



Si827x Data Sheet

4 Amp ISOdriver with High Transient (dV/dt) Immunity

The Si827x isolators are ideal for driving power switches used in a wide variety of power supply, inverter, and motor control applications. The Si827x isolated gate drivers utilize Silicon Laboratories' proprietary silicon isolation technology, supporting up to 2.5 kVRMS withstand voltage per UL1577 and VDE0884. This technology enables industry leading common-mode transient immunity (CMTI), tight timing specifications, reduced variation with temperature and age, better part-to-part matching, and extremely high reliability. It also offers unique features such as separate pull-up/down outputs, driver shut-down on UVLO fault, and precise dead time programmability. The Si827x series offers longer service life and dramatically higher reliability compared to opto-coupled gate drivers.

The Si827x drivers utilize Silicon Labs' proprietary silicon isolation technology, which provides up to 2.5 kVRMS withstand voltage per UL1577 and fast 60 ns propagation times. Driver outputs can be grounded to the same or separate grounds or connected to a positive or negative voltage. The TTL level compatible inputs with >400 mV hysteresis are available in individual control input (Si8271/2/3/5) or PWM input (Si8274) configurations. High integration, low propagation delay, small installed size, flexibility, and cost-effectiveness make the Si827x family ideal for a wide range of isolated MOSFET/IGBT and SiC or GaN FET gate drive applications.

Applications:

- Switch-mode Power Supplies
- Solar Power Inverters
- Motor control and drives
- Uninterruptible Power Supplies
- High-Power Class D Amplifiers

Safety Regulatory Approvals (Pending):

- UL 1577 recognized
 - Up to 2500 Vrms for 1 minute
- CSA component notice 5A approval
 - IEC 60950-1 (reinforced insulation)
- VDE certification conformity
 - VDE 0884 Part 10
- CQC certification approval
 - GB4943.1

KEY FEATURES

- Single, dual, or high-side/low-side drivers
- Single PWM or dual digital inputs
- High dV/dt immunity:
 - 200 kV/ μ s CMTI
 - 400 kV/ μ s Latch-up
- Separate pull-up/down outputs for slew rate control
- Wide supply range:
 - Input supply: 2.5–5.5 V
 - Driver supply: 4.2–30 V
- Very low jitter of 200 ps p-p
- 60 ns propagation delay (max)
- Dedicated enable pin
- Silicon Labs' high performance isolation technology:
 - Industry leading noise immunity
 - High speed, low latency and skew
 - Best reliability available
- Compact packages:
 - 8-pin SOIC
 - 16-pin SOIC
 - 5 x 5 mm LGA-14
- Industrial temperature range:
 - –40 to 125 °C
- AEC-Q100 Qualified

1. Ordering Guide

Table 1.1. Si827x Ordering Guide

| Ordering Part Number | Inputs | Driver Configuration | Output UVLO | Integrated Deglitcher | Dead Time Adjustable Range | Low Jitter | Package | Isolation Rating |
|-------------------------------|---------|----------------------|-------------|-----------------------|----------------------------|------------|--------------|------------------|
| Products Available Now | | | | | | | | |
| Si8271AB-IS | VI | Single | 5 | N | N/A | Y | SOIC-8 NB | 2.5 kVrms |
| Si8271BB-IS | VI | Single | 8 | N | N/A | Y | SOIC-8 NB | 2.5 kVrms |
| Si8271DB-IS | VI | Single | 12 | N | N/A | Y | SOIC-8 NB | 2.5 kVrms |
| Si8271GB-IS | VI | Single | 3 | N | N/A | Y | SOIC-8 NB | 2.5 kVrms |
| Si8273AB-IS1 | VIA/VIB | HS/LS | 5 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8273ABD-IS1 | VIA/VIB | HS/LS | 5 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8273AB-IM | VIA/VIB | HS/LS | 5 | N | N/A | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8273ABD-IM | VIA/VIB | HS/LS | 5 | Y | N/A | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8273DB-IS1 | VIA/VIB | HS/LS | 12 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8273DBD-IS1 | VIA/VIB | HS/LS | 12 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8273GB-IS1 | VIA/VIB | HS/LS | 3 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8273GBD-IS1 | VIA/VIB | HS/LS | 3 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8273BB-IS1 | VIA/VIB | HS/LS | 8 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8273BBD-IS1 | VIA/VIB | HS/LS | 8 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8274AB1-IS1 | PWM | HS/LS | 5 | N | 10-200 | Y | SOIC-16 NB | 2.5 kVrms |
| Si8274AB4D-IS1 | PWM | HS/LS | 5 | Y | 20-700 | N | SOIC-16 NB | 2.5 kVrms |
| Si8274AB1-IM | PWM | HS/LS | 5 | N | 10-200 | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8274AB4D-IM | PWM | HS/LS | 5 | Y | 20-700 | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8274BB1-IS1 | PWM | HS/LS | 8 | N | 10-200 | Y | SOIC-16 NB | 2.5 kVrms |
| Si8274DB1-IS1 | PWM | HS/LS | 12 | N | 10-200 | Y | SOIC-16 NB | 2.5 kVrms |
| Si8274GB1-IS1 | PWM | HS/LS | 3 | N | 10-200 | Y | SOIC-16 NB | 2.5 kVrms |
| Si8274GB4D-IS1 | PWM | HS/LS | 3 | Y | 20-700 | N | SOIC-16 NB | 2.5 kVrms |
| Si8274GB1-IM | PWM | HS/LS | 3 | N | 10-200 | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8274GB4D-IM | PWM | HS/LS | 3 | Y | 20-700 | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275GB-IS1 | VIA/VIB | Dual | 3 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8275GBD-IS1 | VIA/VIB | Dual | 3 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8275AB-IM | VIA/VIB | Dual | 5 | N | N/A | Y | 5x5mm LGA-14 | 2.5 kVrms |

| Ordering Part Number | Inputs | Driver Configuration | Output UVLO | Integrated Deglitcher | Dead Time Adjustable Range | Low Jitter | Package | Isolation Rating |
|---|---------|----------------------|-------------|-----------------------|----------------------------|------------|--------------|------------------|
| Si8275ABD-IM | VIA/VIB | Dual | 5 | Y | N/A | N | 5x5mm LGA-14 | 2.5 kVrms |
| Contact Silicon Labs Sales for These Options | | | | | | | | |
| Si8271ABD-IS | VI | Single | 5 | Y | N/A | N | SOIC-8 NB | 2.5 kVrms |
| Si8271BBD-IS | VI | Single | 8 | Y | N/A | N | SOIC-8 NB | 2.5 kVrms |
| Si8271DBD-IS | VI | Single | 12 | Y | N/A | N | SOIC-8 NB | 2.5 kVrms |
| Si8271GBD-IS | VI | Single | 3 | Y | N/A | N | SOIC-8 NB | 2.5 kVrms |
| Si8273BB-IS1 | VIA/VIB | HS/LS | 8 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8273BBD-IS1 | VIA/VIB | HS/LS | 8 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8274BB4D-IS1 | PWM | HS/LS | 8 | Y | 20-700 | N | SOIC-16 NB | 2.5 kVrms |
| Si8274DB4D-IS1 | PWM | HS/LS | 12 | Y | 20-700 | N | SOIC-16 NB | 2.5 kVrms |
| Si8275AB-IS1 | VIA/VIB | Dual | 5 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8275ABD-IS1 | VIA/VIB | Dual | 5 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8275BB-IS1 | VIA/VIB | Dual | 8 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8275BBD-IS1 | VIA/VIB | Dual | 8 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8275DB-IS1 | VIA/VIB | Dual | 12 | N | N/A | Y | SOIC-16 NB | 2.5 kVrms |
| Si8275DBD-IS1 | VIA/VIB | Dual | 12 | Y | N/A | N | SOIC-16 NB | 2.5 kVrms |
| Si8275BB-IM | VIA/VIB | Dual | 8 | N | N/A | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275BBD-IM | VIA/VIB | Dual | 8 | Y | N/A | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275DB-IM | VIA/VIB | Dual | 12 | N | N/A | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275DBD-IM | VIA/VIB | Dual | 12 | Y | N/A | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275GB-IM | VIA/VIB | Dual | 3 | N | N/A | Y | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275GBD-IM | VIA/VIB | Dual | 3 | Y | N/A | N | 5x5mm LGA-14 | 2.5 kVrms |
| Si8275DA-IM | VIA/VIB | Dual | 12 | N | N/A | Y | 5x5mm LGA-14 | 1 kVrms |
| Si8275DAD-IM | VIA/VIB | Dual | 12 | Y | N/A | N | 5x5mm LGA-14 | 1 kVrms |

2. System Overview

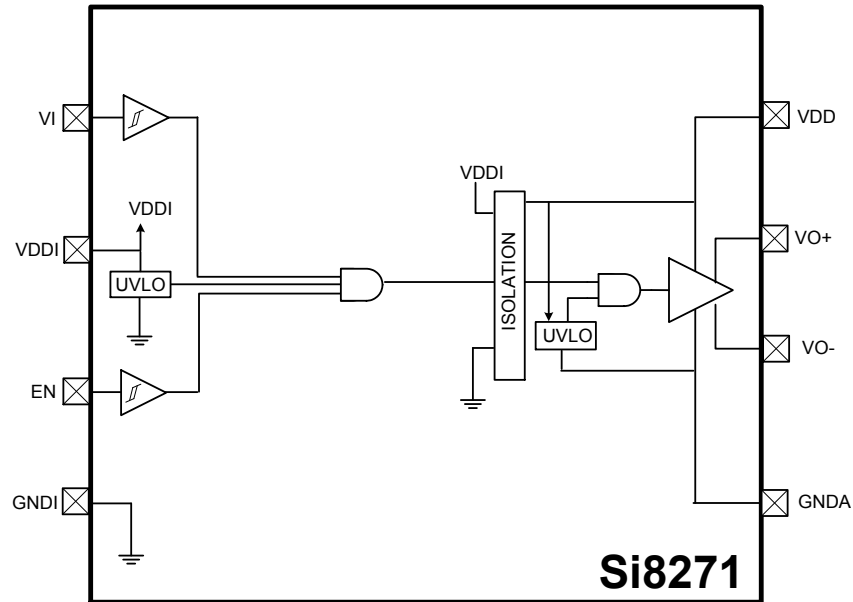


Figure 2.1. Si8271 Block Diagram

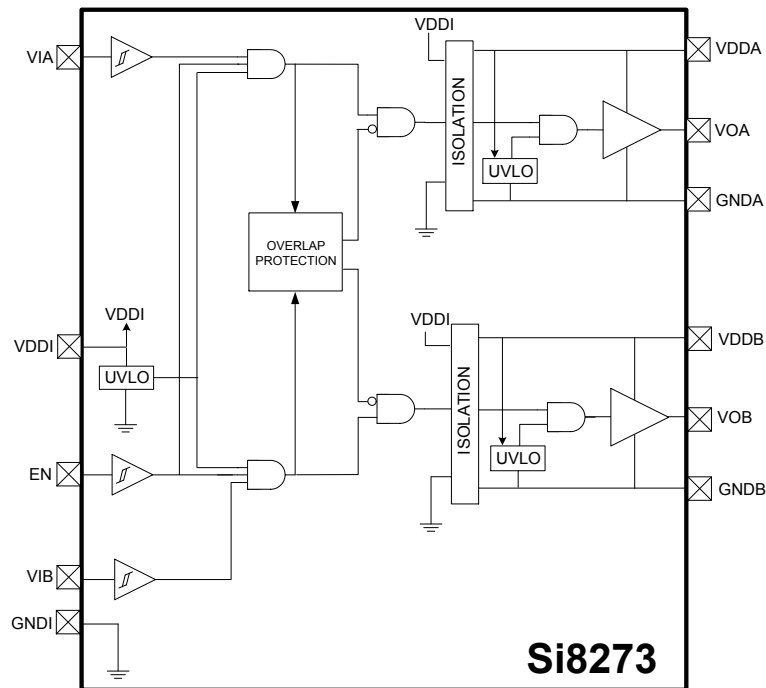


Figure 2.2. Si8273 Block Diagram

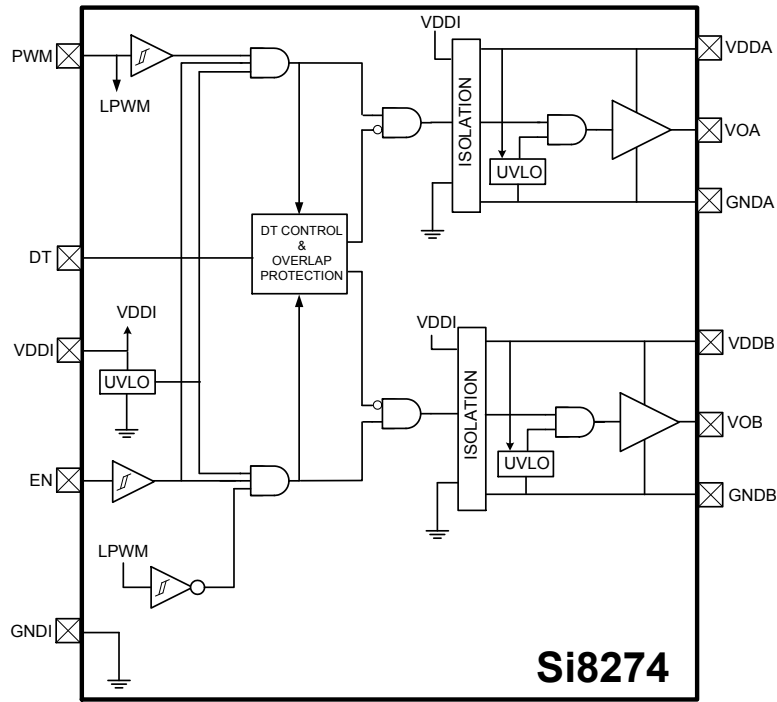


Figure 2.3. Si8274 Block Diagram

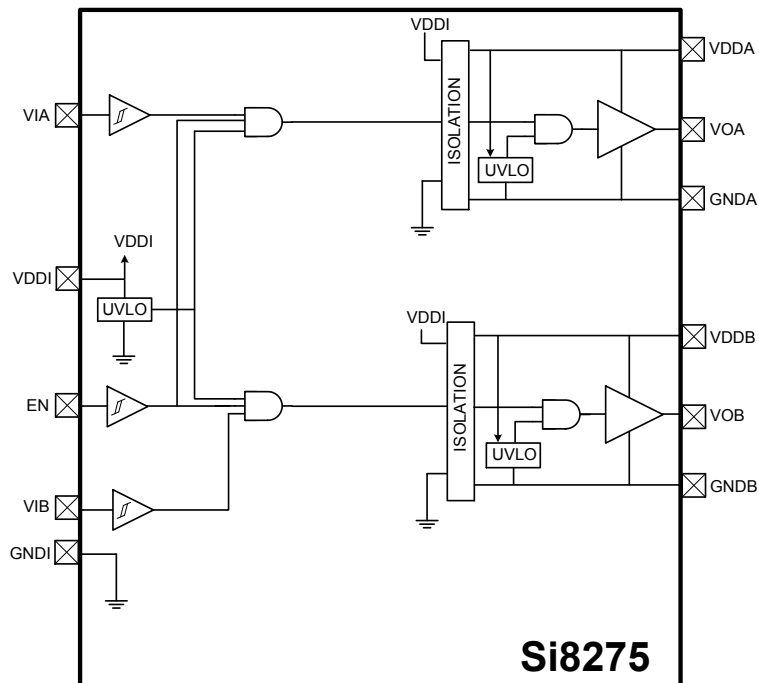


Figure 2.4. Si8275 Block Diagram

The operation of an Si827x channel is analogous to that of an optocoupler and gate driver, except an RF carrier is modulated instead of light. This simple architecture provides a robust isolated data path and requires no special considerations or initialization at start-up. A simplified block diagram for a single Si827x channel is shown in the figure below.

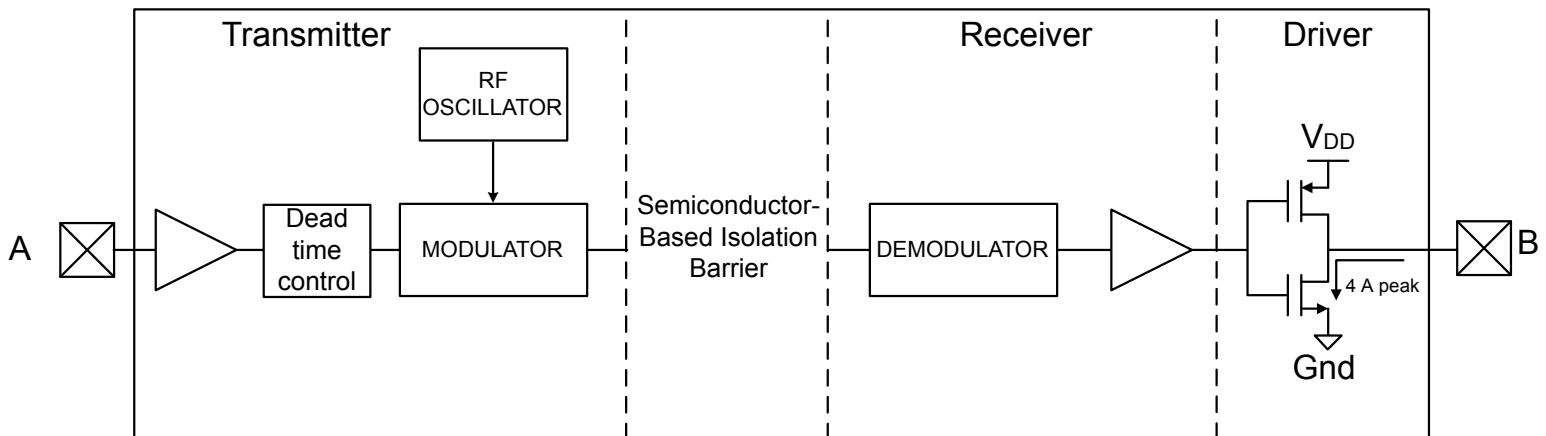


Figure 2.5. Simplified Channel Diagram

A channel consists of an RF Transmitter and RF Receiver separated by a semiconductor-based isolation barrier. Referring to the Transmitter, input A modulates the carrier provided by an RF oscillator using on/off keying. The Receiver contains a demodulator that decodes the input state according to its RF energy content and applies the result to output B via the output driver. This RF on/off keying scheme is superior to pulse code schemes as it provides best-in-class noise immunity, low power consumption, and better immunity to magnetic fields. See [Figure 2.6 Modulation Scheme on page 5](#) for more details.

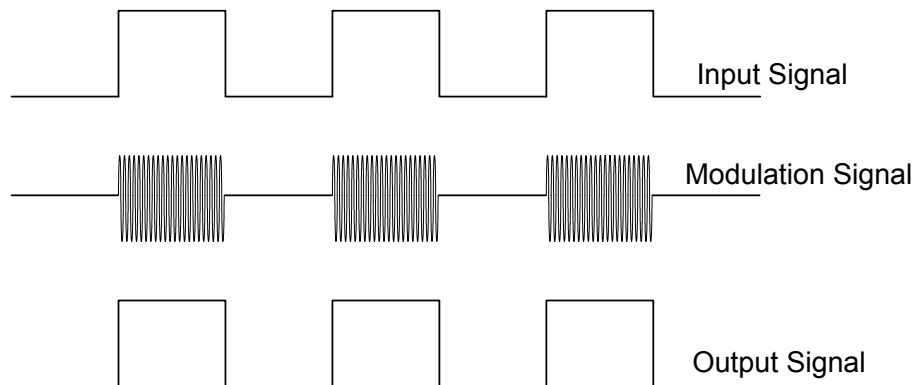


Figure 2.6. Modulation Scheme

2.1 Typical Operating Characteristics

The typical performance characteristics depicted in the figures below are for information purposes only. Refer to [Table 4.1 Electrical Characteristics](#) on page 16 for actual specification limits.

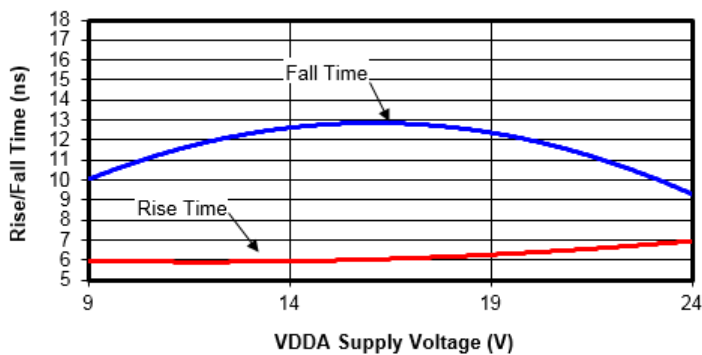


Figure 2.7. Rise/Fall Time vs. Supply Voltage

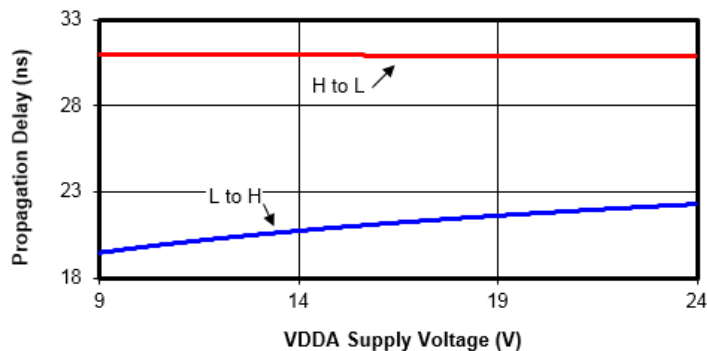


Figure 2.8. Propagation Delay vs. Supply Voltage

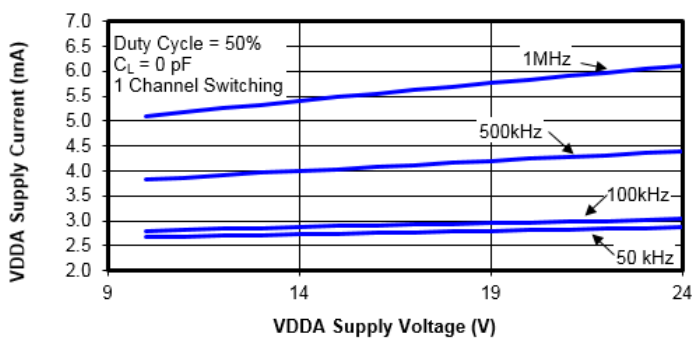


Figure 2.9. Supply Current vs. Supply Voltage

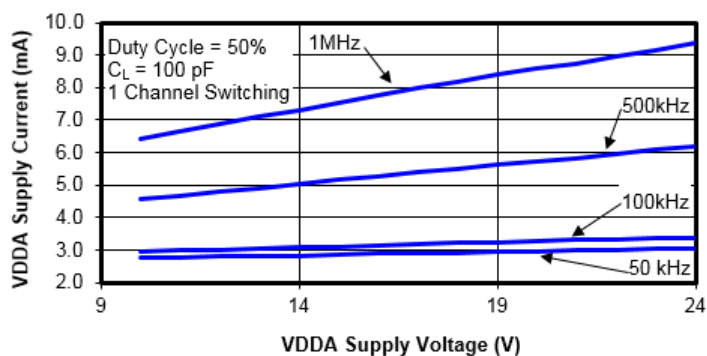


Figure 2.10. Supply Current vs. Supply Voltage

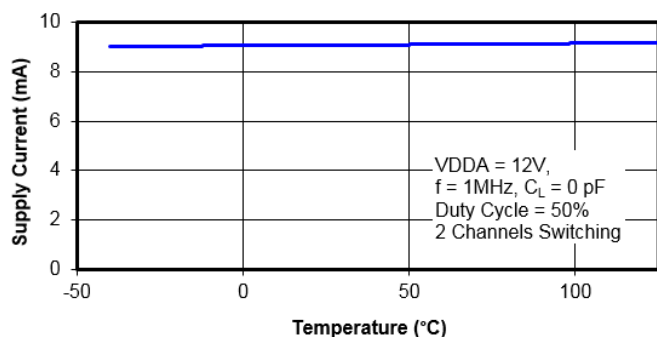


Figure 2.11. Supply Current vs. Temperature

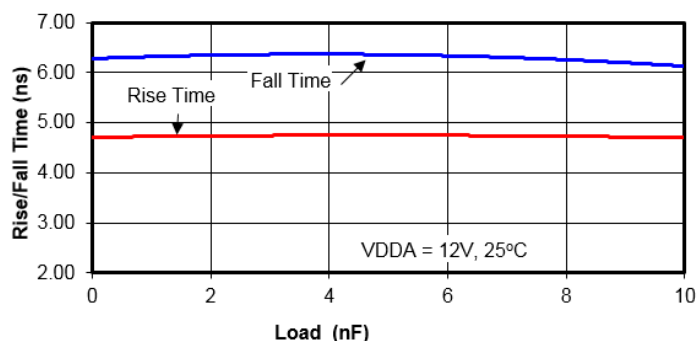


Figure 2.12. Rise/Fall Time vs. Load

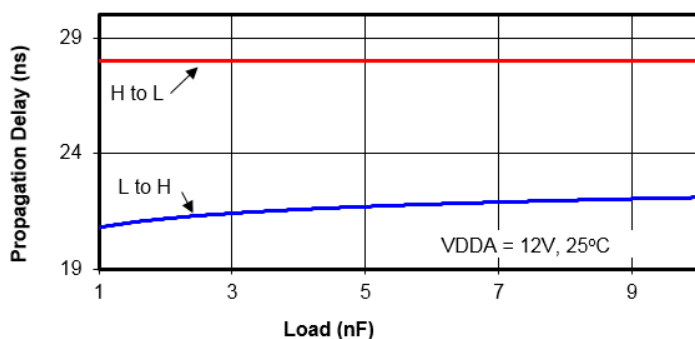


Figure 2.13. Propagation Delay vs. Load

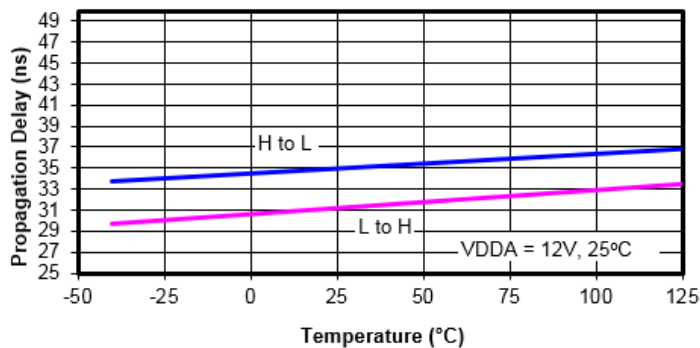


Figure 2.14. Propagation Delay vs. Temperature

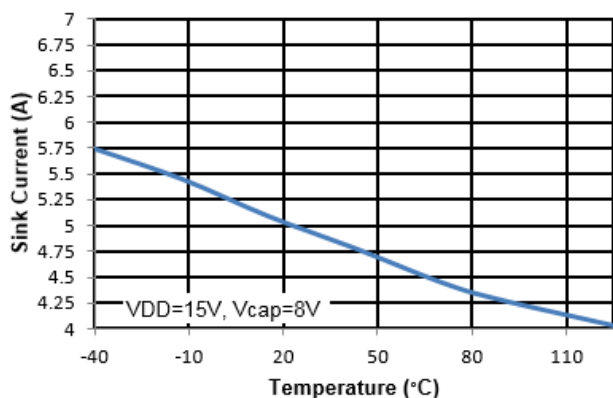


Figure 2.15. Output Sink Current vs. Temperature

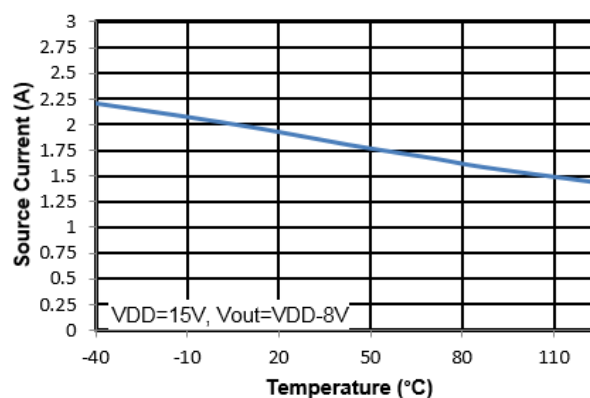


Figure 2.16. Output Source Current vs. Temperature

2.2 Family Overview and Logic Operation During Startup

The Si827x family of isolated drivers consists of single, high-side/low-side, and dual driver configurations.

2.2.1 Products

The table below shows the configuration and functional overview for each product in this family.

Table 2.1. Si827x Family Overview

| Part Number | Configuration | Overlap Protection | Programmable Dead Time | Inputs | Peak Output Current (A) |
|-------------|--------------------|--------------------|------------------------|----------|-------------------------|
| Si8271 | Single Driver | — | — | VI | 4.0 |
| Si8273 | High-Side/Low-Side | Y | — | VIA, VIB | 4.0 |
| Si8274 | PWM | Y | Y | PWM | 4.0 |
| Si8275 | Dual Driver | — | — | VIA, VIB | 4.0 |

2.2.2 Device Behavior

The table below consists of truth tables for the Si8273, Si8274, and Si8275 families.

Table 2.2. Si827x Family Truth Table¹

| Si8271 (Single Driver) Truth Table | | | | | | |
|---|----------------|------------|--------|--------|------|---|
| Inputs | | VDDI State | Enable | Output | | Notes |
| VI | | | | VO+ | VO- | |
| L | | Powered | H | Hi-Z | L | |
| H | | Powered | H | H | Hi-Z | |
| X ² | | Unpowered | X | Hi-Z | L | |
| X | | Powered | L | Hi-Z | L | |
| Si8273 (High-Side/Low-Side) Truth Table | | | | | | |
| Inputs | | VDDI State | Enable | Output | | Notes |
| VIA | VIB | | | VOA | VOB | |
| L | L | Powered | H | L | L | |
| L | H | Powered | H | L | H | |
| H | L | Powered | H | H | L | |
| H | H | Powered | H | L | L | Invalid state. |
| X ² | X ² | Unpowered | X | L | L | Output returns to input state within 7 μ s of VDDI power restoration. |
| X | X | Powered | L | L | L | Device is disabled. |
| Si8274 (PWM Input High-Side/Low-Side) Truth Table | | | | | | |
| PWM Input | | VDDI State | Enable | Output | | Notes |
| | | | | VOA | VOB | |
| H | | Powered | H | H | L | |
| L | | Powered | H | L | H | |
| X ² | | Unpowered | X | L | L | Output returns to input state within 7 μ s of VDDI power restoration. |
| X | | Powered | L | L | L | Device is disabled. |
| Si8275 (Dual Driver) Truth Table | | | | | | |
| Inputs | | VDDI State | Enable | Output | | Notes |
| VIA | VIB | | | VOA | VOB | |
| L | L | Powered | H | L | L | |
| L | H | Powered | H | L | H | |
| H | L | Powered | H | H | L | |
| H | H | Powered | H | H | H | |
| X ² | X ² | Unpowered | X | L | L | Output returns to input state within 7 μ s of VDDI power restoration. |
| X | X | Powered | L | L | L | Device is disabled. |

1. This truth table assumes VDDA and VDDB are powered. If VDDA and VDDB are below UVLO, see [2.6.2 Undervoltage Lockout](#) for more information.

2. An input can power the input die through an internal diode if its source has adequate current.

2.3 Power Supply Connections

Isolation requirements mandate individual supplies for VDDI, VDDA, and VDDDB. The decoupling caps for these supplies must be placed as close to the VDD and GND pins of the Si827x as possible. The optimum values for these capacitors depend on load current and the distance between the chip and the regulator that powers it. Low effective series resistance (ESR) capacitors, such as Tantalum, are recommended.

2.4 Power Dissipation Considerations

Proper system design must assure that the Si827x operates within safe thermal limits across the entire load range. The Si827x total power dissipation is the sum of the power dissipated by bias supply current, internal parasitic switching losses, and power dissipated by the series gate resistor and load. The equation below shows total Si827x power dissipation.

$$P_D = (V_{DDI})(I_{DDI}) + 2(I_{DD2})(V_{DD2}) + (f)(Q_G)\left(V_{DD2}\left[\frac{R_p}{R_p + R_g}\right] + (f)\left(Q_G\right)\left(V_{DD2}\left[\frac{R_n}{R_n + R_g}\right] + 2fC_{int}V_{DD2}^2\right.\right.$$

where:

P_D is the total Si827x device power dissipation (W)

I_{DDI} is the input-side maximum bias current (10 mA)

I_{DD2} is the driver die maximum bias current (4 mA)

C_{int} is the internal parasitic capacitance (370 pF)

V_{DDI} is the input-side V_{DD} supply voltage (2.5 to 5.5 V)

V_{DD2} is the driver-side supply voltage (4.2 to 30 V)

f is the switching frequency (Hz)

Q_G is the gate charge of external FET

R_G is the external gate resistor

R_p is the $R_{DS(ON)}$ of the driver pull-up switch: 2.7 Ω

R_n is the $R_{DS(ON)}$ of the driver pull-down switch: 1 Ω

Equation 1

Power dissipation example for driver using Equation 1 with the following givens:

$$V_{DDI} = 5.0 \text{ V}$$

$$V_{DD2} = 12 \text{ V}$$

$$f = 350 \text{ kHz}$$

$$R_G = 22 \text{ } \Omega$$

$$Q_G = 25 \text{ nC}$$

$$P_d = 199 \text{ mW}$$

From which the driver junction temperature is calculated using Equation 2, where:

P_d is the total Si827x device power dissipation (W)

θ_{ja} is the thermal resistance from junction to air (105 $^{\circ}\text{C/W}$ in this example)

T_A is the ambient temperature

$$T_j = P_d \times \theta_{ja} + T_A = (0.199)(105) + 20 = 41.0 \text{ } ^{\circ}\text{C}$$

The maximum power dissipation allowable for the Si827x is a function of the package thermal resistance, ambient temperature, and maximum allowable junction temperature, as shown in Equation 2:

$$P_{Dmax} \leq \frac{T_{jmax} - T_A}{\theta_{ja}}$$

where:

P_{Dmax} = Maximum Si827x power dissipation (W)

T_{jmax} = Si827x maximum junction temperature (150 °C)

T_A = Ambient temperature (20 °C)

θ_{ja} = Si827x junction-to-air thermal resistance (105 °C/W)

Equation 2

Substituting values for P_{Dmax} , T_{jmax} , T_A , and θ_{ja} into Equation 2 results in a maximum allowable total power dissipation of 1.19 W. Maximum allowable load is found by substituting this limit and the appropriate data sheet values from [Table 4.1 Electrical Characteristics on page 16](#) into Equation 1 and simplifying. The result is Equation 3, both of which assume $V_{DD1} = 5\text{ V}$ and $V_{DDA} = V_{DDB} = 12\text{ V}$.

$$C_L (MAX) = \frac{1.24 \times 10^{-2}}{f} - 1.21 \times 10^{-9}$$

Equation 3

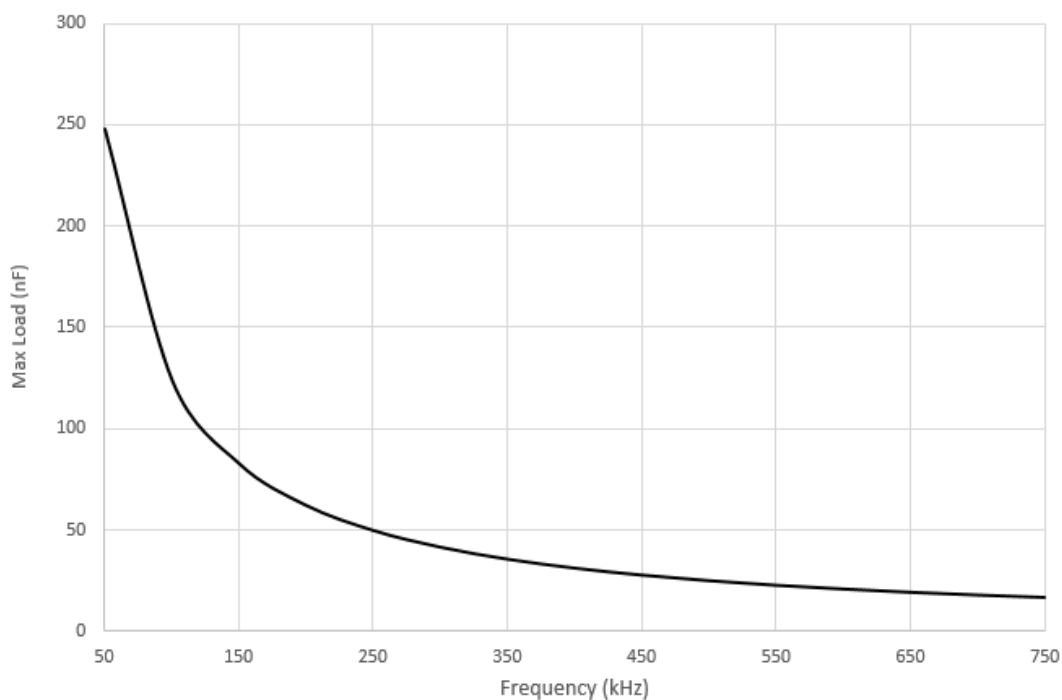


Figure 2.17. Max Load vs. Switching Frequency

2.5 Layout Considerations

It is most important to minimize ringing in the drive path and noise on the Si827x VDD lines. Care must be taken to minimize parasitic inductance in these paths by locating the Si827x as close to the device it is driving as possible. In addition, the VDD supply and ground trace paths must be kept short. For this reason, the use of power and ground planes is highly recommended. A split ground plane system having separate ground and VDD planes for power devices and small signal components provides the best overall noise performance.

2.6 Undervoltage Lockout Operation

Device behavior during start-up, normal operation and shutdown is shown in the figure below, where UVLO+ and UVLO- are the positive-going and negative-going thresholds respectively.

Note: Outputs VOA and VOB default low when input side power supply (VDDI) is not present.

2.6.1 Device Startup

Outputs VOA and VOB are held low during power-up until VDD is above the UVLO threshold for time period t_{START} . Following this, the outputs follow the states of inputs VIA and VIB.

2.6.2 Undervoltage Lockout

Undervoltage Lockout (UVLO) is provided to prevent erroneous operation during device startup and shutdown or when VDD is below its specified operating circuits range. The input (control) side, Driver A and Driver B, each have their own undervoltage lockout monitors.

The Si827x input side enters UVLO when $VDDI < VDDI_{UV-}$, and exits UVLO when $VDDI > VDDI_{UV+}$. The driver outputs, VOA and VOB, remain low when the input side of the Si827x is in UVLO and their respective VDD supply (VDDA, VDDDB) is within tolerance. Each driver output can enter or exit UVLO independently. For example, VOA unconditionally enters UVLO when $VDDA$ falls below $VDDA_{UV-}$ and exits UVLO when $VDDA$ rises above $VDDA_{UV+}$.

The UVLO circuit unconditionally drives VO low when VDD is below the lockout threshold. Upon power up, the Si827x is maintained in UVLO until VDD rises above VDD_{UV+} . During power down, the Si827x enters UVLO when VDD falls below the UVLO threshold plus hysteresis (i.e., $VDD < VDD_{UV+} - VDD_{HYS}$). Please refer to spec tables for UVLO values.

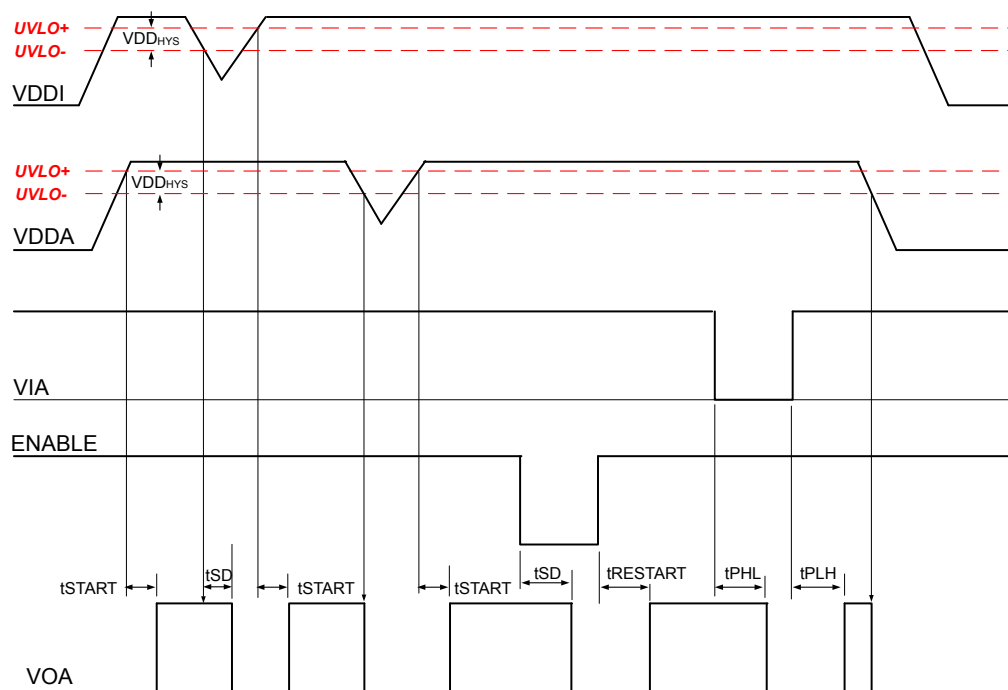


Figure 2.18. Device Behavior during Normal Operation and Shutdown

2.6.3 Control Inputs

VIA, VIB, and PWM inputs are high-true, TTL level-compatible logic inputs. A logic high signal on VIA or VIB causes the corresponding output to go high. For PWM input versions (Si8274), VOA is high and VOB is low when the PWM input is high, and VOA is low and VOB is high when the PWM input is low.

2.6.4 Enable Input

When brought low, the ENABLE input unconditionally drives VOA and VOB low regardless of the states of VIA and VIB. Device operation terminates within t_{SD} after $ENABLE = V_{IL}$ and resumes within $t_{RESTART}$ after $ENABLE = V_{IH}$. The ENABLE input has no effect if VDDI is below its UVLO level (i.e., VOA, VOB remain low).

2.7 Programmable Dead Time and Overlap Protection

All PWM drivers (Si8274x) include programmable dead time, which adds a user-programmable delay between transitions of VOA and VOB. When enabled, dead time is present on all transitions. The amount of dead time delay (DT) is programmed by a single resistor (RDT) connected from the DT input to ground per the equation below.

$$DT = 2.02 \times RDT + 7.77 \text{ (for 10-200 ns range)}$$

$$DT = 6.06 \times RDT + 3.84 \text{ (for 20-700 ns range)}$$

where:

DT = dead time (ns)

and

RDT = dead time programming resistor (k Ω)

Equation 4

Input/output timing waveforms for the Si8273 two-input drivers are shown in the figure below, and dead time waveforms for the Si8274 are shown in [Figure 2.20 Dead Time Waveforms for Si8274 Drivers on page 13](#).

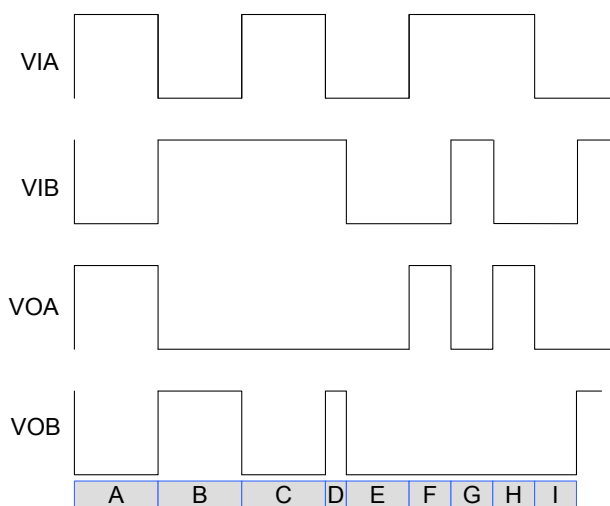
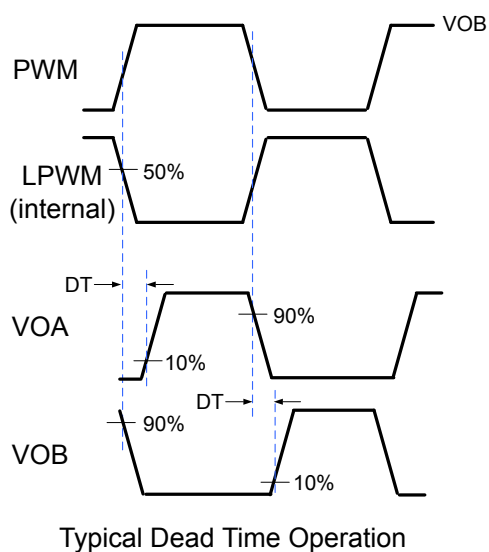


Figure 2.19. Input / Output Waveforms for Si8273 Drivers

Table 2.3. Input / Output Waveforms for High-Side / Low-Side Two-Input Drivers

| Ref | Description |
|-----|--|
| A | Normal operation: VIA high, VIB low. |
| B | Normal operation: VIB high, VIA low. |
| C | Contention: VIA = VIB = high. |
| D | Recovery from contention: VIA transitions low. |
| E | Normal operation: VIA = VIB = low. |
| F | Normal operation: VIA high, VIB low. |
| G | Contention: VIA = VIB = high. |
| H | Recovery from contention: VIB transitions low. |
| I | Normal operation: VIB transitions high. |

**Figure 2.20. Dead Time Waveforms for Si8274 Drivers**

2.8 De-glitch Feature

A de-glitch feature is provided on some options, as defined in the [1. Ordering Guide](#). The internal de-glitch circuit provides an internal time delay of 15 ns typical, during which any noise is ignored and will not pass through the IC. For these product options, the propagation delay will be extended by 15 ns, as specified in the spec table.

3. Applications

The following examples illustrate typical circuit configurations using the Si827x.

3.1 High-Side/Low-Side Driver

In the figure below, side A shows the Si8273 controlled using the VIA and VIB input signals, and side B shows the Si8274 controlled by a single PWM signal.

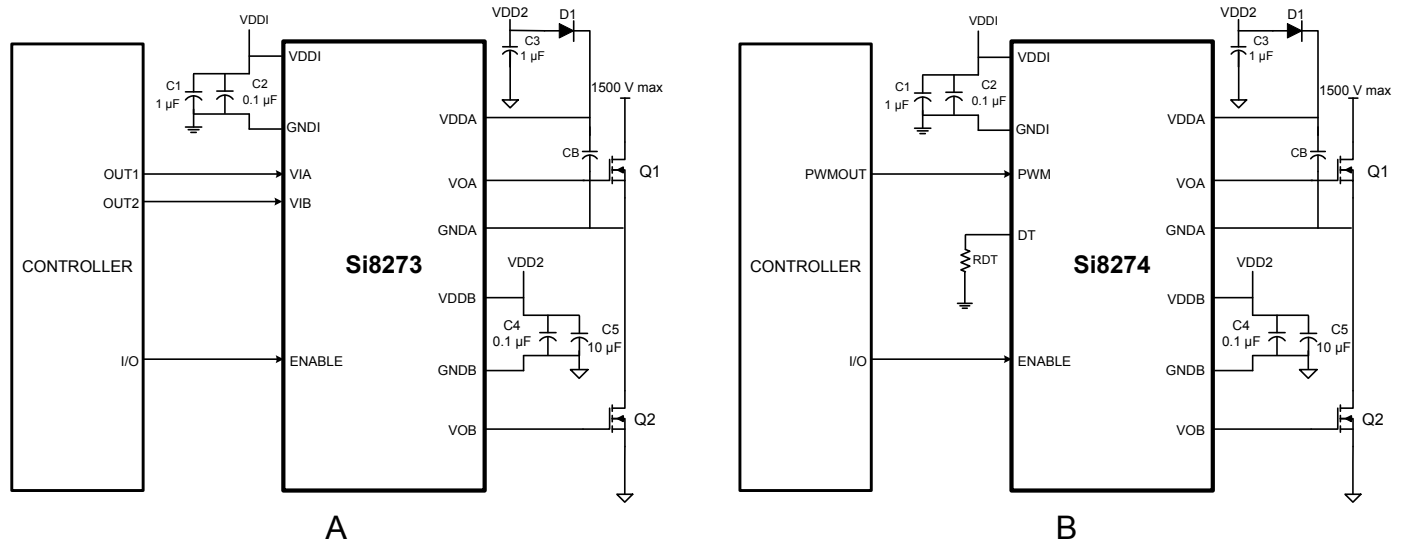


Figure 3.1. Si827x in Half-Bridge Application

For both cases, D1 and CB form a conventional bootstrap circuit that allows VOA to operate as a high-side driver for Q1, which has a maximum drain voltage of 1500 V. VOB is connected as a conventional low-side driver. Note that the input side of the Si827x requires VDD in the range of 2.5 to 5.5 V, while the VDDA and VDDB output side supplies must be between 4.2 and 30 V with respect to their respective grounds. The boot-strap start up time will depend on the CB cap chosen. VDD2 is usually the same as VDDB. Also note that the bypass capacitors on the Si827x should be located as close to the chip as possible. Moreover, it is recommended that bypass capacitors be used (as shown in the figures above for input and driver side) to reduce high frequency noise and maximize performance. The outputs VOA and VOB can be used interchangeably as high side or low side drivers.

3.2 Dual Driver

The figure below shows the Si827x configured as a dual driver. Note that the drain voltages of Q1 and Q2 can be referenced to a common ground or to different grounds with as much as 1500 V dc between them.

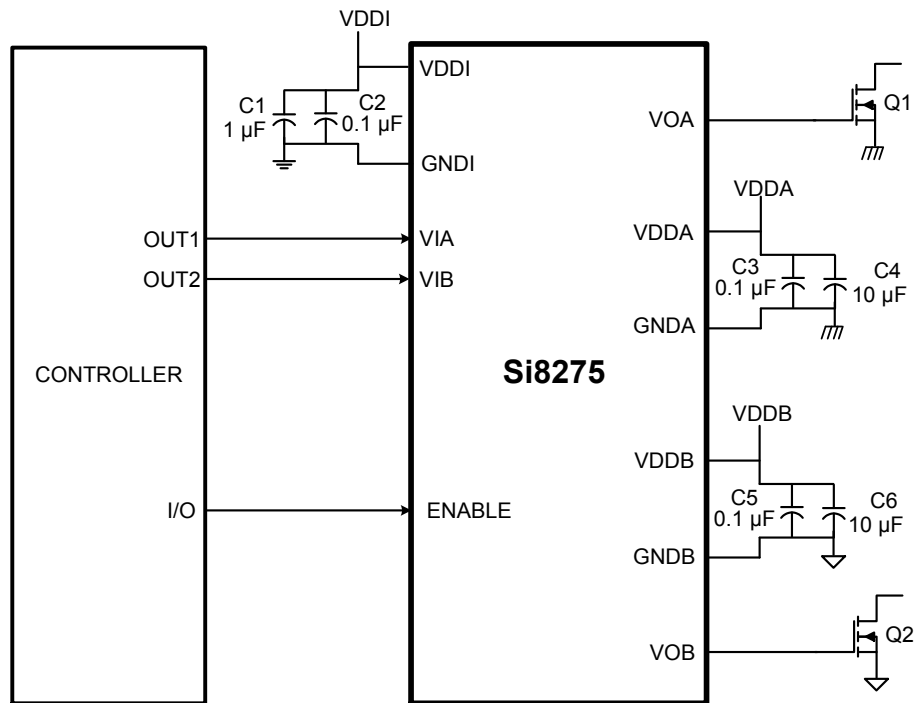


Figure 3.2. Si827x in a Dual Driver Application

Because each output driver resides on its own die, the relative voltage polarities of VOA and VOB can reverse without damaging the driver. That is, the voltage at VOA can be higher or lower than that of VOB by VDD without damaging the driver. Therefore, a dual driver in a high-side/low-side drive application can use either VOA or VOB as the high side driver. Similarly, a dual driver can operate as a dual low-side or dual high-side driver and is unaffected by static or dynamic voltage polarity changes.

4. Electrical Specifications

Table 4.1. Electrical Characteristics

V_{DDI} = 5 V, GNDI = 0 V, V_{DDA/B}-GND_{A/B} = 30 V, T_A = -40 to +125 °C; typical specs at 25 °C

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---------------------------------------|--------------------------------|--|------|------|------|-------|
| DC Parameters | | | | | | |
| Input Supply Voltage | VDDI | | 2.5 | — | 5.5 | V |
| Driver Supply Voltage | (VDDA/B – GND _{A/B}) | | 4.2 | — | 30 | V |
| Input Supply Quiescent Current | IDDI(Q) | | — | 7.9 | 10.0 | mA |
| Input Supply Active Current | IDDI | f = 500 kHz | — | 8.0 | 10.0 | mA |
| Output Supply Quiescent Current | IDDX(Q) | | — | 2.5 | 4.0 | mA |
| Output Supply Active Current | IDDX | f = 500 kHz | — | 10.0 | 11.0 | mA |
| Gate Driver | | | | | | |
| High Output Transistor RDS (ON) | R _{OH} | | — | 2.7 | — | Ω |
| Low Output Transistor RDS (ON) | R _{OL} | | — | 1.0 | — | Ω |
| High Level Peak Output Current | I _{OH} | V _{DDA/B} = 15 V, See Figure 4.2 I _{OH} Source Current Test Circuit on page 19 for Si827xG, V _{DD} = 4.2 V, T < 250 ns | — | 1.8 | — | A |
| Low Level Peak Output Current | I _{OL} | V _{DDA/B} = 15 V, See Figure 4.1 I _{OL} Sink Current Test Circuit on page 19 for Si827xG, V _{DD} = 4.2 V, T _{PW_IOL} < 250 ns | — | 4.0 | — | A |
| UVLO | | | | | | |
| VDDI UVLO Threshold + | VDDI _{UV+} | | 1.85 | 2.2 | 2.45 | V |
| VDDI UVLO Threshold – | VDDI _{UV–} | | 1.75 | 2.1 | 2.35 | V |
| VDDI Hysteresis | VDDI _{HYS} | | — | 100 | — | mV |
| UVLO Threshold + (Driver Side) | | | | | | |
| 3 V Threshold | VDDX _{UV+} | | 2.7 | 3.5 | 4.0 | V |
| 5 V Threshold | | | 4.9 | 5.5 | 6.3 | V |
| 8 V Threshold | | | 7.2 | 8.3 | 9.5 | V |
| 12 V Threshold | | | 11 | 12.2 | 13.5 | V |
| UVLO Threshold - (Driver Side) | | | | | | |

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|--|-------------------------------------|-------------------------------------|---------------------------|------|------|-------|
| 3 V Threshold | VDD _{XUV-} | | 2.5 | 3.2 | 3.8 | V |
| 5 V Threshold | | | 4.6 | 5.2 | 5.9 | V |
| 8 V Threshold | | | 6.7 | 7.8 | 8.9 | V |
| 12 V Threshold | | | 9.6 | 10.8 | 12.1 | V |
| UVLO Lockout Hysteresis | | | | | | |
| 3 V Threshold | VDD _{HYS} | | — | 300 | — | mV |
| 5 V Threshold | | | — | 300 | — | mV |
| 8 V Threshold | | | — | 500 | — | mV |
| 12 V Threshold | | | — | 1400 | — | mV |
| Digital | | | | | | |
| Logic High Input Threshold | V _{IH} | | 2.0 | — | — | V |
| Logic Low Input Threshold | V _{IL} | | — | — | 0.8 | V |
| Input Hysteresis | V _{IHYST} | | 350 | 400 | — | mV |
| Logic High Output Voltage | V _{OH} | I _O = -1 mA | V _{DDA/B} - 0.04 | — | — | V |
| Logic Low Output Voltage | V _{OL} | I _O = 1 mA | — | — | 0.04 | V |
| AC Switching Parameters | | | | | | |
| Propagation Delay Si8271/3/5 with low jitter | t _{PLH} , t _{PHL} | C _L = 200 pF | 20 | 30 | 60 | ns |
| Propagation Delay Si8271/3/5 with de-glitch option | t _{PLH} , t _{PHL} | C _L = 200 pF | 30 | 45 | 75 | ns |
| Propagation Delay Si8274 with low jitter | t _{PHL} | C _L = 200 pF | 20 | 30 | 60 | ns |
| Propagation Delay Si8274 with de-glitch option | t _{PHL} | C _L = 200 pF | 30 | 45 | 75 | ns |
| Propagation Delay Si8274 with low jitter | t _{PLH} | C _L = 200 pF | 30 | 45 | 75 | ns |
| Propagation Delay Si8274 with de-glitch option | t _{PLH} | C _L = 200 pF | 65 | 85 | 105 | ns |
| Pulse Width Distortion Si8271/3/5 all options | PWD | t _{PLH} - t _{PHL} | — | 3.6 | 8 | ns |
| Pulse Width Distortion Si8274 with low jitter | PWD | t _{PLH} - t _{PHL} | — | 14 | 19 | ns |
| Pulse Width Distortion Si8274 with de-glitch option | PWD | t _{PLH} - t _{PHL} | — | 38 | 47 | ns |
| Peak to Peak Jitter Si827x with low jitter | | | — | 200 | — | ps |

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---|-------------|---|-----|------|-----|-------------|
| Programmed dead-time (DT) for products with 10–200 ns DT range | DT | RDT = 6 k Ω | 10 | 20 | 30 | ns |
| | | RDT = 15 k Ω | 26 | 38 | 50 | |
| | | RDT = 100 k Ω | 150 | 210 | 260 | |
| Programmed dead-time (DT) for products with 20–700 ns DT range | DT | RDT = 6 k Ω | 23 | 40 | 57 | ns |
| | | RDT = 15 k Ω | 60 | 95 | 130 | |
| | | RDT = 100 k Ω | 450 | 610 | 770 | |
| Rise time | t_R | CL = 200 pF | 4 | 10.5 | 16 | ns |
| Fall time | t_F | CL = 200 pF | 5.5 | 13.3 | 18 | ns |
| Device Startup Time | t_{START} | | — | 16 | 30 | μ s |
| Common Mode Transient Immunity Si827x with de-glitch option | | See Figure 4.3 Common Mode Transient Immunity Test Circuit on page 20 . VCM = 1500 V | 200 | 350 | 400 | kV/ μ s |
| Common Mode Transient Immunity Si827x with low jitter option | | See Figure 4.3 Common Mode Transient Immunity Test Circuit on page 20 . VCM = 1500 V | 150 | 300 | 400 | kV/ μ s |

4.1 Test Circuits

The figures below depict sink current, source current, and common-mode transient immunity test circuits.

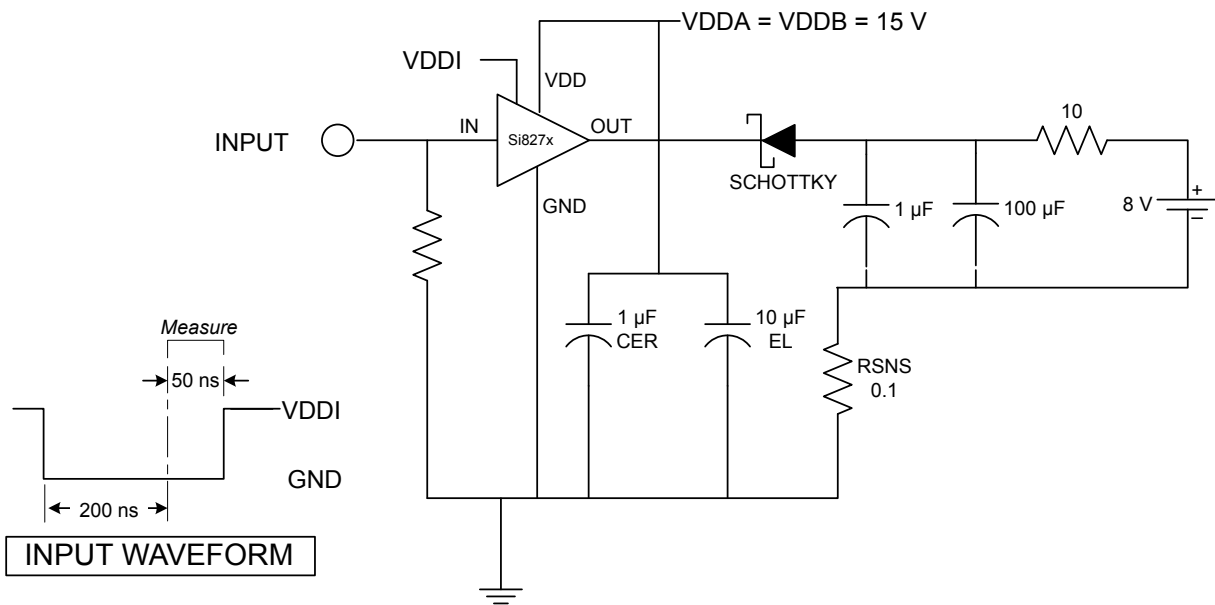


Figure 4.1. IOL Sink Current Test Circuit

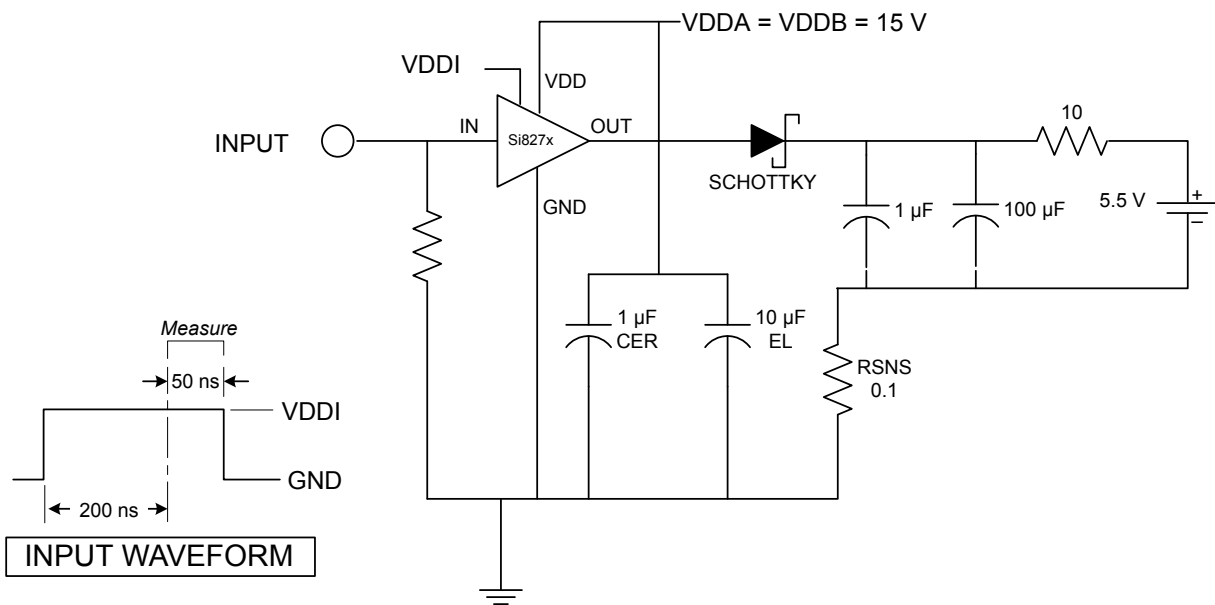


Figure 4.2. IOH Source Current Test Circuit

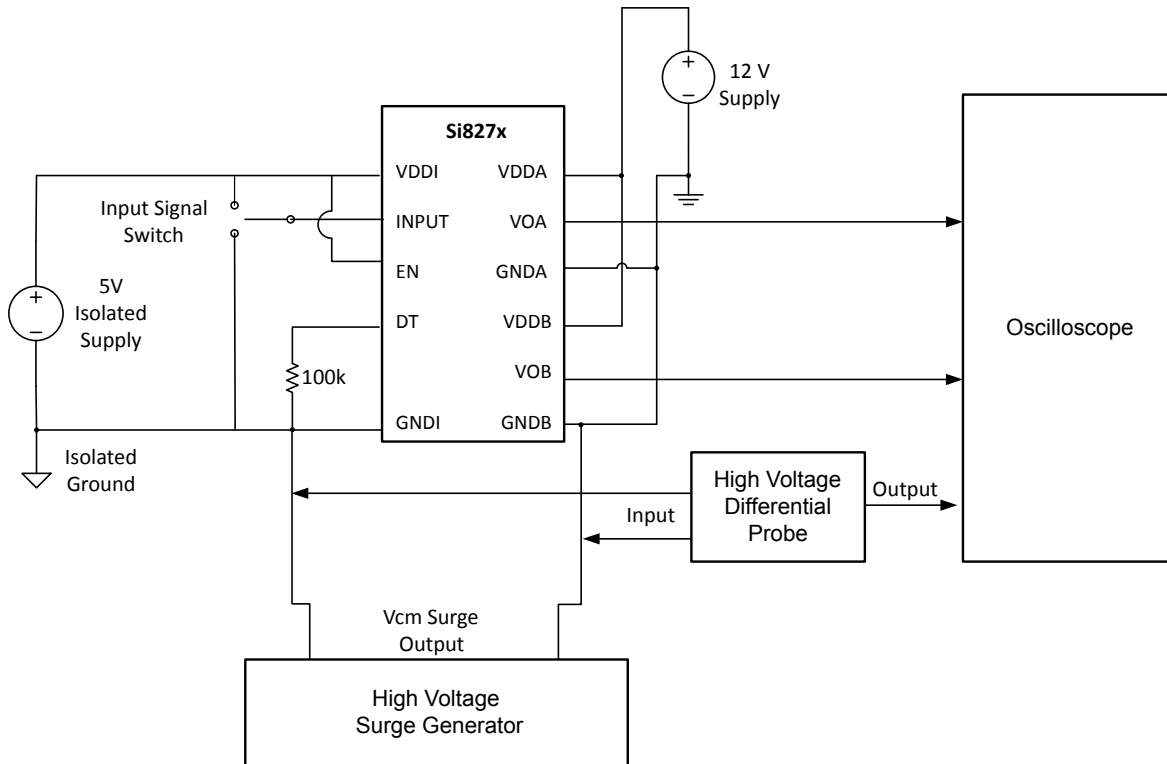


Figure 4.3. Common Mode Transient Immunity Test Circuit

4.2 Regulatory Information (Pending)

Table 4.2. Regulatory Information^{1,2}

| |
|---|
| CSA |
| The Si827x is certified under CSA Component Acceptance Notice 5A. For more details, see File 232873. |
| 60950-1: Up to 125 V _{RMS} reinforced insulation working voltage; up to 600 V _{RMS} basic insulation working voltage. |
| VDE |
| The Si827x is certified according to VDE 0884-10. For more details, see File 5006301-4880-0001. |
| VDE 0884-10: Up to 630 V _{peak} for basic insulation working voltage. |
| UL |
| The Si827x is certified under UL1577 component recognition program. For more details, see File E257455. |
| Rated up to 2500 V _{RMS} isolation voltage for basic protection. |
| CQC |
| The Si827x is certified under GB4943.1-2011. |
| Rated up to 125 V _{RMS} reinforced insulation working voltage; up to 600 V _{RMS} basic insulation working voltage. |
| 1. Regulatory Certifications apply to 2.5 kV _{RMS} rated devices which are production tested to 3.0 kV _{RMS} for 1 sec. |
| 2. For more information, see 1. Ordering Guide . |

Table 4.3. Insulation and Safety-Related Specifications

| Parameter | Symbol | Test Condition | Value | | | Unit |
|---|-----------------|----------------|------------------|------------------|------------------|------|
| | | | SOIC-8 | NB SOIC-16 | 14 LD LGA | |
| Nominal Air Gap (Clearance) | L(101) | | 4.7 | 4.7 | 3.5 | mm |
| Nominal External Tracking (Creepage) | L(102) | | 3.9 | 3.9 | 3.5 | mm |
| Minimum Internal Gap (Internal Clearance) | | | 0.008 | 0.008 | 0.008 | mm |
| Tracking Resistance (Proof Tracking Index) | PTI | IEC60112 | 600 | 600 | 600 | V |
| Erosion Depth | ED | | 0.019 | 0.019 | 0.021 | mm |
| Resistance (Input-Output) ¹ | R _{IO} | | 10 ¹² | 10 ¹² | 10 ¹² | Ω |
| Capacitance (Input-Output) ¹ | C _{IO} | f = 1 MHz | 0.5 | 0.5 | 0.5 | pF |
| Input Capacitance ² | C _I | | 3.0 | 3.0 | 3.0 | pF |

Notes:

1. To determine resistance and capacitance, the Si827x is converted into a 2-terminal device. All pins on side 1 are shorted to create terminal 1, and all pins on side 2 are shorted to create terminal 2. The parameters are then measured between these two terminals.
2. Measured from input pin to ground.

Table 4.4. IEC 60664-1 Ratings

| Parameter | Test Condition | Specification | | |
|-----------------------------|---|---------------|------------|-----------|
| | | SOIC-8 | NB SOIC-16 | 14 LD LGA |
| Basic Isolation Group | Material Group | I | I | I |
| Installation Classification | Rated Mains Voltages < 150 V _{RMS} | I-IV | I-IV | I-IV |
| | Rated Mains Voltages < 300 V _{RMS} | I-III | I-III | I-III |
| | Rated Mains Voltages < 400 V _{RMS} | I-II | I-II | I-II |
| | Rated Mains Voltages < 600 V _{RMS} | I-II | I-II | I-II |

Table 4.5. VDE 0884 Insulation Characteristics¹

| Parameter | Symbol | Test Condition | Characteristic | Unit |
|--|------------|--|----------------|----------|
| Maximum Working Insulation Voltage | V_{IORM} | | 630 | V peak |
| Input to Output Test Voltage | V_{PR} | Method b1 ($V_{IORM} \times 1.875 = V_{PR}$, 100% Production Test, $t_m = 1$ sec, Partial Discharge < 5 pC) | 1181 | V peak |
| Transient Overvoltage | V_{IOTM} | $t = 60$ sec | 4000 | V peak |
| Pollution Degree (DIN VDE 0110, Table 1) | | | 2 | |
| Insulation Resistance at T_S , $V_{IO} = 500$ V | R_S | | $>10^9$ | Ω |

Note:

1. Maintenance of the safety data is ensured by protective circuits. The Si827x provides a climate classification of 40/125/21.

Table 4.6. IEC Safety Limiting Values¹

| Parameter | Symbol | Test Condition | SOIC-8 | NB SOIC-16 | 14 LD LGA | Unit |
|--------------------------|--------|--|--------|------------|-----------|--------------------|
| Case Temperature | T_S | | 140 | 150 | 150 | $^{\circ}\text{C}$ |
| Safety Input Current | I_S | $\theta_{JA} = 110$ $^{\circ}\text{C}/\text{W}$ (SOIC-8), 105 $^{\circ}\text{C}/\text{W}$ (NB SOIC-16, 14 LD LGA), $V_{DDI} = 5.5$ V, $V_{DDA} = V_{DDB} = 30$ V, $T_J = 150$ $^{\circ}\text{C}$, $T_A = 25$ $^{\circ}\text{C}$ | 35 | 40 | 40 | mA |
| Device Power Dissipation | P_D | | 1 | 1.2 | 1.2 | Ω |

Note:

1. Maximum value allowed in the event of a failure. Refer to the thermal derating curve in the two figures below.

Table 4.7. Thermal Characteristics

| Parameter | Symbol | SOIC-8 | NB SOIC-16 | 14 LD LGA | Unit |
|---------------------------------------|---------------|--------|------------|-----------|-----------------------------|
| IC Junction-to-Air Thermal Resistance | θ_{JA} | 110 | 105 | 105 | $^{\circ}\text{C}/\text{W}$ |

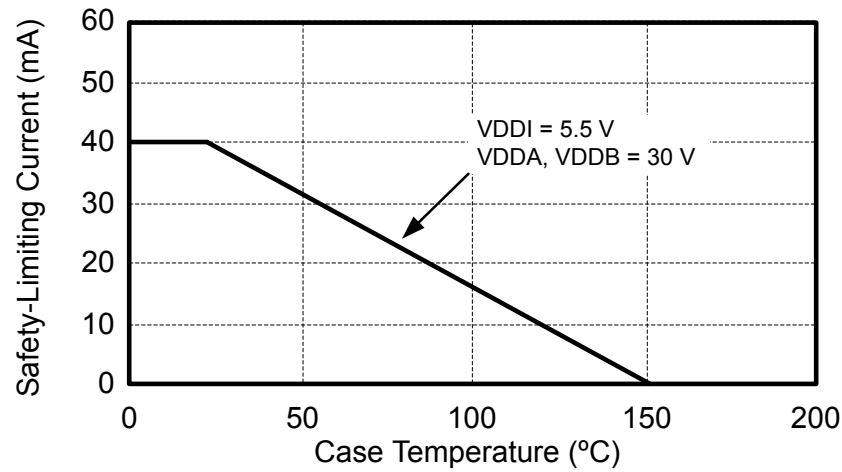


Figure 4.4. NB SOIC-16, LGA-14 Thermal Derating Curve, Dependence of Safety Limiting Values Limiting Values with Case Temperature per VDE 0884

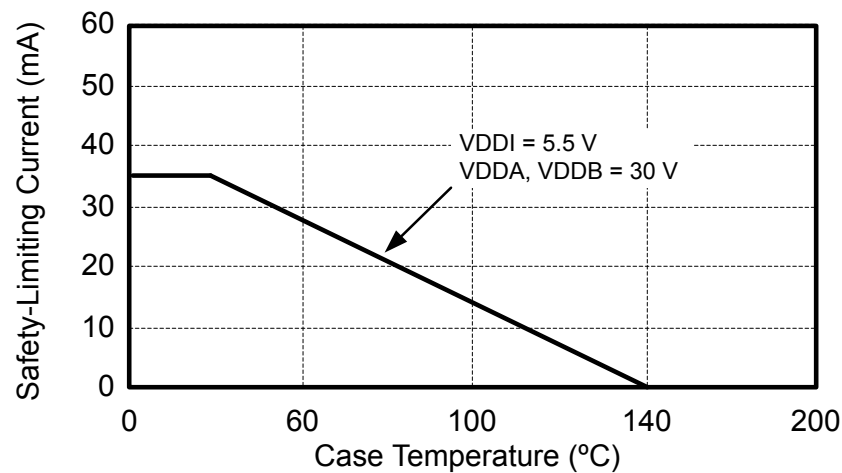


Figure 4.5. NB SOIC-8 Thermal Derating Curve, Dependence of Safety Limiting Values Limiting Values with Case Temperature per VDE 0884

Table 4.8. Absolute Maximum Ratings¹

| Parameter | Symbol | Min | Max | Units |
|--|------------|------|-----------|-------------|
| Storage Temperature | T_{STG} | -65 | +150 | °C |
| Operating Temperature | T_A | -40 | +125 | °C |
| Junction Temperature | T_J | — | +150 | °C |
| Input-side supply voltage | VDDI | -0.6 | 6.0 | V |
| Driver-side supply voltage | VDDA, VDDB | -0.6 | 36 | V |
| Voltage on any pin with respect to ground | V_{IO} | -0.5 | VDD + 0.5 | V |
| Peak Output Current ($t_{PW} = 10 \mu s$, duty cycle = 0.2%) | I_{OPK} | — | 4.0 | A |
| Lead Solder Temperature (10 s) | | — | 260 | °C |
| HBM Rating ESD | | — | 3.5 | kV |
| CDM | | — | 2000 | V |
| Maximum Isolation Voltage (Input to Output) (1 sec) NB SOIC-16 and SOIC-8 | | — | 3000 | V_{RMS} |
| Maximum Isolation Voltage (Input to Output) (1 sec) 5x5 LGA-14 | | — | 3000 | V_{RMS} |
| Maximum Isolation Voltage (Output to Output) (1 sec) NB SOIC-16 | | — | 1500 | V_{RMS} |
| Maximum Isolation Voltage (Output to Output) (1 sec) 5x5 LGA-14 | | — | 650 | V_{RMS} |
| Latch-up Immunity | | — | 400 | kV/ μs |

Note:

1. Permanent device damage may occur if the absolute maximum ratings are exceeded. Functional operation should be restricted to the conditions specified in the operational sections of this data sheet.

5. Pin Descriptions

5.1 Si8271 Pin Descriptions

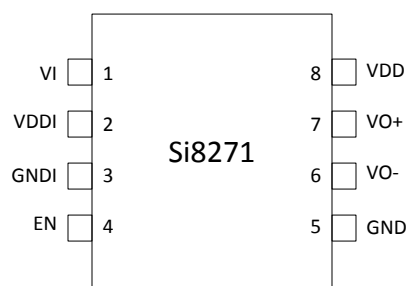


Figure 5.1. Pin Assignments Si8271

Table 5.1. Si8271 Pin Descriptions

| Pin | Name | Description |
|-----|------|-------------------------------|
| 1 | VI | Digital driver control signal |
| 2 | VDDI | Input side power supply |
| 3 | GNDI | Input side ground |
| 4 | EN | Enable |
| 5 | GND | Driver side ground |
| 6 | VO- | Gate drive pull low |
| 7 | VO+ | Gate drive pull high |
| 8 | VDD | Driver side power supply |

5.2 Si8273/75 Pin Descriptions

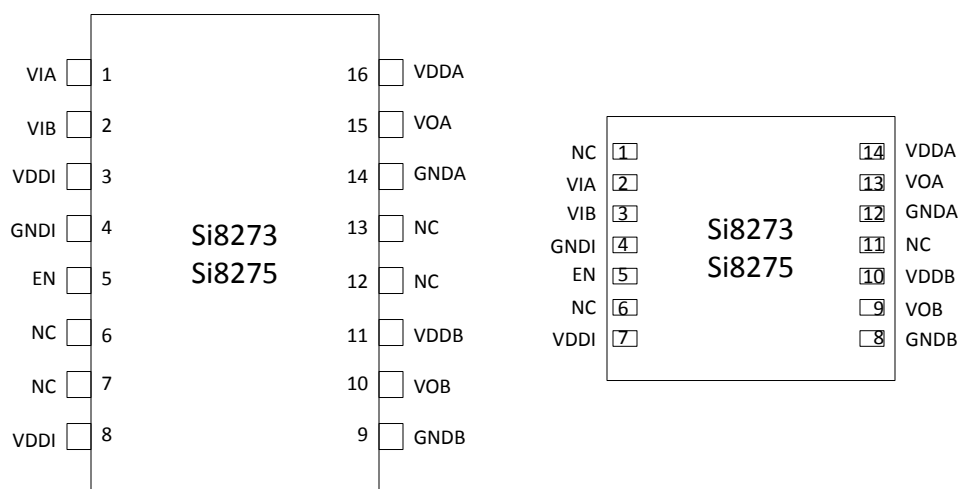


Figure 5.2. Pin Assignments Si8273/5

Table 5.2. Si8273/5 Pin Descriptions

| NB SOIC-16 Pin # | 5x5 mm LGA-14 Pin # | Name | Description |
|------------------|---------------------|-------|--|
| 1 | 2 | VIA | Digital driver control signal for "A" driver |
| 2 | 3 | VIB | Digital driver control signal for "B" driver |
| 3,8 | 7 | VDDI | Input side power supply |
| 4 | 4 | GNDI | Input side ground |
| 5 | 5 | EN | Enable |
| 6, 7, 12, 13 | 1, 6, 11 | NC | No Connect |
| 9 | 8 | GNDB | Driver side power supply for "B" driver |
| 10 | 9 | VOB | Gate drive output for "B" driver |
| 11 | 10 | VDDDB | Driver side power supply for "B" driver |
| 14 | 12 | GNDA | Driver side power supply for "A" driver |
| 15 | 13 | VOA | Gate drive output for "A" driver |
| 16 | 14 | VDDA | Driver side power supply for "A" driver |

5.3 Si8274 Pin Descriptions

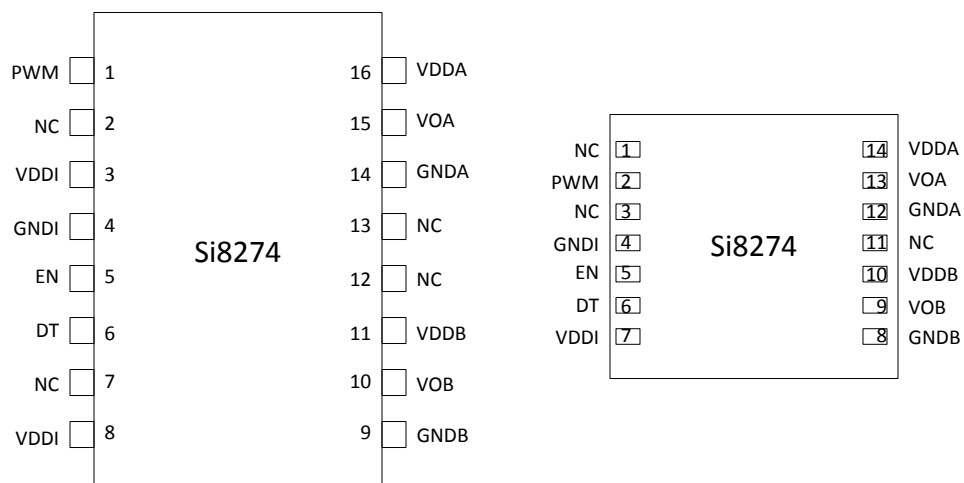


Figure 5.3. Pin Assignments Si8274

Table 5.3. Si8274 Pin Descriptions

| NB SOIC-16 Pin # | 5x5 mm LGA-14 Pin # | Name | Description |
|------------------|---------------------|------|---|
| 1 | 2 | PWM | Pulse width modulated driver control signal |
| 2, 7, 12, 13 | 1, 3, 11 | NC | No Connect |
| 3, 8 | 7 | VDDI | Input side power supply |
| 4 | 4 | GNDI | Input side ground |
| 5 | 5 | EN | Enable |
| 6 | 6 | DT | Dead time control |
| 9 | 8 | GNDB | Driver side power supply for "B" driver |
| 10 | 9 | VOB | Gate drive output for "B" driver |
| 11 | 10 | VDDB | Driver side power supply for "B" driver |
| 14 | 12 | GNDA | Driver side power supply for "A" driver |
| 15 | 13 | VOA | Gate drive output for "A" driver |
| 16 | 14 | VDDA | Driver side power supply for "A" driver |

6. Package Outlines

6.1 Package Outline: 16-Pin Narrow-Body SOIC

The figure below illustrates the package details for the Si827x in a 16-pin narrow-body SOIC (SO-16). The table below lists the values for the dimensions shown in the illustration.

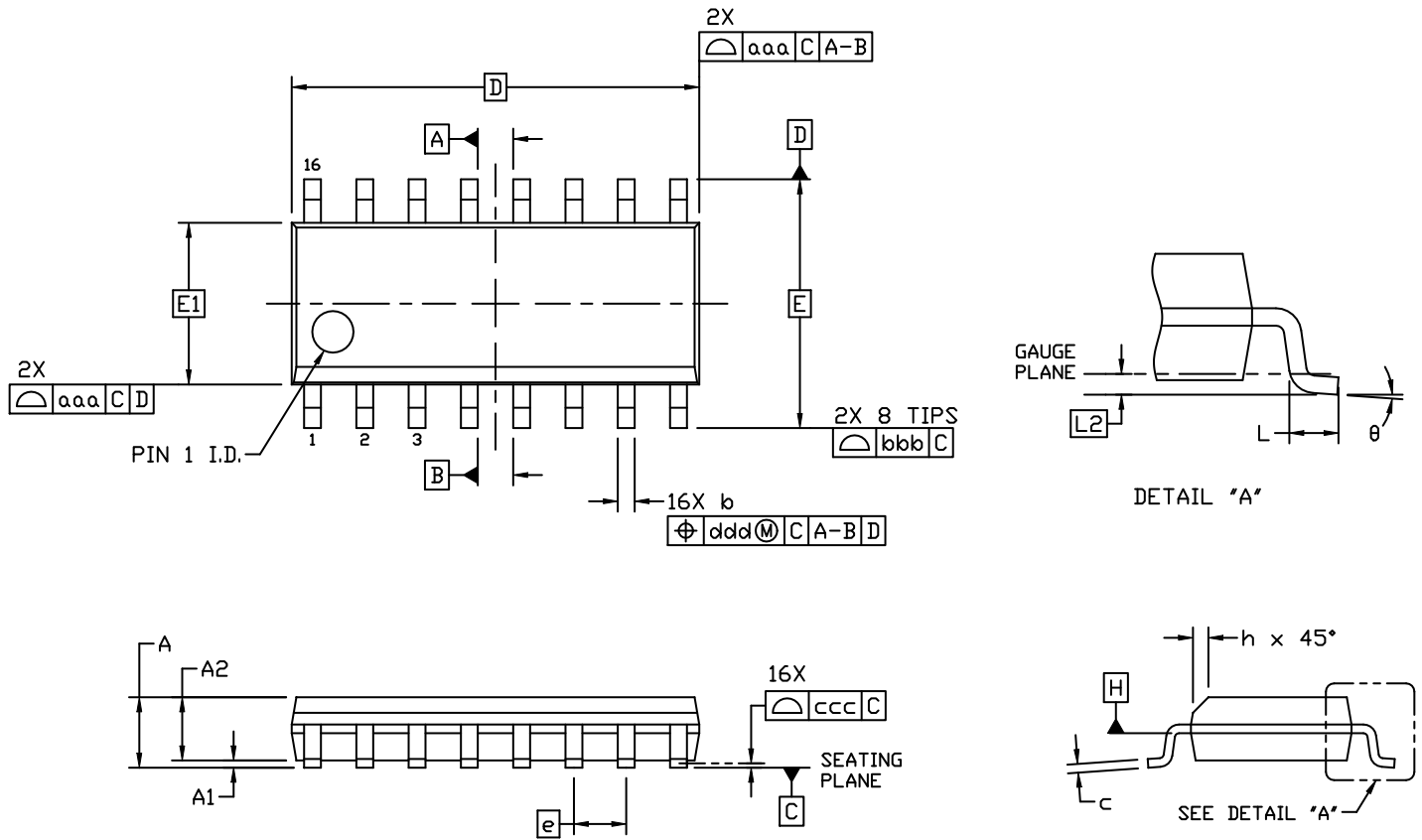


Figure 6.1. 16-pin Small Outline Integrated Circuit (SOIC) Package

Table 6.1. Package Diagram Dimensions

| Dimension | Min | Max | Dimension | Min | Max |
|-----------|----------|------|-----------|----------|------|
| A | — | 1.75 | L | 0.40 | 1.27 |
| A1 | 0.10 | 0.25 | L2 | 0.25 BSC | |
| A2 | 1.25 | — | h | 0.25 | 0.50 |
| b | 0.31 | 0.51 | θ | 0° | 8° |
| c | 0.17 | 0.25 | aaa | 0.10 | |
| D | 9.90 BSC | | bbb | 0.20 | |
| E | 6.00 BSC | | ccc | 0.10 | |
| E1 | 3.90 BSC | | ddd | 0.25 | |
| e | 1.27 BSC | | | | |

1. All dimensions shown are in millimeters (mm) unless otherwise noted.
2. Dimensioning and Tolerancing per ANSI Y14.5M-1994.
3. This drawing conforms to the JEDEC Solid State Outline MS-012, Variation AC.
4. Recommended card reflow profile is per the JEDEC/IPC J-STD-020 specification for Small Body Components.

6.2 Package Outline: 8-Pin Narrow Body SOIC

The figure below illustrates the package details for the Si827x in an 8-pin narrow-body SOIC package. The table below lists the values for the dimensions shown in the illustration.

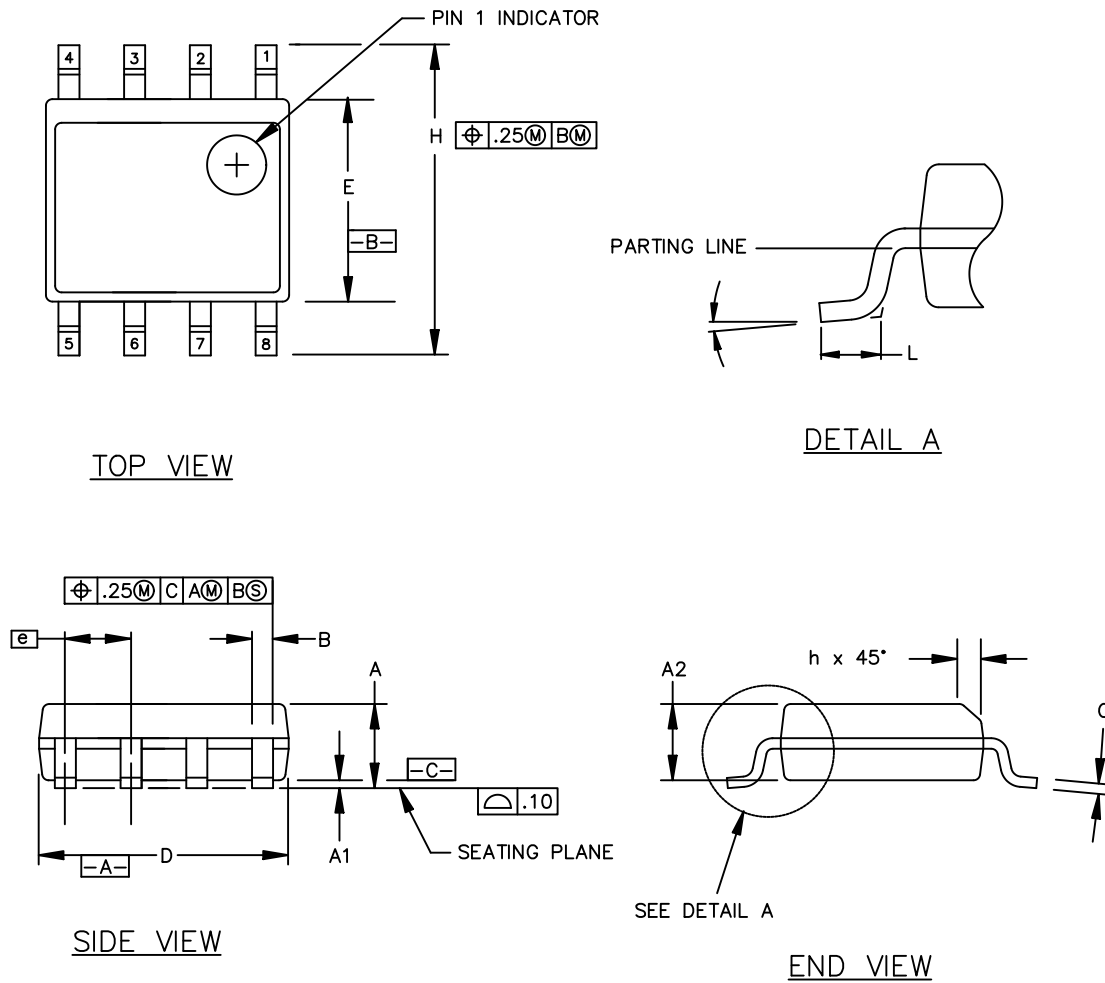


Figure 6.2. 8-Pin Narrow Body SOIC Package

Table 6.2. 8-Pin Narrow Body SOIC Package Diagram Dimensions

| Symbol | Millimeters | |
|--------|-------------|----------|
| | Min | Max |
| A | 1.35 | 1.75 |
| A1 | 0.10 | 0.25 |
| A2 | 1.40 REF | 1.55 REF |
| B | 0.33 | 0.51 |
| C | 0.19 | 0.25 |
| D | 4.80 | 5.00 |
| E | 3.80 | 4.00 |
| e | 1.27 BSC | |
| H | 5.80 | 6.20 |
| h | 0.25 | 0.50 |
| L | 0.40 | 1.27 |
| | 0° | 8° |

6.3 Package Outline: 14 LD LGA (5 x 5 mm)

The figure below illustrates the package details for the Si827x in an LGA outline. The table below lists the values for the dimensions shown in the illustration.

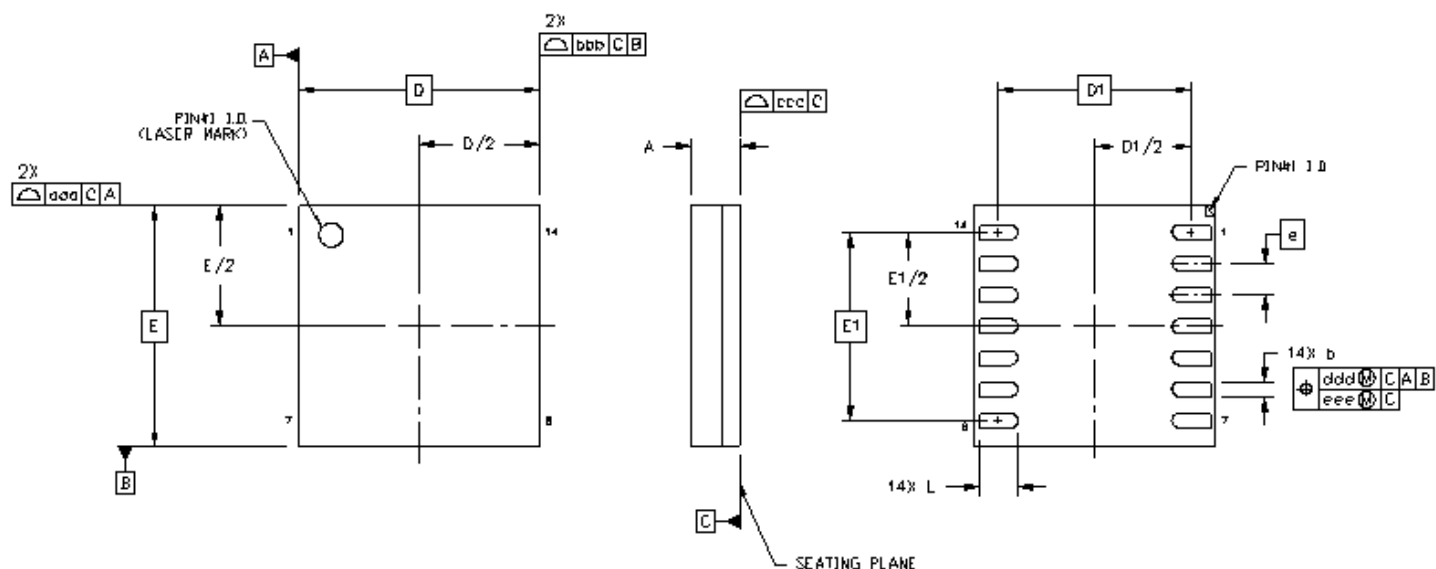


Figure 6.3. Si827x LGA Outline

Table 6.3. Package Diagram Dimensions

| Dimension | MIN | NOM | MAX |
|-----------|----------|------|------|
| A | 0.74 | 0.84 | 0.94 |
| b | 0.25 | 0.30 | 0.35 |
| D | 5.00 BSC | | |
| D1 | 4.15 BSC | | |
| e | 0.65 BSC | | |
| E | 5.00 BSC | | |
| E1 | 3.90 BSC | | |
| L | 0.70 | 0.75 | 0.80 |
| L1 | 0.05 | 0.10 | 0.15 |
| aaa | — | — | 0.10 |
| bbb | — | — | 0.10 |
| ccc | — | — | 0.08 |
| ddd | — | — | 0.15 |
| eee | — | — | 0.08 |

1. All dimensions shown are in millimeters (mm) unless otherwise noted.
2. Dimensioning and Tolerancing per ANSI Y14.5M-1994.

7. Land Patterns

7.1 Land Pattern: 16-Pin Narrow Body SOIC

The figure below illustrates the recommended land pattern details for the Si827x in a 16-pin narrow-body SOIC. The table below lists the values for the dimensions shown in the illustration.

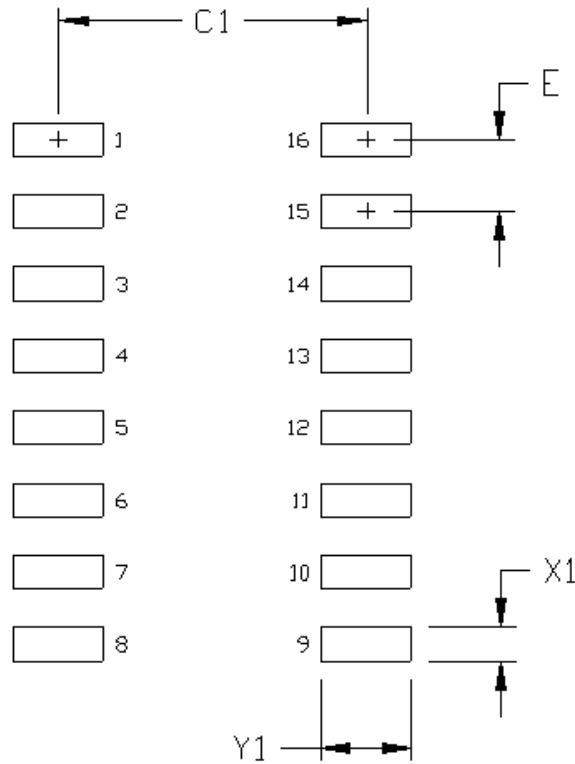


Figure 7.1. 16-Pin Narrow Body SOIC PCB Land Pattern

Table 7.1. 16-Pin Narrow Body SOIC Land Pattern Dimensions

| Dimension | Feature | (mm) |
|-----------|--------------------|------|
| C1 | Pad Column Spacing | 5.40 |
| E | Pad Row Pitch | 1.27 |
| X1 | Pad Width | 0.60 |
| Y1 | Pad Length | 1.55 |

Notes:

1. This Land Pattern Design is based on IPC-7351 pattern SOIC127P600X165-16N for Density Level B (Median Land Protrusion).
2. All feature sizes shown are at Maximum Material Condition (MMC) and a card fabrication tolerance of 0.05 mm is assumed.

7.2 Land Pattern: 8-Pin Narrow Body SOIC

The figure below illustrates the recommended land pattern details for the Si827x in an 8-pin narrow-body SOIC. The table below lists the values for the dimensions shown in the illustration.

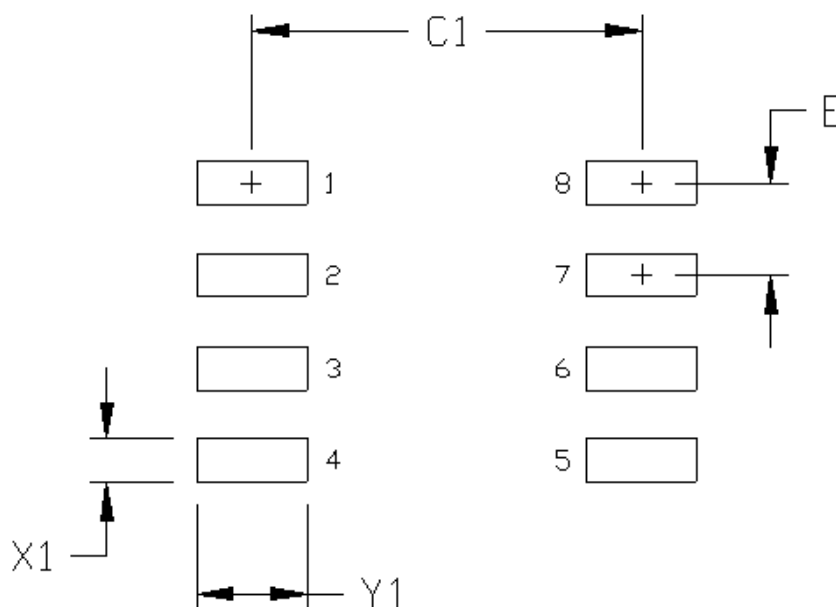


Figure 7.2. 8-Pin Narrow Body SOIC Land Pattern

Table 7.2. 8-Pin Narrow Body SOIC Land Pattern Dimensions

| Dimension | Feature | (mm) |
|-----------|--------------------|------|
| C1 | Pad Column Spacing | 5.40 |
| E | Pad Row Pitch | 1.27 |
| X1 | Pad Width | 0.60 |
| Y1 | Pad Length | 1.55 |

Notes:

1. This Land Pattern Design is based on IPC-7351 pattern SOIC127P600X173-8N for Density Level B (Median Land Protrusion).
2. All feature sizes shown are at Maximum Material Condition (MMC) and a card fabrication tolerance of 0.05 mm is assumed.

7.3 Land Pattern: 14 LD LGA

The figure below illustrates the recommended land pattern details for the Si827x in a 14-pin LGA. The table below lists the values for the dimensions shown in the illustration.

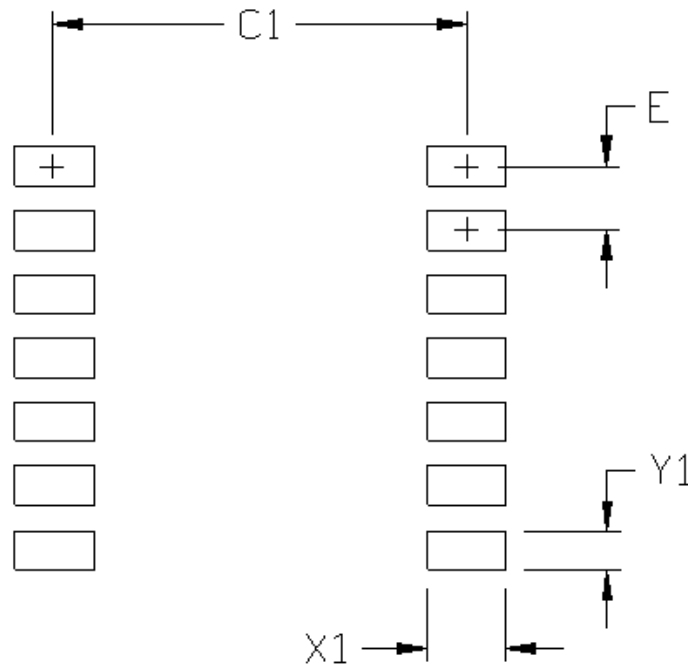


Figure 7.3. 14-Pin LGA Land Pattern

Table 7.3. 14-Pin LGA Land Pattern Dimensions

| Dimension | (mm) |
|-----------|------|
| C1 | 4.20 |
| E | 0.65 |
| X1 | 0.80 |
| Y1 | 0.40 |

Notes:

- All dimensions shown are in millimeters (mm).
- This Land Pattern Design is based on the IPC-7351 guidelines.
- All dimensions shown are at Maximum Material Condition (MMC). Least Material Condition (LMC) is calculated based on a Fabrication Allowance of 0.05 mm.
- All metal pads are to be non-solder mask defined (NSMD). Clearance between the solder mask and the metal pad is to be 60 μm minimum, all the way around the pad.
- A stainless steel, laser-cut and electro-polished stencil with trapezoidal walls should be used to assure good solder paste release.
- The stencil thickness should be 0.125 mm (5 mils).
- The ratio of stencil aperture to land pad size should be 1:1.
- A No-Clean, Type-3 solder paste is recommended.
- The recommended card reflow profile is per the JEDEC/IPC J-STD-020 specification for Small Body Components.

8. Top Markings

8.1 Si827x Top Marking (16-Pin Narrow Body SOIC)

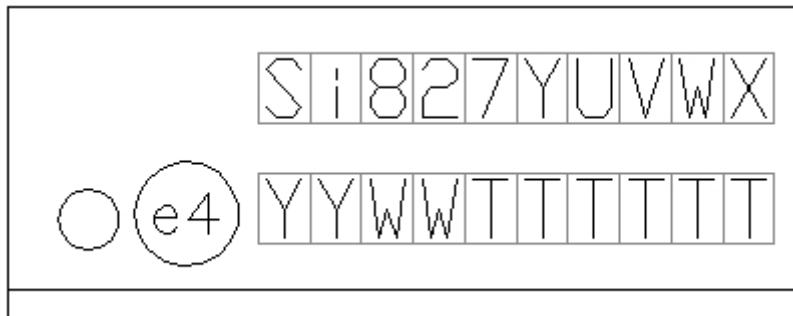


Table 8.1. Top Marking Explanation (16-Pin Narrow Body SOIC)

| | | |
|-------------------------------|--|---|
| <p>Line 1 Marking:</p> | <p>Base Part Number</p> <p>Ordering Options</p> <p>See 1. Ordering Guide for more information.</p> | <p>Si827 = ISOdriver product series</p> <p>Y = Configuration</p> <p>3 = High-side/Low-side (HS/LS)</p> <p>4 = PWM HS/LS</p> <p>5 = Dual driver</p> <p>U = UVLO level</p> <p>G = 3 V</p> <p>A = 5 V</p> <p>B = 8 V</p> <p>D = 12 V</p> <p>V = Isolation rating</p> <p>B = 2.5 kV</p> <p>W = Dead-time setting range</p> <p>1 = 10-200 ns</p> <p>4 = 20-700 ns</p> <p>X = Integrated de-glitch circuit</p> <p>D = integrated</p> <p>none = not included</p> |
| <p>Line 2 Marking:</p> | <p>YY = Year</p> <p>WW = Workweek</p> <p>TTTTTT = Mfg Code</p> | <p>Assigned by the Assembly House. Corresponds to the year and workweek of the mold date.</p> <p>Manufacturing Code from Assembly Purchase Order form.</p> |

8.2 Si8271 Top Marking (8-Pin Narrow Body SOIC)

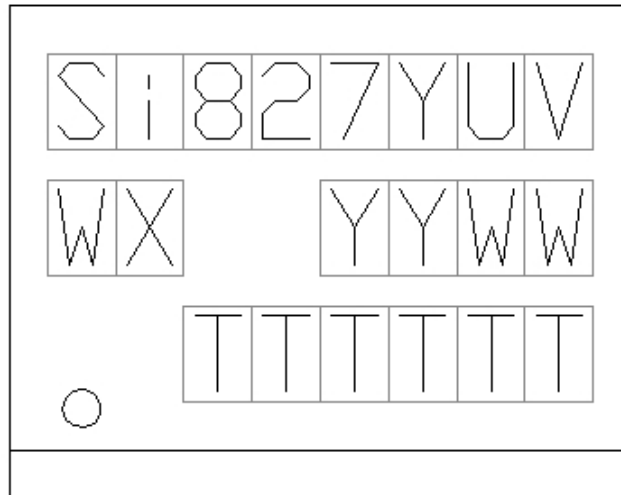


Table 8.2. Top Marking Explanation (Narrow Body SOIC)

| | | |
|------------------------|--|--|
| Line 1 Marking: | Customer Part Number | <p>Si827 = ISOdriver product series</p> <p>Y = Configuration</p> <p> 1 = Single driver</p> <p>U = UVLO level</p> <p> G = 3 V</p> <p> A = 5 V</p> <p> B = 8 V</p> <p> D = 12 V</p> <p>V = Isolation rating</p> <p> B = 2.5 kV</p> |
| Line 2 Marking: | WX = Ordering options | <p>W = Dead-time setting range</p> <p> 1= 10-200 ns</p> <p> 4 = 20-700 ns</p> <p>X = Integrated de-glitch circuit</p> <p> D = integrated</p> <p> none = not included</p> |
| | <p>YY = Year</p> <p>WW = Work week</p> | Assigned by the Assembly House. Corresponds to the year and workweek of the mold date. |
| Line 3 Marking: | TTTTTT = Mfg code | Manufacturing Code from Assembly Purchase Order form. |

8.3 Si827x Top Marking (14 LD LGA)

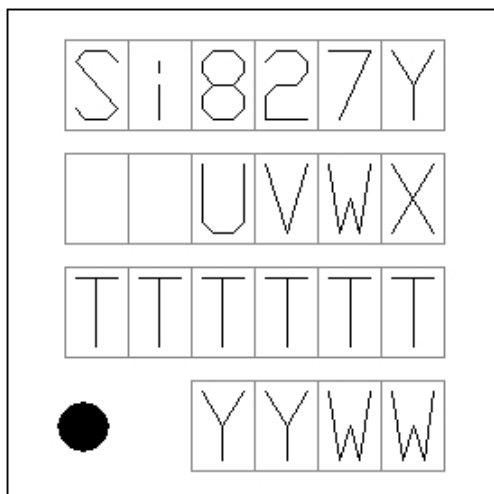


Table 8.3. Top Marking Explanation (14 LD LGA)

| | | |
|------------------------|---|---|
| Line 1 Marking: | Base Part Number Ordering Options See 1. Ordering Guide for more information. | Si827 = ISOdriver product series Y = configuration 1 = single driver 3 = High-side/Low-side (HS/LS) 4 = PWM HS/LS 5 = Dual driver |
| Line 2 Marking: | Ordering Options | U = UVLO level G = 3 V A = 5 V B = 8 V D = 12 V V = Isolation rating B = 2.5 kV W = Dead-time setting range 1 = 10-200 ns 4 = 20-700 ns X = Integrated de-glitch circuit D = integrated none = not included |
| Line 3 Marking: | TTTTTT = Mfg code | Manufacturing Code from Assembly. |
| Line 4 Marking: | Circle = 1.5 mm diameter YYWW | Pin 1 identifier. Manufacturing date code. |

9. Revision History

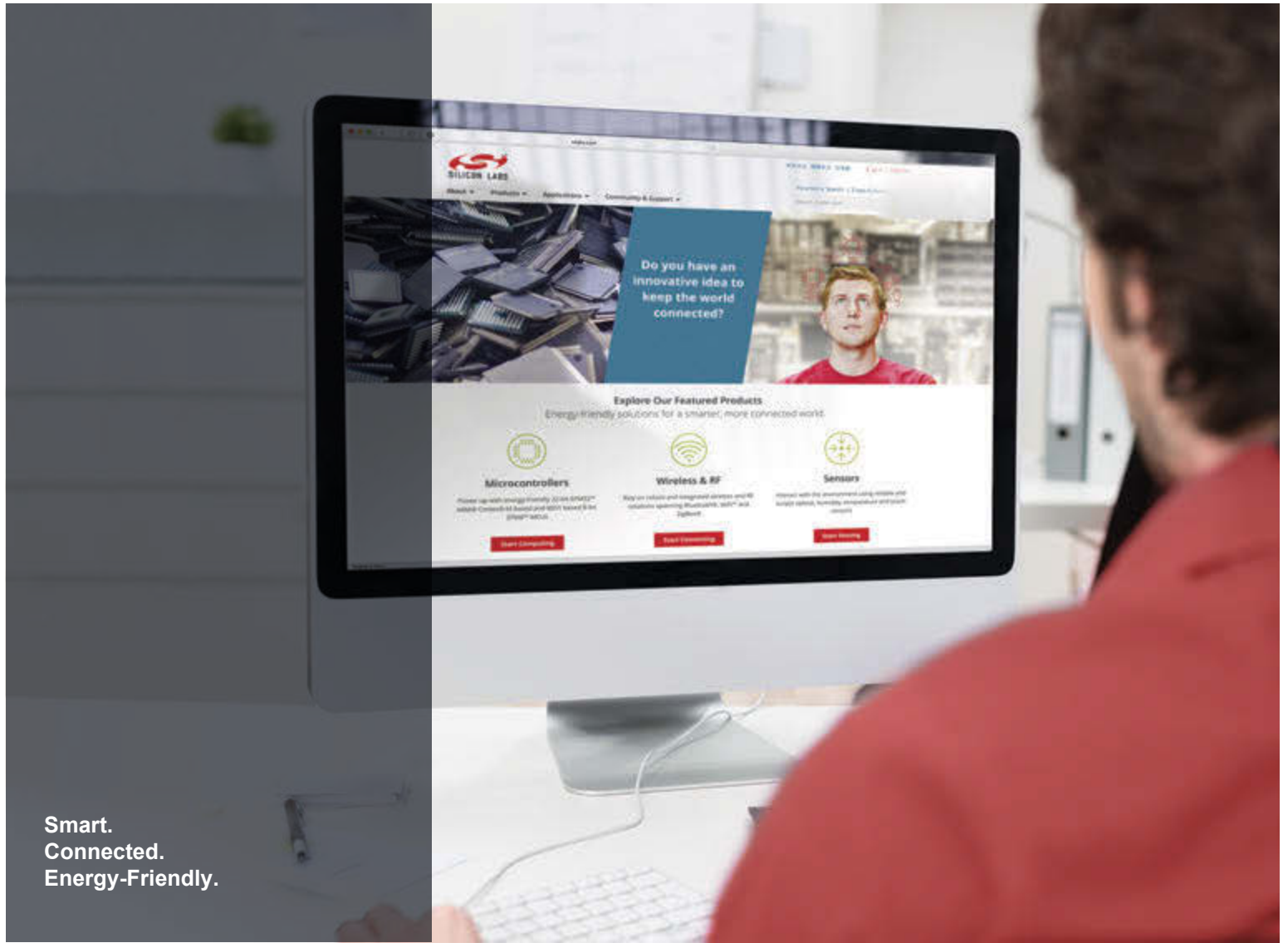
9.1 Revision 0.1

February 26, 2016

- Initial release.

| | |
|--|-----------|
| 1. Ordering Guide | 1 |
| 2. System Overview | 3 |
| 2.1 Typical Operating Characteristics | 6 |
| 2.2 Family Overview and Logic Operation During Startup | 7 |
| 2.2.1 Products | 7 |
| 2.2.2 Device Behavior | 7 |
| 2.3 Power Supply Connections | 9 |
| 2.4 Power Dissipation Considerations | 9 |
| 2.5 Layout Considerations | 10 |
| 2.6 Undervoltage Lockout Operation | 11 |
| 2.6.1 Device Startup | 11 |
| 2.6.2 Undervoltage Lockout | 11 |
| 2.6.3 Control Inputs | 11 |
| 2.6.4 Enable Input | 12 |
| 2.7 Programmable Dead Time and Overlap Protection | 12 |
| 2.8 De-glitch Feature | 13 |
| 3. Applications | 14 |
| 3.1 High-Side/Low-Side Driver | 14 |
| 3.2 Dual Driver | 15 |
| 4. Electrical Specifications | 16 |
| 4.1 Test Circuits | 19 |
| 4.2 Regulatory Information (Pending) | 20 |
| 5. Pin Descriptions | 25 |
| 5.1 Si8271 Pin Descriptions | 25 |
| 5.2 Si8273/75 Pin Descriptions | 26 |
| 5.3 Si8274 Pin Descriptions | 27 |
| 6. Package Outlines | 28 |
| 6.1 Package Outline: 16-Pin Narrow-Body SOIC | 28 |
| 6.2 Package Outline: 8-Pin Narrow Body SOIC | 30 |
| 6.3 Package Outline: 14 LD LGA (5 x 5 mm) | 32 |
| 7. Land Patterns | 33 |
| 7.1 Land Pattern: 16-Pin Narrow Body SOIC | 33 |
| 7.2 Land Pattern: 8-Pin Narrow Body SOIC | 34 |
| 7.3 Land Pattern: 14 LD LGA | 35 |
| 8. Top Markings | 36 |
| 8.1 Si827x Top Marking (16-Pin Narrow Body SOIC) | 36 |
| 8.2 Si8271 Top Marking (8-Pin Narrow Body SOIC) | 37 |

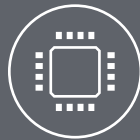
| | |
|--|-----------|
| 8.3 Si827x Top Marking (14 LD LGA) | .38 |
| 9. Revision History | 39 |
| 9.1 Revision 0.1 | .39 |



Smart.
Connected.
Energy-Friendly.



Products
www.silabs.com/products



Quality
www.silabs.com/quality



Support and Community
community.silabs.com

Disclaimer

Silicon Laboratories intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Laboratories products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Laboratories reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Laboratories shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any Life Support System without the specific written consent of Silicon Laboratories. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Laboratories products are not designed or authorized for military applications. Silicon Laboratories products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

Trademark Information

Silicon Laboratories Inc.®, Silicon Laboratories®, Silicon Labs®, SiLabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, Clockbuilder®, CMEMS®, DSPLL®, EFM®, EFM32®, EFR®, Ember®, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, ISModem®, Precision32®, ProSLIC®, Simplicity Studio®, SiPHY®, Telegesis, the Telegesis Logo®, USBXpress® and others are trademarks or registered trademarks of Silicon Laboratories Inc. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

<http://www.silabs.com>