IS32LT3138, 18-Channel Current-Sink LED Driver for Dynamic Automotive Exterior Light Animation

UART 2-wire interface for reliable LED driver-to-MCU off-board communication

MILPITAS, Calif., July 10, 2023 -- Lumissil Microsystems, a division of Integrated Silicon Solution, Inc. (ISSI), announces the release of its latest LED driver IC for controlling large quantities of LEDs on a single PCB or over multiple PCB boards. The IS32LT3138 is an 18 channel, current sink LED driver that allows up to 64 devices to be cascaded, for a total of 1152 individually controlled channels. It is targeted at the automotive lighting market utilizing hundreds of LEDs for achieving vivid and bright animations as found in welcome and rear lamps that span the entire width of a vehicle.

"The automotive industry is requesting unique and complex light animation features to establish brand identity and provide the car buyer with personalization capabilities" said Ven Shan VP of Lumissil Marketing. "The design challenge has been managing many driver ICs to independently control the large number of LED pixels required for smooth and uninterrupted lighting effects that encircle a vehicle. With the IS32LT3138, lighting engineers can now create long chains of LED boards that reliably communicate with a remote MCU to create these vivid lighting effects."

Automotive rear lamps that extend across the back of an automobile require long copper traces etched on the PCB or a wire harness to interconnect multiple PCBs. A microcontroller (MCU) board must establish reliable long-distance off-board communications with the LEDs while meeting strict electromagnetic compatibility (EMC) requirements. The IS32LT3138 supports a high-speed 1MHz UART interface compatible with the CANFD physical layer and integrates Cyclical Redundancy Checks (CRC), a powerful error-detection and correction method for reliable communication between the MCU and other IS32LT3138 devices. The IS32LT3138 can easily accomplish long-distance off-board communication by using an industry-standard UART-to-CAN physical layer at the transmit side of the wiring harness and another at the receiving end of the harness.

The IS32LT3138 employs both a 12-bit pulse-width modulation (PWM) dimming register and a 7-bit analog dimming register on each LED channel for fine LED brightness adjustment. A 4.2V output supply connected to an NTC temperature sensor helps mitigate LED board thermals by lowering the LED current if the temperature rises. The driver is designed with other advanced features such as slew rate control to optimize LED current ramp rate, clock spread spectrum and a configurable phase shift between channels with 180-degree clock phase delay for improved EMC performance.

The IS32LT3138 meets multiple regulation requirements with fault detection and reporting capability for LED string open/shorted, single LED shorted, CRC error, watchdog timeout, overvoltage, overcurrent (ISET pin shorted), and over temperature diagnostics. Reporting these failures is accomplished with a dedicated open drain FAULTB pin. Each failure is stored in registers which can be read back by the external host MCU through the UART interface. A programmable watchdog timer guards against a lost MCU connection and automatically enters one of three programmable fail-safe states, thereby enhancing system reliability and robustness.

ISO 26262

The IS32LT3138A is in currently in design to include additional measures to meet the ASIL-B safety integrity level according to the ISO 26262 Functional Safety development process. It implements a configurable fallback concept for each LED channel, which allows it to adapt the safe state and fault tolerance time interval according to the requirements of the lamp application. The ASIL-B rated IS32LT3138A will be pin-to-pin compatible with the IS32LT3138 package.

Availability and pricing

The IS32LT3138 is available now in production quantities and comes in a WFQFN-32 package. It operates from 4.5V to 16V over the temperature range of -40°C to +125°C. The IS32LT3138 is priced at $1.09 in 1k pcs quantities.

The ISO 26262 ASIL-B version, IS32LT3138A, is sampling in Q4 2023 with production release scheduled for mid 2024.

About Lumissil Microsystems

Lumissil Microsystems is a division of ISSI specializing in analog/mixed-signal products for automotive, communications, industrial, and consumer markets. Lumissil's primary products are LED drivers for low to mid-power RGB color mixing and high-power lighting applications. Other products include audio, sensors, high-speed wire communications, optical networking and application-specific microcontrollers. ISSI and Lumissil Microsystems have worldwide offices in the US, Taiwan, Japan, and Singapore, mainland China, Europe, Hong Kong, India, and Korea. Website: http://www.lumissil.com

About Integrated Silicon Solution, Inc. (ISSI)

ISSI is a fabless semiconductor company that designs, develops and markets high performance SRAM, DRAM, Flash memory (including NOR flash, NAND flash and managed NAND solutions (eMMC)), and Analog/Mixed-signal integrated circuits. ISSI provides high-quality semiconductor products and has been a committed long-term supplier to its customers. ISSI has worldwide offices in the US, Taiwan, Japan, Singapore, mainland China, Europe, Hong Kong, India, and Korea. Visit our website at http://www.issi.com/

Ven Shan
408 969 4622

Aaron Reynoso
408 969 5141