AC/DC Secondary-Side Controller for Qualcomm® Quick Charge™ 2.0 USB Interface and Secondary-Primary Communication

1 Description

The iW626 is an AC/DC secondary-side controller for QC2.0 USB interface and secondary-primary communication. The device allows rapid charging of QC2.0-enabled PDs. The iW626 resides on the secondary side of an AC/DC power supply and allows the adapter to be configured for 5V, 9V, or 12V output depending on the voltage requested by QC2.0 enabled PD. It can be used in Dialog's primary-side controlled AC/DC systems to achieve fast voltage transition, low no-load power consumption and fast dynamic load response. The iW626 implements Dialog's proprietary secondary-to-primary digital communication technique. When paired with Dialog's primary-side controller iW1780, the iW626 eliminates the discrete decoders in the primary side and simplifies system designs. The iW626 uses one opto-coupler to transmit all necessary information for rapid charge, including output voltage requests, output current limits, output voltage undershoot and output over-voltage. It also has a built-in opto-coupler LED driver to minimize the bill of material cost.

Dialog's innovative proprietary technology ensures that power supplies designed with the iW626 and iW1780 can provide 5V/9V/12V output voltage configuration, with user-selected various output current limit combinations. Furthermore, the chipset can achieve <10mW no-load power consumption at 5V2A output setting and fast dynamic load response in typical AC/DC HVDCP adapter designs.

Qualcomm® Quick Charge™ 2.0 is a product of Qualcomm Technologies, Inc.

2 Features

- Supports Qualcomm® Quick Charge™ 2.0 (QC2.0) technology High Voltage Dedicated Charging Port (HVDCP) Class A with voltage configuration of 5V, 9V, and 12V

- Proprietary secondary-to-primary digital communication eliminates discrete decoders in the primary side and simplifies system designs

- Single opto-coupler transmits all information for rapid charge: output voltage requests, output current limits, output voltage undershoot, and over-voltage protection

- Backward compatible with USB Battery Charging Specification Revision 1.2 (USB BC1.2) Dedicated Charging Port (DCP)

- Programmable active fast discharge from 9V/12V to 5V at portable device (PD) unplug or from a high voltage level to a lower level upon request with built-in switch or external switch

- Normally OFF state with <120μA cut-off current during 5V steady-state operation to achieve <10mW power consumption at no load

- Wide operating voltage range from 3V to 25V

- Built-in opto-coupler LED driver with minimum driving current of 2mA

- 6-lead SOT-23 package

3 Applications

- Rapid-charging AC/DC adapters for smart phones, tablets, and other portable devices

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AC/DC Secondary-Side Controller for Qualcomm® Quick Charge™ 2.0 USB Interface and Secondary-Primary Communication
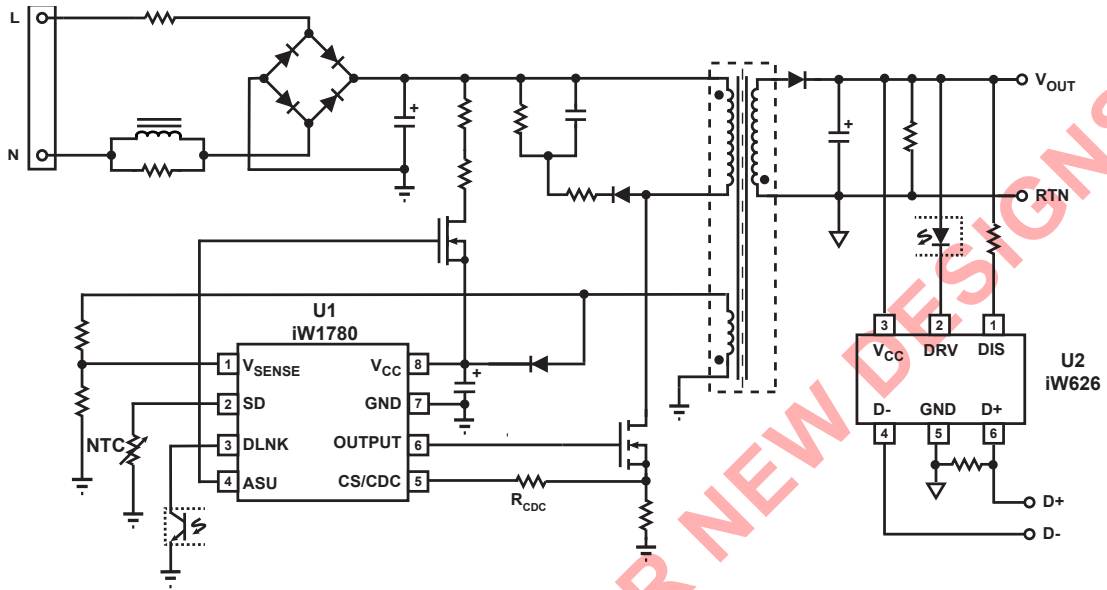

Figure 3.1 : iW626 Typical Application Circuit for Multi-Level Output Voltage and Current (Using iW1780 as Primary-Side Controller. Achieving <10mW No-Load Power Consumption)

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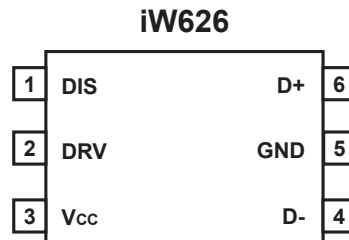
4 Pinout Description

iW626

```
      ┌─────────────────┐
 [1]  │ DIS          D+ │  [6]
      │                 │
 [2]  │ DRV         GND │  [5]
      │                 │
 [3]  │ Vcc          D- │  [4]
      └─────────────────┘
```

Figure 4.1 : 6-Pin SOT23 Package

Pin No.	Pin Name	Type	Pin Description
1	DIS	Analog Output	Discharging circuit and external FET drive. Used for fast discharging of output capacitor. Also can be used for driving external FET.
2	DRV	Analog Output	External circuit drive. Can be used for opto-coupler LED drive with automatic current limiting for transmitting signals to primary side.
3	V_{CC}	Power Supply	IC power supply.
4	D-	Analog Input	USB D- signal.
5	GND	Ground	Ground.
6	D+	Analog Input	USB D+ signal.

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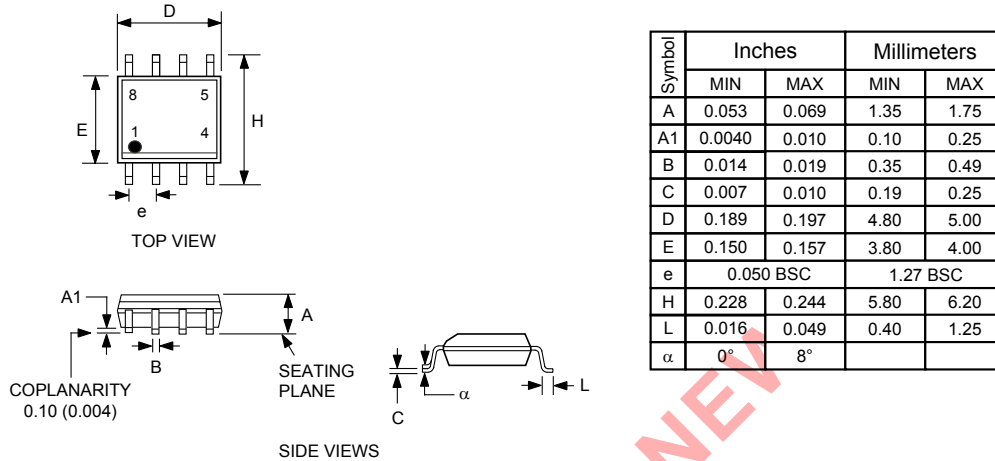
5 Absolute Maximum Ratings

Absolute maximum ratings are the parameter values or ranges which can cause permanent damage if exceeded. For maximum safe operating conditions, refer to Electrical Characteristics in Section 6.

Parameter	Symbol	Value	Units
DIS (pin 1) voltage	V_{DIS}	30	V
DRV (pin 2) voltage	V_{DRV}	30	V
Vcc (pin 3) voltage	V_{CC}	30	V
D- (pin 4) voltage	V_{D-}	-0.3 to 7	V
D+ (pin 6) voltage	V_{D+}	-0.3 to 7	V
Continuous DC current at DRV pin (V_{DRV}= 11V)	I_{DRV}	25	mA
Continuous DC supply current at V_{CC} pin (V_{CC}= 12V)	I_{VCC}	25	mA
Peak current at DIS pin (V_{DIS}= 12V)	I_{DIS}	600	mA
Maximum junction temperature	T_{JMAX}	150	°C
ESD rating per JEDEC JESD22-A114 (D+ and D- pins)		4,000	V
ESD rating per JEDEC JESD22-A114 (all other pins)		2,000	V

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6 Physical Dimensions

8-Lead Small Outline (SOIC) Package

TOP VIEW

SIDE VIEWS

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
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
L	0.016	0.049	0.40	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 < 260°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.

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7 Ordering Information

Part No.	Options	Package	Description
iW626-00	k=0.5/0.411/0.322 for CC limits for 5/9/12V configuration, 4.8V undershoot threshold for 5V, 11kΩ dynamic preload at 5V	SOT-23	Tape & Reel[1]
iW626-02	k=0.411 for CC limits for 5/9/12V configuration, 4.7V undershoot threshold for 5V, 11kΩ dynamic preload at 5V	SOT-23	Tape & Reel[1]
iW626-04	k=0.411 for CC limits for 5/9V configuration, k=0.322 for 12V, 4.7V undershoot threshold for 5V, 11kΩ dynamic preload at 5V	SOT-23	Tape & Reel[1]
iW626-06	k=0.5/0.322/0.231 for CC limits for 5/9/12V configuration, 4.7V undershoot threshold for 5V, 11kΩ dynamic preload at 5V	SOT-23	Tape & Reel[1]
iW626-20	k=0.5/0.411 for CC limits for 5V/9V configuration, 12V is disabled with V_{OUT} remaining unchanged upon 12V request, 4.8V undershoot threshold for 5V, 11kΩ dynamic preload at 5V. See Note 2.	SOT-23	Tape & Reel[1]
iW626-21	k=0.5/0.411 for CC limits for 5V/9V configuration, 12V is disabled with V_{OUT} remaining unchanged upon 12V request, 4.8V undershoot threshold for 5V, no dynamic preload. See Note 2.	SOT-23	Tape & Reel[1]
iW626-24	k=0.411 for CC limits for 5V/9V configuration, 12V is disabled with V_{OUT} remaining unchanged upon 12V request, 4.8V undershoot threshold for 5V, 11kΩ dynamic preload at 5V. See Note 2.	SOT-23	Tape & Reel[1]

Note 1: Tape and reel packing quantity is 3,000/reel. Minimum ordering quantity is 3,000.

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RoHS Compliance

Dialog Semiconductor's suppliers certify that its products are in compliance with the requirements of Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment. RoHS certificates from our suppliers are available on request.

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