# Lumissil New Products update

Sep 2020

Intelligent Analog

lumissil.com

Light • Sense • Power • Connect • Control

About Lumissil Microsystems – Division of ISSI

- In 2011, ISSI a Memory products Fabless Semiconductor company diversified into Analog Products with the acquisition of SiEn Semiconductor

- In 2017, ISSI acquired two entities "Taiwan based MCU company" and a "Division of Sigma Designs" to add MCU and Wired Networking/Connectivity competence to Analog and Mixed Signal (AMS) Product Line

- In 2020 ISSI created an independent Analog & Mixed Signal Division called "Lumissil Microsystems"

- In 2020 May，Ingenic(北京君正) finished merged ISSI group, Stock ID: 300223

- Lumissil Microsystems develops and markets Analog & Mixed Signal, Applications Specific Microcontrollers and Connectivity products

- Lumissil is part of the ISSI Group Company with Independent Engineering, Sales and Marketing Organization

- Quality, Operations and Infrastructure is still combined with ISSI

- Approximately 200 people worldwide including offices in US, Europe, Israel, Taiwan, China, Japan, SEA/India and Korea

- Foundry & Backend Partners: – Tower Jazz, VIS, TSMC, SMIC, CSMC and HHGrace; Greatek, JCET, TSHT, HXTA & Goodark

Lumissil Strategic Focus
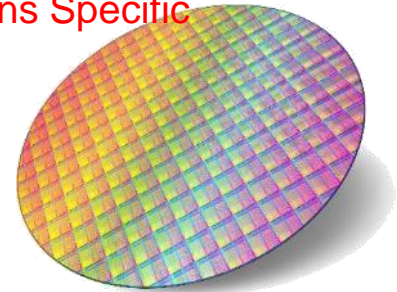
Lumissil Products that deliver affects to generate SIGHTs, SOUNDs, SENSE and CONNECT

- SIGHTS – Family of FXLED Drivers and Auto LED Drivers for lighting and special affects

- SOUNDs – Family of Audio Amplifiers to generate sound affects

- SENSE – Family of Proximity, Gesture and Touch Sensors

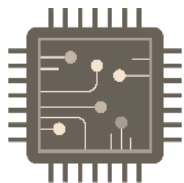- CONNECT- Home and In Vehicle Networking

Lumissil at a glance

ISSI
AMS
Analog Mixed Signal Division

LUMISSIL
MICROSYSTEMS
A Division of ISSI

What we do?

Make Analog & Mixed Signal ICs
- LED drivers for Auto Lighting & color mixing
- Applications Specific Micro-controllers
- Power management
- Power-line communication

Quality

Committed to Design-In Quality
- Long-term Support
- ISSI's Quality and Finance Infrastructure
- AECQ-100 for Automotive
- Cost effective and innovative solutions

Headquarters

A Division of ISSI - 2020
1623 Buckeye Drive
Milpitas, CA USA
www.Lumissil.com

Analog & Mixed Signal Products

CONTROL

CONNECTIVITY

POWER

SENSE

LIGHTING

Five Pillars of Growth

Auto Lighting
Interior/Exterior
FxLED RGB Drivers
Multichannel
Matrix

MCU based Sensors
Touch/Proximity/
Gesture

Class AB/Class D
1W – 20W
Analog /Digital
Inputs
Power Management
DC/DC Regulators

Networking
HPNA/G.hn
G.vn
Fiber Optics

Embedded Controllers
8/32 bit MCU
8051/ARM
Motor Drivers LIN/CAN ASICs

Analog & Mixed Signal Products & Markets Served

Five Pillars of Growth

LIGHTING

SENSE

POWER

CONNECTIVITY

CONTROL

Consumer IoT & Gaming

Industrial & Medical

Automotive

6

Consumer – Gaming, AI Speakers & IoT

- Major supplier to gaming, AI speaker & IoT markets
  - Cost-effective solutions
  - High-volume quality supplier
  - Feature-rich RGB color mixing

- Roadmap to address market needs
  - Low power, low leakage, low EMI
  - High color brightness, high reliability
  - Evolving new product introductions

Industrial – Appliances, Office Equipment

- ## Human-Machine Interface (HMI)

  - Color LED drivers for informative user feedback

  - High Brightness LED drivers for illumination

  - Audio amplifiers for audible notifications

  - Capacitance sense for 'clean surface' key input

- ## Growing Market

  - Smart appliances require a well-defined user interface

  - Our devices used in cost-effective and intuitive interface designs

  - Our application engineering team is ready to assist with hardware and software support

Whirlpool CORPORATION

SAMSUNG

Haier

Panasonic

resideo

BOSCH
Invented for life

EAT•N
Powering Business Worldwide

Hisense

Midea

Drive entire RGB LEDS with one IC!

Automotive – Solutions for Lighting and Control

- Leverage our broad knowledge of automotive semiconductor requirements
  - Focus on innovation for automotive MCUs and Lighting solutions
  - Willing to engage with our customers to define silicon solutions which meet their requirements

- Partnerships with car manufacturers, Tier 1's and technology leaders
  - Evaluation board kits for all our IC solutions
  - Applications and design support from concept to production
  - Meet and exceed AEC-Q100 requirements

Networking / Communications

WIRED NETWORKING - G.hn

- G.hn for home networking with data rates up to 2Gbit/s

- Integrate data communication with power connection for low deployment costs

- Operation over any legacy two wires: Telephone, Coax, Power-Line and Plastic Optical Fiber

- Applications: Smart Home, IPTV and security cameras - Smart grid (Broadband Power Line) for house or buildings

OPTICAL NETWORKING

- GPON, EPON, BPON, and GEPON ONT IC solutions

- TIA trans impedance amplifiers from 155M to 2.5G

- Laser drivers and limited amplifier with DDM from 1.25G to 10G

- MSA-compliant optical modules from 155Mbps to 10Gbps that meet Ethernet, SONET/SDH, & Fiber Channel standards

AT&T   eoptolink   FiberHome   Hi-Optel   vivint. SmartHome   Telefonica

WT wintop   YSOD   Hisense Broadband   Accelink

Recent Highlights – Non Automotive

- Released IS31FL3246 – 36 Channels LED Driver, 18 bits PWM, noise reduction, white balance.

- Released IS31FL3726A –16 Channel LED Driver with serial shift-register-plus latch-type.

- Sampling IS31FL3748 – 28V, 24x4 Channels, 40mA/Channel Matrix LED Driver, noise reduction, Spread Spectrum, white balance.

Recent Highlights – Automotive

- Released IS32LT3125/3125A -Single Channel 250mA LED Driver with Fault Detection

- Released IS32LT3123 – Quad Channel, high current LED Driver with external MOSFET

- Released IS32LT3361– 40V, 1.3A Buck LED driver with fault Reporting

- Released IS32PM3420- 3A, 36V, 2MHZ Synchronous Step-Down Converter

NEW

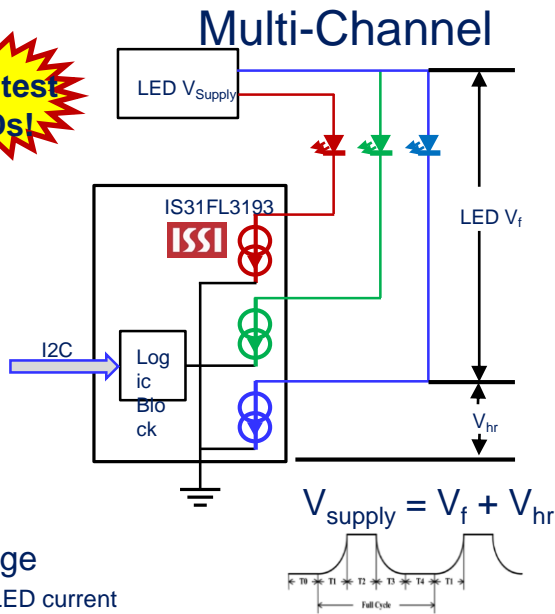# FXLED driver New products update

FxLED Drivers Target Applications

- Mobile phone
- Wearables
- VR headsets
- Gaming device
- BT/WIFI/AI Speaker
- IOT applications
- House appliances
- Whitegoods application
- Music Instruments
- Medical application
- Automotive

Lumissil Provide the total FxLED solution

- Lumissil Provides the Innovative and Professional FxLED solution:

  - Provide the leading and best features to bring values to end products

  - Extensive products selection for different applications

  - Lighting Guide/LED position/ MD suggestion for better LED effect targets

  - Hardware Support like concept stage evaluation and application circuit check to minimize the hardware design risk or cycle time

  - Software coding support for robust system design, speed time to market

LED Driver Architecture Types

Multi-Channel

Brightest LEDs!

LED V$_{Supply}$

IS31FL3193

ISSI

LED V$_f$

I2C

Logic Block

V$_{hr}$

$$V_{supply} = V_f + V_{hr}$$

- Advantage
  - Higher LED current
  - Average LED current matches set current
- Disadvantage
  - Number of LEDs limited by number of channels
- Competitors & Solution
  - TI ,Rohm….
  - TLC5971, LP5024, LP5018…

Matrix

Most LEDs!

(12x16) = 192 LEDs

IS31FL3733

ISSI

I2C

Logic Block

Row

Column
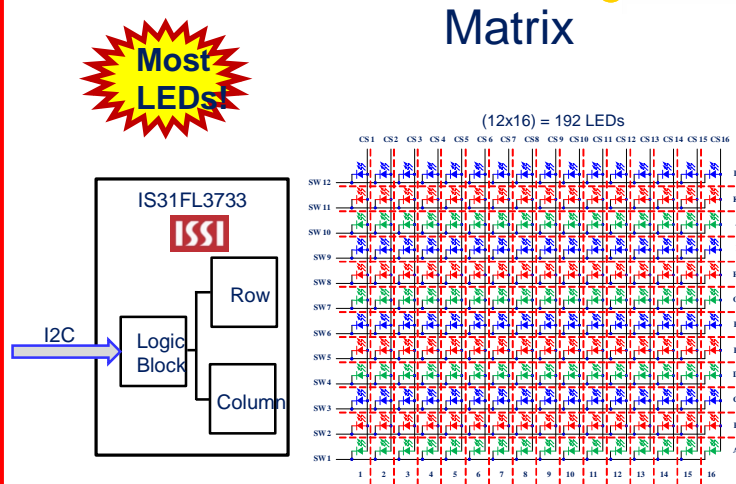
- Advantage
  - Can drive many LEDs
  - Save PCB space and LED driver cost
- Disadvantage
  - Scanning architecture results in lower average current
- Competitors & Solution
  - Panasonic, Sonix, AMS, MBI…
  - AN32181B, AS1119, AS1130, bu16501…

FxLED Driver(current source)

Type	Part Number	Description	Package
RGB Driver	IS31FL3190 IS31FL3193 IS31FL3193D IS31FL3194 IS31FL3195 IS31FL3196A IS31FL3199	One-channel RGB LED driver 3-channel RGB LED driver 3-channel RGB LED driver 3-channel RGB LED driver 4- channel charge pump RGBW LED driver 6-channel, audio sync, cascade, 6 patterns 9-channel, audio sync, cascade, 9 patterns	UTQFN-9 DFN-10 WLCSP-8 W-CSP-8 QFN-16 QFN-20 QFN-20
Multi-Channel Driver	IS31FL3726A IS31FL3216A IS31FL3218 IS31FL3205 IS31FL3206 IS31FL3207 IS31FL3208A IS31FL3209 IS31FL3235A IS31FL3236A IS31FL3237 IS31FL3238 IS31FL3239 IS31FL3246 IS31FL3265A/B	16-channel, serial shift-register-plus latch-type, LED driver. 16-channel, 8 frames memory, GPIO 18-channel, 256 steps PWM brightness 12-channel, noise reduction, Spread spectrum, white balance 12-channel, selectable PWM frequency 18-channel, noise reduction, Spread spectrum, white balance 18-channel, 1/24 DC Scaling White Balance 18-channel, 1/24 DC Scaling White Balance, 76mA/CH 28-channel, 256 steps PWM brightness 36-channel, 256 steps PWM brightness 36-channel, noise reduction, Spread spectrum, white balance 18-channel, noise reduction, Spread spectrum , white balance 24-channel, noise reduction, spread spectrum, white balance 36-channel, 18 bit PWM , noise reduction, white balance 18-Channel, 40V, 60mA, noise reduction, S.S, W.B, A:I2C, B:SPI	QFN/SSOP/eTSSOP-24 QFN-28 QFN-24, SOP-24 QFN-20 QFN-20 QFN-28 QFN-28 QFN-28 QFN-36 QFN-44, TQFP-48 QFN-44 eTSSOP-28 QFN-32 QFN-44 eTSSOP-28

NEW

Strategy update for Multi channels products

Channels	Advanced	Enhanced	Basic
1~3		FL3194	FL3190/3/3D
4	with charge pump, Pattern control and power saving mode FL3195(2.7V~5.5V) FL3197(2V~3.3V)		
6/9		FL3196A/FL3199 (Auto fade in out)	
12	FL3205(38mA,16bit PWM, 8bit DC)	FL3206(8bit PWM, better accuracy)	
16~18	FL3207(38mA,16bit PWM,8bit DC) FL3238(76mA,16bit PWM, 8bit DC)	FL3216A(Audio sync) FL3208A(8bit PWM, better accuracy)	FL3218(38mA, 8bit PWM, QFN and SOP24) FL3209(76mA,8bit PWM) FL3726A(60mA, VSB 30MHZ)
24/28	FL3239(38mA, 16bit PWM,8bit DC)		FL3235A(8bit PWM)
36	FL3246(25mA, 18bit PWM, 8bit x3 Global DC) FL3237(38mA, 16bit PWM, 8bit DC)		FL3236A(8bit PWM, QFN&TQFP)

Based on customer performance's requirement and cost expectation for suitable product

NEW

IS31FL3726A- 16 Channel Driver

FEATURES
- 60mA × 16 outputs
- Current set with external resistor
- Constant current range: 5mA to 60mA
  - I_{OUT_MAX}= 45mA @ VCC= 3V
  - I_{OUT_MAX}= 60mA @ VCC= 5V
- Current accuracy (All output on)
  - Bit to bit: < ±4% @ IOUT=25mA.
  - Device to device: < ±2% @ I_{OUT}=25mA.
- For common-anode LEDs
- Power supply voltage range, VCC= 3.0V to 5.5V
- Serial and parallel data transfer rate: 30MHz (Max. cascade connection)
- Operating temperature range, TA= -40°C ~ +125°C
- Package: QFN-24 (4mm×4mm), SSOP-24 and eTSSOP-24
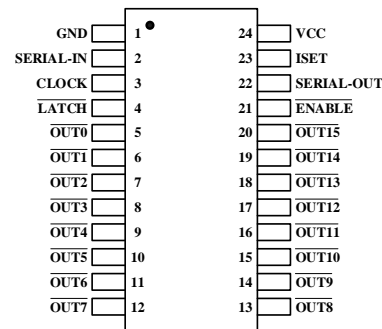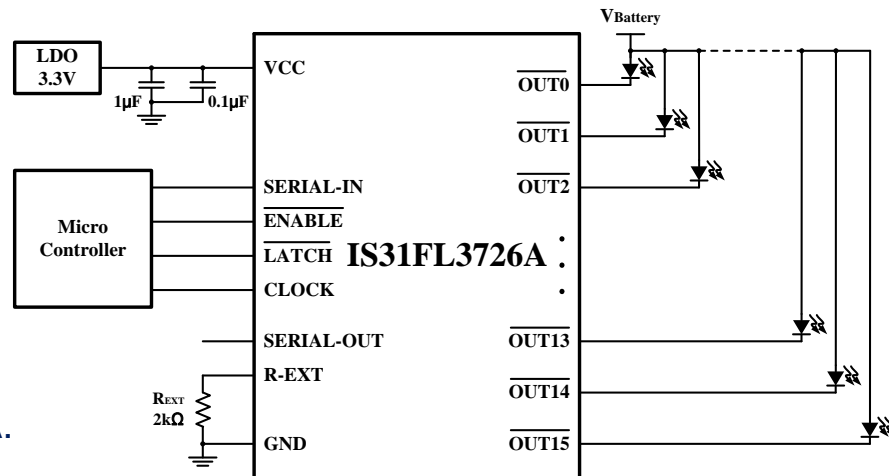
IS31FL3726A Competition

Tech	ISSI	ISSI	MBI	集创北方	GuangzhouRunxin	深圳明微	ST
Part Number	FL3726	FL3726A	MBI5020	ICN2026	RX5024	SM16016	STP16CPC26
VCC	3.3V~6V	3.3V~6V	3.3V~7V	3.3V~7V	3.3V~7V	3.3V~7V	3.3V~6V
IOUT	60mA*16	60mA*16	45mA*16	45mA*16	45mA*16	36mA*16	90mA*16
Imax(5V)		60mA		45mA	45mA	36mA	90mA
VOUT	4V	5V	17V max.	20V max.	19V max.	17V max.	20V max.
VHR		0.4V typ.@Iout=25mA 0.5V max. @Iout=25mA	0.5V (Iout=20mA)	0.6V (Iout=23mA)	0.6V (Iout=20mA)	0.6V (Iout=28mA)	0.2V (Iout=25mA)
Mismatch	<3% typ. <4% max.	<4% max. @IOUT=25mA	<2.0% max.	<1.5% typ. <2.3% max.	<1.5% typ. <2.5% max.	<2.5% max.	<1.0% typ. <3.0% max.
Accuracy	<20% max.	<2% max. @IOUT=25mA	<3.0% max.	<1.5% typ. <3.0% max.	<1.5% typ. <3.0% max.	<4.5% max.	<6.0% max.
IGND	960mA	960mA	1440mA	1000mA	720mA		1600mA
$V_{R\text{-}EXT}$	0.36V	1.26V	1.26V	1.24V	1.26V		
IOUT	IOUT = ($V_{R\text{-}EXT}$/REXT)×52	IOUT = ($V_{R\text{-}EXT}$/REXT)×15	IOUT = ($V_{R\text{-}EXT}$/REXT)×15	IOUT = ($V_{R\text{-}EXT}$/REXT)×15	IOUT = ($V_{R\text{-}EXT}$/REXT)×15	IOUT = (17/REXT)×1000 mA	
ESD HBM/CDM	3kV/1KV	8kV/1KV		8kV		4kV	
Temp grade	-40~85C	-40~125C	-40~85C	-40~85C	-40~85C	-40~85C	-40~85C
Package	QFN-24 (4×4), eTSSOP-24	QFN-24 (4×4) SSOP-24, eTSSOP-24	SSOP24, SOP24	SSOP24	SSOP24	SSOP24, QSOP24, QFN24(4*4)	TSSOP24, SO-24 TSSOP-24 , HTSSOP-24

Summary: 1. IS31FL3726A has better current accuracy and lower Headroom
2. IS31FL3726A support 125C temp grade, with 8KV ESD

NEW

Target new applications

- High speed train/Taxi/Bus/traffic signage/outdoor Pannel
- Competitor: MBI/DGI

Target new applications

- Panchinko application

LUMISSIL Microsystems

A Division of ISSI

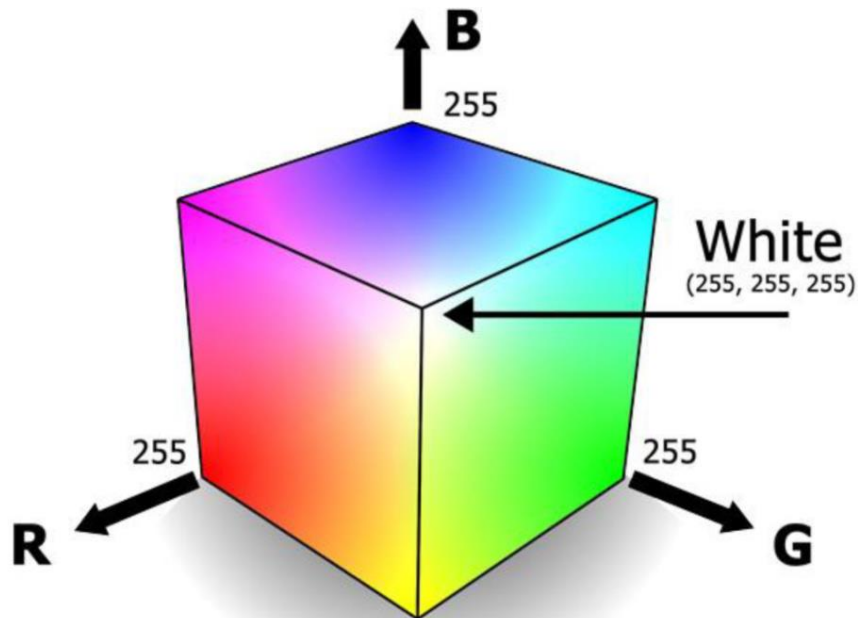# IS31FL3246　New! 4th　Generation！

3 Dimension Dimming control　for high accuracy color mixing and high resolution fade control！

三维调光:白平衡调节，精准配色，超细腻调光

Intelligent Analog

lumissil.com

Light • Sense • Power • Connect • Control

理想情况下，如果红、绿、蓝的色坐标确定，则立方体上任意位置的颜色（对应的色坐标 Lxy），都可以找到对应的RGB值；一定RGB比例混合出来的颜色的色坐标是唯一的，而且线性可计算。

DC control for white balance

A RGB Color card
with Balance Control

DC for white balance

PWM is the right way to get target RGB color without change

LUMISSIL Microsystems
A Division of ISSI

LED 电流可以起到调节 LED 光输出强度的作用，但是，**电流的变化会改变LED 的颜色**，即 LED 的色度会随着电流的变化而变化，即常说的蓝移或红移。等于说，改变电流后，LED的色域会发生变化，对应的混色结果都会改变。
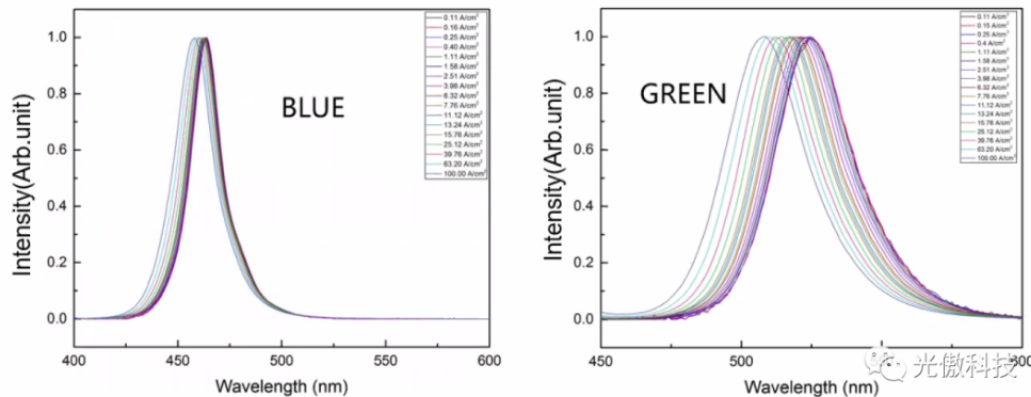
因此，为了避免电流的变化，必须采用PWM脉宽调制调光技术。PWM就是Pulse Width Modulation，即**脉冲宽度调制**。

通过施加一个 PWM 信号来控制 LED 亮度的做法允许不改变彩色的情况下完成 LED的调光。

IS31FL3246- 36 Channel Driver (三维调光！)

FEATURES

- 2.7V to 5.5V VCC supply
- Pin to Pin with IS31FL3236A/IS31FL3237
- 1MHz I2C interface with 4 selectable I2C addresses
- Accurate Color Rendition, total 18 bit PWM resolution
  - 8-bit PWM @ 122Hz/244Hz for color mixing
  - 10-bit PWM @32kHz for breath dimming
  - 3 x 8-bit group current adjust for white balance
- Open/short detect function
- Group Dimming for Reduce Coding for RGB
- EMI Reduction Technology
  - Spread spectrum
  - Selectable 6 phase delay
  - 180 degree phase delay
- -40°C to +125°C temperature range
- QFN-44 (5mm×5mm) package
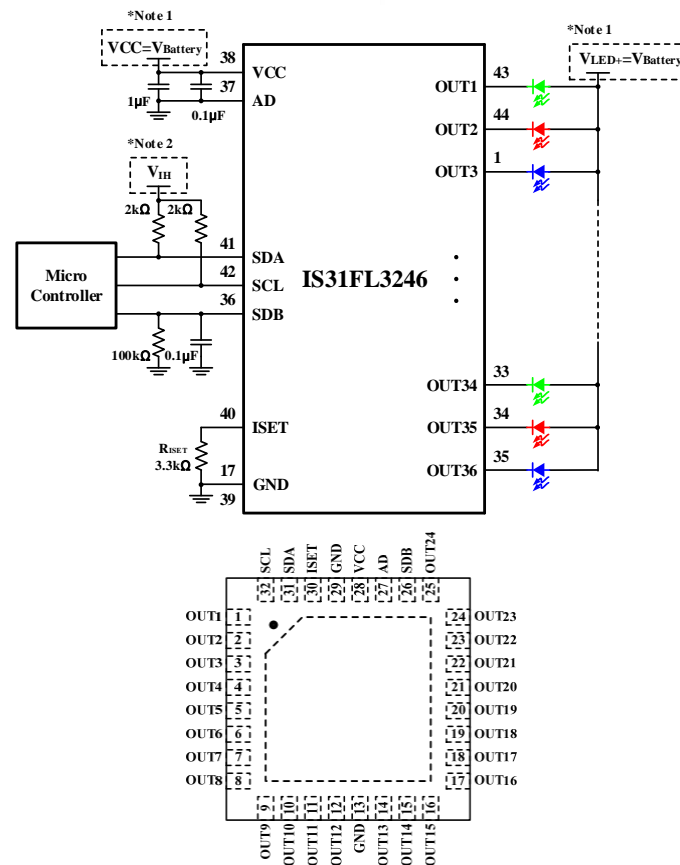
IS31FL3246 3Dimension Dimming control is the Best!三维调光！

LUMISSIL Microsystems
A Division of ISSI

	IS31FL3236A	AW21036	IS31FL3246	IS31FL3237

AW21036

$I_{OUT(MAX)}$ REXT=3.3K

I_{GCC} 256 steps Global Current Control

I_{OUT} 256 steps Current Control for color mixing

I_{PWM} 256 steps PWM dimming

IS31FL3246

$I_{OUT(MAX)}$ REXT=3.3K

I_{GCC} x3   256 steps x3 Global Current Control to do white balance/color calibration

I_{PWM1} LFPWM: 240hz: color mixing

I_{PWM} HFPWM: 32kHz PWM dimming

IS31FL3237

$I_{OUT(MAX)}$ REXT=3.3K

I_{GCC} 256 steps Global Current Control

I_{OUT} 256 steps Current Control for color mixing

I_{PWM} 8-bit/10-bit/12-bit/16-bit PWM dimming

IS31FL3236A

$I_{OUT(MAX)}$ REXT=3.3K

I_{OUT} SL=1, 1/2, 1/3, 1/4

I_{PWM} 256 steps PWM dimming

White balance function, Higher PWM resolution!

- LED current & PWM resolution

    – 3x8-bit global DC current control, all Red channels has 256 steps, all green channels has 256 steps, all Blue channels has 256 steps, can be used as white balance/color calibration

    – 8-bit 120/240/480Hz LFPWM for each channel, can be used as color mixing

    – 10-bit 32k/64k/128kHz HFPWM for each channel, can be used as smooth dimming control

Conclusion: IS31FL3246 is the Best Solution with real high accuracy RGB color mixing (8bit PWM) and high PWM resolution(10bit) for breathing control.

28

FxLED Driver

Type	Part Number	Description	Package
Matrix LED Driver	IS31FL3728	Audio Modulated 64 LEDs, audio EQ mode	QFN-24
	IS31FL3729	16x8,15×n (n=1~9) matrix LED Driver, 256 step DC & PWM	QFN-32
	IS31FL3730	Audio Modulated 128 LEDs	QFN-24
	IS31FL3731	Audio Modulated 144 LEDs, 8 frames memory	QFN-28, SSOP-28
	IS31FL3732A	Audio Modulated 144 LEDs, Cascade	QFN-40
	IS31FL3733B	192 LEDs, special modes with Fault Reporting	QFN- 48, LQFP- 48
	IS31FL3736B	96 LEDs, special modes with Fault Reporting	QFN- 40
	IS31FL3737B	144 LEDs, special modes with Fault Reporting	QFN- 40
	IS31FL3738	48 LEDs, special modes with Fault Reporting	QFN-28
	IS31FL3739	64, 8×8 or7xn(n=1~9) Matrix LED Driver ,256 step DC & PWM	SOP-24
	IS31FL3740	3×4 LEDs matrix driver	QFN-20,eTSSOP-20
	IS31FL3741A	39 x 9 Dots matrix Led driver	QFN- 60
	IS31FL3742A	30 x 6 Dots matrix Led driver	QFN- 48
	IS31FL3743A/B	198 (18x11)LED 256 Step DC&PWM 3743A:I2C , 3743B:SPI	UQFN-40
	IS31FL3745	144 (18x8) LED, 256 Step DC&PWM	WCSP-36
	IS31FL3746A/B	72 (18x4) LED, 256Step DC&PWM 3746A: I2C, 3746B: SPI	QFN-32
	IS31FL3748	28V, 96(24x4) , multiple interface ,256 Step DC&PWM	QFN-48

NEW

IS31FL3748

FEATURES

- Support 24 constant current channels @ 40mA/ch
- 4 PMOS high side switches (500ma each); when combining 2 for 2*24 configuration, supporting 1A each
- Tolerate up to 30V, nominal operation voltage between 4.5V to 24V
- Built-in LDO to generate 4.8V supply for internal logic (option to float it and use external power)
- Interface
  – DSB(Daisy Chained Serial Bus, 2MHz)
  – HSB(High speed Series Bus: 10MHz)
  – I2C(1Mhz)
  – SPI(12Mhz)
- SDB pin rising edge reset the interface
- Reset register reset all the registers to default value
- For DSB and HSB
  – Built-in PWM generator: 7-bit/dot
  – Built-in Dot correction: 7-bit/dot

- 7bit x 3 global current adjustment
- For I2C and SPI
  – Built-in PWM generator: 8-bit/dot
  – Built-in Dot correction: 8-bit/dot
- 8-bit x 3 global current adjustment
- 4 groups delay to minimize the power ripple
- Channel to channel timing skew (one sys-clock skew to reduce transient noise)
- Power noise reduction method
- Spread spectrum
- LED open/short detection and fault reporting(For I2C and SPI only)
- Other protection: over temperature, over voltage, under voltage
- FAULT/bidirectional: one fail, all fail optional supported (can be turned on/off by interface bus)
- Operating temperature: -40°C to 125°C
- QFN-48 (6mm×6mm) package

NEW

IS31FL3748
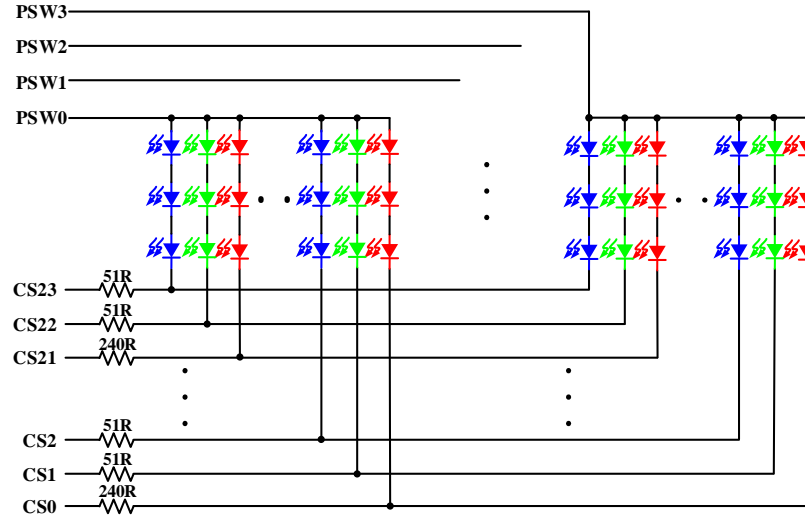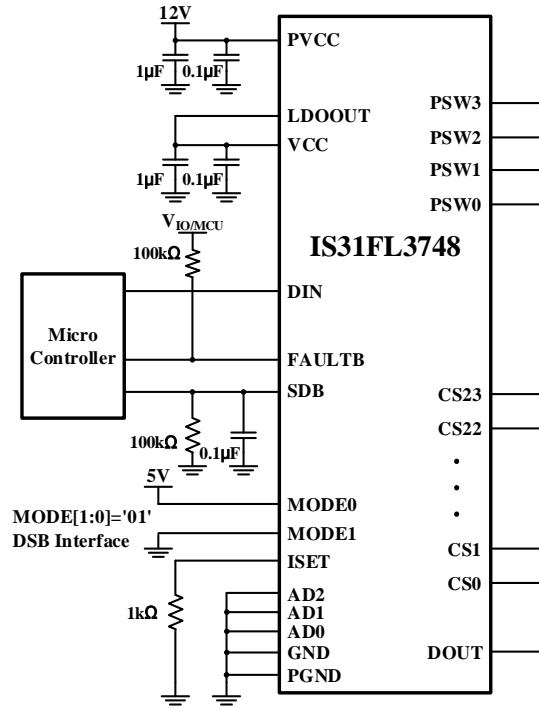
IS31FL3748

	IS31FL3748	TB62D787FTG	TB62D612FTG
(Constant current)Channels	24CSx4PSW	24 SINK	24 SINK
RGB	8x3	8	8
LED Current Per Channel (mA)	40mA Max.(n=1) 20mA Max.(n=2) 13.3mA Max.(n=3) 10mA Max.(n=4)	40mA Max. Constant current 85mA, Output current capability	40mA Max. Constant current 80mA, Output current capability
VSAT_PSW(Headroom Voltage)	Typ. 0.37V@40mA, Max. 0.44V@40mA	NA	NA
VSAT_CS(Headroom Voltage)	Typ. 0.37V@40mA	0.5V min, constant current 5 to 40 mA	0.4V min, constant current 5 to 40 mA
Channel-to-Channel Error:%	±4 @IOUT=40mA	±3 @IOUT=15mA	±3 @IOUT=15mA
Device-to-Device Error:%	±6 @IOUT=40mA	±6 @IOUT=15mA	±6 @IOUT=15mA
LED Configuration	Parallel-Common Anode	Parallel-Common Anode	Parallel-Common Anode
Interface	I2C Control 1MHz MODE[1:0]='10' SPI Control 12MHz MODE[1:0]='11' DSB Control 2MHz MODE[1:0]='01' HSB Control 10MHz MODE[1:0]='00'	Single Wire Control 2MHz Same as DSB 2MHz	Two Wire Control 10MHz Same as HSB 10MHz
Vin (Min) (V)	5.5(PVcc), 3(Vcc)	7(PVcc),4.5(Vcc)	3(Vcc)
Vin (Max) (V)	28(PVcc), 5.5(Vcc)	28(PVcc),5.5(Vcc)	28(PVcc),5.5(Vcc)
Iq (Typ) (mA)	1.3(PVcc), 7.5(Vcc)	12(PVcc),11.5(Vcc)	9mA typ.(REXT=1.2kΩ) 14mA max.(REXT=1.2kΩ)
ISD (uA)	9.8(PVcc), 2.6(Vcc)	NA	1
Noise Rejection	4 groups delay	NA	NA
Global Current	256(SPI/I2C) ,128(DSB/HSB)	NA	NA
Current Setting Resolution/Color cabration(Individual)	256(SPI/I2C),128(DSB/HSB)	NA	NA
PWM Resolution	256(SPI/I2C) ,128(DSB/HSB)	128	128
Spread spectrum(improve EMI)	Yes	NA	NA
PWM Frequency	25.6kHz/51.2kHz/200Hz/400Hz	70kHz	NA
Hardware Address	AD: 64 selection	AD: 64 selection	AD: 64 selection
Special Features	4 Interfaces , 4 groups delay to minimize power ripple	Single Wire Control	Two Wire Control
Thermal shutdown	Yes	Yes	Yes
Operating Temperature Range (C)	-40 to 125	-40 to 85	-40 to 85
Pin/Package	QFN48 6x6	VQFN40 6x6	WQFN36 6x6

NEW

IS31FL3748
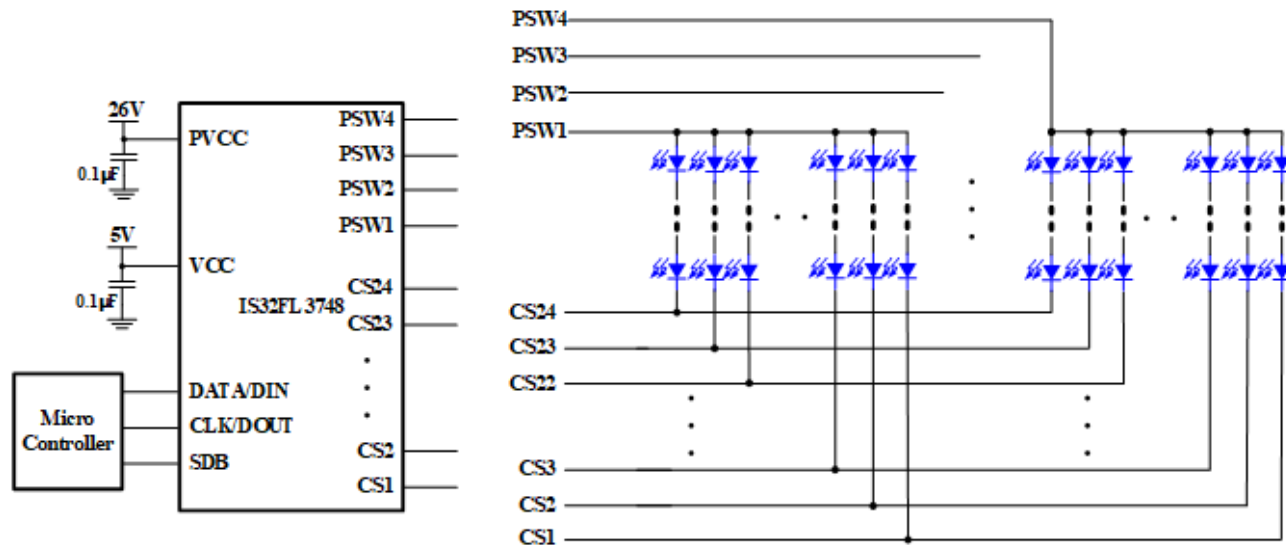
- Each 3748 support 24*4=96 BLU, each BLU include 9 LEDs, in series
  - Total 96 BLU
  - Each BLU include 9 LEDs, in series
- Brightness Uniformity
  - In BLU, 100% match because all LED are in series, like traditional back light LED driver
  - Between each BLU, depending on the match and accuracy of LED driver
- Efficiency
  - Constant current driver: Total Vf /PVCC, if total Vf of 9 LED is 2.7*9=24.3V, VCC is 26V, Boost is 90%, total efficacy is 24.3/26*90%=84%

Strategy update for Matrix LED Driver products

Channels	Advanced	Enhanced	Basic
64		FL3739 (64,SOP24, 8bit PWM, 8bit CS)	FL3728 (on/off)
72	FL3746A/B (8bit PWM and DC)		
96	FL3748(High Voltage, multiple interface)	FL3736B (8x12, 8bit PWM)	
128/135		FL3729 (8x16,8bit PWM, 8bit CS PWM, QFN& TQFP)	FL3730 (on/off)
144		FL3731 (8x9x2,8bit PWM) FL3737B (12x12,8bit PWM)	
180/192/198	FL3742B (30x6, 8bit PWM/DC) FL3743A/B(18x11, 8bit PWM/DC)	FL3733B (16x12, 8bit PWM,QFN& eTQFP)	
351	FL3741A (39x9, 8bit PWM/DC)		

Based on customer performance's requirement and cost expectation to select the right one.

Matrix LED Drivers By Generation

Tech	1st Gen		2nd Gen		3rd Gen		4th Gen				
Part Number	IS31FL3728	IS31FL3730	IS31FL3731	IS31FL3732A	IS31FL3736/ IS31FL3737/ IS31FL3733	IS31FL3738/ IS31FL3740	IS31FL3741/ IS31FL3742	IS31FL3743A/ IS31FL3743B	IS31FL3745	IS31FL3746A/ IS31FL3746B	IS31FL3729/39
Status	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP
(Matrix)Dots	64	128	144	144	96/144/192	48/12	351/180	198	144	72	135/64/63
RGB	no support	no support	32	32	32/48/64	16/4	117/60	66	48	24	45/18
Current Setting (IMAX)	15(5-75)	15(5-75)	RISET Set	RISET Set	RISET Set	RISET Set	RISET Set	RISET Set	RISET Set	RISET Set	RISET Set
LED Current Per Channel (peak, mA)	40mA Tpy. 75mA Max.	40mA Tpy. 75mA Max.	34mA	34mA	42mA Tpy.	84mA Tpy.	38mA Tpy.	34mA Tpy.	34mA Tpy.	34mA Tpy.	35mA Tpy.
Dot average current(mA)	5	2.5	3.4	3.4	3.4	13.2/26.4	3.2/6.4	3	4	8	4.2
Duty(Matrix Only)	1/8	1/8 or 1/16	1/9	1/9	1/12	1/6	1/n, n=1-9/1-6	1/n, n=1-11	1/n, n=1-8	1/n, n=1-4	1/n, n=1-9
LED Configuration	8x8, 7x9, 6x10, 5x11	8x8x2, 7x9x2, 6x10x2, 5x11x2	Multi-Scan 8x9x2	Multi-Scan 8x9x2	12SWx8CS/ 12SWx12CS 12SWx16CS	6SWx8CS/ 3SWx4CS	39CSx9SW/ 30CSx6SW	18CSx11SW	18CSx8SW	18CSx4SW	16/7CSx9SW CS:Current Sink
Interface	I2C 400khz	I2C 400khz	I2C 400khz	I2C 400khz	I2C 1Mhz	I2C 1Mhz	I2C 1Mhz	I2C 1Mhz/ SPI 12MHz	I2C 1Mhz	I2C 1Mhz/ SPI 12MHz	I2C 1Mhz
Program Memory	No	No	Yes	Yes	No	No	No	No	No	No	No
Ramp Control	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Vin (Max) (V)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Iq(Typ)(mA)VCC3.6V	7	7	2.17Typ	2.17Typ	2.17Typ	2.17Typ	4.5Typ./6Max.	1.8Typ	1.9Typ./3Max.		1.9Typ./3Max.
Iq(Typ)(mA)VCC5V										2.3Typ	2Typ
Accuracy ±x%			About ±10	About ±10	±10	About ±10	±7	±7	±7	About ±7	±7
ISD (Typ) (uA)	1.7	1.7	0.5	0.5	3	3	2	1.3	2	2	2
Global current dimming	NA	128(Global PWM)	no	256	256	256	256	256	256	256	256
Dot Correction(DC)	no	no	no	no	no	no	256/dot	256/dot	256/dot	256/dot	256/Each CS 16 groups
PWM Resolution	no	no	256	256	256	512/1024	256	256	256	256	256
PWM Frequency(kHz)			8.26	20.4	7.35	7.35	29	29	29	29	80
Spread spectrum	no	no	no	no	no	no	Yes	Yes	Yes	Yes	Yes
Special Features		128 LED Global 7 bit PWM	Ultrl-Less pin count	256 Global Current setting Ultrl-Less pin count	Ultrl-Low IQ	Ultrl-Low IQ Big dot current	FL3741: 351 LED! FL3742: higher average current for each dot	FL3743B: 12MHz SPI interface Both: 2 chip for full gamming KB	FL3745: WCSP3x3 package	Big average current for each dot FL3746B: 12MHz SPI interface	Less Dot correct registers
Operating T Range (C)	-40~85	-40~85	-40~85	-40~85	-40~85	-40~85	-40~125	-40~125	-40~125	-40~125	-40~125
Pin/Package	QFN4X4-28	QFN4X4-28	QFN4X4-28	QFN5X5-40	QFN5x5-40/ QFN6x6-48	WFQFN5x5-28/ WFQFN5x5-20	QFN7x7-48/ QFN7x7-60	UQFN-40 (5×5)	WCSP3x3 6x6 36 pin	QFN4x4-32	QFN4x4-3 SOP-24

NEW

LUMISSIL Microsystems
A Division of ISSI

Strategy update for Matrix LED Driver products

Channels	Advanced	Enhanced	Basic
64		FL3739 (64,SOP24, 8bit PWM, 8bit CS)	FL3728 (on/off)
72	FL3746A/B (8bit PWM and DC)		
96	FL3748(High Voltage, multiple interface)	FL3736B (8x12, 8bit PWM)	
128/135		FL3729 (8x16,8bit PWM, 8bit CS PWM, QFN& TQFP)	FL3730 (on/off)
144		FL3731 (8x9x2,8bit PWM) FL3737B (12x12,8bit PWM)	
180/192/198	FL3742B (30x6, 8bit PWM/DC) FL3743A/B(18x11, 8bit PWM/DC)	FL3733B (16x12, 8bit PWM,QFN& eTQFP)	
351	FL3741A (39x9, 8bit PWM/DC)		

Based on customer performance's requirement and cost expectation to select the right one.

FxLED concept

FxLED concept

1. 左右侧火焰大小调节灯效
宝蓝色LED，128pcs LED/侧
设计方案：IS31FL3731，2PCS

FxLED concept
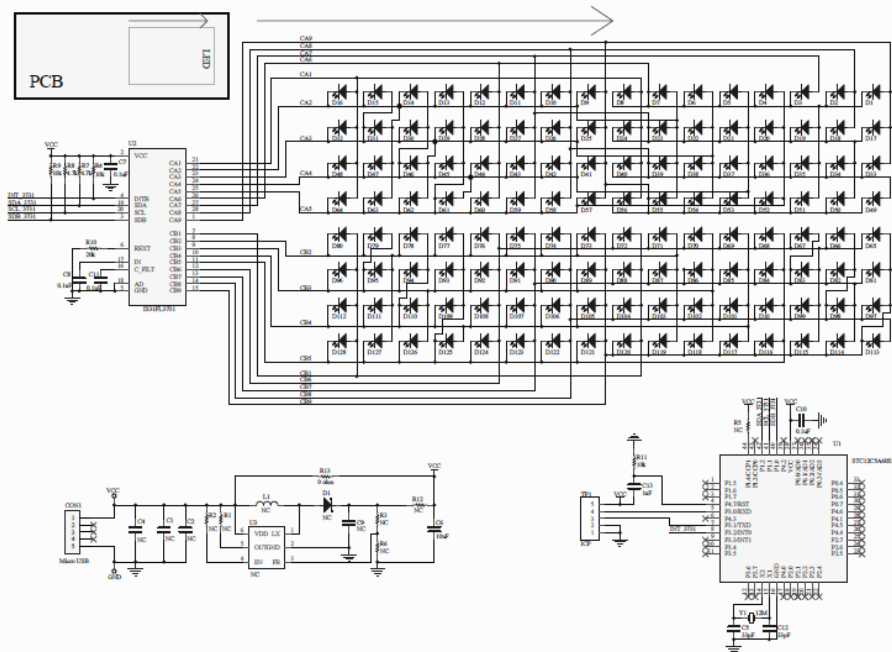
2. 灶台四周灯效
宝蓝色LED，128pcs
设计方案：IS31FL3729，1PCS

TYPICAL APPLICATION CIRCUIT
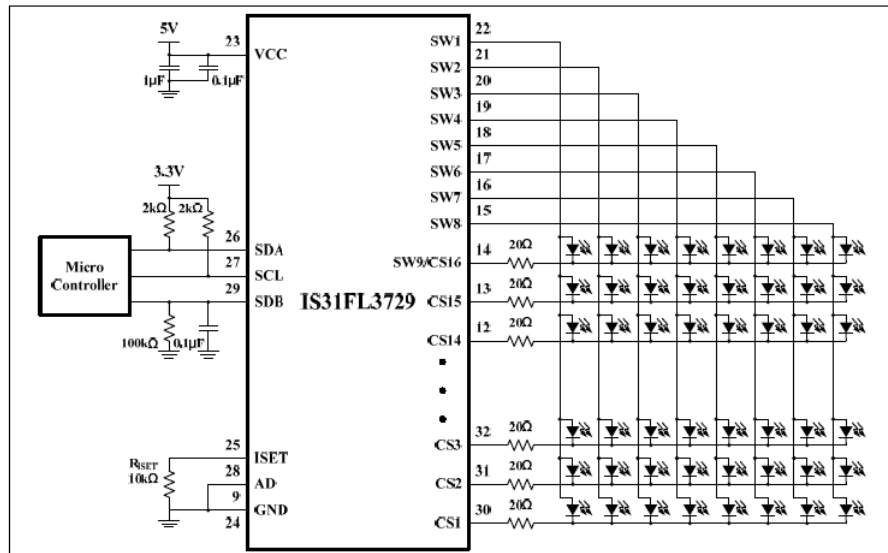
Figure 1 Typical Application Circuit (16×8)

FxLED concept

3. Logo灯效
宝蓝色LED, 36pcs
设计方案1：
动态效果，IS31FL3236A，1PCS

Figure 1   Typical Application Circuit

BSH

FxLED concept
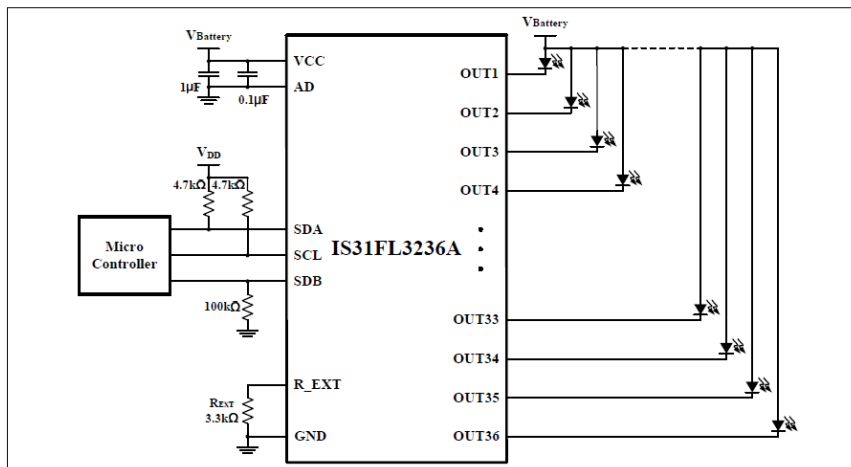
3. Logo灯效
宝蓝色LED, 36pcs
设计方案1：
静态效果，IS31FL3177，1PCS
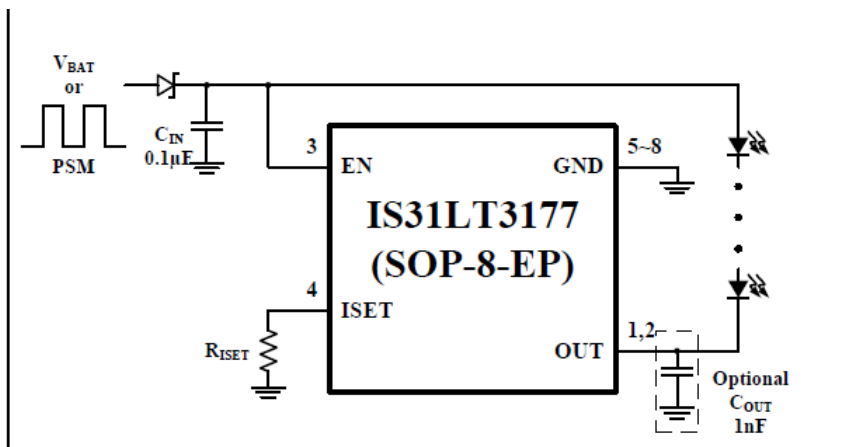
Figure 1 Typical Applic

BSH

W动力
汽车之家

FXLED driver Markets Served by ISSI

- Mobile and Wearable

FXLED driver Markets Served by ISSI

FXLED driver Markets Served by ISSI

FXLED driver Markets Served by ISSI

FXLED driver Markets Served by ISSI

46

FXLED driver Markets Served by ISSI

FXLED driver Markets Served by ISSI

49

ISSI Solution for JBL PULSE 3 and HOMEPOD

FXLED driver Markets Served by ISSI

JBL Pulse3 speaker

52

Original LED Design of JBL PULSE 3 96RGB

96 RGB LED (integrated IC)

Advantages

- Daisy chain, Simple connection

Disadvantages

- High system cost
- Poor reliability
- High firmware loading for controller
- Poor dimming levels, can not reach true color

ISSI Solution for JBL PULSE 3   96RGB
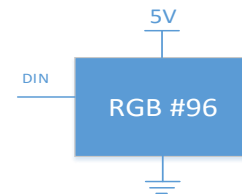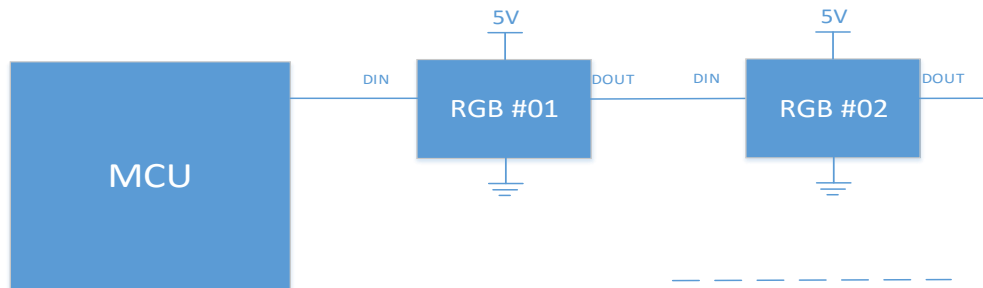
4pcs IS31FL3746B.

Advantages

- Lower system cost
- More features :
  - 8 bit PWM
  - 8 bit DC current adjust
  - 8bit global current adjust
  - Open/short detection/Deghost
  - High speed SPI interface to low down the load of the MCU
  - High average current to achieve same brightness
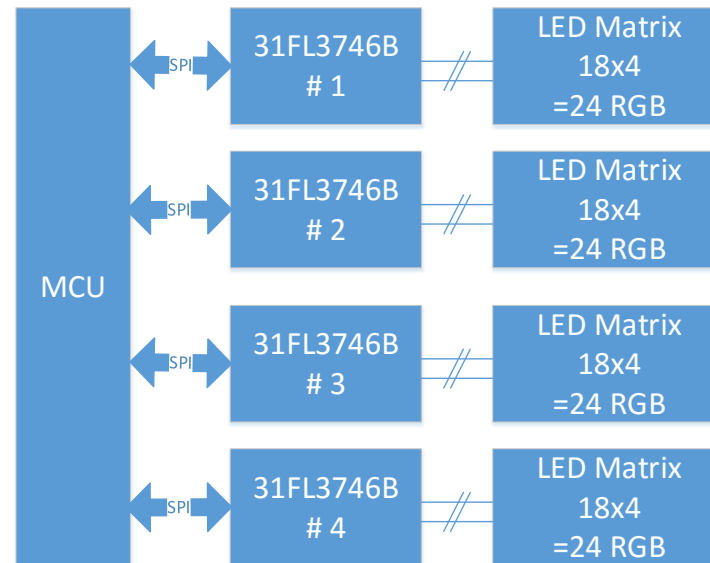
Original LED Design of HOMEPOD 19RGB

19RGB = 57 LEDS.

5pcs TLC5971/system

Advantages

- Full function

Disadvantages

- Very high system cost

ISSI Solution for HOMEPOD 19RGB

Advantages

- Lower system cost
- Simple connection
- Full function
    - 8 bit PWM
    - 8 bit current adjust
    - 8bit global current adjust
    - High speed I2C interface to low down the load of the MCU
    - High average current to achieve same brightness

```
MCU  <--I2C-->  31FL3746A
                    #1       //  19 RGB
```
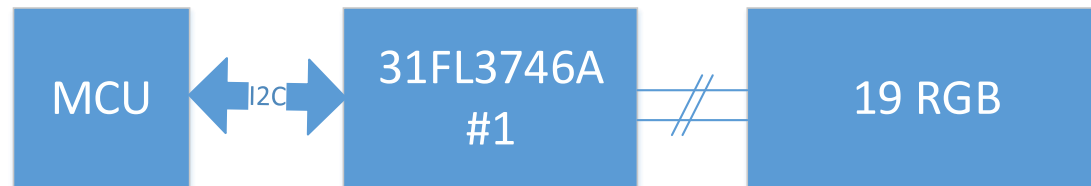
FL3746 for Home POD application

Apple is using 5pcs TI 12CHs driver

Cover with 1pcs IS31FL3746

➢ **Sony BT speaker (FL3236)/Polk AI sound Bar**

Sony XB72 High Power Home Audio
System with Bluetooth Technology
(GTK-XB72), Black

-Skyworth/LG TV with AI

➢ **VOIP phone /Router (Allworx,Qimiao)**
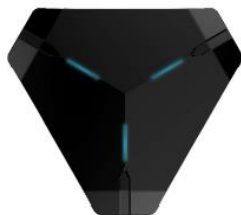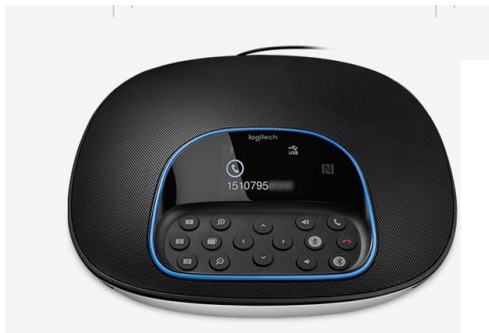
Ohh智能家居新一代中控主机 Batell组网

60

FXLED driver Markets Served by ISSI

➢ **Gaming**   Razer, Corsair, Logitech,..

FXLED driver Markets Served by ISSI

➤ **Gaming PC**

Asus

FXLED driver Markets Served by ISSI
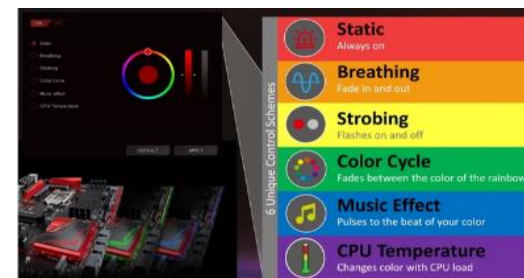
➤ **Gaming PC**

Model :Kintec Gaming PC
Part Number: IS31FL3236A

FXLED driver Markets Served by ISSI

> ➢ **Wireless Charger**

64

➢ **Washing machine**

FXLED driver Markets Served by ISSI

➢ **Home**

66
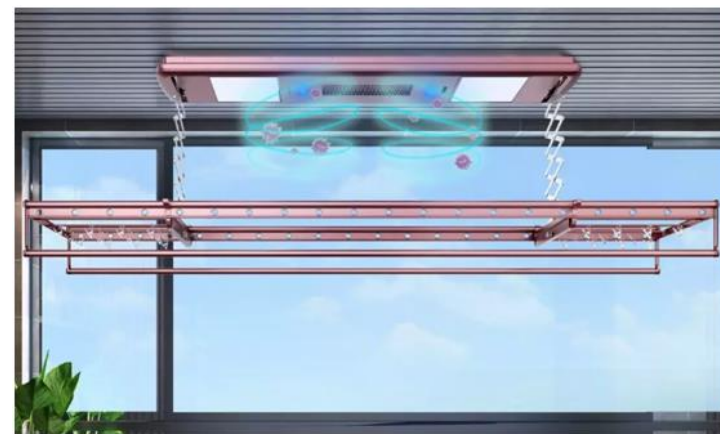
FXLED driver Markets Served by ISSI

➢ **Air Condition**

FXLED driver Markets Served by ISSI
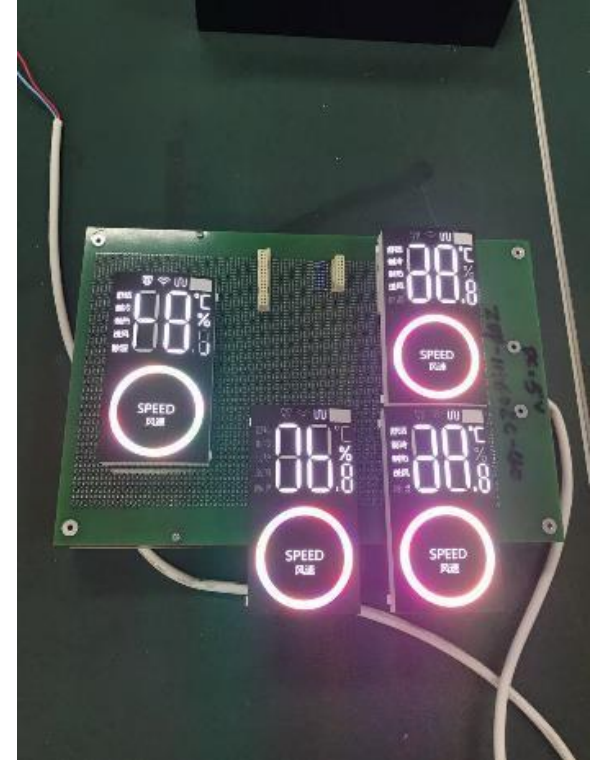
➢ **Air Purifier**

➤ **Air Purifier**

LUMISSIL Microsystems
A Division of ISSI

➢ **Air Purifier**

FXLED driver Markets Served by ISSI

➤ **Ice refrigerator**

FXLED driver Markets Served by ISSI

➤ **Water heater**

72

FXLED driver Markets Served by ISSI

➢ **Rice cocker/Microwave**

FXLED driver Markets Served by ISSI

➢ **Water dispenser**

FXLED driver Markets Served by ISSI

➢ **Education Robot**

75

FXLED driver Markets Served by ISSI

Sphero BOLT App-Enabled Robot (FL3733)
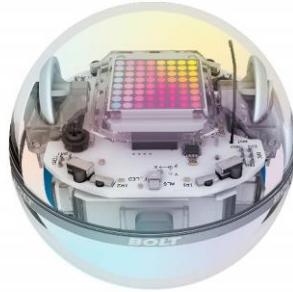
Model :I-FLYTEK 科大讯飞/搜狗
 Translation Pan

> **Music Equipment**

➢ **Smart Clock**
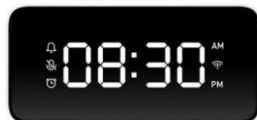
FXLED driver Markets Served by ISSI

➢ **Healthy**

- IOT Health Scales use Matrix LED Driver to Display Messages

Fitbit Aria

Garmin Index Smart Scale

清晰易读数
采用80颗均匀高亮LED组成的点阵屏幕，在各种光线条件下都可清晰读数。

80

➢ **Beauty**

Electric toothbrush：FL3193

Nuskin Lumi SPA（FL3218）

FXLED driver Markets Served by ISSI

➢ **Smart Lock/Home security**

➢ **Home (house cleaner robot)**

FXLED driver Markets Served by ISSI

➢ **Home**

FXLED driver Markets Served by ISSI

➢ **Sports wear**

FXLED driver Markets Served by ISSI

Lumissil Automotive Solutions
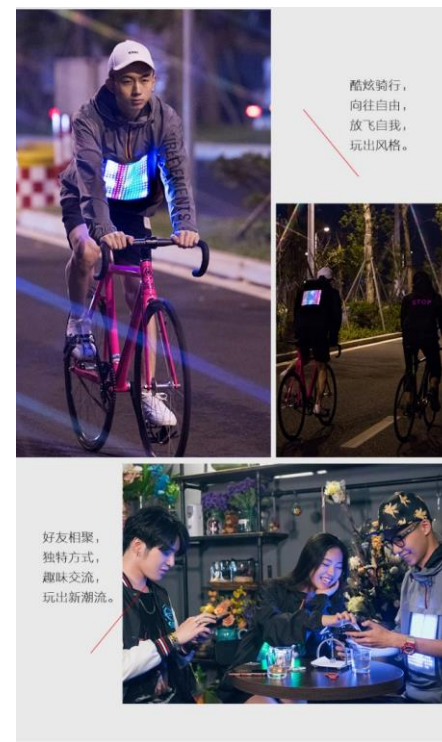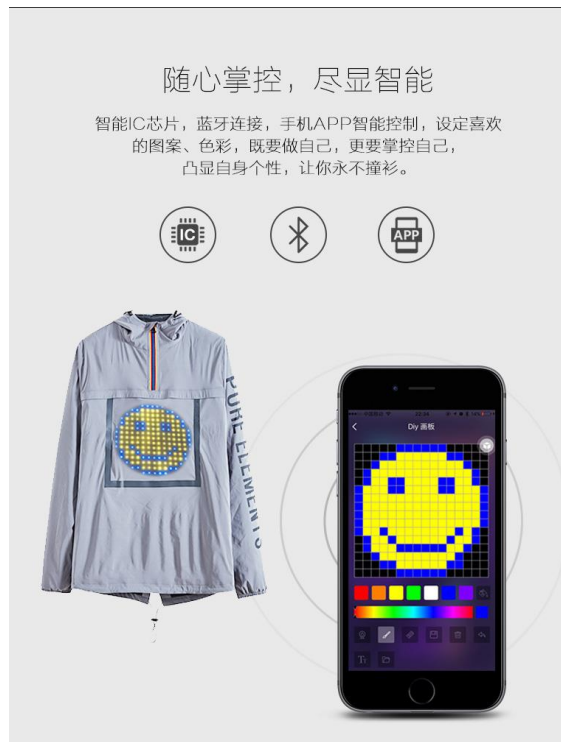
Offer a Complete Lighting Portfolio for all Auto Lighting Applications

- Audio Solutions
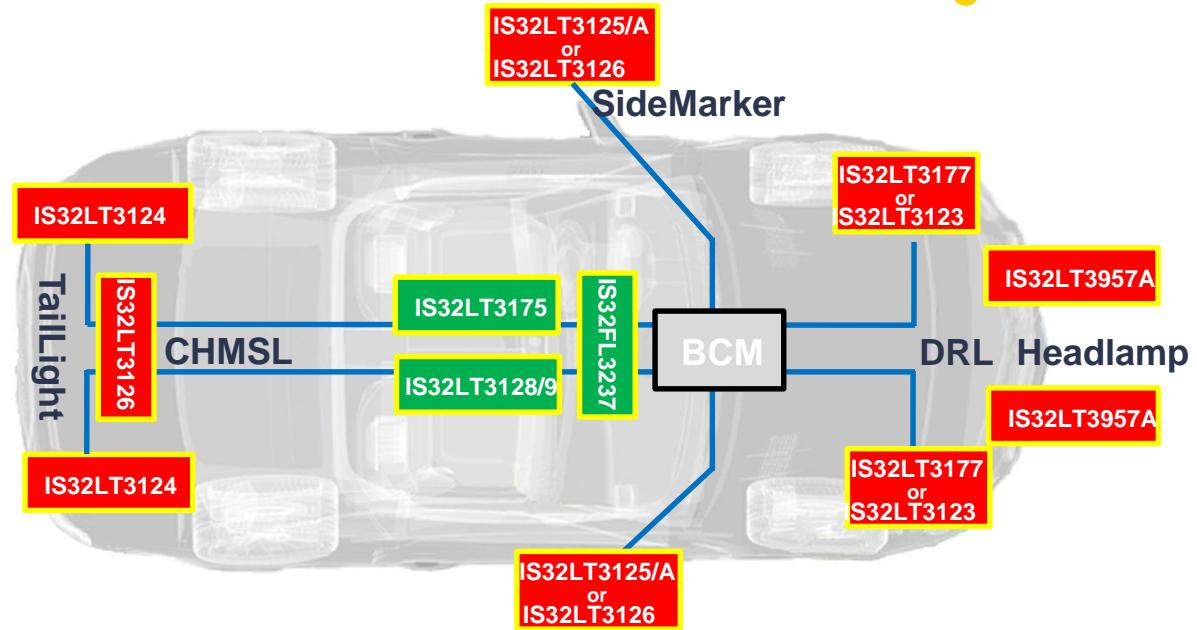 - Low Power Audio Amplifiers for Clusters & Ecall applications

- Lighting Solutions
  - LED Drivers for Interior Lighting
    - LED Backlight Drivers for Infotainment / Cluster & Ambient applications
  - LED Drivers for Exterior Lighting

Automotive Lighting – Interior/Exterior

Automotive:
- Stop/Tail Light
- CHMSL
- Sidemarker
- Headlamp
- DRL
- Domelight
- RGB Color

IS32LT3125/A or IS32LT3126

SideMarker

IS32LT3177 or S32LT3123

IS32LT3124

IS32LT3957A

IS32LT3124

TailLight

IS32LT3126

CHMSL

IS32LT3175

IS32FL3237

IS32LT3128/9

BCM

DRL Headlamp

IS32LT3957A

IS32LT3177 or S32LT3123

IS32LT3125/A or IS32LT3126

TailLight/CHMSL

SideMarker

DRL / Headlamp