EVAL6574B

CFL/TL ballast driver preheat and dimming demonstration board based on the L6574

Data brief

EVAL6574B

Features

- Dimmable fluorescent lamp ballast
- Multiple T8 lamps application
- Wide range input (85 Vac – 265 Vac)
- PF > 0.99, THD < 10%
- Fault ignition protection
- Lamp absence detection

Description

This design was developed to drive a TL fluorescent lamp of up to 58 W. It is composed of two sections: the PFC using the L6561 controller, and the ballast based on the L6574. The application includes a current feedback that can be used to control the power (and, if necessary, the dimming function) by varying the switching frequency during normal lamp operation. The application also features safety circuitry which activates when an open load or faulty lamp ignition is detected. The PFC pre-regulator allows connection of the application to a wide input voltage range (85 Vac to 265 Vac) providing a Power Factor higher than 0.99 and a THD lower than 10%.

1 Board description

Table 1: Board electrical specifications

Parameter	Value
Input voltage	85 Vac to 265 Vac
Power factor	> 0.99
THD	< 10%
Output power	Up to 58 W
Lamp configuration	Single lamp – tubular T8 model (32 W to 58 W)

Figure 1: Jumper and connector locations

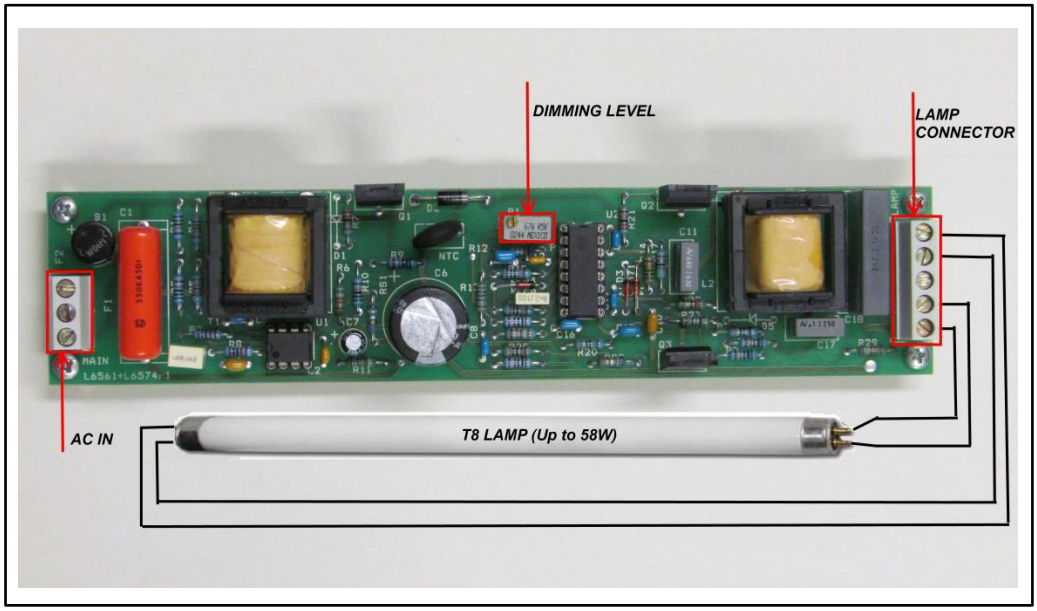


Table 2: Connector A pinout

Name	Type	Function
MAIN (AC IN)	Screw connector	Input voltage connection
LAMP	Screw connector	Lamp connection

Figure 2: Schematic

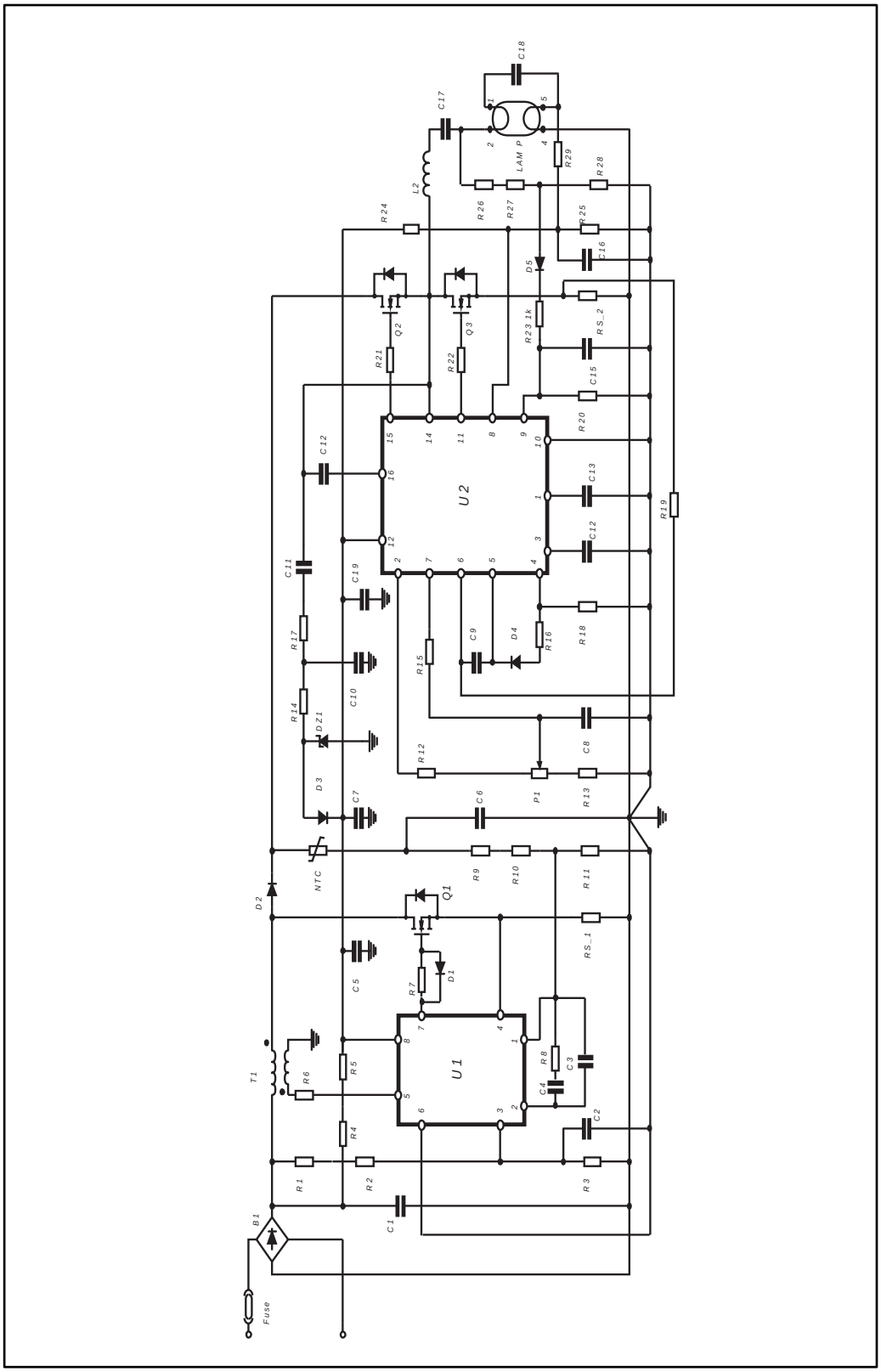


Table 3: Bill of material

Reference	Part value	Part description
R1	750 kΩ	Resistor 250 mW 1%
R2	750 kΩ	Resistor 250 mW 1%
R3	10 kΩ	Resistor 250 mW 1%
R4	120 kΩ	Resistor 250 mW 1%
R5	120 kΩ	Resistor 250 mW 1%
R6	68 kΩ	Resistor 250 mW 1%
R7	22 Ω	Resistor 250 mW 1%
R8	10 kΩ	Resistor 250 mW 1%
R9	750 kΩ	Resistor 250 mW 1%
R10	750 kΩ	Resistor 250 mW 1%
R11	9.53 kΩ	Resistor 250 mW 1%
R12	82 kΩ	Resistor 250 mW 1%
R13	1.5 kΩ	Resistor 250 mW 1%
R14	10 Ω	Resistor 250 mW 1%
R15	10 kΩ	Resistor 250 mW 1%
R16	100 kΩ	Resistor 250 mW 1%
R17	47 Ω	Resistor 250 mW 1%
R18	100 kΩ	Resistor 250 mW 1%
R19	10 kΩ	Resistor 250 mW 1%
R20	6.8 kΩ	Resistor 250 mW 1%
R21	22 Ω	Resistor 250 mW 1%
R22	22 Ω	Resistor 250 mW 1%
R23	1 kΩ	Resistor 250 mW 1%
R24	390 kΩ	Resistor 250 mW 1%
R25	20 kΩ	Resistor 250 mW 1%
R26	750 kΩ	Resistor 250 mW 1%
R27	750 kΩ	Resistor 250 mW 1%
R28	3.9 kΩ	Resistor 250 mW 1%
R29	6.8 kΩ	Resistor 250 mW 1%
RS_1	0.68 Ω	Resistor 250 mW 1%
RS_2	0.68 Ω	Resistor 250 mW 1%
P1	5 kΩ	Trimmer 10 turns (Bourns / Spectrol)
NTC1	5 Ω	Thermistor 3 W (EPCOS)
C1	330 nF	Film Capacitor 400 V (Panasonic / Rubycon)
C2	10 nF	Capacitor 50 V
C3	220 nF	Capacitor 50 V

Reference	Part value	Part description
C4	680 nF	Capacitor 50 V
C5	100 nF	Capacitor 50 V
C6	22 µF	Electrolytic capacitor, 450 V low ESR
C7	4.7 µF	Electrolytic capacitor, 35 V
C8	100 nF	Capacitor 50 V
C9	8.2 nF	Capacitor 50 V
C10	4.7 nF	Capacitor 50 V
C11	680 pF	Film capacitor 630 Vdc
C12	100 nF	Capacitor 50 V
C13	1 µF	Capacitor 50 V
C14	100 nF	Capacitor 50 V
C15	330 nF	Capacitor 50 V
C16	470 nF	Capacitor 50 V
C17	100 nF	Polypropilene capacitor 250 Vdc
C18	8.2 nF	Polypropilene capacitor 1600 Vdc
C19	100 nF	Capacitor 50 V
F1	T 2A	Fuse 250 Vac – 2 A
T1		PFC transformer: 1.88 mH, 138 : 13 turns, core E25 – N87 or eq.
L2	2.1 mH	Ballast inductor: 2 mH, 146 turns, core E25 – N87 or eq.
B1	W04M	Rectifier bridge 4 A – 600 V
D1	1N4148	Diode
D2	STTH1L06	Turbo 2 ultrafast high voltage rectifier
D3	1N4148	Diode
D4	1N4148	Diode
D5	1N4148	Diode
DZ1	BZX79C15	15 V Zener diode
U1	L6562	PFC controller
U2	L6574	Ballast controller
Q1	STP5NK50Z	N-channel 500 V – 1.22 Ω Zener-protected SuperMESH™ Power MOSFET
Q2	STP4NK50Z	N-channel 500 V – 2.4 Ω Zener-protected SuperMESH™ Power MOSFET
Q3	STP4NK50Z	N-channel 500 V – 2.4 Ω Zener-protected SuperMESH™ Power MOSFET
CN1		3 way PCB connector 250 Vac, Pin distance 5.08 mm
CN2		5 way PCB connector 250 Vac Pin distance 5.08 mm

Figure 3: Layout (top layer)

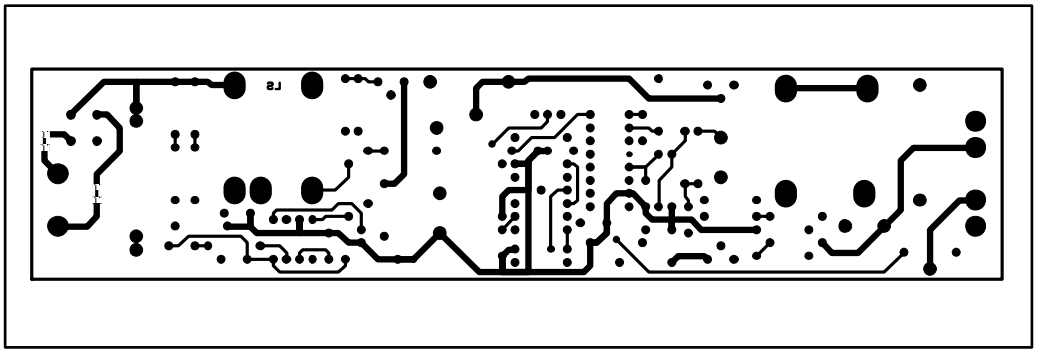


Figure 4: Layout (bottom layer)

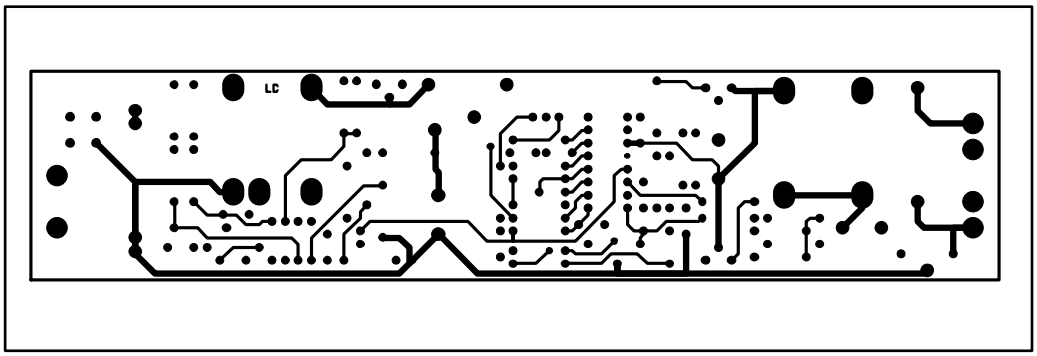
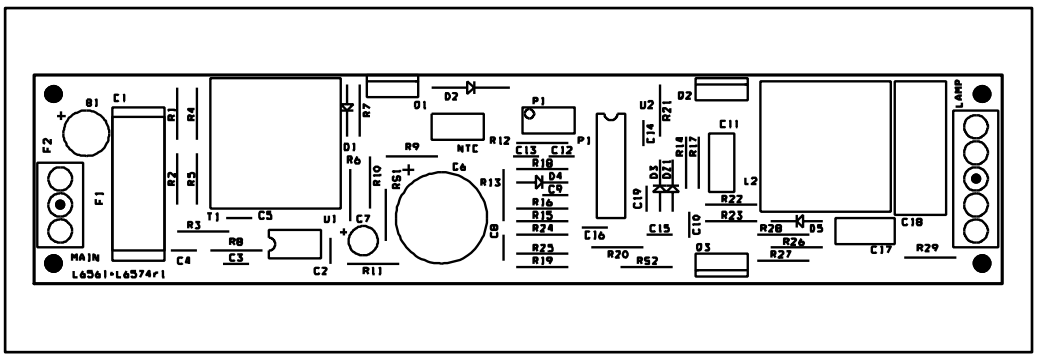


Figure 5: Layout (silk screen)



2 Revision history

Table 4: Document revision history

Date	Revision	Changes
23-May-2013	1	First release

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