

## Description

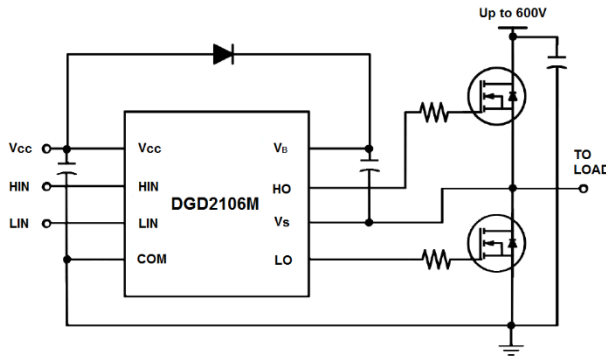
The DGD2106M is a high-voltage / high-speed gate driver capable of driving N-Channel MOSFETs and IGBTs in a half-bridge configuration. High voltage processing techniques enable the DGD2106M's high-side to switch to 600V in a bootstrap operation.

The DGD2106M logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) to interface easily with controlling devices. The driver outputs feature high pulse current buffers designed for minimum driver cross conduction.

The DGD2106M is available in a space saving SO-8 (Type TH) package and operates over an extended -40°C to +125°C temperature range.

## Applications

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



Typical Configuration

## Features

- Floating High-Side Driver in Bootstrap Operation to 600V
- Drives Two N-Channel MOSFETs or IGBTs in Half Bridge Configuration
- Outputs Tolerant to Negative Transients
- Wide Logic and Low-Side Gate Driver Supply Voltage: 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 (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
- Weight: 0.075 grams (Approximate)



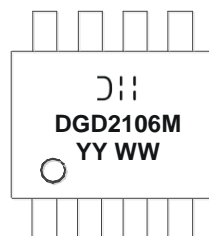
SO-8 (Type TH)  
Top View

## Ordering Information (Note 4)

| Part Number   | Marking  | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|----------|--------------------|-----------------|-------------------|
| DGD2106MS8-13 | DGD2106M | 13                 | 12              | 2,500             |

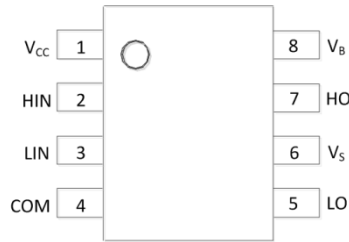
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free,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

## Marking Information



= Manufacturer's Marking  
 DGD2106M = Product Type Marking Code  
 YY = Year (ex: 17 = 2017)  
 WW = Week (01 to 53)

**Pin Diagrams**

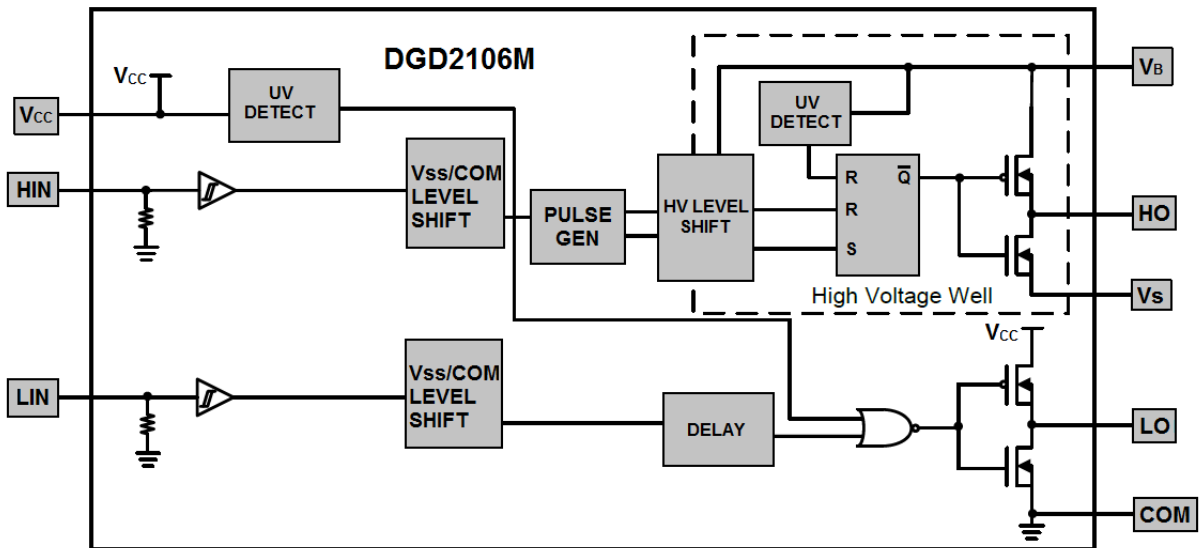


Top View: SO-8 (Type TH)

**Pin Descriptions**

| Pin Number | Pin Name        | Function   |
|------------|-----------------|--|
| 1          | V <sub>CC</sub> | Low-side and logic fixed supply                                |
| 2          | HIN             | Logic input for high-side gate driver output, in phase with HO |
| 3          | LIN             | Logic input for low-side gate driver output, in phase with LO  |
| 4          | COM             | Low-side return  |
| 5          | LO              | Low-side gate drive output                                     |
| 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**



**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                           | Symbol              | Value                                      | Unit |
|--|---------------------|--|------|
| High-Side Floating Supply Voltage        | V <sub>B</sub>      | -0.3 to +624                               | V    |
| High-Side Floating Supply Offset Voltage | V <sub>S</sub>      | V <sub>B</sub> -24 to V <sub>B</sub> +0.3  | V    |
| High-Side Floating Output Voltage        | V <sub>HO</sub>     | V <sub>S</sub> -0.3 to V <sub>B</sub> +0.3 | V    |
| Offset Supply Voltage Transient          | dV <sub>S</sub> /dt | 50   | V/ns |
| Low-Side and Logic Fixed Supply Voltage  | V <sub>CC</sub>     | -0.3 to +24                                | V    |
| Low-Side Output Voltage                  | V <sub>LO</sub>     | -0.3 to V <sub>CC</sub> +0.3               | V    |
| Logic Input Voltage (HIN and LIN)        | V <sub>IN</sub>     | -0.3 to V <sub>CC</sub> +0.3               | V    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                    | Symbol           | Value       | Unit |
|---|------------------|-------------|------|
| Power Dissipation Linear Derating Factor (Note 5) | P <sub>D</sub>   | 0.625       | W    |
| Thermal Resistance, Junction to Ambient (Note 5)  | R <sub>θJA</sub> | 200         | °C/W |
| Operating Temperature                             | T <sub>J</sub>   | +150        | °C   |
| Lead Temperature (Soldering, 10s)                 | T <sub>L</sub>   | +300        |      |
| Storage Temperature Range                         | T <sub>STG</sub> | -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 <sub>B</sub>  | V <sub>S</sub> + 10 | V <sub>S</sub> + 20 | V    |
| High Side Floating Supply Offset Voltage   | V <sub>S</sub>  | (Note 6)            | 600                 | V    |
| High Side Floating Output Voltage          | V <sub>HO</sub> | V <sub>S</sub>      | V <sub>B</sub>      | V    |
| Low Side and Logic Fixed Supply Voltage    | V <sub>CC</sub> | 10                  | 20                  | V    |
| Low Side Output Voltage                    | V <sub>LO</sub> | 0                   | V <sub>CC</sub>     | V    |
| Logic Input Voltage                        | V <sub>IN</sub> | 0                   | 5                   | V    |
| Ambient Temperature                        | T <sub>A</sub>  | -40                 | +125                | °C   |

Note: 6. Logic operation for V<sub>S</sub> of -5V to +600V. Logic state held for V<sub>S</sub> of -5V to -V<sub>BS</sub>.

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

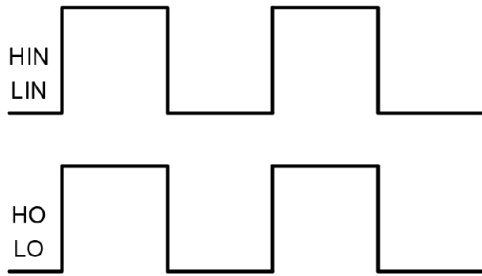
| Parameter   | Symbol      | Min | Typ  | Max | Unit    | Conditions                      |
|---|-------------|-----|------|-----|---------|---------------------------------|
| Logic "1" Input Voltage                               | $V_{IH}$    | 2.5 | —    | —   | V       | $V_{CC} = 10V$ to 20V           |
| Logic "0" Input Voltage                               | $V_{IL}$    | —   | —    | 0.6 | V       | $V_{CC} = 10V$ to 20V           |
| 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                     | $I_{BSQ}$   | 20  | 75   | 130 | $\mu A$ | $V_{IN} = 0V$ or 5V             |
| Quiescent $V_{CC}$ Supply Current                     | $I_{CCQ}$   | 60  | 120  | 180 | $\mu A$ | $V_{IN} = 0V$ or 5V             |
| Logic "1" Input Bias Current                          | $I_{IN+}$   | —   | 5.0  | 20  | $\mu A$ | $V_{IN} = 5V$                   |
| Logic "0" Input Bias Current                          | $I_{IN-}$   | —   | —    | 2.0 | $\mu A$ | $V_{IN} = 0V$                   |
| $V_{BS}$ Supply Undervoltage Positive Going Threshold | $V_{BSUV+}$ | 8.0 | 8.9  | 9.8 | V       | —                               |
| $V_{BS}$ Supply Undervoltage Negative Going Threshold | $V_{BSUV-}$ | 7.4 | 8.2  | 9.0 | V       | —                               |
| $V_{CC}$ Supply Undervoltage Positive Going Threshold | $V_{CCUV+}$ | 8.0 | 8.9  | 9.8 | V       | —                               |
| $V_{CC}$ Supply Undervoltage Negative Going Threshold | $V_{CCUV-}$ | 7.4 | 8.2  | 9.0 | V       | —                               |
| Hysteresis  | $V_{CCUVH}$ | 0.3 | 0.7  | —   | V       | —                               |
| Hysteresis  | $V_{BSUVH}$ | 0.3 | 0.7  | —   | V       | —                               |
| Output High Short Circuit Pulsed Current              | $I_{O+}$    | 130 | 290  | —   | mA      | $V_O = 0V$ , $PW \leq 10\mu s$  |
| Output Low Short Circuit Pulsed Current               | $I_{O-}$    | 270 | 600  | —   | mA      | $V_O = 15V$ , $PW \leq 10\mu s$ |

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

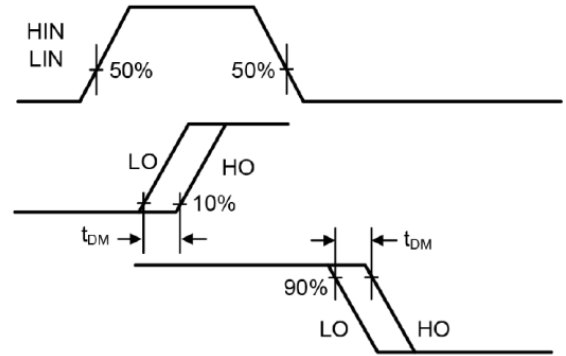
**AC Electrical Characteristics** ( $V_{BIAS}$  ( $V_{CC}$ ,  $V_{BS}$ ) = 15V,  $C_L = 1000pF$ , @ $T_A$  = +25°C, unless otherwise specified.)

| Parameter                  | Symbol    | Min | Typ | Max | Unit | Conditions         |
|----------------------------|-----------|-----|-----|-----|------|--------------------|
| Turn-On Propagation Delay  | $t_{ON}$  | —   | 220 | 300 | ns   | $V_S = 0V$         |
| Turn-Off Propagation Delay | $t_{OFF}$ | —   | 200 | 280 | ns   | $V_S = 0V$ or 600V |
| Delay Matching             | $t_{DM}$  | —   | —   | 30  | ns   | —                  |
| Turn-On Rise Time          | $t_R$     | —   | 100 | 220 | ns   | $V_S = 0V$         |
| Turn-Off Fall Time         | $t_F$     | —   | 35  | 80  | ns   | $V_S = 0V$         |

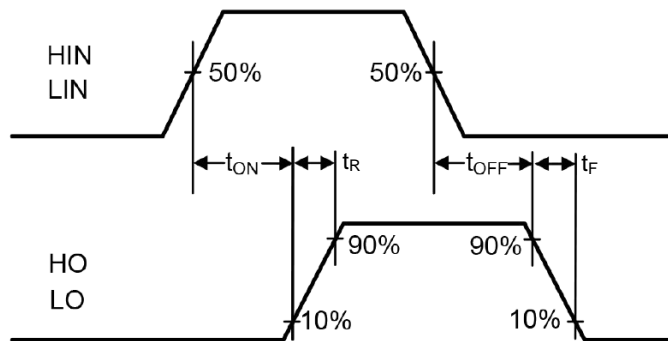
**Timing Waveforms**



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

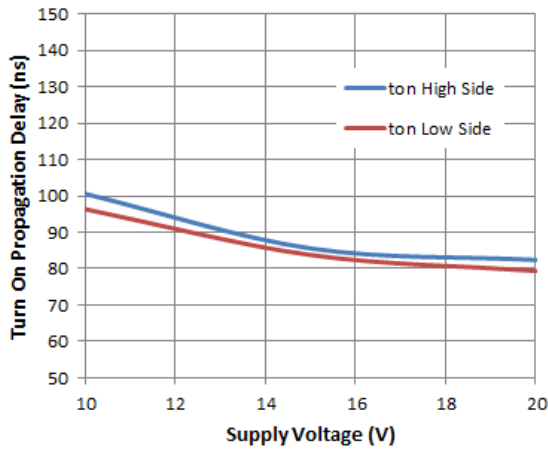


**Figure 2.** Delay Matching Waveform Definitions

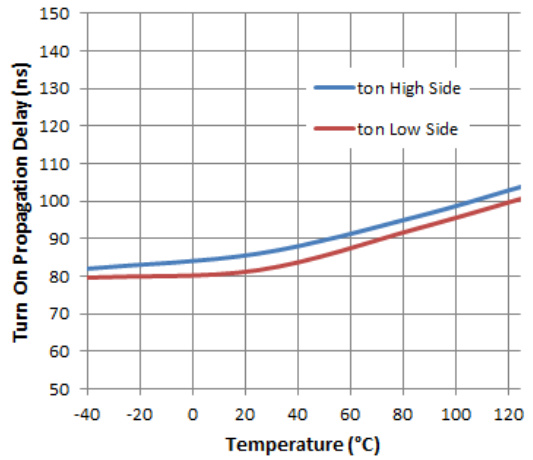


**Figure 3.** Switching Time Waveform Definitions

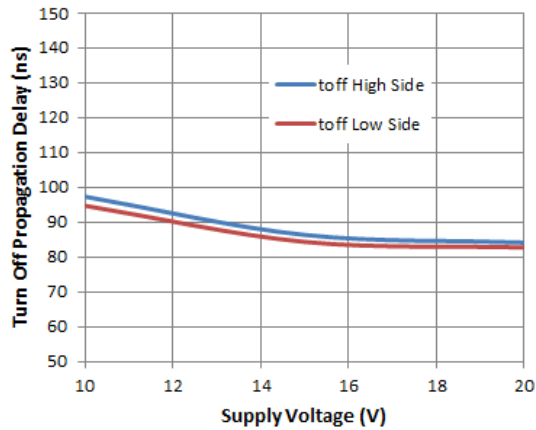
**Typical Performance Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



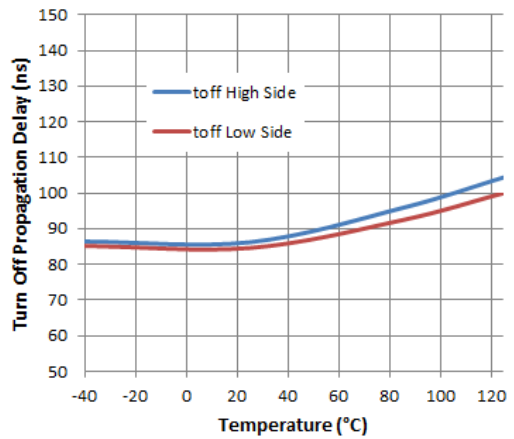
**Figure 4.** Turn-on Propagation Delay vs. Supply Voltage



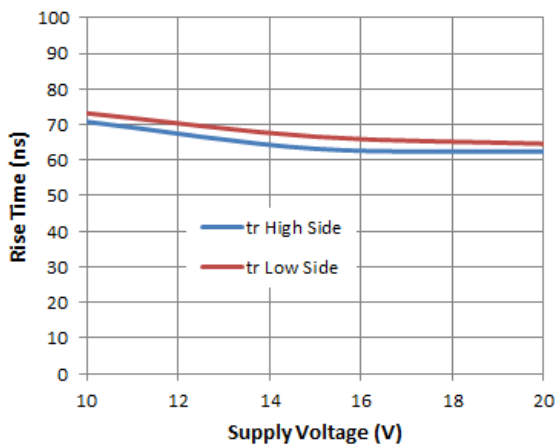
**Figure 5.** Turn-on Propagation Delay vs. Temperature



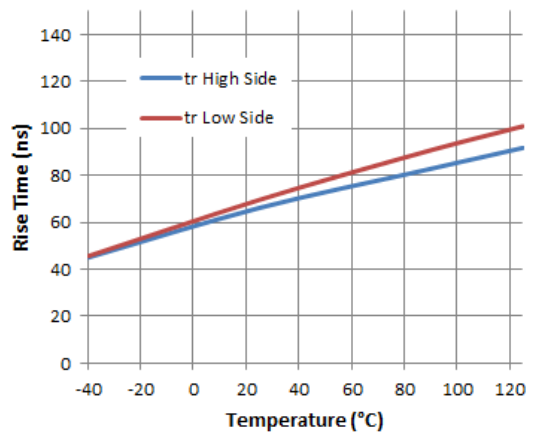
**Figure 6.** Turn-off Propagation Delay vs. Supply Voltage



**Figure 7.** Turn-off Propagation Delay vs. Temperature

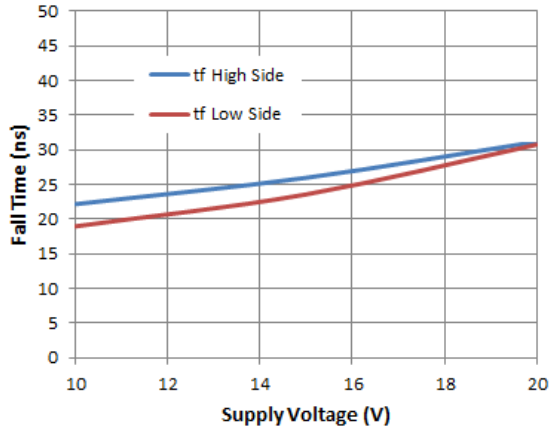


**Figure 8.** Rise Time vs. Supply Voltage

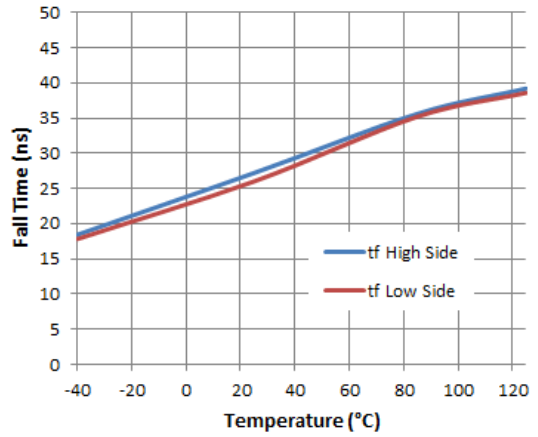


**Figure 9.** Rise Time vs. Temperature

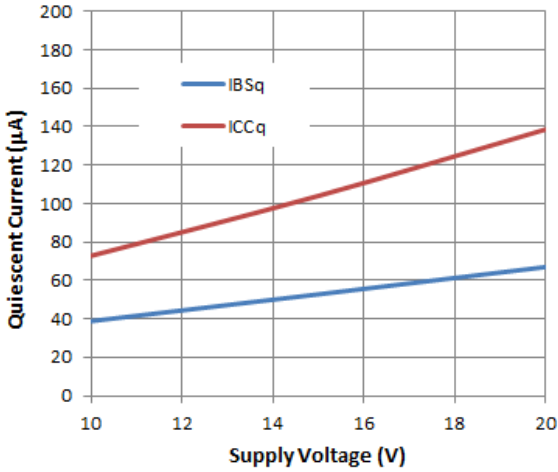
**Typical Performance Characteristics (Cont.)**



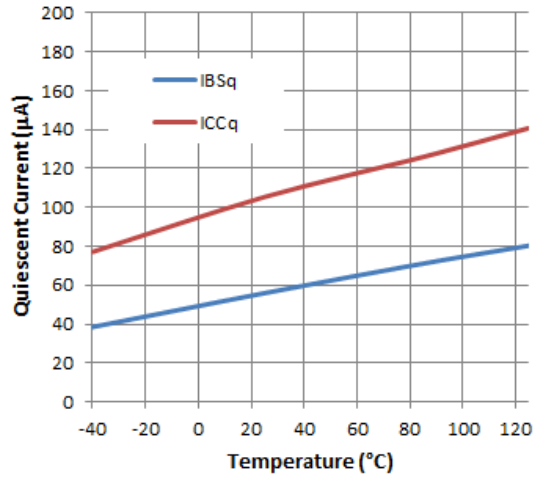
**Figure 10.** Fall Time vs. Supply Voltage



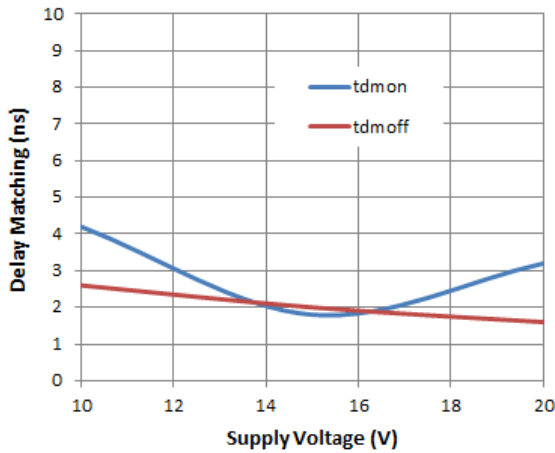
**Figure 11.** Fall Time vs. Temperature



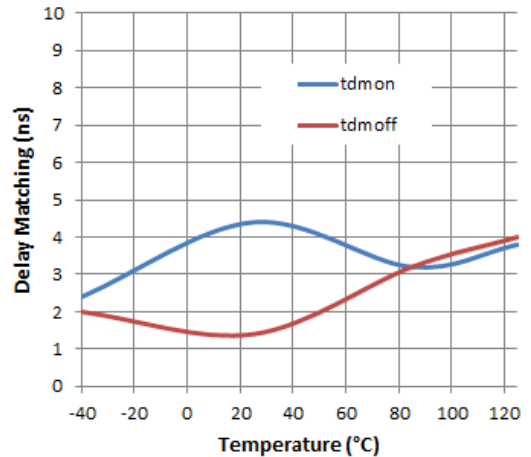
**Figure 12.** Quiescent Current vs. Supply Voltage



**Figure 13.** Quiescent Current vs. Temperature

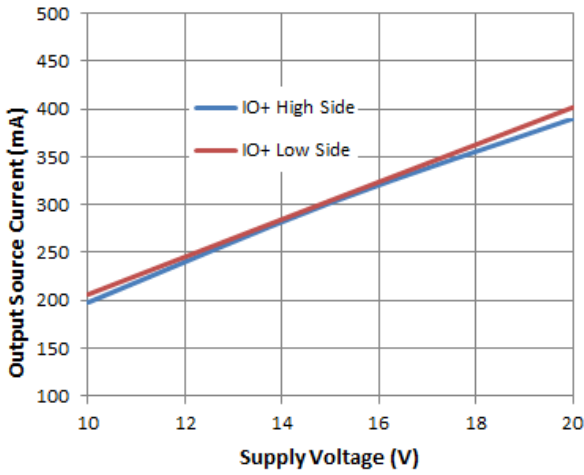


**Figure 14.** Delay Matching vs. Supply Voltage

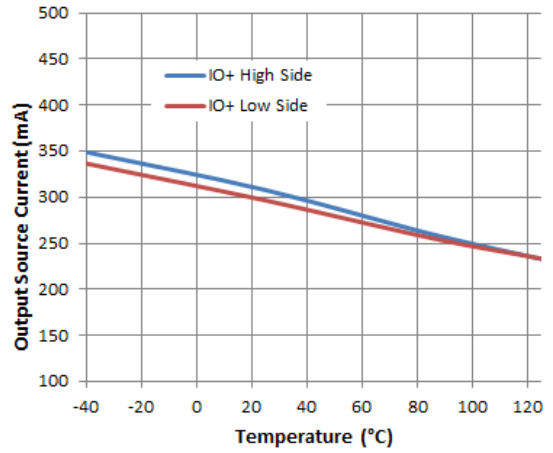


**Figure 15.** Delay Matching vs. Temperature

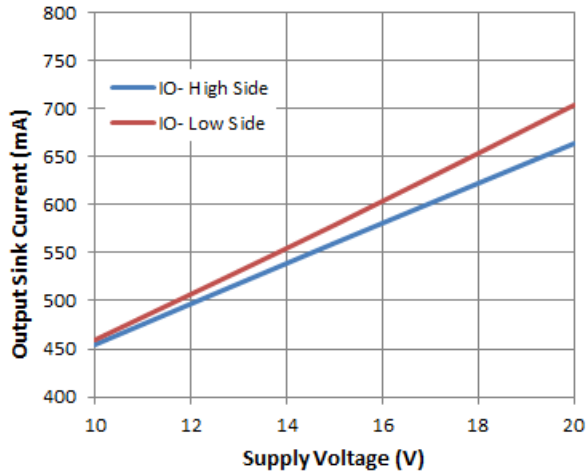
**Typical Performance Characteristics (Cont.)**



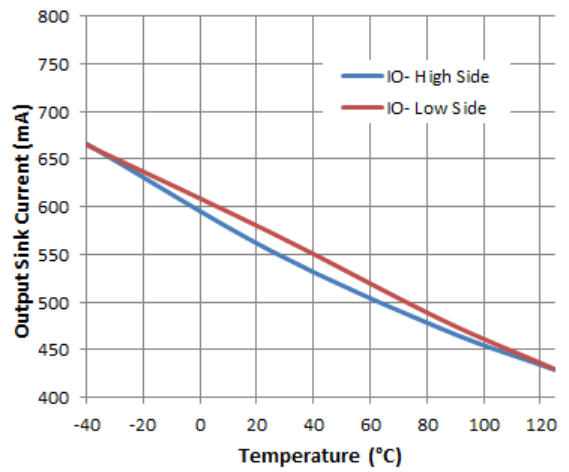
**Figure 16.** Output Source Current vs. Supply Voltage



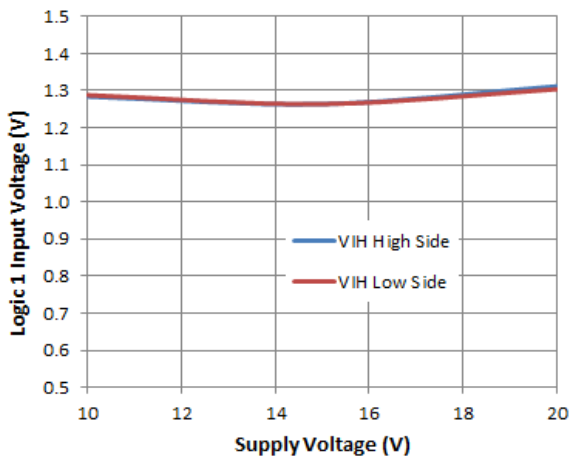
**Figure 17.** Output Source Current vs. Temperature



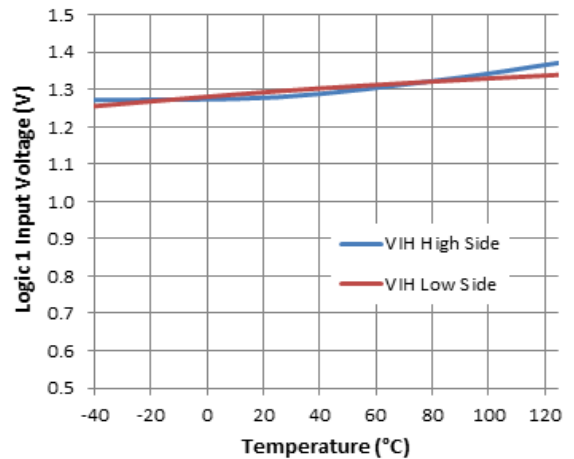
**Figure 18.** Output Sink Current vs. Supply Voltage



**Figure 19.** Output Sink Current vs. Temperature



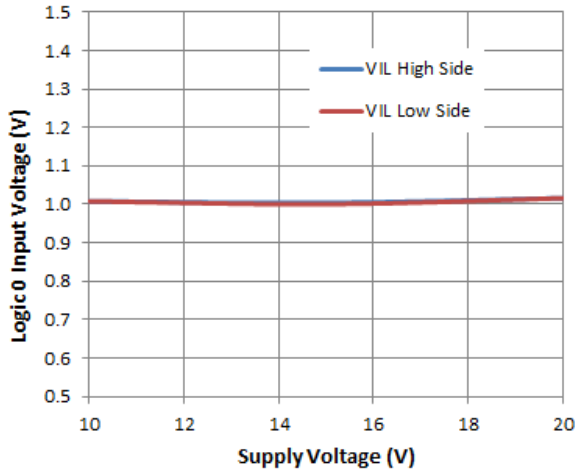
**Figure 20.** Logic 1 Input Voltage vs. Supply Voltage



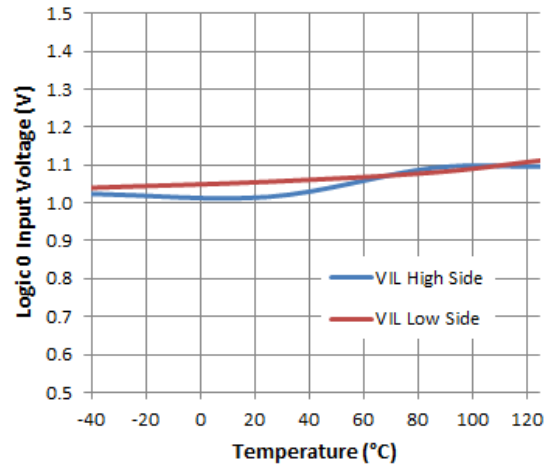
**Figure 21.** Logic 1 Input Voltage vs. Temperature



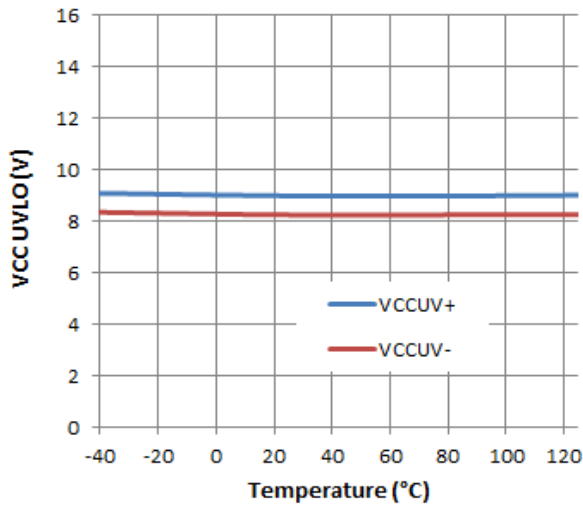
**Typical Performance Characteristics (Cont.)**



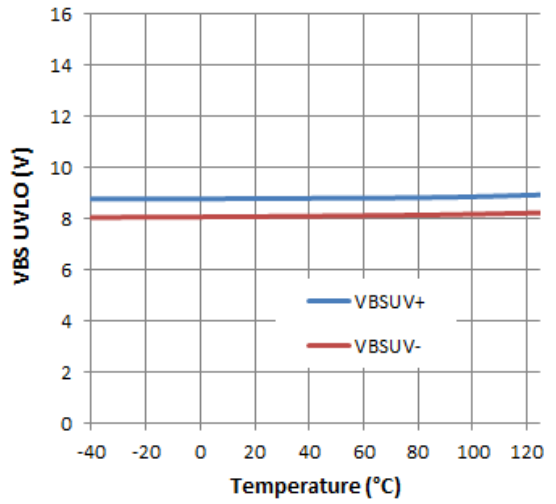
**Figure 22.** Logic 0 Input Voltage vs. Supply Voltage



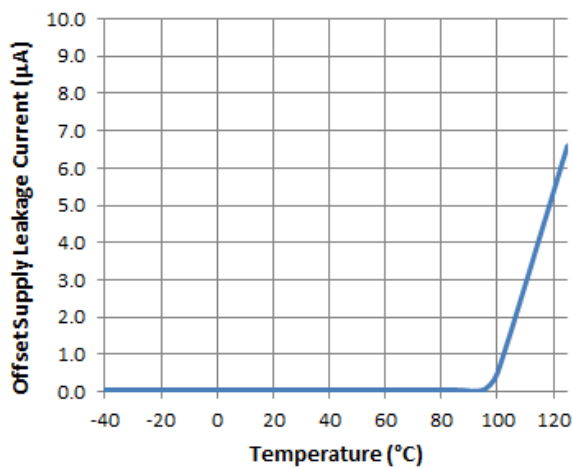
**Figure 23.** Logic 0 Input Voltage vs. Temperature



**Figure 24.** VCC UVLO vs. Temperature



**Figure 25.** VBS UVLO vs. Temperature

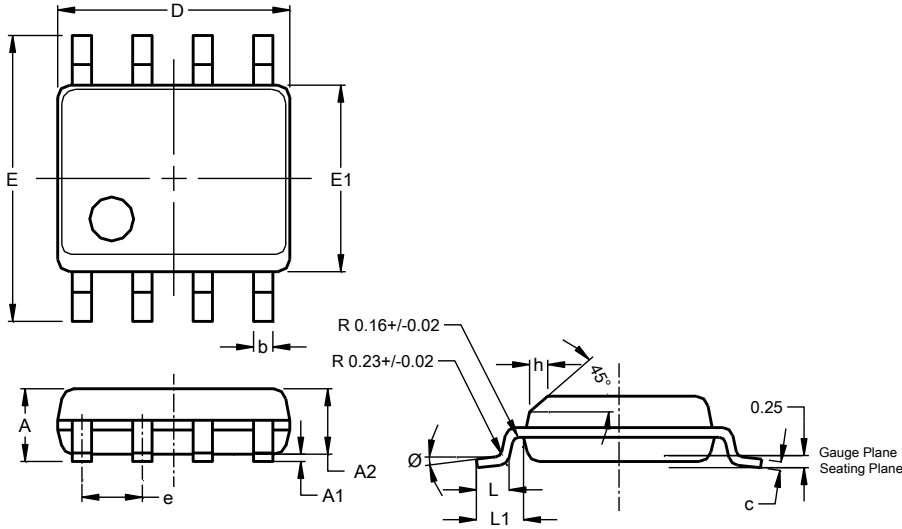


**Figure 26.** Offset Supply Leakage Current vs. Temperature

**Package Outline Dimensions**

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

**SO-8 (Type TH)**

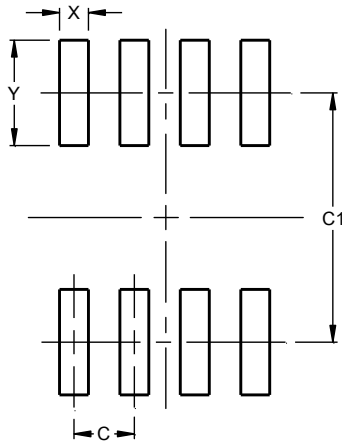


| SO-8 (Type TH)       |       |       |      |
|----------------------|-------|-------|------|
| Dim                  | Min   | Max   | Typ  |
| A                    | 1.35  | 1.75  | --   |
| A1                   | 0.10  | 0.25  | --   |
| A2                   | --    | --    | 1.45 |
| b                    | 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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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