



**THE DATASHEET OF
DGD0227S8-13**



Description

The DIODES™ DGD0227 dual, high-speed, low-side MOSFET and IGBT driver is capable of driving 4A of peak current. The DGD0227 logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) to interface easily with MCUs. Fast and well-matched propagation delays allow high-speed operation, enabling a smaller, more compact power-switching design using smaller associated components.

The DGD0227 is offered in the SO-8 (Type TH) package and operates over an extended -40°C to +125°C temperature range.

Features

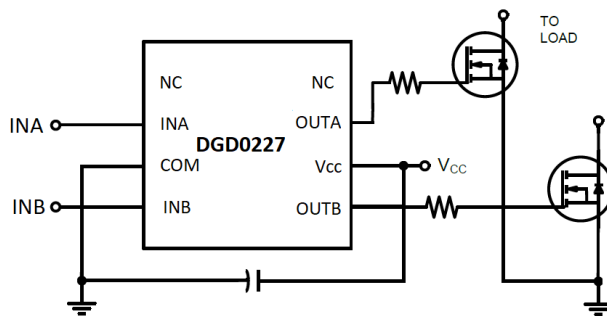
- Efficient Low Cost Solution for Driving MOSFETs and IGBTs
- Wide Supply Voltage Operating Range: 4.5V to 18V
- 4.0A Source/4.0A Sink Output Current Capability
- Fast Propagation Delay (35ns Typ)
- Fast Rise and Fall Times (20ns Typ)
- Logic Input (IN) 3.3V Capability
- Extended Temperature Range: -40°C 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](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Applications

- DC-DC converters
- Line drivers
- Motor controls
- Switch mode power supplies

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 (E3)
- Weight: 0.075 grams (Approximate)



Typical Configuration

SO-8 (Type TH)



Top View

Ordering Information (Note 4)

| Part Number | Package | Marking | Reel Size (inches) | Tape Width (mm) | Packing | |
|--------------|----------------|---------|--------------------|-----------------|---------|---------|
| | | | | | Qty. | Carrier |
| DGD0227S8-13 | SO-8 (Type TH) | DGD0227 | 13 | 12 | 2,500 | Reel |

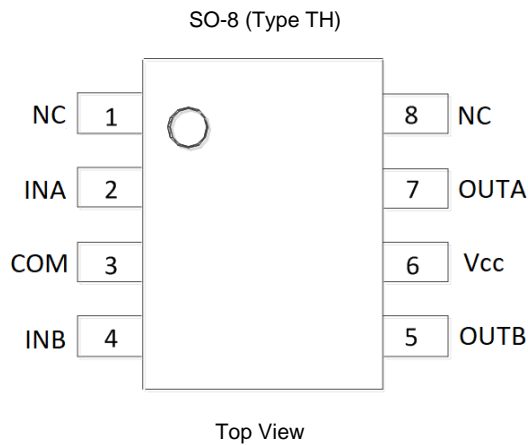
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen-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



DII = Manufacturer's Marking
 DGD0227 = Product Type Marking Code
 YY = Year (ex: 23 = 2023)
 WW = Week (01 to 53)

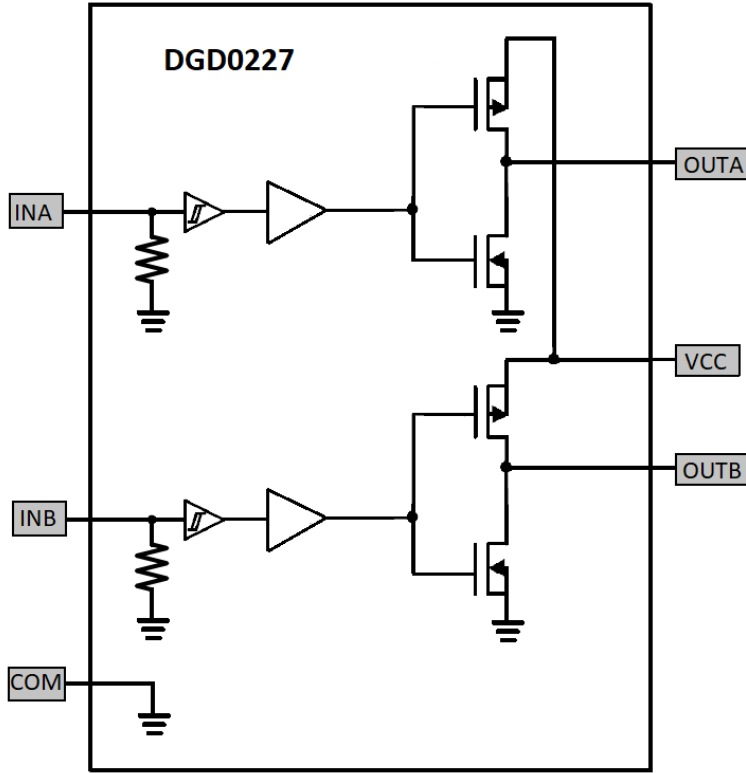
Pin Diagram



Pin Descriptions

| Pin Number | Pin Name | Function |
|------------|----------|---|
| 1, 8 | NC | No Connection (No Internal Connection) |
| 2 | INA | Logic Input for A Phase, in Phase with OUTA |
| 3 | COM | Supply Return |
| 4 | INB | Logic Input for B Phase, in Phase with OUTB |
| 5 | OUTB | Gate Driver Output B Phase |
| 6 | Vcc | Supply Input |
| 7 | OUTA | Gate Driver Output A Phase |

Functional Block Diagram



Absolute Maximum Ratings (Note 5) (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--------------------------------|------------------|------------------------------|------|
| Low-Side Fixed Supply Voltage | V _{CC} | -0.3 to +22 | V |
| Output Voltage (OUTA, OUTB) | V _{OUT} | -0.3 to V _{CC} +0.3 | V |
| Logic Input Voltage (INA, INB) | V _{IN} | -0.3 to V _{CC} +0.3 | V |

Note: 5. Stresses greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.

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

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------------|------|
| Power Dissipation Linear Derating Factor (Note 6) | P _D | 0.625 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 200 | °C/W |
| Operating Temperature | T _J | +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +150 | |

Note: 6. When mounted on a standard JEDEC 2-layer FR-4 board.

ESD Ratings (Note 7)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 2,000 | V | 2 |
| Electrostatic Discharge – Charge Device Model | ESD CDM | 750 | V | III |

Note: 7. Refer to JEDEC specification JESD22-A114 and JESD22-C101.

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------|------------------|-----|-----------------|------|
| Supply Voltage | V _{CC} | 4.5 | 18 | V |
| Output Voltage (OUTA/OUTB) | V _{OUT} | 0 | V _{CC} | V |
| Logic Input Voltage (INA, INB) | V _{IN} | 0 | 5 | V |
| Ambient Temperature | T _A | -40 | +125 | °C |

DC Electrical Characteristics (V_{BIAS} (4.5V < V_{CC} < 18V), @T_A = +25°C, unless otherwise specified.) (Note 8)

| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|---|------------------|-----|-----|-----|------|---|
| Logic "1" Input Voltage | V _{IH} | 2.4 | — | — | V | — |
| Logic "0" Input Voltage | V _{IL} | — | — | 0.7 | V | — |
| Logic "1" Input Bias Current | I _{IH+} | — | — | 10 | μA | V _{IN} = 3.3V |
| Logic "0" Input Bias Current | I _{IH-} | — | — | 10 | μA | V _{IN} = 0V |
| High Level Output Voltage, V _{BIAS} - V _O | V _{OH} | — | 30 | 100 | mV | I _{OUT} = -10mA |
| Low Level Output Voltage | V _{OL} | — | 16 | 50 | mV | I _{OUT} = 10mA |
| Quiescent V _{CC} Supply Current | I _{CCQ} | — | 40 | 100 | μA | V _{IN} = 0V or 3.3V |
| Output High Short Circuit Pulsed Current | I _{O+} | — | 4.0 | — | A | V _{CC} = 14V |
| Output Low Short Circuit Pulsed Current | I _{O-} | — | 4.0 | — | A | V _{CC} = 14V |
| Output Resistance, High | R _{OH} | — | 1.5 | — | Ω | I _{OUT} = -10mA, V _{CC} = 14V |
| Output Resistance, Low | R _{OL} | — | 1.0 | — | Ω | I _{OUT} = 10mA, V _{CC} = 14V |

Note: 8. The V_{IN} and I_{IN} parameters are applicable to the logic pins: INA and INB. The V_O and I_O parameters are applicable to the output pins: OUTA and OUTB.

AC Electrical Characteristics (V_{BIAS} (4.5V < V_{CC} < 18V), C_L = 1000pF, @T_A = +25°C, unless otherwise specified.)

| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|----------------------------|------------------|-----|-----|-----|------|-----------------------|
| Turn-On Rise Time | t _R | — | 20 | 40 | ns | V _{CC} = 14V |
| Turn-Off Fall Time | t _F | — | 20 | 40 | ns | V _{CC} = 14V |
| Turn-On Propagation Delay | t _{ON} | — | 40 | 100 | ns | V _{CC} = 14V |
| Turn-Off Propagation Delay | t _{OFF} | — | 35 | 50 | ns | V _{CC} = 14V |

Timing Waveforms

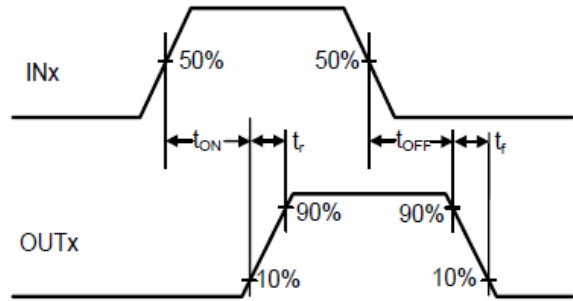


Figure 1. Switching Time Waveform Definitions

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

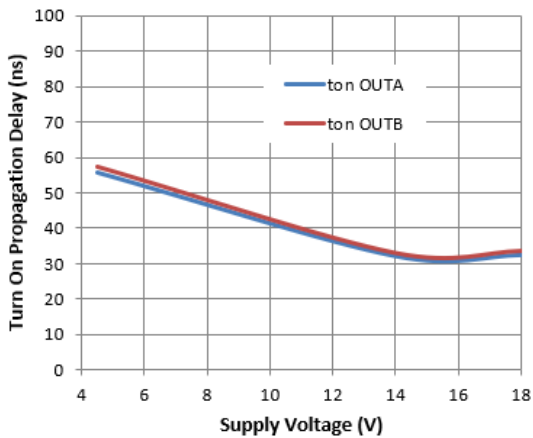


Figure 2. Turn-on Propagation Delay vs. Supply Voltage

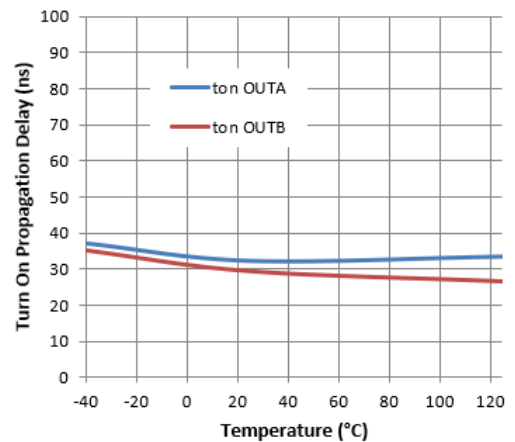


Figure 3. Turn-on Propagation Delay vs. Temperature

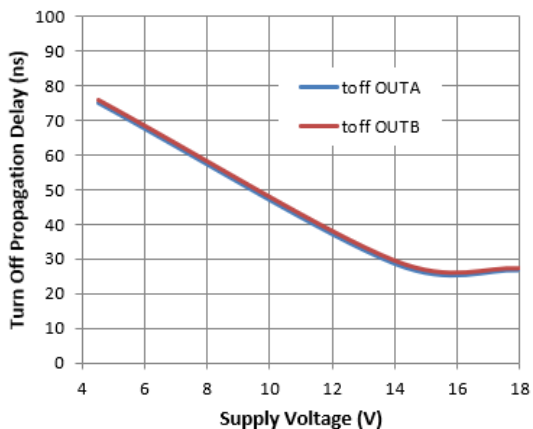


Figure 4. Turn-off Propagation Delay vs. Supply Voltage

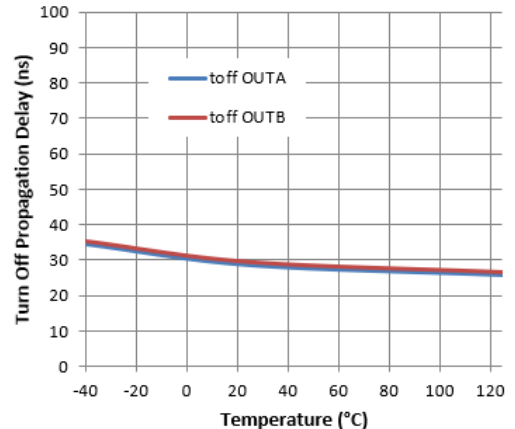


Figure 5. Turn-off Propagation Delay vs. Temperature

Typical Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (continued)

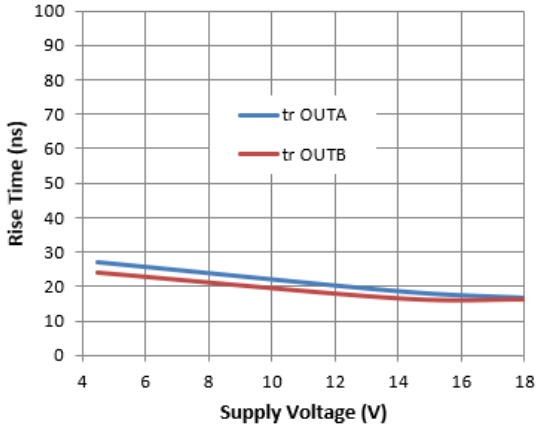


Figure 6. Rise Time vs. Supply Voltage

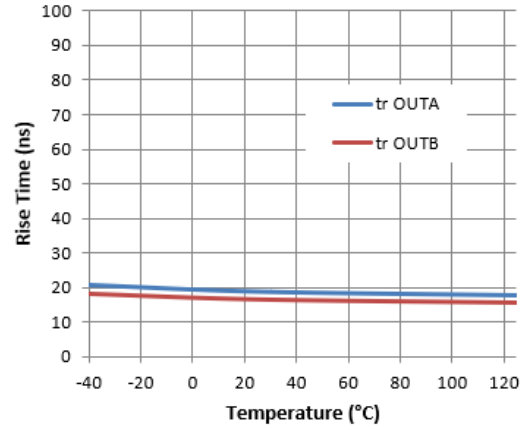


Figure 7. Rise Time vs. Temperature

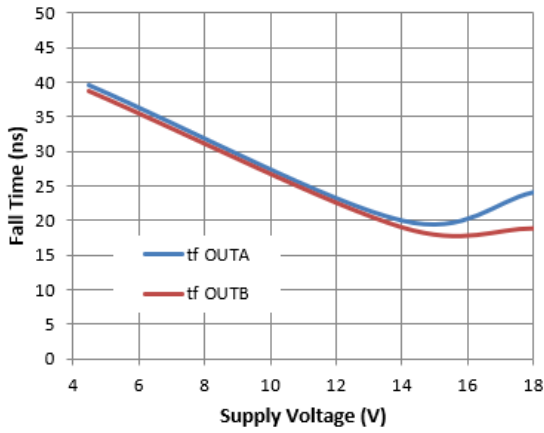


Figure 8. Fall Time vs. Supply Voltage

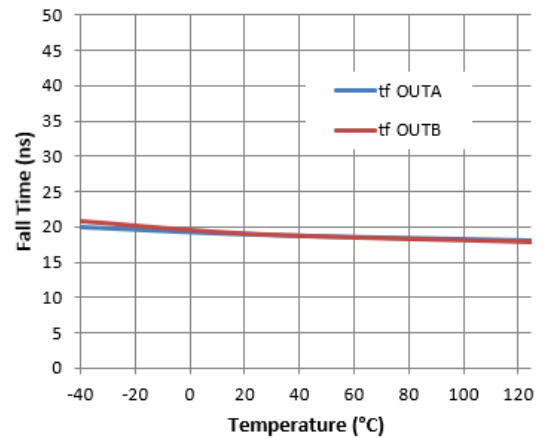


Figure 9. Fall Time vs. Temperature

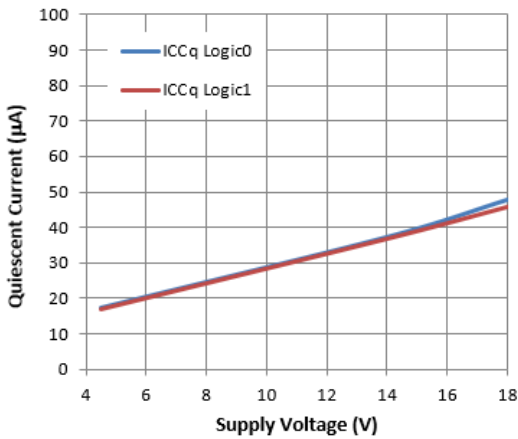


Figure 10. Quiescent Current vs. Supply Voltage

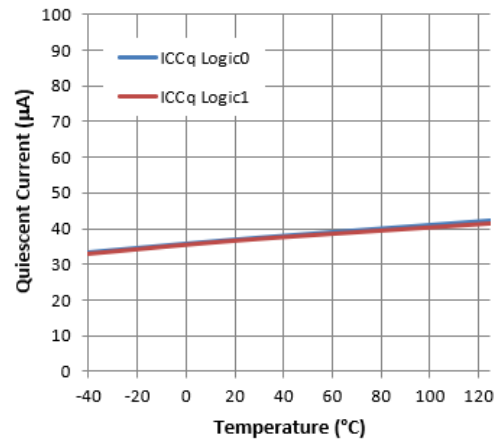


Figure 11. Quiescent Current vs. Temperature

Typical Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (continued)

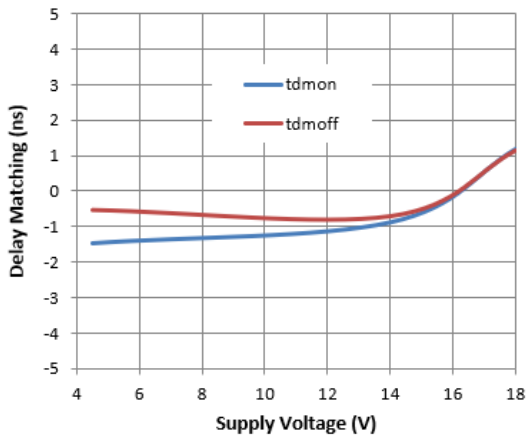


Figure 12. Delay Matching vs. Supply Voltage

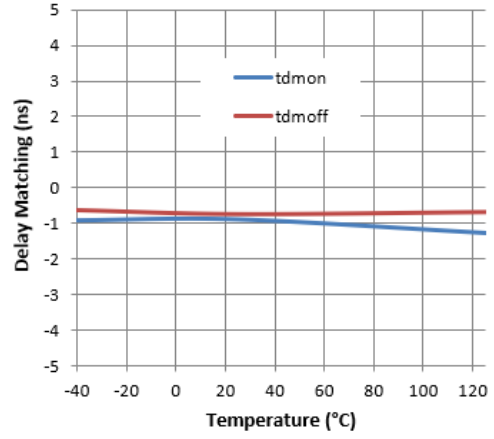


Figure 13. Delay Matching vs. Temperature

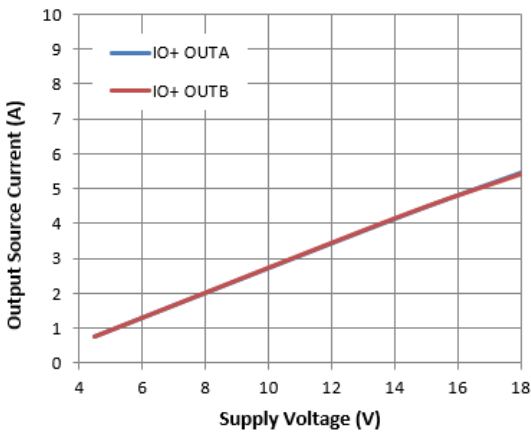


Figure 14. Output Source Current vs. Supply Voltage

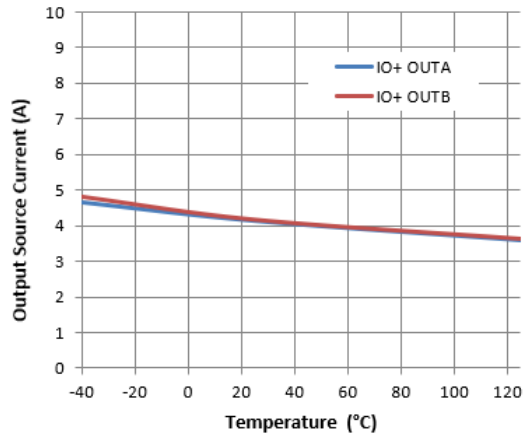


Figure 15. Output Source Current vs. Temperature

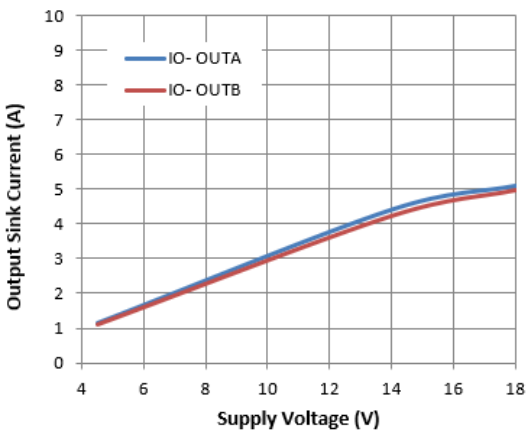


Figure 16. Output Sink Current vs. Supply Voltage

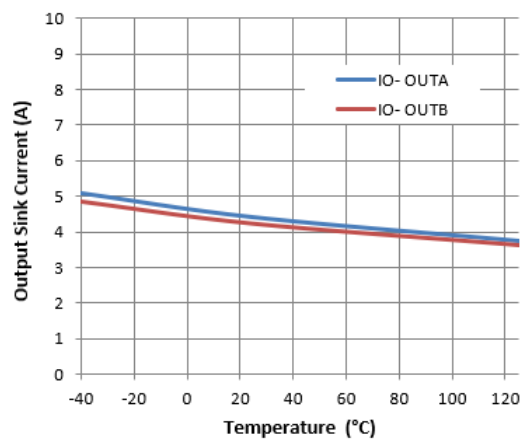


Figure 17. Output Sink Current vs. Temperature

Typical Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (continued)

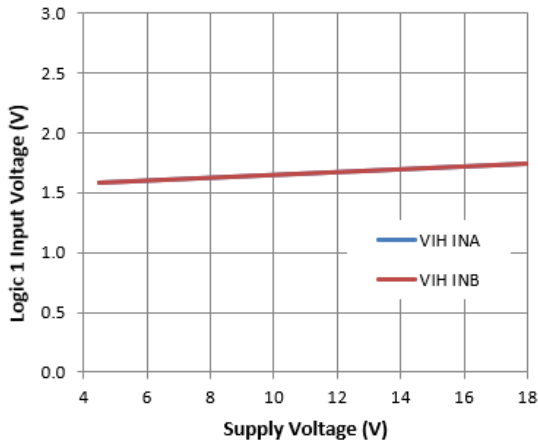


Figure 18. Logic 1 Input Voltage vs. Supply Voltage

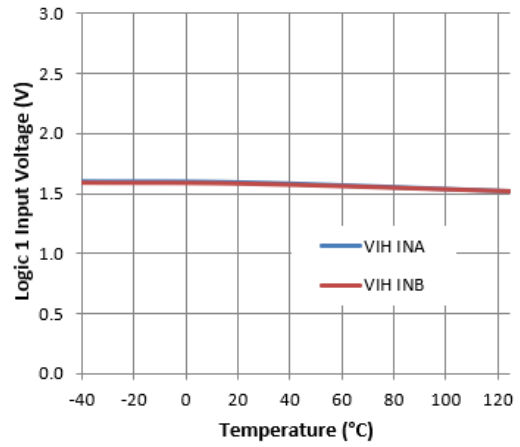


Figure 19. Logic 1 Input Voltage vs. Temperature

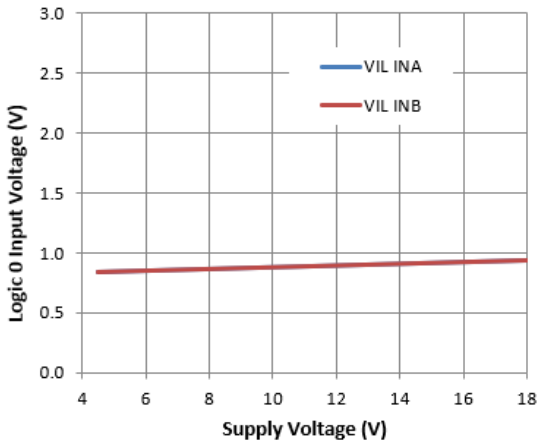


Figure 20. Logic 0 Input Voltage vs. Supply Voltage

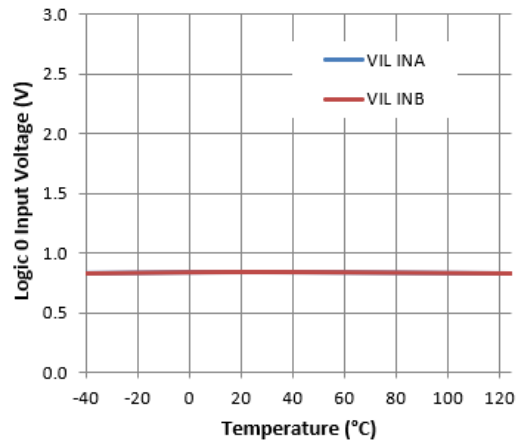
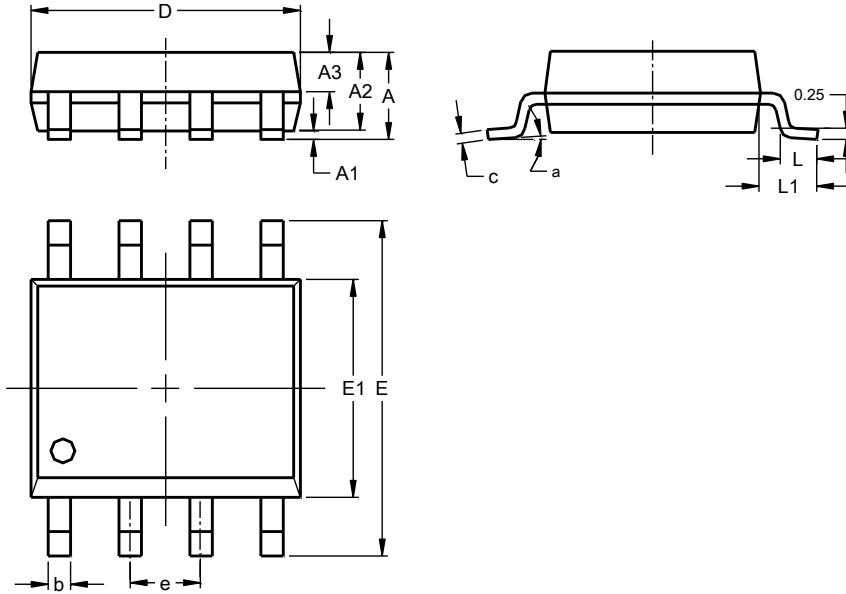


Figure 21. Logic 0 Input Voltage vs. Temperature

Package Outline Dimensions

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

SO-8 (Type TH)

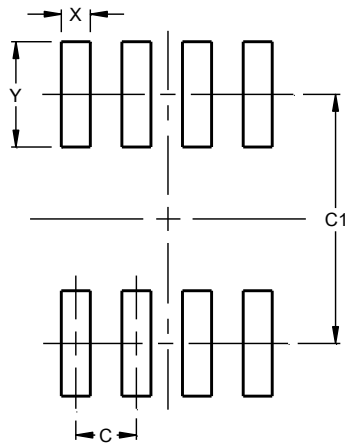


| SO-8 (Type TH) | | | |
|----------------------|---------|-------|------|
| Dim | Min | Max | Typ |
| A | -- | 1.75 | -- |
| A1 | 0.10 | 0.225 | -- |
| A2 | 1.30 | 1.50 | 1.40 |
| A3 | 0.60 | 0.70 | 0.65 |
| b | 0.39 | 0.47 | -- |
| c | 0.20 | 0.24 | -- |
| D | 4.80 | 5.00 | 4.90 |
| E | 5.80 | 6.20 | 6.00 |
| E1 | 3.80 | 4.00 | 3.90 |
| e | 1.27BSC | | |
| h | 0.25 | 0.50 | -- |
| L | 0.50 | 0.80 | -- |
| L1 | 1.05REF | | |
| a | 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 |

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