

# Si834x Data Sheet

## Isolated Smart Switch

The Si834x provides up to four isolated high-side or low-side switches with low  $R_{ON}$ . These switches are ideal for driving resistive and inductive loads like solenoids, relays, and lamps commonly found in industrial control systems like programmable logic controllers (PLC). Each switch is galvanically isolated for safety using Silicon Labs' groundbreaking CMOS based isolation technology offering better reliability and performance than traditional optocoupler based isolation, including high common-mode transient immunity (CMTI) of over 150 kV/ $\mu$ s.

The logic interface for the switches supports low power 2.25V MCUs and FPGAs while the switches offer a wide power supply range of 9 V – 32 V making them ideal for a range of industrial digital voltage levels. The switches are capable of providing up to .5A of IEC61131-2 compliant continuous current in a quad channel configuration, or over 2.5A of continuous current in a single channel configuration. Each switch has many built-in protection features making them extremely robust and flexible load drivers. Each switch is protected against over-current, over-voltage from demagnetization (inductive kick or flyback voltage,) and over-temperature conditions. Additionally, each switch can detect an open-circuit condition. An innovative multi-voltage Smart Clamp is used to efficiently handle an unlimited amount of demagnetization energy ( $E_{AS}$ ). The over-current protection includes an innovative Inrush Current Mode on select products which allows the switch to drive challenging loads like lamps and DC motors. Additionally, the device power supplies are monitored, and the switches are safely constrained or shutdown if a fault is detected.

Seven separate diagnostics are available through the logic interface, offering an unprecedented level of detail and control of each switch. Diagnostics are configured, monitored, and cleared via an SPI interface or exposed on active-low, open-drain indicator pins for easy access and combination. Diagnostic communication is independent of the switch control signals, with separate isolation channels and constant fault monitoring, ensuring the highest level of device reliability.

### Applications

- Programmable logic controllers
- Industrial data acquisition
- Distributed control systems
- CNC machines
- I/O modules
- Motion control systems

### Safety Approvals

- UL 1577 recognized
  - Up to 1500 Vrms for 1 minute
- CSA component notice 5A approval
  - IEC 60950-1, 62368-1
- VDE certification conformity
  - VDE 0884-10
- CQC certification approval
  - GB4943.1

### KEY FEATURES

- High-side or low-side switch options
- Logic Supply: 2.25 V – 5.5 V
- Switch Supply: 9 V – 32 V
- Fast (10 $\mu$ s) update rate
- High continuous current and low  $R_{ON}$ 
  - 4 channels: 700 mA (145 m $\Omega$ )
  - 2 channels: 1.25 A (73 m $\Omega$ )
  - 1 channel: 2.5 A (38 m $\Omega$ )
- Innovative multi-voltage output clamp
  - Demagnetization energy > 2.5 J
  - Efficient and fast turn OFF
- Inrush current tolerance: 7 A for 20 ms
- Overload protection with current limit
- Per channel over-temperature protection
- Undervoltage protection on both supplies
- Up to 7 different diagnostic reports
  - Multiple power supply reports
  - Over-current, over-temperature
  - Open-circuit warning
  - Communication error
- Dedicated channel status indicators
- Dedicated fault indicator
- Asynchronous output disable function
- Control up to 128 channels with SPI
- 1.5 kV<sub>RMS</sub> safety rated galvanic isolation
- Transient immunity > 150 kV/ $\mu$ s (CMTI)
- Compliant to IEC 61131-2
- Compact 9x9 DFN-32 package
- 5kV ESD Protection
- -40 to 125 °C operating temperature range

## 1. Ordering Guide

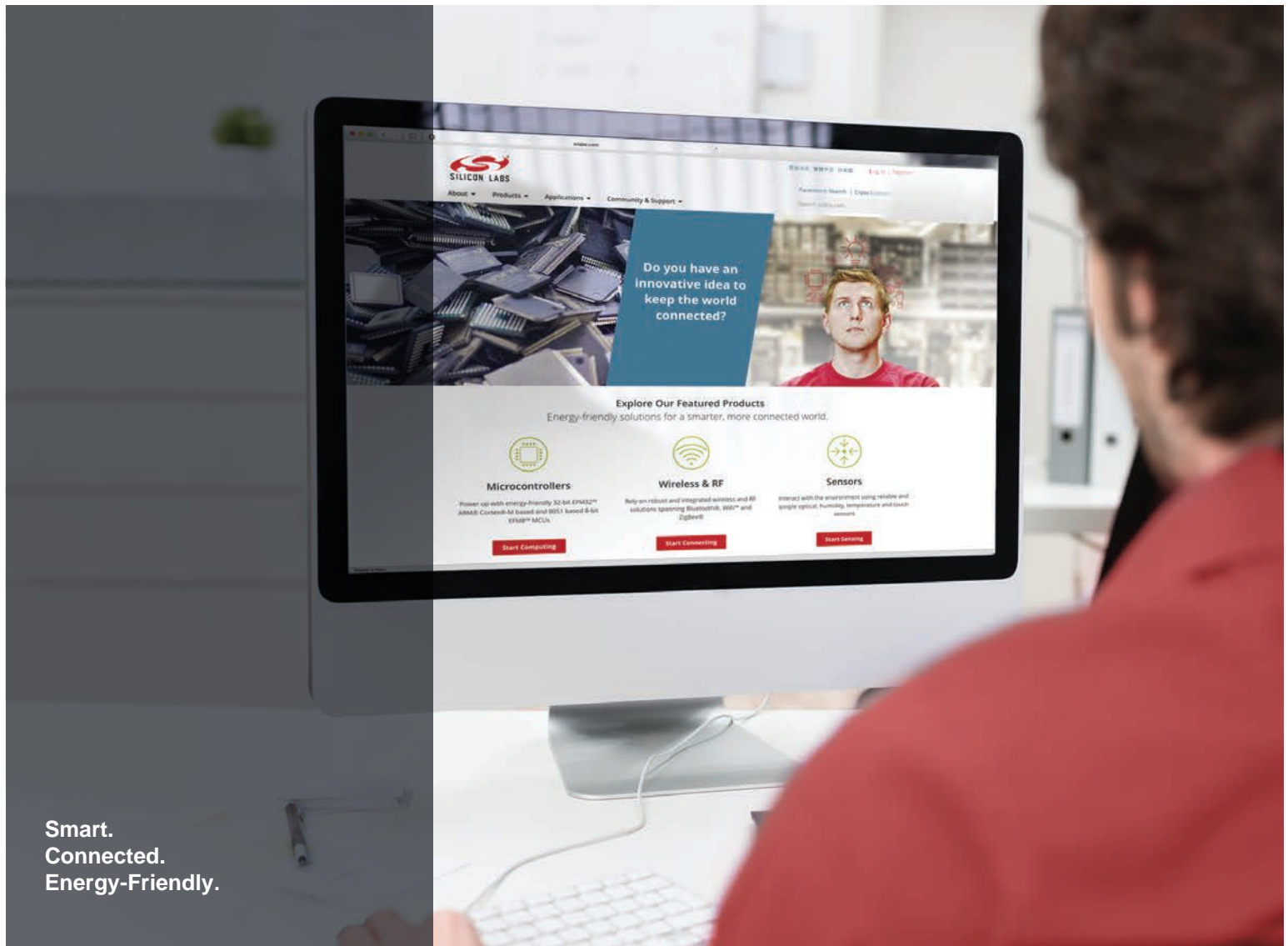
Table 1.1. Si834x Ordering Guide

Ordering Part Number	Output <sup>1</sup> Driver Type	Input <sup>3</sup> Interface	Output <sup>2</sup> Channels	Continuous Output Current	Channel Status Indicators	Low Voltage Indicator	Open Channel Indicator	Clear Fault Input	Package <sup>4</sup> Type	Iso. Rating	
Products Available Now											
Si83401AAA-IF	Sourcing	Parallel	1	2 A	Yes	Yes	No	No	9X9 DFN-32	1.5 kVrms	
Si83401ABA-IF						No	Yes	No			
Si83402AAA-IF			2	1 A		Yes	No	No			
Si83404AAA-IF						Yes	No	No			
Si83405ADA-IF		SPI	1	2 A		No	No	No			
Si83408ADA-IF						No	No	No			
Si83408AFA-IF		Parallel/ SPI	4	0.5 A	No	No	No	No			
Si83411AAA-IF	Sinking	Parallel	1	2 A	Yes	Yes	No	No			
Si83411ABA-IF						No	Yes	No			
Si83412AAA-IF			2	1 A		Yes	No	No			
Si83414AAA-IF						Yes	No	No			
Si83415ADA-IF		SPI	1	2 A		No	No	No			
Si83418ADA-IF						No	No	No			
Si83418AFA-IF		Parallel/ SPI	4	0.5 A	No	No	No	No			

Ordering Part Number	Output <sup>1</sup> Driver Type	Input <sup>3</sup> Interface	Output <sup>2</sup> Channels	Continuous Output Current	Channel Status Indicators	Low Voltage Indicator	Open Channel Indicator	Clear Fault Input	Package <sup>4</sup> Type	Iso. Rating
Contact Silicon Labs Sales for These Options										
Si83401ACA-IF	Sourcing	Parallel	1	2 A	Yes	No	No	Yes	9X9 DFN-32	1.5 kVrms
Si83402ABA-IF			2	1 A		No	Yes	No		
Si83402ACA-IF						No	No	Yes		
Si83404ABA-IF			4	0.5 A		No	Yes	No		
Si83404ACA-IF						No	No	Yes		
Si83406ADA-IF		SPI	2	1 A		No	No	No		
Si83405AFA-IF		Parallel/ SPI	1	2 A	No	No	No	No		
Si83406AFA-IF			2	1 A		No	No	No		
Si83411ACA-IF	Sinking	Parallel	1	2 A	Yes	No	No	Yes		
Si83412ABA-IF			2	1 A		No	Yes	No		
Si83412ACA-IF						No	No	Yes		
Si83414ABA-IF			4	0.5 A		No	Yes	No		
Si83414ACA-IF						No	No	Yes		
Si83416ADA-IF		SPI	2	1 A		No	No	No		
Si83415AFA-IF		Parallel/ SPI	1	2 A	No	No	No	No		
Si83416AFA-IF			2	1 A		No	No	No		

**Note:**

1. Output driver can source current in a high-side, open-source configuration or sink current in a low-side, open-drain configuration.
2. One and two channel configurations require PCB traces to combine pins together to achieve rated output current.
3. SPI interface provides access to all diagnostic, fault and channel status information. SPI only interface allows output channel control as well.
4. All packages are RoHS-compliant with peak reflow temperatures of 260 °C according to the JEDEC industry standard classifications and peak solder temperatures.
5. Continuous output current represents nominal current per IEC 61131-2. Continuous output current may be higher.
6. "Si" and "SI" are used interchangeably.
7. An "R" at the end of the Ordering Part Number indicates tape and reel option.

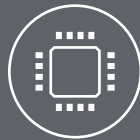


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Connected.  
Energy-Friendly.



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