

## 18W AccuSwitch™ Quasi-Resonant PWM Controller with Integrated Power BJT for >5V Applications

### 1 Description

The iW1819 integrates a high performance AC/DC power supply controller using digital control technology and a power BJT switch in one package to enable compact peak current mode PWM flyback power supplies. The device operates in quasi-resonant mode and features multiple key protection features, allowing designs with improved efficiency and lower EMI, while lowering the bill of material cost.

The iW1819 features a distinctive soft-start scheme, which allows for fast and yet smooth start-up with both small and large capacitive loads. It removes the need for a secondary feedback circuit while achieving excellent line and load regulation. It also eliminates the need for loop compensation components while maintaining stability across all operating conditions. The pulse-by-pulse waveform analysis allows for fast dynamic load response. The built-in power limit function enables optimized transformer design for a wide input voltage range.

Dialog's innovative, proprietary technology ensures that power supplies built with the iW1819 can achieve both the highest average efficiency and less than 30mW no-load power consumption. And, the iW1819 can start-up into a wide range of capacitive loads at voltages greater than 5V, making it ideal for networking, set-top box and home appliance power supply applications. For 5V applications, please see the iW1820.

### 2 Features

- Optimized for 12V/1.5AAC/DC adapters with < 30mW no-load power consumption at 230V<sub>AC</sub> and fast dynamic response
- **AccuSwitch™** technology – integrated 800V bipolar junction transistor (BJT)
- Adaptively controlled soft-start enables fast and smooth start-up for a wide range of capacitive loads (from 330μF to 6,000μF)
- Very tight constant voltage and constant current regulation over entire operating range
- **PrimAccurate™** primary-side feedback eliminates optocoupler and simplifies design
- **EZ-EMI®** design enhances manufacturability
- Intrinsically low common mode noise
- Optimized 72kHz maximum PWM switching frequency achieves best size and efficiency
- Adaptive multi-mode PWM/PFM control improves efficiency
- Quasi-resonant operation for highest overall efficiency
- Dynamic base current control
- No external loop compensation components required
- Built-in single-point protections against output short-circuit, output low impedance, and output overvoltage
- Built-in over-temperature protection (OTP)
- No audible noise over entire operating range

### 3 Applications

- Network power adapters for ADSL, wireless access
- AC/DC adaptor for set top box
- AC/DC power supplies for home appliances and industrial applications

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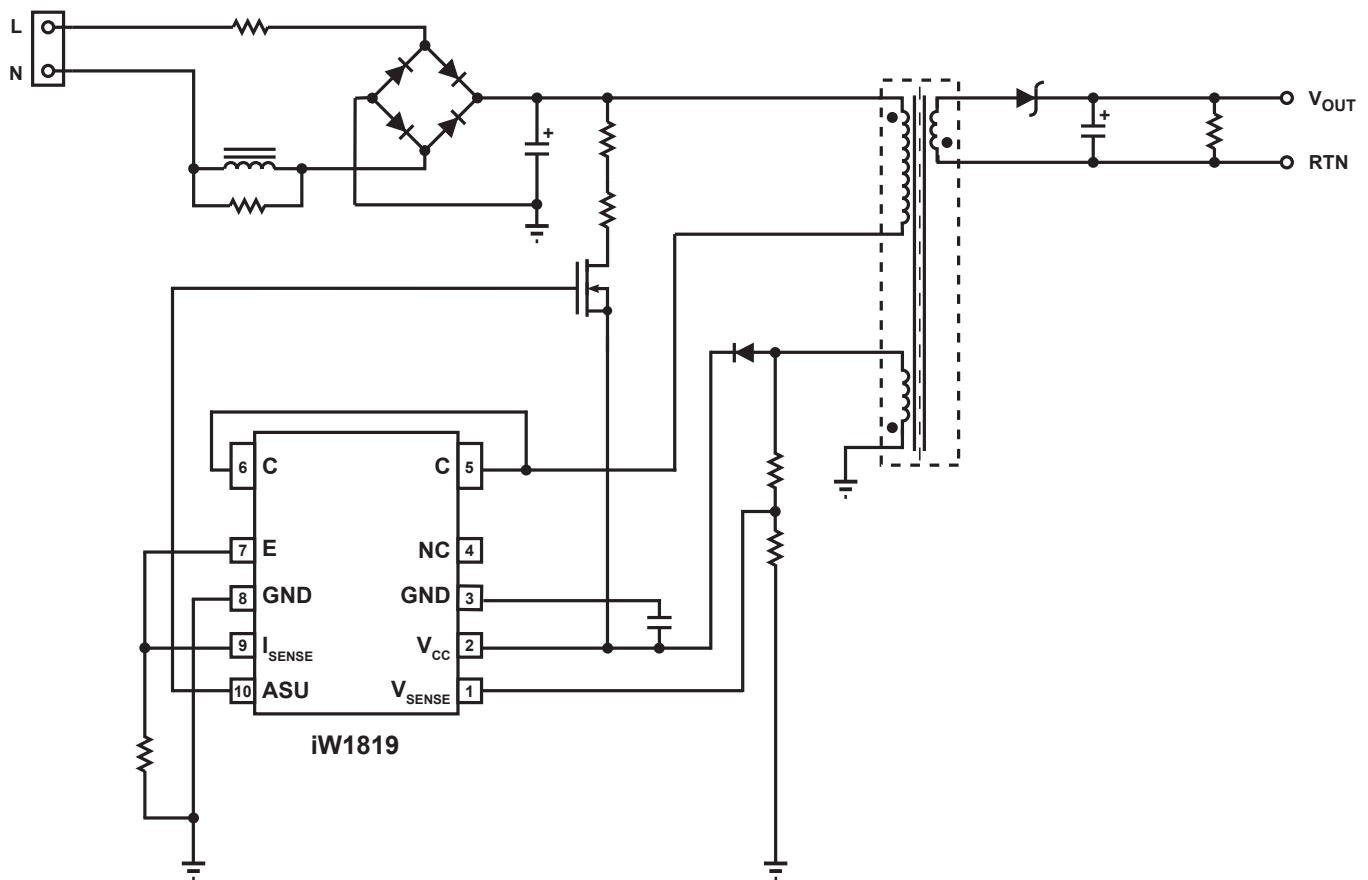


Figure 3.1 : iW1819 Typical Application Circuit

### WARNING:

The iW1819 is intended for high voltage AC/DC offline applications. Contact with live high voltage offline circuits or improper use of components may cause lethal or life threatening injuries or property damage. Only qualified professionals with safety training and proper precaution should operate with high voltage offline circuits.

### iW1819 Output Power Table at Universal Input (85V<sub>AC</sub>–264V<sub>AC</sub>)

Condition	Open Frame <sup>1</sup>
Output Power (W) <sup>2</sup>	18

### Notes:

- Note 1. Maximum practical continuous output power measured at open frame ambient temperature of 50°C while minimum bulk capacitor voltage is kept above 90V (test unit is placed in a non-ventilated environment).
- Note 2. The output power can vary depending on the power supply system designs and operating conditions.

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### 4 Pinout Description

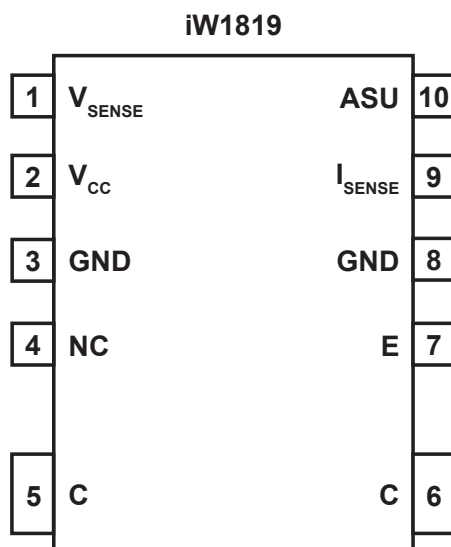


Figure 4.1 : 10-Lead SOIC Batwing Package

Pin Number	Pin Name	Type	Pin Description
1	$V_{SENSE}$	Analog Input	Auxiliary voltage sense (used for primary-side regulation).
2	$V_{CC}$	Power Input	Power supply for control logic.
3	GND	Ground	Ground.
4	NC		
5	C	BJT Collector	Collector of internal BJT.
6	C	BJT Collector	Collector of internal BJT.
7	E	BJT Emitter	Emitter of internal BJT.
8	GND	Ground	Ground.
9	$I_{SENSE}$	Analog Input	Primary current sense. Used for cycle-by-cycle peak current control and current limit.
10	ASU	Output	Control signal. Used for active start-up device.

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### 5 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 2, $I_{CC} = 20\text{mA max}$ )	$V_{CC}$	-0.3 to 25.0	V
Continuous DC supply current at $V_{CC}$ pin ( $V_{CC} = 15\text{V}$ )	$I_{CC}$	25	mA
ASU output (pin 10)		-0.3 to 19.0	V
$V_{SENSE}$ input (pin 1, $I_{VSENSE} \leq 10\text{mA}$ )		-0.7 to 4.0	V
$I_{SENSE}$ input (pin 9)		-0.3 to 4.0	V
Collector-Base breakdown voltage	$V_{CBO}$	800	V
Collector current (Note 1)	$I_C$	4	A
Collector peak current (Note 1) ( $t_p < 1\text{ms}$ )	$I_{CM}$	8	A
Maximum junction temperature	$T_{JMAX}$	150	°C
Operating junction temperature	$T_{JOPT}$	-40 to 150	°C
Storage temperature	$T_{STG}$	-55 to 150	°C
Electrostatic Discharge Capability (Human Body Model), JEDEC JS-001-2012	$ESD_{(HBM)}$	±2000	V
Electrostatic Discharge Capability (Charged Device Model), JESD22-C101	$ESD_{(CDM)}$	±1000	V
Latch-up test per JESD78D		±100	mA

#### Notes:

Note 1. Limited by maximum junction temperature.

### 6 Thermal Characteristics

Parameter	Symbol	Value	Units
Thermal Resistance Junction-to-Ambient <sup>1</sup>	$\theta_{JA}$	55.2	°C/W
Characterization Parameter Junction-to-Collector pin (pin 5 and pin 6) <sup>2</sup>	$\Psi_{J-COLLECTOR}$	5.8	°C/W
Thermal Shutdown Threshold <sup>3</sup>	$T_{SD}$	150	°C
Thermal Shutdown Recovery <sup>3</sup>	$T_{SD-R}$	120	°C

#### Notes:

Note 1. Device is mounted on a 4-layer JEDEC board with 100mm<sup>2</sup> of 70µm thick copper, in a one-cubic-foot natural convection chamber.

Note 2.  $\Psi_{J-COLLECTOR}$  [Psi Junction to Collector pin] provides an estimation of the die junction temperature relative to the Collector pin [internal BJT Collector] surface temperature.

Note 3. These parameters are typical and they are guaranteed by design.



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## Contacting Dialog Semiconductor

**United Kingdom (Headquarters)**  
*Dialog Semiconductor (UK) LTD*  
Phone: +44 1793 757700

**Germany**  
*Dialog Semiconductor GmbH*  
Phone: +49 7021 805-0

**The Netherlands**  
*Dialog Semiconductor B.V.*  
Phone: +31 73 640 8822

**Email**  
[info\\_pcbg@diasemi.com](mailto:info_pcbg@diasemi.com)

**North America**  
*Dialog Semiconductor Inc.*  
Phone: +1 408 845 8500

**Japan**  
*Dialog Semiconductor K. K.*  
Phone: +81 3 5769 5100

**Taiwan**  
*Dialog Semiconductor Taiwan*  
Phone: +886 281 786 222

**Web site:**  
[www.dialog-semiconductor.com](http://www.dialog-semiconductor.com)

**Hong Kong**  
*Dialog Semiconductor Hong Kong*  
Phone: +852 2607 4271

**Korea**  
*Dialog Semiconductor Korea*  
Phone: +82 2 3469 8200

**China (Shenzhen)**  
*Dialog Semiconductor China*  
Phone: +86 755 2981 3669

**China (Shanghai)**  
*Dialog Semiconductor China*  
Phone: +86 21 5424 9058

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

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