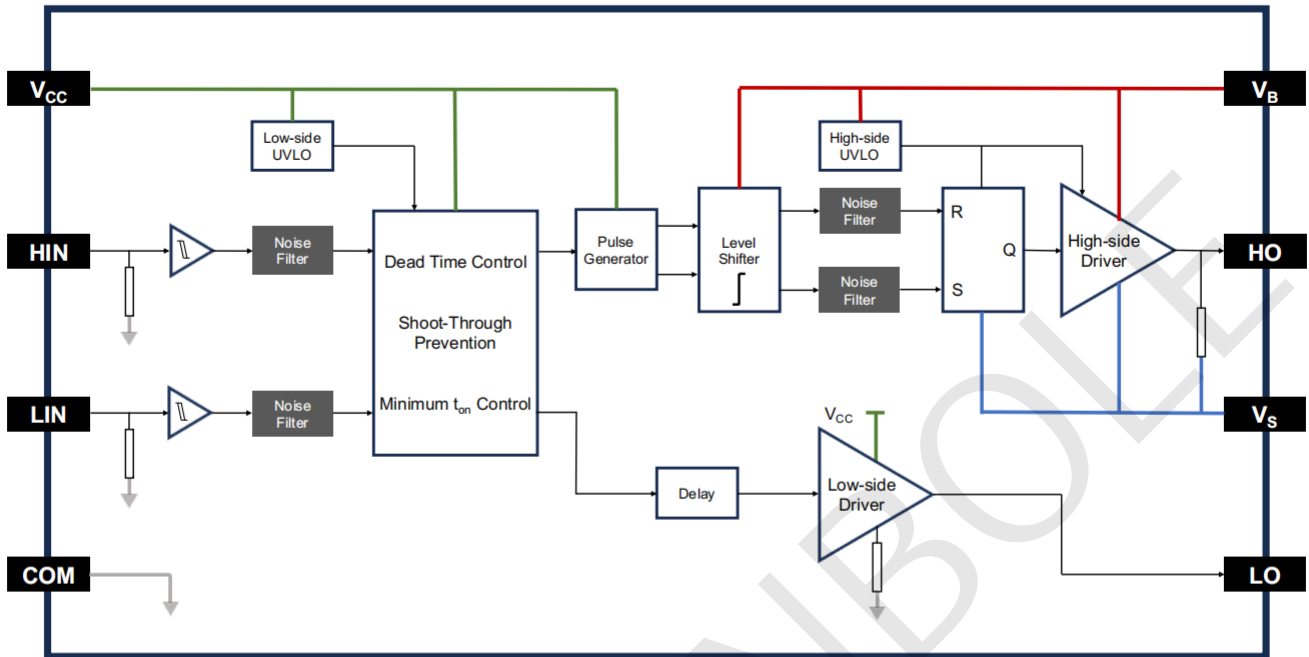


Figure 3. Functional block diagram

### Absolute Maximum Ratings

All voltages are absolute voltage referenced to  $V_{COM}$  unless otherwise specified. ( $T_A=25^\circ\text{C}$ )

| Symbol     | Parameter  | Min         | Max            | Unit                        |
|------------|--|-------------|----------------|-----------------------------|
| $V_B$      | High side floating supply voltage  | - 0.3       | 600            | V                           |
| $V_S$      | High side floating supply offset voltage                                 | $V_B - 20$  | $V_B + 0.3$    |                             |
| $V_{HO}$   | High side floating output voltage  | $V_S - 0.3$ | $V_B + 0.3$    |                             |
| $V_{CC}$   | Low side and logic fixed supply voltage                                  | - 0.3       | 20             |                             |
| $V_{LO}$   | Low side output voltage  | - 0.3       | $V_{CC} + 0.3$ |                             |
| $V_{IN}$   | Logic input voltage (HIN & LIN)  | - 0.3       | $V_{CC} + 0.3$ |                             |
| $dV_S/dt$  | Allowable offset supply voltage transient                                | —           | 50             | V / ns                      |
| $P_D$      | Package power dissipation @ $T_A \leq + 25^\circ\text{C}$ <sup>(1)</sup> | —           | 0.625          | W                           |
| $R_{thJA}$ | Thermal resistance, junction to ambient <sup>(2)</sup>                   | —           | 200            | $^\circ\text{C} / \text{W}$ |
| $T_J$      | Junction temperature   | —           | 150            | $^\circ\text{C}$            |
| $T_S$      | Storage temperature  | - 55        | 150            |                             |

(1) Total power dissipation depends on package and mounting conditions, here is based on 8 leads SOIC package.

(2) Thermal resistance depends on package and mounting conditions, here is based on 8 leads SOIC package.

### Recommended Operating Conditions

All voltages are absolute voltage referenced to  $V_{COM}$  unless otherwise specified. ( $T_A=25^{\circ}C$ )

| Symbol   | Parameter                                    | Min        | Max        | Unit        |
|----------|--|------------|------------|-------------|
| $V_B$    | High side floating supply absolute voltage   | $V_S + 12$ | $V_S + 18$ | V           |
| $V_S$    | High side floating supply offset voltage     | -6         | 450        |             |
| $V_{HO}$ | High side floating output voltage            | $V_S$      | $V_B$      |             |
| $V_{CC}$ | Low side and logic fixed supply voltage      | 13         | 17.5       |             |
| $V_{LO}$ | Low side output voltage                      | 0          | $V_{CC}$   |             |
| $V_{IN}$ | Logic and analog input voltage               | 0          | 5          |             |
| DT       | HIN & LIN dead time (depends on MCU control) | 1          |            | $\mu s$     |
| $T_A$    | Ambient temperature                          | -40        | 125        | $^{\circ}C$ |

### Static Electrical Characteristics

$V_{CC}=V_{BS}= 15V$  unless otherwise specified ( $T_A=25^{\circ}C$ )

| Symbol                     | Parameter   | Min | Typ | Max | Unit    | Conditions                |
|----------------------------|---|-----|-----|-----|---------|---------------------------|
| $V_{IH}$                   | Logic " 1 " input voltage                                     | -   | 2.5 | -   | V       |                           |
| $V_{IL}$                   | Logic " 0 " input voltage                                     | -   | 2.2 | -   |         |                           |
| $V_{I\_HYS}$               | $V_{IH}$ $V_{IL}$ input hysteresis                            |     | 0.3 |     |         |                           |
| $V_{CCUV+}$<br>$V_{BSUV+}$ | $V_{CC}/V_{BS}$ supply under voltage positive going threshold |     | 9   |     |         |                           |
| $V_{CCUV-}$<br>$V_{BSUV-}$ | $V_{CC}/V_{BS}$ supply under voltage negative going threshold |     | 8   |     |         |                           |
| $V_{CCUVH}$<br>$V_{BSUVH}$ | $V_{CC}$ and $V_{BS}$ supply under voltage lockout hysteresis |     | 1   |     |         |                           |
| $I_{LK}$                   | Offset supply leakage current                                 | -   | -   | 50  | $\mu A$ | $V_B = V_S = 600 V$       |
| $I_{QCC1}$                 | Quiescent $V_{CC}$ supply current                             | -   | 125 | -   |         | LO=Low                    |
| $I_{QCC2}$                 | Quiescent $V_{CC}$ supply current                             | -   | 275 | -   |         | LO=High                   |
| $I_{QBS1}$                 | Quiescent $V_{BS}$ supply current                             | -   | 90  | -   |         | HO=Low                    |
| $I_{QBS2}$                 | Quiescent $V_{BS}$ supply current                             | -   | 240 | -   |         | HO=High                   |
| $I_{IN+}$                  | Logic " 1 " input bias current                                | -   | 60  |     |         | HIN= 5V, LIN=5V           |
| $I_{IN-}$                  | Logic " 0 " input bias current                                | -   | 0   | -   |         | HIN= 0V, LIN=0V           |
| $I_{O+}$                   | Output source current   | -   | 220 | -   | mA      | $V_O=0V, PW\leq 10\mu s$  |
| $I_{O-}$                   | Output sink current   | -   | 380 | -   |         | $V_O=15V, PW\leq 10\mu s$ |

### Dynamic Electrical Characteristics

$V_{CC}=V_{BS}= 15V$ ,  $C_L=1nF$  unless otherwise specified ( $T_A=25^\circ C$ )

| Symbol    | Parameter   | Conditions | Min | Typ | Max | Unit |
|-----------|---|------------|-----|-----|-----|------|
| $t_{on}$  | HIN/LIN turn-on propagation delay                               | $V_S = 0V$ |     | 450 | -   | ns   |
| $t_{off}$ | HIN/LIN turn-off propagation delay                              | $V_S = 0V$ |     | 420 | -   |      |
| $t_r$     | HO/LO turn on rise time   | $V_S = 0V$ |     | 82  |     |      |
| $t_f$     | HO/LO turn off fall time  | $V_S = 0V$ |     | 46  |     |      |
| DT        | Deadtime, LS turn-off to HS turn-on & HS turn-off to LS turn-on |            |     | 350 |     |      |
| MT        | Delay matching, HS & LS turn-on/off                             |            |     | 50  |     |      |

### Timing Diagrams

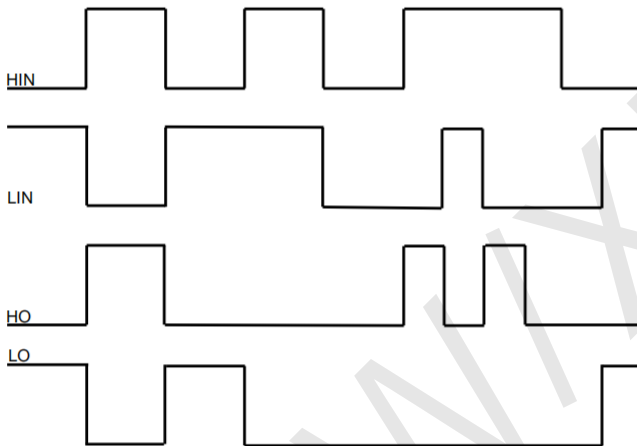


Figure 4. Input/Output timing diagram

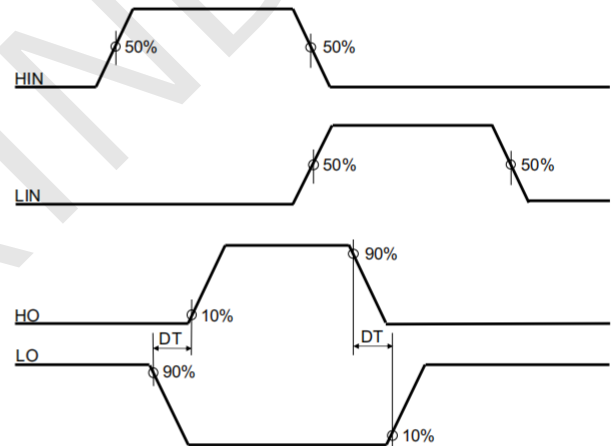


Figure 5. Deadtime waveform definition

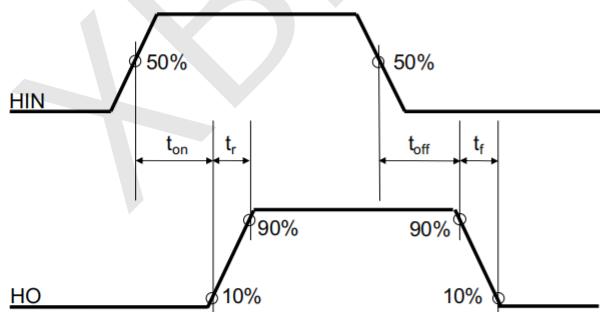
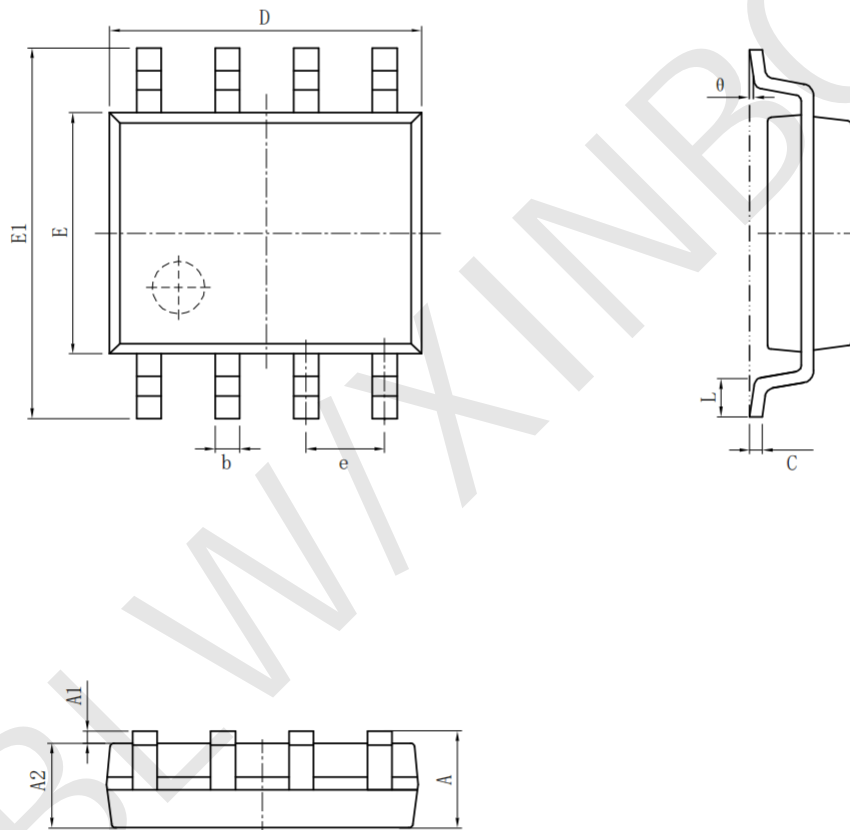


Figure 6. Switching time waveform definition

## Package Information

- SOP-8

| Symbol | Dimensions In Millimeters |          | Symbol | Dimensions In Inches |          |
|--------|---------------------------|----------|--------|----------------------|----------|
|        | Min (mm)                  | Max (mm) |        | Min (in)             | Max (in) |
| A      | 1.350                     | 1.750    | A      | 0.053                | 0.069    |
| A1     | 0.100                     | 0.250    | A1     | 0.004                | 0.010    |
| A2     | 1.350                     | 1.550    | A2     | 0.053                | 0.061    |
| b      | 0.330                     | 0.510    | b      | 0.013                | 0.020    |
| c      | 0.170                     | 0.250    | c      | 0.006                | 0.010    |
| D      | 4.700                     | 5.100    | D      | 0.185                | 0.200    |
| E      | 3.800                     | 4.000    | E      | 0.150                | 0.157    |
| E1     | 5.800                     | 6.200    | E1     | 0.228                | 0.224    |
| e      | 1.270 (BSC)               |          | e      | 0.050 (BSC)          |          |
| L      | 0.400                     | 1.270    | L      | 0.016                | 0.050    |
| θ      | 0°                        | 8°       | θ      | 0°                   | 8°       |





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