
CH7530A DP++ to HDMI/DVI Level Shifter

FEATURES

- Compliant with DisplayPort Dual mode Specification version 1.1
- HDMI output is compliant with HDMI specification version 1.4b and DVI specification version 1.0
- HDMI output supports up to 300 MHz TMDS clock for video transport with resolution up to 4Kx2K@30Hz or 1920x1080@120Hz
- IIC-over-AUX transaction supported
- DDC buffer and related control register integrated
- HDMI Identifier supported
- Single 3.3V power supply
- 5V HDMI power supply output supported with over 50mA current output capability
- Programmable equalizer
- Programmable Pre-Emphasis on output driver supported
- CEC isolation switch supported
- Power saving mode supported
- Low power architecture
- Anti-Back Drive design on sink-side pins
- RoHS compliant and Halogen free package
- HBM 8KV (DP ++ main link pairs pass 5KV)
- Crystal free
- Offered in 40-Pin QFN Package (5 x 5 mm)

GENERAL DESCRIPTIONS

Chrontel's CH7530A is a low-cost, low-power semi-conductor device that translates the DisplayPort dual mode signal to HDMI/DVI signal. This innovative device, which integrates programmable equalizer, high speed TMDS level shifter and IIC to AUX translator, is specially designed to target the DP++ to HDMI/DVI adaptor device, docking station and PC market segments.

The CH7530A is compliant with the DisplayPort dual mode standard specification version 1.1. With sophisticated equalizer and high-speed TMDS level shifter integrated, the device's TMDS signal output is compliant with HDMI specification version 1.4b and DVI specification version 1.0, and supports video resolution up to 4Kx2K@30Hz or 1920x1080@120Hz for 3D applications.

The CH7530A also integrates the HDMI identifier, IIC over AUX translator and the related DDC control registers, which enables the programmable HDMI or DVI output and supports both DDC and AUX signaling on the upstream DisplayPort connector. With step-up regulator integrated, CH7530A supports 5V power supply output for HDMI/DVI configuration.

Application

- DP++ to HDMI/DVI type 2 Cable Adaptor
- Docking Station
- Notebook/Ultrabook/AIO

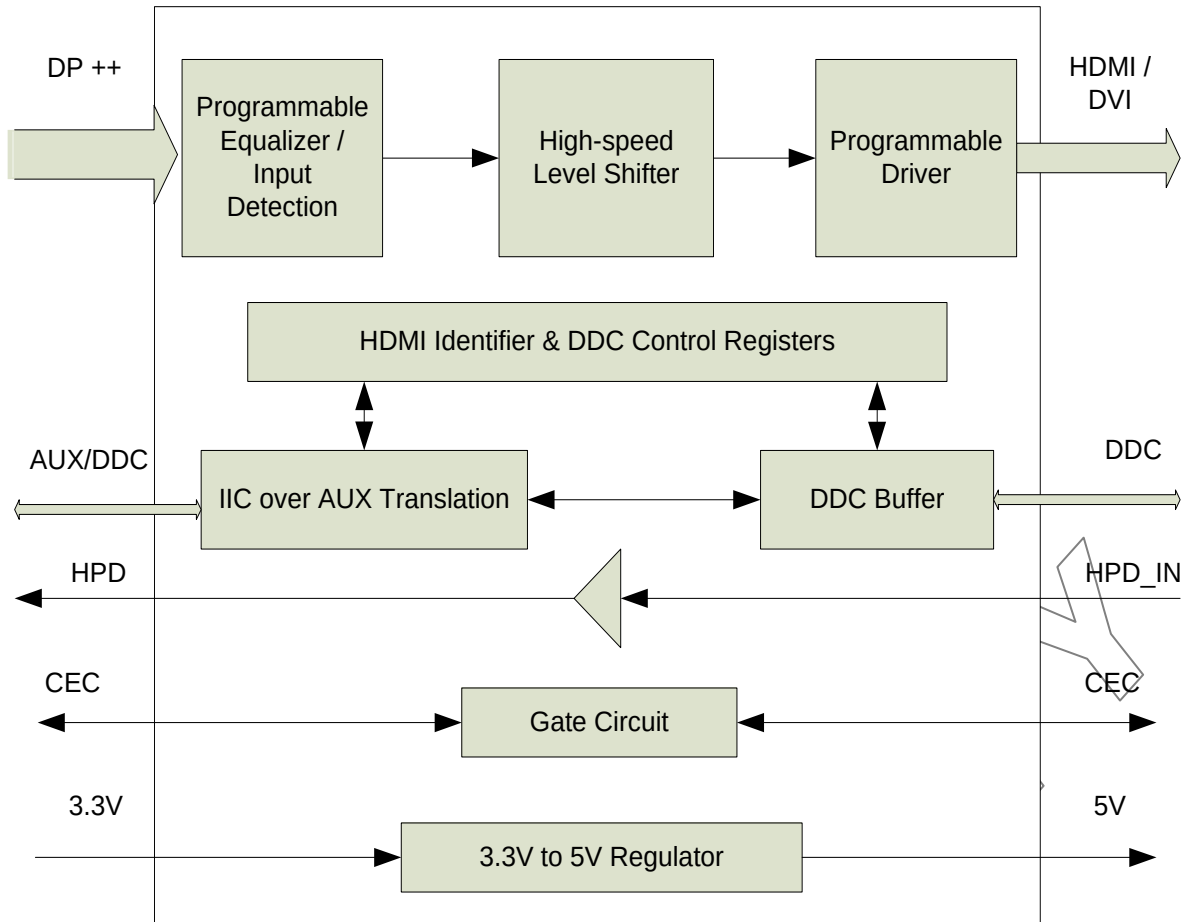


Figure 1: CH7530A Functional Block Diagram

1.0 PIN-OUT

1.1 Package Diagram

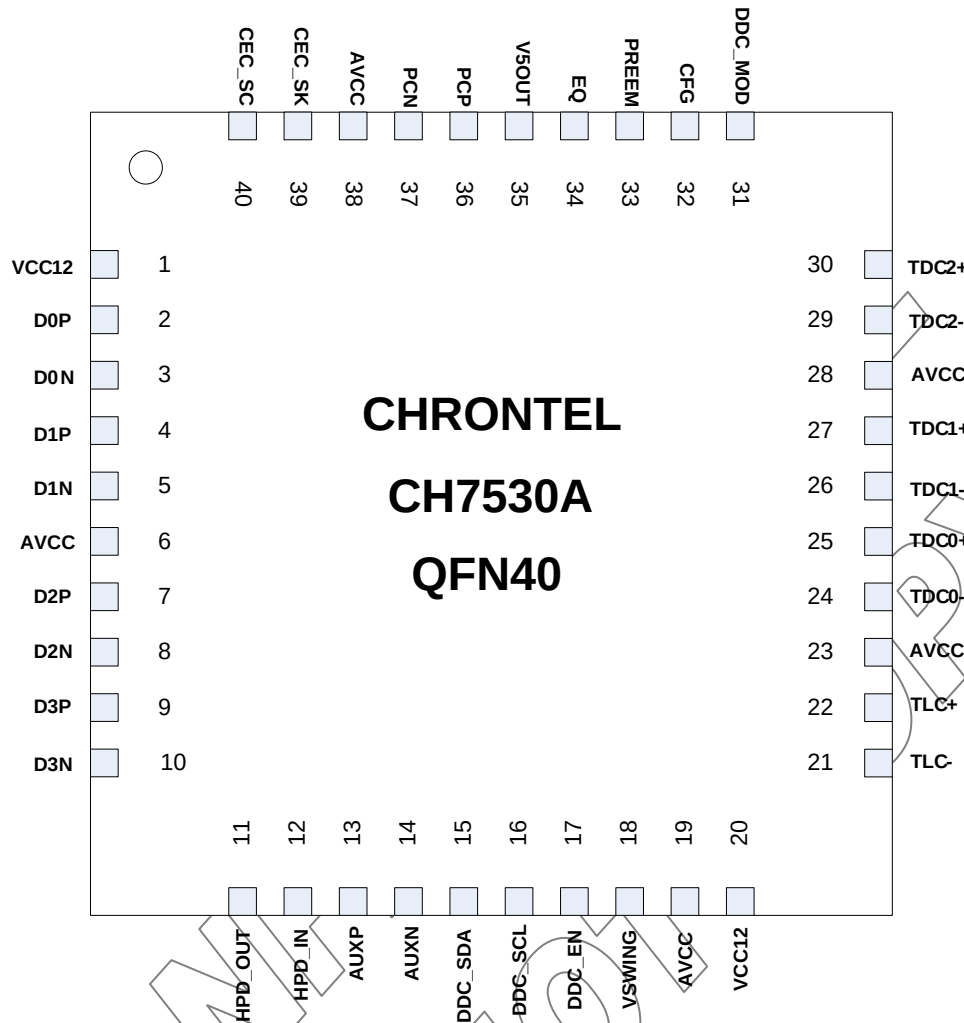


Figure 2: CH7530A 40-Pin QFN Pin Out

1.2 Pin Description

Table 1: CH7530A QFN 40-Pin Descriptions

Pin #	Type	Symbol	Description
2,3,4,5, 7,8,9,10	In	D[3:0]P/N	DP Dual Mode Main Link Differential Line Input These pins accept four AC-coupled differential pairs signals from the DisplayPort transmitter.
11	Out	HPD_OUT	DP Dual Mode Receiver Hot Plug Output
12	In	HPD_IN	HDMI/DVI Transmitter Hot Plug Input
13,14	In/Out	AUXP, AUXN	AUX Channel Differential Input/Output These two pins are DisplayPort AUX Channel control, which supports a half-duplex, bi-directional AC-coupled differential signal.
15	In/Out	DDC_SDA	Serial Port Data to HDMI/DVI Receiver The pin should be connected to data signal of HDMI DDC. This pin requires a pull-up 2 k Ω resistor to the desired voltage level
16	Out	DDC_SCL	Serial Port Clock Output to HDMI/DVI Receiver The pin should be connected to clock signal of HDMI DDC. This pin requires a pull-up 2 k Ω resistor to the desired voltage level
17	In	DDC_EN	Enables the DDC buffer and level shifter When DDC_EN = LOW, buffer/level shifter is disabled. When DDC_EN = HIGH, buffer and level shifter are enabled To prevent the back drive from sink via DDC channel. This pin requires a pull-up k Ω resistor to AVCC
18	Out	VSWING	HDMI/DVI Swing Control This pin sets the swing level of the HDMI/DVI outputs. A 11.5k Ω with 1% tolerance resistor should be connected between this pin and TGND using short and wide traces.
21,22	Out	TLC-,TLC+	HDMI/DVI Clock Outputs These pins provide the differential clock output for the HDMI/DVI .
24,25	Out	TDC0-,TDC0+	HDMI/DVI Data Channel 0 Outputs These pins provide the DVI differential outputs for data channel 0
26,27	Out	TDC1-,TDC1+	HDMI/DVI Data Channel 1 Outputs These pins provide the DVI differential outputs for data channel 1
29,30	Out	TDC2-,TDC2+	HDMI/DVI Data Channel 2 Outputs These pins provide the DVI differential outputs for data channel 2
31	In	DDC_MOD	DDC buffer selection This pin can be board-strapped to one of four decode values: short to AVCC, 22k Ω resistor to AVCC, open-circuit, 22k Ω resistor to AVSS ^[1]
32	In	CFG	HDMI/DVI selection HIGH for HDMI, LOW for DVI
33	In	PREEM	Pre-emphasis Setting This pin can be board-strapped to one of five decode values: short to AVSS, 22k Ω resistor to AVSS, open-circuit, 22k Ω resistor to AVCC, short to AVCC ^[2]
34	In	EQ	Programmable Equalizer Setting Equalizer setting. This pin can be board-strapped to one of five decode values: short to AVSS, 22k Ω resistor to AVSS, open-circuit, 22k Ω resistor to AVCC, short to AVCC ^[3]
35	Out	V5OUT	5V Power Supply Output 5V regulated output from the integrated voltage regulator
36	In	PCP	Positive terminal for the Power regulator external capacitor
37	In	PCN	Negative terminal for the Power regulator external capacitor
39	In/Out	CEC_SK	CEC Pin to HDMI Sink

40	In/Out	CEC_SC	CEC Pin to DP dual mode Source
1,20	Power	VCC12	Analog Power Supply (1.2V) with internal LDO
6,19,23, 28,38	Power	AVCC	Analog Power Supply (3.3V)
Thermal Pad	Power	AVSS	Analog Ground

Notes:

1. This pin provides DDC buffer configuration, the details are as follow:

Table 2: Pin DDC_MOD Configuration

Options	Short to AVCC	22k to AVCC	OPEN CIRCUIT	22k or short to AVSS
DDC buffer	Active buffer	Passive buffer	Active buffer	Passive buffer
PD_LDO	0	0	1	1

2. Table 3: Driver settings

Options	Short to AVCC	22k to AVCC	OPEN CIRCUIT	22k to AVSS	Short to AVSS
Driver Settings	0dB	3dB	5dB	7dB	10dB

3. Table 4: Equalizer settings

Options	Short to AVCC	22k to AVCC	OPEN CIRCUIT	22k to AVSS	Short to AVSS
EQ Settings	1dB	4dB	7dB	10dB	13dB

2.0 PACKAGE DIMENSIONS

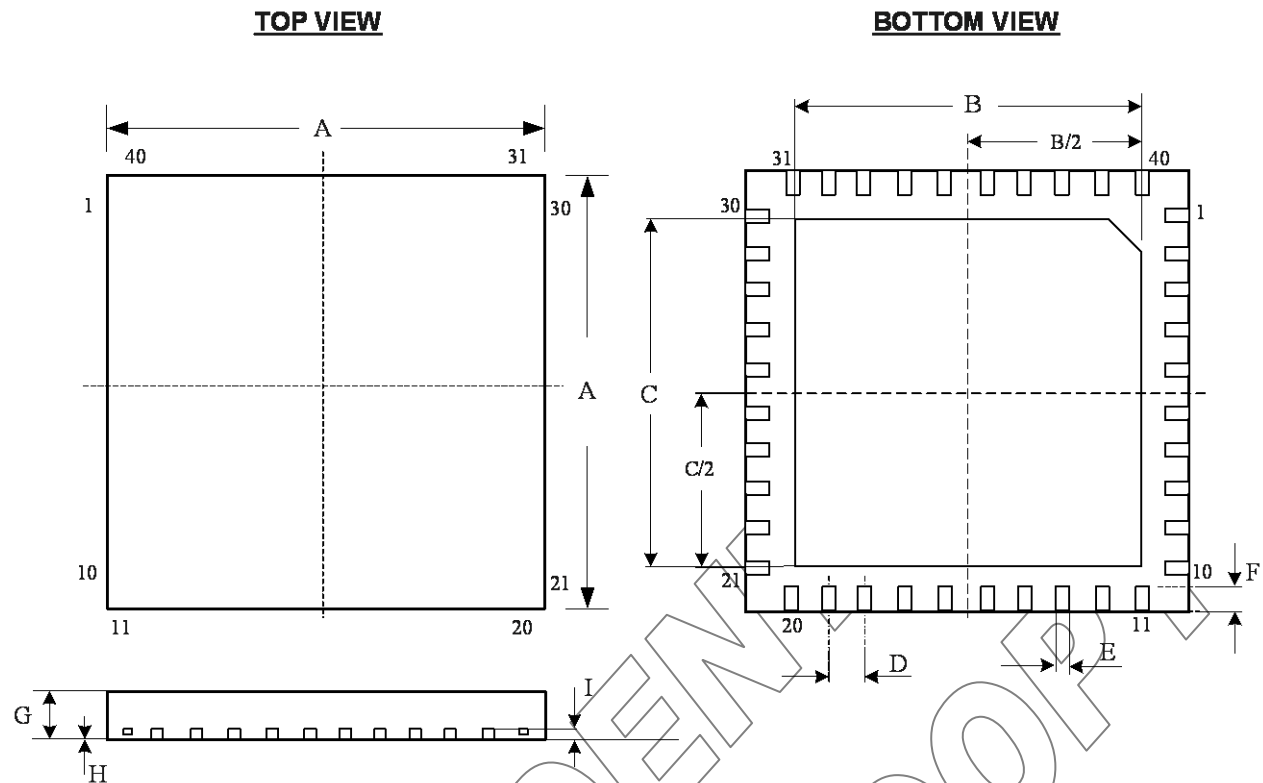


Table 5: Table of Dimensions

No. of Leads		SYMBOL								
40 (5 X 5 mm)		A	B	C	D	E	F	G	H	I
Milli-meters	MIN	4.90	3.20	3.20	0.4	0.15	0.35	0.70	0	0.203
	MAX	5.10	3.40	3.40		0.25	0.45	0.80	0.05	REF

Notes:

1. Conforms to JEDEC standard JESD-30 MO-220.

3.0 REVISION HISTORY

Rev. #	Date	Section	Description
0.1	02/18/2014	All	Initial Draft for CH7530A RevA
0.2	10/28/2014	Feature List 1.1, 1.2 2.0	Update the feature list Update the pin out and the description information Update the package dimensions
0.3	03/18/2015	1.2	Update the pin out description
0.4	03/30/2016	Feature List	Update the feature list
0.5	08/18/2016	1.2	Update the description of Vswing
0.6	08/23/2016	Feature 1.2	Update the feature list Update the description of Vswing, DDC_MOD, PREEM and EQ
1.0	07/18/2017	2.0	Update the package dimensions

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ORDERING INFORMATION			
Part Number	Package Type	Operating Temperature Range	Minimum Order Quantity
CH7530A-BF	40 QFN, Lead-free	Commercial : 0 to 70°C	490/Tray

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