Isolation Solutions

The Silicon Labs’ digital isolation product portfolio leverages our superior isolation and high-voltage expertise to enhance system performance, flexibility, and reliability while reducing system size and cost. Our family of products includes CMOS digital isolators, isolated gate drivers, isolated analog amplifiers and isolated ADCs. Our family of isolators supports voltages up to 5 kV.

Isolation Product Families

Digital Isolator

- IN: Digital control or data signal
- OUT: Reproduced digital control or data signal

Isolated ADC

- IN: Analog signal
- OUT: Digital representation of analog signal

Isolated Gate Driver

- IN: 3V-5V pulse width modulated digital signal
- OUT: 15-30V digital signal

Analog Isolator

- IN: Analog signal
- OUT: Amplified analog signal
Isolation Applications

Industrial
- Motor control
- Factory automation
- Programmable logic controllers (PLCs)

Automotive
- Battery management
- Isolated fieldbus
- Inverters and chargers

Solar Inverters
- Isolated communication
- DC-AC inverters
- DC-DC converter

Power Supplies
- UPS
- Server supplies
- Communications supplies

Consumer
- Inductive cooktops
- Motor control
- Lighting

Telecom
- Isolated communication
- VoIP gateways
- Service ports
Digital Isolators

Each of our digital isolator product families is designed and continuously developed to serve specific industry applications, and all of them ship with Silicon Labs’ proprietary CMOS capacitive isolation technology. Count on the lowest electro-magnetic emissions of all digital isolators on the market, the highest immunity to external fields, and robust, industrial-grade performance with high noise immunity and a temperature operating range of up to 125 ºC.

Features

Si86xx/Si86xxT
- Best timing characteristics of any isolator, with a typical latency of under 10 ns
- 150 Mbps capable, 1–6 channels of signal isolation in compact QSOP packages or wide creepage SOIC, > 8 mm

Si87xx
- Unique pin-to-pin compatibility for drop-in upgrades to popular optocouplers

Si88xx
- Integrated DC-DC converter with feedback-controlled regulation

Si838x
- Unique 8-channel, bipolar input isolator for programmable logic controllers

Industrial Automation Application Example

![Diagram showing the connection of a Fieldbus, Field Digital I/O, and various isolators (Si85xx, Si87xx, Si88xx) to a MCU and XCVRs.]

Isolator Evaluation Kits

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>UNIDIRECTIONAL CHANNELS</th>
<th>BIDIRECTIONAL CHANNELS</th>
<th>ISOLATION RATING (KVRMS)</th>
<th>INPUT TYPE</th>
<th>PACKAGE TYPE</th>
<th>MAX DATA RATE (MBPS)</th>
<th>MAX PROPAGATION DELAY (NS)</th>
<th>INPUT SUPPLY (V)</th>
<th>OUTPUT SUPPLY (V)</th>
<th>FORWARD CHANNELS</th>
<th>REVERSE CHANNELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si80xx</td>
<td>3, 4, 5, 6</td>
<td>0</td>
<td>1</td>
<td>Digital</td>
<td>QSOP16</td>
<td>65</td>
<td>3.15 5.5</td>
<td>3.15 5.5</td>
<td>3, 4, 5, 6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Si838x</td>
<td>8</td>
<td>0</td>
<td>2.5</td>
<td>LED Emulator</td>
<td>QSOP20</td>
<td>200, 2000</td>
<td>4 µs, 4 µs/100 ns</td>
<td>2.25 5.5</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Si86xx</td>
<td>0, 1, 2, 3, 4, 5, 6</td>
<td>0, 1, 2</td>
<td>1, 2, 5, 3.75, 5</td>
<td>Digital</td>
<td>NB SOIC16, NB SOIC16, QSOP16, WB SOIC16</td>
<td>1.7, 150</td>
<td>13, 55</td>
<td>2.5 5.5</td>
<td>2.5 5.5</td>
<td>0, 1, 2, 3, 4, 6</td>
<td>0, 1, 2, 3</td>
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<tr>
<td>Si86xxT</td>
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<td>5</td>
<td>Digital</td>
<td>WB SOIC16</td>
<td>150</td>
<td>13</td>
<td>2.5 5.5</td>
<td>2.5 5.5</td>
<td>1, 2, 3</td>
<td>0, 1, 2</td>
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<tr>
<td>Si87xx</td>
<td>1</td>
<td>0</td>
<td>3.75, 5</td>
<td>LED Emulator</td>
<td>GW DIP8, NB SOIC8, WB SOIC8</td>
<td>1, 15</td>
<td>50, 60</td>
<td>2.25 30</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Si88xx</td>
<td>2, 4</td>
<td>0</td>
<td>3.75, 5</td>
<td>Digital, Low</td>
<td>WB SOIC16, WB SOIC20, WB SOIC24</td>
<td>100</td>
<td>23</td>
<td>3.5 5.5</td>
<td>0, 1, 2, 3, 4</td>
<td>0, 1, 2, 3, 4</td>
<td></td>
</tr>
</tbody>
</table>

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Isolated Gate Drivers

With utilitarian and highly integrated safety features, Silicon Labs defined the industry standard for isolated gate drivers—high-side, low-side, and dual. In addition to all of the benefits of our proprietary CMOS capacitive isolation technology, which include signature low electro-magnetic emissions, high immunity to external fields, robust industrial grade performance, Silicon Labs’ gate drivers also include several safety integrated features such as dead-time programmability, overlap protection, power status pin on the isolated side, and asynchronous shutdown protection.

Features

**Si823x/Si8239x**
- Industry-defining high-side, low-side, or dual drivers in compact LGA/QFN packages or wide creepage SOIC, > 8 mm
- Driver-side power status pin on isolated logic side

**Si827x**
- Highest noise immunity of any gate driver for driving fast-switching GaN/SiC FETs, > 300 kV/us
- Low UVLO options for driving GaN/SiC FETS

**Si826x**
- Unique pin-to-pin compatibility for drop-in upgrades to popular opto-drivers
- Available in wide-SOIC, compact, 6-pin packages for 5 kV RMS applications

**Si828x**
- IGBT drivers w/built in desaturation & auto soft shutdown
- Integrated DC-DC converter with feedback control for tight load and line regulation

### Power Supply Application Example

![Power Supply Application Diagram]

### Isolated Gate Drivers

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>ISOLATION RATING (KV RMS)</th>
<th>PACKAGE TYPE</th>
<th>OUTPUT CONFIGURATION</th>
<th>INPUT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si823x</td>
<td>3.75, 5</td>
<td>WB SOIC16, WB SOIC20, WB SOIC24</td>
<td>Single Driver</td>
<td>PWM</td>
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<tr>
<td>Si827x</td>
<td>2.5</td>
<td>NB SOIC16, NB SOIC8</td>
<td>Dual Driver, High Side / Low Side, Single Driver, Separate Pull Up/Down</td>
<td>PWM, Single Input, VIA, VIB</td>
</tr>
<tr>
<td>Si829x</td>
<td>5</td>
<td>WB SOIC16</td>
<td>Dual Driver, High Side / Low Side</td>
<td>PWM, VIA, VIA</td>
</tr>
<tr>
<td>Si822x/3x</td>
<td>1.5, 2.5, 3.75, 5</td>
<td>LGA14, NB SOIC16, NB SOIC8, QFN14, WB SOIC14, WB SOIC16</td>
<td>Dual Driver, High Side / Low Side, Single</td>
<td>LED emulator, PWM, VIA, VIB</td>
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<tr>
<td>Si826x</td>
<td>3.75, 5</td>
<td>GW DIP8, NB SOIC8, WB SO6</td>
<td>Single Driver</td>
<td>LED emulator</td>
</tr>
<tr>
<td>Si88xx</td>
<td>High Data-rate, Isolators with Integrated</td>
<td>2, 4</td>
<td>0</td>
<td>3.75, 5</td>
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<tr>
<td>Si8065AA-B-IU</td>
<td>6</td>
<td>0</td>
<td>10</td>
<td>—</td>
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<tr>
<td>Si8641BA-B-IU</td>
<td>3</td>
<td>1</td>
<td>150</td>
<td>✔</td>
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<tr>
<td>Si8642BA-B-IU</td>
<td>2</td>
<td>2</td>
<td>150</td>
<td>✔</td>
</tr>
</tbody>
</table>

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Current Sensors

The Silicon Labs Si890x/892x sensor families are ideal for a broad range of applications, including ac-dc switching power supplies, isolated dc-dc supplies, UPS systems and inverters for motor control. The Si890x is a good fit for isolated AC mains monitoring while the Si892x provides shunt resistor based current sensing solutions for a wide range of power applications.

Features

Si890x

- 10-bit ADC with 3-channel mixed analog input and I2C, SPI or UART digital output formats
- Ideal for line monitoring

Si8920

- 5kVrms analog isolator with the highest bandwidth, 450 kHz and lowest group delay of 750 ns
- 100mV or 200 mV inputs

Si8920 Isolated Amplifiers

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>EVALUATION KIT</th>
<th>PACKAGE TYPE</th>
<th>TEMPERATURE RANGE (°C)</th>
<th>OUTPUT MODE</th>
<th>ISOLATION RATING</th>
<th>INITIAL ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si8920AC-IP</td>
<td>Si8920ISO-KIT</td>
<td>GW DIP8</td>
<td>-40 125</td>
<td>Analog</td>
<td>3.75</td>
<td>1.50%</td>
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<tr>
<td>Si8920BC-IP</td>
<td>Si8920ISO-KIT</td>
<td>GW DIP8</td>
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<td>Analog</td>
<td>3.75</td>
<td>0.75%</td>
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<tr>
<td>Si8920BD-IS</td>
<td>Si8920ISO-KIT</td>
<td>WB SOIC16</td>
<td>-40 125</td>
<td>Analog</td>
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<td>0.75%</td>
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</table>

Si890x Isolated ADCs

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>EVALUATION KIT</th>
<th>PACKAGE TYPE</th>
<th>TEMPERATURE RANGE (°C)</th>
<th>OUTPUT MODE</th>
<th>ISOLATION RATING (KV RMS)</th>
<th>FULL SCALE CURRENT (A)</th>
<th>INITIAL ACCURACY</th>
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<tbody>
<tr>
<td>Si8900B-GS</td>
<td>Si890PWR-EVB</td>
<td>WB SOIC16</td>
<td>-40 85</td>
<td>UART</td>
<td>2.5</td>
<td>10</td>
<td>0.10%</td>
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<tr>
<td>Si8900D-GS</td>
<td>Si890PWR-EVB</td>
<td>WB SOIC16</td>
<td>-40 85</td>
<td>UART</td>
<td>5</td>
<td>10</td>
<td>0.10%</td>
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<tr>
<td>Si8901B-GS</td>
<td>Si890PWR-EVB</td>
<td>WB SOIC16</td>
<td>-40 85</td>
<td>I2C/SMBus</td>
<td>2.5</td>
<td>10</td>
<td>0.10%</td>
</tr>
<tr>
<td>Si8901D-GS</td>
<td>Si890PWR-EVB</td>
<td>WB SOIC16</td>
<td>-40 85</td>
<td>I2C/SMBus</td>
<td>5</td>
<td>10</td>
<td>0.10%</td>
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<td>Si8902B-GS</td>
<td>Si890PWR-EVB</td>
<td>WB SOIC16</td>
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<td>SPI</td>
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<td>10</td>
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<tr>
<td>Si8902D-GS</td>
<td>Si890PWR-EVB</td>
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<td>SPI</td>
<td>5</td>
<td>10</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

Si8540 High-Side DC Current Sensor

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>EVALUATION KIT</th>
<th>PACKAGE TYPE</th>
<th>VCM (V)</th>
<th>ICC (MAX)</th>
<th>BIDIRECTIONAL</th>
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</thead>
<tbody>
<tr>
<td>Si8540</td>
<td>SOT23-5</td>
<td>5 36</td>
<td>90</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

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Isolated FET Drivers

The Silicon Labs Si8751/52 FET drivers offers a simple way for customers to replace solid-state relays (SSRs) or electromechanical relays (EMRs). Versatile inputs provide digital CMOS pin control (Si8751) or diode emulation (Si8752) to best suit the application, plus flexible outputs to support driving AC or DC load configurations. The Si875x family eliminates the need for bulky mechanical relays, which can be difficult to assemble onto PCBs and add switching noise to the system. Furthermore, its 2.5 kVrms isolation rating forms the basis for full certification to UL, CSA, VDE, and CQC.

Features

Si875x
- Self-powered output to drive external FET enables solid state relay replacement
- LED emulator or digital pin input options

High Voltage Battery Monitoring Application Example

Si875x Product Matrix

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>EVALUATION KIT</th>
<th>ISOLATION RATING (KVRMS)</th>
<th>INPUT TYPE</th>
<th>PEAK OUTPUT CURRENT</th>
<th>MAX PROPAGATION DELAY (μS)</th>
<th>DRIVER SUPPLY RANGE (V)</th>
<th>PACKAGE TYPE</th>
<th>AEC-Q100</th>
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<tbody>
<tr>
<td>Si8751AB-IS</td>
<td>Si8751-KIT</td>
<td>2.5</td>
<td>Digital CMOS</td>
<td>External FET Specific</td>
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<td>8 13</td>
<td>NB SOIC8</td>
<td>Yes</td>
</tr>
<tr>
<td>Si8752AB-IS</td>
<td>Si8752-KIT</td>
<td>2.5</td>
<td>Diode Emulation</td>
<td>External FET Specific</td>
<td>41</td>
<td>8 13</td>
<td>NB SOIC8</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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Environmental and Safety Compliance

silabs.com/quality

Isolation Products Meet Safety Standard Compliance

Silicon Labs isolation products meet global requirements and standards for safety compliance and mechanical creepage and clearance. Digital isolator, AC current sensor and ISOdriver products support up to 8 mm of creepage and clearance through wide-body SOIC package to pass the industry’s most stringent requirements. The devices also adhere to worldwide safety standards through Underwriter Laboratories (UL), CSA, CQC and VDE certification with devices specifying up to 5 kV isolation.

<table>
<thead>
<tr>
<th>TESTING AGENCY</th>
<th>COMPONENT STANDARD</th>
<th>ISOLATION RATINGS (KVRMS)</th>
<th>DIGITAL ISOLATORS</th>
<th>ISODRIVERS</th>
<th>ISOLATED AMPLIFIERS</th>
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<tbody>
<tr>
<td>UL</td>
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<td>✔ □</td>
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<td>3.75</td>
<td>✔</td>
<td>✔</td>
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<td>5</td>
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<td>✔ □</td>
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<tr>
<td>VDE/IEC</td>
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<td>□</td>
<td>□ □</td>
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<tr>
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<td></td>
<td>REINFORCED</td>
<td></td>
<td></td>
<td>□ □ □</td>
</tr>
</tbody>
</table>

NOTE: ALL PRODUCTS ARE ALSO COMPLIANT TO CSA 5A AND CQC GB4943.1 COMPONENT STANDARDS. PLEASE SEE PRODUCTS DATASHEETS FOR COMPLIANCE TO END EQUIPMENT STANDARDS LIKE IEC 60950, 61010, 60601 ETC.

Online Support

Find the development tools you need for your isolation design

silabs.com/isolation

Isolation Bootstrap Calculator

The web-based bootstrap calculator helps you determine the required CB recharge current at MAX and MIN duty cycle, and provides the information required to determine the best fit bootstrap module.

silabs.com/bootstrap-calculator

Isolator Power Consumption Calculator

The Isolator Power Consumption Calculator web-based utility allows you to define basic information about your isolation set-up, and find out what your power budget will be. Simply choose the settings that match your design and get detailed power and current data.

silabs.com/isolator-power-calculator
Si86XXCOM-KIT

To help demonstrate the low power, reliability and performance of Silicon Labs’ digital isolators, we offer the Si86xx Digital Isolated Communications reference design kit.