

Description

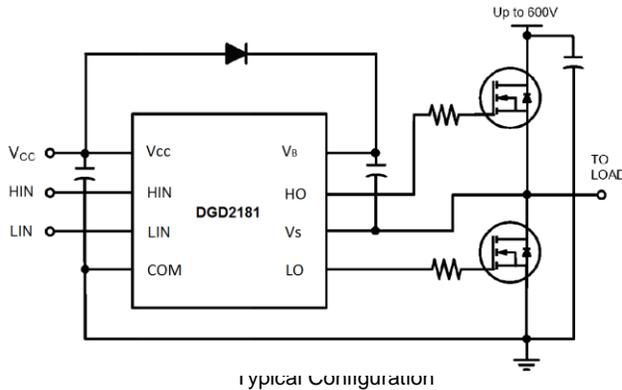
The DGD2181 is a high voltage / high speed gate driver capable of driving N-Channel MOSFETs and IGBTs in a half bridge configuration. High voltage processing techniques enable the DGD2181's high-side to switch to 600V in a bootstrap operation.

The DGD2181 logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) for easy interfacing with controlling devices. The driver outputs feature high pulse current buffers designed for minimum driver cross conduction.

The DGD2181 is offered in SO-8 package and the operating temperature extends from -40°C to +125°C.

Applications

- DC-DC Converters
- DC-AC Inverters
- AC-DC Power Supplies
- Motor Controls
- Class D Power Amplifiers



Features

- Floating High-side Driver in Bootstrap Operation to 600V
- Drives Two N-Channel MOSFETs or IGBTs in a Half Bridge Configuration
- 1.9A Source / 2.3A Sink Output Current Capability
- Outputs Tolerant to Negative Transients
- Wide Low-side Gate Driver and Logic Supply: 10V to 20V
- Logic Input (HIN and LIN) 3.3V Capability
- Schmitt Triggered Logic Inputs with Internal Pull Down
- Undervoltage Lockout for High and Low Side Drivers
- Extended Temperature Range: -40°C to +125°C
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony free. "Green" Device (Note 3)**

Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓔ
- Weight: 0.075 grams (Approximate)



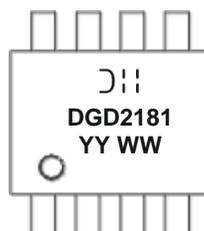
SO-8
Top View

Ordering Information (Note 4)

Part number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DGD2181S8-13	DGD2181	13	12	2,500

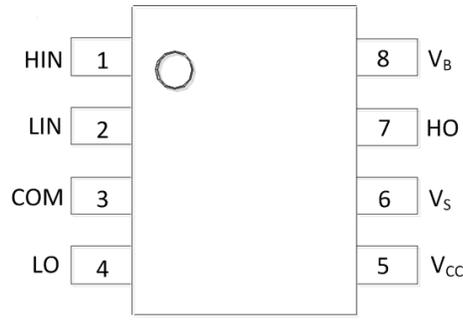
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- DII = Manufacturer's Marking
 DGD2181 = Product Type Marking Code
 YY = Year (ex: 15 = 2015)
 WW = Week (01 - 53)

Pin Diagrams

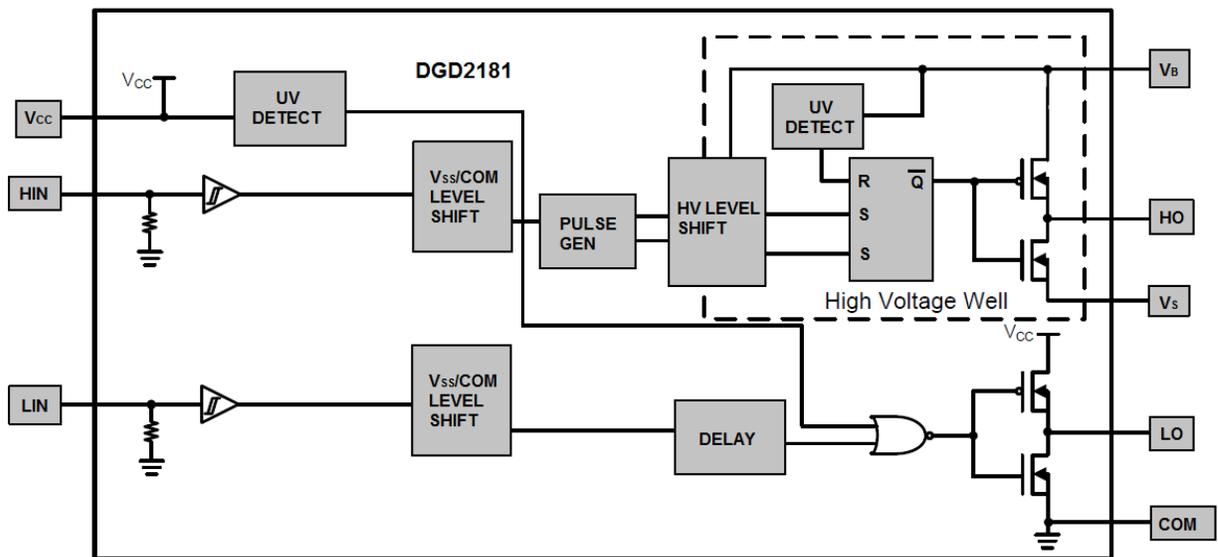


Top View SO-8

Pin Descriptions

Pin Number	Pin Name	Function
1	HIN	Logic input for high-side gate driver output, in phase with HO
2	LIN	Logic input for low-side gate driver output, in phase with LO
3	COM	Low-side and logic return
4	LO	Low-side gate drive output
5	V _{CC}	Low-side and logic fixed supply
6	V _S	High-side floating supply return
7	HO	High-side gate drive output
8	V _B	High-side floating supply

Functional Block Diagram



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
High-side Floating Supply Voltage	V _B	-0.3 to +624	V
High-side Floating Supply Offset Voltage	V _S	V _B -24 to V _B +0.3	V
High-side Floating Output Voltage	V _{HO}	V _S -0.3 to V _B +0.3	V
Offset Supply Voltage Transient	dV _S /dt	50	V/ns
Low-side Fixed Supply Voltage	V _{CC}	-0.3 to +24	V
Low-side Output Voltage	V _{LO}	-0.3 to V _{CC} +0.3	V
Logic Input Voltage (HIN and LIN)	V _{IN}	-0.3 to V _{CC} +0.3	V

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor (Note 5)	P _D	0.625	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	200	°C/W
Operating Temperature	T _J	+150	°C
Lead Temperature (Soldering, 10s)	T _L	+300	
Storage Temperature Range	T _{STG}	-55 to +150	

Note: 5. When mounted on a standard JEDEC 2-layer FR-4 board.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
High side Floating Supply Absolute Voltage	V _B	V _S + 10	V _S + 20	V
High side Floating Supply Offset Voltage	V _S	(Note 6)	600	V
High side Floating Output Voltage	V _{HO}	V _S	V _B	V
Low Side Fixed Supply Voltage	V _{CC}	10	20	V
Low Side Output Voltage	V _{LO}	0	V _{CC}	V
Logic Input Voltage (HIN and LIN)	V _{IN}	0	5	V
Ambient Temperature	T _A	-40	+125	°C

Note: 6. Logic operation for V_S of -5V to +600V. Logic state held for V_S of -5V to -V_{BS}.

DC Electrical Characteristics (V_{BIAS} (V_{CC} , V_{BS}) = 15V, @ T_A = +25°C, unless otherwise specified.) (Note 7)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Logic "1" Input Voltage	V_{IH}	2.5	–	–	V	$V_{CC} = 10V$ to 20V
Logic "0" Input Voltage	V_{IL}	–	–	0.8	V	$V_{CC} = 10V$ to 20V
High Level Output Voltage, $V_{BIAS} - V_O$	V_{OH}	–	–	1.4	V	$I_O = 0mA$
Low Level Output Voltage, V_O	V_{OL}	–	–	0.2	V	$I_O = 20mA$
Offset Supply Leakage Current	I_{LK}	–	–	50	μA	$V_B = V_S = 600V$
Quiescent V_{BS} Supply Current	I_{BSQ}	20	60	150	μA	$V_{IN} = 0V$ or 5V
Quiescent V_{CC} Supply Current	I_{CCQ}	50	120	240	μA	$V_{IN} = 0V$ or 5V
Logic "1" Input Bias Current	I_{IN+}	–	25	60	μA	$V_{IN} = 5V$
Logic "0" Input Bias Current	I_{IN-}	–	–	5.0	μA	$V_{IN} = 0V$
V_{BS} Supply Under-voltage Positive Going Threshold	V_{BSUV+}	8.0	8.9	9.8	V	–
V_{BS} Supply Under-voltage Negative Going Threshold	V_{BSUV-}	7.4	8.2	9.0	V	–
V_{CC} Supply Under-voltage Positive Going Threshold	V_{CCUV+}	8.0	8.9	9.8	V	–
V_{CC} Supply Under-voltage Negative Going Threshold	V_{CCUV-}	7.4	8.2	9.0	V	–
Output High Short Circuit Pulsed Current	I_{O+}	1.4	1.9	–	A	$V_O = 0V$, $PW \leq 10\mu s$
Output Low Short Circuit Pulsed Current	I_{O-}	1.7	2.3	–	A	$V_O = 15V$, $PW \leq 10\mu s$

Note: 7. The V_{IN} and I_{IN} parameters are applicable to the two logic input pins: LIN and HIN. The V_O and I_O parameters are applicable to the respective output pins: HO and LO.

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

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Turn-on Propagation Delay	t_{ON}	–	180	270	ns	$V_S = 0V$
Turn-off Propagation Delay	t_{OFF}	–	220	330	ns	$V_S = 0V$ or 600V
Delay Matching, HS & LS Turn-on/off	t_{DM}	–	–	35	ns	–
Turn-on Rise Time	t_r	–	40	60	ns	$V_S = 0V$
Turn-off Fall Time	t_f	–	20	35	ns	$V_S = 0V$

Timing Waveforms

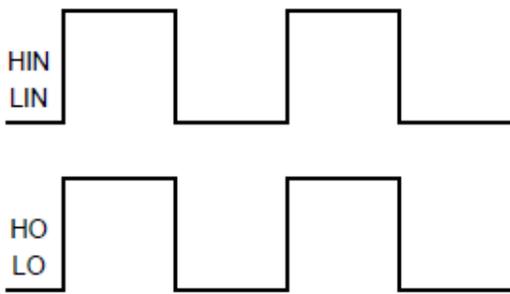


Figure 1. Input / Output Timing Diagram

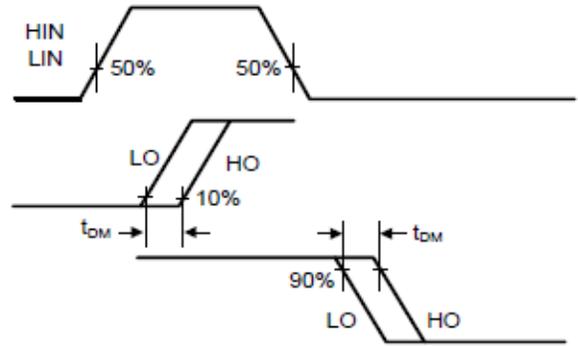


Figure 2. Delay Matching Waveform Definitions

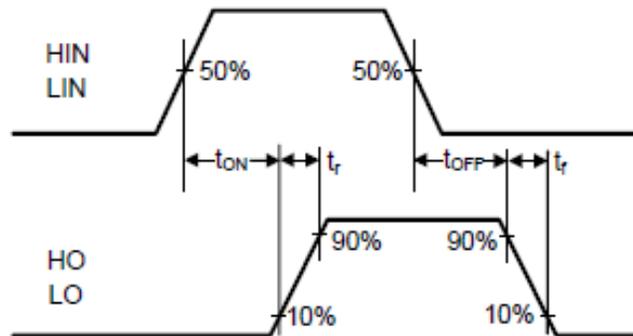
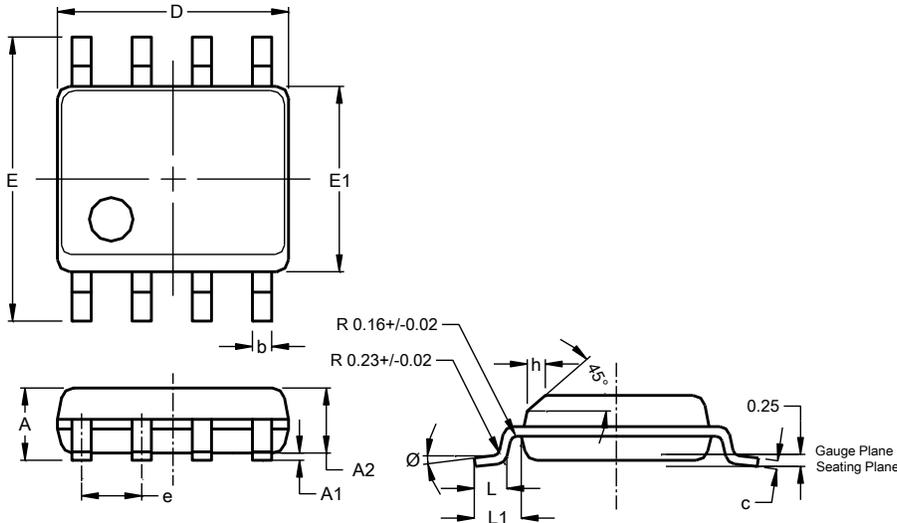


Figure 3. Switching Time Waveform Definitions

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

SO-8 (Type TH)

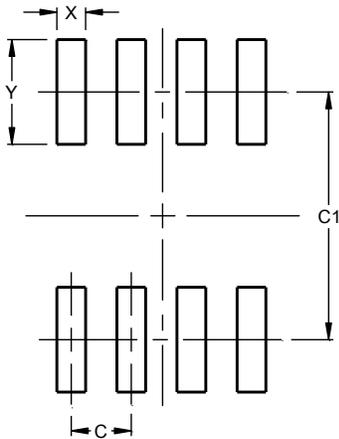


SO-8 (Type TH)			
Dim	Min	Max	Typ
A	1.35	1.75	--
A1	0.10	0.25	--
A2	--	--	1.45
b	0.35	0.51	--
c	0.190	0.248	--
D	4.80	5.00	4.90
E	5.80	6.20	6.00
E1	3.80	4.00	3.90
e	--	--	1.27
h	0.25	0.50	--
L	0.41	1.27	--
L1	--	--	1.04
Ø	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

SO-8 (Type TH)



Dimensions	Value (in mm)
C	1.27
C1	5.20
X	0.60
Y	2.20

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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