

Enhanced Matrix LED Drivers IS31LT3716/17/19 for White Goods Application

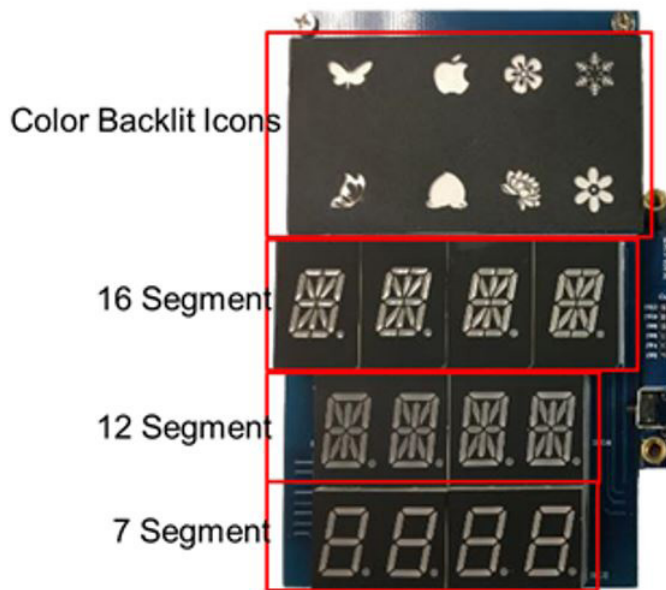


This is an introduction to Lumissil's latest enhanced Matrix LED drivers, IS31FL3716, IS31FL3717, and IS31FL3719; targeted for White Goods Human Machine Interface (HMI) Panels. In a prior article published in April 2021, titled "Matrix LED Drivers for Appliance Interfaces", the benefits of Matrix LED drivers were reviewed. Today's White Goods HMI display demands rich content (indicator, text or icons) in true colors and often with animations for intuitive, easy to understand usage and improved aesthetics appeal. The table below summarizes the features of all 3 drivers.

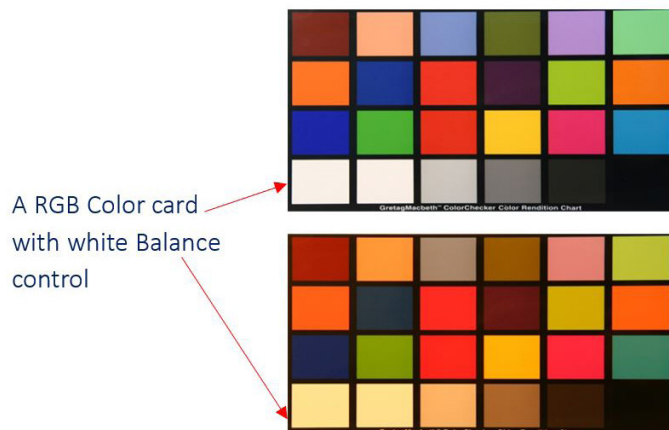
Part Number	IS31FL3716	IS31FL3717	IS31FL3719
Matrix Configurations	8x7, 9x6, 10xn (n=1~5); 54/56 matrix dots	7x9, 8xn (n=1~8); 63/64 matrix dots	15x9, 16xn (n=1~8); 128/135 matrix dots
Supply Voltage	2.7 to 5.5V	2.7 to 5.5V	2.7 to 5.5V
Quiescent Current	1.1mA typ. 1.5mA max. (V _{SDB} =V _{CC} , all LEDs off)	1.29mA typ. 1.9mA max. (V _{SDB} =V _{CC} , all LEDs off)	1.29mA typ. 1.9mA max. (V _{SDB} =V _{CC} , all LEDs off)
Shutdown Current	1uA typ. 2uA max. (V _{SDB} =0V)	0.6uA typ. 2uA max. (V _{SDB} =0V)	0.6uA typ. 2uA max. (V _{SDB} =0V)
LED Current (Peak/Avg)	40mA typ./ 5.6mA typ.	34.6mA typ./ 4.21mA typ.	34.6mA typ./ 4.21mA typ.
Interface / Reset	I2C 1Mhz / SDB rising edge	I2C 1Mhz / SDB rising edge	I2C 1Mhz / SDB rising edge
PWM Frequency	25kHz scan frequency for no audible noise	125Hz~256kHz; 32kHz default 28.4kHz when n=9 for no audible noise	1kHz~256kHz; 32kHz default 28.4kHz when n=9 for no audible noise
PWM Control Resolution	1-bit/ Individual on/off	8-bits/256 steps	1-bit/Individual on/off for Half of all LEDs 8-bits/256 steps for Half of all LEDs
Global current	7-bits/128 steps	7-bits/128 steps	7-bits/128 steps
EMI reduction	None	180D phase shift	180D phase shift
De-ghost	Yes, with reduced LED reverse voltage	Yes, with reduced LED reverse voltage	Yes, with reduced LED reverse voltage
Open / Short Detection	Yes, individual with status registers	Yes, individual with status registers	Yes, individual with status registers
Pin/Package	QFN-20 (3x3mm) /SOP-20 (12.8x10.3mm) -40°C to +125°C	SOP-24 (15.4 x 10.3mm) -40°C to +125°C	QFN-32 (4x4mm) / eTQFP-32 (9x9mm) -40°C to +125°C

All 3 drivers have standard input supply voltage range with low quiescent and shutdown current for low power consumption when the HMI panel is off or in idle.

The IS31FL3716/17/19 drives small/medium/large matrix arrays of RGBW LEDs. The IS31FL3716 drives a max of 56 matrix LEDs/dots in arrays of 8x7, 9x6 or 10xn (n=1~5). The IS31FL3717 drives a max of 64 dots in arrays of 7x9, or 8xn (n=1~8). And the IS31FL3719 drives a max of 135 dots in arrays of 15x9, or 16xn (n=1~8). These matrix dots can be used to drive 7,12, or 16-segments for alphanumeric displays or backlit visual icons.



All three drivers are controlled via 1MHz I2C interface; permitting highspeed register write or read. The IS31FL3716 can control each individual LED on/off with 128 steps of global current control for white balance adjustment. This means each LED will have 1 brightness level but adjusted for pure white color.



The IS31FL3717 is capable of 256 PWM steps for accurate color rendition and 128 steps of global current for white balance adjustments. For the IS31FL3719, half of all LEDs are on/off control and remaining half are 256 PWM steps

capable; and all LEDs have 128 steps of global current for white balance adjustments. The PWM frequency in all 3 drivers were increase above 22kHz (human audible limit) to avoid audible humming noise from MLCC capacitors. All 3 drivers have de-ghosting at a lower reverse voltage to remove false LED turn on by parasitic capacitance while improving each matrix LED lifespan.

Each driver can detect individual LED open or short and store its status in dedicated registers. This helps production/ diagnostic testing of HMI panels during manufacturing. The IS31FL3717 and IS31FL3719 further have the ability to perform 180-degree phase delay to distribute channel currents evenly in order to reduce EMI to ease EMC conformance certification.

Each driver is capable of full-range industrial temperature range of -40°C to 125°C. The IS31FL3716 is expected to be used in small PCBs hence it is offered in QFN-20 (3x3mm) package and should the PCB have sufficient space a cheaper but larger, SOP-20 package is offered. The IS31FL3717 is expected to be used in relatively large PCB hence it is offered in only a large but cheaper SOP-24 package. The IS31FL3719 is expected to be on large PCB but the larger LED matrix could consume most of the real estate hence it is offered in QFN-32 (4x4mm) or a larger but cheaper eTQFP-32 (9x9mm).

PRODUCT ORDERING AND AVAILABILITY

Lumissil ordering part numbers:

Part Number	Package	Quantity
IS31FL3716-QFLS4-TR	QFN-20, Lead-free	2500 per reel
IS31FL3716-GRLS4-TR	SOP-20, Lead-free	1000 per reel
IS31FL3717-GRLS4-TR	SOP-24, Lead-free	1500 per reel
IS31FL3719-QFLS4-TR	QFN-32, Lead-free	2500 per reel
IS31FL3719-TQLS4-TR	eTQFP-32, Lead-free	2500 per reel

IS31FL3716, IS31FL3717 and IS31FL3719 are in production. Enquire with your Lumissil Sales Representative to order samples and evaluation boards.

Lumissil Team is committed to provide customers strong technical support and abide to ISSI company’s mission to maintain long-term support.

CONTACT:

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