

XL5004-DEMO1: XL5004 DEMO Borad Manual

Introduction

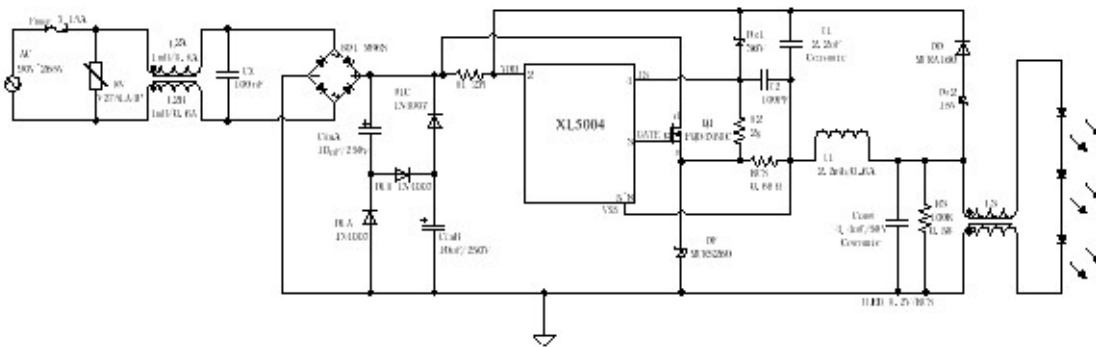
The document describes a non-isolated, power-factor corrected, high efficiency LED driver designed to drive an LED string at a current of 300 mA from an input voltage range of 90 VAC to 265 VAC.

The XL5004 also provides a sophisticated range of protection features including auto-restart for control loop open/short faults and output short-circuit conditions. Accurate hysteretic thermal shutdown ensures safe average PCB temperatures under all conditions.

High-efficiency, power factor corrected LED driver design with very low parts count.

This document contains the LED driver specification, schematic, PCB diagram, bill of materials.

Schematic



XL5004 System Application for AC LED LAMP(Series8~14*1W)

Pin Description

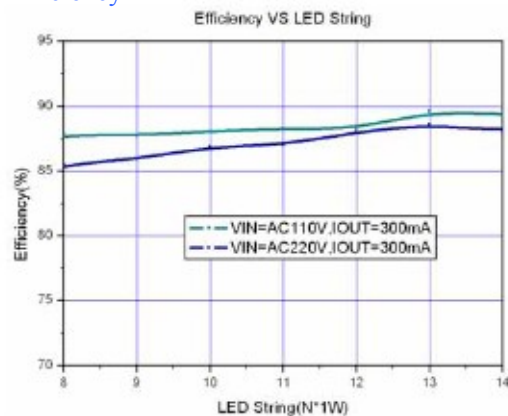
| Pin Number | Pin name | Description |
|------------|----------|---|
| 1 | NC | No Connected |
| 2 | VDD | The Chip supply voltage |
| 3 | GATE | Output HV-NMOS gate Driver |
| 4 | IS | Current Sense Pin.(The current sense voltage is 0.2V) |
| 5~8 | VSS | The chip reference ground |

Bill of Materials

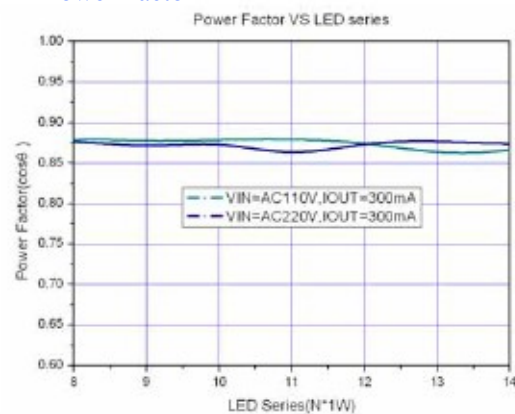
| Item | Qty | Ref Des | Description | Mfg Part Number | Mfg |
|------|-----|-------------|-------------------------------------|------------------|------------|
| 1 | 1 | BD1 | 600 V,1A, Bridge Rectifier,SMD | MB6S | 东森微 |
| 2 | 1 | C1 | 2.2uF,50V, Ceramic,X7R,0805 | C2012X7R1H225K | TDK |
| 3 | 1 | C2 | 100pF,100V, Ceramic,cog,0603 | C1608C0G2E101K | TDK |
| 4 | 1 | CinA | 10uF,250V,Electrolytic,(10x16) | BXC-250V-10uF | Rubycon |
| 5 | 1 | CinB | 10uF,250V,Electrolytic,(10x16) | BXC-250V-10uF | Rubycon |
| 6 | 2 | Cout | 2.2uF,100V, Ceramic,X7R,1210 | C3225X7S2A335K | TDK |
| 7 | 1 | CX | 100nF,630V,Film | B32671Z6104K289 | EPCOS |
| 8 | 3 | D1A,D1B,D1C | 1000V,1A,Rectifier,SMA | MRA4007T3G | 东森微 |
| 9 | 1 | DF | 600V,2A,Ultrafast Recovery,50ns,SMB | MURS260T3G | 东森微 |
| 10 | 1 | DD | 600V,1A,Ultrafast Recovery,75ns,SMA | MURA160T3G | 东森微 |
| 11 | 1 | DZ1 | 36V,500mW,Zener,SOD-123 | MMSZ5258BT1G | 东森微 |
| 12 | 1 | DZ2 | 15V,500mW,Zener,SOD-123 | MMSZ5245BT1G | 东森微 |
| 13 | 1 | FUSE | 3.15A,250V,TE5 | 392-1315 | Littelfuse |
| 14 | 2 | L1A,L1B | 1mH,0.6A | C12-K7.5L GE-102 | Mitsumi |
| 15 | 2 | L2A,L2B | 1mH,0.6A | C12-K7.5L GE-102 | Mitsumi |
| 16 | 1 | L3 | 80V,Common Mode Line Filter,SMD | ACM9070-701-2PL | TDK |
| 17 | 1 | Q1 | 600V,N-Channal,MOSFET,TO252-2L | FCD4N60 | 东森微 |
| 18 | 1 | R1 | 2MΩ,1%,1/4 W,Thick Film,1206 | RC1206xR-072004L | Yageo |
| 19 | 1 | R2 | 2KΩ,1%,1/16W,Thick Film,0603 | RC0603xR-072001L | Yageo |
| 20 | 1 | R3 | 100KΩ,1%,1/4 W,Thick Film,1206 | RC0603xR-071003L | Yageo |
| 21 | 1 | RCS | 0.68Ω,1%,1/4 W,Thick Film,1206 | RL1206xR-07R680L | Yageo |
| 22 | 1 | RV1 | 275V,7mm,RADIAL | V275LA4P | Littelfuse |
| 23 | 1 | U1 | XL5004,SOP8 | XL5004 | 东森微 |

Performance Data

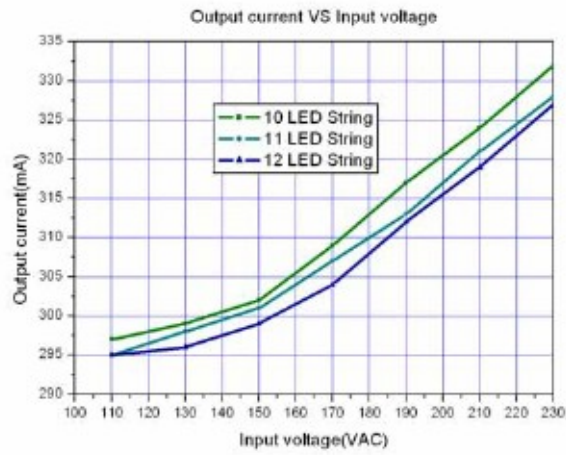
Efficiency



Power Factor



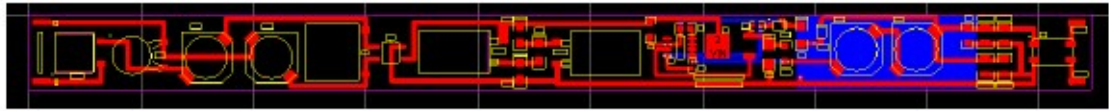
Line and Load Regulation



Populated Circuit Board Photograph.



PCB Layout



Printed Circuit Layout, Top, 241mm×17mm



Printed Circuit Layout, Bottom

XL5004-DEMO2: XL5004 DEMO Borad Manual

Introduction

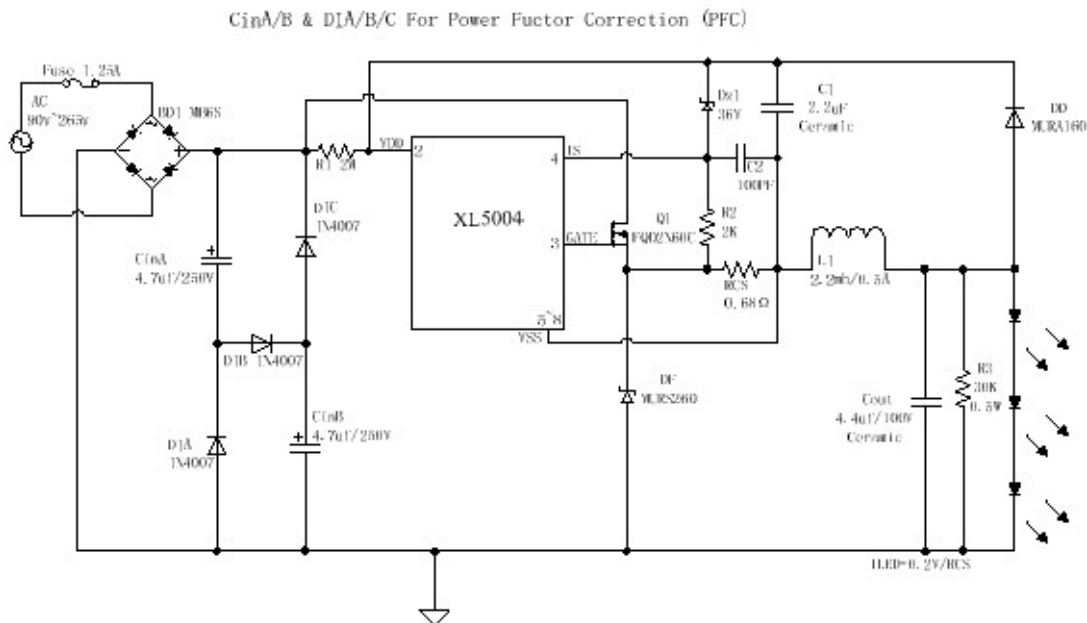
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High-efficiency, power factor corrected LED driver design with very low parts count.

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Schematic



XL5004 System Application for AC LED LAMP(Series3~8*1W)

Pin Description

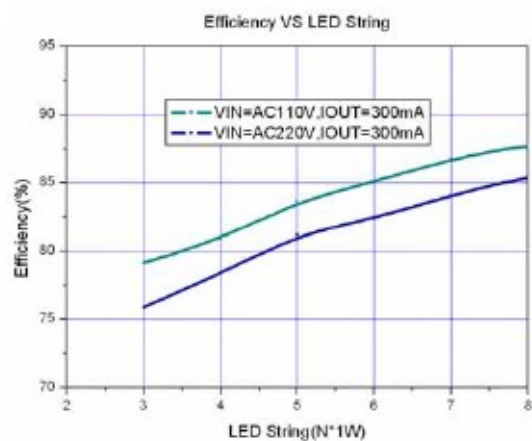
| Pin Number | Pin name | Description |
|------------|----------|---|
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Bill of Materials

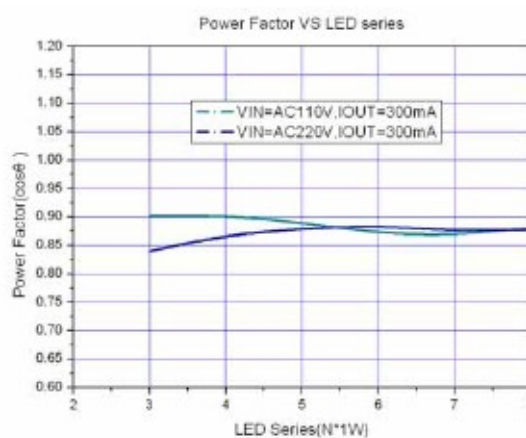
| Item | Qty | Ref Des | Description | Mfg Part Number | Mfg |
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| 3 | 1 | C2 | 100pF,100V, Ceramic,cog,0603 | C1608C0G2E101K | TDK |
| 4 | 1 | CinA | 4.7uF,250V,Electrolytic,(8x11.5) | BXC-250V-4.7uF | Rubycon |
| 5 | 1 | CinB | 4.7uF,250V,Electrolytic,(8x11.5) | BXC-250V-4.7uF | Rubycon |
| 6 | 2 | Cout | 2.2uF,100V, Ceramic,X7R,1210 | HMK325B7225 | Taiyo |
| 7 | 3 | D1A,D1B,D1C | 1000V,1A,Rectifier,SMA | MRA4007T3G | 东森微 |
| 8 | 1 | DF | 600V,2A,Ultrafast Recovery,50ns,SMB | MURS260T3G | 东森微 |
| 9 | 1 | DD | 600V,1A,Ultrafast Recovery,75ns,SMA | MURA160T3G | 东森微 |
| 10 | 1 | DZ1 | 36V,500mW,Zener,SOD-123 | MMSZ5258BT1G | 东森微 |
| 11 | 1 | FUSE | 1.25A,250V,SMD | AF2-1.25V125TM | AEM |
| 12 | 1 | L1 | 2.2mH,0.5A | C12-K7.5L GE-202 | Mitsumi |
| 13 | 1 | Q1 | 600V,N-Channal,MOSFET,TO252-2L | FCD2N60 | 东森微 |
| 14 | 1 | R1 | 2MΩ,1%,1/4 W,Thick Film,1206 | RC1206xR-072004L | Yageo |
| 15 | 1 | R2 | 2KΩ,1%,1/16W,Thick Film,0603 | RC0603xR-072001L | Yageo |
| 16 | 1 | R3 | 30KΩ,1%,1/4 W,Thick Film,1206 | RC0603xR-073002L | Yageo |
| 17 | 1 | RCS | 0.68Ω,1%,1/4 W,Thick Film,1206 | RL1206xR-07R680L | Yageo |
| 18 | 1 | U1 | XL5004,SOP8 | XL5004 | XLSEMI |

Performance Data

Efficiency



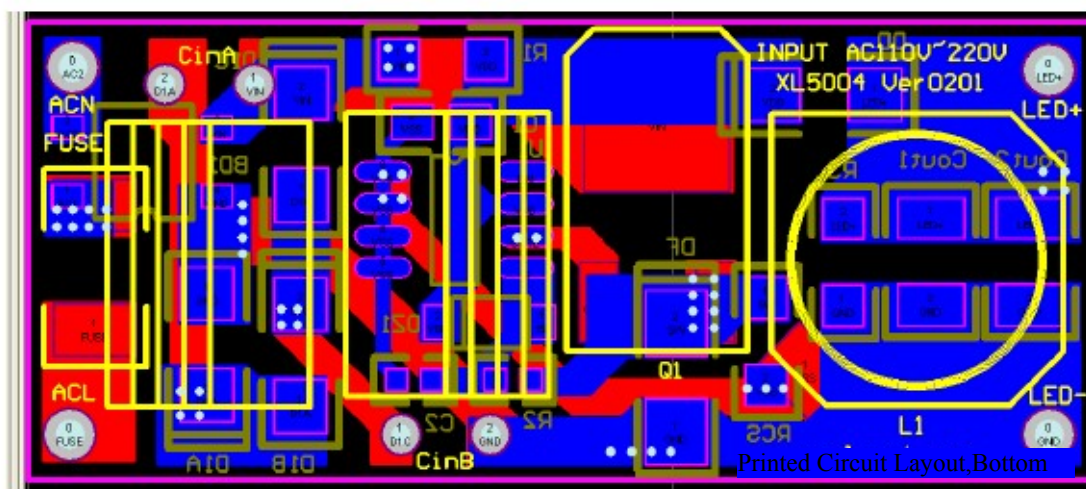
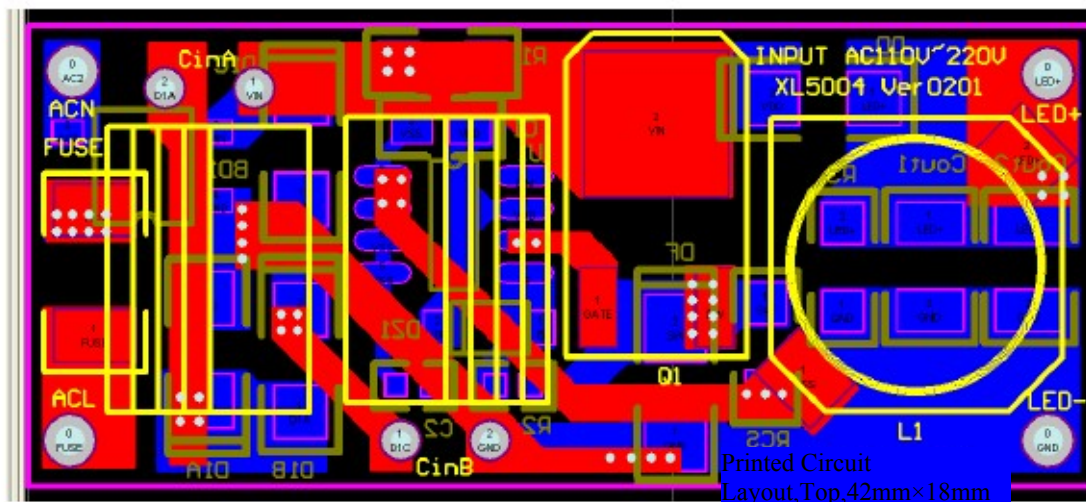
Power Factor



Populated Circuit Board Photograph.



PCB Layout



昆山东森微电子有限公司

手机: 15950933050

电话: 0512-50710709

传真: 0512-50111209

MSN: wei_126@hotmail.com

QQ: 41086900

网站: <http://www.ksmcu.com>

代理: 集成电路、光耦、MOS管、可控硅、各类二三极管、桥堆