

## 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 (Type TH) package and the operating temperature extends from -40°C to +125°C.

## Features

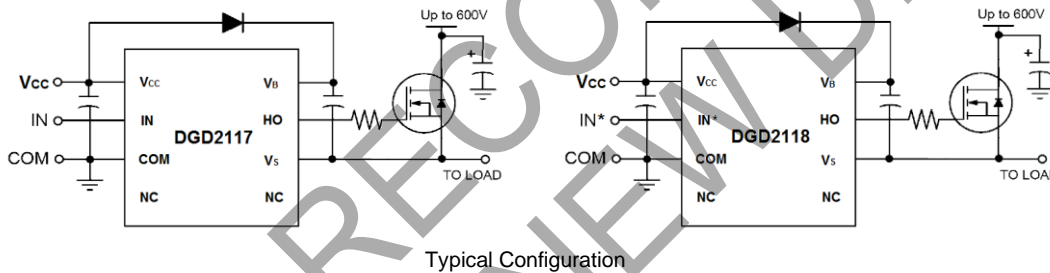
- Floating Channel in Bootstrap Operation to 600V
- Drives One N-Channel MOSFET or IGBT
- Outputs Tolerant to Negative Transients
- Wide Logic Supply: 10V to 20V
- Schmitt Triggered Logic Input with Internal Pulldown
- Undervoltage Lockout
- Extended Temperature Range: -40°C to +125°C
- **Totally Lead-Free & 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-Q100/101/104/200, 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/>

## Applications

- DC-DC converters
- DC-AC inverters
- AC-DC power supplies
- Motor controls
- Class D power amplifiers

## Mechanical Data

- Package: SO-8
- Package 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, Ⓔ3
- Weight: 0.075 grams (Approximate)

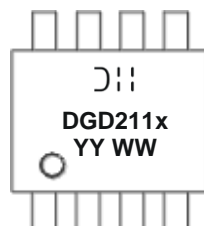


## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DGD2117S8-13	SO-8 (Type TH)	DGD2117	13	12	2,500	Reel
DGD2118S8-13	SO-8 (Type TH)	DGD2118	13	12	2,500	Reel

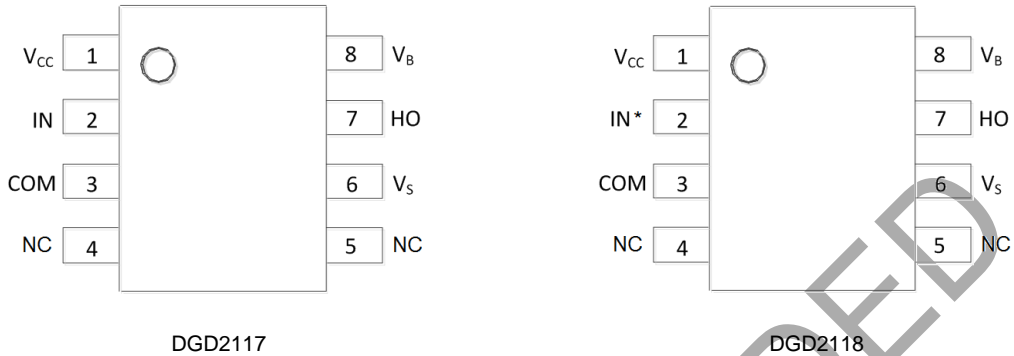
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. 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: 24 = 2024)  
 WW = Week (01 to 53)

**Pin Diagrams**

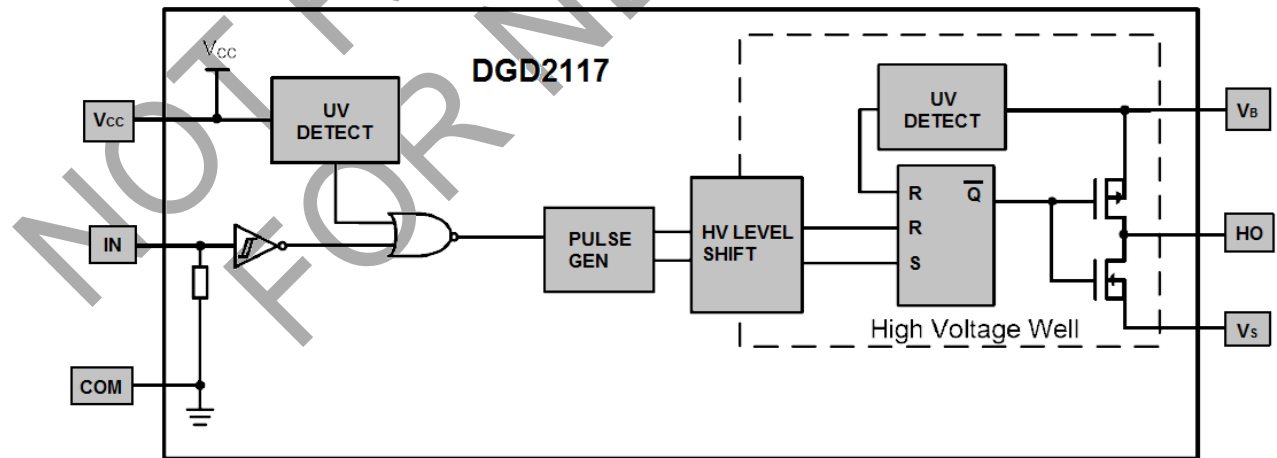


Top View SO-8 (Type TH)

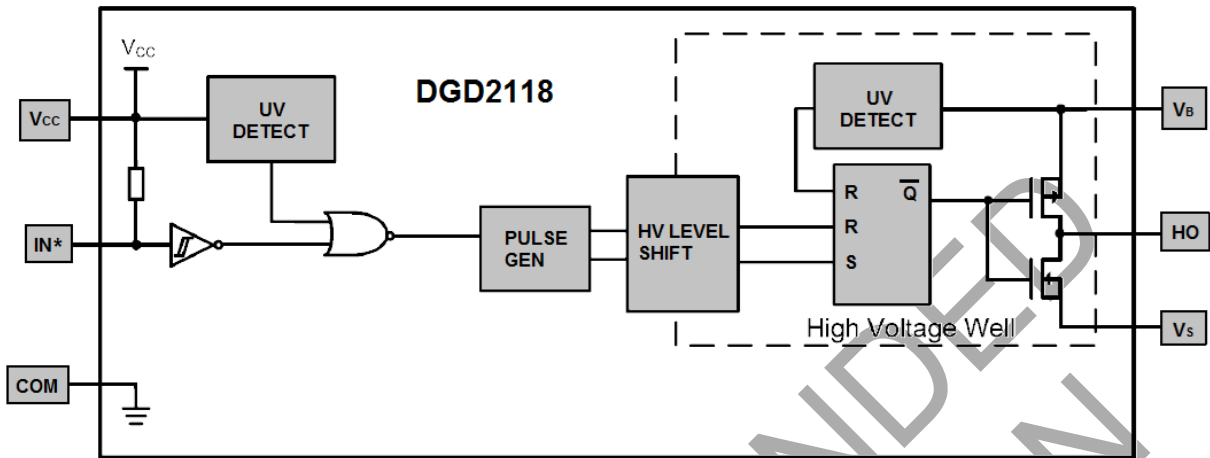
**Pin Descriptions**

Pin Number	Pin Name	Function
1	V <sub>CC</sub>	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 <sub>S</sub>	High-side floating supply return
7	HO	High-side gate drive output
8	V <sub>B</sub>	High-side floating supply

**Functional Block Diagram**



**Functional Block Diagram** (continued)



**Absolute Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , 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** (@ $T_A = +25^\circ\text{C}$ , 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)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	45	$^\circ\text{C}/\text{W}$
Operating Temperature	$T_J$	+150	$^\circ\text{C}$
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	$^\circ\text{C}$

Note: 6. Logic operation for  $V_S = -5\text{V}$  to +600V.

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

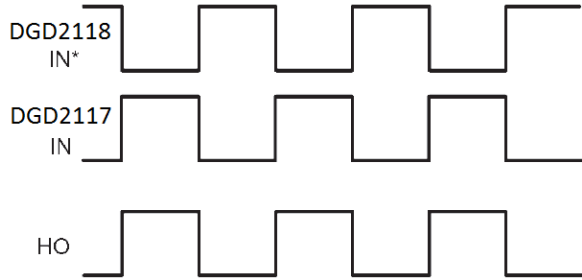
Parameter	Symbol	Min	Typ	Max	Unit	Conditions	
Logic "1" (DGD2117) & Logic "0" (DGD2118) Input Voltage (Note 8)	$V_{IH}$	9.5	—	—	V	—	
Logic "0" (DGD2117) & Logic "1" (DGD2118) Input Voltage (Note 8)	$V_{IL}$	—	—	6.0	V	—	
High-Level Output Voltage, $V_{BIAS} - V_O$	$V_{OH}$	—	0.05	0.2	V	$I_O = 2mA$	
Low-Level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

- Notes:
- 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.
  - 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.

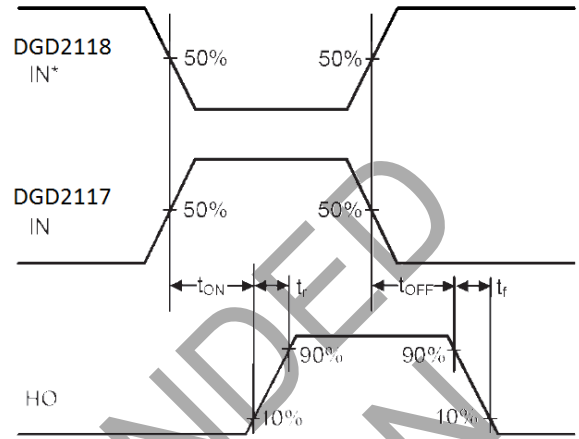
**AC Electrical Characteristics** ( $V_{BIAS} (V_{CC}, V_{BS}) = 15V, C_L = 1000pF, @T_A = +25^\circ C$ , unless otherwise specified.)

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**



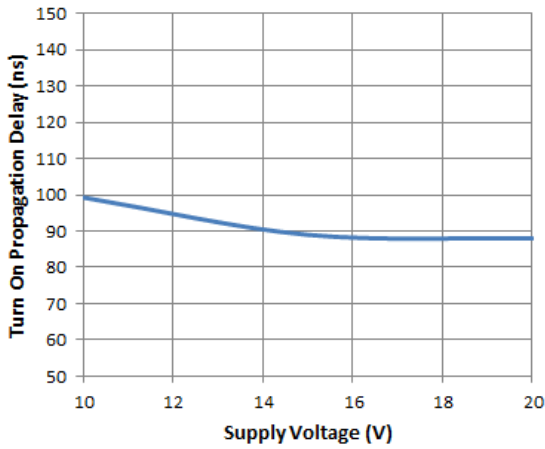
**Figure 1.** Input / Output Timing Diagram



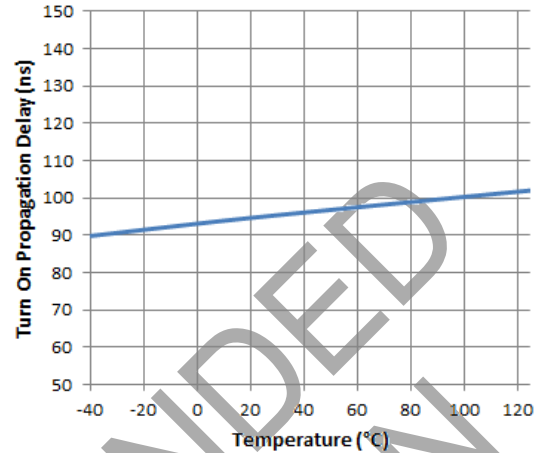
**Figure 2.** Switching Time Waveform Definitions

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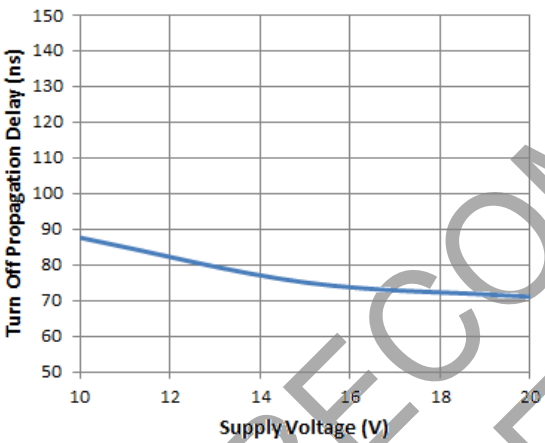
**Typical Performance Characteristics** ( $V_{CC} = 15V$ ,  $@T_A = +25^\circ C$ , unless otherwise specified.)



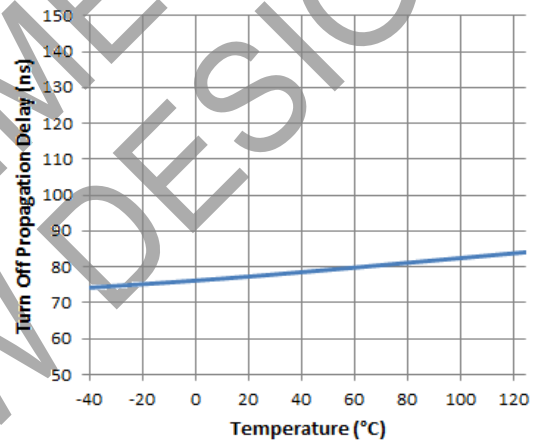
**Figure 3.** Turn-on Propagation Delay vs. Supply Voltage



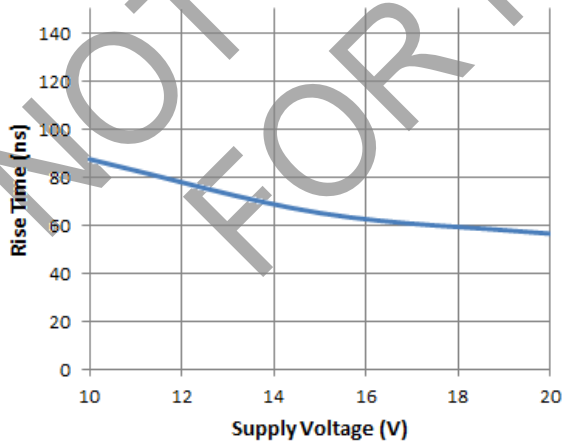
**Figure 4.** Turn-on Propagation Delay vs. Temperature



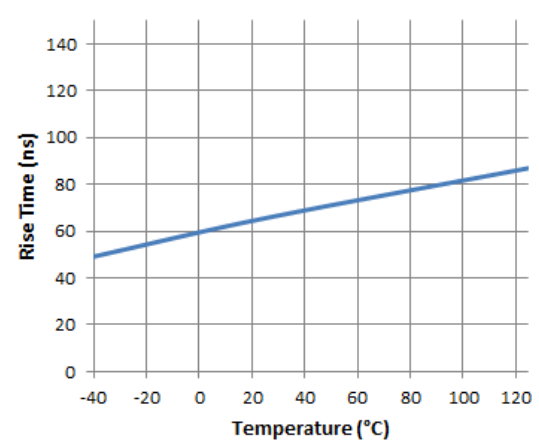
**Figure 5.** Turn-off Propagation Delay vs. Supply Voltage



**Figure 6.** Turn-off Propagation Delay vs. Temperature



**Figure 7.** Rise Time vs. Supply Voltage



**Figure 8.** Rise Time vs. Temperature

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

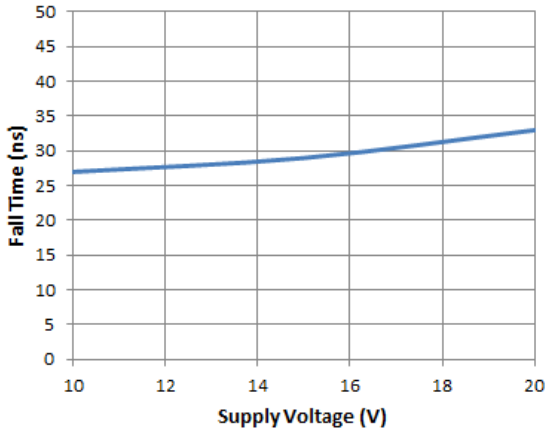


Figure 9. Fall Time vs. Supply Voltage

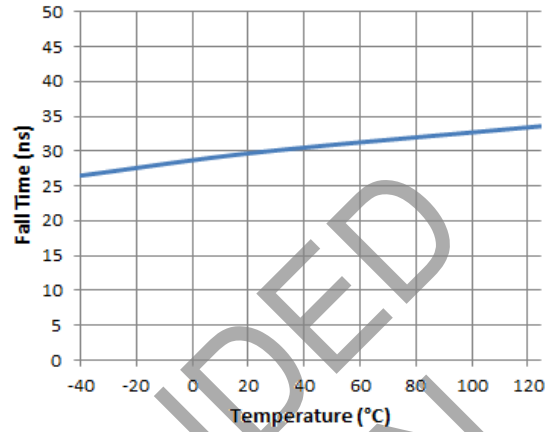


Figure 10. Fall Time vs. Temperature

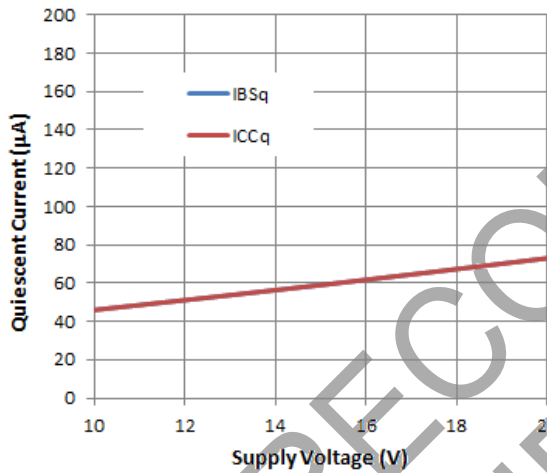


Figure 11. Quiescent Current vs. Supply Voltage

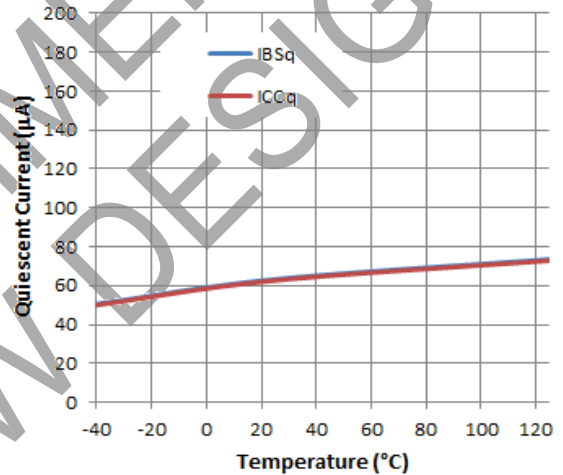


Figure 12. Quiescent Current vs. Temperature

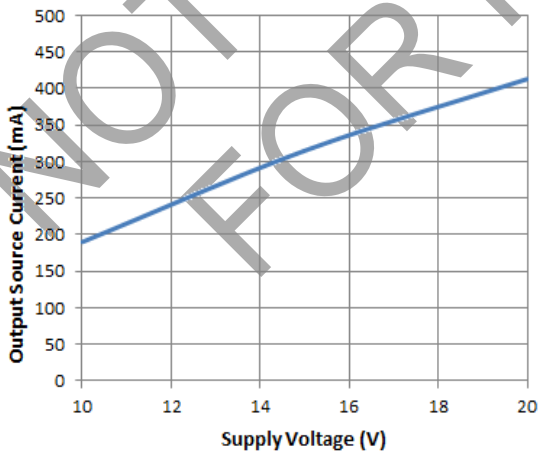


Figure 13. Output Source Current vs. Supply Voltage

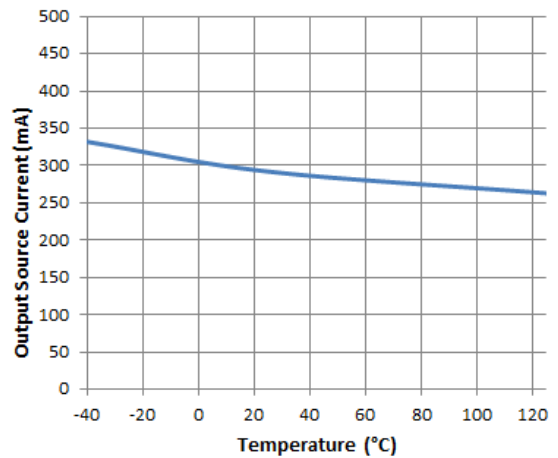
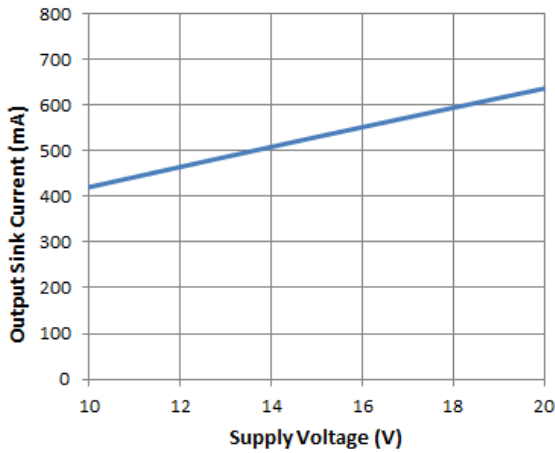
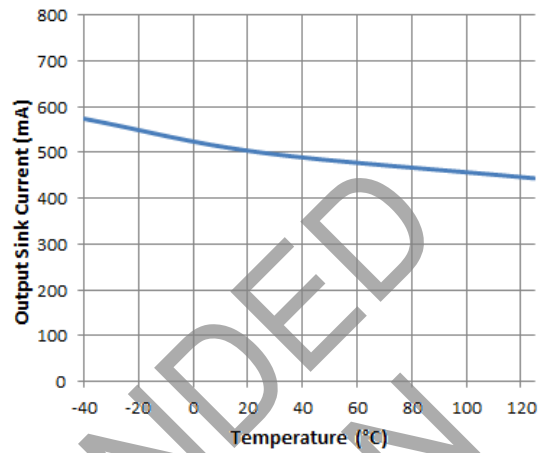


Figure 14. Output Source Current vs. Temperature

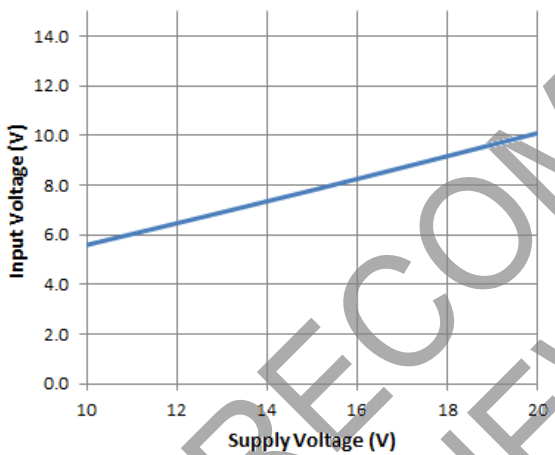
**Typical Performance Characteristics** ( $V_{CC} = 15V$ ,  $@T_A = +25^\circ C$ , unless otherwise specified.) (continued)



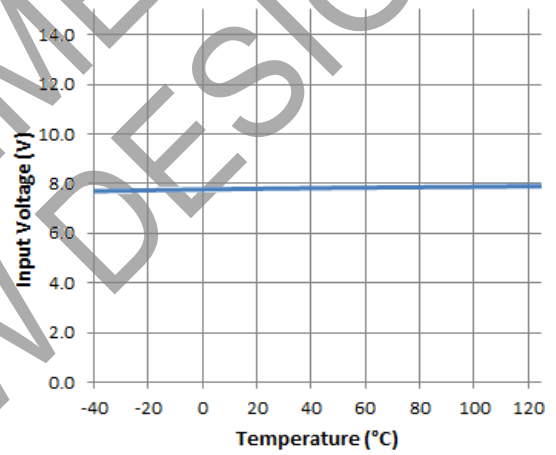
**Figure 15.** Output Sink Current vs. Supply Voltage



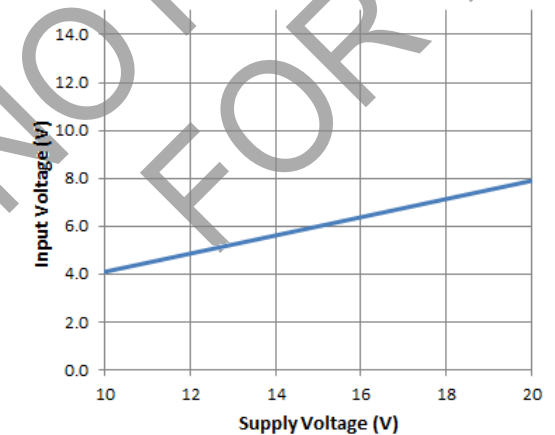
**Figure 16.** Output Sink Current vs. Temperature



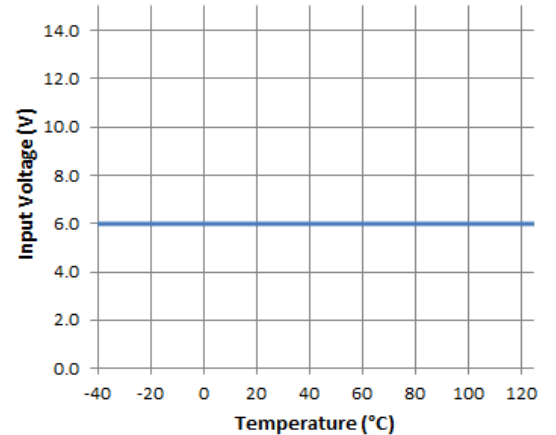
**Figure 17.** DGD2117 Logic 1 (DGD2118 Logic 0) Input Voltage vs. Supply Voltage



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

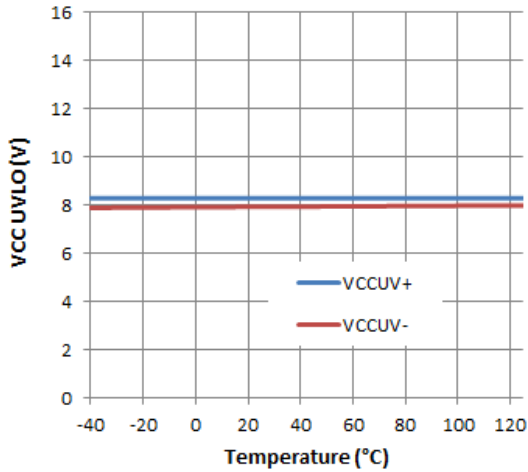


Figure 21. VCC UVLO vs. Temperature

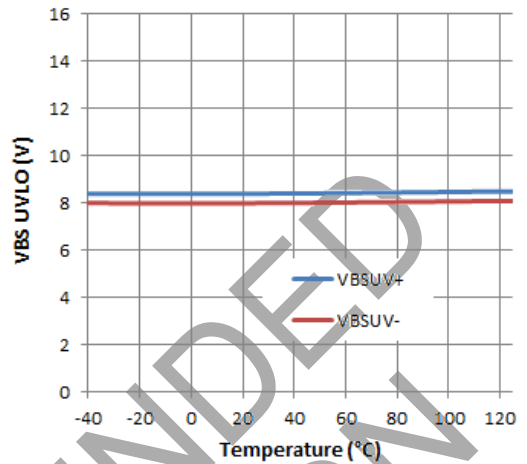


Figure 22. VBS UVLO vs. Temperature

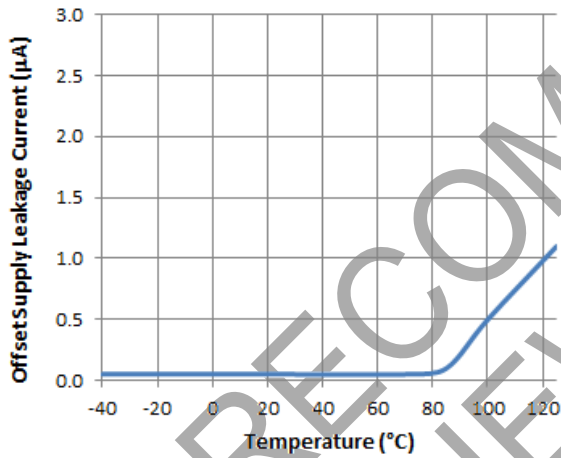


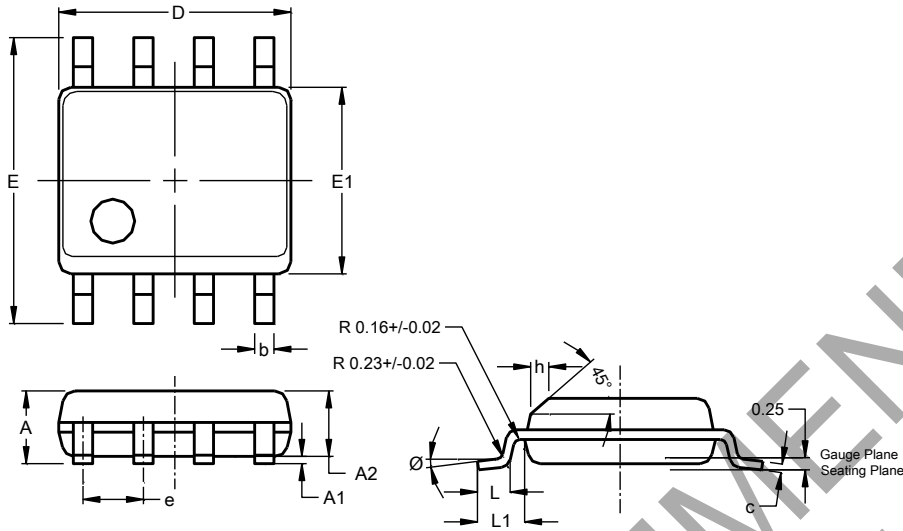
Figure 23. Offset Supply Leakage Current vs. Temperature

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**Package Outline Dimensions**

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

**SO-8 (Type TH)**

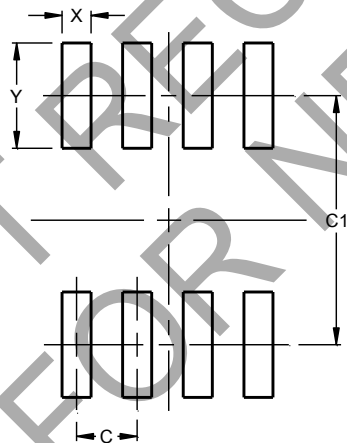


SO-8 (Type TH)			
Dim	Min	Max	Typ
A	1.35	1.75	--
A1	0.10	0.25	--
A2	--	--	1.45
b	0.35	0.51	--
c	0.190	0.248	--
D	4.80	5.00	4.90
E	5.80	6.20	6.00
E1	3.80	4.00	3.90
e	--	--	1.27
h	0.25	0.50	--
L	0.41	1.27	--
L1	--	--	1.04
Ø	0°	8°	--
All Dimensions in mm			

**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: 9. 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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