

DN1151

Start-up Sequencing for Diode’s Gate Drivers

Background

The Diode’s series of gate driver ICs are typically arranged with MOSFETs/IGBTs in a half-bridge configuration (Figure 1). In the half-bridge configuration, common applications are motors and power supplies. When the gate driver IC DGD2104 in Figure 1, is powered up, the state of the outputs follow the pullups and pulldowns of the IC at the input; these lines are set to start-up in the condition with HO and LO are low. Once completed start-up event, then the DGD2104 outputs follow the inputs as given in figure 2 timing diagram. For this start-up example, the DGD2104 has a pulldown on SD* and IN, so HO and LO are low. In the half-bridge, when HO and LO low the respective high-side and low-side MOSFETs are turned off and V_S is left floating.

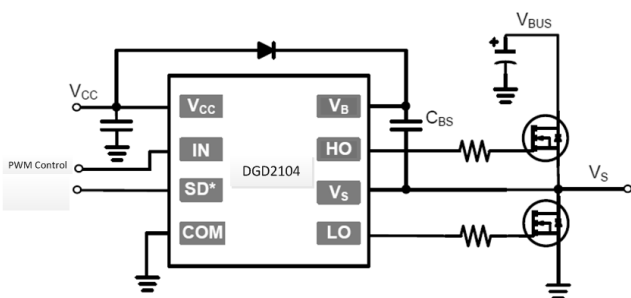


Figure 1: The DGD2104 Gate Driver IC in a Half-Bridge Configuration.

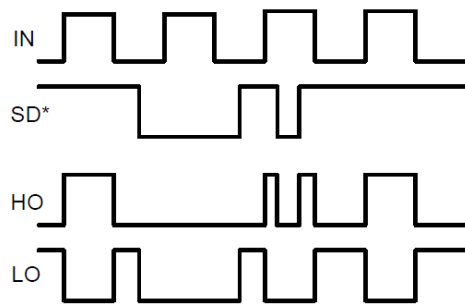


Figure 2: The DGD2104 Input / Output Timing Diagram.

The Start-up Condition

When V_S is left floating, C_{BS} is unable to charge from V_{CC} to provide a power supply for the high-side. Because of the floating V_S in the half-bridge, V_S can rest at an unknown DC level, but always less than V_{CC} . In this start-up condition, if IN and SD* are high at the same time HO does not react because there is no charge on C_{BS} , and V_S does not change (see Figure 3); LO remains low, because when IN is high, the LO is low. And when LO remains low, the low-side MOSFET remains off, and V_S rests in this condition.

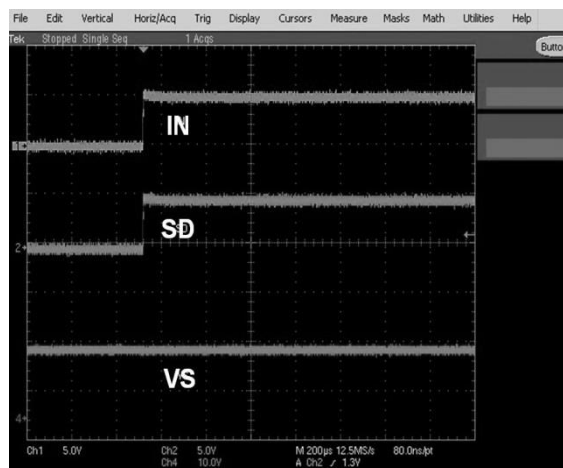


Figure 2: IN and SD High from Start-up Condition

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