# iW1702

## Offline Digital Quasi-Resonant PWM Controller Optimized for 9V+ Applications with Option for Input OVP

### 1 Description

The iW1702 is a high performance, digital AC/DC power supply controller for high-power, peak current mode flyback converters. The device integrates a programmable light load mode of operation allowing the power supply designer to optimize for no-load power consumption and dynamic load response. It operates in quasi-resonant mode to provide high efficiency at heavy loads and minimizes the external component count while simplifying EMI design and lowering the total bill of material cost.

Dialog’s **PrimAccurate™** primary-side sensing technology allows the iW1702 to eliminate the need for secondary-side feedback while achieving excellent line and load regulation. This proprietary digital control technology also eliminates the need for loop compensation components while maintaining stability over all operations. 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.

Dialog’s innovative proprietary technology ensures that power supplies built with the iW1702 can achieve both the highest average active efficiency and less than 75mW no-load power consumption. Active start-up circuitry enables fast, yet smooth start-up into large capacitive loads at output voltages of 9V, 12V or higher, making it ideal for networking and monitor adaptor applications.

The iW1702 offers a full range of fault protection circuits including internal and external over-voltage protection (OVP). The external OVP feature can monitor either the input voltage or output voltage. The -0x/0xB and -3x/3xB options offer a supplemental output OVP, while the -1x/1xB options can monitor the input voltage, even during start-up, to protect from an over-voltage event on the input.

### 2 Features

- **iW1702-0x/0xB and iW1702-3x/3xB options:** external supplemental output over-voltage protection, optimized for 9V+ output voltages
- **iW1702-1x/1xB options:** external input over-voltage protection, supports 5V+ output voltages
- Adaptively controlled soft-start enables fast and smooth start-up into large capacitive loads (from 330μF to 6,000μF) at 9V+ output voltages
- Internal single-point fault protections against output short-circuit, output over-voltage and output over-current
- User-configurable light-load operation mode for optimized dynamic load response and no-load power consumption
- < 75mW no-load power consumption at 230V_{AC} with fast dynamic load response in typical 12V, 2A 24W compact adapter/charger
- **PrimAccurate™** Primary-side feedback eliminates optocouplers and simplifies design
- Proprietary optimized 79kHz maximum PWM switching frequency with quasi-resonant operation achieves best size, efficiency and common mode noise
- **EZ-EMI®** design enhances manufacturability
- Adaptive multi-mode PWM/PFM control improves efficiency
- User-configurable 5-level cable drop compensation provides design flexibility in iW1702-0x/0xB and iW1702-3x/3xB options
- Tight constant-voltage and constant current regulation across line and load range
- **SmartDefender™** smart hiccup technology helps to address issues of soft shorts in cables and connectors by effectively reducing the average output power at fault conditions without latch
- Optional on-chip internal over-temperature protection
- No audible noise over entire operating range
- Space-saving SOT-23 package

### 3 Applications

- Power adapters for network devices and monitors
- Universal AC/DC adapters (5 – 45W)
**Figure 3.1 :** iW1702 Typical Application Circuit
(Achieving < 75mW No-Load Power Consumption in 12V, 2A 24W Adapter Design).

**Figure 3.2 :** iW1702-1xB Typical Application Circuit with Input Over-Voltage Protection.
Figure 3.3 : iW1702-1xB Typical Application Circuit with Input Over-Voltage Protection Using Transformer Winding.

Figure 3.4 : iW1702 Typical Application Circuit with Supplement Output Over-Voltage Protection and iW676-32 Secondary Synchronous Rectifier Controller with Active Voltage Positioning.
## Pinout Description

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
<th>Type</th>
<th>Pin Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V\textsubscript{CC}</td>
<td>Power Input</td>
<td>IC power supply.</td>
</tr>
<tr>
<td>2</td>
<td>V\textsubscript{SENSE}</td>
<td>Analog Input</td>
<td>Auxiliary voltage sense. It is used for primary-side regulation and detection of secondary-side load transient signal.</td>
</tr>
<tr>
<td>3</td>
<td>CFG</td>
<td>Analog Input</td>
<td>In iW1702-0x/0xB and iW1702-3x/3xB options, it is used for external cable drop compensation (CDC) configuration and supplemental output over-voltage protection (OVP). In iW1702-1x/1xB options, it is dedicated to input OVP.</td>
</tr>
<tr>
<td>4</td>
<td>CS/FS</td>
<td>Analog Input</td>
<td>Primary-side current sense and minimum switching frequency configuration. It is used for cycle-by-cycle peak-current control and limit in primary-side CV/CC regulation. It is also used for minimum switching frequency configuration.</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
<td>Ground.</td>
</tr>
<tr>
<td>6</td>
<td>OUTPUT</td>
<td>Output</td>
<td>Gate drive for the external MOSFET switch.</td>
</tr>
</tbody>
</table>

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![Figure 4.1: 6-Lead SOT23 Package](image-url)
5 Absolute Maximum Ratings

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC supply voltage range (pin 1, I_{CC} = 20mA max)</td>
<td>V_{CC}</td>
<td>-0.3 to 25.0</td>
<td>V</td>
</tr>
<tr>
<td>Continuous DC supply current at V_{CC} pin (V_{CC} = 15V)</td>
<td>I_{CC}</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>OUTPUT (pin 6)</td>
<td></td>
<td>-0.3 to 20.0</td>
<td>V</td>
</tr>
<tr>
<td>V_{SENSE} input (pin 2, I_{VSENSE} ≤ 10mA)</td>
<td></td>
<td>-0.7 to 4.0</td>
<td>V</td>
</tr>
<tr>
<td>CS/FS input (pin 4)</td>
<td></td>
<td>-0.3 to 4.0</td>
<td>V</td>
</tr>
<tr>
<td>CFG (pin 3, I_{CFG} ≤ 20mA)</td>
<td></td>
<td>-0.8 to 4.0</td>
<td>V</td>
</tr>
<tr>
<td>Maximum junction temperature</td>
<td>T_{JMAX}</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Operating junction temperature</td>
<td>T_{JOPT}</td>
<td>-40 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>T_{STG}</td>
<td>-65 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction-to-ambient</td>
<td>θ_{JA}</td>
<td>208</td>
<td>°C/W</td>
</tr>
<tr>
<td>ESD rating per JEDEC JESD22-A114</td>
<td></td>
<td>±2,000</td>
<td>V</td>
</tr>
<tr>
<td>Latch-up test per JESD78A</td>
<td></td>
<td>±100</td>
<td>mA</td>
</tr>
</tbody>
</table>
## 7 Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Status</th>
<th>Options¹</th>
<th>CC Shutdown Voltage at 5V Output²</th>
<th>Latch Conditions</th>
<th>CDC</th>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW1702-00</td>
<td>Not recommend for new design</td>
<td>Output</td>
<td>No CC Operation</td>
<td>No Latch</td>
<td>Yes</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
<tr>
<td>iW1702-31</td>
<td>Not recommend for new design</td>
<td>Output</td>
<td>0.75V</td>
<td>No Latch</td>
<td>Yes</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
<tr>
<td>iW1702-10</td>
<td>Not recommend for new design</td>
<td>Input</td>
<td>4V</td>
<td>No Latch</td>
<td>No</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
<tr>
<td>iW1702-00B</td>
<td>Active</td>
<td>Output</td>
<td>No CC Operation</td>
<td>No Latch</td>
<td>Yes</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
<tr>
<td>iW1702-31B</td>
<td>Active</td>
<td>Output</td>
<td>0.75V</td>
<td>No Latch</td>
<td>Yes</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
<tr>
<td>iW1702-10B</td>
<td>Active</td>
<td>Input</td>
<td>4V</td>
<td>No Latch</td>
<td>No</td>
<td>SOT-23</td>
<td>Tape &amp; Reel³</td>
</tr>
</tbody>
</table>

Note 1: For availability of additional options, please contact Marketing.

Note 2: Please refer to section 9.5 for CC shutdown voltage at different nominal output voltages.

Note 3: Tape and reel packing quantity is 3,000/reel. Minimum ordering quantity is 3,000.
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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 73 649 8922

Email
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

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

Product Summary

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