

iW3626 Product Brief

Off-Line Digital Power Controller for LED Driver with High Power-Factor and Low-Ripple Current

iWatt
Power Management Simplified Digitally™

1.0 Features

- All-in-one non-dimmable low-cost off-line LED driver
- Supports universal input voltage range (90V – 277V) up to 10W
- Supports isolated or non-isolated LED driver
- Isolated design without opto-coupler
- Supports wide range of LED number with tight current regulation
- Stabilized LED current-ripple control without visible shimmer or flicker
- High power factor (PF) with low current-ripple control technology
- User-configurable power factor setting (> 0.7 to > 0.9)
- User-configurable over-temperature protection (OTP) with temperature-current derating
- Very tight LED current regulation ($\pm 5\%$) across line and load, and within primary inductance tolerance ($\pm 20\%$)
- Active start-up scheme enables fastest possible start-up
- 72kHz maximum PWM switching frequency with quasi-resonant operation
- Dynamic base current control to drive low-cost BJT
- **EZ-EMI®** design enhances manufacturability
- Built-in single-point fault protection features: LED open-/short-circuit protection and over-current protection
- No audible noise over entire operating range

2.0 Description

The iW3626 is a high performance AC/DC power controller for LED luminaires with power factor correction. The device uses digital control technology to build unique hybrid control in PWM flyback power supplies to achieve high power factor meanwhile minimizing LED current ripple. The device operates in quasi-resonant mode to provide high efficiency along with a number of key built-in protection features while minimizing the external component count, simplifying EMI design and lowering the total bill of material cost. The iW3626 removes the need for secondary feedback circuit while achieving excellent LED current regulation over line and load variation. It also eliminates the need for loop compensation components while maintaining stability over all operating conditions. The built-in power limit function enables optimized transformer design in universal off-line applications and allows for a wide input voltage range.

iWatt's innovative proprietary technology maximizes the iW3626 performance in a tiny SOT-23 package. The iW3626 offers two multi-function pins allowing users to configure PF and OTP as required with no cost and size impact, thereby providing design flexibility. The active start-up scheme enables the shortest possible start-up time without sacrificing active efficiency.

3.0 Applications

- Solid-state LED lighting
- LED lighting ballast

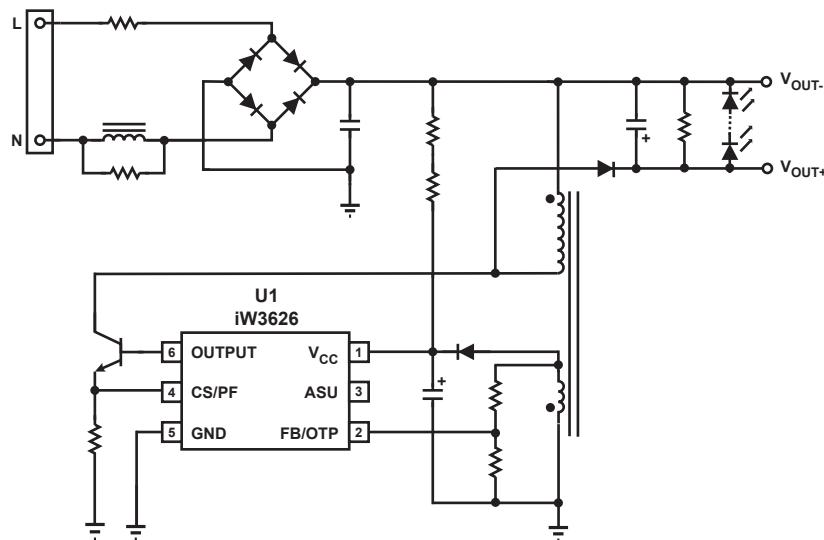


Figure 3.1: iW3626 Typical Application Circuit (Non-isolated Application)

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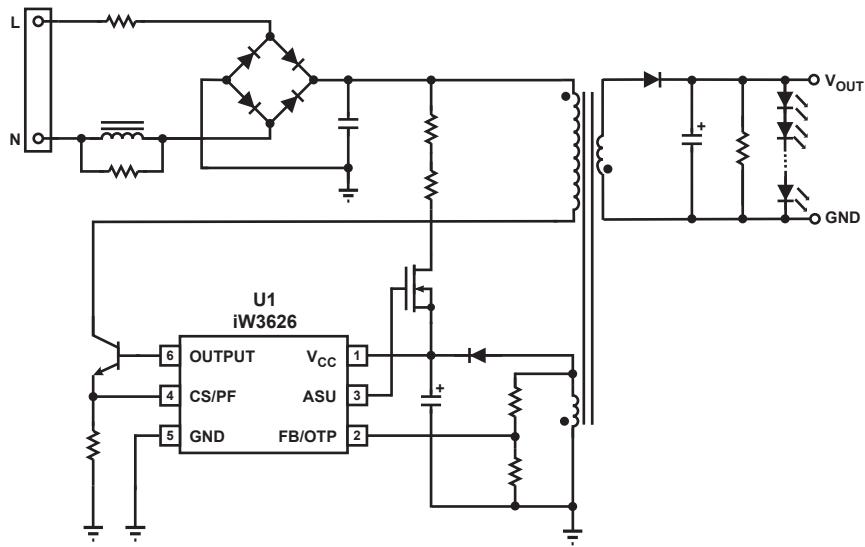


Figure 3.2: iW3626 Typical Application Circuit (Isolated Application)

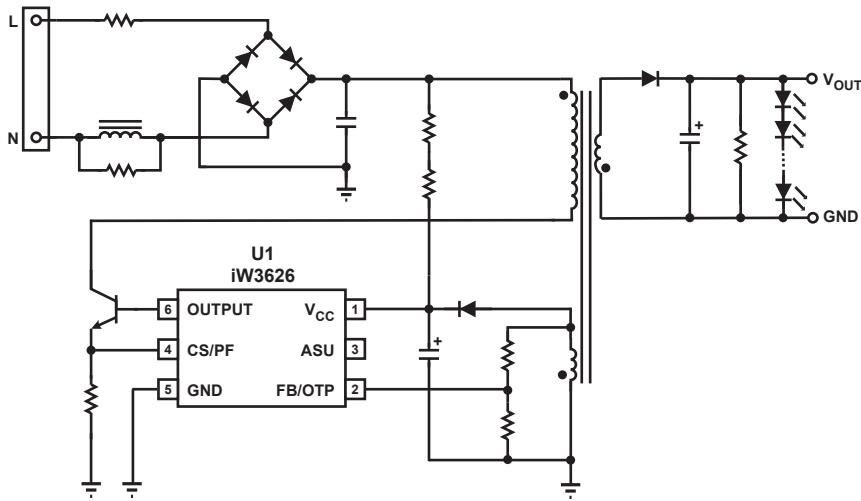


Figure 3.3: iW3626 Typical Application Circuit (Isolated Application without Using Active Start-up Device)

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4.0 Pinout Description

iW3626

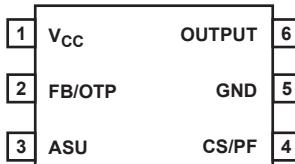


Figure 4.1: 6-Lead SOT-23 Package

Pin #	Name	Type	Pin Description
1	V _{cc}	Power Input	Power supply for control logic.
2	FB/OTP	Analog Input	Multi-function pin. Used to configure over-temperature protection (OTP) derating selection at the beginning of start-up and provide auxiliary voltage sense for primary regulation during normal operation.
3	ASU	Output	Control signal for active start-up device (BJT or depletion mode N-FET).
4	CS/PF	Analog Input	Multi-function pin. Used to configure PF selection at the beginning of start-up and provide primary current sense for cycle-by-cycle peak current control and limit during normal operation.
5	GND	GROUND	GROUND.
6	OUTPUT	Output	Base drive for BJT.

5.0 Absolute Maximum Ratings

Absolute maximum ratings are the parameter values or ranges which can cause permanent damage if exceeded.

Parameter	Symbol	Value	Units
DC supply voltage range (pin 1, I _{CC} = 20mA max)	V _{cc}	-0.3 to 18.0	V
Continuous DC supply current at V _{cc} pin (V _{cc} = 15V)	I _{cc}	20	mA
ASU output (pin 3)		-0.3 to 18.0	V
OUTPUT (pin 6)		-0.3 to 4.0	V
FB/OTP input (pin 2, I _{FB/OTP} ≤ 10mA)		-0.7 to 4.0	V
CS/PF input (pin 4)		-0.3 to 4.0	V
Maximum junction temperature	T _{JMAX}	150	°C
Operating junction temperature	T _{JOPT}	-40 to 150	°C
Storage temperature	T _{STG}	-65 to 150	°C
Lead temperature during IR reflow for ≤ 15 seconds	T _{LEAD}	260	°C
Thermal resistance junction-to-ambient	θ _{JA}	190	°C/W
ESD rating per JEDEC JESD22-A114		2,000	V
Latch-up test per JEDEC 78		±100	mA

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6.0 Physical Dimensions

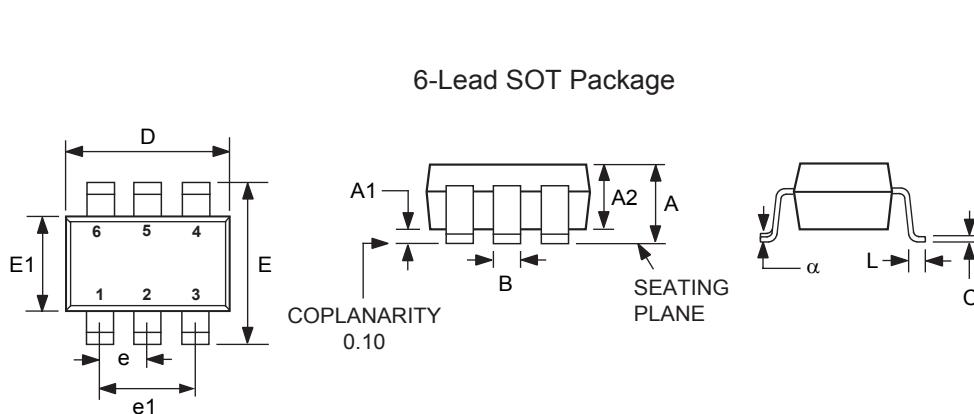
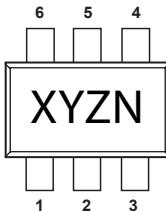


Figure 6.1 : Physical dimensions, 6-lead SOT-23 package

Symbol	Millimeters	
	MIN	MAX
A	-	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.30	0.50
C	0.08	0.22
D	2.90 BSC	
E	2.80 BSC	
E1	1.60 BSC	
e	0.95 BSC	
e1	1.90 BSC	
L	0.30	0.60
α	0°	8°

SOT23-6 devices are marked with a 4-digit code. Orientation of Pin 1 is shown below:



Compliant to JEDEC Standard MO-178AB

Controlling dimensions are in millimeters

This package is RoHS compliant and Halide free.

Soldering Temperature Resistance:

- [a] Package is IPC/JEDEC Std 020D Moisture Sensitivity Level 1
- [b] Package exceeds JEDEC Std No. 22-A111 for Solder Immersion Resistance; packages can withstand 10 s immersion < 270°C

Dimension D does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.25 mm per side.

The package top may be smaller than the package bottom. Dimensions D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs and interlead flash, but including any mismatch between top and bottom of the plastic body.

7.0 Ordering Information

Part Number	Options	Package	Description
iW3626-00	Maximum driver current = 40mA, wide V_{OUT} range	SOT-23	Tape & Reel ¹
iW3626-01	Maximum driver current = 40mA, narrow V_{OUT} range	SOT-23	Tape & Reel ¹
iW3626-02	Maximum driver current = 50mA, wide V_{OUT} range	SOT-23	Tape & Reel ¹

Notes:

1. Tape & Reel packing quantity is 2,500 per reel. Minimum ordering quantity is 2,500.

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