

iW1761 Product Brief

Ultra-Low No-Load Power Digital Quasi-Resonant PWM Controller



1.0 Features

- Ultra-low no-load power consumption with lowest system cost ($< 10\text{mW}$ at 230V_{AC} in typical $5\text{V}/2\text{A}$, 10W power supplies)
- Primary-side feedback eliminates opto-isolators and simplifies design
- Intelligent low power management achieves ultra-low operating current ($\sim 300\mu\text{A}$) at no-load
- Adaptive load transient detection and fast response
- Tight constant-voltage and constant-current regulation across line and load range
- Proprietary optimized 89kHz maximum constant frequency PWM switching with quasi-resonant operation achieves best size, efficiency and common mode noise
- User-configurable 5-level cable drop compensation provides design flexibility
- **EZ-EMI**® design enhances manufacturability
- Adaptive multi-mode PWM/PFM control improves efficiency
- No external loop compensation components required
- Built-in single-point fault protections against output short-circuit, output over-voltage, output over-current, and current-sense-resistor-short fault
- Dedicated pins for external over-temperature protection and over-voltage protection, with latch function available
- No audible noise over entire operating range

2.0 Description

The iW1761 is a high performance AC/DC power supply controller which uses digital control technology to build peak current mode PWM flyback power supplies. 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 iW1761 removes the need for secondary feedback circuit while achieving excellent line and load regulation. It also eliminates the need for loop compensation components while maintaining stability over all operating conditions. Pulse-by-pulse waveform analysis allows for a loop response that is much faster than traditional solutions, resulting in improved dynamic load response. 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 ensures that power supplies built with the iW1761 can achieve both highest average active efficiency and less than 10mW no-load power consumption in 10W output power range in a compact form factor.

3.0 Applications

- Compact AC/DC adapter/chargers for media tablets and smart phones
- AC/DC adapters for consumer electronics
- Optimized for universal input AC/DC adapters ($10 - 12\text{W}$)

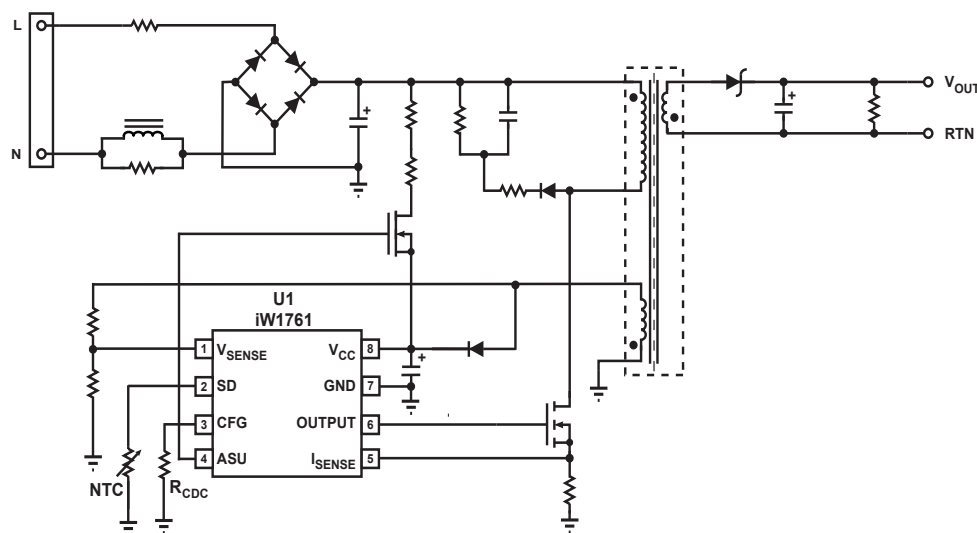


Figure 3.1: iW1761 Typical Application Circuit (Using Depletion Mode N-FET as Active Start-up Device)
(Achieving $< 10\text{mW}$ No-load Power Consumption in $5\text{V}/2\text{A}$, 10W Adapter Designs)

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4.0 Pinout Description

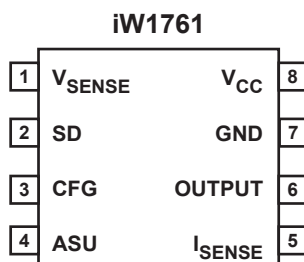


Figure 4.1: 8 Lead SO-8 Package

Pin #	Name	Type	Pin Description
1	V_{SENSE}	Analog Input	Auxiliary voltage sense (used for primary regulation).
2	SD	Analog Input	External shutdown control. Used for external over-temperature protection (OTP) by connecting an NTC resistor from this pin to Ground.
3	CFG	Analog Input	Used for external cable drop compensation (CDC) configuration and supplemental over-voltage protection (OVP).
4	ASU	Output	Control signal for active start-up device (BJT or depletion mode N-FET).
5	I_{SENSE}	Analog Input	Primary current sense. Used for cycle-by-cycle peak current control and limit.
6	OUTPUT	Output	Gate drive for external MOSFET switch.
7	GND	Ground	Ground.
8	V_{CC}	Power Input	Power supply for control logic.

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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 8, $I_{CC} = 20\text{mA max}$)	V_{CC}	-0.3 to 18.0	V
Continuous DC supply current at V_{CC} pin ($V_{CC} = 15\text{V}$)	I_{CC}	20	mA
ASU output (pin 4)		-0.3 to 18.0	V
OUTPUT (pin 6)		-0.3 to 18.0	V
V_{SENSE} input (pin 1, $I_{Vsense} \leq 10\text{mA}$)		-0.7 to 4.0	V
I_{SENSE} input (pin 5)		-0.3 to 4.0	V
SD (pin 2)		-0.3 to 4.0	V
CFG (pin 3, $I_{CFG} \leq 20\text{mA}$)		-0.8 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}	160	°C/W
ESD rating per JEDEC JESD22-A114		2,000	V
Latch-up test per JEDEC 78		± 100	mA

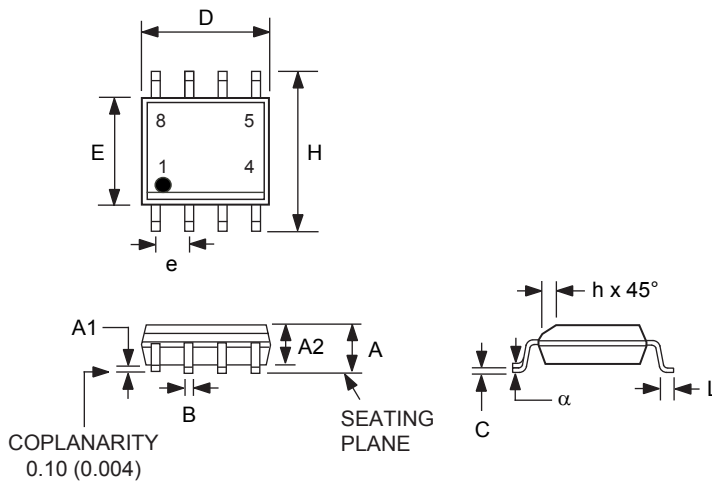
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6.0 Physical Dimensions

8-Lead Small Outline (SOIC) Package



Symbol	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.0040	0.010	0.10	0.25
A2	0.049	0.059	1.25	1.50
B	0.014	0.019	0.35	0.49
C	0.007	0.010	0.19	0.25
D	0.189	0.197	4.80	5.00
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	0.228	0.244	5.80	6.20
h	0.10	0.020	0.25	0.50
L	0.016	0.049	0.4	1.25
α	0°	8°		

Compliant to JEDEC Standard MS12F

Controlling dimensions are in inches; millimeter dimensions are for reference only

This product 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; package 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 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion. Interlead flash or protrusion 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, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.

7.0 Ordering Information

Part Number	Options	Package	Description
iW1761-00	No OVP/OTP latch	SOIC-8	Tape & Reel ¹
iW1761-01	OVP/OTP/latch	SOIC-8	Tape & Reel ¹

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

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