

40x9 (360 LED) Matrix LED Driver IC for High-Performance LED Display Applications

Integrates advanced EMI suppression and ghost elimination circuitry with external PMOS FETs for improved thermal management

MILPITAS, Calif., March 10, 2025 – Lumissil Microsystems, a leader in LED driver semiconductor solutions, today announced the release of its new IS31FL3758 matrix LED driver, designed to meet the growing demand for high-performance, energy-efficient LED display solutions in various applications, including appliance display panels, LCD zonal backlighting, and gaming machines.

The IS31FL3758 supports a configurable matrix ranging from 48 channels (48ch) up to a 40x9 matrix, consisting of 48 constant current sinks and 9 gate drivers (SW1-SW9) for external PMOS transistors. This new design allows for improved thermal management by offloading power dissipation to the external PMOS transistors outside the device package, enabling efficient heat dissipation in high-power applications. It supports flexible matrix configurations such as 48ch, 47x1, 46x2, 45x3, down to 40x8 and 40x9, offering designers significant flexibility in LED array layouts.

Each of the 48 constant current sinks supports a maximum output current of 60mA, adjustable via three 8-bit global current control registers (GCCR, GCCG, GCCB) for grouped channels (e.g., CS1, CS4, CS7...CS46 for GCCR; CS2, CS5, CS8...CS47 for GCCG; CS3, CS6, CS9...CS48 for GCCB). This grouped control optimizes current adjustment precision while reducing bus bandwidth requirements. The communication interface supports either a high-speed 12MHz SPI or a 1MHz I2C bus, ensuring seamless integration with a wide range of microcontrollers and system design needs. The device also features an SDB pin rising edge bus reset for either the SPI or I2C interface, enhancing operational reliability.

The IS31FL3758 incorporates advanced features to minimize power supply ripple and electromagnetic interference (EMI). Its 137kHz PWM frequency (in 8-bit mode) with spread spectrum technology ($\pm 5\%$ to $\pm 30\%$ range options), combined with 6-group phase delay functionality, significantly reduces power bus noise and improves overall system performance. Additional noise reduction is achieved through proprietary algorithms that mitigate the impact of passive components like MLCC decoupling capacitors. These features make the IS31FL3758 suitable for applications requiring clean power and low EMI, such as high-end appliance control panels and gaming machines.

"Our new IS31FL3758 matrix LED driver represents a significant leap forward in LED display technology," said Ven Shan, VP of Marketing. "Its unique combination of support for external PMOS transistors, a configurable 40x9 matrix, and advanced thermal management capabilities makes the IS31FL3758 ideal for zonal backlighting and appliance HMI (Human-Machine-Interface) panels where reliability and performance are critical."

Additional features include 8-bit or 6+2-bit dithering PWM dimming with 256-step precision for smooth brightness or color mixing control, programmable open/short detection with fault storage registers for enhanced reliability and ease of manufacturing/debugging, and a built-in de-ghosting circuit to eliminate LED ghosting artifacts in matrix scanning operations. The device operates over a wide voltage range of 2.7V to 5.5V and an industrial temperature range of -40°C to +125°C. It also offers robust protection features, including thermal shutdown (160°C with 25°C hysteresis), over-current protection (configurable at 90mA or 120mA), and under-voltage lockout. The minimum headroom voltage of 200mV (typical) at 40mA ensures efficient operation, while current accuracy is maintained at $\pm 7\%$ bit-to-bit and $\pm 6\%$ device-to-device at 40mA.

The IS31FL3758 is available now in a compact 7x7mm QFN-60 package, with a thermal resistance (θ_{JA}) of 32.6°C/W, supporting a maximum power dissipation of approximately 3.07W at 25°C ambient temperature (per JEDEC 51-2A standards). It is RoHS and Halogen-Free compliant, with ordering information for part number IS31FL3758-QFLS4-TR (2500 units per reel).

About Lumissil Microsystems

Lumissil Microsystems 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. Lumissil Microsystems has worldwide offices in the US, Taiwan, Japan, Singapore, mainland China, Europe, Hong Kong, India, Israel, and Korea. Website: <https://www.lumissil.com>

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IS31FL3758
40x9 (360 LED) Matrix LED Driver for High-Performance LED Display

- ▲ Flexible 40x9 Matrix Configurations
- ▲ External PMOS Transistors to Enhance Heat Dissipation
- ▲ Spread Spectrum Technology for Low EMI Operation
- ▲ $\pm 7\%$ bit-to-bit and $\pm 6\%$ device-to-device Current Accuracy at 40mA