

Description

The DGD2117 and DGD2118 are high voltage / high speed gate drivers capable of driving one N-Channel MOSFET or IGBT in a bootstrap configuration. High voltage processing techniques enable the DGD2117 and DGD2118 to switch at 600V.

The DGD2117 and DGD2118 logic inputs are compatible with standard CMOS outputs. The driver outputs feature high pulse current buffers designed for minimum driver cross conduction. The single floating channel can be used in high side and low side configuration.

The DGD2117 and DGD2118 are offered in SO-8 package and the operating temperature extends from -40°C to +125°C.

Applications

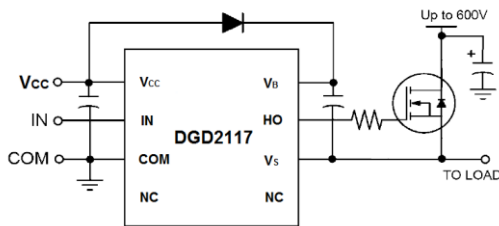
- DC-DC Converters
- DC-AC Inverters
- AC-DC Power Supplies
- Motor Controls
- Class D Power Amplifiers

Features

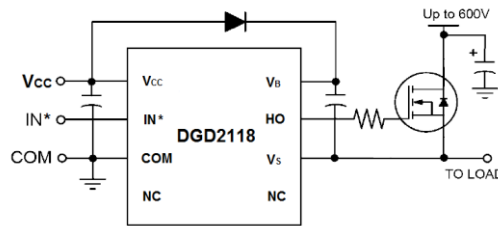
- Floating Channel in Bootstrap Operation to 600V
 - Drives One N-Channel MOSFET or IGBT
 - Outputs Tolerant to Negative Transients
 - Wide Logic Supply: 10V to 20V
 - Schmitt Triggered Logic Input with Internal Pull Down
 - Undervoltage Lockout
 - Extended Temperature Range: -40°C to +125°C
 - **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**
 - **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**
- <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Case: SO-8 (Type TH)
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.075 grams (Approximate)



Typical Configuration



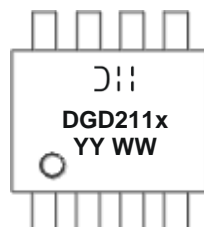
SO-8
Top View

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DGD2117S8-13	DGD2117	13	12	2,500
DGD2118S8-13	DGD2118	13	12	2,500

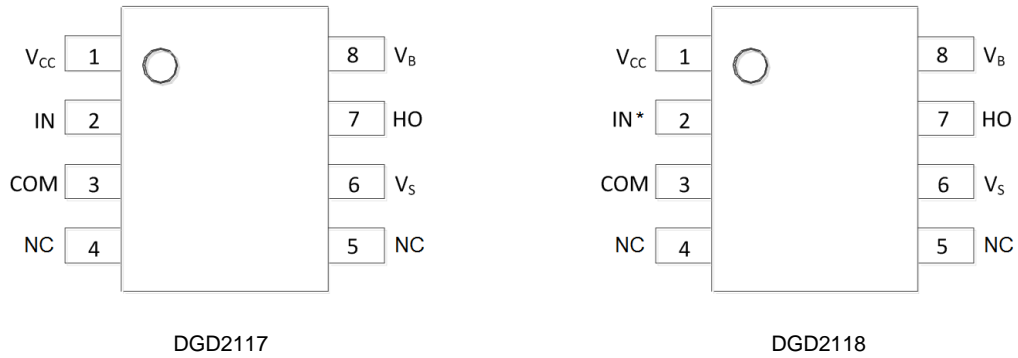
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



⌋⌋ = Manufacturer's Marking
DGD211x = Product Type Marking Code (See Table Above)
YY = Year (ex: 19 = 2019)
WW = Week (01 to 53)

Pin Diagrams

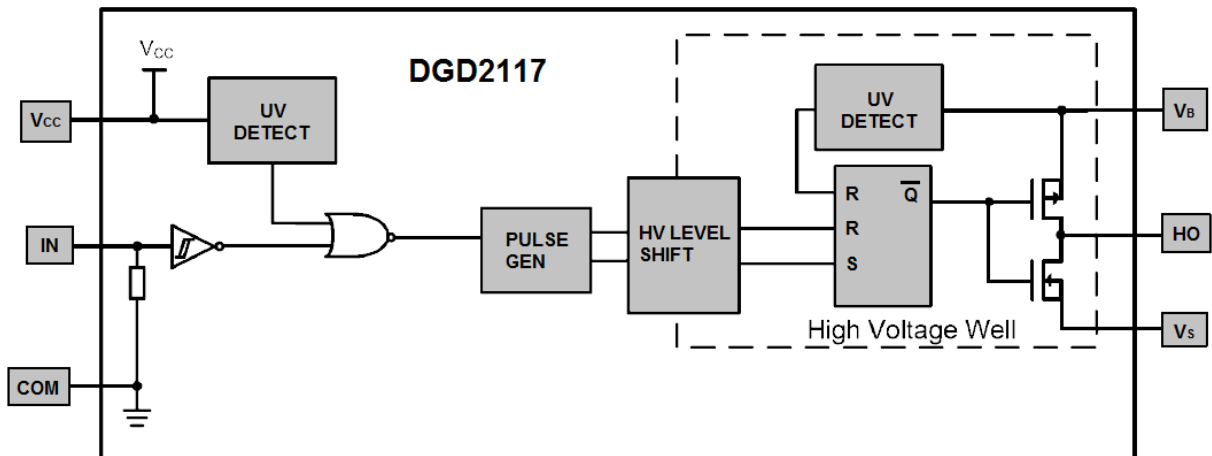


Top View SO-8

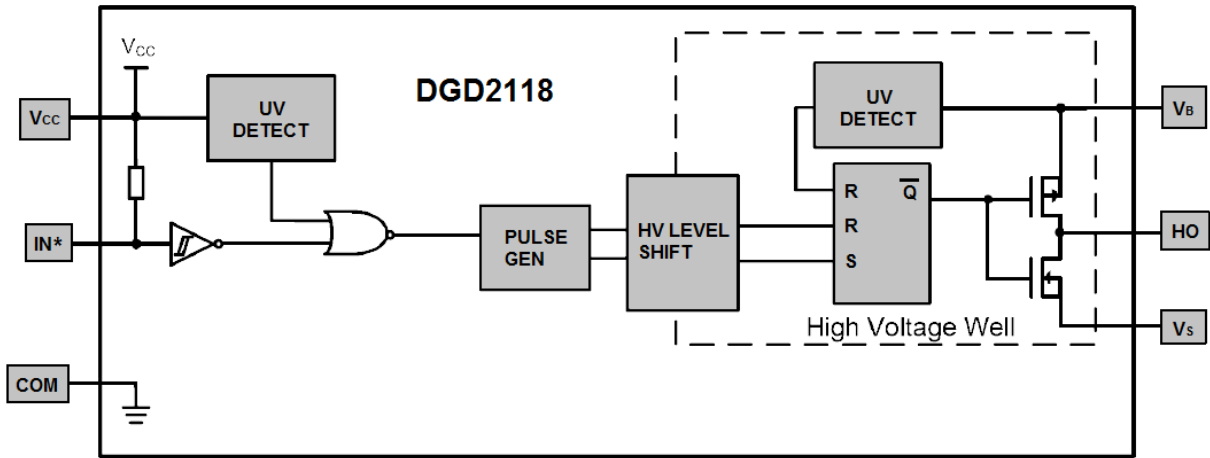
Pin Descriptions

Pin Number	Pin Name	Function
1	V _{CC}	Logic and gate driver supply
2	IN	DGD2117 Logic input for gate driver output (HO), in phase with HO
2	IN*	DGD2118 Logic input for gate driver output (HO), out of phase with HO
3	COM	Logic ground
4, 5	NC	No Connection (No Internal Connection)
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



Functional Block Diagram (continued)



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
Logic Supply Voltage	V _{CC}	-0.3 to +24	V
Logic Input Voltage	V _{IN}	-0.3 to V _{CC} +0.3	V
Allowable Offset Supply Voltage Transient	dV _S / dt	50	V/ns

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
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	45	°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 and Logic Fixed Supply Voltage	V _{CC}	10	20	V
Logic Input Voltage	V _{IN}	0	V _{CC}	V
Ambient Temperature	T _A	-40	+125	°C

Note: 6. Logic operation for V_S = -5V to +600V.

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

Parameter	Symbol	Min	Typ	Max	Unit	Conditions	
Logic "1" (DGD2117) & Logic "0" (DGD2118) Input Voltage (Note 8)	V_{IH}	9.5	—	—	V	—	
Logic "0" (DGD2117) & Logic "1" (DGD2118) Input Voltage (Note 8)	V_{IL}	—	—	6.0	V	—	
High Level Output Voltage, $V_{BIAS} - V_O$	V_{OH}	—	0.05	0.2	V	$I_O = 2mA$	
Low Level Output Voltage, V_O	V_{OL}	—	0.02	0.1	V	$I_O = 2mA$	
Offset Supply Leakage Current	I_{LK}	—	—	50	μA	$V_B = V_S = 600V$	
Quiescent V_{BS} Supply Current	I_{BSQ}	—	50	240	μA	$V_{IN} = 0V$ or V_{CC}	
Quiescent V_{CC} Supply Current	I_{CCQ}	—	70	340	μA	$V_{IN} = 0V$ or V_{CC}	
Logic "1" Input Bias Current	DGD2117	I_{IN+}	—	20	40	μA	$V_{IN} = V_{CC}$
	DGD2118						$V_{IN} = 0V$
Logic "0" Input Bias Current	DGD2117	I_{IN-}	—	—	5.0	μA	$V_{IN} = 0V$
	DGD2118						$V_{IN} = V_{CC}$
V_{BS} Supply Under-Voltage Positive Going Threshold	V_{BSUV+}	7.6	8.6	9.6	V	—	
V_{BS} Supply Under-Voltage Negative Going Threshold	V_{BSUV-}	7.2	8.2	9.2	V	—	
V_{CC} Supply Under-Voltage Positive Going Threshold	V_{CCUV+}	7.6	8.6	9.6	V	—	
V_{CC} Supply Under-Voltage Negative Going Threshold	V_{CCUV-}	7.2	8.2	9.2	V	—	
Output High Short Circuit Pulsed Current	I_{O+}	200	290	—	mA	$V_O = 0V, V_{IN} = \text{Logic "1"}, PW \leq 10\mu s$	
Output Low Short Circuit Pulsed Current	I_{O-}	420	600	—	mA	$V_O = 15V, V_{IN} = \text{Logic "0"}, PW \leq 10\mu s$	

Notes: 7. The V_{IN} and I_{IN} parameters are referenced to COM and are applicable to the logic input pins: IN and IN*. The V_O and I_O parameters are referenced to COM and are applicable to the output pin: HO.
8. For optimal operation, it is recommended that the input pulses (IN and IN*) should have a minimum amplitude of 9.5V with a minimum pulse width of 250ns.

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

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Turn-On Propagation Delay	t_{ON}	—	125	200	ns	$V_S = 0V$
Turn-Off Propagation Delay	t_{OFF}	—	105	180	ns	$V_S = 600V$
Turn-On Rise Time	t_r	—	75	130	ns	—
Turn-Off Fall Time	t_f	—	35	65	ns	—

Timing Waveforms

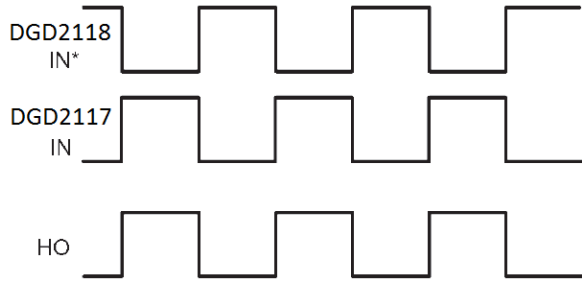


Figure 1. Input / Output Timing Diagram

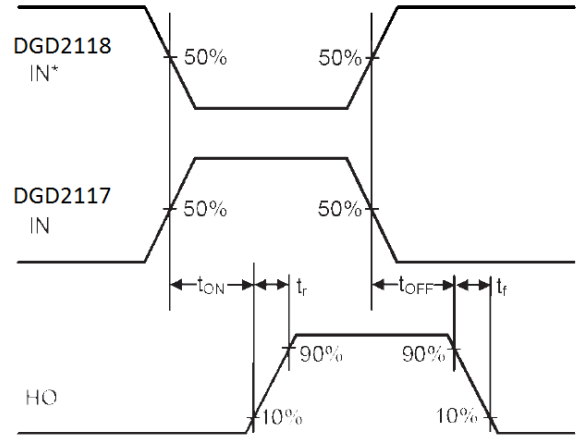


Figure 2. Switching Time Waveform Definitions

Typical Performance Characteristics ($V_{CC} = 15V$, $@T_A = +25^\circ C$, unless otherwise specified.)

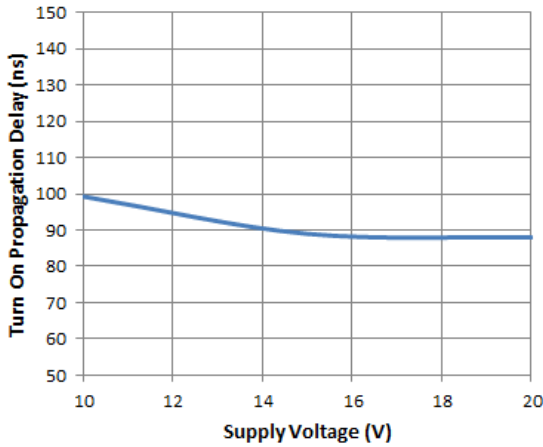


Figure 3. Turn-on Propagation Delay vs. Supply Voltage

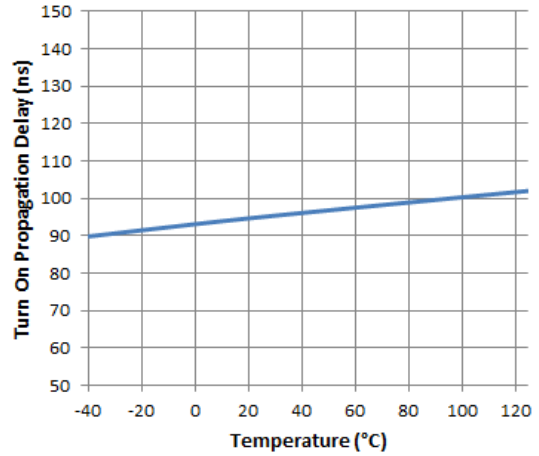


Figure 4. Turn-on Propagation Delay vs. Temperature

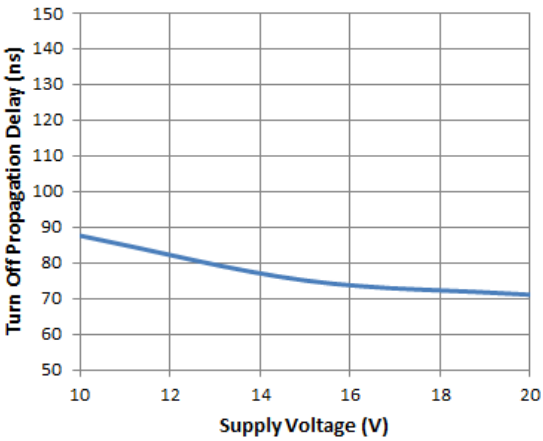


Figure 5. Turn-off Propagation Delay vs. Supply Voltage

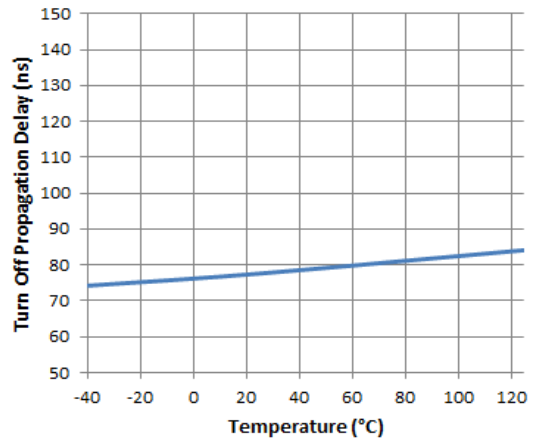


Figure 6. Turn-off Propagation Delay vs. Temperature

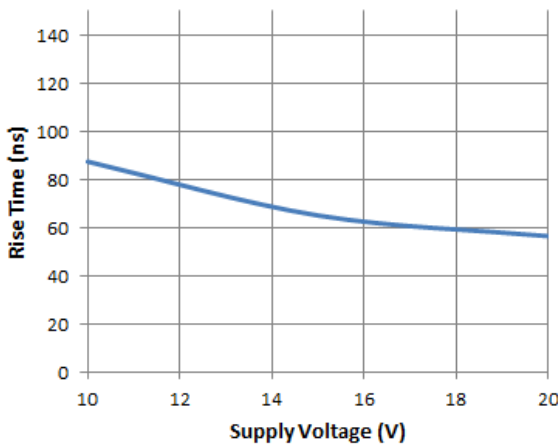


Figure 7. Rise Time vs. Supply Voltage

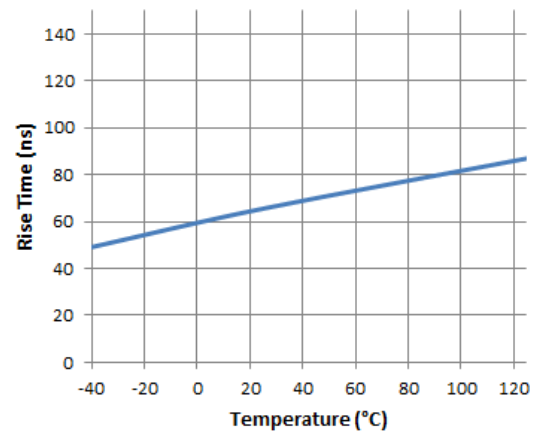


Figure 8. Rise Time vs. Temperature

Typical Performance Characteristics (continued)

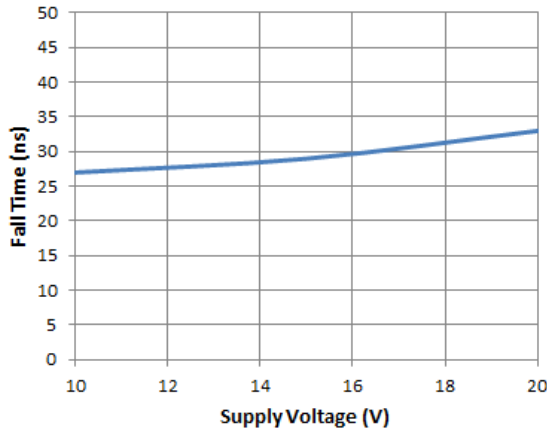


Figure 9. Fall Time vs. Supply Voltage

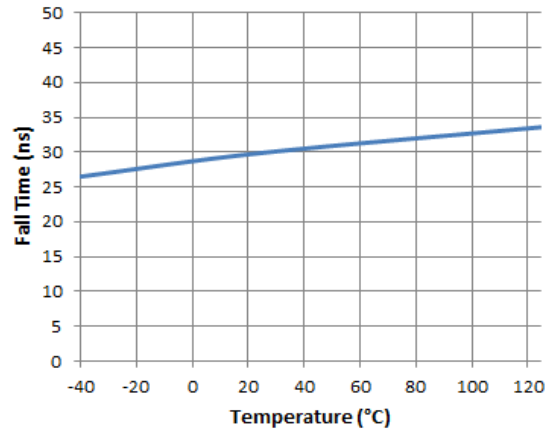


Figure 10. Fall Time vs. Temperature

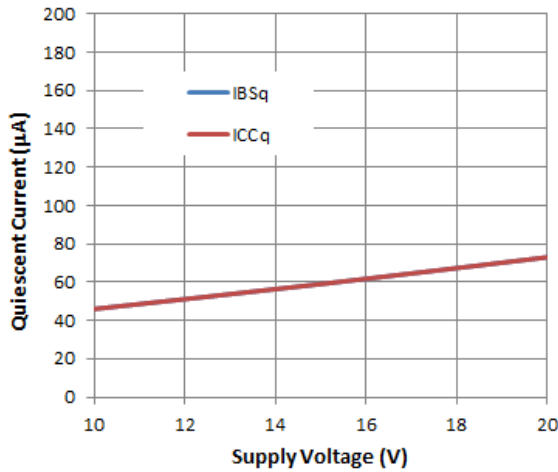


Figure 11. Quiescent Current vs. Supply Voltage

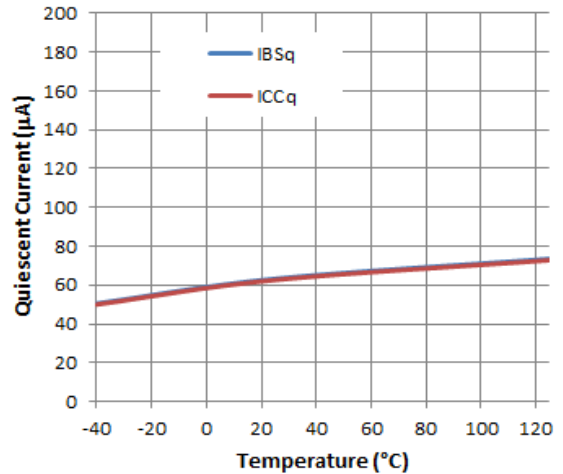


Figure 12. Quiescent Current vs. Temperature

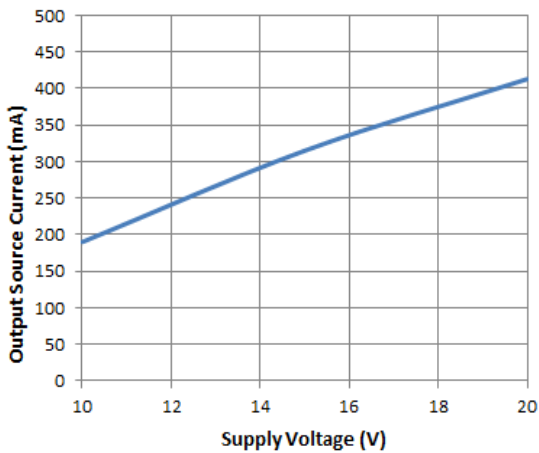


Figure 13. Output Source Current vs. Supply Voltage

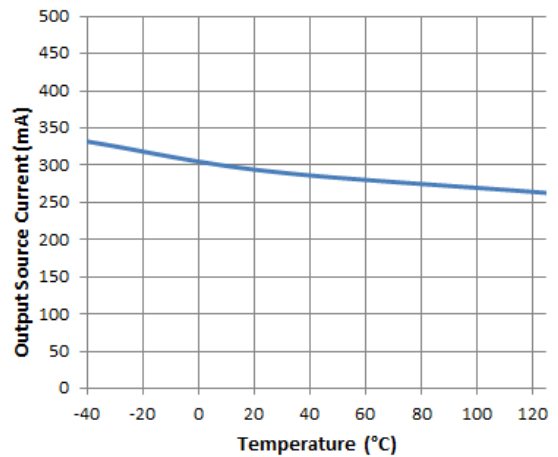


Figure 14. Output Source Current vs. Temperature

Typical Performance Characteristics (continued)

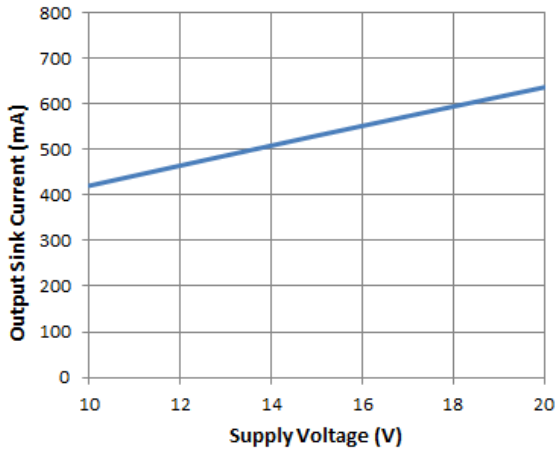


Figure 15. Output Sink Current vs. Supply Voltage

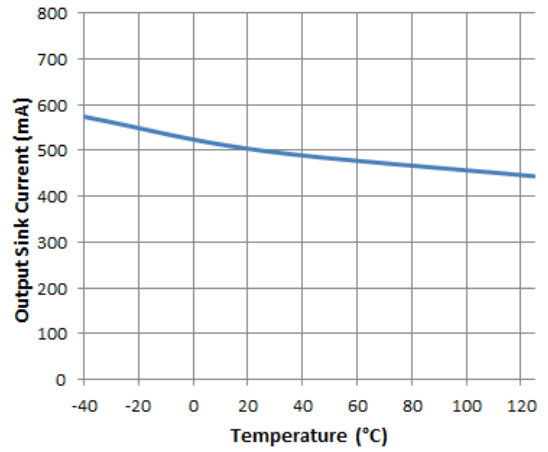


Figure 16. Output Sink Current vs. Temperature

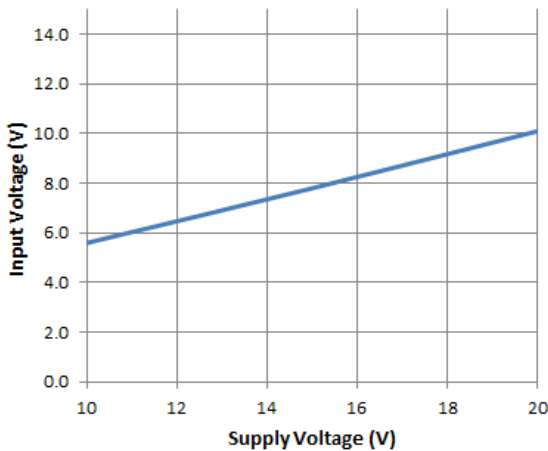


Figure 17. DGD2117 Logic 1 (DGD2118 Logic 0) Input Voltage vs. Supply Voltage

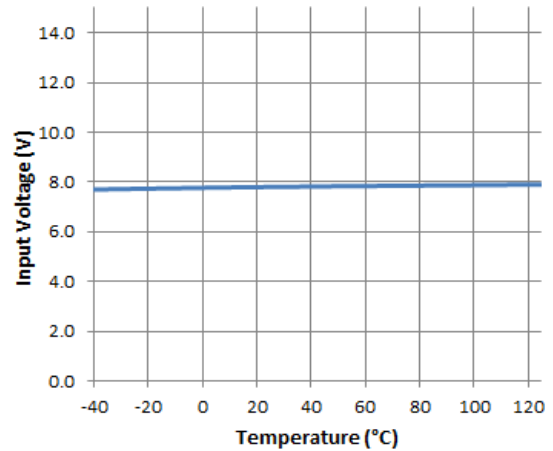


Figure 18. DGD2117 Logic 1 (DGD2118 Logic 0) Input Voltage vs. Temperature

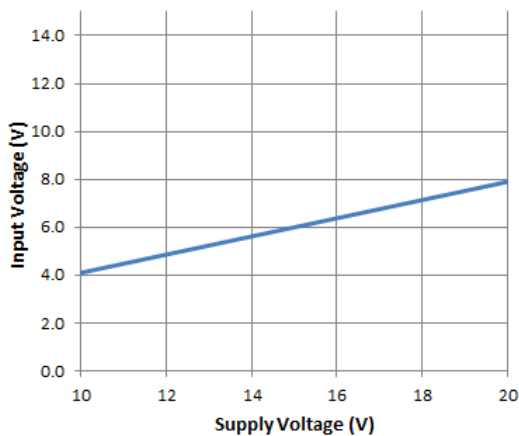


Figure 19. DGD2117 Logic 0 (DGD2118 Logic 1) Input Voltage vs. Supply Voltage

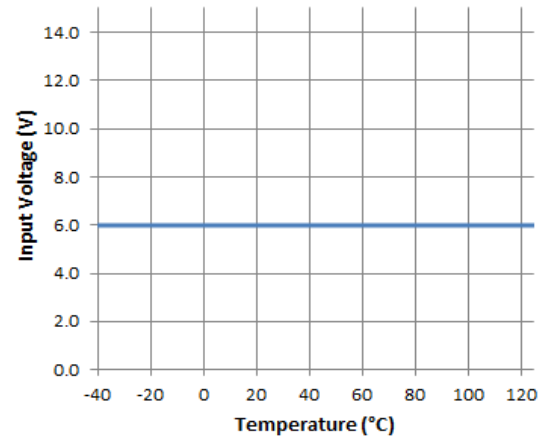


Figure 20. DGD2117 Logic 0 (DGD2118 Logic 1) Input Voltage vs. Temperature

Typical Performance Characteristics (continued)

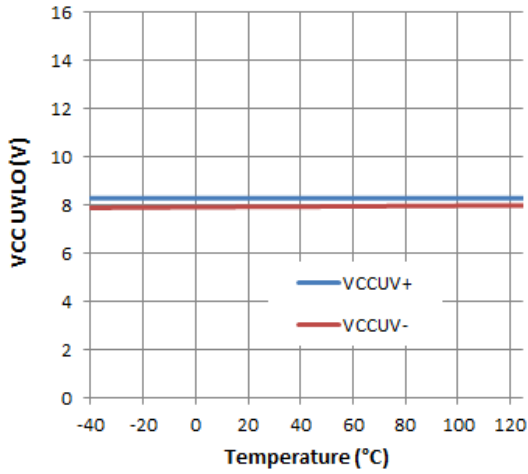


Figure 21. VCC UVLO vs. Temperature

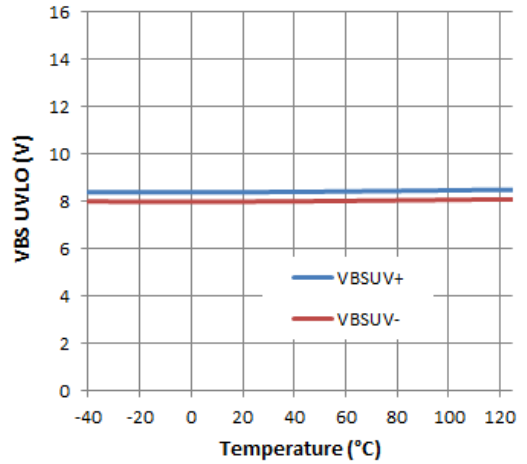


Figure 22. VBS UVLO vs. Temperature

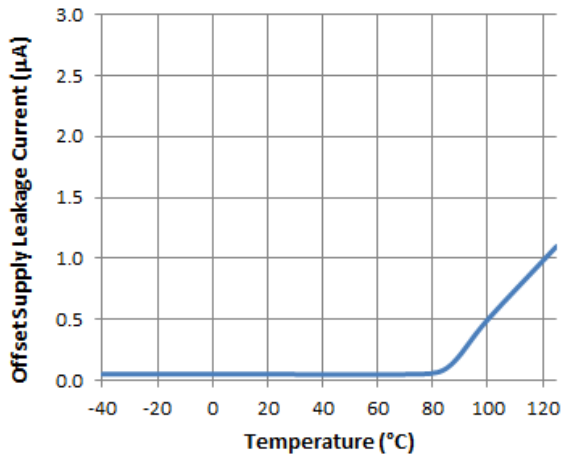
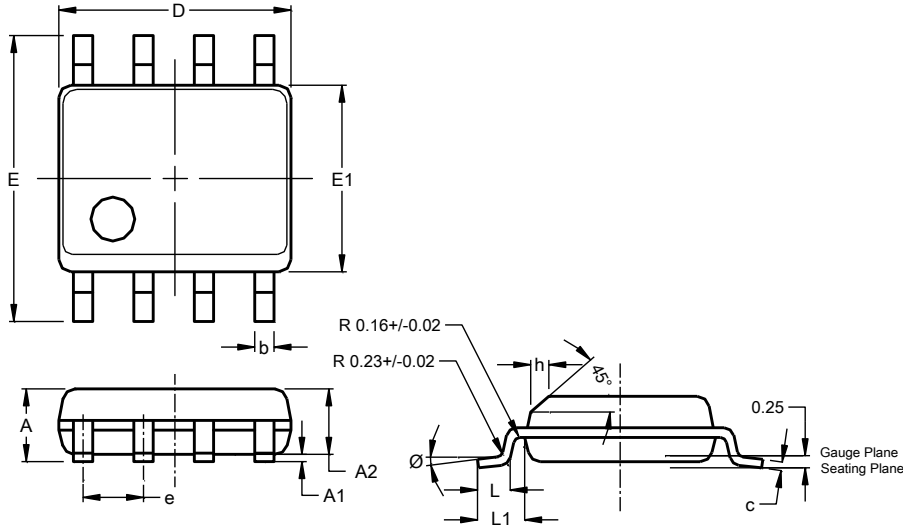


Figure 23. Offset Supply Leakage Current vs. Temperature

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8 (Type TH)

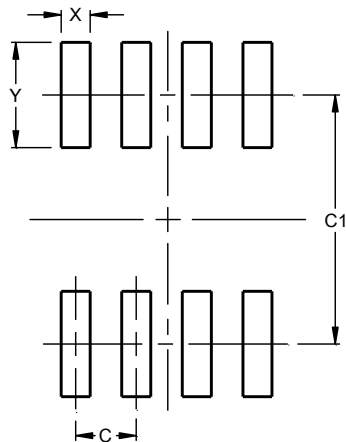


SO-8 (Type TH)			
Dim	Min	Max	Typ
A	1.35	1.75	--
A1	0.10	0.25	--
A2	--	--	1.45
b	0.35	0.51	--
c	0.190	0.248	--
D	4.80	5.00	4.90
E	5.80	6.20	6.00
E1	3.80	4.00	3.90
e	--	--	1.27
h	0.25	0.50	--
L	0.41	1.27	--
L1	--	--	1.04
Ø	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> 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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