

LIGHTING

Solution Guide

June 2010

Making Bright Ideas BrilliantSM

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LINECARD

HP/HB LED

Cree 科锐
ORSAM 欧司朗
Everlight 亿光电子
Avago Technologies 安华高科技

Heat Sink

TT Electronics (IRC)

LED Driver

NXP Semiconductors 恩智浦半导体
Texas Instruments 德州仪器
National Semiconductor 美国国家半导体
STMicroelectronics 意法半导体
Cypress Semiconductor 赛普拉斯
Infineon Technologies 英飞凌科技
International Rectifier 国际整流器
Linear Technology 凌力尔特
Fairchild Semiconductor 飞兆半导体
ON Semiconductor 安森美半导体
Micrel 麦瑞
Diodes 达拉斯

Lens / Optics

Fraen
Ledil
LedLink 雷笛克光学

Microcontroller

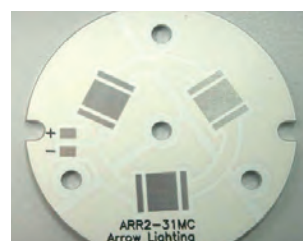
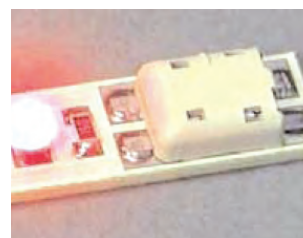
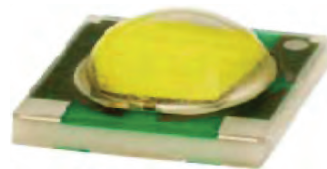
Texas Instruments 德州仪器
Freescale Semiconductor 飞思卡尔半导体
NXP Semiconductors 恩智浦半导体
Renesas 瑞萨电子
Cypress Semiconductor 赛普拉斯
Atmel 爱特梅尔

By Product Category

PCB 线路板
TT Electronics (IRC)
MCPCB 铝基板
FR4 with Metalbase

Passive Components

Tyco Electronics 泰科电子



This is specially designed for promoting HP-LEDs which are measured in Lumen @350mA/25°C normally. Cree is Arrow Asia's focus LED line for the brightest white color HP-LEDs when driving @350mA or higher. The high power LED series from Cree include XPC/XPE/XPG LED, XRE/XRC, lighting class MX6 LED and multiple chip LED MCE and MPL LED.

以下内容是为推广高功率LED所设，流明值都是在350mA驱动电流和25度条件下所测。Cree大功率白光LED是艾睿亚洲重点推广的一条照明产品线，包含有XPC/XPE/XPG/XRE/XRC，还有多芯片的MX6和MCE以及MPL LED。

FEATURES (特性)

- Industrial leading luminous flux in color and efficiency 产业界领先的亮度和光效
- Wide range of colors. E.g. cool white, warm white, red, green, blue, etc 多种颜色，如冷白、暖白、红色绿色蓝色等
- Narrow color bins 色温分档细
- Low thermal resistance & high max. junction temperature 极低热阻，极高工作节温
- Uniform small source 统一的小尺寸光源
- Low forward voltage 低正向压降
- Autoclave-compliant 满足高温作业要求
- Isolated thermal path 热电分离

BENEFITS (优点)

- Enable low total system cost through low power and heat requirements 低功率和热的要求能减少系统成本
- Allow XLamp LEDs to replace conventional lighting 可替换传统的照明光源
- Can be tailored towards specific applications 可满足某些特定应用
- Good uniformity across end products 产品一致性好
- Low inventory of LEDs for matching 可低库存运作
- Ease of thermal design and secondary 简易光学和导热设计
- Lower power consumption 更低的功率损耗
- Extends battery life in portable lighting 可延长电池寿命
- Enhance ruggedness & reliability of LED in all environments 在各种环境中具有高可靠度

APPLICATIONS (应用)

- Outdoor decoration/general illumination 室外装饰/通用照明
- Indoor/ residential lighting 室内/住宅照明
- Portable lighting - torch 便携照明 - 手电筒
- Street lighting 路灯
- Parking garage lighting 停车场照明
- Emergency vehicle lighting 应急车辆照明
- Industrial lighting 工业照明
- MR16 format spot lighting MR16类的照明
- Mining lamp lighting 矿灯

SUPPLIER (供应商)

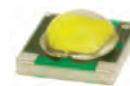


XPG		XPE		XPC		XRE		XRC		MCE		MPL		MX6	
Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current	Thermal Resistance	Max. Driving Current
6°C/W	1500mA	9°C/W	1000mA	12°C/W	500mA	8°C/W	1000mA	12°C/W	700mA	3°C/W	700mA	N/A	250mA	5°C/W	1000mA
Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types	Viewing Angle	Lens Types
125	Silicone	115	Silicone	110	Silicone	90	Glass	90	Glass	110	Glass	125	Silicone	120	N/A
Dimension: 3.45mm x 3.45mm		Dimension: 3.45mm x 3.45mm		Dimension: 3.45mm x 3.45mm		Dimension: 7.0mm x 9.0mm		Dimension: 7.0mm x 9.0mm		Dimension: 7.0mm x 9.0mm		Dimension: 12.15mm x 13.15mm		Dimension: 5.0mm x 6.5mm	

Cree — High Power Lighting Class LED - XPC/XPE/XPG LED 科銳 — 照明級高功率 LED - XPC/XPE/XPG LED

XP LED is a LED which combines with lighting class performance and reliability and much smaller foot print compare with XR LED. The newly launched XPG series delivers unprecedented levels of light output and efficacy for a single die LED which is a perfect fit on general illumination application.

XP系列集成了照明级别的特性和高可靠性，但尺寸要比XR系列的小很多。XPG系列是最新推出的单芯片LED，它能输出前所未有的亮度和光效，可完美的应用于通用照明。



FEATURES (特性)

- Industry first lighting class LED 业界首位的照明级LED
- Small package size 3.45mm x 3.45mm 小尺寸
- Narrow color bins 色温分档细
- High light intensity output 高亮度输出
- Isolated thermal path 热电分离
- Low thermal resistance 低热阻

BENEFITS (优点)

- High light intensity output 高亮度输出
- Small size for small form factor 小尺寸
- Low power consumption 低功率损耗
- Increased energy saving & efficiency 高效节能
- Fits various application 适合各种应用
- Ease of thermal and optic design 简易光学和导热设计

APPLICATIONS (应用)

- General lighting 通用照明
- High end portable 高端便携应用
- Light bar 灯条
- Outdoor lighting such as street light 路灯
- Indoor Retrofit 室内照明升级改造
- Area lighting 区域照明

SUPPLIER (供应商)



Supplier 供应商	Cree Lighting Class XP Series LED															
	Cool White (冷白)						Neutral White (中性白)		Warm White (暖白)				Color (颜色)			
Part No. 产品编号	XPCWHT-L1-0000-00951	XPCWHT-L1-0000-00C51	XPEWHT-L1-0000-00C51	XPEWHT-L1-0000-00D51	XPGWHT-L1-0000-00G51	XPGWHT-L1-0000-00H51	XPEWHT-01-0000-00CD2	XPGWHT-01-0000-00GC2	XPCWHT-L1-0000-007W6	XPEWHT-L1-0000-008W6	XPEWHT-L1-0000-008AA	XPEWHT-L1-0000-009W6	XPERED-L1-0000-00601	XPERED-L1-0000-00301	XPEBLU-L1-0000-00Y01	XPEGRN-L1-0000-00B01
Technical Performance (lm) 技术参数 (流明)	min. 80.6 @350mA, full bins	min. 100 @350mA, full bins	min. 100 @350mA, full bins	min. 107 @350mA, full bins	min. 130 @350mA, full bins	min. 139 @350mA, full bins	min. 100 @350mA, 16 bins	min. 130 @350mA, 12 bins	min. 67.2 @350mA, 12 bins	min. 73.9 @350mA, 12 bins	min. 73.9 @350mA, 6 bins	min. 80.6 @350mA, 12 bins	Amber Color min. 62 @350mA, A2 & A3 color bins	Red color min. 45.7 @350mA, R2 & R3 color bins	Blue color min. 30.6 @350mA, B3, B4, B5, B6 color bins	Green color min. 93.9 @350mA, G2, G3, G4 color bins
Type 种类	XP-C series	XP-C series	XP-E series	XP-E series	XP-G series	XP-G series	XP-E series	XP-G series	XP-C series	XP-E series	XP-E series	XP-E series	XP-E series	XP-E series	XP-E series	XP-E series
Color 颜色	Cool White	Cool White	Cool White	Cool White	Cool White	Cool White	Neutral White	Neutral White	Warm White	Warm White	Warm White	Warm White	Amber	Red	Blue	Green
Color Temp. (°K) 色温	5000-10000	5000-10000	5000-10000	5000-10000	5000-10000	5000-10000	3700-5000	4000-5300	2700-3500	2700-3500	2700-3000	2700-3500	N/A	N/A	N/A	N/A
Wavelength (nm) 波长	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	585-595	620-630	465-485	520-535
Current (mA) 驱动电流	350-500	350-500	350-1000	350-1000	350-1500	350-1500	350-1000	350-1500	350-500	350-1000	350-1000	350-1000	350-500	350-700	350-1000	350-1000
Lens Type 透镜	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome
Viewing Angle (q) 角度	110	110	115	115	125	125	115	125	110	115	115	115	130	130	130	130
Luminous Flux (lm) 光通量	80.6+	100+	100+	107+	130+	139+	100+	130+	67.2+	73.9+	73.9+	80.6+	62+	45.7+	30.6+	93.9+
Luminous Intensity (mcd) 亮度	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1K pcs Reference Price 参考价格	1.12	1.51	1.88	1.97	3.62	4.08	1.97	3.50	1.24	1.86	2.07	1.87	2.11	1.58	2.63	2.50

Xlamp MX6 LED provide the proven lighting class performance and reliability of Cree Xlamp LED in a flat top PLCC package. It continues Cree's innovation history on LED with wide viewing angle, unlimited floor life, uniform color output with no secondary optics and electrically isolated thermal path.

MX6系列LED采用平顶型PLCC封装，具有Cree Xlamp系列LED业已证明的照明级光效和可靠性。它延续了Cree在LED照明应用领域的创新历史，产品具有视角宽，车间寿命不受限制，无需二次光学元件就能提供均匀的光输出，以及散热部分不带电的特点。



FEATURES (特性)

- Small package size 小尺寸
- Unlimited floor life 车间寿命不受限制
- Lighting class performance 照明级光效
- Narrow color bins 色温分档细

BENEFITS (优点)

- High light intensity output 高亮度输出
- Small size for small form factor 小尺寸
- Low power consumption 低功率损耗
- Increased energy saving 节能

APPLICATIONS (应用)

- Light strip, T5/T8 fluorescent tube replacement T5/T8荧光灯管的替代
- Indoor/Residential lighting 室内/住宅照明
- Portable lighting - torch 便携式照明 - 手电筒
- Street lighting 路灯
- Retrofit lighting 传统照明升级改造

SUPPLIER (供应商)



Supplier 供应商	Cree Lighting Class MX6 LED							
Part No. 产品编号	MX6AWT-A1-0000-000C51	MX6AWT-A1-0000-000D51	MX6AWT-A1-0000-000BA1	MX6AWT-A1-0000-000CA1	MX6AWT-A1-0000-000CB1	MX6AWT-A1-0000-000B9	MX6AWT-A1-0000-0009AA	MX6AWT-A1-0000-0009E8
Technical Performance (lm) 技术参数 (流明)	min. 100@300mA, full bins	min. 107@300mA, full bins	min. 93.9@300mA, 6 bins	min. 100@300mA, 6 bins	min. 100@300mA, 8 bins	min. 73.9@300mA, 8 bins	min. 80.6@300mA, 6 bins	min. 80.6@300mA, 4 bins
Type 种类	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED	5.0 x 5.0 SMT LED
Color 颜色	Cool White	Cool White	Neutral White	Neutral White	Neutral White	Warm White	Warm White	Warm White
Color Temp.(°K) 色温	5300-8000	5300-8000	4500-5300	4500-5300	4300-5300	2600-3200	2600-3000	2600-2900
Wave Length(nm) 波长	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Current(mA) 驱动电流	350-1000	350-1000	350-1000	350-1000	350-1000	350-1000	350-1000	350-1000
Lens Type 透镜	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Viewing Angle(q) 角度	120	120	120	120	120	120	120	120
Luminous Flux(lm) 光通量	100	107	93.9	100	100	73.9	80.6	80.6
Luminous Intensity(mcd) 亮度	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1K pcs Reference Price 参考价格	1.380	1.580	1.380	1.500	1.420	1.420	1.630	1.780

Cree — High Brightness LED 科銳 — 高亮度 LED

Cree offers a number of high brightness LED in various package, they include P4, 3mm, 4mm, 5mm round and oval, SMD PLCC which fits various application in commercial and industrial. Cree LED introduce reliable package as well as high lumen maintenance in LED lighting market.

Cree提供了各种封装的高亮度LED，包括P4、3mm、4mm和5mm圆灯和椭圆灯，以及PLCC封装，它们可以用到各种商业和工业应用中，Cree LED封装可维持高流明增加可靠性。



FEATURES (特性)

- Various package - P4, Oval, PLCC, SMD 多种封装 - P4, Oval, PLCC, SMD
- Small package size 小尺寸
- Narrow color bins 色温分档细
- High light intensity output 高亮度输出
- Available in various angle 有多种角度可选
- Various color coverage — red, green, amber, white, blue 各种不同颜色，红绿蓝琥珀白光

BENEFITS (优点)

- High light intensity output 高亮度输出
- Small size for small form factor 小尺寸
- Low power consumption 低功率损耗
- Increased energy saving 节能
- Fits various application 适用于各种应用
- Common package size increase design flexibility 通用的尺寸适用于各种设计

APPLICATIONS (应用)

- General lighting 通用照明
- Video screen 显示屏
- Automotive 汽车
- Electronic signal sign 电子信号灯
- Multi-purpose 多用途
- Advertising 广告
- Traffic light 交通灯
- Moving message sign 移动信息指示

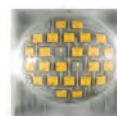
SUPPLIER (供应商)



Supplier 供应商	Cree HB LED Series											
Part No. 产品编号	General Lighting (T5/T8 Retrofit)				Electronic Signage				Multiple Purposes			
	CLA1A-WKW	CLA1A-MKW	CLM3C-WKW	CLM3C-MKW	C503B-RGS	C503B-ACS	C503T-GCS	C503B-BCS	CLM4B-RKW	CLM4B-AKW	CLM4B-GKW	CLM4B-BKW
Technical Performance (lm) 技术参数 (流明)	min. 1800mcd @30mA driving current	min. 1400mcd @30mA driving current	min. 1400mcd @20mA driving current	min. 1120mcd @20mA driving current	min. 3000mcd @20mA driving current	min. 3000mcd @20mA driving current	min. 4180mcd @20mA driving current	min. 2130mcd @20mA driving current	min. 1120mcd @50mA driving current	min. 1120mcd @50mA driving current	min. 1400mcd @30mA driving current	min. 355mcd @30mA driving current
Type 种类	3.2 x 2.8 SMT LED	3.2 x 2.8 SMT LED	2.7 x 2.0 SMT LED	2.7 x 2.0 SMT LED	5mm oval LED	5mm round LED	5mm round LED	5mm round LED	3.2 x 2.7 SMT LED	3.2 x 2.7 SMT LED	3.2 x 2.7 SMT LED	3.2 x 2.7 SMT LED
Color 颜色	Cool White	Warm White	Cool White	Warm White	Red	Amber	Green	Blue	Red	Amber	Green	Blue
Color Temp.(°K) 色温	4600-10000+	2500-4600	4600-5500	2500-3200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wave Length(nm) 波长	N/A	N/A	N/A	N/A	618-630	584-596	520-535	465-480	618-630	584-599	515-535	460-480
Current (mA) 驱动电流	35	35	25	25	50	50	25	30	70	70	30	30
Lens Type 透镜	N/A	N/A	N/A	N/A	water transparent lens + stopper	water transparent lens + stopper	water transparent lens + stopper	water transparent lens + stopper	N/A	N/A	N/A	N/A
Viewing Angle(q) 角度	120	120	120	120	30	30	30	30	120	120	120	120
Luminous Flux(lm) 光通量	7000	6000	4200	4000	N/A	N/A	N/A	N/A	4200	4000	N/A	N/A
Luminous Intensity(mcd) 亮度	2600	2000	1850	1560	5100	5000	7500	4100	1600	1500	1800	550
1K pcs Reference Price 参考价格	0.247	0.247	0.247	0.247	0.123	0.123	0.218	0.290	0.152	0.152	0.262	0.236

MPL-EZW eliminates traditional chromaticity binning and maximizes lumen density, enabling luminaires and bulb retrofit manufacturers to deliver consistent color and required light output to the target end user. XLamp MPL-EZW LEDs reduce LED-to-LED color variation to within a 4-step MacAdams ellipse around the desired color temperature, which is 75% smaller than the total area of the corresponding ANSI C78.377 color region. MPL-EZW LED is the perfect choice for lighting applications where high luminous flux output is required from a single, small point source, commercial/retail display spotlights, LED retrofit bulbs, and other indoor general illumination applications.

MPL-EZW系列突破了传统的分档标准，提高了流明密度，以保证灯具制造商能够为他们的终端用户提供一致的色彩和所需的光输出。MPL-EZW系列LED减小了LED之间的色彩变化，能够保持在所期望色温的4步麦克亚当椭圆之内，这比ANSI C78.377所规定的区域小了75%。MPL EasyWhite LED是要求从单个点光源获取高光通量输出照明应用的完美选择，如商业/零售展示聚光灯、LED改造灯泡和其它室内和室外常规照明应用。



FEATURES (特性)

- Proven lighting class performance 业已验证的照明级性能
- Narrow color bins 色温分档细
- High lumen density 高流明密度
- Wider viewing angle at 125 degree 125度宽视角
- RoHS-compliant 符合RoHS标准
- 24 die, 8 pcs in series/3 parallel string 24个LED芯，8串3並
- Introduce EasyWhite bin 引入EasyWhite分档

BENEFITS (优点)

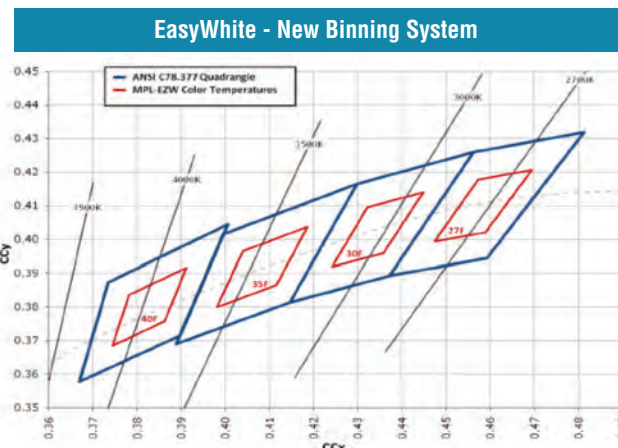
- High intensity output and smaller size 高亮度输出小尺寸
- Low power consumption 低功率损耗
- Less moisture sensitivity 抗高湿度
- Isolated thermal path 热电分离
- Reduce system cost 减少系统成本

APPLICATIONS (应用)

- Retrofit / Traditional lamp replacement 传统灯具的升级改造替换
- Personal lighting 私人照明
- Indoor lighting 室内照明
- Commercial lighting 商业照明
- Directional lighting 定向照明

SUPPLIER (供应商) **CREE**

Supplier 供应商	Cree MPL LED Easy White				
Part No. 产品编号	MPLEZW-A1-0000-0000B027F	MPLEZW-A1-0000-0000B030F	MPLEZW-A1-0000-0000B035F	MPLEZW-A1-0000-0000C030F	MPLEZW-A1-0000-0000C035F
Technical Performance (lm) 技术参数 (流明)	min. 700lm @150mA, 27F bins	min. 700lm @150mA, 30F bins	min. 700lm @150mA, 35F bins	min. 800lm @150mA, 30F bins	min. 800lm @150mA, 35F bins
Type 种类	MPL	MPL	MPL	MPL	MPL
Color 颜色	EasyWhite	EasyWhite	EasyWhite	EasyWhite	EasyWhite
Color Temp. (°K) 色温	2700	3000	3500	3000	3500
Wave Length (nm) 波长	N/A	N/A	N/A	N/A	N/A
Current (mA) 驱动电流	150-250	150-250	150-250	150-250	150-250
Lens Type 透镜	Dome	Dome	Dome	Dome	Dome
Viewing Angle (q) 角度	125	125	125	125	125
Luminous Flux (lm) 光通量	700	700	700	800	800
Luminous Intensity (mcd) 亮度	N/A	N/A	N/A	N/A	N/A
1K pcs Reference Price 参考价格	17.110	17.110	17.110	19.080	19.080



Cree — High Power Multiple Chip MCE LED 科銳 — 高功率多芯片 MCE LED

Cree MCE multi chip LED is a lighting-class multi-chip LED which build in 4 LED chip that provides 4 times the flux of the XLamp XR-E LED in the same footprint. Compare with single die LED, it reduces the system complexity and part counts and fit various lighting application.

Cree MCE系列是多芯片的照明级LED，它在与XRE系列LED相同封装尺寸上集成了4个LED芯片，因此能提供4倍于XRE的流明输出。相对于单芯片LED，它能减小系统复杂程度和减小元件数量，可适用于多种照明应用。



FEATURES (特性)

- Industry first lighting class LED 业界首位的照明级LED
- Small package size 7.0mm x 9.0mm 8pins 小尺寸
- Narrow color bins 色温分档细
- High light intensity output 高亮度输出
- Individually addressable LED chip 芯片独立连接
- Low thermal resistance (3°C/W) 低热阻
- Introduce EasyWhite bin 引入EasyWhite分档

BENEFITS (优点)

- High light intensity output 高亮度输出
- Small size and small form factor 小尺寸
- Low power consumption 低功率损耗
- Increased energy saving 节能
- Fits various application 适用于多种应用
- Ease of thermal and optic design 易于热和光学设计
- Reduce total system cost 减少系统成本

APPLICATIONS (应用)

- General lighting 通用照明
- High-end portable lighting 高端便携式照明
- Street light 路灯
- Retrofit 传统灯具升级改造
- Area lighting 区域照明

SUPPLIER (供应商) **CREE**

Supplier 供应商	Cree MCE LED													
	Cool White (冷白)		Neutral White (中性白)				Warm White (暖白)					Color (颜色)		
Part No. 产品编号	MCE4WT-A2-0000-000K01	MCE4WT-A2-0000-000M01	MCE4WT-A2-0000-000KA1	MCE4WT-A2-0000-000JA1	MCEEZW-A1-0000-000H035F	MCEEZW-A1-0000-000H035F	MCE4WT-A2-0000-000HF8	MCE4WT-A2-0000-000HAA	MCE4WT-A2-0000-000JAA	MCEEZW-A1-0000-000G027F	MCEEZW-A1-0000-000H027F	MCE4CT-A2-0000-00A4AAAB1	MCE4CT-A2-0000-00A5AAAA1	
Technical Performance (lm) 技术参数 (流明)	min. 370lm @350mA, Full bins	min. 430lm @350mA, Full bins	min. 370lm @350mA, 6 bins	min. 320lm @350mA, 6 bins	min. 280lm @350mA, 35F bins	min. 320lm @350mA, 35F bins	min. 280lm @350mA, 4 bins	min. 280lm @350mA, 6 bins	min. 320lm @350mA, 6 bins	min. 240lm @350mA, 27F bins	min. 280lm @350mA, 27F bins	RGB + Neutral White	RGB + Cool White	
Type 种类	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	MC-E	
Color 颜色	Cool White	Cool White	Neutral White	Neutral White	Neutral White	Neutral White	Warm White	Warm White	Warm White	Warm White	Warm White	Neutral White	Cool White	
Color Temp. (°K) 色温	5000-10000	5000-10000	4500-5300	4500-5300	3500	3500	2700-3000	2600-3000	2600-3000	2700	2700	N/A	N/A	
Wave Length (nm) 波长	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Current(mA) 驱动电流	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	350-700	
Lens Type 透镜	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	Dome	
Viewing Angle (q) 角度	110	110	110	110	110	110	110	110	110	110	110	115	115	
Luminous Flux(lm) 光通量	370+	430+	370+	320+	280+	320+	280+	280+	320+	240+	280+	N/A	N/A	
Luminous Intensity(mcd) 亮度	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
1K pcs Reference Price 参考价格	7.630	9.470	9.290	7.740	8.290	9.740	8.160	8.250	9.800	6.820	9.340	10.530	10.530	
SUNSTAR半导体集成电路 http://www.icasic.com/ TEL: 0755-83387016 FAX:0755-83376182 E-MAIL: szss20@163.com														

Buck Converter can drive one Cree XRE and XPE LED from 3 Ni-NH batteries or 1 Li-ion battery for battery power application such as torch and portable. It can provide 3V to 4V output voltage and up to 1000mA output current. State of art controller reduce circuit components count as well as simplified circuit design.

在一些使用三节镍氢电池或者锂电的应用中，如手电筒和其他便携设备可以使用降压电路来驱动单颗 Cree XRE或XPE LED。它可以提供3V至4V的驱动电压和高达1000mA的驱动电流。一个设计得好的控制器也可以做得非常简单。



FEATURES (特性)

- High efficiency, up to 95% 效率高达95%
- Buck / Boost design 升降压设计
- High current output 大电流输出
- SMD reduce product size 贴片工艺减小尺寸
- Low input voltage operation 低输入电压工作
- Low start up voltage and high current 低启动电压和大电流

BENEFITS (优点)

- Enable long battery life 延长电池寿命
- Parallel / Serial LED connection 串/并联LED
- Low components count 元件数量少
- High frequency for compact size 高频小尺寸设计

APPLICATIONS (应用)

- Torch 手电筒
- Single-LED driver module 单LED驱动模组
- Flashlight 闪光灯
- Bike lighting 自行车灯
- Portable projector 便携式投影仪

SUPPLIERS (供应商)



Supplier 供应商	TI		NS		ON Semi			Diodes	LTC		Fairchild
Part No. 产品编号	TPS6210X	TPS63000 buck & boost	LM3401	LM3405A	NCP1529	NCP3065 buck configuration	NCP5030 buck & boost	ZXLD1322	LTC3453 buck & boost	LTC3454 buck & boost	FAN5307
Min. Input Voltage 最少输入电压	2.5V	1.8V	4.5V	3V	2.7V	3V	2.7V	2.5V	2.7V	2.7V	2.5V
Max. Input Voltage 最大输入电压	9V	5.5V	35V	22V	5.5V	40V	5.5V	15V	5.5V	5.5V	5.5V
Max. Output Current 最大输出电流	500mA	up to 1200mA	3A	1A	up to 1A	up to 1.5A	up to 0.9A	up to 700mA	500mA	1A	up to 300mA
Output Voltage 输出电压	0.8V to 8V	1.2V to 5.5V	up to 35V	up to 20V	0.9V to 3.9V	3V to 40V	3V to 5.5V	3V or above	5.15V	5.15V	0.7 to Vin
Est. Efficiency 效能	up to 90%	up to 96%	85 to 92%	85 to 90%	up to 95%	up to 85%	up to 85%	> 85%	up to 90%	up to 90%	up to 95%
Switching Frequency 开关频率	2.5MHz Max	1.25MHz	1.5MHz	1.6MHz	1.7MHz	150KHz	700KHz	350KHz	1MHz	1MHz	1MHz
Feedback Voltage 反馈电压	800mV	500mV	200mV	0.205V	0.6V	235mV	200mV	10.5mV	Fix output	Fix output	0.5V
Built-in MOSFET 内置 MOSFET	Yes (PMOS - 0.5/0.8 NMOS - 0.3/0.6)	Yes (not specify Rdson)	No	Yes (300 mOhm NMOS)	Yes (HS - 0.4 Ohm, LS - 0.3 Ohm)	Yes (Bipolar Power Transistor)	Yes (100 mOhm)	Yes (Built-in BJT)	Yes (PMOS 0.3 Ohm / NMOS 0.25 Ohm)	Yes (PMOS 170 mOhm / NMOS 130 mOhm)	Yes (PMOS - 0.53/NMOS - 0.43)
Component Count 零件总数	10	5	8	8	7	8	8	10	5	5	6
Package 封装	SO-8	QFN-10	MSOP	SOT23	TSOP-5	SOIC8 or DFN-8	DFN-12	DFN1443	QFN-16	DFN-10	SOT23-5
1K pcs Reference Price (USD)** 参考价格	1.80	2.00	0.74	1.10	0.35	0.40	0.77	1.37	2.00	1.80	0.99
Remark 附录	4 selectable frequency (TPS6210x)	Auto switch to Buck / Boost, integrated MOSFET for Syn Rect	Buck	Drives up to 1A with more than 1 LED, OCP and thermal shutdown	Integrated Syn Rectifier	High switching current up to 1.5A	Buck / Boost achieved by Syn Rect H-bridge	Buck / Boost, integrated BJT	Buck Boost achieved by Syn H-bridge	Buck Boost achieved by Syn H-bridge	Integrated MOSFET for Syn Rect

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考，如阁下对产品有兴趣，请与客户代表联络再作详细报价。

Boost Converters can be designed to drive more than 1 HP XPE/XPG LED in series, and multi-chip MCE LED with chip connected in series from a 9V battery or 6xAA size battery pack. All the converters can provide a simpler and high current output to drive high-power LEDs in voltage step-up application. Some controllers can access very low input voltage and oscillate at high frequency which reduce size of LED driver, those features fit for size limited battery powered lighting application such as in torch or headlamp. Constant current driven features is recommended for maintain constant lumen and color temp output throughout LED's life.

升压电路在使用9V电池或者6节AA电池时，可以驱动多个串联的高功率XPE/XPG LED或者串联使用的 MCE LED，所有这些升压驱动都能提供简单的设计和大电流的输出。某些控制器可以工作在很低的输入电压，很高的工作频率，由此可以把驱动器设计得很小，升压电路主要应用到手电筒和头灯中。恒流控制可以保证LED输出恒定的流明和色温。



FEATURES (特性)

- High efficiency 高效率
- Boost output voltage up to 33V
输出电压高达33V
- Can access very low input voltage 超低电压工作
- Numerous LED in series 多LED串联工作
- Built-in MOSFET / Transistor
内置 MOSFET / Transistor

BENEFITS (优点)

- Simple circuit design 电路设计简单
- Able to deliver high current output 可大电流输出
- Low component count 元件数量少
- High frequency for compact size 高频开关尺寸减少
- Cost effective 成本经济
- Syn Rectifier reduce thermal stress
同步整流减小热损耗

APPLICATIONS (应用)

- Torch 手电筒
- Flash LED 闪光灯
- Under cabinet lighting 陈列柜照明灯
- Headlamp 头灯
- DC/DC constant current controller 恒流控制器
- Light bar 灯条

SUPPLIERS (供应商)



Supplier 供应商	TI		NS			ON Semi			Diodes	Fairchild		ST	Micrel
Part No. 产品编号	TPS61165	TPS61058	LM3430	LM3410	LM3224	NCP1421	NCP1450	NCP3065 boost configuration	ZXSC310	FAN5336	FAN5333A	L6920	MIC3230
Min. Input Voltage 最少输入电压	3V	2.7V	6V	2.7V	2.7V	1V (no Load)	0.9V	3V	0.8V	2.5V	1.8V	0.6V	6V
Max. Input Voltage 最大输入电压	18V	5.5V	40V	5.5V	7V	5V	6V	40V	8V	5.5V	5.5V	5.5V	45V
Output Voltage 输出电压	38V	2.5V to 5.5V	48V	24V	up to 20V	1.5V to 5.0V	1.9V to 5.0V	3V to 40V	up to 16V (boost 4 LEDs)	up to 33V	up to 30V	3.3V or 5V	up to 60V
Max. Output Current 最大输出电流	350mA (1.2A switch)	up to 500mA	up to 1A or above	350mA to 1000mA	up to 1A 1000mA	up to 600mA	up to 1000mA	up to 1500mA	19mA	170mA	750mA	around 500mA	up to 1A
Est. Efficiency 效能	90%	up to 80%	up to 94%	88%	up to 92%	up to 94%	86% to 90%	up to 85%	94%	up to 88%	up to 88%	up to 94%	90% to 95%
Switching Frequency 开关频率	1.2MHz Max	650KHz	600KHz	525KHz / 1.6MHz	615KHz / 1.25MHz	1.2MHz	180KHz	150KHz	200KHz	1.5MHz	1.5MHz	Not specified	400KHz
Feedback Voltage 反馈电压	200mV	500mV	1.25V	0.06V	1.26V	1.2V	O/P dependent	235mV	19mV	1.23V	110mV	1.23V	250mV
Built-in MOSFET 内置 MOSFET	Yes (0.3 Ohm)	Yes (0.26 Ohm / 0.29 Ohm)	No	Yes (170 mOhm)	Yes (0.15 Ohm)	Yes (0.3 Ohm)	No	Yes (Bipolar Power Transistor)	No	Yes (0.4 Ohm)	Yes (0.6 Ohm)	Yes (PMOS 0.12 Ohm / NMOS)	No
Component Count 零件总数	6	10	16	5	7	8	5	8	6	7	5	7	14
Current Mode Operation 恒流	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes
Package 封装	2mm x 2mm QFN	3mm x 3mm QFN10	SDF12	SOT23-5	MS08	Micro8	DSOP5	SOIC8 and DFN-8	SOT23-5	MLP-6	SOT23-5	TTSOP8	TTSOP16
Number of LED LED 数量	10	1	12 - 15	6	6	1	1	8 - 10	1 - 3	8	8	1	10 - 15
1K pcs Reference Price (USD)** 参考价格	1.10	0.80	0.80	1.20	1.10	0.45	0.20	0.40	0.36	0.35	0.28	0.62	1.31
Remark 附录	Built-in softstart and PWM brightness	Shut down mode optimized battery life	Ext. MOSFET allows high current output	High freq., low standby current	Freq. selectable, shutdown pin turn driver down	Integrated MOSFET for Syn Rect, Anti DCM ringing	Ext. MOSFET enable high switching current	High switching current up to 1.5A	Low input voltage	Low noise and adjustable output	Up to 1.5A peak switching current, high output voltage	Integrated Syn Rect and reverse battery protection	Various protection features and PWM dimming

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考，如阁下对产品有兴趣，请与客户代表联络再作详细报价。

Middle Voltage (12V or above) LED Driver 中端电压输入 LED 驱动 (12V 以上)

SUNSTAR 半导体集成电路 http://www.icasic.com/ TEL: 0755-83387030 FAX: 0755-83376182 E-MAIL: szss20@163.com

Arrow Asia
LIGHTING Solution Guide

Middle Voltage LED drivers accept a wider input voltage (12V to 36V) and with high current output. These drivers can drive high power/high brightness LED by serial or matrix. Meanwhile, those controllers are also fit for application for secondary constant current control. Some of the listed drivers have dimming control, high efficiency and up to 75V dc input. Therefore, they can provide very flexible design features for the designer in various applications.

中端电压LED驱动的输入电压通常是从12V至36V，输出电流较大，它们能驱动多个LED的串联或串并联。同时也能应用于AC二次侧的恒流控制。下面列出来的这些方案当中，某些可提供PWM调光控制，某些效率高，某些输入电压高达75V。因此，设计者可以根据需要来灵活设计。



FEATURES (特性)

- High output voltage/current 高电压大电流输出
- High input voltage 高输入电压
- Very low feedback voltage 低反馈电压
- Dimming control input 调光控制

BENEFITS (优点)

- Able to drive large amount of LED 可驱动多个LED
- Compact design 小尺寸设计
- Simple design 设计简单
- High efficiency 高效率
- PWM dimming available 可PWM调光控制

APPLICATIONS (应用)

- MR16 replacement MR16卤素灯替换
- Automotive lighting 汽车照明
- Outdoor architectural lighting 户外建筑照明
- Street lamp 2nd constant current control 路灯二次恒流控制
- Light bar 灯条

SUPPLIERS (供应商)



Supplier 供应商	TI		NS			NXP	ON Semi			Diodes	LTC		
Part No. 产品编号	TPS40200	TPS40211	LM3404HV	LM3409HV	LM3424	UBA3070	NCP1215A	CS51411	NCP3065	ZXLD1350	LT3474	LT3475	LT3466
Min. Input Voltage 最少输入电压	4.5V	4.5V	6V	6V	4.5V	12V	8V	4.5V	3V	7V	4V	4V	2.7V
Max. Input Voltage 最大输入电压	52V	52V	75V	75V	75V	190V	16V	40V	40V	30V	36V	36V	24V
Output Voltage 输出电压	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable	14V	Adjustable	Adjustable	Adjustable	26V	25V	39V
Max. Output Current 最大输出电流	1A	1A	1A	4A	up to 1A	350mA or above	0.35A to 1A	1.5A	1.5A	350mA	1A	2* 1.5A	2* 0.32A
Est. Efficiency 效能	up to 94%	up to 94%	up to 96%	up to 95%	up to 95%	90%	up to 90%	up to 85%	up to 85%	95%	up to 88%	up to 88%	up to 81%
Switching Frequency 开关频率	35KHz - 500KHz	Set by ext. resistor	Base on selected o/p voltage	Base on Roff / Coff	up to 2MHz	30KHz - 125KHz	Set by ext. resistor	260KHz/ 520KHz	150KHz	250KHz - 1MHz	200KHz - 2MHz	200KHz - 2MHz	Fixed freq. up to 2MHz
Feedback Voltage 反馈电压	700mV	270mV	200mV	Nil	2.35V	0.52V	1.2V	0.32V	235mV	0.1V	1.25V	1.25V	200mV
Built-in MOSFET 内置 MOSFET	No	No	Yes (0.75 Ohm)	No	No	No	No	Yes BJT	Yes BJT	Yes (1.5 Ohm)	Yes BJT	Yes BJT	Yes BJT
Component Count 零件总数	15	16	7	15	20+	26	11	8	8	5	8	12	8
Package 封装	SOIC8	10 pin SON	MSOP8	eMPOP10	TSSOP20	S08	DIP 8 and TSOP6	SOIC8/ DFN-18	SOIC8/DFN-8 or PDIP8	TSOT23-5	TSSOP-16	TSSOP-20	DFN-10 and TSSOP-16
Number of LED LED 数量	12 -15	10	20	20	20	up to 20	3	10	8 - 10	1 - 5	6 - 8	6 - 8	12 - 15
Topology 线路结构	Buck	Boost, Flyback, SEPIC	Buck	Buck	Buck / Boost / SEPIC	Buck / Boost	Buck / Boost	Buck	Buck / Boost	Buck	Buck	Buck	Boost
Built-in Dimming Control 调光控制	No, require external circuit	No, require external circuit	Yes	Yes	Yes	Yes	No, require external circuit	No, require external circuit	No, require external circuit	No	Yes	Yes	Yes
1K pcs Reference Price (USD)** 参考价格	0.85	0.99	1.76	1.43	1.65	0.45	0.20	0.60	0.40	0.80	2.50	3.00	1.90
Remark 附录	Wide input range, ext. MOSFET allow high current	Wide input range, ext. MOSFET allow high current	Very wide input range	eMPOP10 improve thermal performance	Automotive grade LED driver AEC-Q100 Grade 1	2nd current control	NCP1215 can be used in AC flyback	1.5A switch pin-pin compatible LT1375	High switching current up to 1.5A	Low part count, high efficiency	Integrated diode and 1A driving current	Dual step down driver	Dual step up converter

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考，如阁下对产品有兴趣，请与客户代表联络再作详细报价。

High Voltage LED Driver (Output Power Level <25W)

AC 高压低功率的 LED 驱动 (25W 以下)

SUNSTAR 半导体集成电路 <http://www.ic6816.com/> TEL: 0755-83387030 FAX: 0755-83376182 E-MAIL: szss20@163.com

High voltage low power LED driver can connect to universal off-line input (85V to 265V AC input) directly. These drivers can provide up to 1A driving depends on designer application. Most for the drivers have isolated/non-isolated configuration. For indoor lighting application, some of the LED drivers controllers can be compatible with Triac dimmers and well fitted with MCE and MPL LED. With proper design, those controllers can perform very high efficiency in compact size to fit various lighting fixture form factor.

高压稍低功率的LED驱动可以直接连接到全球电网(85V至265V)。如果设计需要,可以提供高达1A的电流。另外,也可连接调光器,并配合MCE及MPL LED应用在室内照明中。只要设计得当,多数此类隔离/非隔离的驱动能够做到高效率并且能够适应各种灯具。



FEATURES (特性)

- Universal input 全电压输入
- Low feedback voltage 低反馈电压
- Some controllers with built-in MOSFET 一些控制器内置MOSFET
- Wide output voltage and current range 宽输出电压电流范围
- Precious current regulation 精密电流控制

BENEFITS (优点)

- High efficiency 高效率
- Long life 长寿命
- Compact packaging 高集成度
- Design flexibility 设计灵活
- Compact size 小尺寸
- Jitter mode reduce EMI 导频减少EMI问题
- Valley switching enhance efficiency 谷底开关技术提高效率

APPLICATIONS (应用)

- Emergency lighting 应急照明
- Outdoor architectural lighting 户外建筑照明
- Entertainment lighting 娱乐活动照明
- General lighting 通用照明
- LED ballast LED镇流器
- Retrofit 传统灯泡替换

SUPPLIERS (供应商)



Triac Dimming (可配调光器)							Non-Triac Dimming (非调光)									
Supplier 供应商	NXP	TI	NS	Cypress	ON Semi	Infineon	NXP		ST		Fairchild			ON Semi		Infineon
Part No. 产品编号	SSL2101	SN0901026 (TPS92210)	LM3445	CY8CLEDAC02	NCL30000	ICL8001G	SSL152X	SSL162x	Viper15/25	L6562A	FSEZ1016	FSEZ1216	FSQ0365	NCP1027	NCP101X	ICE3B0565J
ACDC / DCDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC
Min. Input Voltage 最少输入电压	80Vac	90Vac	90Vac	90Vac	85Vac	207Vac	80Vac	70Vac	85Vac	85Vac	85Vac	85Vac	85Vac	85Vac	85Vac	85Vac
Max. Input Voltage 最大输入电压	132V / 270V	132V / 270V	132V / 270V	264Vac	265Vac	250Vac	265Vac	265Vac	265Vac	132V / 270V	265Vac	265Vac	265Vac	265Vac	265Vac	265Vac
Max. Output Voltage 最大输出电压	DC50V	DC50V	15 to 50V	DC50V	DC50V	DC29V	DC50V	DC50V	DC50V	DC50V	DC50V	DC50V	DC50V	DC50V	DC50V	DC50V
Max. Output Power 最大输出功率	10W to 15W	7W to 50W	8W to 15W	30W	25W	9W to 12W	12W	25W	6W to 12W	15 / 90W PFC	10W	10W	25W	15W	7W	12W
Est. Efficiency 效能	80% or above	80% or above	85% or above	85%	80% or above	up to 88%	80% to 85%	80% to 85%	80%	82% to 85%	80% to 85%	70%	75%	82% to 86%	80% to 85%	82% to 86%
Switching Frequency 开关频率	User defined	Freq. modulation	User defined	Max 200KHz	User defined	Freq. modulation	User defined	User defined	Freq. modulation	User defined	100KHz	42KHz	Freq. modulation	65KHz / 100KHz	65KHz / 100KHz / 130KHz	67KHz
Feedback Voltage 反馈电压	0.5V	0.7V	0.75adj	1.538V	Isense 0.5V	Isense 1.03V	0.5V	0.5V	0.5V	2.5V	2.5V	Isense 1.3V	0.7V	2.5V	2.5V	2.5V
Built-in MOSFET 内置 MOSFET	Yes (6.5 Ohm)	No	No	No	No	No	Yes (6.5 to 48 Ohm)	Yes (6.5 Ohm)	Yes (20 Ohm)	No	Yes (10 Ohm)	Yes (9.3 Ohm)	Yes (4.5 Ohm)	Yes (5.8 Ohm)	Yes (11 Ohm)	Yes (4.7 Ohm)
Topology 线路结构	Flyback / Buck	PFC + Flyback	Non-isolated Buck	Flyback	Flyback	Flyback	Flyback	Flyback	Flyback	Boost / Flyback	Flyback	Flyback	Flyback	Flyback	Flyback	Flyback
Package 封装	SO16	DIP8	MSOP	SO8	SO8	SO8	DIP8 / SO14	DIP16	DIP7 / SO16	DIP16	DIP8	DIP8	DIP8	DIP8	DIP8	DIP8
Number of LED LED 数量	1 to 20	up to 15	up to 15	up to 15	up to 15	8	10	20	10	10	8	6	20	10	6	10
Built-in Dimming Control 调光控制	Yes, Triac dimming compatible	Yes, Triac dimming compatible	Yes, Triac dimming compatible	Yes, Triac dimming compatible	Yes, Triac dimming compatible	Yes, Triac dimming compatible	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit
1K pcs Reference Price (USD)** 参考价格	1.98	0.8	1.6	Available by request	0.65	TBC	0.25 to 0.44	0.33 to 0.55	0.3/0.4	0.21	0.23	0.23	0.41	0.50	0.26	0.25
Remark 附录	Triac Dim, very good linearity, built-in MOSFET and avoid E cap	High efficiency and PFC, compatible with Triac dimming	PPFC by valley fill, front end dimming	Resonant control achieve high efficiency / Also available in non-dimming	High efficiency and PFC, compatible with Triac dimming	QR flyback PF, Triac dimming	Valley switching increase efficiency	Valley switching increase efficiency	QR for Valley switching	Very high PF, Triac dimming available	Optocoupler free design, Jitter mode	Fixed freq. switching increase efficiency	Minimum freq. switching increase efficiency	Freq. Jitter for EMI, creepage for HV	Freq. Jitter for EMI, creepage for HV	Lowest Rds and freq. Jitter

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考, 如阁下对产品有兴趣, 请与客户代表联络再作详细报价。

SUNSTAR 半导体集成电路 <http://www.ic6816.com/> TEL: 0755-83387016 FAX: 0755-83376182 E-MAIL: szss20@163.com

*** TPS92210 & SN0901026 is pin to pin compatible. TPS92210 及 SN0901026 为对等型号。

High voltage, high power LED driver can connect to universal off-line input (85V to 265V AC input) directly and able to deliver over a hundred watt of electrical power. These drivers can provide very high output current and voltage and also energy efficient. Meanwhile, these controllers and solutions also implement various protection features makes the driver more reliable. The following controllers simplified designs, more cost effective and suit application in streetlight and outdoor illumination application.

高压大功率的LED驱动直接接到电网(86V至265V)，它能够超过100W的功率。这些驱动通常提供大电流高电压输出并且都有较高的效率，同时也能提供各种保护以提高驱动的可靠性。下面的这些方案都是设计比较简单，成本较低，可以应用到路灯和户外照明。



FEATURES (特性)

- Universal input 全电压输入
- Low feedback voltage 低反馈电压
- PFC and DC/DC combo chip or single stage flyback PFC 集成PFC和DC/DC或者单级反激PFC
- Wide output voltage and current range 宽输出电压电流范围
- PWM dimming compatible 兼容PWM调光

BENEFITS (优点)

- High efficiency 高效率
- Long life 长寿命
- Compact packaging 高集成度
- Design flexibility 设计灵活
- High output power delivery 高输出功率
- Good thermal management 优异的热管理
- High reliability 高可靠性
- Ease of EMI / Safety approval 容易获得EMI / 安规的认证

APPLICATIONS (应用)

- Emergency lighting 应急照明
- Outdoor architectural lighting 户外建筑照明
- Entertainment lighting 娱乐活动照明
- Street lamp 路灯
- Transport lighting 交通灯
- Garden lighting 园艺照明

SUPPLIERS (供应商)



ON Semiconductor



Supplier 供应商	TI			NXP		ON Semi			Fairchild	IR		Infineon
Part No. 产品编号	UCC28810	UCC28811	SN0901026 (TPS92210)	SSL1750 / SSL1751	SSL1530	NCP1207	NCP1351	NCP1652	FAN7602	IRS2540	IRS2541	ICE2QS03
ACDC / DCDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC	ACDC, DCDC	ACDC, DCDC	ACDC
Min. Input Voltage 最少输入电压	85Vac	—	90Vac	70Vac	70Vac	85Vac	85Vac	85Vac	85Vac	9V	9V	85Vac
Max. Input Voltage 最大输入电压	276Vac	—	270Vac	276Vac	265Vac	265Vac	265Vac	276Vac	265Vac	200VDC	600VDC	265Vac
Max. Output Voltage 最大输出电压	PFC output voltage varies depends on loading	up to 150V	DC50V Max.	DC80V / Low voltage constant voltage source	DC80V / Low voltage constant voltage source	DC80V / Low voltage constant voltage source	DC80V / Low voltage constant voltage source	DC80V / Low voltage constant voltage source	DC80V / Low voltage constant voltage source	10% to 90% input voltage	10% to 90% input voltage	DC80V / Low voltage constant voltage source
Max. Output Power 最大输出功率	up to 200W	up to 200W	120W	250W	60W	60W	60W	250W	60W	250W	>500W	80W
Est. Efficiency 效能	90% or above	90% or above	90%	88% to 92%	86% to 88%	86% to 88%	84% to 88%	85% or above	84% to 88%	84% to 88%	84% to 88%	84% to 88%
Switching Frequency 开关频率	Self oscillating	Self oscillating	Freq. modulation	125KHz	63KHz	Free running	User defined set by Ct	User defined set by Ct (100KHz)	65KHz	500KHz	500KHz	Free running
Feedback Voltage 反馈电压	2.5V	2.5V	0.7V	0.5V	0.5V	2.5V	2.5V	0.6V	2.5V	500mV	500mV	2.5V
Topology 线路结构	Boost / Buck	Boost / Buck	PFC + Flyback	PFC + Flyback (combo chip)	Flyback	Flyback	Flyback	Flyback (PFC single stage)	Flyback	Buck	Buck	Flyback
Package 封装	S08	S08	DIP8	S016	S08	DIP8	SOIC8	SOIC16	DIP8	DIP8 / SOIC8	DIP8 / SOIC8	DIP8
Number of LED LED 数量	30	30	60+	100 to 150	25	20	20	20 to 100	30	more than 100	more than 100	30
Built-in Dimming Control 调光控制	No, require external circuit	No, require external circuit	Yes, Triac dimming compatible	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	No, require external circuit	Yes	Yes	No, require external circuit
1K pcs Reference Price (USD)** 参考价格**	0.35	0.35	0.8	0.78	0.25	0.26	0.20	1.00	0.20	0.60	0.66	0.25
Remark 附录	Transition mode PFC	Non-isolated Buck	High efficiency and PFC	PFC flyback combo chip / Syn Rect controller SSL1761	Fixed freq. flyback	Free running quasi resonant flyback	Variable freq. offtime flyback	Single stage flyback PFC	Flyback with freq. modulation	Non-isolated buck	Non-isolated buck	Quasi resonant

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考，如阁下对产品有兴趣，请与客户代表联络再作详细报价。

*** Please refer to page 34 for Arrow Lighting circuit protection devices which can increase the reliability of LED driver.

请参考34页，建议使用电路保护装置，这样可以增加LED驱动的可靠性。

**** TPS92210, SN0901026, SSL1750, SSL1530, NCP1207, NCP1351, NCP1652, FAN7602, IRS2540, IRS2541, ICE2QS03, etc. are compatible with TPS92210. 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

This page introduces lens and optics solution for Cree lighting class XP series LED from worldwide suppliers. As Cree LED viewing angle is wide (115 degree), therefore for certain applications, such as spot light, torch and MR16 lamp replacement, this viewing angle needs to be focus into a narrower angle and narrow flux beam. However, for area lighting and outdoor lighting application, where wide viewing angle with perfect uniformity, then extended viewing angle optic solutions are also required.

这一页主要介绍Cree照明级XP系列的LED系列的光学方案。Cree XP系列的LED视角比较宽(115度)，因此对于某些产品的应用，比如射灯、手电筒和MR16，这种视角需要转换成一个更加窄的光束角。然而对于一些区域照明和室外照明的应用就需要宽视角和均匀性很好，所以扩大光源的发光视角的光学方案也是必需的。



FEATURES (特性)

- Available in single lens, lens with holder
针对单个LED分带支架和无支架的光学元件
- High efficiency
出光效率非常高
- Available in single lens and 3 in 1 lens and multiple LED lens
有配套单个和多个LED组合的光学元件

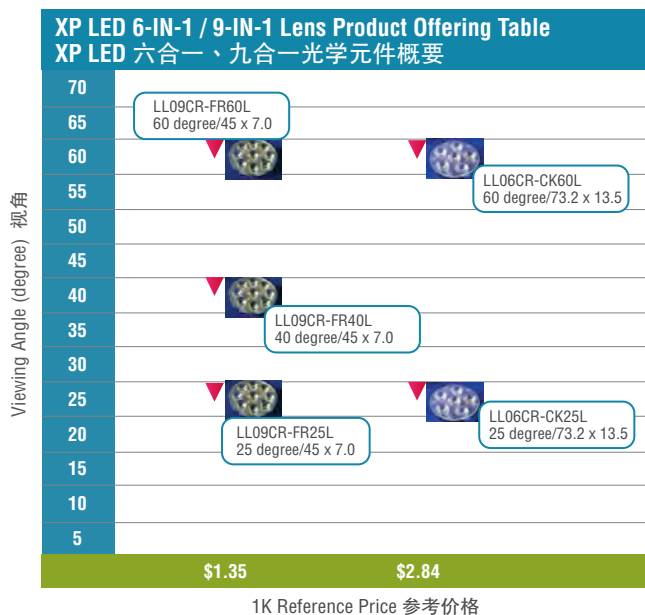
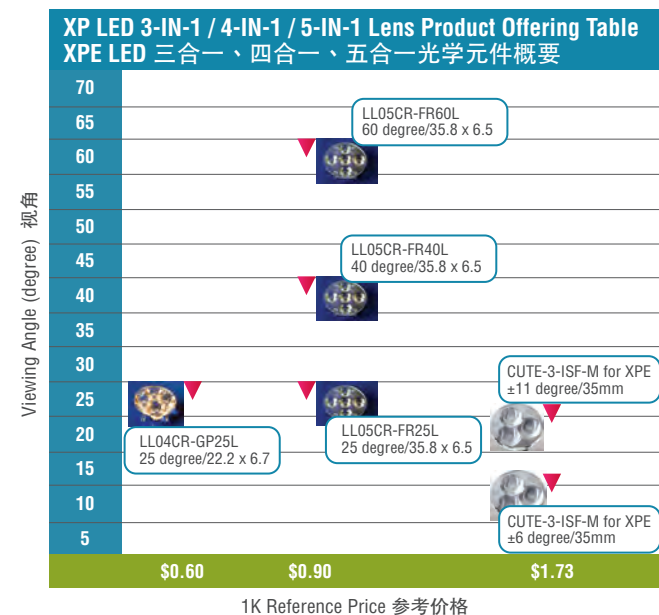
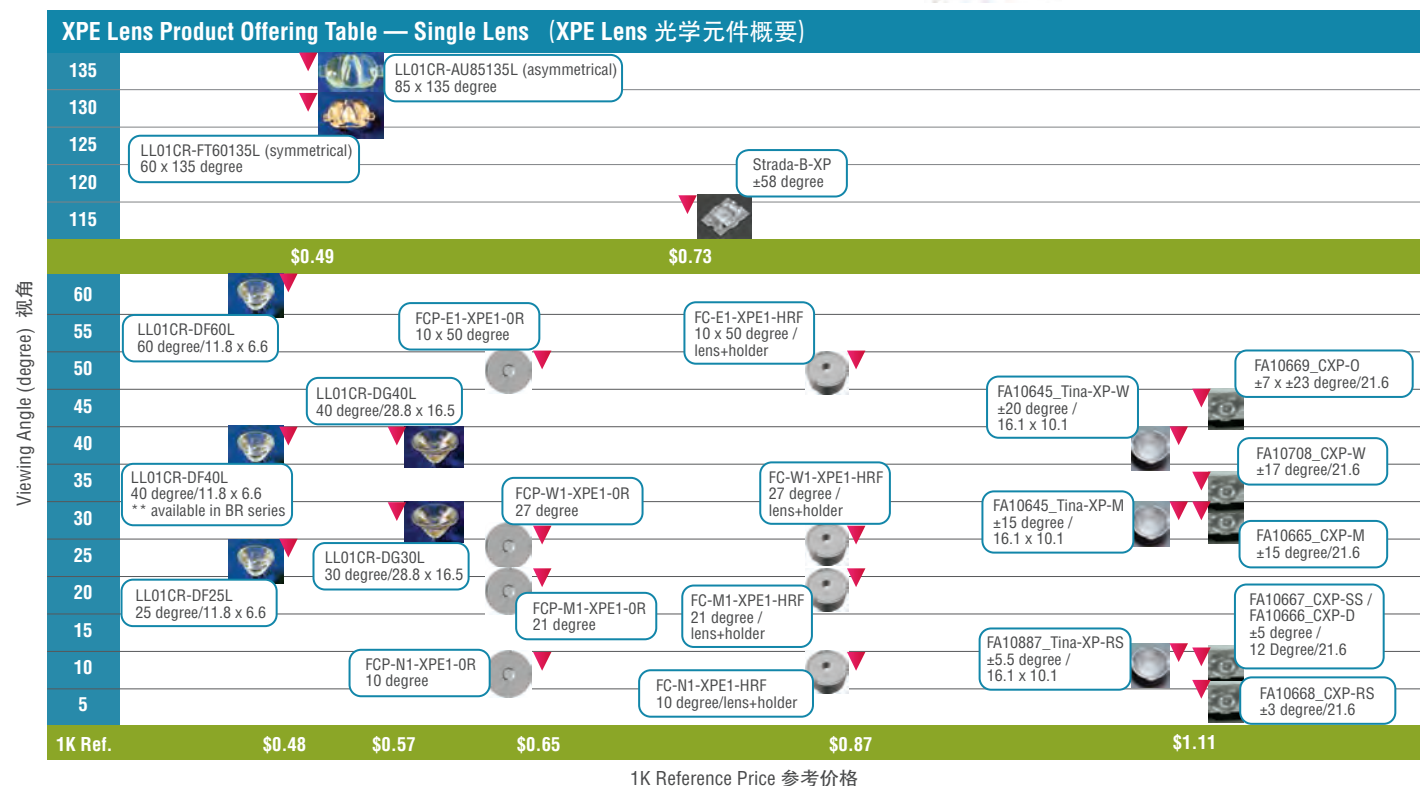
BENEFITS (优点)

- Customer can choose the right viewing angle single lens for many of their applications from one supplier, Arrow Asia
针对客户的多种应用，Arrow都可以提供配套的光学方案给客户

APPLICATIONS (应用)

- General lighting (indoor or outdoor) 通用照明(室内和室外)
- Architectural lighting 建筑照明
- Color changing lighting 七彩灯
- Industrial lighting 工业照明
- Portable lighting (includes camping, bike lighting, torch light, etc) 便携式照明

SUPPLIERS (供应商)



This page introduces the optical solution for Cree multiple chip MCE, MX6 and MPL lighting class LED. These lens and optics products are mainly target in general lighting application such as spot light, indoor lighting, high end portable lighting etc.

这一页主要介绍照明级的多芯片LED MCE、MX6和MPL 的光学方案。这些透镜和光学产品主要针对通用照明领域的应用，比如射灯、室内照明以及高端的便携式照明产品等。



FEATURES (特性)

- Available in single lens, lens with holder 针对单个LED分带支架和无支架的光学元件
- High efficiency 出光效率非常高
- Available in single lens and 3 in 1 lens and multiple LED lens 有配套单个和多个LED组合的光学元件

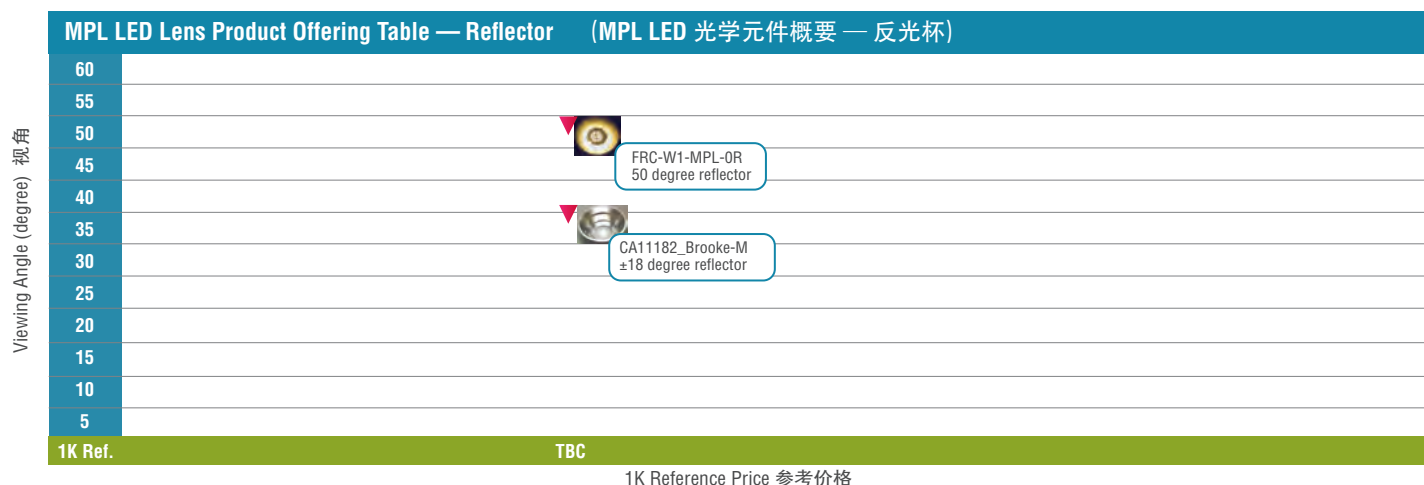
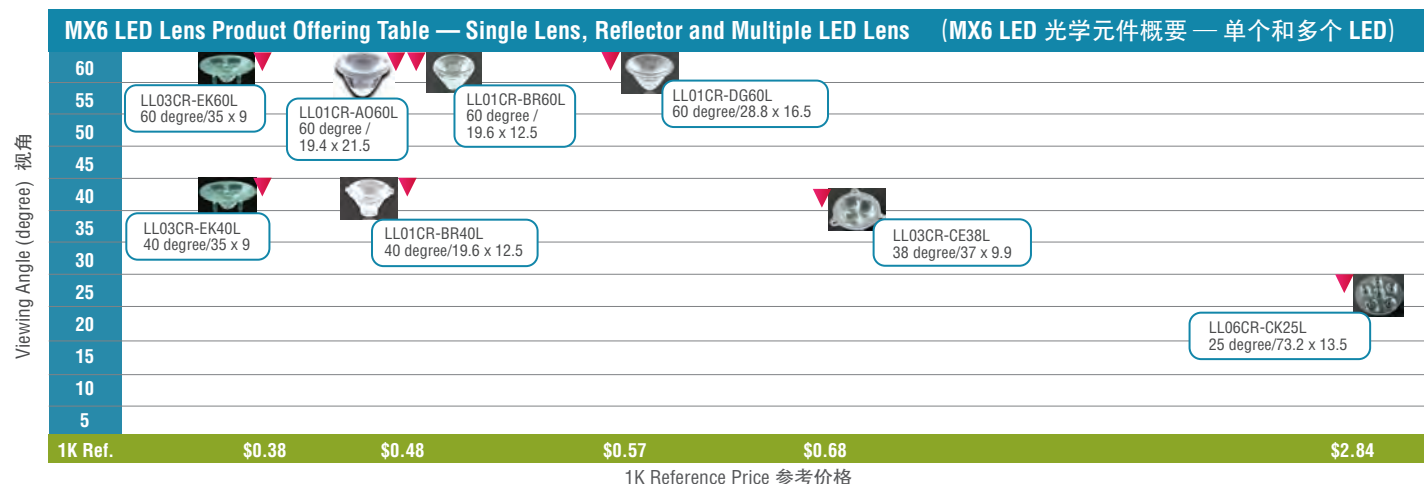
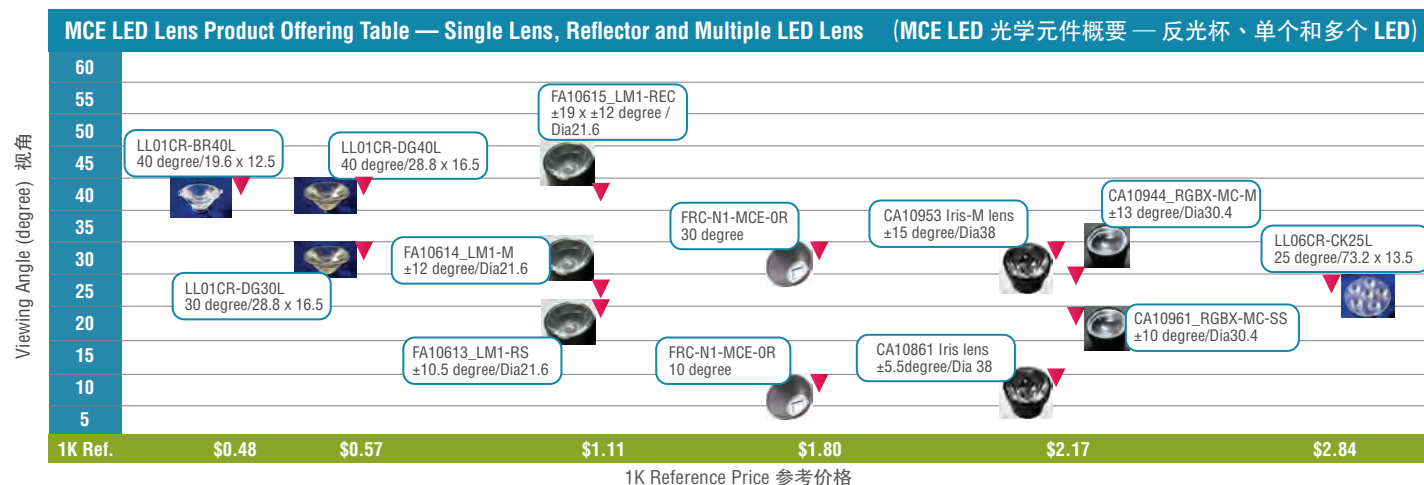
BENEFITS (优点)

- Customer can choose the right viewing angle single lens for many of their applications from one supplier, Arrow Asia 针对客户的多种应用，Arrow都可以提供配套的光学方案给客户

APPLICATIONS (应用)

- General lighting (indoor or outdoor) 通用照明 (室内和室外)
- Architectural lighting 建筑照明
- Color changing lighting 七彩灯
- Industrial lighting 工业照明
- Portable lighting (includes camping, bike lighting, torch light, etc) 便携式照明

SUPPLIERS (供应商)



As Cree LED viewing angle is wide (XRE/XRC has 90 degree), for certain applications, this viewing angle needs to be focus into a narrower angle. Thus, an optical lens or reflector cup is needed to focus the LED beams into a narrower angle. The normal single optics or lens have the viewing angles as 8, 12, 16, 20, 25, 30, 34, 36, 40, 45, Oval 8x50, 6x50, 60x120 and 50x135 degree. 3-in-1 lens and 6-in-1 lens also available currently for various applications. In this page, optic products for XRE lens will be introduced.

Cree的LED视角比较宽，XRE、XRC的视角都是90度，对于某些应用，这种宽视角需要转换成较窄的光束角以达到客户所需要的要求。然而，使用光学透镜或者反光杯恰好可以使光束角变窄。通常单个LED透镜的光学角度有8度、12度、16度、20度、25度、30度、34度、36度、40度、45度、以及椭圆的8x50度、6x50度、60x120度、50x135度。同样还有三合一和六合一的透镜也在很多产品中广泛使用。在这一页主要介绍可适用于Cree XRE系列的光学元件。



FEATURES (特性)

- Available in single, 3-in-1, 6-in-1 lens with many viewing angles
可以提供各种角度和各种规格的透镜，包括单个、三合一以及六合一

BENEFITS (优点)

- Customer can choose the right viewing angle single lens for many of their applications from one supplier, Arrow Asia
针对客户的多种应用，Arrow都可以提供配套的光学方案给客户

APPLICATIONS (应用)

- General lighting (indoor or outdoor) 通用照明 (室内和室外)
- Architectural lighting 建筑照明
- Color changing lighting 七彩灯
- Industrial lighting 工业照明
- Portable lighting (includes camping, bike lighting, torch light, etc) 便携式照明

SUPPLIERS (供应商)



Single Lens Product Offering Table (单个 LED 光学元件概要)	
Viewing Angle (degree) 视角	
135	LL01SH-AU75135L 75 x 135 degree
130	
125	
120	LL01CR-AU50120L 50 x 120 degree
115	
110	
\$0.48	
60	
55	FC-E2-XR79-HRF 8 x 50 degree Oval VA/Dia 22.2
50	
45	LL01CR-AO80L-M2 40 degree/Dia 19.4
40	LL01CR-DG40L 40 degree/Dia 28.8
35	LL01CR-AO2545L-M2 8 x 30 degree/Dia 19.4
30	FC-W3-XR79-HRF 45 degree VA/Dia 22.2
25	LL01CR-AO60L-M2 30 degree/Dia 19.4
20	FC-W2-XR79-HRF 34 degree VA/Dia 22.2
15	LL01CR-AO40L-M2 20 degree/Dia 19.4
10	FC-M2-XR79-HRF 25 degree VA/Dia 22.2
5	LL01CR-AO25L-M2 12 degree/Dia 19.4
	LL01CR-AO15L-M2 8 degree/Dia 19.4
	FC-N2-XR79-HRF 7.8 degree VA/Dia 22.2
	LL01CR-BM40L 40 degree/Dia 35.8
	LL01ED-AK40L 40 degree/34.6 x 18.7
	LL01CR-BM15L 15 degree/Dia 35.8
	LL01CR-BM08L 8 degree/Dia 35.8
	LL01ED-AK15L 15 degree/34.6 x 18.7
1K Ref.	\$0.48 \$0.57 \$0.97 \$1.05 \$1.43
1K Reference Price 参考价格	

3-IN-1 / 6-IN-1 Lens Product Offering Table (三合一、六合一光学元件概要)	
Viewing Angle (degree) 视角	
70	LL03ED-AF4070L 35 x 70 degree/Dia 50.7
65	
60	LL03CR-EK60L 60 degree/low profile
55	LL03ED-AF60L 60 degree/Dia 50.7
50	
45	LL03CR-EK45L 45 degree/low profile
40	LL03ED-AF45L 45 degree/Dia 50.7
35	
30	LL03ED-AF30L 30 degree/Dia 50.7
25	LL03CR-EQ25L 25 degree/low profile
20	
15	
10	
5	
1K Ref.	\$0.60 \$0.70 \$2.84
1K Reference Price 参考价格	

LedLink is one of the suppliers of Arrow lighting optics solution provider. It is an expertise optical solution company which has been recognised by Cree. With integration of in house optical design, mould tooling, and mass production, the performance of LedLink lens is utilised to meet rapid shift in lighting industry. Lamp manufacturers may adapt our standard products or our customised lenses to design innovative LED fixtures.

In order to facilitate the evaluation process and reduce the developing time and cost of LED street light application, LedLink has developed nine types of street light lenses which are compatible with light various LED manufacturers. These lenses are designed with different assumed conditions of the road and pole arrangements to optimise both the uniformity and the output lux value. Technical data, such as ies files, datasheets or the assumed installed conditions details is available by request.

为了降低客户开发LED路灯的时间及成本，雷笛克开发了多种配合不同LED之路灯透镜，在设计这些路灯透镜时，IES档、规格书及以下所列举的道路环境资讯可以提供给我们，我们针对各种可能的道路条件及灯杆配置做优化设计，使透镜效率及均匀度能达到不同的规范。

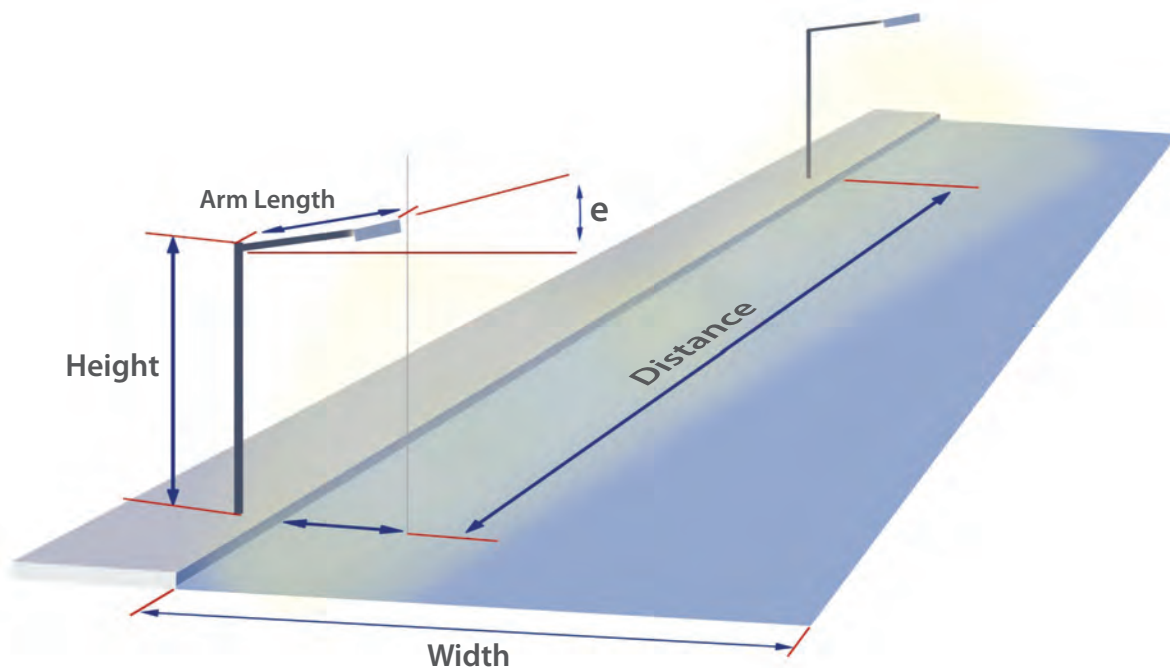


APPLICATIONS AREA - DESIGN CRITERIA (路灯应用 - 设计要求)

- Installed height of the pole 路灯杆高
- Distance between the poles 路灯杆距
- Arm length 路灯杆臂长度
- Tilt angle 杆臂倾斜角度
- Road width 路宽
- Arrangement of the poles 路灯设置方式

To achieve energy saving, reduce the gap and the differences between traditional light and LED light source in street lamps, using the rectangular beam projected by secondary lenses, the output lum which generated by LEDs can be utilised and the efficiency can be optimised.

相较于传统路灯，LED路灯除了达到节能效果外，尤其使用我们的二次光学透镜，其发射出的矩形光更能使LED路灯达到最高发光效率及最佳照明效果。



APPLICATIONS AREA (应用)

- Retrofit lighting application 传统灯泡替换
- Torch 手电筒
- Large area optic for street lamp 路灯
- Stage lighting 舞台照明
- Light bar 灯条
- Tunnel lighting 隧道照明



	Narrow Beam 窄光束	Medium Beam 中光束	Wide Beam 阔光束	Others 其他 (对称/不对称光束)
XRE 	 LL01CR-A015L-M2 Degree: 15° D x H: 23.5 x 16mm Also available with : 25°, 40°, 60°, 80°, 25°x40°	 LL01CR-BRxxL Degree: 40° D x H: 19.6 x 12.5mm Also available with : 30°, 40°, 50°, 10°x45°, 15°x50°, 15°x80°, 40°x90°	 LL01CR-BS60L Degree: 60° D x H: 19.8 x 12.5mm Also available with : 10°, 38°	 LL01SH-AU75135L Symmetrical beam 对称光束 Degree: 75°x135° D x W x H: 24 x 12.6 x 9.3mm LL01CR-AU50120L Symmetrical beam 对称光束 Degree: 50°x120° D x W x H: 21 x 11.8 x 9.4mm
XPC XPE XPG (**PS1)	 LL01ZZ-EX10L-M2 Degree: 10° D x H: 22.4 x 9.8mm Also available with : 25°, 40°, 60° LL01CR-DFxxL-M2 Degree: 25° D x H: 13.5 x 7.1mm Also available with : 40°, 60°	 LL03LU-DMxxL Degree: 15° 25° 40° D x H: 23.1 x 10.9mm LL03LU-DOxxL Degree: 15° 25° 40° D x H: 35 x 10.5mm LL03ED-GKxxL Degree: 40° D x H: 33.2 x 10.3mm Also available with : 4 in 1/ 7 in 1/ 9 in 1/ 12 in 1 40°, 60°	 LL04CR-GPxxL Degree: 25° 45° D x H: 22.2 x 6.7mm LL07ZZ-FUxxL Degree: 15° 25° D x H: 50.3 x 10.8mm LL05CR-FRxxL Degree: 25° D x H: 35.8 x 6.5mm Also available with : 7 in 1/ 9 in 1/ 12 in 1 40°, 60°	 LL01CR-FT60135L Symmetrical beam 对称光束 Degree: 60°x135° D x W x H: 18 x 9.3 x 7mm LL01CR-AU85135L Asymmetrical beam 不对称光束 Degree: 85°x135° D x W x H: 18 x 10.1 x 7.6mm LL24CR-AU75135L Asymmetrical beam 不对称光束 Degree: 75°x135° D x W x H: 120 x 100 x 10.22mm LDKPCR-24L3WS4-01 MCPCB is available
MCE 	 LL01ED-AY10L Degree: 10° D x H: 43.8 x 24.5mm Also available with : 38°	 LL01CR-FL25L-M2 Degree: 25° D x H: 24.4 x 12.2mm	 LL01CR-DGxxL-M2 Degree: 30° D x H: 32.8 x 18mm Also available with : 40°, 60°	 LL01ED-AJ60L Degree: 60° D x H: 28.8 x 19.8mm MCE RGBW colour mixing
MX6 	 LL01NI-GRxxL-M2 Degree: 40° D x H: 23.6 x 15mm Also available with : 60°, 80°	 LL01ZZ-FL25L Degree: 25° D x H: 22 x 10.6mm	 LL03CR-EKxxL Degree: 40° D x H: 35 x 9mm	 LL03ED-CTxxL Degree: 38° D x H: 31 x 11.2mm Also available with : 80°
MPL 	 LL01ED-IHxxL Degree: 60° D x H: 87 x 44.25mm	 LL01ED-AY38L Degree: 38° D x H: 43.8 x 24.5mm Also available with : 10°	 LL01ED-AI60L Degree: 60° D x H: 59.9 x 17mm Convex Lens	

PS1**XPC/XPE/XPG beam pattern is compatible but the beam angle is different. The beam angle is tested based on XPE. 以上光束角度以XPE测试结果为准。

** IES file, datasheets are available by request. 客户可索取IES档案及规格书。

1. Customisation Process and Time

- To define the light source (LED type)
- To define the beam angle (full angle view)
- To define the mechanical design
- The optical simulation time is two weeks after above details confirmed
- T1 sample will be available within 30 days after our client confirms our provided simulation report
- Total developing period is around 30 to 45 days, depending on the situation

2. Lead Time

Normally our lead time for mass production product is three weeks

1. 个别开发项目流程及需时

- 定义LED厂牌以及型号
- 定义角度(90°光强度全角或是50°光强度半角)
- 定义机构设计
- 在客户模具定金50%确认后两周内提供光学模拟报告
- 第一次试模样品在光学模拟报告确认后30天可提供
- 总开发时间为30到45天, 但可依照客户的需求来作调整

2. 需時

交貨期一般需時三週

Why Optics?

The idea of optics is to direct the light where it is needed. Optical lenses and reflectors offer solutions that are not possible with LEDs only.

为何使用二次光学?

透镜的目的在于引导光线到所需要的位置。光学透镜及光杯提供了LED所无法独自产生的解决方案。



Why LEDiL Optics?

- Visually pleasing products
- High optical efficiency, mostly between 85-95%
- Distribute world wide and have agreement with Arrow
- Prompt deliveries and high-level customer service
- Competitive price

为何选择 LEDiL 光学?

- 美观的产品
- 优异的光学效率，通常介於85-95%之间
- 全球经销网路，艾睿电子签约经销
- 快速的送货以及高品质的服务
- 极具竞争力的价格

LEDiL products cover over 450 standard lens and reflector solutions, enabling an almost unlimited range of possibilities for different applications. Examples of applications:

Indoor applications

- Down lights
- Emergency lights
- Lobby lighting
- Kitchen lighting
- Living room lighting
- Bathroom lighting
- Torch lights
- Mood lights
- Decorative lights
- Architectural lighting
- Reading and task lights

Outdoor applications

- Street lighting
- Architectural lighting
- Automotive lighting
- Park lighting
- Public lights

LEDiL的产品包含超过450种标准规格透镜及光杯，创造出各种应用的可能性，其中所包括的应用有：

室内应用

- 投射灯
- 紧急照明
- 大堂照明
- 厨房照明
- 起居室照明
- 浴厕照明
- 手电筒
- 情境照明
- 装饰照明
- 建筑照明
- 阅读及工作照明

户外应用

- 路灯
- 建筑景观照明
- 车用照明
- 停车场照明
- 公共区域照明

Supported LED Manufacturers:

Supported LEDs by Arrow:

Cree, Osram, Sharp, Everlight

Others:

Nichia, Luxeon, Seoul Semiconductor, Samsung, Luminus, Bridgelux, Citizen, LedEngin, Intermatix

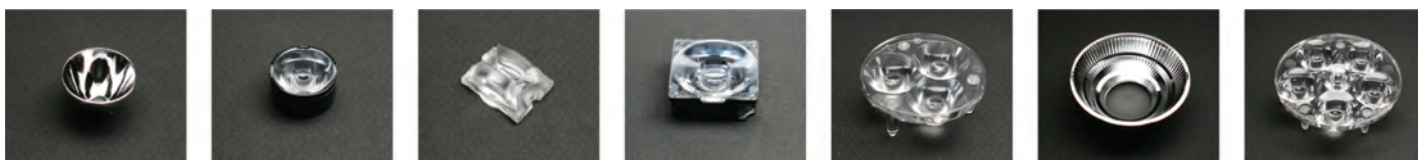
支援的 LED 厂商：

艾睿电子支援：

科锐，欧司朗，夏普，亿光

其他：

Nichia, Luxeon, Seoul Semiconductor, Samsung, Luminus, Bridgelux, Citizen, LedEngin, Intermatix

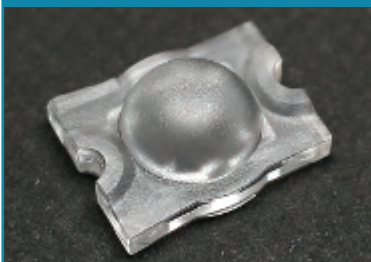


PRODUCT EXAMPLES (产品范例):

Lens diameters from 9.9mm to 210mm
透镜直径 9.9mm - 210mm



Strada-C



Strada-C (-C2) product series is especially designed to meet the street lighting requirements of the future. The beam pattern is uniform batwing and extremely wide. The beam angle is from ± 48 to ± 68 degrees, depending on the light source. Lenses are available for Osram, Cree, Nichia, Luxeon and Sharp LEDs.

Strada-C系列产品是特别为了道路照明的法规以及需求所设计。蝙蝠状的光型以及均匀的光斑将程度拉开到极致。出光角从 ± 48 到 ± 68 度。搭配 Osram、Cree、Nichia、Luxeon 及 Sharp 的 LED。

Heidi



Heidi lens series is a new product series for Osram Oslon, Cree XP-E, Luxeon Rebel and Nichia 119 LEDs. There are 4 beam types available: diffuser, medium, oval and wide. The lens foot can be covered with resin without losses in optical efficiency (fully sealed construction of luminaire possible).

Heidi系列是一款新型的透镜，搭配Cree XP-E系列，Osram Oslon、Luxeon Rebel 以及 Nichia 119 LED。共有四种光型：扩散型，中角型，椭圆形以及广角型。底部可灌胶且不会折损出光效率。(可制作防水型灯具)

Lisa2



Perhaps the smallest high quality lens with holder yet. Lisa2 product series is brand new and extremely tiny. The diameter is only 9.9 mm and there are 3 different beam types available: spot, medium and wide. Lenses are available for Osram, Cree, Nichia, Luxeon and Sharp LEDs.

极有可能是搭配固定底座，且高效率的透镜中最小的。Lisa2系列不但新颖，而且极度细小。直径仅 9.9mm，共三种光型：聚焦型，中角型，广角型。搭配Cree、Osram、Nichia、Luxeon及Sharp LED。

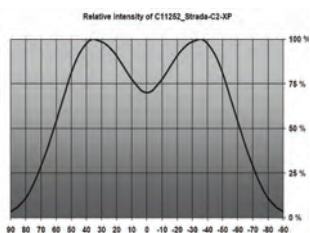
Tuija-3



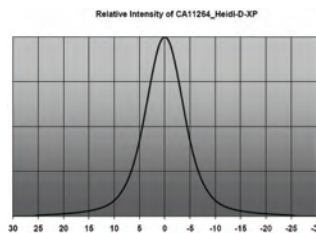
Tuija-3 series is a MR16 (50 mm) sized lens, which is ideal for many applications where the lens needs to be sunk, for example, to the ceiling. Three different beam types: spot, medium and wide. Lenses are available for newest Osram, Cree, Luxeon and Sharp LEDs.

Tuija-3是一款50mm直径，MR16灯泡所使用的透镜，特别适用于坎入式天花板灯，共有三种光型：聚焦型，中角型，广角型。搭配Cree、Osram、Luxeon以及Sharp最新的LED款式。

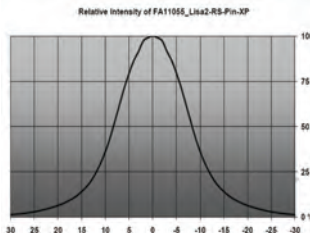
Strada-C Beam Pattern



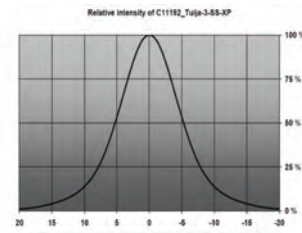
Heidi Beam Pattern



Lisa2 Beam Pattern



Tuija-3 Beam Pattern



For price and sample inquiries, please contact your local Arrow distributor.
For technical information and test kits, please visit <http://www.ledil.com>
or contact engineering@ledil.com

如欲查询产品价格或样板，请联系艾睿电子。

如欲查询技术信息及测试工具包，请浏览 <http://www.ledil.com>

或联络 engineering@ledil.com。

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Adding intelligence for dimming control, eliminating low frequency blinking, maintain constant current for LED. Programmable pattern display for flashing control such as SOS signal or any pattern pre-stored in Flash/ROM memory. Some MCU controllers also consist of multiple LED driver channels for multiple LED string control.

微处理器可增加调光控制的智能功能，消除低频闪烁，同时保持对LED的恒流控制。另外，MCU为闪烁控制提供可编程图案显示，比如SOS信号，或者任何预定存在於Flash/ROM中的图案。一些MCU控制器也带有多LED驱动通道以满足多芯片LED或LED串控制。



FEATURES (特性)

- Programmable Timer/PWM out
可编程Timer/PWM输出
- Built-in temperature sensor
含有温度感应器
- ADC or analog comparator
ADC或者模拟比较器
- Flash memory
Flash记忆

BENEFITS (优点)

- Ease of implementation 容易设计使用
- Makes RGB easy 颜色变化容易
- Improve color quality 改善颜色质量

APPLICATIONS (应用)

- Home general lighting 家庭通用照明
- Flashlight torch 手电筒
- Automotive signal lights and interior lighting
汽车信号灯和室内照明
- SOS signal blinking / pattern display
SOS信号闪烁/图案显示
- Car emergency warning light 小汽车紧急警告灯
- Smart flashlight 智能手电筒

SUPPLIERS (供应商)



Supplier 供应商	Freescale				NXP		TI		Cypress	Atmel		Renesas	
Part No. 产品编号	MC9S08QD2 MSC	MC9S08QD2 CPC	MC9RS08 KA2	MC9RS08 KA1	P89LPC9102	P89LPC901	MSP430F 2012	MSP430F 2001	CY8CLED04C	ATtiny13V-10SU	ATtiny26L-8SU	M37548G1	M34283G2GP
MCU Type MCU 类型	8bit	8bit	8bit	8bit	8bit	8bit	16bit	16bit	8bit	8bit	8bit	8bit	4bit
Min. Input Voltage 最少输入电压	2.7V	2.7V	1.8V	1.8V	2.4V	2.4V	1.8V	1.8V	7V	1.8V	2.7V	1.8V	1.8V
Max. Input Voltage 最大输入电压	5.5V	5.5V	5.5V	5.5V	3.6V with 5V tolerant I/O pins	3.6V with 5V tolerant I/O pins	3.6V	3.6V	32V	5.5V	5.5V	5.5V	3.6V
Standby Current 辅助电流	0.8uA@5V	0.8uA@5V	1uA@5V	1uA@5V	1uA@3V	1uA@3V	0.5uA@3V	0.5uA@3V	25uA	0.1uA@1.8V	1uA@3V	0.1uA	1uA
External Interrupt 外部中断	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No (but have wake up pins)
Timer Interrupt 时钟中断	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Memory 寄存器	2K Flash	2K Flash	2K Flash	1K Flash	1K Flash	1K Flash	2K Flash	1K Flash	16K Flash	1K Flash	2K Flash	2K QzROM	2K QzROM
RAM 随机存取存储器	128B	128B	64B	64B	128B	128B	128B	128B	1K SRAM	64B	128B	192B	32B
# of Timer 定时器大小	2ch 16bit	2ch 16bit	1ch 8bit	1ch 8bit	2ch 16bit	1ch 16bit	1ch 16bit	1ch 16bit	8 to 32bit	1ch 8bit	2ch 8bit	1 x 16bit, 2 x 8bit	2ch 8bit
A/D 模数转换	4ch 10bit	4ch 10bit	Comparator	Comparator	4ch 8bit	Comparator	1ch 10bit	Comparator	12bit	4ch 10bit	11ch 10bit	6ch 10bit	No
Other Features 其它特性	Temp. sensor	Temp. sensor	N/A	N/A	N/A	N/A	N/A	N/A	DMX512	N/A	N/A	N/A	N/A
GP I/O GP 输入/输出	6	6	4 / 6	4 / 6	8	6	10	10	14	6	16	16	16
Package 封装	8 PDIP 8 NB-SOIC	8 PDIP 8 NB-SOIC	6 DFN (3x3mm) 8 NB-SOIC 8 PDIP	6 DFN (3x3mm) 8 NB-SOIC 8 PDIP	HVSON10 (3x3mm)	8 SOIC 8 DIP	14PDIP 14TSSOP 16QFN	14PDIP 14TSSOP 16QFN	QFN56	8 DIP 8 SOIC	20 DIP 20 SOIC	20pin SSOP	20pin SSOP
Operating Temp. 操作温度	-40°C to 125°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 105°C	-40°C to 105°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-20°C to 85°C	-20°C to 85°C
C-Compile 编译	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
1K pcs Reference Price (USD)** 参考价格	0.62	0.59	0.29	0.27	0.42	0.37	1.00	0.55	Available upon request	0.66	0.96	0.86	0.29

* Green highlight means best in class. 标示绿色的表示在系列中是最好的。

** 1K pcs order price is for reference only. Please consult Arrow sales representative for quotation.

1K 报价仅作参考，如阁下对产品有兴趣，请与客户代表联络再作详细报价。

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This is specially designed for IRC Anotherm heat sink. IRC Anotherm is the best commercial material known to Arrow, to pass through heat from LED to ambient temperature. Since these heat sink are mostly customized, each request will be taken as a special handling deal. Its best thermal conductivity comes from the fact that LED (XPE thermal resistance, junction to solder point, typical 9°C/W) sit on top of IRC Anotherm circuitry (K=27w/m-°K) which passes the LED heat directly onto the Aluminum (K=201w/m-°K) immediately below it. There is no need of any heat gel which K value is lower than the Anotherm, in between the MCPCB/Anotherm and the heat sink below (aluminium with fin).

这是IRC Anotherm所设计的散热器。IRC Anotherm将热量从LED传导到周围环境，是Arrow所了解的最好的商业材料。因为这种散热器大多数情况下是定制的，所以每一种需求都将视为特殊项目去处理。他优良的导热系数来自于LED(XPE的热阻，结点到焊点，典型值9°C/W)直接放在IRC Anotherm(K=27w/m-°K)的线路上面，因此LED上的热量直接通过导线传导到下面的铝材(K=201w/m-°K)上。在MCPCB/Anotherm和散热器(铝基板)之间不需要任何K值小于Anotherm的散热胶。



FEATURES (特性)

- Fastest heat dissipation 散热最快
- All shapes and sizes 各种形状和尺寸

BENEFITS (优点)

- Sustain LED junction temperature 维持LED结温不变
- PCB to heatsink as one aluminum body
PCB到散热器成为一个铝合体

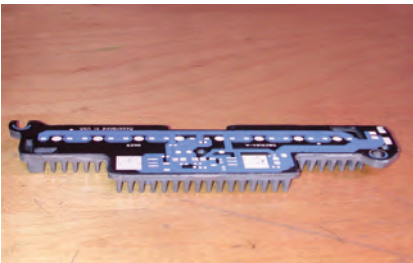
APPLICATIONS (应用)

- Street lamp 道路照明
- Automotive 汽车应用
- General lighting 通用照明

SUPPLIER (供应商)



TYPES (类型)

A IRC Anotherm HMSL Heat Sink IRC Anotherm HMSL 散热器		B IRC Anotherm Torch Heat Sink IRC Anotherm 筒状散热器
16cm x 4cm x 1.3cm with fin behind the PCB (USD 3.8 for 5K set) 16cm x 4cm x 1.3cm 散热片排列在PCB后面 (5K套时，单价3.8美元)		2.8cm diameter x 3cm cylinder length (USD 1.3 for 5K set) 2.8cm直径 x 3cm柱高 (5K套时，单价1.3美元)
Fin view 散热片示意图	PCB view PCB 示意图	
		

Due to the high current needed to drive the high-brightness LEDs, thermal management becomes increasingly important especially when the number of LED count becomes increasing. Arrow Lighting source and provide differentiated PCBs so that our customers have the world best commercially available fast heat-drain PCBs. Arrow will also provide custom IRC Anotherm board, single LED per MCPCB as well as 3 in 1 MCPCB for special customers' needs.

由于驱动高亮度LED需要电流高，所以散热变的越来越重要，特别是当LED数量增加的时候。为了使我们的客户拥有全世界最好最快的商用散热PCB，艾睿照明小组开发并且提供多样化的PCB，Arrow也会提供给特殊客户IRC Anotherm散热板，单颗LED的铝基板和三合一的铝基板。



FEATURES (特性)

- Available in FR4 with metal base at 0.8w/m²-K 金属衬底的FR4，导热系数0.8w/m²-K
- Available in MCPCB, at about 1 to 4w/m²-K 铝基板，导热系数在4w/m²-K
- Available in IRC Anotherm at 27w/m²-K IRC Anotherm导热系数在27w/m²-K

BENEFITS (优点)

- Cheap and must be used with Vias, for 1 to 2 LEDs @350mA 便宜，使用时需要Vias，在350mA焊1到2颗LED
- Industrial standard, affordable price 符合工业标准，价格合理
- Better thermal MCPCB, but higher price 散热比铝基板好，但是价格也贵很多
- Best available thermal MCPCB, most costly 最有效的散热铝基板，价格最贵

APPLICATIONS (应用)

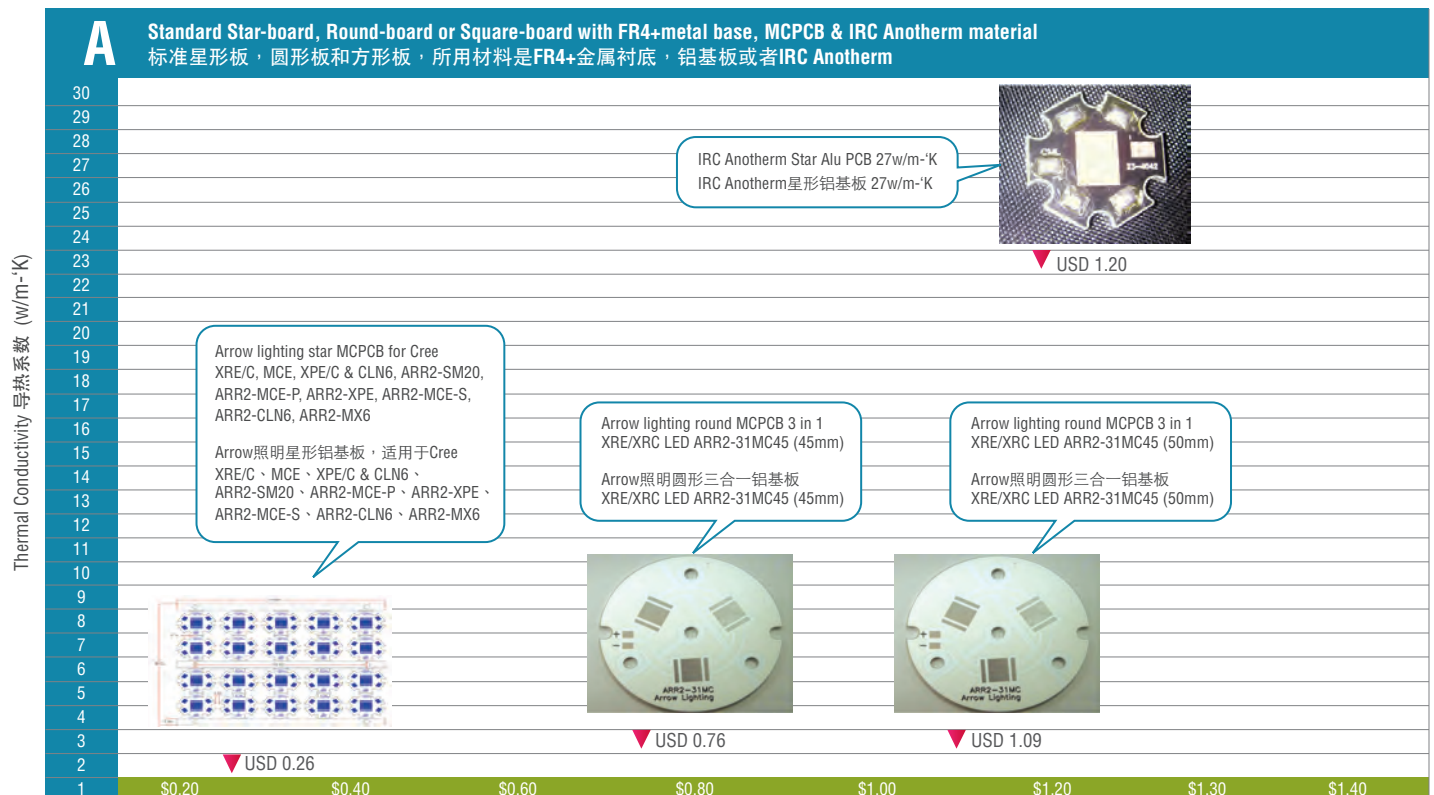
- Torch light or any single to 3 LED source of lighting 手电筒，任何带1到3颗LED光源
- Street lighting, park lighting 路灯、庭院灯
- General lighting 通用照明

SUPPLIER (供应商)



Asian Supplier 亚洲供应商

TYPES (类型)



* Each panel contain 20pcs of Star MCPCB. 每块有20片星形铝基板。

** MPL LED MCPCB will be available soon.

B IRC Anotherm 6 Cree Rectangular

矩形IRC Anotherm板，含6个Cree LED焊盘

35.7cm x 3.2cm x 2mm board
(USD 4 for 5K set)35.7cm x 3.2cm x 2mm板
(5K套时，单价4美元)

C IRC Anotherm 8 Cree Rectangular

矩形IRC Anotherm板，含8个Cree LED焊盘

56.5cm x 3.2cm x 2mm board
(USD 6.3 for 5K set)56.5cm x 3.2cm x 2mm板
(5K套时，单价6.3美元)

D IRC Anotherm 12 Cree Rectangular

矩形IRC Anotherm板，含12个Cree LED焊盘

30.3cm x 4cm x 1.5mm board
(USD 4.3 for 5K set)30.3cm x 4cm x 1.5mm板
(5K套时，单价4.3美元)

E IRC Anotherm 12x3 Cree Rectangular

矩形IRC Anotherm板，12x3 Cree LED焊盘

29.5cm x 9.4cm x 1.5mm board
(USD 9.6 for 5K set)29.5cm x 9.4cm x 1.5mm板
(5K套时，单价9.6美元)

F IRC Anotherm 1 Cree Round

圆形IRC Anotherm板，含1个Cree LED焊盘

Round 2.4cm diameter board
(USD 1.6 for 5K set)Round 2.4cm diameter板
(5K套时，单价1.6美元)

G IRC Anotherm 5 Cree Round

圆形IRC Anotherm板，含5个Cree LED焊盘

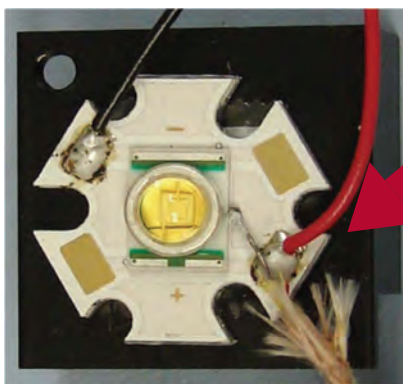
Round 7.6cm diameter board
(USD 14.8 for 5K set)Round 7.6cm diameter板
(5K套时，单价14.8美元)

In LED lighting design, thermal management becomes one of the most challenging area. As in order to extend LED life for maximizing the lighting fixture reliability. It is always necessary to estimate the LED chip junction temperature in design stage. In the following, the method of LED thermal management as well as junction temperature estimation will be introduced.

在LED照明设备的设计中，散热处理成为最具挑战的领域之一。为了延长LED的寿命而增加照明设备的可靠性。所以在设计照明平台上必须去估算LED芯片的结温。下面将介绍LED的散热处理，即结温估算方法。

The Proper Way to Measure LED Solder Point Temperature:

一种可行的方法是去测量LED焊点的温度：



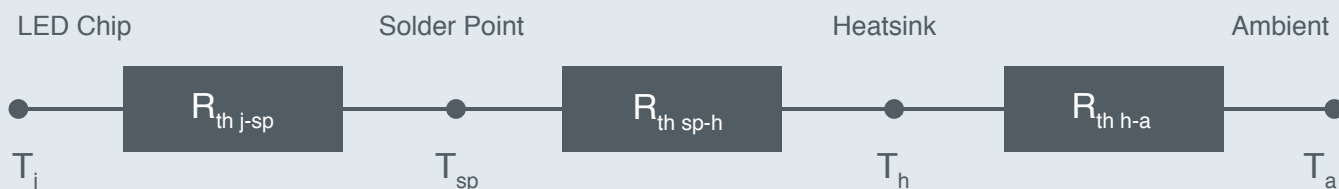
Place the temperature probe or thermal couple just right next to the LED package.

把温度探针或者热偶放到LED封装边的焊点上。



Extended solder pad for temperature measurement into the MCPCB.

增大焊盘面积去测量MCPCB的温度。



To estimate the junction temperature, designer should consider the total thermal resistance from ambient to junction, which include the thermal resistance from junction to solder point, solder point to heatsink and heatsink to ambient.

为了测量结温，设计者要考虑到所有的从环境到结点的热阻，包括结点到焊点，焊点到散热器和散热器到环境。

Application Example: Estimating Junction Temperature in XRE LED

Calculating the junction temperature from measuring the solder point temperature: Assuming an Xlamp LED driving at 350mA at 3.3V, the measured solder point temperature is 51.2°C, the junction temperature can be estimated as:

应用实例：测试XRE LED的结温

从测量焊点的温度计算结温：假设一个大功率LED驱动在350mA、3.3V，焊点测量出来的温度是51.2°C，则结温计算如下：

$$\begin{aligned}\text{Total LED power (LED总功率)} &= 3.3V \times 350mA \\ &= 1.155W\end{aligned}$$

$$\begin{aligned}\text{Junction Temperature } T_j &= \text{Temperature of solder point} + R_{th(j-sp)} \times \text{Power} (R_{th} \text{ of XRE is } 8^\circ\text{C/W}) \\ \text{结温 } T_j &= \text{焊点温度} + \text{热阻系数} \times \text{功率} (\text{XRE的热阻系数是 } 8^\circ\text{C/W}) \\ &= 51.2^\circ\text{C} + 8^\circ\text{C/W} \times 1.155W \\ &= 60^\circ\text{C}\end{aligned}$$

AC/DC Street Lighting Application Description (AC/DC 路灯照明应用描述)



Abstract

In this application, an AC/DC street lamp application will be presented. Arrow Lighting provides solution on street lamp lighting design in high power LED, high efficiency LED driver as well as lens/optics solution. Apart from street lamp application, this design concept can also be applied in outdoor lighting such as floodlight and spotlight.

Street Lamp Design Criteria

Most of the country has implemented lighting design standard for street lamp. In China, the street lamp should be designed base on the national standard CJJ45-2006, which is a Chinese standard of lighting design in urban road. It governs the Luminance, Illuminance, Uniformity, threshold increment as well as surround ratio on various kind of road lane. Meanwhile, this standard also govern the street lamp luminaires efficiency, lumen maintenance as well as life time in real application.

Definition

Average Illuminance Eav: Horizontal illuminance averaged over a road area.

Overall Uniformity (of road surface luminance, illuminance): Ratio of the lowest to the average value of illuminance.

Longitudinal Uniformity: Ratio of the lowest to the highest road surface luminance of the driving lanes.

Threshold Increment TI:

Measure of the loss of visibility caused by the disability glare of the luminaires of a road lighting installation.

Surround Ratio (SR):

Average illuminance of strips just outside the edges of the carriageway in proportion to the average illuminance on strips just inside the edges.

Cree LED in Street Lamp

Cree Xlamp XPG, XPE and MCE delivers high lumen output, high efficacy, good color quality as well as high reliability, which fit for various outdoor lighting application such as street lamp, floodlight, pathway lighting and landscape lighting. These LED series form a perfect choice for outdoor lighting application together with Arrow lighting LED driver and optical solution.

摘要

在这AC/DC路灯应用方案中。艾睿照明提供HPLED路灯应用。大功率LED驱动和透镜/光学解决方案。除了路灯应用，这种设计概念也可运用于室外照明，如泛光灯及射灯。

路灯设计准则

在大多数国家，路灯照明已被标准化。在中国内地，路灯的法規标准为CJJ45-2006。CJJ45-2006规范了在不同种类的道路中的照度均匀度及边缘比例等要求。同时CJJ45亦规范了路灯灯具的光效，光衰及寿命等。

定义

平均照度：在整条道路上的照度的平均值。

总体均匀度U0：最低照度和平均照度比值。

纵向均匀度UL：行车道路面最低亮度和最高亮度的比值。

阈值增量TI：道路照明系统中，由于光源的失能眩光引起的能见度损失的测量。

SR边缘比例：行车道边缘平均照度于行车道平均照度比值。

可用于路灯的科锐发光二极管

科锐公司提供高亮度，高光效，高素质及高可靠性的 XPG、XPE 及 MCE LED，可多方面应用于户外照明，如路灯，泛光灯，庭园照明。如与艾睿LED驱动及光学方案一并应用更是一个户外照明方案的完美配合。

Color	CCT Range		XPE LED			XPG LED				
			Base Order Codes Min. Luminous Flux(lm)			Base Order Codes Min. Luminous Flux(lm)				
	Min.	Max.	Group	Flux(lm)		Order Code			Group	Flux(lm)
Cool White	5,000K	10,000K	Q4	100	XPEWHT-L1-0000-00C01		R2	114	XPGWHT-L1-0000-00E51	
			Q5	107	XPEWHT-L1-0000-00D01		R3	122	XPGWHT-L1-0000-00F51	
			R2	114	XPEWHT-L1-0000-00E01		R4	130	XPGWHT-L1-0000-00G51	
			R3	122	XPEWHT-L1-0000-00F01		R5	139	XPGWHT-L1-0000-00H51	
Outdoor White	4,000K	5,300K	Q3	93.9	XPEWHT-01-0000-00BC2		R2	114	XPGWHT-01-0000-00EC2	
			Q4	100	XPEWHT-01-0000-00CC2		R3	122	XPGWHT-01-0000-00FC2	
			Q5	107	XPEWHT-01-0000-00DC2		R4	130	XPGWHT-01-0000-00GC2	
			R2	114	XPEWHT-01-0000-00EC2					
Neutral White	3,700K	5,000K	Q3	93.9	XPEWHT-L1-0000-00BE4		Q5	107	XPGWHT-L1-0000-00DE4	
			Q4	100	XPEWHT-L1-0000-00CE4		R2	114	XPGWHT-L1-0000-00EE4	
			Q5	107	XPEWHT-L1-0000-00DE4		R3	122	XPGWHT-L1-0000-00FE4	
Warm White	2,600K	3,700K	P3	73.9	XPEWHT-L1-0000-00BE7		Q3	93.9	XPGWHT-L1-0000-00BE7	
			P4	80.6	XPEWHT-L1-0000-009E7		Q4	100	XPGWHT-L1-0000-00CE7	
			Q2	87.4	XPEWHT-L1-0000-00AE7		Q5	107	XPGWHT-L1-0000-00DE7	
			Q3	93.9	XPEWHT-L1-0000-00BE7					

MCE Multiple Chip LED						
Color	CCT Range		Base Order Codes Min. Luminous Flux(lm) @ 350mA			Order Code
	Min.	Max.	Group	Flux(lm)		
Cool White	5,000K	10,000K	K	370	MCE4WT-A2-0000-000K01	
			M	430	MCE4WT-A2-0000-000M01	
Neutral White	3,700K	5,000K	J	320	MCE4WT-A2-0000-000JE4	
			K	370	MCE4WT-A2-0000-000KE4	
Warm White	2,600K	3,700K	G	240	MCE4WT-A2-0000-000GE7	
			H	280	MCE4WT-A2-0000-000HE7	
			J	320	MCE4WT-A2-0000-000JE7	
Easy White	3,500K 3,000K 2,700K		J	320	MCEEZW-A1-0000-0000J035F	
			J	320	MCEEZW-A1-0000-0000J030F	
			H	280	MCEEZW-A1-0000-0000H027F	

LED driver is one of the key part in street lamp lighting design. It performs constant current control, protection and power conversion for the LED. As in order to design a reliable and long life LED driver. Some of the design criteria needs to be considered and are shown as follow:

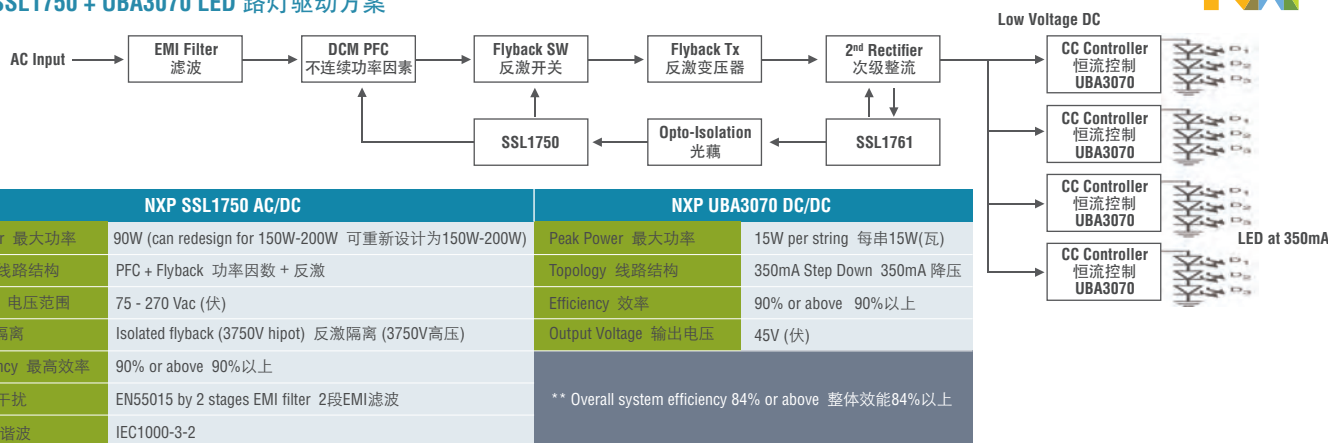
LED驱动是路灯照明设计的关键部分之一，LED驱动实施LED的恒流控制，保护功能和AC/DC转换。为了设计一个可靠的，寿命长的LED驱动，必须考虑一些设计标准，下面将介绍这些标准：

Solution Features (方案特性)

Outdoor Product Qualification 室外照明防水防尘等级：	IP65 or above 或以上
EMI 电磁干扰：	EN55015 class B
Power Factor and Harmonics 功率因数和谐波：	IEC1000-3-2 class C
Protection of Lighting Strokes 雷击保护：	IEC1000-4-5
Operating Temperature 操作温度：	-20°C to 50°C
Energy Star Life Time (outdoor) 能源之星寿命要求 (户外)：	35000 hr
Lighting Fixture Safety 照明设备安全等级：	IEC60598 class 1, 2 and 3

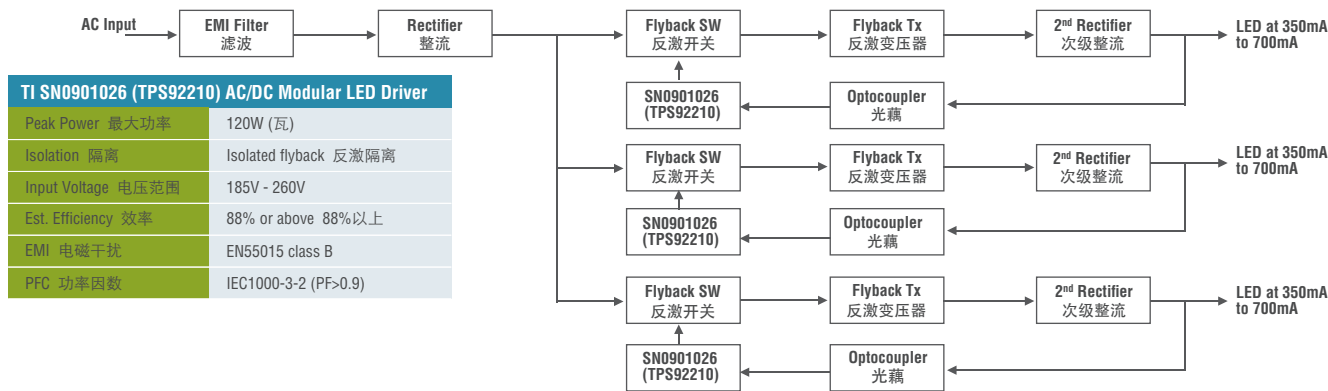
Solution A: NXP Street Lamp LED Driver Solution

恩智浦 SSL1750 + UBA3070 LED 路灯驱动方案



Solution B - TI LED Driver Solution (AC/DC modular basis LED driver)

德州仪器 SN0901026 (TPS92210) 120W LED驱动 (AC/DC 模块)



LedLink LENS

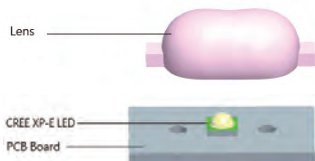
Arrow lighting provide lens and optics solution on street lamp application. LL01CR-AU85135 is a lens for street lamp application where it is high efficiency, asymmetrical beam pattern and optimized with uniform effects. It generates 85 x 135 degree of viewing angle which suitable for street lighting / outdoor lighting application.

雷笛克光学透镜

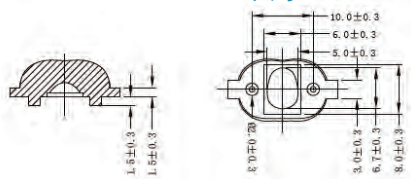
艾睿照明提供路灯照明应用的光学透镜，LL01CR-AU85135是由雷笛克光学设计的路灯透镜，可提供 85 x 135 度的照度，良好的均匀度，高光效及不对称光束光速设计十分适合应用在路灯及室外照明。



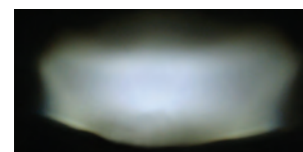
Outlook 外观



Dimension 尺寸



Beam Pattern 光速



* TPS92210 & SN0901026 is pin to pin compatible. TPS92210 及 SN0901026 为对等型号。



General Requirement of TRIAC Dimming Solution for Indoor Lighting Application

Dimming Linearity: This is to define the linearity of light output from LED lamp as the firing angle change in TRIAC dimmer.

Dimmer Compatible List: The LED lamp should be able to perform the same when it is dimmed by various types of dimmer, no matter by leading and trailing edge dimmer.

Parallel Operation: For multiple lamp operation, one should expect to have the same linearity of various LED lamps when control by single dimmer.

Flickering: No flickering is expected when the LED lamp is dimmed.

LED for Indoor Lighting Application

Cree offers various kind of high power LED which fit for indoor lighting application, such as multiple chip MCE and MPL which reduce total system cost. Meanwhile, XPE warm white series delivers high quality of light output and efficacy for a single die LED which increase the competitiveness of luminaires.

XPE LED	Color	CCT Range		Base Order Codes Min. Luminous Flux(lm)		Order Code
		Min.	Max.	Group	Flux(lm)	
	Warm White	2,600K	3,700K	P3	73.9	XPEWHT-L1-0000-008E7
				P4	80.6	XPEWHT-L1-0000-009E7
				Q2	87.4	XPEWHT-L1-0000-00AE7
				Q3	93.9	XPEWHT-L1-0000-00BE7

TRIAC 调光基本要求

调光线性: 通过可控硅调光器触发相位变化使LED的光输出达到线性的变化。

调光器的兼容性: 不论是用于前缘或后缘的相位调光, 以及使用多种不同的调光器都不会影响LED的调光线性。

并行控制: 当多个LED灯由单一调光器驱动时, 调光线性需保持一致。

闪烁: 当LED灯具进行调光时, 不会出现闪烁。

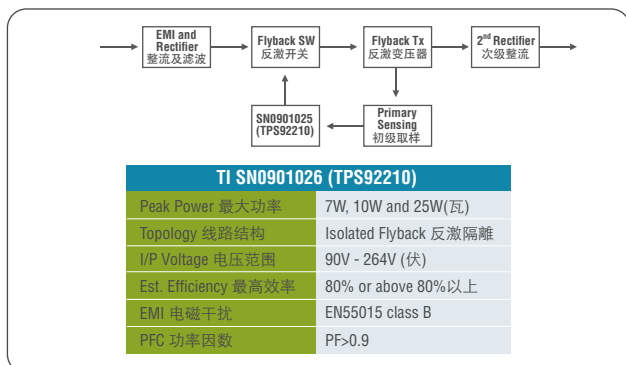
於室内照明应用的 LED

在室内照明应用中, 科锐提供多种不同高功率的照明级LED, 如可减少系统成本的多芯片LED, 包括MCE及MPL系列。另外, 单芯片XPE暖白系列可提供高质量的光输出, 从而增加整体灯具的竞争性。

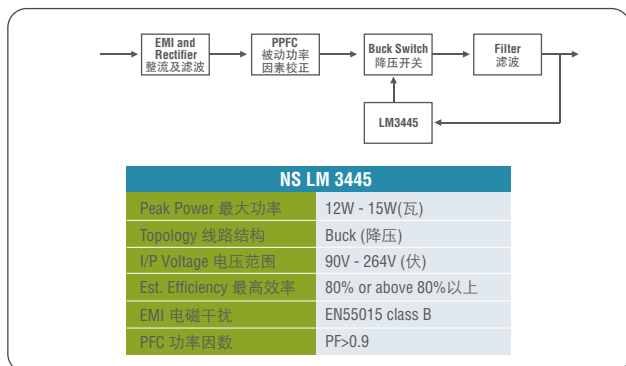
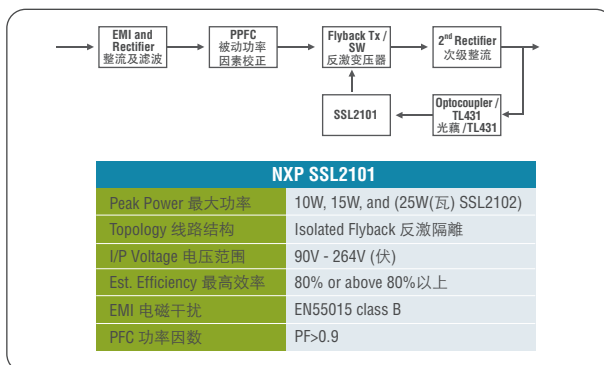
MPL LED	Color	CCT Range	Base Order Codes Min. Luminous Flux(lm)		Order Code
			Group	Flux(lm)	
	Easy White	4,000K	C0	800	MPLEZW-A1-0000-0000C040F
			D0	900	MPLEZW-A1-0000-0000D040F
		3,500K	B0	700	MPLEZW-A1-0000-0000B035F
			C0	800	MPLEZW-A1-0000-0000C035F
		3,000K	B0	700	MPLEZW-A1-0000-0000B030F
			C0	800	MPLEZW-A1-0000-0000C030F
		2,700K	B0	700	MPLEZW-A1-0000-0000B027F
			C0	800	MPLEZW-A1-0000-0000C027F

TRIAC Dimming LED Driver Solution

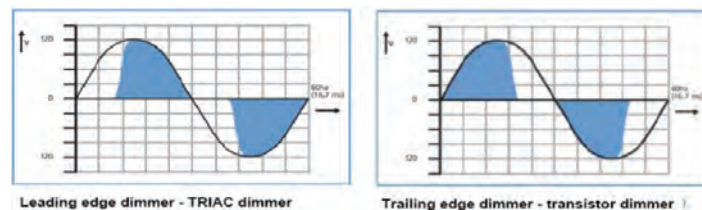
Arrow lighting offers various LED driver solutions for dimming application, they offers good linearity as well as electrical performance.



艾睿照明提供多种可配调光器的LED驱动方案, 它们提供良好的调光线性及电器性能参数。



Operation of 2 Common Types of Dimmer - TRIAC and Transistor Dimming 调光器运作模式 - 可控硅及三极管调光



Lens and Optics Solution for Indoor Lighting

Arrow lighting introduces various of lens and optics products which fit for multiple XP series LED as well as multiple chip LED for indoor lighting application. Here below introduce some multiple LED lens which fit for indoor lighting application such as light bulb application.



LL05CR-FRxxL
Carry 5 XP LEDs
25, 40, 60 degree



LL06CR-DKxxL
Carry 6 XP LEDs
25, 60 degree



LL06CR-CKxxL
Carry 6 MCE LEDs
25 degree

Part Number (型号) TPS40211 + CC2510

Description

The TPS40210 and TPS40211 are wide-input voltage (4.5V to 52V), non-synchronous boost controllers. They are suitable for topologies which require a grounded source N-channel FET including boost, flyback, SEPIC and various LED driver application. The device features include programmable soft start, overcurrent protection with automatic restart and programmable oscillator frequency. In this solution, a DC/DC constant current controller for 25W with Zigbee control will be presented.

Target Application

Middle voltage DC/DC conversion, street lamp constant current LED driver

IC Features (IC 特性)

Distinctive Features 特点：

Topology 线路结构：

Protection 保护：

Switching Frequency 开关频率：

Driver 驱动：

Package 封装：

Wide input voltage range from 8V - 52V 输入电压范围广(8V-52V)

Boost, SEPIC, flyback and etc 升压、SEPIC、反激等等

OCP, OVP, SS and UVLO 过压保护、软启动和欠压锁定

Programmable frequency 35KHz-1000KHz 可编程频率35KHz-1000KHz

400mA internal P-Channel driver 400mA内部P-MOSFET驱动

S-PDSO-G10

TPS40211 DC/DC Constant Current Application (恒流线路)

Peak Power 最大功率：

24W (瓦) / 700mA (毫安)

Input Voltage 输入电压：

8V - 28V (伏)

Output Voltage 输出电压：

20V - 37V (伏)

Estimated Efficiency 预计效率：

90% above at 8V-28V input 8-28V输入时保持90%以上

Output Current 输出电流：

700mA (毫安) (user defined 用户定义)

Dimming 调光原理：

PWM dimming 脉冲调光

Supplier (供应商)



描述

TPS40210和TPS40211都是不同步升压控制器，它们适合那些需要一个接地源极N通道FET的结构，其中包括升压，反激，SEPIC的各种LED驱动应用。TPS40211带有可编程软启动，过流保护自动重试，可编程振荡频率等特性。在这个方案应用手册中，将展示一个带有Zigbee控制的25W DC/DC恒流线路。

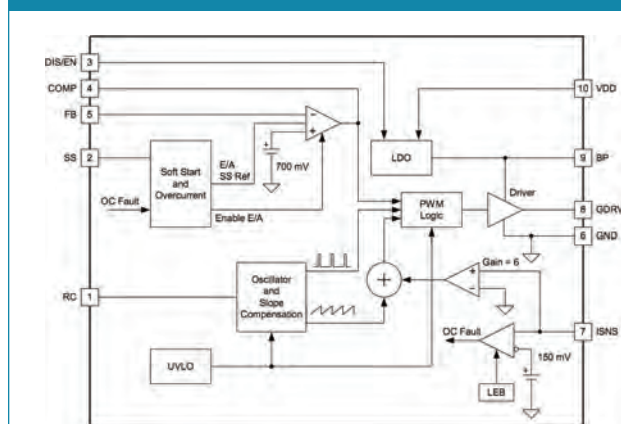
目标应用

DC/DC转换，道路照明恒流LED驱动

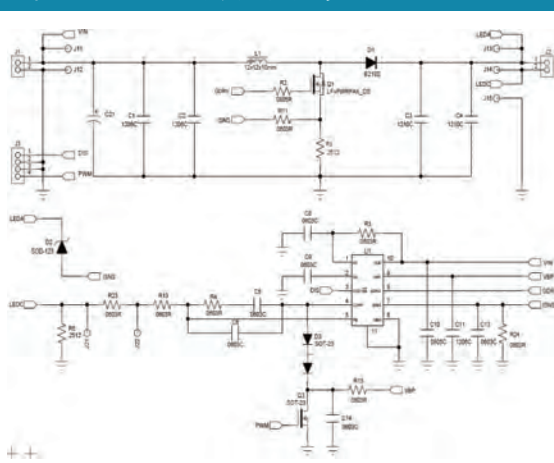
TI Zigbee Module CC2510 (模块 CC2510)

- 2.4 GHz system-on-chip solutions 2.4 GHz的单芯片系统解决方案
- High performance 8051 microcontroller 高性能的8051内核
- Integrated flash, RAM and 8-12 bits ADC 集成flash、RAM和8至12位ADC
- AES encryption 采用AES标准加密
- Data rates up to 500Kbps 数据采样率高达500Kbps

IC Functional Block Diagram (控制器原理图)



DC/DC 25W Constant Current Light Bar Application DC/DC 25W LED 驱动典型应用原理图



TI — MR16 Halogen Lamp Retrofit by TPS40211

德州仪器 — TPS40211 的 MR16 LED 升级改造 (卤素灯替换)

Apart from DC/DC Light bar application in street lamp, Texas Instruments TPS40211 can also apply to MR16 halogen lamp replacement by SEPIC topology.

除了DC/DC路灯用的灯条外，TPS40211也可应用于MR16卤素灯的LED升级改造。



Solution Features (特性)

Peak Power 最大功率：

6W (瓦)

Input Voltage 输入电压：

8V - 20V (伏)

Output Voltage 输出电压：

10.5V (伏)

Estimated Efficiency 预计效率：

80%

Output Current 输出电流：

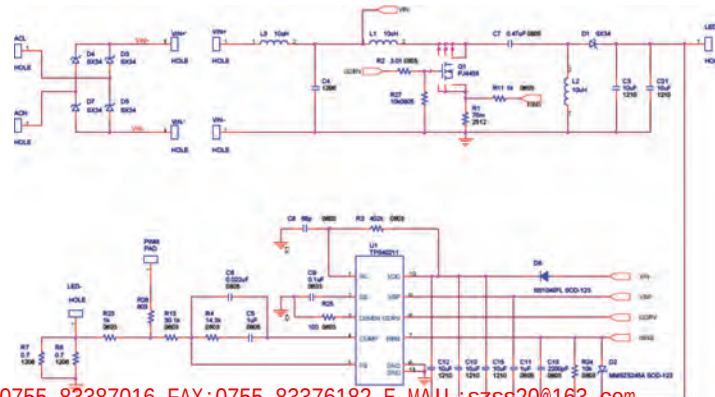
700mA (毫安)

Topology 线路结构：

SEPIC

Target for application to replace halogen lamp at 35W approximately.

目标35W MR16卤素灯的LED升级改造。



Part Number (型号) SN0901026 (TPS92210)

Supplier (供应商)  TEXAS INSTRUMENTS
Authorized Distributor

Description

Texas Instruments SN0901026(TPS92210) is a controller offering frequency and peak current modulation for optimized LED driver efficiency. Meanwhile, it also introduces resonant valley turn on and cascode configuration to increase efficiency as well as reducing EMI signature. In this application note, SN0901026(TPS92210) implemented in LED driver design which compatible in AC TRIAC dimming with active power factor correction. By proper design, overall efficiency can achieve up to 80% or above and PF>0.9.

描述

TI SN0901026(TPS92210)控制器利用频率和峰值电流调整实现了高效率的电源减少, 另外, SN0901026(TPS92210)导入谐振波谷开启亦可增加效率及减少EMI干扰。在这个室内照明应用手册中, 将会介绍带AC TRIAC调光的SN0901026(TPS92210) LED驱动。配合适当的线路设计, 整体效能可达至80%或以上, 功率因数0.9以上。

Target Application

LED driver and ballast, Retrofit with AC TRIAC dimming

目标应用

AC/DC传统照明LED升级改造

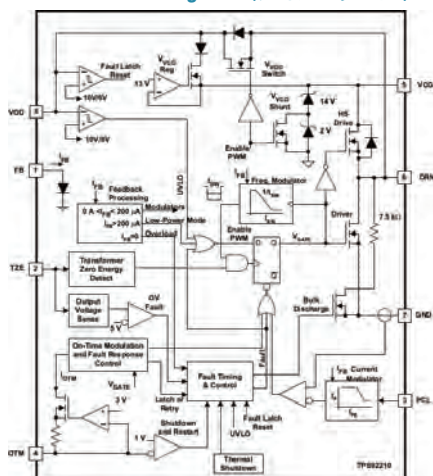
IC Features (IC 特性)

Distinctive Features 特点: Cascode configuration and Valley switching aims to increase overall efficiency 波谷启动达到提高总效率
Topology 线路结构: Isolated flyback 反激隔离
Protection 保护: Various, thermal protection, OCP, OVP and etc 多种保护, 包括过热保护、过流保护、过压保护等
MOSFET: External MOSFET 外置MOSFET
Driver 驱动: 3A typical
Package 封装: S08

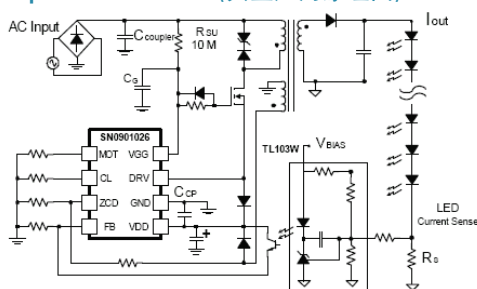
SN0901026 (TPS92210) Solution for AC/DC TRIAC Dimming Application (SN0901026 (TPS92210) AC/DC TRIAC 调光应用方案)

Peak Power 最大功率: Design available in 7W, 10W and 25W (瓦)
Input Voltage 输入电压: 90V - 264V (伏)
Output Voltage 输出电压: Design/Application dependent 依应用和设计有所不同
Estimated Efficiency 预计效率: 80% or above 80%以上
Output Current 输出电流: 350mA to 700mA (毫安)
Dimming 调光原理: TRIAC dimming with good linearity 调光线性度好
PFC 功率因数: PF>0.9 功率因数>0.9
Safety Class 安規: AC/DC isolated AC/DC隔离

Controller Block Diagram (控制器原理图)



Simplified Schematic (典型应用原理图)



5W-7W TRIAC dimming LED driver
5W-7W TRIAC 调光驱动



10W TRIAC dimming LED driver
10W TRIAC 调光驱动



25W TRIAC dimming LED driver
25W TRIAC 调光驱动



220V / 7W LED Driver Testing Figures — available in 110V (220V 测试数据)				
Vin 输入电压	PF 功率因数	Efficiency 效能	THD 谐波	Iout 输出电流
200	0.980	84.2%	4.60%	349mA
220	0.972	84.2%	5.30%	350mA
240	0.961	84.1%	6.10%	351mA
265	0.947	83.9%	7.40%	363mA

10W LED Driver Test Data (10W LED 驱动测试数据)				
Vin 输入电压	PF 功率因数	Efficiency 效能	THD 谐波	Iout 输出电流
90	0.998	79.7%	5.85%	353mA
110	0.997	83.5%	5.02%	357mA
220	0.985	84.5%	4.27%	356mA
240	0.979	85.1%	4.31%	358mA
265	0.968	85.3%	5.08%	358mA

25W LED Driver Test Data (25W LED 驱动测试数据)				
Vin 输入电压	PF 功率因数	Efficiency 效能	THD 谐波	Iout 输出电流
90	0.998	77.4%	6.41%	696mA
110	0.972	83.7%	5.41%	701mA
220	0.974	85.1%	3.04%	706mA
240	0.960	85.8%	4.03%	703mA
265	0.939	86.5%	5.25%	700mA

* TPS92210 & SN0901026 is pin to pin compatible. TPS92210 及 SN0901026 为对等型号。

** 6W SUNSTAR 半导体集成电路 TPS92210 另有 TPS92210 6W LED 调光 0755-83387016 FAX:0755-83376182 E-MAIL: szss20@163.com

Part Number (型号) SN0901026 (TPS92210)

Supplier (供应商)  TEXAS INSTRUMENTS
Authorized Distributor

Description

This application note presented a 120W LED driver which target for street lamp and outdoor application. It is an isolated solution which can drive 36 - 60pcs of high power LED (Cree XPG) at 700mA by 3 modularized flyback converter. Because of the single staged PFC flyback, the overall efficiency can go up to 90% throughout the universal line input voltage with isolation as well as high power factor.

描述

本应用手册介绍一个来自 TI 的 120W 高效路灯照明 LED 驱动，此线路利用 3 个由反激模块，输出可带 36 - 60 个 Cree XPG SN0901026 (TPS92210) LED。由于 SN0901026 (TPS92210) 是带 PFC 的反激线路，所以整效能可达 90%，也可达到隔离结构功效因素校正的效果。

Target Application

Street lamp and outdoor lighting

目标应用

道路照明和室外照明应用

IC Features (IC 特性)

Distinctive Features 特点： Cascode configuration/Valley switching aims to increase overall efficiency 波谷启动达到提高总效率
Topology 线路结构： Single stage isolated flyback 反激隔离
Protection 保护： Various, OCP, OVP, OTP 包括过流保护、过压保护、过温保护
Switching Frequency 开关频率： 118KHz
Driver 驱动： 3A typical
Package 封装： SO8

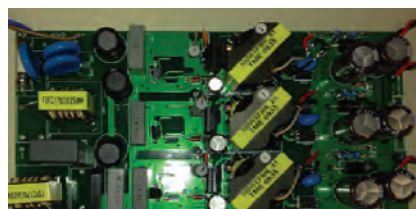
SN0901026 (TPS92210) Solution for AC/DC Street Lamp Constant Current Application (SN0901026 (TPS92210) 道路照明 AC/DC 恒流控制应用)

Peak Power 最大功率： 120W (瓦)
Input Voltage 输入电压： 180V - 260V (伏)
Output Voltage 输出电压： 60V below 60V (伏) 以下
Estimated Efficiency 预计效率： 88% or above 88% 或以上
Output Current 输出电流： 700mA (毫安)
Dimming 调光原理： PWM dimming 脉冲调光
PFC 功率因数： 0.9 or above 0.9 或以上
Safety Class 安规： Isolated flyback AC/DC 隔离 AC/DC
EMI 电磁干扰： EN55015 class B
Reliability 可靠性： No HV Ecap which extending LED fixture life time
没有高压电容，从而延长寿命

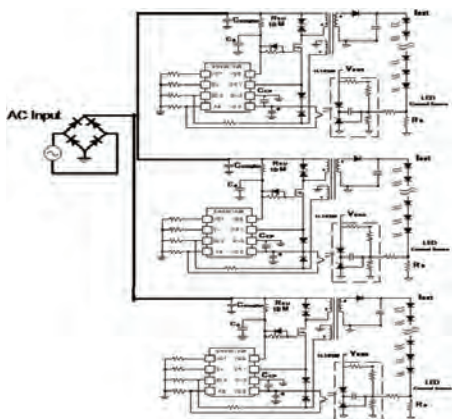
Electrical Testing Figures (测试数据)

Vin	180V	200V	220V	240V	264V	300V
Iout1	703mA	703mA	703mA	702mA	702mA	702mA
Iout2	701mA	701mA	701mA	701mA	701mA	701mA
Iout3	706mA	706mA	706mA	706mA	706mA	706mA
PF	0.994	0.991	0.988	0.984	0.978	0.967
THD	5.30%	5.00%	4.88%	4.97%	5.67%	6.87%
Pout	118.1W	118.1W	118.1W	118.1W	118.1W	118.1W
Pin	130.9W	130.7W	130.5W	130.3W	130.4W	130.6W
Eff	90.22%	90.36%	90.50%	90.64%	90.57%	90.43%

Demoboard (展视板)



Simplified Functional Schematic - 120W Street Lamp LED Driver 120W LED 驱动典型应用原理图



TI — Street Lamp LED Driver Solution 德州仪器 — 路灯 LED 电源方案

Other street lamp LED driver solution available by Texas Instruments:

其他德州仪器的路灯 LED 电源方案：

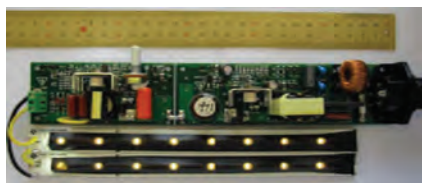
 TEXAS INSTRUMENTS
Authorized Distributor

1) UCC28810 / UCC28811 100W Non-Isolated LED Driver UCC28810 / UCC28811 100W 非隔离 LED 驱动

Input Voltage 最大功率： 90V - 264V (伏)
Power Factor 输入电压： 0.9 or above 0.9 以上
Efficiency 输出电压： 90% or above 90% 以上
Driving Current 预计效率： 100W (瓦), 900mA (毫安) constant current control 恒流控制
Topology 线路结构： PFC + Non-isolated buck 不隔离降压

2) UCC28810 + SN0901026 (TPS92210) 100W PFC + QR Isolated LED Driver UCC28810 + SN0901026 (TPS92210) 100W 功率因数 + 准谐振反激 LED 驱动

Input Voltage 最大功率： 90V - 264V (伏)
Power Factor 输入电压： 0.9 or above 0.9 以上
Efficiency 输出电压： 88% or above 88% 以上
Driving Current 预计效率： 100W (瓦), 700mA (毫安) constant current control 恒流控制
Topology 线路结构： PFC + Isolated flyback 隔离反激



Part Number (型号) LM3445

Supplier (供应商)



Description

This application note introduces a brand new part from National Semiconductor LM3445 which able to take AC input and capable dim by AC with good linearity. LM3445 enable LED lighting designer driving multi lamp through single dimmer. Meanwhile, to compile IEC harmonic standard. This solution also employs PPFC valley fill to reduce the overall harmonic distortion ($PF > 0.9$ at full bright).

描述

这个应用手册介绍了一款来自NS的新产品，交流输入的LM3445，LM3445可以兼容使用TRIAC调光器。並且可以使照明设计者通过一个调光器驱动多路LED灯。同时，这个方案也可以采用PPFC补偿线路达至 $PF > 0.9$ (LED 全亮)及减少谐波干扰，并通过 IEC标准。

Target Application

AC/DC LED driver in Retrofit application

目标应用

AC/DC传统照明LED升级改造

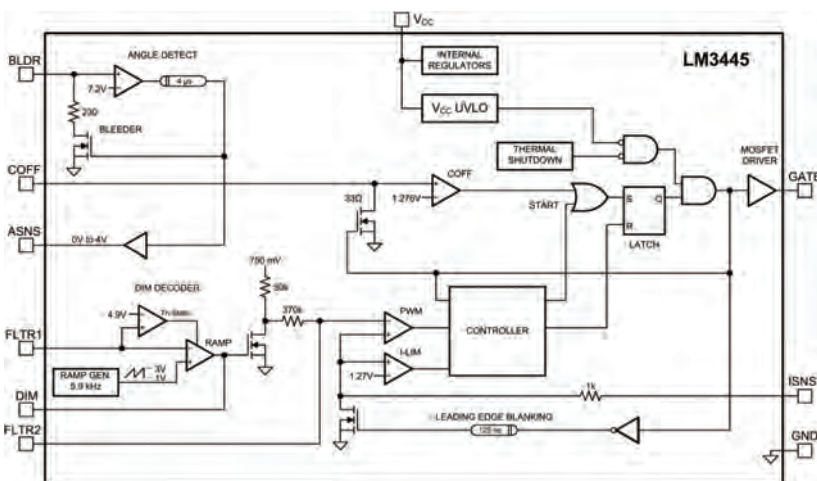
IC Features (IC 特性)

Distinctive Features 特点：	TRIAC dimming compatible/Enable parallel driver operation TRIAC调光兼容/多路LED灯
Topology 线路结构：	Non-isolated buck 不隔离降压
Protection 保护：	Various including OCP, OTP and OVP 包括过流保护、过压保护、过温保护
Switching Frequency 开关频率：	Adjustable frequency 频率可调
Driver Current 驱动电流：	400mA (毫安)
Package 封装：	MSOP10 package 封装

LM3445 for AC/DC Retrofit Application (LM3445 用於传统照明 LED 升级改造)

Peak Power 最大功率：	8W - 10W(瓦) (Can redesign up to 20W 可重新设计为20瓦)
Input Voltage 输入电压：	110V & 220V (伏)
Output Voltage 输出电压：	Up to 50V, depends on number of LED 最高可达50伏，由LED数量决定
Estimated Efficiency 预计效率：	80%, depends on number of LED and driving current 由LED的数量和驱动电流决定
Regulation 校准：	$\pm 3\%$
Power Factor 功率因数：	PPFC by valley fill $PF > 0.9$ 被动功率因素校正 $PF > 0.9$

IC Functional Block Diagram (控制器原理图)



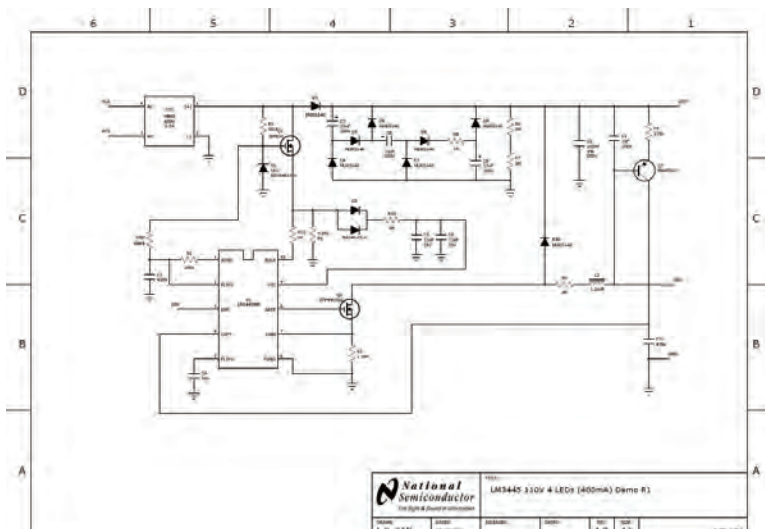
Testing Figures (测试数据)

Input Power 输入功率	O/P Voltage 输出电压	O/P Current 输出电流	Efficiency 效能
10.9W	15.07V	540mA	80.00%

Dimmer Compatible List (相容的调光器)

	Brand 品牌	Model no. 型号
1	Lutron - 300W Dimmer	Credenza Lamp Dimmer: TT300
2	Lutron - 600W Dimmer	Skyjack Slide Dimmer: S600
3	Kuen Lin Co Ltd.	Electron Control
4	(Taiwan) 150W Dimmer	CT103
5	Cooper	6001 600W
6	Local Chinese	N/A

AC/DC Application Circuit (AC/DC 应用电路图 —110V/5 LED)



10W LM3445 Demoboard (演示板)



NS LM3445 Demoboard (演示板)



Part Number (型号) LM3409HV

Supplier (供应商)



Description

The LM3409/09HV are P-channel MOSFET (PFET) controllers for step-down (buck) current regulators. They offer wide input voltage range, high-side differential current sense with low adjustable threshold voltage, fast output enable/disable function and a thermally enhanced eMSOP-10 package. This controller is an excellent choice for LED driver in various lighting application.

描述

LM3409/09HV系列中为降压电流调节的 P 沟道 MOSFET (PFET) 控制器。这系列具备宽输入电压范围，并提供带有低可调阈值电压的高边差分电流采样、快速输出使能/禁止功能和具有增强散热能力的10引脚eMSOP封装。所以，LM3409HV是不同照明应用中驱动LED的理想恒流源。

Target Application

Constant current driver, street lamp, industrial lighting and general lighting etc

目标应用

DC/DC恒流驱动、道路照明、工业照明、通用照明

IC Features (IC 特性)

Distinctive Features 特点：

Wide input range from 6V to 75V, external PFET drive by 2Ω 1A driver

Topology 线路结构：

输入电压范围：6V to 75V、外掛PFET、2Ω、1峰值MOSFET门极驱动器

Protection 保护：

Buck DC/DC 降压

Switching Frequency 开关频率：

Low power shutdown, thermal shutdown and etc 低功耗关断、热关断保护

Driver 驱动：

User defined by Coff and Roff 用户自定

Package 封装：

1A forward 1安正向

Thermally enhanced 10 lead eMSOP 增强散热能力的10引脚eMSOP封装

LM3409HV for LED Lighting Application (LM3409HV — 在 LED 照明的应用)

Peak Power 最大功率：

16.8W (瓦)

Input Voltage 输入电压：

36V (伏)

Output Voltage 输出电压：

24V (伏)

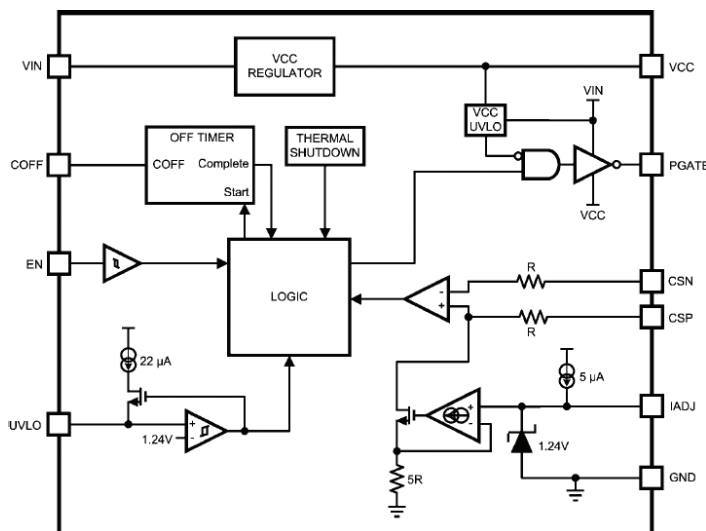
Estimated Efficiency 预计效率：

95% or above 95%以上

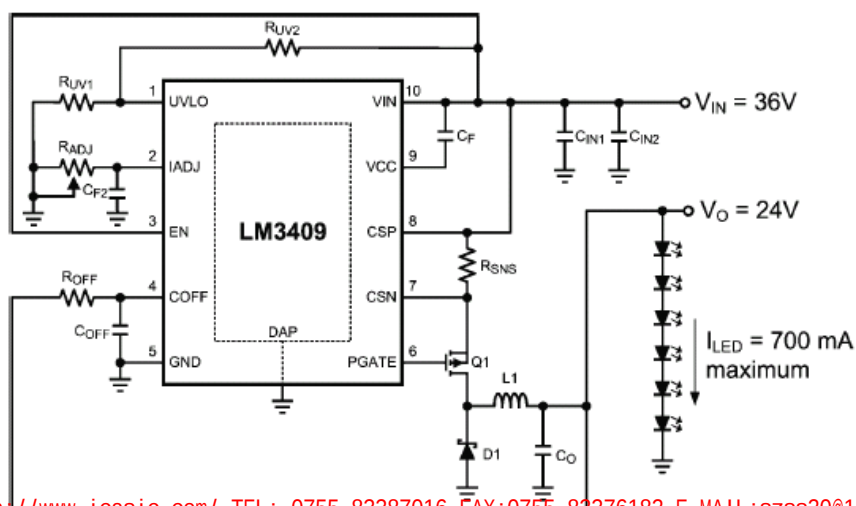
Regulation 校准：

±1%

IC Functional Block Diagram (IC 原理图)



LM3409HV Application Circuit in LED Driver Application 15W - 20W (LM3409HV LED 驱动中的应用电路图 15W - 20W)



Part Number (型号) SSL1750 + SSL1761 (SSL1751) / UBA3070

Supplier (供应商) **NXP**

Description

2 application designs are presented in this application note which are 90W SSL1750/SSL1761 chip set for constant voltage design and 25W SSL1750 constant current application with dimming. Those 2 applications offer high efficiency, high power factor (low harmonic distortion) as well as compact size. Meanwhile, those application are suitable for street lamp and outdoor lighting application.

描述

在这篇应用注释里，描述了两个应用：一是用SSL1750+SSL1761做的90W的恒压设计，另一个是用SSL1750做的带调光的25W恒流设计。这两个设计以较小的空间尺寸提供了高效率和高功率因素（低谐波失真），比较适合于路灯和其他的户外照明应用。

Target Application (目标应用)

Street lighting application, outdoor lighting, transport lighting 路灯、户外照明、交通灯

IC Features (IC 特性)

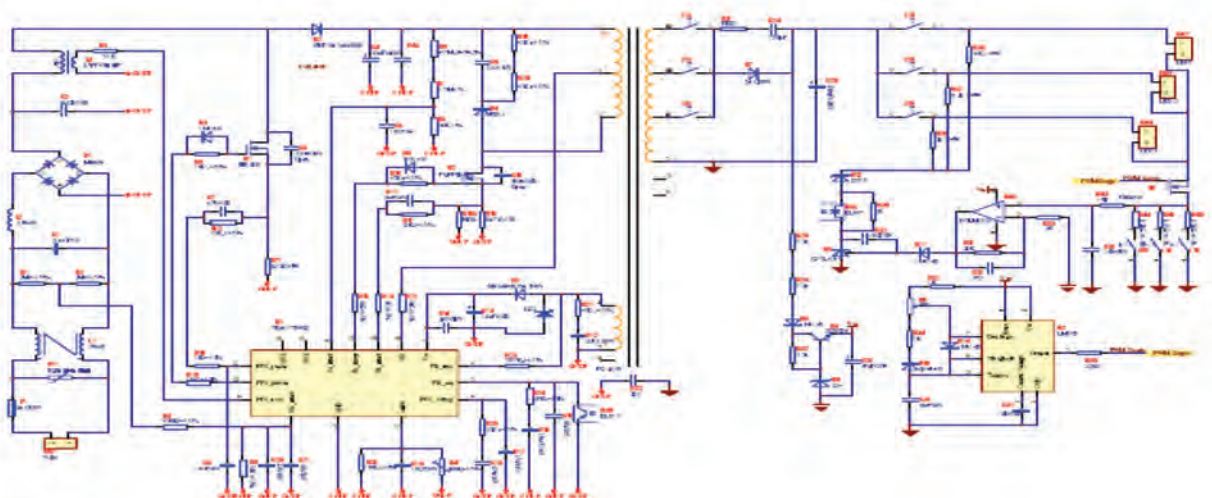
Distinctive Features 特点：	Integrated PFC and flyback controller 集成PFC和flyback
Green Features 绿色特点：	Valley switching minimizing switching loss 谷底开关技术减小开关损耗
Switching Frequency 开关频率：	125K (flyback and PFC stage) 125KHz
PFC mode 功率因素校正工作模式：	Discontinuous mode booster 非连续升压
Protection 保护：	SS, Demagnetization, UVP, OVP, OTP, OCP, Open Loop 软启动、磁复位、欠压保护、过压保护、过流保护、开环保护
Package 封装：	S016
2nd Rectification 二次侧整流：	Syn Rectifier control by SSL1761 同步整流SSL1761

SSL1750 Features for Lighting Application (SSL1750 的照明应用)

Peak Power 峰值功率：	25W and 90W (can redesign for 150W-200W) 25W和90W (可设计到150W-200W)
Topology 线路结构：	PFC + Flyback 功率因数+反激
Input Voltage Range 输入电压范围：	75V (伏) - 270 V (伏)
Isolation 隔离：	Isolated Flyback 3750V 隔离电压达3750V (伏)
Estimated Efficiency 估计的效率：	88% or above (depending on actual circuit design) 88%或更高 (取决于实际电路的设计)
EMI 电磁干扰：	EN55015 by 2 stages EMI filter 可通过EN55015标注 (采用两级滤波器)
Harmonic 谐波：	IEC1000-3-2
	25W constant current design involve analog PWM dimming 25W恒流设计采用了PWM调光

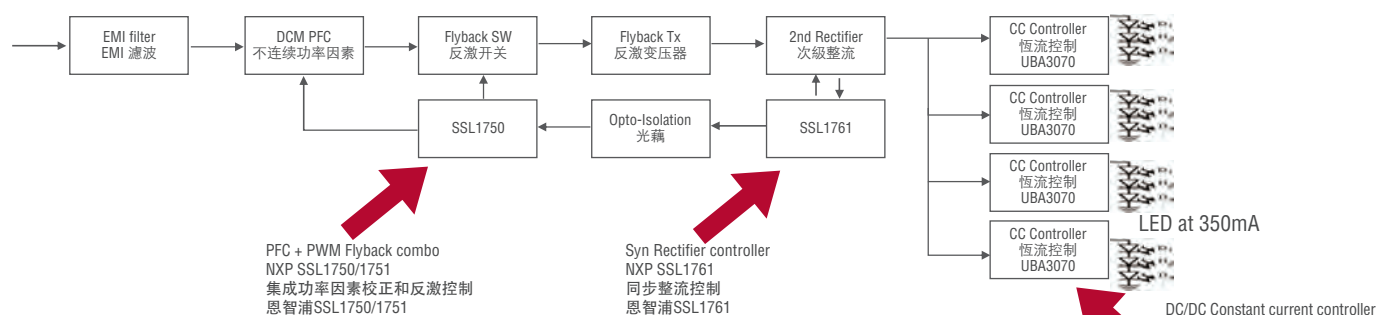
25W Circuit Schematic — Constant Current Selectable with PWM Dimming

25W 电路原理图 — 可设定恒定的电流并带 PWM 调光



AC/DC Street Lamp Application — By SSL1750 + UBA3070 (NXP) for Street Lamp and Outdoor Lighting Application

AC/DC 路灯应用 — 使用 SSL1750 和 UBA3070 用于路灯和户外照明



PART NUMBER (型号): SSL2101 / SSL2102

SUPPLIER (供应商)



DESCRIPTION

This application presents an AC/DC LED driver solution developed by NXP SSL2101. The SSL2101 is a Switched Mode Power Supply (SMPS) controller IC that operates directly from rectified mains and also in combination with a phase cut dimmer. It is designed to drive LED devices. SSL2101 includes a high-voltage power switch and a circuit to allow start-up directly from the rectified mains voltage. Furthermore the device includes high-voltage circuitry to supply the phase cut dimmer. Target application include indoor lighting, interior lighting as well as bulb replacement/retrofit lighting.

描述

这篇应用注释描述了采用恩智浦SSL2101的一个AC/DC LED驱动方案。SSL2101是一款开关电源控制芯片，可直接在市电整流之后工作，也可以接一个切相的调光器。它内部包含了一个高压开关管且可以直接从市电高压启动，它可用来设计驱动LED。此外，它内部还有配合切相调光器工作的高压开关电路。它的目标应用室内照明，如灯泡的替换或者升级改造。

TARGET APPLICATION (目标应用)

Retrofit lighting, Indoor lighting 室内照明/ LED升级改造照明

** There is another SSL1523 TRIAC dimming from NXP, contact Arrow FAE for details.

另有一款可控硅调光的SSL1523，请垂询艾睿的技术支持工程师。

IC FEATURES (IC 特性)

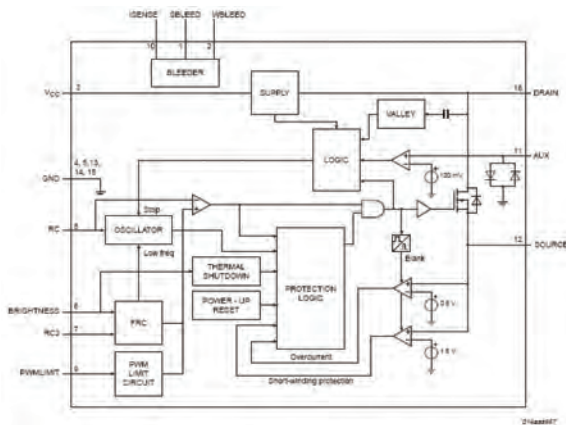
Distinctive Features 特点:	Built-in MOSFET, low Rds(on), Valley switching and demagnetization 内置MOS管、低导通电阻、谷底开关和磁复位技术
Topology 线路结构:	Compatible with non-isolated buck, isolated flyback 可兼用于非隔离降压及隔离反激
Protection 保护:	OTP, OCP and short winding protection 过温过流及短路保护
Frequency 开关频率:	RC user defined 用户定义开关频率
Package 封装:	SO16
EMI 电磁干扰:	Valley switching reduce EMI filter 谷底开关技术可减小EMI滤波器



SSL2101 Solution for AC/DC Retrofit Constant Current Application (SSL2101调光室内照明)

Peak Power 峰值功率:	GU10 1W to 10W, Downlight up to 15W GU10 1W到10W(瓦)、射灯可高达15W(瓦)
Input Voltage 输入电压:	120V or 220V (伏)
Power Factor 功率因素:	PF>0.9 for 120V and 220V input 功率因素达0.9以上
Estimated Efficiency 预估效率:	75% or above 75%甚至更高
Output Current 输出电流:	500mA (毫安)
Dimming 调光:	0.1% to 100%, compatible to leading edge dimmer and trailing edge dimmer 可满足前切及后切的调光器
Others 其他:	E-cap free design enable extended life 可不使用电解电容来延长寿命

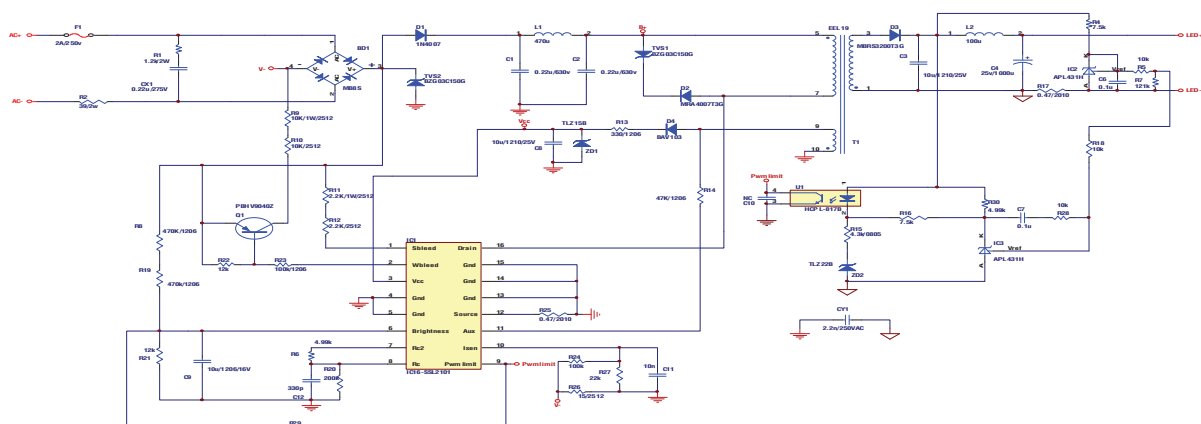
Circuit Functional Block Diagram (电路功能框)



Compatible Dimmer List — refer to NXP demoboard (相容的调光器)

Manufacturer	Type (Voltage V)	Power	Load	Range
OPUS	852.390 (230V)	60-400	Ha/Inc	0.60%
OPUS	852.392 (230V)	20-500	Inc	0.50%
Bush-Jaeger	2250U (230V)	20-600	Ha/Inc	0.03%
Bush-Jaeger	2247U (230V)	20-500	Ha/Inc	0.07%
Bush-Jaeger	6519U (230V)	40-550	Ha/Inc	8.40%
Gira	1184 (230V)	60-400	Inc	1%
Everflourish	EF0700D (230V)	50-300	Ha/Inc	0.20%
Drespa	0817 (230V)	20-315	Ha/Inc	3.40%
Ehamann	39 Domus (230V)	20-500	Ha/Inc	1%
Drespa	815 (230V)	20-500	Inc	1.10%
Lutron	TG-600PH-WH (120V)	600	Inc	0% (off)
Levitron	L12-6641-W (120V)	600	Inc	0% (off)
Levitron	L02-700-W (120V)	600	Inc	0% (off)
Levitron	6602-1W (120V)	600	Inc	0% (off)
Levitron	6683-W (120V)	600	Inc	0% (off)
Levitron	R12-6631-LW (120V)	600	Inc	0% (off)
Cooper	6001 (120V)	600	Inc	0% (off)
Lutron	MIR-600THWWH (120V)	600	Ha/Inc	0.90%

AC/DC LED Driver with Isolated TRIAC Dimming Application (AC/DC 隔离式 Triac 调光应用)



CONTROLLER PART NUMBER (型号)

Cypress power PSOC (CY8CLED02D01-56LTXI)/Cap sense IC (CY8C21434)/XPE LED

SUPPLIER (供应商)



DESCRIPTION

This application note introduces a LED desk lamp module which implemented Cypress Power PSOC IC (CY8CLED02D01-56LTXI), and Cap sense IC (CY8C21434). By high lumen intensity as well as high efficacy features of XPE LED. This solution module can provide 1000 lumen output with excellent uniformity and dimming linearity.

描述

这个方案应用手册介绍一个来自Cypress Power PSOC IC (CY8CLED02D01-56LTXI) 和 Cap sense IC (CY8C21434)。本方案由于采用了XPE LED高功率照明级LED及Cypress控制器，所以可提供1000流明以上亮度及完美的调光线性及均匀度。

TARGET APPLICATION

Indoor lighting, Intelligent control of portable desk lamp, Undercabinet lamp

目标应用

室内照明，智能控制便携式桌灯，橱柜灯

SOLUTION FEATURES (方案特性)

- Power Requirement 功率：** 20W (瓦)
- Input Voltage 输入电压：** 24V DC (伏，直流)
- Lumen Output 流明：** 1000 lumen 1000流明
- LED Parts 元件：** XPEWHT-L1-0000-00C50 x6
XPEWHT-L1-0000-00AE7 x6
- Illuminance 照度：** Over 200 lx (Distance 1.0m) 1.0米距离，200勒克斯以上
Over 750 lx (Distance 0.5m) 0.5米距离，750勒克斯以上
- CCT 色温：** 2200K - 6600K control by slider 色温控制 2200K - 6600K
- Efficacy 光效能：** 90lm/W per LED performance 高光效90lm/W
- Others 其他特性：** Power ON/OFF control 电源开关控制
Brightness slider adjustment 光暗滑动调节
Color temperature slider adjustment 色温滑动调节
Color temperature can be adjusted to suit your mood or surrounding environment 色温可根据不同环境而调较
Design with high power lighting class LED that increase overall efficiency 利用高效LED增加整体光效

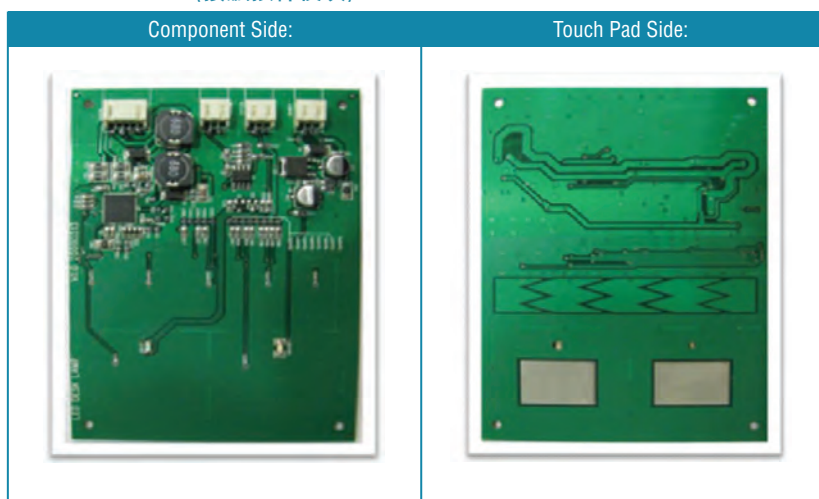
CONTROLLER FEATURES

- CY8CLED02D01-56LTXI
- 2 integrated 32V/1A MOSFETs
- 2 independent channels able to drive 1A per channel
- 2 low-side gate drivers with programmable drive strength
- Floating load buck, floating load buck-boost, & boost converter topologies
- Up to 2MHz switching frequency
- Auxiliary power regulator and 16-bit dimming

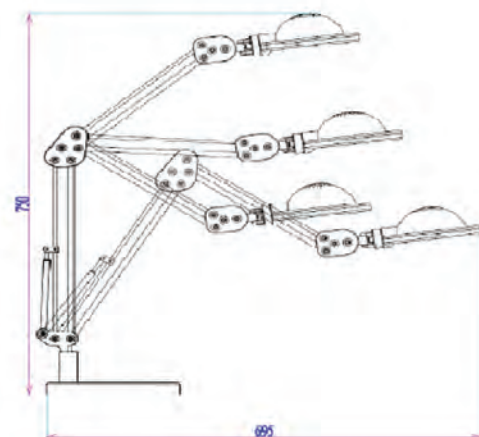
控制器特性

- CY8CLED02D01-56LTXI
- 两个32V/1A MOS管
- 两个可驱动1A的独立通道
- 两个低端栅极可编程驱动器
- 浮动负载降压升压及升降压线路结构
- 可达2MHz开关频率
- 辅助稳定电源及16位调光

Touch Pad Module (接触按钮模块)



Desk Lamp form Factor (台灯尺寸)



PART NUMBER (型号) CY8CLEDAC02

SUPPLIER (供应商)



DESCRIPTION

The Cypress CY8CLEDAC02 product provides LED system designers with a high efficiency, AC-DC LED driver that can drive up to 25W of output power over the full universal range and 50W at 230V input. The family utilizes a proprietary digital power control scheme through an isolated topology with primary-side feedback that is both highly efficient (up to 85%) and accurate ($\pm 2.5\%$ current regulation). This feedback method eliminates the need for opto-isolators, current sensors, and secondary control circuitry, which entail a smaller component count for the total solution than competitive circuits. The isolated topology meets needed safety requirements for power designs such as UV, OVP, SCP, and OCP, while also providing the same precision of secondary side control circuitry without the secondary side control.

TARGET APPLICATION

Indoor lighting application, Retrofit lighting

描述

Cypress的CY8CLEDAC系列可提供一个高效的AC/DC LED 驱动设计。CY8CLEDAC可驱动大量的高功率LED，并可在全电压输入范围时输出功率可达30W。此Cypress控制器采用了数码能源管理，并透过初级取样及隔离反激实现了85%效能及($\pm 2.5\%$)的恒流准确度，初级绕组取样可减少其他控制元件如光耦，次级控制线路，从而减少PCB面积及增加产品竞争性。另外减少了次级元件，但此隔离线路亦可符合不同的安规要求。如过压过流及短路。

目标应用

AC/DC传统照明LED升级改造，室内照明

IC FEATURES (IC 特性)

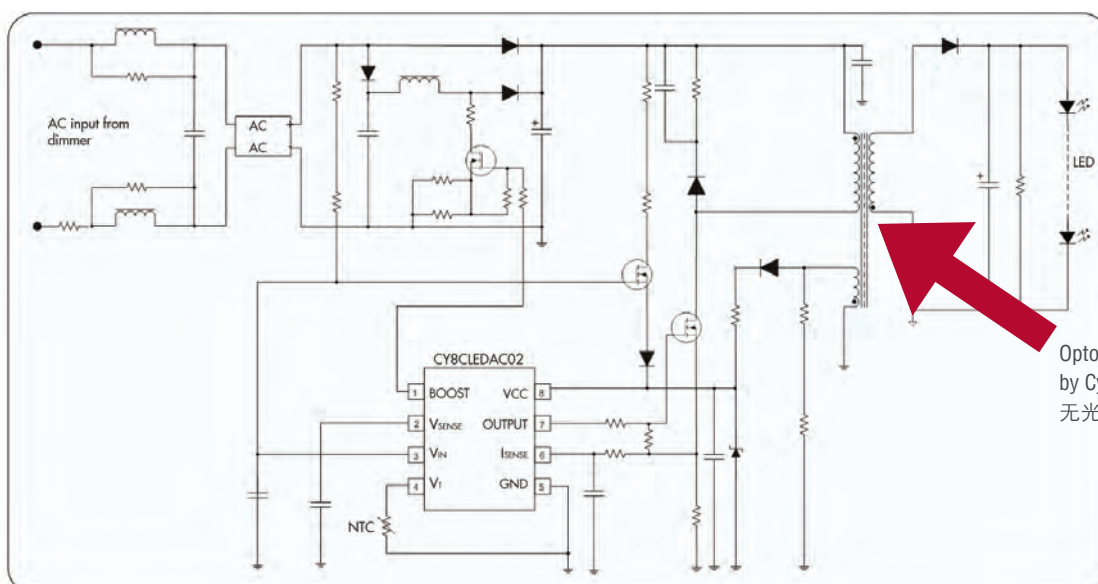
- Distinctive Features 特点：** Digital primary-feedback technology simplifies design, reduces cost Automatic Dimmer Detection enables working with both leading edge & trailing edge dimmers
 数位初级反馈，简化线路设计及成本，可前缘或后缘调光
- Topology 线路结构：** Isolated Flyback 反激隔离
- Protection 保护：** Built-in advanced protection features OVP, UVP, SCP, Brown out protection, OTP etc
 先进保护功能，包括过流保护、过压保护、低压保护等
- Switching Frequency 开关频率：** Maximum is 200KHz. Suggest to range from 40K to 90K to be optimized on size and efficiency
 最大200KHz，建议范围在40K to 90K，可有效地减少PCB大小及增加效能
- Driving Current 驱动电流：** 700mA (毫安)
- Package 封装：** SOIC 8 pin

CY8CLEDAC02 for AC/DC Retrofit Application (CY8CLEDAC02用于传统照明 LED 升级改造)

- Peak Power 最大功率：** 25W (瓦) (design available in 17W)
- Input Voltage 输入电压：** 85V - 264V (伏)
- Output Voltage 输出电压：** Depends on application 就应用而不同
- Estimated Efficiency 预计效率：** 85% without dimmer 不带调光器
- Regulation 校准：** $\pm 2.5\%$
- Power Factor 功率因数：** PF>0.7 without dimmer 功率因数 >0.7 不带调光器
- Others 其他：** Optocoupler free design, Elimination of TL431 and sec control circuit / Compatible with additional Cypress lighting solutions to offer additional performance and cost-savings
 初级反馈及无光耦设计可减少TL431及次级控制线路/可配合其他Cypress方案增加其他特性及减低成本

Dimming Range 调光范围	Dimmer 调光器
Down to 2% 小至2%	Leading and Trailing Edge (前缘或后缘调光)

AC/DC Application Schematic (AC/DC应用线路)



Optocoupler Free Design
 by Cypress AC/DC CY8CLEDAC02
 无光耦设计- CY8CLEDAC02

PART NUMBER (型号) VIPer15/VIPer25

SUPPLIER (供应商)



DESCRIPTION

The device is an off-line converter with an 800V rugged power section, a PWM control, double levels of overcurrent protection, overvoltage and overload protections, hysteretic thermal protection, softstart and safe auto-restart after any fault condition removal. Burst mode operation and offers very low consumption helps to meet the standby energy saving regulations. The quasi resonant feature reduces EMI filter cost. Brown-out and brown-in function protects the switch mode power supply when the rectified input voltage level is below the normal minimum level specified for the system. The high voltage start-up circuit is embedded in the device.

描述

VIPerx5是一个单片集成离线转换器，集成了一颗800V MOSFET和一个PWM控制器，具有非常完备的保护功能，包括两级过流保护，过压保护，过载保护，过温保护以及软启动功能，当故障去除后，IC能自动重启。脉冲模式和极低的工作消耗使器件能轻易的满足各种认证对待机的要求。准谐振的工作模式有助于减少EMI滤波器件成本。Brown-out功能可以在低于规格的输入电压条件下关断转换器避免损坏。此外内置的高压启动电路可以进一步简化外围电路的设计。

TARGET APPLICATION

LED driver, (others: Auxiliary power supply, SMPS for set-top boxes, DVD players)

应用目标

LED驱动 (其他：辅助电源、机顶盒、DVD播放器电源)

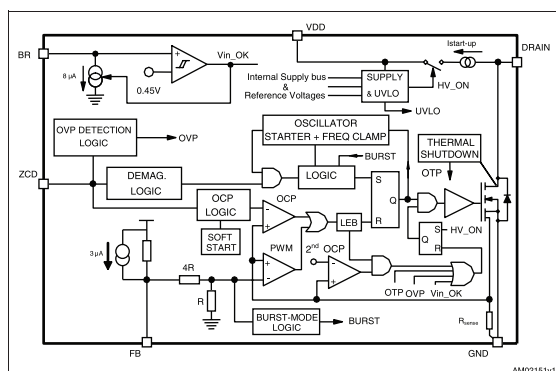
IC FEATURES (IC 特性)

Distinctive Features 特点：	800V power section, Quasiresonant (QR) operation 800V开关管、准谐振工作模式
Topology 线路结构：	Flyback 反激
Protection 保护：	OCP, OVP, OTP, Brown-out 过流、过压、过温、Brown-out
Switching Frequency 开关频率：	variable frequency 变频
Driving Current 驱动电流：	0.7A (drain current limitation)
Package 封装：	DIP7, SO16 narrow

VIPer25 for AC/DC 9W Application (VIPer25 for AC/DC 9W — 应用)

Peak Power 最大功率：	10W (瓦)
Input Voltage 输入电压：	90Vac~264Vac (伏)
Output Voltage 输出电压：	31.5V (伏) $\pm 10\%$
Estimated Efficiency 预计效率：	80%
Regulation 校准：	0.29A (安) $\pm 20\%$
Power Factor 功率因数：	0.8 or above

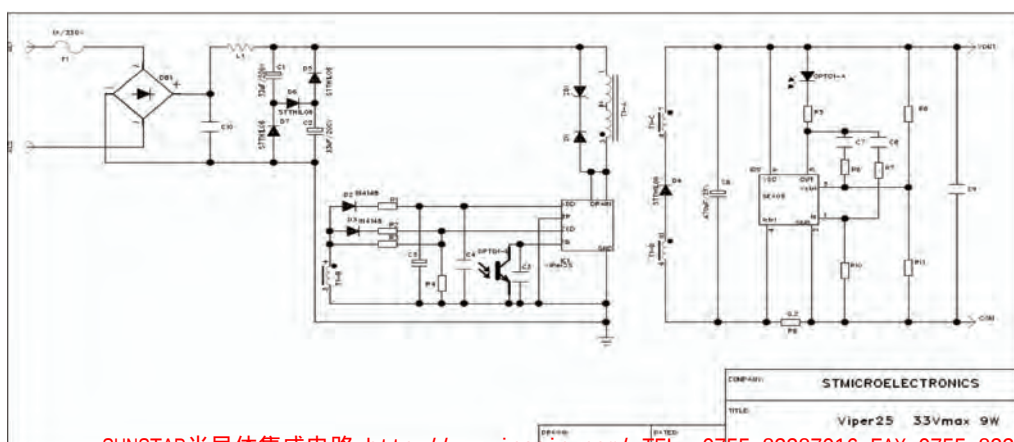
Controller Block Diagram (控制器原理图)



Testing Figures (测试数据)

Input Power 输入功率	Output Voltage 输出电压	Output Current 输出电流	Efficiency 效率
11.97W	31.5V	0.3A	80.00%

9W AC/DC Application Circuit (9W AC/DC应用电路图)



PART NUMBER (型号)

Circuit Protection Devices 电路保护元件

DESCRIPTION

Today, most LED applications utilize power conversion and control devices to interface with various power sources, such as the AC line, a solar panel or battery power etc. To control power dissipation from the LED driver and protecting these interfaces from overcurrent, transient and overtemperature damage is frequently required and desired. Tyco electronics offers lighting designer a series of protection devices which increase lighting product quality and high reliability. In this notes, circuit protection opportunities will be presented in DC/DC and AC/DC lighting application.

Product Offers for Protection Against

- **Overcurrent**
 - PPTC, Fuse
- **Overvoltage**
 - Lighting Protection & AC Power Fluctuations: GDT
 - DC transients: PolyZen Device, GDT
- **Reverse Voltage**
 - Lighting Protection & AC Power Fluctuations: GDT
 - DC transients or Misconnection: PolyZen Device
- **Overtemperature**
 - PPTC as a Series "Thermal Shutdown" Device
 - PPTC as a Series "Derating" Device

SUPPLIER (供应商)



描述

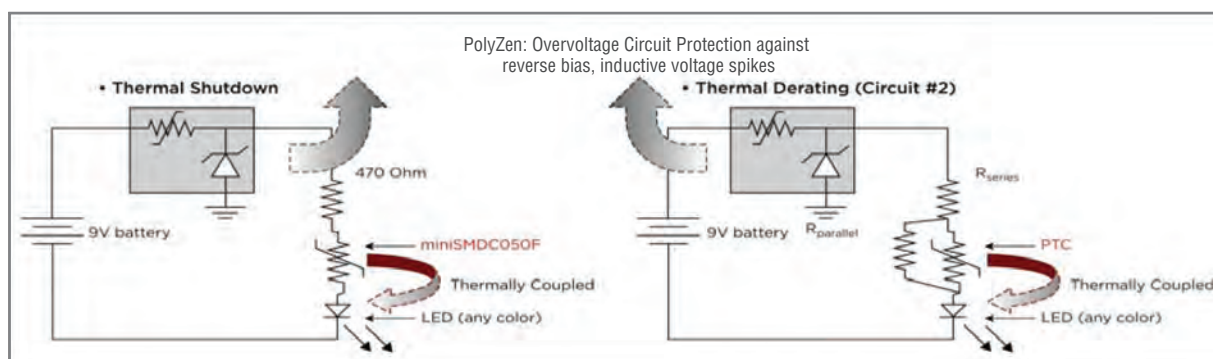
目前，大多数LED应用采用电源转换和控制设备作为与各种能源的接口，例如交流电源、太阳能电池板、电池电源等。通常要求控制LED驱动电路的功耗，保护各种接口的过流，瞬态脉冲和过热损坏。泰科电子为设计者提供的一系列保护元件可以提高照明产品质量和可靠性。在本笔记中，以DC/DC，AC/DC照明为例介绍电路保护的应用。

产品防护目标

- 过流保护
 - PPTC、保险丝
- 过压保护
 - 雷击保护及交流电源波动保护：GDT气体放电管
 - 直流瞬态过压保护：PolyZen元件、GDT气体放电管
- 电源极性反转保护
 - 雷击保护及交流电源波动保护：GDT气体放电管
 - 直流瞬态脉冲和电源错误连接保护：PolyZen元件
- 过热保护
 - PPTC串联，作为过热关断保护元件
 - PPTC串联，作为过热电流折减保护元件

Portable Lighting DC/DC Thermal Protection and Overvoltage Protection Against Reverse and Inductive Spike

便携式直流转直流照明系统过热保护，以及由电压反转和感性尖峰引起的过压保护

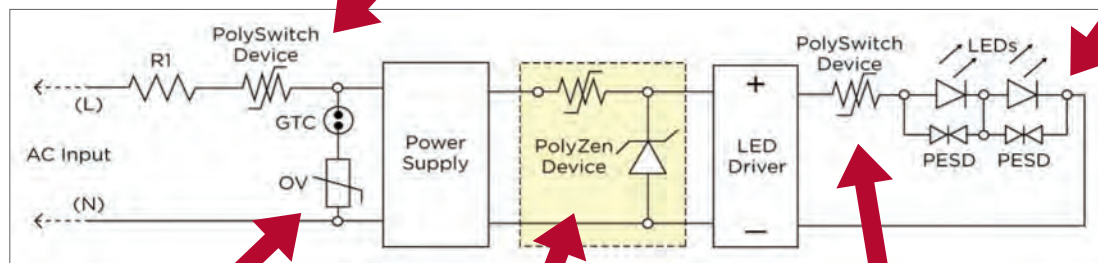


AC/DC Street lamp / High Power Lighting Application – Protection Against OVP, Lighting Surge and DC Transient

交流转直流街灯/大功率照明应用 – 过压，雷击和直流瞬态脉冲保护

Overcurrent and overtemperature protection (example: LVR040S)
过流和过热保护(例如: LVR040S)

A PESD protection device placed in parallel with the LED can help protect against electrostatic discharge (ESD) damage
每颗LED采用一个PESD元件并联实现ESD保护



Overvoltage (OV) device is used to protect against lighting surge
过电压元件用于雷击保护

DC Transient : ZEN132V130A24LS
直流瞬态脉冲保护 : ZEN132V130A24LS

A PolySwitch device on the driver output helps protect against damage caused by inadvertent short circuits or other load anomalies. To fully leverage the PolySwitch device, it can be thermally bonded to the metal core circuit board or LED heat sink.
与LED驱动输出串联一颗PolySwitch，可以提供系统的无意短路或其它负载异常保护。为了充分发挥PolySwitch保护作用，可以将其与金属芯印制板或LED热沉（散热基板）热粘接在一起。

PART NUMBER (型号)

Screw Down Jumper Assembly 螺丝旋紧式板对板电气连接跨接器

DESCRIPTION

The board-to-board, screw down jumper assembly provides the electrical connection between two adjacent printed circuit boards in a string of printed circuit boards.

APPLICATION (应用)

T8-T12 Retrofit, LED Lighting Strips, LED Lighting Controls, Channel Lettering
T8-T12 LED灯管、LED灯条、LED照明控制、LED字符串

SPECIFICATION (技术指标)

Electrical 电气： Operating Current 工作电流：5A
Operating Voltage 工作电压：250VAC / 250VDC
Dielectric Withstanding Voltage 绝缘电压：1500 VAC

Mechanical 机械： Operating Temperature 工作温度：-40°C to 105°C
Mating Cycles 插拔次数：10
Screw Down Torques 螺丝扭矩：0.11 Nm [0.97 Lb-In] max

Materials 材料： Contacts 端子：Tin Plated Copper Alloy 铜合金、镀锡
Housing 塑壳：UL 94 V0 Thermoplastic 耐高温热塑材料
ETL Recognized, ETL 认证 File No. 3178692CRT-001 to UL (1977)

SAFETY FEATURES (安全标准)

114-13260： Screw Down Jumper Assembly Application Specification
螺丝旋紧式板对板电气连接跨接器应用说明

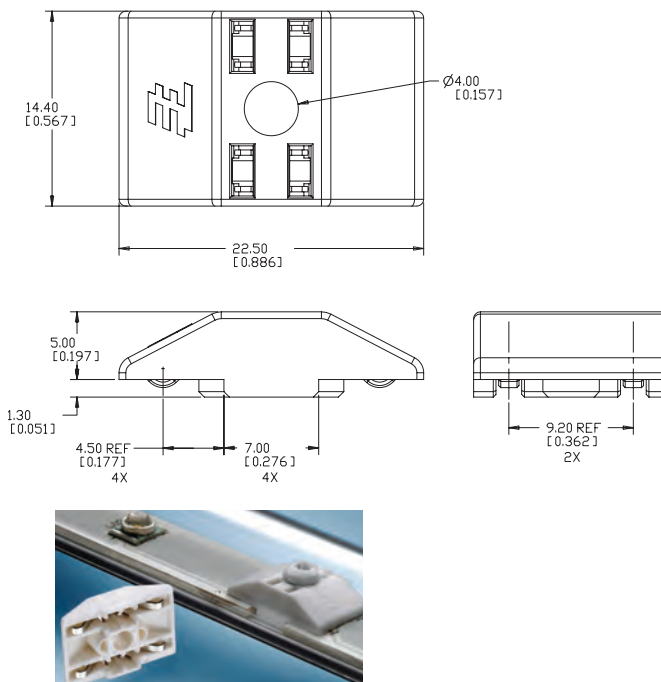
108-2392： Screw Down Jumper Assembly Product Specification
螺丝旋紧式板对板电气连接跨接器产品指标

SUPPLIER (供应商)



描述

该螺丝旋紧式板对板电气连接跨接器适合两块相邻印刷电路制板间的电气连接，并结构固定。安装方便，连接可靠。



Tyco Electronics — G13 SMT Connector and End Cap Cover 泰科电子 — G13 灯头 SMT 连接器及端盖

PART NUMBER (型号)

G13 SMT Connector and End Cap Cover G13 灯头 SMT 连接器及端盖

DESCRIPTION

The G13 Style SMT Assembly and End Cap Cover are designed for use on printed circuit board LED strip lighting modules in T8 and T12 fluorescent retrofit LED tubes. The End Cap Cover is designed to interface with G13 Style SMT assembly, heat sink and tube. (Custom configurations are available upon special request)

APPLICATION (应用)

Standard T8 and T12 fluorescent fixtures 标准的T8 和 T12 LED灯管

SPECIFICATION (技术指标)

Electrical 电气： Operating Current 工作电流：2A
Operating Voltage 工作电压：250VAC / 250VDC

Mechanical 机械： Dielectric Withstanding Voltage 绝缘电压：1500VAC
Operating Temperature 工作温度：-40°C to 120°C

Materials 材料： Mating Cycles 插拔次数：10
G13 SMT Assembly G13 SMT组件：UL 94 V0 Rated High Temp. Resist.
Thermoplastic G13灯头SMT连接组件：UL 94V-0 耐高温热塑材料
End cap cover 端盖：UL 94 V0 Thermoplastic 耐高温热塑材料
Contacts 灯头端子：Tin Plated Brass 铜、镀锡
SMT hold down 端子：Tin Plated Brass 铜、镀锡

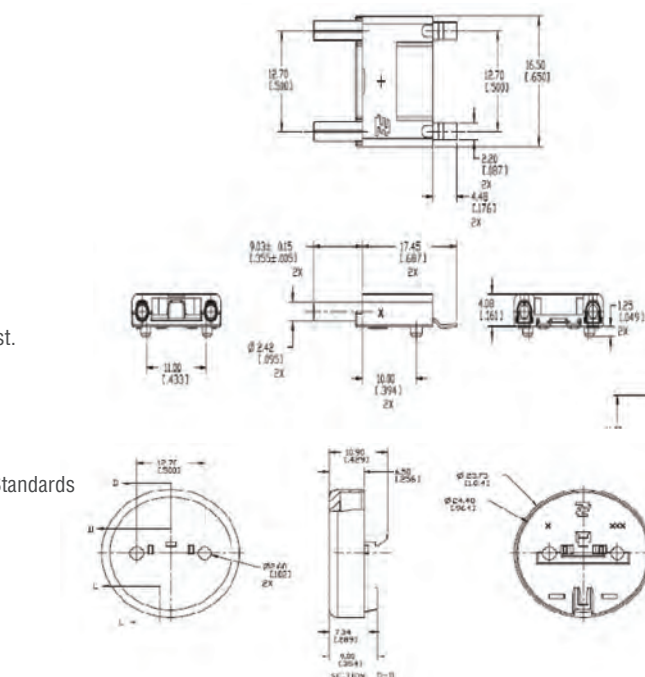
Safety 安全标准： ETL Recognized, File No. 3177705CRT-001 to UL 8750 and UL 1993 Standards
ETL 认证，文件编号 3177705CRT-001 to UL 8750 和 UL 1993标准

SUPPLIER (供应商)



描述

该G13灯头SMT连接器及端盖是专门为安装在T8和T12灯管里的LED电路板连接所设计。该端盖可匹配G13 SMT连接组件，散热和玻璃管。(客户定制化尺寸改动特殊要求可接受)



PART NUMBER (型号)

Hermaphroditic Blade and Receptacle Connector 插片插座一体式板对板连接器

DESCRIPTION

The Hermaphroditic Blade and Receptacle connector is a new SMT connector and is intended for use with in-line board-to-board applications. It is a connector system which mates and unmates horizontally and vertically -3 axis mating. Meanwhile, it can be articulated from 90 to 180 degree.

APPLICATION (应用)

LED Lighting Modules, Incandescent Lighting Strips, Channel Lettering

LED照明模块、LED照明灯条、LED字符串等

SPECIFICATION (技术指标)

Electrical 电气: Operating Current : 6 AMPS 工作电流 : 6 AMPS
Operating Voltage : 125VAC / 125VDC 工作电压 : 125VAC / 125VDC
Dielectric Withstanding Voltage : 1500VAC 绝缘电压 : 1500VAC

Mechanical 机械: Operating Temperature : -40°C to +105°C 工作温度 : -40°C to +105°C

Materials 材料: Housing: UL 94V-0 High Temperature Resistant Thermoplastic
塑壳 : UL 94V-0 耐高温热塑材料
Contact: Copper Alloy, Tin Over Nickel Plated 触点 : 铜合金、镍底镀锡

Safety 安全: UL and cUL Recognized, File No. E28476 UL与cUL认证, 文件编号E28476

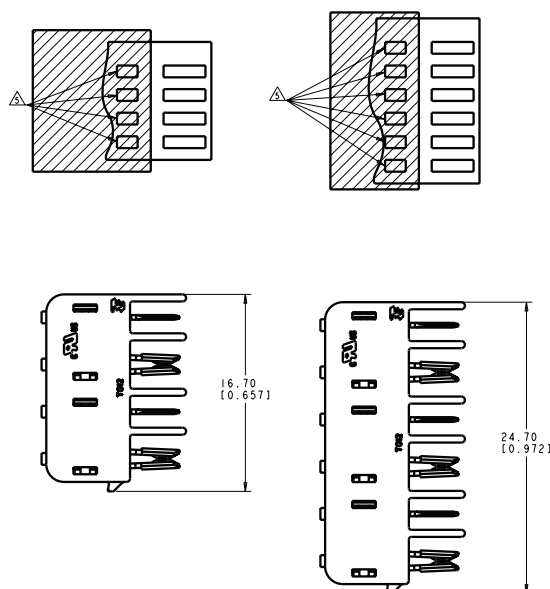


SUPPLIER (供应商)



描述

该插片插座一体式板对板连接器是一款新的SMT连接器专为板对板间连接应用设计。该系列产品允许水平及垂直立体式电气连接, 也就意味着可以90度到180度的绞接。同样, 也非常有利于水平向或垂直向维修替换操作。



Tyco Electronics — Inverted SMT Thru Board Connector

泰科电子 — SMT 反向通板连接器

PART NUMBER (型号)

Inverted SMT Thru Board Connector SMT 反向通板连接器

DESCRIPTION

The Inverted SMT Thru Board Connector provides a means to bring power to LED aluminum clad and FR4 boards from the underside of the pc board. It eliminates wire dress management issues with discreet wire leads around the surface of the LED pc board and accepts 2 thru 6 Position.

APPLICATION (应用)

LED lighting controls, Indoor and outdoor lighting fixtures, General LED illumination fixtures, various non-lighting applications that require wire dress connections below the pc board.

LED照明控制, 室内外照明灯具; 普通照明灯具; 各种需要从PC板下进线的非照明应用。

SPECIFICATION (技术指标)

Electrical 电气: Operating Voltage : 50VAC / 50VDC 工作电压 : 50VAC / 50VDC
Operating Current : #24 AWG - 3A, #26 AWG - 2.5A, #28 AWG - 1.5A
工作电流 : #24 AWG - 3A, #26 AWG - 2.5A, #28 AWG - 1.5A

Mechanical 机械: Housing : 94 V0 Rated High Temperature Resistant Thermoplastic
塑壳 : UL 94V-0 耐高温热塑材料
Contacts : Tin Over Nickel Plated Copper Alloy 触点 : 铜合金、镍底镀锡

Materials 材料: Operating Temperature : -40°C to +105°C 允许温度 : -40°C to +105°C

SAFETY (安全)

Safety Standard : UL 1977 File No. E28476
UL 1977 文件编号 E28476

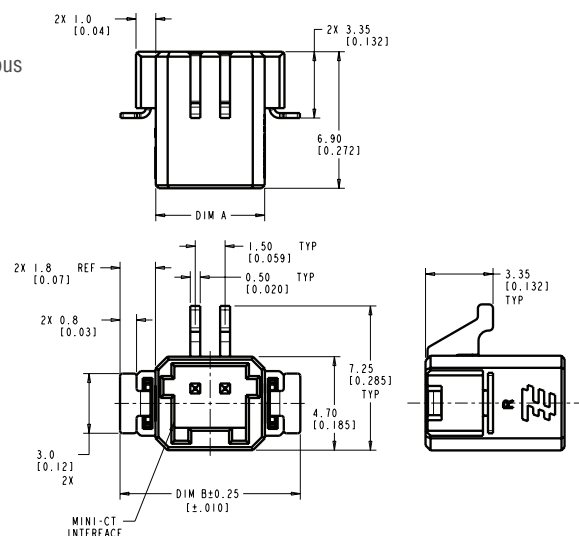


SUPPLIER (供应商)



描述

该SMT反向通板连接器为电源从LED铝基板和FR4板的背部引入提供了一种便捷方法。它消除了引线在LED PC板上的不美观及可能的挡光阴影问题。该系列拥有2到6位连接器。



PART NUMBER (型号)

SMT Poke-In Lighting Connector SMT插入式照明连接器

DESCRIPTION

Tyco Electronics SMT Poke-In Lighting Connector is 2-position, low profile SMT wire Poke-In connector is designed for LED lighting applications. This connector is a perfect product which can prevent cold soldering in manufacturing process. Tyco Electronics Poke-In connector is available in surface mount tape & reel packaging. Poke-In connector is designed to accept a wide range of wire sizes and types.

APPLICATION

LED Light String Connections, Lighting Control, MCPCB Connection

SPECIFICATION (技术指标)

Electrical 电气: 1500VAC Dielectric 绝缘电压1500VAC
250VAC / 4A 工作电压/电流250VAC / 4A
250VDC / 4A 工作电压/电流250VDC / 4A

Mechanical 机械: Operating Temperature: -25°C to +105°C 工作温度: -25°C to +105°C
Wire Retention: 5 lb. Minimum 导线保持力: 至少抵抗5磅的拉力

Materials 材料: Housing: UL 94V-0 High Temperature Resistant Thermoplastic
塑壳: UL 94V-0 耐高温热塑材料
Contact: Copper Alloy, Tin Over Nickel Plating 触点: 铜合金、镍底镀锡

SAFETY (安全)

Safety Standard: Design Objectives: 108-2284 产品规格: 108-2284
UL and cUL Recognized, File No.E28476 UL与cUL认证, 文件编号E28476
(18, 20, 22 AWG Solid) (18, 20, 22 AWG实芯)
(18, 20 AWG Prebond) (18, 20, AWG预装)
(18 AWG 7, 9, 16 Strand) (18 AWG 7, 9, 16多芯)
Application Specification: 114-13194 应用规范: 114-13194



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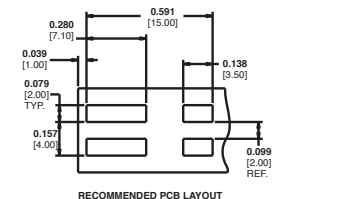
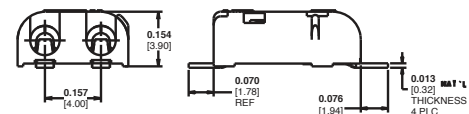
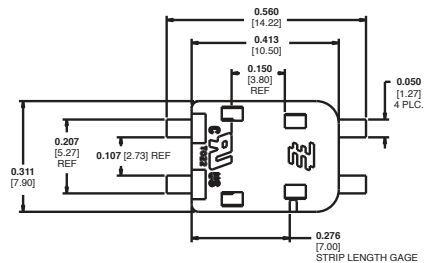


描述

泰科电子SMT插入式照明连接器系列拥有1位和2位。该小型化连接器是专门为照明设计,不但能帮助提高产能,而且可防止或降低因传统手工焊接可能带来的欠温焊接风险及潜在的虚焊假焊风险。泰科电子SMT插入式照明连接器有表面贴装SMT及通孔引脚设计两种。并拥有为SMT工艺的编带及卷状包装。并适合较宽范围的引线和线型。

应用

LED 灯串, 灯条及其他各种模块连接, 照明控制等其他线对板的PCB连接



RECOMMENDED PCB LAYOUT

Tyco Electronics — Hermaphroditic Blade and Receptacle Connector Wire to Board 泰科电子 — 插片插座一体式线对板连接器

PART NUMBER (型号)

Hermaphroditic Blade and Receptacle Connector Wire to Board
插片插座一体式线对板连接器

DESCRIPTION

The Wire-to-Board connector is a new plug connector that mates to the new part number series of the surface mount Hermaphroditic Blade and Receptacle board to board connectors. The connector provides power to the first LED printed circuit board in a string of rigid printed circuit board light strips. Connector accepts crimp snap contacts and contacts accept 18 – 22 AWG stranded wire.

APPLICATION (应用)

LED Lighting Controls, LED Lighting Strips, Channel Lettering LED照明控制、LED 照明灯条、LED 字符串

SPECIFICATION (技术指标)

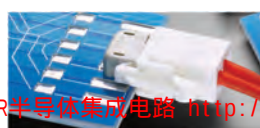
Electrical 电气: Operating Current: 6 AMPS 工作电流: 6 AMPS
Operating Voltage: 125VAC / 125VDC 工作电压: 125VAC / 125VDC
Dielectric Withstanding Voltage: 1500VAC 绝缘电压: 1500VAC

Mechanical 机械: Operating Temperature: -40°C to +105°C 工作温度: -40°C to +105°C
Mating cycles: 10 插拔次数: 10

Materials 材料: Housings: UL 94 V-0 塑壳: UL 94V-0
Contacts: Tin Plated Brass 端子: 黄铜镀锡

SAFETY (安全)

Safety Standard: 114-13252: Wire-to-Board Application Specification
插片插座一体式线对板连接器应用说明
108-2387: Wire-to-Board Product Specification
插片插座一体式线对板连接器产品指标



SUPPLIER (供应商)



描述

该插片插座一体式线对板连接器是一款新的插头连接器,可与新版本的SMT贴片式插片插座一体式的板对板连接器匹配使用。该连接器为整个LED模块组的第一块印刷电路板提供电源。该连接器方便接受插入咬合式压接端子,方便使用。并适合18-22AWG的多芯线。

