POWERING AUTOMOTIVE
Infotainment, Driver Assistance, Rear Camera Display, EV/HEV Solutions, Interior and Lighting
Intersil, with a proven history of providing innovative and highly reliable ICs for the space, consumer, computing, and industrial markets, is uniquely qualified to meet the challenging requirements of the automotive industry.

Over the past few years Intersil has invested in key technologies to address the current mega trends within the automotive market such as safety, efficiency, connectivity and affordability.

This effort has resulted in leadership positions in high performance power conversion, state-of-the-art precision analog, cell balancing and battery charging ICs, power management, and highly-flexible TFT display controllers.

Intersil has also invested in TS16949 certification of internal fabs and the development of proprietary process technologies (including smart power) for automotive. With a strong balance sheet and a dedicated organization of automotive professionals, Intersil is committed to delivering world class automotive solutions for you and your customers.

Learn how Intersil’s power management technologies have transformed the semiconductor industry and are ideal for today’s evolving infrastructure, industrial and mobile consumer markets at intersil.com/power
Intersil offers both standard and AEC-Q100 products for automotive applications. Products that are qualified for and meet automotive standards are clearly designated in their datasheet.

Intersil products are neither designed nor intended for use in automotive applications or environments unless the specific Intersil products are designated by Intersil as compliant with ISO/TS 16949 and AEC-Q100 requirements. Buyers acknowledge and agree that if they use any non-designated products in automotive applications, Intersil will not be responsible for any failure to meet such requirements.
DESIGN TOOLS AND SUPPORT

Go to intersil.com/tools for design tools and resources.

- Browse our library of reference designs, evaluation boards, and demo boards.

Intersil’s iSim interactive web-based design tool helps you select and simulate power and precision analog devices.

- Download IBIS, SPICE, macro, Saber and text file design models.

Watch the latest videos and tutorials at Intersil’s Video Center.

- Browse the latest application block diagrams and selection tables.

Subscribe to receive product change notifications for the devices you are using in your design.

Ask an Expert and get answers from an Intersil application support professional within one business day.

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Peripheral Controller

USB Switching

CD/DVD Drive

CD/DVD Dock

MP3/iPod Dock

SD Card Interface

Bluetooth & WLAN Radio

AM/FM Tuner

DAB/Sat Tuner

GPS Receiver

AFE

Backup Camera

LVDS

MOST i/f

CAN i/f

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APPLICATION BLOCK DIAGRAMS

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LINEAR REGULATORS

ISL78302 : Dual LDO with low noise, very high PSRR and low $I_Q$

- Integrates two 300mA high performance LDOs
- Excellent transient response to large current steps
- ±1.8% accuracy over all operating conditions
- Excellent load regulation: < 0.1%
- Low output noise: typically 30μVRMS @ 100μA (1.5V)
- Very high PSRR: 90dB @ 1kHz
- Extremely low quiescent current: 42μA (both LDOs active)
- Wide input voltage capability: 2.3V to 6.5V
- Low dropout voltage: typically 200mV @ 300mA
- Stable with 1μF to 10μF ceramic capacitors
- Separate enable and POR pins for each LDO
- Soft-start and staged turn-on to limit input current surge
- Current limit and overheat protection
- Tiny 10 Ld 3mm x 3mm DFN package

EMBEDDED POWER

From single to multiple core embedded processors to GPUs and FPGAs, Intersil has a wealth of power experience to deliver versatile and efficient power solutions for your next Infotainment, Navigation or Telematics platform. Today Intersil offers a rapidly expanding range of point-of-need DC/DC controllers and regulators offering the best in features, performance, efficiency and size.

- Linear Regulators
- Off-Battery Power
- Synchronous & Standard Buck Regulators
- Processor Power
- PWM Controllers
- MOSFET Drivers

PSRR vs Frequency

Very High PSRR: 90dB @ 1kHz
**ISL78310 : High performance 1A LDO**

- 2.2V to 6V input supply
- 130mV dropout voltage typical (at 1A)
- Fast load transient response
- ±0.2% initial VOUT accuracy
- Adjustable in-rush current limiting
- 58dB typical PSRR
- 63μVRMS output noise at VOUT = 1.8V
- Power-good feature
- Supply-independent 1V enable input threshold
- Short-circuit current protection
- 1A peak reverse current
- Any cap stable with minimum 10μF ceramic
- ±1.8% guaranteed VOUT accuracy for junction temperature range from -40°C to +125°C
- 10 Ld DFN package

**ISL78301 / ISL78307: 40V, Low IQ, 50mA and 150mA linear regulators**

- Optimized for “always-on” applications
- 21μA quiescent current (typical)
- Withstands 45V load dump
- Operates down to 3V during cold cranking
- Low 300mV dropout voltage
- 50mA [ISL78307] or 150mA [ISL78301] output
- +3.3V, +5.0V or 2.5-12V adjustable output
- Stable operation with 10μF output capacitor
- Shutdown input (EN)
- Thermal protection
- Current limit protection
- -40°C to +125°C operating temperature range
- Thermally enhanced 8 Ld SOIC (78307) and 14 Ld HTSSOP (78301) packages
OFF-BATTERY SWITCHING REGULATORS

**ISL78201/ISL78206: 40V 2.5A boost-buck (ISL78201) and 40V 2.5A synchronous buck (ISL78206) regulators**

- 3V to 40V input range
- Pin-for-pin compatible buck with boost pre-regulator for start-stop and cold crank operation (ISL78201); Buck only (ISL78206)
- Single inductor non-inverting buck-boost (ISL78201, I_{OUT} <= 1.2A)
- Flexible device operational topologies
  - Buck with pre-boost
  - Synchronous buck
  - Standard buck
- Forced PWM or PWM/PFM Mode
- Programmable load boundary between PFM and PWM modes
- Optional PFM under light load
- ISL78201 starts-up with V_{IN} = 3V
- 4A integrated HS FET
- Programmable frequency from 200kHz to 2.2MHz
- 200µA quiescent current, 3µA shutdown current
- Programmable cycle by cycle current limit
- Frequency fold back feature
- -40°C to +125°C operating temperature range
- 20 Ld HTSSOP package
ISL78113A: High efficiency 500mA synchronous boost converter
- Output disconnect during shutdown preventing output precharging and uncontrolled short-circuit current
- Input voltage range: 0.8V to 4.7V
- Output current: Up to 500mA ($V_{BAT} = 3V$, $V_{OUT} = 5V$)
- Logic control shutdown ($I_0 < 1\mu A$)
- 2MHz switching frequency
- Forced PWM Mode Operation
- Up to 95% efficiency at typical operating conditions
- Fault protection: OVP, OCP, OTP, UVLO
- 2mmx2mm 8 Ld DFN package

Applications
- Automotive power
- Telecom and industrial power supplies
- General purpose power
- Supercap charging

SYNCHRONOUS BOOST REGULATOR

ISL78268: 55V synchronous buck controller with integrated 3A driver
- Constant Current Regulation
- Adaptive Dead Time Control
- Adjustable switching frequency from 50kHz to 1.1MHz
- Low shutdown current of 1µA
- Adjustable slope compensation
- Selectable diode emulation
- Selectable hiccup or latch-off fault response
- 4x4mm QFN package

Applications
- Automotive power
- Telecom and industrial power supplies
- General purpose power
- Supercap charging
SYNCHRONOUS BUCK REGULATORS

ISL78236: Dual 3A current sharing 2.5MHz high efficiency synchronous buck regulator
- Dual 3A high efficiency synchronous buck regulator with up to 95% efficiency
- 6A current sharing mode
- 2% output accuracy over temperature/load/line
- 2.5MHz switching frequency
- External synchronization up to 8 MHz
- Internal digital soft-start: 1.5ms
- Internal current mode compensation
- Peak current limiting and hiccup mode short circuit protection
- Reverse overcurrent protection
- 24 Ld 4x4mm QFN package

Applications
- Embedded processor power: μC/μP, FPGA and DSP power

ISL78213 / ISL78214: 3A/4A low l0 1MHz high efficiency synchronous buck regulator
- Pin-to-pin compatible 3A/4A integrated FET regulators
- \(V_{IN}\) range: 2.7V to 5.5V
- \(V_{OUT}\) range: 0.8V to \(V_{IN}\)
- ISL78213: 3A continuous load current
- ISL78214: 4A continuous load current
- Current mode control
- Flexible operation mode: selectable PFM/PWM mode
- Highest light load efficiency: 35μA quiescent current
- High switching frequency: 1MHz
- External synchronization capability

Applications
- Automotive power
- DC/DC POL modules
- μC/μP, FPGA and DSP power

Up to 95% Efficiency

Typical Application Diagram
ISL78228: Dual low quiescent current, 2.25MHz high efficiency synchronous buck regulator

- Dual 800mA output current
- 30μA standby and 6.5μA shutdown current
- Internal current mode compensation
- 100% maximum duty cycle for lowest dropout
- Selectable forced PWM mode and PFM mode
- External synchronization up to 4MHz
- Start-up with pre-biased output
- Soft-stop output discharge during disable

- Internal digital soft-start: 2ms
- Power-Good (PG) output with 1ms delay
- 10 Ld 3x3mm DFN package
- For higher output current capability consider the ISL78322 (see below)

ISL78322: Dual 2A/1.7A low quiescent current 2.25MHz high efficiency synchronous buck regulator

- Dual 2A/1.7A high efficiency synchronous buck regulator with up to 97% efficiency, low Iq (40μA)
- Outputs 180° out-of-phase
- Start-up with pre-biased output
- Selectable forced PWM mode and PFM mode
- External synchronization up to 8MHz
- Negative current detection and protection
- 100% maximum duty cycle for lowest dropout
- Internal current mode compensation
- Peak current limiting, hiccup mode short circuit protection and over-temperature protection
- 12 Ld 4mm x 3mm DFN package
**AUTOMOTIVE POWER PRODUCTS**

**ISL78233/ISL78234: Single, compact, 3, 4, 5, & 6A 2MHz synchronous buck regulators**
- 2.7V to 5.5V input voltage range
- Very low on-resistance FET’s
- P-channel 45mΩ and N-channel 19mΩ typical values
- High efficiency up to 95% synchronous regulator design
- 0.8% reference accuracy over-temperature/load/line
- Complete BOM with as few as 3 external parts
- Start-up with pre-biased output
- Internal soft-start: 1ms or adjustable
- Soft-stop output discharge during disable

**ISL78208: Dual 3A standard buck regulator**
- Wide input voltage range from 4.5V to 28V
- Adjustable output voltage with continuous output current up to 3A
- Current mode control
- Adjustable switching frequency from 300kHz to 2MHz
- Current sharing parallel outputs support single 6A output
- Independent power-good detection
- Selectable in-phase or out-of-phase PWM operation
- Independent, sequential, ratiometric or absolute tracking between outputs
- Internal 2ms soft-start time
- Overcurrent/short circuit protection, thermal overload
- -40 to 105 °C operation
- Supplied in 32 Ld 5x5mm wettable flank QFN package

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**STANDARD BUCK REGULATORS**

**ISL78208: Dual 3A standard buck regulator**
- Adjustable frequency from 500kHz to 4MHz: default at 2MHz
- External synchronization up to 4MHz
- Over-temperature, over-current, over-voltage and negative over-current protection
- -40 to 105 °C operation

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Typical Application Diagram

Dual 3A Output [Vin Range From 4.5V to 28V]
**EMBEDDED PROCESSOR PWM CONTROLLERS**

**ISL78210: Automotive PWM DC/DC voltage controller**
- Input voltage range: 3.3V to 25V
- Output voltage range: 0.5V to 3.3V
- Output load to 30A
- Simple resistor programming for output voltage
- ±0.75% system accuracy: -40°C to +105°C
- Capacitor programming for soft-start delay
- Fixed 300kHz PWM frequency in continuous conduction
- External compensation affords optimum control loop tuning
- Automatic diode emulation mode for highest efficiency
- Integrated high-current MOSFET drivers and schottky boot-strap diode for optimal efficiency
- Choice of over-current detection schemes
- Lossless inductor DCR current sensing
- Precision resistive current sensing
- Power-Good monitor for soft-start and fault detection
- 16 Ld 2.6 x 1.8mm µTQFN package

**ISL78211: Automotive single-phase core regulator for IMVP-6™ CPUs**
- Precision single-phase CORE voltage regulator
- 0.5% system accuracy over -10°C to 100°C temperature range
- 0.8% system accuracy over entire temperature range
- Enhanced load line accuracy
- Internal gate driver with 2A driving capability
- Microprocessor voltage identification input
- 7-Bit VID input
- 0.300V to 1.500V in 12.5mV steps
- Support VID change on-the-fly
- Multiple current sensing schemes supported
- Lossless inductor DCR current sensing
- Precision resistive current sensing
- Power monitor indicating CPU instantaneous power
- User programmable switching frequency
- Differential remote voltage sensing at CPU die
- 14 Ld 6x6mm QFN package
HIGH POWER CONTROLLERS AND FET DRIVERS

ISL78220 / ISL78225: Multi-phase boost PWM controller with phase dropping enhancement

- Peak current mode PWM control with adjustable slope compensation
- Precision resistor/DCR current sensing
- Accurate channel-current balancing
- Accurate total current monitoring pin (I\text{OUT})
- ISL78220 - 2, 3, 4 or 6-phase operation
- ISL78225 - 2, 3 or 4-phase operation
- Adjustable phase dropping/diode emulation/pulse skipping for high efficiency at light load
- Phase dropping facilitated with ISL78420 tri-level input FET driver
- Adjustable [75kHz to 1MHz] switching frequency
- Adjustable maximum duty cycle
- Frequency synchronization
- Dedicated PWM invert signal allows use of inverting or non-inverting FET drivers
- Input & output over-voltage detection
- Secondary V\text{REF}2 input with fast response to facilitate audio envelope tracking
- Configurable as multi-phase buck
- 44 Ld TQFP package

MOSFET DRIVES

ISL78420: 100V, 2A peak, high frequency half-bridge driver with adjustable dead time

- Tri-Level PWM input for single input switch control
  - Ideal in phase shedding multi-phase power supplies
  - Ideal companion product to ISL78220/225
- Bootstrap supply max voltage to 114 VDC
- Break-before-make dead-time prevents shoot-through
  - Adjustable up to 250ns
- Wide supply voltage range (8V to 14V)
- Supply under-voltage protection
- 1.6Ω/1Ω typical output pull-up/pull-down resistance
- 9 and 10 Ld 4x4 mm TDFN packages
  - The 9 Ld ”B” package compliant with 100V conductor spacing guidelines per IPC-2221
Intersil’s TW88xx automotive infotainment display IC product line is defined by feature rich, highly integrated semiconductor solutions that incorporate many key function blocks for front console, rear seat entertainment, and rear camera display applications. The product family includes an analog video decoder, high quality H/V scaler, 2D de-interlacer, and embedded timing controllers. In addition, certain TW88xx products include advanced technologies such as a 3D adaptive comb filter, 3D noise reduction, an embedded MCU, a touchscreen controller, bit-map OSD, graphic overlay with alpha blending, PIP/POP, dual view display support, and a single channel LVDS interface to directly drive high resolution OpenLDI (LVDS) LCD panels.

The TW88xx product line is designed for OEM Automotive applications and therefore support -40˚C to +85˚C or +105˚C and all of the products listed in this section are AEC-Q100 qualified.

Samples and evaluation boards are available for all parts listed in this section. Contact your local sales office for your samples and evaluation boards.
TW8836: Advanced LCD controller with built-in decoder, triple ADCs, LVDS & TTL inputs, MCU, OSD, TCON and LVDS panel interface

The TW8836 is a highly integrated LCD video processor that incorporates many of the features required to create a multi-purpose LCD display system into a single package. It can take virtually any type of video input: analog composite & s-video, analog RGB, digital RGB, and LVDS, and it can drive almost any digital LCD panel up to WXGA+ resolution (TTL, 1CH LVDS, and TCON panels). The built-in scaler and de-interlacer, as well as the image enhancement and On Screen Display capabilities make the TW8836 a truly robust LCD Controller.

• Supports most types of video sources:
• Flexible panel output to drive virtually any type of LCD panel on the market (up to WXGA+ resolution [1366x768]):
• AEC-Q100 grade 2 qualified
• 128 LQFP

TW8834: LCD video processor with built-in decoder, LVDS and TTL inputs, BT.656 output and LVDS panel interface

Highly integrated LCD video processor supports boot-up and rear camera display in less than 500ms. The TW8834 incorporates a high quality 2D comb NTSC/PAL/SECAM video decoder which support single-ended, differential, and pseudo differential CVBS signals, an LVDS or TTL digital input interface. It has a high quality scaler and de-interlacer, Font OSD engine, and a LVDS, TTL, or TCON panel interface.

• Independent horizontal and vertical scalers with 2D De-interlacer
• Font OSD, short-to-battery & short-to-ground detection
• 100 TQFP

**AUTOMOTIVE INFOTAINMENT AND DISPLAY PRODUCTS**

**HIGHLY INTEGRATED LCD DISPLAY CONTROLLERS**

The TW8836 is a highly integrated LCD video processor that incorporates many of the features required to create a multi-purpose LCD display system into a single package. It can take virtually any type of video input: analog composite & s-video, analog RGB, digital RGB, and LVDS, and it can drive almost any digital LCD panel up to WXGA+ resolution (TTL, 1CH LVDS, and TCON panels). The built-in scaler and de-interlacer, as well as the image enhancement and On Screen Display capabilities make the TW8836 a truly robust LCD Controller.

- Supports most types of video sources:
- Flexible panel output to drive virtually any type of LCD panel on the market (up to WXGA+ resolution [1366x768]):
- AEC-Q100 grade 2 qualified
- 128 LQFP
TW8832 (S): Cost-effective, highly integrated LCD controller for digital LCD panels

The TW8832 is a highly integrated cost-effective LCD controller supporting digital LCD panels. TW8832 integrates a high quality NTSC/PAL/SECAM 2D comb video decoder, 2D de-interlacer, and an improved H/V scaling engine. Additional features include a robust font-based OSD engine, independent mirroring functionality for the scaler and OSD, serial RGB output, and an LED backlight controller. The TW8832S version also supports a proprietary SPI Bitmap OSD.

- Inputs: CVBS, S-Video, and analog RGB/YPbPr (up to 720p), digital RGB (8-bit for BT.656)
- Output: TFT panel support: TTL, TCON, & serial RGB (up to SVGA resolution)
- High quality horizontal and vertical scalers with 2D De-interlacer
- Font OSD & SPI OSD (bitmap overlay - 4 windows)

- Independent mirroring function for the scaler and OSD
- Integrated LED backlight controller (single string)
- Supports VCOM-DC, VCOM-AC and spread spectrum clock
- Embedded image enhancement such as programmable CTI, black/white stretch, hue, brightness, contrast, sharpness, etc.
- Programmable gamma correction table
- 80 LQFP

See videos about Intersil’s TW8000 series of LCD controllers at Intersil.com/autovideo
**TW8809: Digital RGB to BT.656 format converter with scaling & progressive output**

The TW8809 is a low cost video format converter that can convert either analog CVBS or 24-bit digital RGB format video and output these signals in ITU-R BT.656 format. The video sources can be scaled and de-interlaced so that the ITU-R BT.656 output is already formatted to the desired resolution and can be either progressive or interlaced format. In addition, TW8809 has a built-in font OSD engine as well as image enhancement capabilities.

- Supports digital input: YCbCr / 24-bit RGB up to 720p resolution
- Supports analog CVBS input (2 single ended or 1 differential)
- Output support: ITU-R BT.656 (interlaced or progressive) up to SVGA resolution
- Font OSD with 256 Font RAM / 512 display RAM (4 windows)
- Short diagnostics
- 56 Ld QFN package (wettable flanks QFN available)

**TW8809 Functional Block Diagram**

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**TW8819: Low-cost LCD controller solution (for RCD applications)**

The TW8819 is an ultra low-cost highly integrated LCD controller targeting basic Rear Camera Display (RCD) applications. It combines a high quality 2D comb NTSC/PAL/SECAM video decoder, a powerful H/V scaler, font based OSD engine, and image enhancement functions. TW8819 supports differential and single-ended analog composite video inputs and the output supports a wide variety of digital LCD panel types.

- Supports analog CVBS input (4 single ended or 2 differential)
- Panel output support 24-bit & 18-bit TTL up to WSVGA resolution
- Also supports TCON and serial (8-bit) RGB panel outputs
- Font OSD with 256 font RAM / 512 display RAM (4 windows)
- Short diagnostics & image enhancement built-in
- 48 Ld QFN package (wettable flanks QFN available)

**TW8819 Functional Block Diagram**

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VIDEO DECODERS

TW9984: Four-Channel Video Decoder Provides Stunning Image Quality for Improved Automotive Safety

The TW9984 is a four-channel analog video decoder with built-in analog video encoder for around-view parking assist applications, providing improved safety for drivers and pedestrians. The TW9984 is based on Intersil’s market leading video decoder technology and replaces up to nine discrete components with a single chip. It delivers the industry’s best analog decoding performance resulting in excellent picture quality to generate 360-degree surround images for advanced driver assistance systems (ADAS).

• Integrates four NTSC/PAL analog video decoders and 10-bit ADCs with differential, pseudo differential and single-ended inputs
• Integrates one analog video encoder to re-encode video to CVBS format
• Integrates programmable automotive short diagnostics -- short-to-battery and short-to-ground detection -- on each differential input channel
• Supports 108MHz time multiplexed ITU-R BT.656 format to output four channels over a single 8-bit data bus
• Integrated PLL generates the 108MHz output while using a lower cost 27MHz crystal oscillator on the board
• Consumes approximately 100mW per decoder channel, which is up to 20 percent less per channel than equivalent solutions
• AEC-Q100 qualified

TW9966: 4-channel analog video decoders with analog video encoder for around view applications

The TW9966 includes four independent high quality NTSC/PAL/SECAM analog video decoders as well as a single analog video encoder. Each decoder contains a 10-bit ADC and proprietary clamp and gain controllers. The integrated PLL allows for flexibility when outputting the digitized video data as either 4 standard BT.656 streams, or time multiplexed outputs with 2 channels at 54MHz or 4 channels at 108MHz (per 8-bit bus).

• Superior image with IF compensation filter, color transient improvement (CTI), automatic white peak and programmable hue, saturation, contrast, brightness and sharpness
• Proprietary fast video locking system for non-real-time application

• Supports the standard ITU-R BT.656 format or time multiplexed output with 54/108MHz
• Provides simultaneous four channel Full D1 and CIF time-multiplexed outputs with 54MHz
• Ultra low power consumption (Typical 666.84mW)
• 128 LQFP
**TFT LCD POWER SUPPLY**

**ISL78010: Boost with integrated FET, 2 positive linear regulator controller and negative linear regulator controller**

- High performance boost regulator with integrated FET
  - 2A switch current
  - Up to 20V output
  - Current mode control
- $V_{ON}$ and $V_{LOGIC}$ linear regulator controllers 2% accuracy
- $V_{OFF}$ linear regulator controllers with 3% accuracy
- $V_{LOGIC}$/$V_{OFF}$/VBOOST/$V_{ON}$ or $V_{BOOST}$/$V_{LOGIC}$/$V_{OFF}$/$V_{ON}$ sequence control
- Programmable sequence delay
- Configurable fault protection
- 32 Ld TQFP package

**ISL78419: Integrated automotive TFT-LCD power supply regulator with $V_{COM}$ DCP**

- 2.5V to 5.5V input
- 1.5A, 0.18Ω integrated boost FET
- $V_{OFF}$/$V_{OFF}$ supplies generated by charge pumps driven by the boost switch node
- 350mA LDO for $V_{LOGIC}$ channel
- 600kHz/1200kHz selectable switching frequency
- Integrated gate pulse modulator
- Reset signal generated by supply monitor
- Integrated $V_{COM}$ amplifier
- Integrated digitally controlled potentiometer (DCP)
- UVLO, UVP, OVP, OCP, and OTP protection
- -40°C to 105°C operation
- Supplied in 5x4 mm 28 Ld TQFN package
LED BACKLIGHT DRIVERS

ISL78100: High-power LED backlight driver with an integrated 36V FET

The PWM converter runs from an internally generated 1 MHz clock. With efficiencies over 90%, the regulator provides tight control of LED current and may be configured in either boost or buck topologies, allowing from 3 to 8 series diodes to be driven from wide input voltages.

- Drives 3 to 8 high-power LEDs in series, up to 32V
- 2.7V to 16V input voltage range
- Boost or buck configurable switch
- 3A integrated FET
- Automotive load dump protection
- Light output temperature compensation
- LED over-temperature protection
- LED disconnect
- PWM/analog light level control

Dimming Linearity

Direct PWM dimming duty cycle linear from 0.007% to 100% at 200Hz
SERDES

ISL76321 / ISL76322: Automotive SerDes video link

ISL76321 - 16(+3)-bits, 6 to 45MHz Pixel Clock Serdes
ISL76322 - 24(+3)-bits, 6 to 45MHz Pixel Clock Serdes

A simple, low overhead solution to video data transmission in the car. Intersil’s SerDes enables transmission of video data together with bi-directional control down a single shielded twisted pair (STP) cable. The ISL76321/41 are the only products in their class to use a transceiver at both cable ends allowing on-demand, primary data direction change.

These SerDes links offer user flexibility through their I2C programmability, including 16 levels of cable equalization and pre-emphasis. A unique fast locking circuit at the receiver ensures excellent link performance even when exposed to considerable noise.

- Tx pre-emphasis and Rx-equalization
- Allows for longer cable runs and/or cable cost optimization
- EQ provides maximum cable drive capability whilst minimizing EMI
- Unique back-channel solution
- Allows low cost end-to-end control data communication
- I2C control interface with four I2C addresses
- Unique transceiver design
- Reduces inventory management
- Superior line rate locking performance
- Ensures continuous video transmission in the face of noise
- Hot-plugging with automatic re-lock with every Hsync
- DC balanced line coding via 8B/10B allows AC coupling
- 48 Ld QFN package
Hybrid electric, plug-in hybrid electric and electric vehicle (HEV/PHEV/EV) battery management solutions

Intersil’s automotive grade Li-Ion battery management and safety monitoring chipset solutions are specifically designed to meet the stringent safety, reliability and performance requirements of next generation Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV) and Electric Vehicle (EV) applications.

The automotive grade (AEC-Q100), ISL78600 12-cell battery pack manager provides built-in fault detection for all of its major internal functions and detects external faults such as open wire, over- and under-voltage as well as temperature and cell balancing faults to mitigate battery pack failures.

Overall, the highly integrated functionality of the ISL78600 offers a number of benefits and can significantly reduce the overall battery management costs of HEV/PHEV/EV battery packs and their associated systems.

MULTI-CELL BALANCING (MCB)

ISL78600: 12 cell li-ion battery pack manager

- Up to 12 cell voltage management
- Supports full range of Li-Ion cell chemistries
- Cell voltage measurement accuracy ±2.5mV
- Also available in ±10mV version – ISL78622
- VBAT measurement accuracy ±100mV
- Cell voltage scan rate of 20μs per cell
- Proprietary daisy chain communications system
- Robust EMI performance
- Excellent system transient resistance
- Passive balancing
- Integrated system diagnostic functions:
  - Cell over and under-voltage
  - Over temperature
  - Open cell monitoring wires
  - Open temperature monitoring wires
  - VBAT and VSS connection integrity
  - Voltage reference function
  - Oscillator function
- 64 Ld TQFP package

Typical Application Block Diagram
**HYBRID/ELECTRIC VEHICLE POWER**

**ISOLATED 400V TO 12V DC/DC**

**ISL78223: Zero voltage switching (ZVS) full-bridge PWM controller**
- Adjustable resonant delay for ZVS operation
- Synchronous rectifier control outputs with adjustable delay/advance
- Voltage- or current-mode control
- 3% current limit threshold
- Adjustable average current limit & deadtime control
- 175μA start-up current
- Supply UVLO
- Adjustable oscillator frequency up to 2MHz
- Internal over-temperature protection
- Buffered oscillator sawtooth output
- Fast current sense to output delay
- Adjustable cycle-by-cycle peak current limit

**Buck/Boost Converter**

**ISL78464**

**6 A FET Driver**

**ISL78200**

**Isolated 800W DC/DC with Sync Rectification**

**ISL78223**

**ZVS Controller**

**ISL78420**

**PWM_B ST**

**PWM_B K**

**EMI Filter**

**ORing**

**10 to 16V Output**

**48/12V BI-DIRECTIONAL DC/DC**

**ISL78225EVB: 48/12V bi-directional DC/DC converter demonstrator**

Designed to support future dual battery power systems now being considered in Europe, this 48/12V bi-directional DC/DC system combines significant power conversion capabilities yet maintains impressive conversion efficiencies above 95%. The system exploits Intersil’s ISL78220/5 multi-phase PWM controllers to provide a high performance converter in a dense form factor. The demonstrator (ISL78225EVAL2Z) is capable of supplying 1.5kW using a 4-phase configuration (ISL78225). In fact, the modular PWM controllers can easily be exploited to develop conversion designs up to 4kW.

**70ns leading edge blanking**
**Multi-pulse suppression**
**20 Ld QSSOP package**

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Main Parts Featured</th>
<th>Description</th>
<th>Electrical Summary</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL78220EVAL1Z</td>
<td>ISL78220, ISL6609A</td>
<td>Low Battery Boost Evaluation Board</td>
<td>6-11V_in to 12V_out @ 30A</td>
<td>In stock</td>
</tr>
<tr>
<td>ISL78225EVAL1Z</td>
<td>ISL78226, ISL78420</td>
<td>600W Continuous Power Audio Booster</td>
<td>10-16V_in to 35V_out @ 17A</td>
<td>In stock</td>
</tr>
<tr>
<td>ISL78225EVAL2Z</td>
<td>ISL78226, ISL78420</td>
<td>1.5kW Bi-directional 48 to 12V DC/DC</td>
<td>1.5kW 48 to 12/12 to 48V, 180A buck &amp; 30A boost direction</td>
<td>Contact factory</td>
</tr>
</tbody>
</table>

To order an evaluation board, please contact your local sales office.
AMBIENT LIGHT SENSORS

**ISL76683: Digital ambient light sensor**
The ISL76683 is an integrated light sensor with an internal integrating ADC intended for automotive applications. The ADC provides 16-bit resolution and is capable of rejecting 50Hz and 60Hz flicker from artificial light sources. The ISL76683 is packaged in a tiny 6 pin package with the benefit of its digital interface offers both programmable features and a robust, low cost link to a microcontroller.

- Four sensitivities range selection via I2C:
  - Range 1 = 0 lux to 1000 lux
  - Range 2 = 0 lux to 4000 lux
  - Range 3 = 0 lux to 16,000 lux
  - Range 4 = 0 lux to 64,000 lux
- Human eye response (540nm peak sensitivity)

**ISL76671: Low light optimized ambient light sensor**
Offered in a tiny 4.2mm² package the ISL76671 will measure incident light levels to lower than 0.01 lux. As such, it’s an ideal solution for light detection when hidden behind darkened glass and plastic bezels in a wide range of light based control applications. With temperature compensation and excellent IR rejection, the ISL76671 is an economic and easy to use alternative to other forms of optical sensors such as photo diodes & transistors as it can be directly connected to an ADC sampling system.

- Operates down to < 0.01 lux
- Ultra-low operating current < 5µA
- 1.8V to 3.0V supply range
- Full scale determined by low cost bias resistor
- Square root law voltage output
- -40 to 105°C operation
- 16-bit resolution
- Adjustable up to 65 counts per lux
- User-programmable upper and lower threshold interrupt
- Simple output code, directly proportional to lux
- Built-in rejection for:
  - IR & UV as well as 50Hz/60Hz flicker
- Tiny 2.1 x 2.1mm ODFN package

Simplified Ambient Light Sensor Simplified Block Diagram
USB/ANALOG SWITCHES

ISL76120: USB 2.0 high/full speed multiplexer
Intersil’s ISL76120 dual 2:1 multiplexer IC is a single supply part that contains two SPDT (Single Pole/Double Throw) switches configured as a DPDT. The part was designed for switching between USB High-Speed and USB Full-Speed sources in a variety of applications. A high ESD rating combined with ultra-low supply current make this an ideal automotive USB interface solution.

- High speed (480Mbps) and full speed (12Mbps) signaling capability per USB 2.0
- 1.8V logic compatible (2.7V to +3.6V supply)
- Enable pin to open all switches, simplifies multiple USB client management
- -3dB frequency

ISL76123: Single supply single pole, double throw (SPDT) analog switch
The Intersil ISL76123 is a precision, bidirectional, SPDT analog switch designed to operate from a single 2.7 to 12V supply.

- Fully specified for 3.3V, 5V, and 12V supplies
- ON resistance (R_{ON}): 15Ω (at 12V)
- R_{ON} matching between channels: ≤ 1Ω
- Low charge injection: 5pC (Max)
- Low power consumption (P_{J}): < 15μW (at 12V)
- Low leakage current: 10nA (typ)
- Fast switching action

- HSx switches 880MHz
- FSx switches 550MHz
- Crosstalk @ 1MHz -70dB
- Off-Isolation @ 100kHz -98dB
- Single supply operation (V_{DD}) 2.7V to 5.5V

- Robust ESD rating > 8.5kV HBM
- Ultra-low operating current: 60nA
- -40°C to 105°C operation
- 10 Ld TDFN package

**Typical Application Circuit**

**Space-saving Tiny SOT-23 Package**
(3mm x 3mm)

**Crosstalk and Off Isolation**
# SELECTION TABLE

## AUTOMOTIVE POWER PRODUCTS

### LINEAR REGULATORS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>$V_{IN}$ (min) (V)</th>
<th>$V_{IN}$ (max) (V)</th>
<th>$V_{OUT}$ (min) (V)</th>
<th>$V_{OUT}$ (max) (V)</th>
<th>Fixed Output Voltage Option</th>
<th>O/P Voltage Accuracy (%)</th>
<th>$I_{OOUT}$ (max) (A)</th>
<th>$I_{OOUT}$ (max) (A)</th>
<th>PSRR</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>40V, Low Quiescent Current, 150mA Linear Regulator</td>
<td>ISL78301</td>
<td>6</td>
<td>40</td>
<td>2.5</td>
<td>12</td>
<td>Yes</td>
<td>±1.8</td>
<td>0.15</td>
<td>N/A</td>
<td>56 @ 100Hz dBc</td>
<td>14 Ld TSSOP</td>
<td>-40 to 125°C</td>
</tr>
<tr>
<td>40V, Low Quiescent Current, 50mA Linear Regulator</td>
<td>ISL78307</td>
<td>6</td>
<td>40</td>
<td>2.5</td>
<td>12</td>
<td>Yes</td>
<td>±1.8</td>
<td>0.05</td>
<td>N/A</td>
<td>58 dBc</td>
<td>8 Ld SOIC</td>
<td>-40 to 125°C</td>
</tr>
<tr>
<td>Dual LDO with Low Noise, High Performance and Low Iq</td>
<td>ISL78302</td>
<td>2.3</td>
<td>6.5</td>
<td>1.2</td>
<td>3.3</td>
<td>Yes</td>
<td>±1.8</td>
<td>0.3</td>
<td>0.3</td>
<td>64 dBc</td>
<td>10 Ld DFN</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>Dual LDO with Low Noise, Very High PSRR and Low Iq</td>
<td>ISL78302A</td>
<td>2.3</td>
<td>6.5</td>
<td>1.2</td>
<td>3.3</td>
<td>Yes</td>
<td>±1.8</td>
<td>0.3</td>
<td>0.3</td>
<td>90 dBc</td>
<td>10 Ld DFN</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>High Performance 1A LDO</td>
<td>ISL78310</td>
<td>2.2</td>
<td>6</td>
<td>0.8</td>
<td>5</td>
<td>Yes</td>
<td>±1.8</td>
<td>1</td>
<td>N/A</td>
<td>58 dBc</td>
<td>10 Ld DFN</td>
<td>-40 to 125°C</td>
</tr>
</tbody>
</table>

### HALF, FULL BRIDGE AND THREE PHASE DRIVERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>$V_{IN}$ (min) (V)</th>
<th>$V_{IN}$ (max) (V)</th>
<th>$V_{OUT}$ (min) (V)</th>
<th>$V_{OUT}$ (max) (V)</th>
<th>Fixed Output Voltage Option</th>
<th>O/P Voltage Accuracy (%)</th>
<th>$I_{OUT}$ (max) (A)</th>
<th>$I_{OUT}$ (max) (A)</th>
<th>PSRR</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>100V, 2A Peak, Half-Bridge Driver with Tri-Level PWM Input and Adjustable Dead-Time</td>
<td>ISL78420</td>
<td>114 V</td>
<td>14 V</td>
<td>2.0 A</td>
<td>2.0 A</td>
<td>32 ns</td>
<td>32 ns</td>
<td>10 ns</td>
<td>10 ns</td>
<td>55 @ 100Hz dBc</td>
<td>9 or 10 Ld DFN</td>
<td>-40 to 125°C</td>
</tr>
</tbody>
</table>

### INTEGRATED FET REGULATORS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Topology</th>
<th># of Outputs</th>
<th>$V_{IN}$ (min) (V)</th>
<th>$V_{IN}$ (max) (V)</th>
<th>$V_{OUT}$ (min) (V)</th>
<th>$V_{OUT}$ (max) (V)</th>
<th>$I_{OUT}$ (max) (A)</th>
<th>PSRR</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUCK</td>
<td>ISL78201</td>
<td>Buck or Boost</td>
<td>1</td>
<td>3</td>
<td>40</td>
<td>0.8</td>
<td>38</td>
<td>2.5</td>
<td>0.3 mA</td>
<td>0.2 MHz</td>
<td>2.2 MHz</td>
</tr>
<tr>
<td>ISL78206</td>
<td>Buck</td>
<td>1</td>
<td>3</td>
<td>40</td>
<td>0.8</td>
<td>38</td>
<td>2.5</td>
<td>1.3 mA</td>
<td>0.2 MHz</td>
<td>2.2 MHz</td>
<td>20 Ld TSSOP</td>
</tr>
<tr>
<td>ISL78208</td>
<td>Buck</td>
<td>2</td>
<td>4.5</td>
<td>28</td>
<td>0.8</td>
<td>26</td>
<td>3</td>
<td>1.2 mA</td>
<td>0.3 MHz</td>
<td>2.0 MHz</td>
<td>32 Ld WQFN</td>
</tr>
<tr>
<td>ISL78236</td>
<td>Buck</td>
<td>2</td>
<td>2.85</td>
<td>6</td>
<td>1.2</td>
<td>6</td>
<td>6</td>
<td>30 µA</td>
<td>2.15 MHz</td>
<td>2.5 MHz</td>
<td>16 Ld QFN</td>
</tr>
<tr>
<td>ISL78235</td>
<td>Buck</td>
<td>1</td>
<td>2.7</td>
<td>5.5</td>
<td>0.6</td>
<td>5.5</td>
<td>5</td>
<td>45 µA</td>
<td>0.5MHz</td>
<td>4MHz</td>
<td>16 Ld WQFN</td>
</tr>
<tr>
<td>ISL78234</td>
<td>Buck</td>
<td>1</td>
<td>2.7</td>
<td>5.5</td>
<td>0.6</td>
<td>5.5</td>
<td>4</td>
<td>45 µA</td>
<td>0.5 MHz</td>
<td>4 MHz</td>
<td>16 Ld TQFN</td>
</tr>
<tr>
<td>ISL78214</td>
<td>Buck</td>
<td>1</td>
<td>2.8</td>
<td>5.5</td>
<td>0.8</td>
<td>5.5</td>
<td>4</td>
<td>35 µA</td>
<td>1 MHz</td>
<td>1 MHz</td>
<td>16 Ld QFN</td>
</tr>
<tr>
<td>ISL78233</td>
<td>Buck</td>
<td>1</td>
<td>2.7</td>
<td>5.5</td>
<td>0.6</td>
<td>5.5</td>
<td>3</td>
<td>45 µA</td>
<td>0.5 MHz</td>
<td>4 MHz</td>
<td>16 Ld TQFN</td>
</tr>
<tr>
<td>ISL78213</td>
<td>Buck</td>
<td>1</td>
<td>2.8</td>
<td>5.5</td>
<td>0.8</td>
<td>5.5</td>
<td>3</td>
<td>35 µA</td>
<td>1 MHz</td>
<td>1 MHz</td>
<td>16 Ld QFN</td>
</tr>
<tr>
<td>ISL78228</td>
<td>Buck</td>
<td>2</td>
<td>2.75</td>
<td>5.5</td>
<td>0.6</td>
<td>5.5</td>
<td>0.8</td>
<td>30 µA</td>
<td>1.8 MHz</td>
<td>2.7 MHz</td>
<td>10 Ld QFN</td>
</tr>
<tr>
<td>ISL78322</td>
<td>Buck</td>
<td>2</td>
<td>2.8</td>
<td>5.5</td>
<td>0.6</td>
<td>5.5</td>
<td>2</td>
<td>40 µA</td>
<td>1.8 MHz</td>
<td>2.7 MHz</td>
<td>12 Ld DFN</td>
</tr>
</tbody>
</table>

### BOOST

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>$V_{IN}$ (min) (V)</th>
<th>$V_{IN}$ (max) (V)</th>
<th>$V_{OUT}$ (min) (V)</th>
<th>$V_{OUT}$ (max) (V)</th>
<th>Fixed Output Voltage Option</th>
<th>O/P Voltage Accuracy (%)</th>
<th>$I_{OUT}$ (max) (A)</th>
<th>$I_{OUT}$ (max) (A)</th>
<th>PSRR</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Input Voltage and High Efficiency Synchronous Boost Converter with 1.3A Switch</td>
<td>ISL78113A</td>
<td>1</td>
<td>0.8</td>
<td>4.7</td>
<td>1</td>
<td>5.2</td>
<td>0.5</td>
<td>1 µA</td>
<td>1.73</td>
<td>2.23</td>
<td>8 Ld DFN</td>
<td>-40 to 105°C</td>
</tr>
</tbody>
</table>
### SINGLE OUTPUT BUCK CONTROLLERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>VIN (min) (V)</th>
<th>VIN (max) (V)</th>
<th>VOUT (min) (V)</th>
<th>VOUT (max) (V)</th>
<th>IOUT (max) (A)</th>
<th>VBIAS (min)</th>
<th>VBIAS (max) IS (typ)</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V Synchronous Buck Controller with Integrated 3A Driver</td>
<td>ISL78288</td>
<td>5</td>
<td>55</td>
<td>1.6</td>
<td>55</td>
<td>25</td>
<td>5.0V</td>
<td>5.4V</td>
<td>5mA</td>
<td>24 Ld QFN</td>
<td>-40 to 125°C</td>
</tr>
<tr>
<td>Automotive PWM DC/DC Voltage Controller</td>
<td>ISL78210</td>
<td>3.3</td>
<td>25</td>
<td>0.5</td>
<td>3.3</td>
<td>30</td>
<td>4.75 V</td>
<td>5.25 V</td>
<td>1.1 mA</td>
<td>16 Ld uTOFN</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>Automotive Single-Phase Core Regulator for IMVP-6 CPUs</td>
<td>ISL78211</td>
<td>5</td>
<td>21</td>
<td>0.3</td>
<td>1.5</td>
<td>30</td>
<td>4.75 V</td>
<td>5.25 V</td>
<td>40 Ld QFN</td>
<td>-40 to 105°C</td>
<td></td>
</tr>
</tbody>
</table>

### PMICs

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th># of Outputs</th>
<th>VIN (min) (V)</th>
<th>VIN (max) (V)</th>
<th>Linear Output</th>
<th>VOUT (V)</th>
<th>Applications</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Automotive TFT-LCD Power Supply Regulator</td>
<td>ISL78419</td>
<td>4</td>
<td>2.5</td>
<td>5.5</td>
<td>Yes</td>
<td>2.5 to 5.5</td>
<td>Automotive TFT-LCD</td>
<td>28 Ld QFN</td>
<td>-40 to 105°C</td>
<td></td>
</tr>
</tbody>
</table>

### MULTIPHASE CONTROLLERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Topology</th>
<th>Control Mode</th>
<th>UVLO Rising (V)</th>
<th>UVLO Falling (V)</th>
<th>VBIAS (max)</th>
<th>Applications</th>
<th>Max # of Outputs</th>
<th>Max # of Phases</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-Phase Interleaved Boost PWM Controller with Light Load Efficiency Enhancement</td>
<td>ISL78220</td>
<td>Single-Ended Peak Current Mode</td>
<td>7 V</td>
<td>6.6 V</td>
<td>20 V</td>
<td>3.3 mA</td>
<td>1</td>
<td>0.01 A</td>
<td>99</td>
<td>20 Ld QSOP</td>
<td>-40 to 125°C</td>
<td></td>
</tr>
<tr>
<td>4-Phase Interleaved Boost PWM Controller with Light Load Efficiency Enhancement</td>
<td>ISL78225</td>
<td>Zero-Voltage-Switching (ZVS) Peak Current Mode</td>
<td>8.75 V</td>
<td>7.0 V</td>
<td>20 V</td>
<td>12 mA</td>
<td>1</td>
<td>0.01 A</td>
<td>99</td>
<td>20 Ld QSOP</td>
<td>-40 to 125°C</td>
<td></td>
</tr>
</tbody>
</table>

### ISOLATED PWM CONTROLLERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Topology</th>
<th>Control Mode</th>
<th>UVLO Rising (V)</th>
<th>UVLO Falling (V)</th>
<th>VBIAS (max)</th>
<th>Applications</th>
<th>Max Duty Cycle (%)</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Ended Current Mode PWM Controller</td>
<td>ISL78215</td>
<td>Single-Ended Peak Current Mode</td>
<td>7 V</td>
<td>6.6 V</td>
<td>20 V</td>
<td>3.3 mA</td>
<td>1</td>
<td>1.0 A</td>
<td>48</td>
<td>8 Ld MSOP</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>ZVS Full-Bridge PWM Controller with Adjustable Synchronous Rectifier Control</td>
<td>ISL78223</td>
<td>Zero-Voltage-Switching (ZVS) Peak Current Mode</td>
<td>8.75 V</td>
<td>7.0 V</td>
<td>20 V</td>
<td>12 mA</td>
<td>1</td>
<td>0.01 A</td>
<td>99</td>
<td>20 Ld QSOP</td>
<td>-40 to 125°C</td>
</tr>
</tbody>
</table>

### SINGLE CELL BATTERY CHARGERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>VOUT (typ) (V)</th>
<th>Voltage Accuracy (%)</th>
<th>VIN1 (max) (V)</th>
<th>IOUT1 (max) (A)</th>
<th>Safety Timer</th>
<th>Self Termination</th>
<th>Accepts CC Adapter</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li-ion/Li-Polymer Battery Charger</td>
<td>ISL78692</td>
<td>4.1, 4.2</td>
<td>1</td>
<td>7 V</td>
<td>1.6</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>10 Ld DFN</td>
<td>40°C to +85°C</td>
<td></td>
</tr>
</tbody>
</table>

### MULTI-CELL BALANCING SOLUTIONS

#### CELL BALANCING

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Cell Accuracy</th>
<th>Sampling Mode</th>
<th>Connected Li-Ion Cells (max)</th>
<th>Daisy Chain # of devices</th>
<th>Power FET Control</th>
<th>Over-voltage Shutdown</th>
<th>Under-voltage Shutdown</th>
<th>Over-current Shutdown</th>
<th>Short Circuit Shutdown</th>
<th>Programmable Thresholds</th>
<th>Programmable Timouts</th>
<th>Package</th>
<th>Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Cell Li-Ion Battery Manager</td>
<td>ISL78600</td>
<td>±2.5mV</td>
<td>Serial</td>
<td>12</td>
<td>14</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>64 Ld TQFP</td>
<td>-40 to 105°C</td>
<td></td>
</tr>
<tr>
<td>Multi-Cell Li-Ion Battery Manager</td>
<td>ISL78612</td>
<td>±2.5mV</td>
<td>Simultaneous</td>
<td>12</td>
<td>14</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>130</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>64 Ld TQFP</td>
<td>-40 to 105°C</td>
<td></td>
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<tr>
<td>Multi-Cell Li-Ion Battery Manager</td>
<td>ISL78622</td>
<td>±10mV</td>
<td>Simultaneous</td>
<td>12</td>
<td>14</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>64 Ld TQFP</td>
<td>-40 to 105°C</td>
<td></td>
</tr>
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</table>
### DISPLAY PRODUCTS

#### DISPLAY PROCESSORS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>CVBS</th>
<th>S-Video</th>
<th>Input Types</th>
<th>Analog RGB / YPbPr</th>
<th>Digital RGB / YCbCr</th>
<th>YUV (OpenLD)</th>
<th>ADC Input Frequency</th>
<th>Max Output Resolution</th>
<th>BT.656 Output</th>
<th>Package Type</th>
<th>Automotive Grade</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced LCD Controller with LVDS I/O</td>
<td>TW8836</td>
<td>Yes (differential)</td>
<td>Yes</td>
<td>Yes</td>
<td>(1080p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>148MHz</td>
<td>WXGA</td>
<td>(1366x768)</td>
</tr>
<tr>
<td>Advanced LCD Controller with BT656 Output</td>
<td>TW8835</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>148MHz</td>
<td>XGA</td>
<td>Yes</td>
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<tr>
<td>Highly Integrated LCD Controller with LVDS I/O</td>
<td>TW8835</td>
<td>Yes (differential)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>27MHz</td>
<td>WXGA</td>
<td>(1366x768)</td>
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<tr>
<td>Analog TFT LCD Controller</td>
<td>TW8833S</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(16-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>WXGA</td>
<td>(1366x768)</td>
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<tr>
<td>Low Cost LCD Controller with SPI Bitmap OSD</td>
<td>TW8832S</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(16-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>60MHz</td>
<td>SVGA</td>
<td>No</td>
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<tr>
<td>Low Cost LCD Controller</td>
<td>TW8831</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(16-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>SVGA</td>
<td>No</td>
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<tr>
<td>Low Cost Analog TFT LCD Controller</td>
<td>TW8827</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(16-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>WVGA</td>
<td>No</td>
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<tr>
<td>Analog TFT LCD Controller</td>
<td>TW8826</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>75MHz</td>
<td>WVGA</td>
<td>No</td>
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<tr>
<td>Highly Integrated LCD Controller with LVDS Panel Support</td>
<td>TW8824</td>
<td>Yes (differential)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>27MHz</td>
<td>WXGA</td>
<td>(1366x768)</td>
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<tr>
<td>Advanced LCD Controller with 3D Video Decoder, PIP, and 16-bit Bitmap OSD</td>
<td>TW8823C</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>Yes</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>80MHz</td>
<td>WXGA</td>
<td>(1366x768)</td>
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<tr>
<td>Low Cost LCD Controller with MCU</td>
<td>TW8820</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(16-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>SVGA</td>
<td>No</td>
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<tr>
<td>Low Cost LCD Controller with Differential CVBS Input Support</td>
<td>TW8819</td>
<td>Yes (differential)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>WVGA</td>
<td>No</td>
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<tr>
<td>LCD Controller with MCU</td>
<td>TW8817</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>SVGA</td>
<td>No</td>
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<tr>
<td>Highly Integrated LCD Controller with Digital &amp; Analog Panel Output</td>
<td>TW8816B3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>75MHz</td>
<td>XGA</td>
<td>No</td>
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<tr>
<td>Advanced LCD Controller with PIP and LVDS Panel Support</td>
<td>TW8813B</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>Yes</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>80MHz</td>
<td>XGA</td>
<td>No</td>
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<tr>
<td>Advanced LCD Controller for Dual View LCD Panels</td>
<td>TW8810</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(720p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>80MHz</td>
<td>XGA</td>
<td>No</td>
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<tr>
<td>Digital RGB to BT656 Format Converter</td>
<td>TW8809</td>
<td>Yes (differential)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(1Ch)</td>
<td>27MHz</td>
<td>WXGA</td>
<td>Yes</td>
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<tr>
<td>Analog TFT LCD Controller</td>
<td>TW8807</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>WVGA</td>
<td>No</td>
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<tr>
<td>Integrated LCD Controller for Digital Panels</td>
<td>TW8806</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(480p)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>54MHz</td>
<td>WXGA</td>
<td>(1280x768)</td>
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<tr>
<td>Integrated LCD Controller with Analog RGB Mixing</td>
<td>TW8804</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>(480i)</td>
<td>Yes</td>
<td>(24-bit)</td>
<td>No</td>
<td>Yes</td>
<td>(8-bit)</td>
<td>27MHz</td>
<td>XGA</td>
<td>No</td>
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#### LED BACKLIGHT DRIVERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Total Current for DC/DC Lighting</th>
<th>Output Current Max/ Channel</th>
<th>VOUT (max) (V)</th>
<th># of Devices/ Channels</th>
<th>Brightness Control</th>
<th>Interface Type</th>
<th>VMIN (max) (V)</th>
<th>VMIN (min) (V)</th>
<th>Backlight for LCD Size (min)</th>
<th>Backlight for LCD Size (max)</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Power LED Driver</td>
<td>ISL78100</td>
<td>3000 mA</td>
<td>1000 mA</td>
<td>32</td>
<td>1</td>
<td>DC or PWM</td>
<td>No</td>
<td>16</td>
<td>2.7</td>
<td>3.5 in</td>
<td>9 in</td>
<td>20 LQFP</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>6-ch x 50mA LED Driver with PWM Dimming</td>
<td>ISL78171</td>
<td>300 mA</td>
<td>50 mA</td>
<td>45</td>
<td>6</td>
<td>DC or PWM</td>
<td>SMBus/ I²C</td>
<td>26.5</td>
<td>4.5</td>
<td>3.5 in</td>
<td>9 in</td>
<td>20 LQFP</td>
<td>-40 to 105°C</td>
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#### VIDEO DECODERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th># of Channels/ Device</th>
<th>Differential CVBS Input</th>
<th>Video DAC</th>
<th># of Inputs</th>
<th>Comb Filter</th>
<th>Interface Type</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Channel Video Decoder and Video Encoder for Automotive Applications</td>
<td>TW9964</td>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
<td>4H</td>
<td>BT.656</td>
<td>68 Ld WFQFN</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>4-Channel Analog Video Decoders and Analog Video Encoder for Automotive Applications</td>
<td>TW9966</td>
<td>4</td>
<td>No</td>
<td>Yes</td>
<td>8</td>
<td>2D</td>
<td>BT.656, BT601</td>
<td>128 Ld LQFP</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>Low Power NTSC/PAL/SECAM Video Decoder with Differential CVBS Inputs</td>
<td>TW9990</td>
<td>1</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>4</td>
<td>2D</td>
<td>BT.656, BT601</td>
<td>32 Ld WFQFN</td>
</tr>
<tr>
<td>Low Power NTSC/PAL/SECAM Video Decoder with VBI Slicer</td>
<td>TW9900</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>2D</td>
<td>BT.656</td>
<td>32 Ld QFN, TQFP</td>
<td>-40 to 105°C</td>
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#### INTEGRATED TFT-LCD DC/DC REGULATORS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>VIN (min) (V)</th>
<th>VOUT (max) (V)</th>
<th>VBOOST (max) (V)</th>
<th>Boost Current Limit (A)</th>
<th>VON (min) (V)</th>
<th>VOFF (min) (V)</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFT-LCD DC/DC with Integrated Amplifiers</td>
<td>ISL78022</td>
<td>2.6</td>
<td>5.5</td>
<td>2.90 V</td>
<td>18 V</td>
<td>3</td>
<td>15</td>
<td>36</td>
<td>-25</td>
</tr>
<tr>
<td>TFT-LCD Power Supply</td>
<td>ISL78010</td>
<td>3</td>
<td>5.5</td>
<td>5.5 V</td>
<td>20 V</td>
<td>2</td>
<td>15</td>
<td>36</td>
<td>-20</td>
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# INFOTAINMENT PRODUCTS

## SINGLE-CELL BATTERY CHARGERS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>$V_{IN}$ (min)</th>
<th>$V_{IN}$ (max)</th>
<th>$V_{BAT}$ (typ)</th>
<th>$I_{BAT}$ Leakage Current (max)</th>
<th>$I_{CHARGE}$ (max)</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-cell 4.1V Battery Charger</td>
<td>ISL78692</td>
<td>4.3V</td>
<td>5.5V</td>
<td>4.1V</td>
<td>3µA</td>
<td>1.6A</td>
<td>10 Ld DFN</td>
<td>-40 to 85°C</td>
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## AMBIENT LIGHT SENSORS

### LIGHT TO ANALOG SENSORS (VOLTAGE)

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Peak Spectral Sensitivity</th>
<th>$V_{S}$ (min)</th>
<th>$V_{S}$ (max)</th>
<th>Supply Current @ EV=100Lux</th>
<th>Lux Range (max)</th>
<th>Output Voltage @ EV=100Lux</th>
<th>Dark Voltage @ EV=0Lux</th>
<th>Rise Time</th>
<th>Fall Time</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Power, &lt;100 Lux Optimized, Analog Output Ambient Light Sensor</td>
<td>ISL76671</td>
<td>550 nm</td>
<td>1.8 V</td>
<td>3 V</td>
<td>23 µA</td>
<td>100 lux</td>
<td>1.85 V</td>
<td>0.95 mV</td>
<td>95 µs</td>
<td>155 µs</td>
<td>6 Ld ODFN</td>
<td>-40 to 105°C</td>
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### LIGHT TO DIGITAL SENSORS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Peak Spectral Sensitivity</th>
<th>$V_{S}$ (min)</th>
<th>$V_{S}$ (max)</th>
<th>Resolution (Bits)</th>
<th>Lux Range (max)</th>
<th>Counts/ Lux (max)</th>
<th>Dark ADC Code @ EV=0Lux (Counts)</th>
<th>Gain Selection</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-to-Digital Output Sensor with Gain Selection, Interrupt Function and PC Interface</td>
<td>ISL76683</td>
<td>540 nm</td>
<td>2.25 V</td>
<td>3.3 V</td>
<td>290</td>
<td>64000 lux</td>
<td>65</td>
<td>1</td>
<td>Yes</td>
<td>6 Ld ODFN</td>
<td>-40 to 105°C</td>
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## SERDES

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Function(s)</th>
<th>$V_{S}$</th>
<th>I$_{S}$</th>
<th>Clock Rate (MHz)</th>
<th>Format</th>
<th>Pre-emphasis</th>
<th>Equalization</th>
<th>Diff Input Impedance</th>
<th>Interface Type</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-Bit Long-Reach Video Automotive Grade SERDES</td>
<td>ISL76322</td>
<td>Transceiver</td>
<td>3.3 V</td>
<td>40 mA</td>
<td>50</td>
<td>16-Bit Data + 3-Bit Control</td>
<td>Yes</td>
<td>Yes</td>
<td>100 Ohms</td>
<td>I2C</td>
<td>48 Ld QFN</td>
<td>-40 to 105°C</td>
</tr>
<tr>
<td>16-Bit Long-Reach Video Automotive Grade SERDES with Bi-directional Side-Channel</td>
<td>ISL76321</td>
<td>Transceiver</td>
<td>3.3 V</td>
<td>40 mA</td>
<td>50</td>
<td>16-Bit Data + 3-Bit Control</td>
<td>Yes</td>
<td>Yes</td>
<td>100 Ohms</td>
<td>I2C</td>
<td>48 Ld QFN</td>
<td>-40 to 105°C</td>
</tr>
</tbody>
</table>

## SWITCHES/MUXES/CROSSPOINTS

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Switch or MUX</th>
<th># of Devices/Channels</th>
<th>Configuration</th>
<th>Type of Switch</th>
<th>$R_{ON/Off}$</th>
<th>Leakage</th>
<th>Source Cap</th>
<th>$V_{CC}$ (Single) (min)</th>
<th>$V_{CC}$ (Single) (max)</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Single Supply, SPDT Analog Switch</td>
<td>ISL76123</td>
<td>Switch/ MUX</td>
<td>1</td>
<td>NO</td>
<td>SPDT</td>
<td>23 Ohms</td>
<td>10 nA</td>
<td>8 pF</td>
<td>1 µA</td>
<td>2.7 V</td>
<td>12 V</td>
<td>8 Ld SOT</td>
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## USB HIGH/FULL SPEED SWITCHES/MUXs

<table>
<thead>
<tr>
<th>Device Description</th>
<th>Device</th>
<th>Configuration</th>
<th>Switch Control</th>
<th>BW High</th>
<th>BW Full (MHz)</th>
<th>$I_{S}$</th>
<th>Supply Voltage Vdd Min</th>
<th>Supply Voltage Vdd Max</th>
<th>Package Type</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Grade USB 2.0 High/Full Speed Multiplexer</td>
<td>ISL76120</td>
<td>HS/FS</td>
<td>Logic Level</td>
<td>880 MHz</td>
<td>550</td>
<td>0.02 µA</td>
<td>2.7 V</td>
<td>5.5 V</td>
<td>10 Ld DFN</td>
<td>-40 to 105°C</td>
</tr>
</tbody>
</table>
Intersil formed in August 1999 when we acquired the semiconductor business of Harris Corporation which held product portfolios and intellectual property from RCA and GE Solid State.

QUICK FACTS

Founded..................1967
Headquarters............Milpitas, CA
President, CEO......Necip Sayiner
Employees...............1,100
NASDAQ Listing.........ISIL
FY 2013 Sales..........$575 million
Unexpired U.S. Patents...1,000+
Number of Products......3,000+

MAIN OFFICES

North America - West Coast
1001 Murphy Ranch Road
Milpitas, CA 95035
TEL: 1-888-INTERSIL (468-3774)

North America - East Coast
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