
CH7110 and CH7113 HDMI 2.0 Re-Timer

FEATURES

- Compliant with HDMI specification version 2.0 and version 1.4
- Support up to 600 MHz TMDS clock for video transport with resolution up to 4Kx2K@60Hz
- Dedicated 6Gbps clock and data recovery module (CDR) integrated
- Adaptive equalizer to compensate for Cable, PCB and/or connector losses, and support up to 16.5 dB boost
- Configurable Pre-Emphasis on output driver support
- AC-coupled and DC-coupled input support
- 3.3V and 1.2V power supply
- Input TMDS/HPD signal detection support and automatic power down management
- Bandgap resistor free
- Active DDC buffer
- MCU embedded to handle the control logic
- Support device boot up by automatically loading firmware from embedded ROM
- IIC slave interface and HDMI DDC interface are available for debug and firmware update
- Low power architecture
- RoHS compliant and Halogen free package
- HBM 6KV ESD performance
- Offered in 40-Pin QFN package (5 x 5mm) and 48-Pin QFN package (6 x 6 mm)

APPLICATION

- HDMI 2.0 Source Devices
- HDMI 2.0 Sink Devices
- HDMI 2.0 Repeater

GENERAL DESCRIPTION

Chrontel's CH7110 and CH7113 are innovative, low-power, high performance semiconductor devices that re-timing and improve the input TMDS signal to match the HDMI 2.0 specification. These devices integrate programmable equalizer, 6Gbps TMDS Clock and Data Recovery (CDR), accurate internal oscillator, high performance PLL and configurable Pre-Emphasis module, are specially designed to target the HDMI 2.0 retimer/repeater market segments.

A sophisticated active DDC buffer is also employed by CH7110 and CH7113, to achieve the losses compensation of HDMI DDC channel and improve the stability and robust of the DDC communication

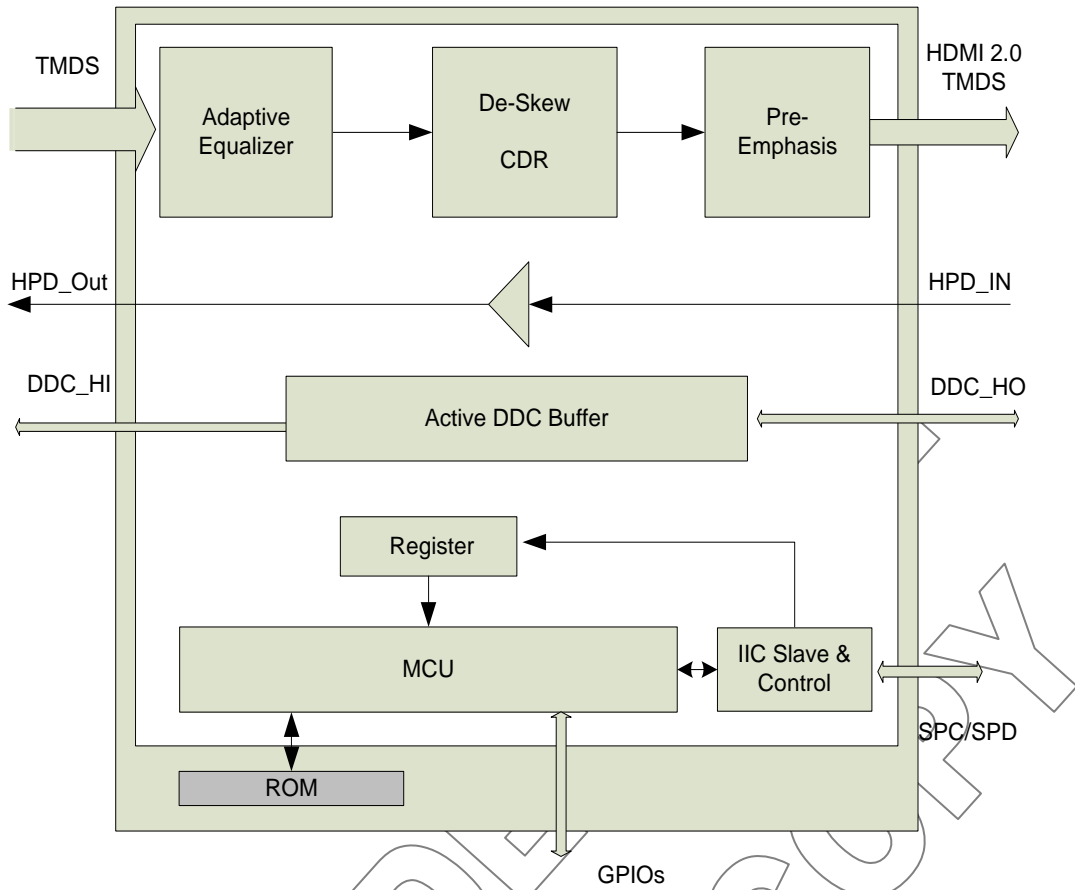


Figure 1: CH7110 and CH7113 Functional Block Diagram

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1.0 PIN-OUT

1.1 Package Diagram

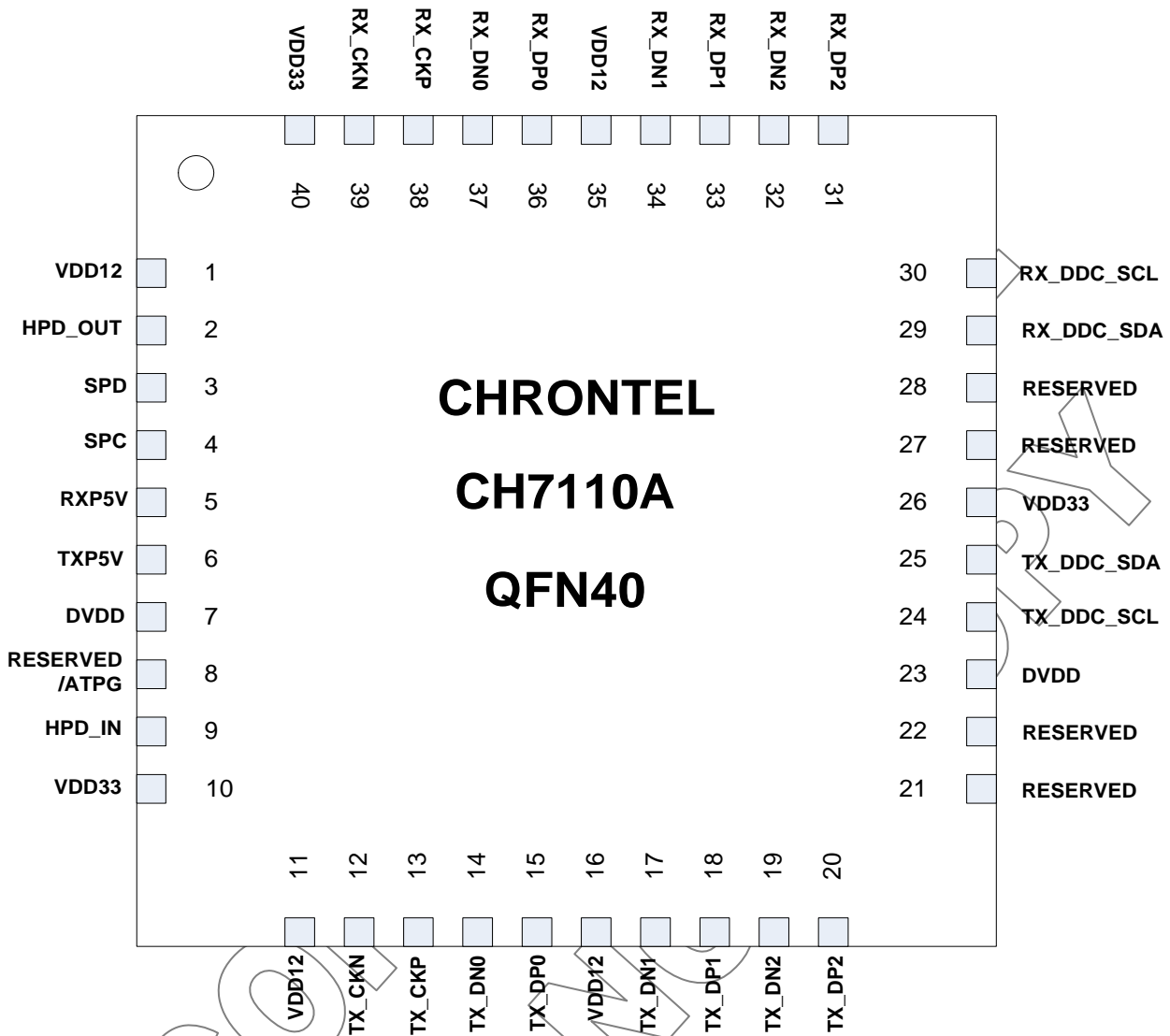


Figure 2: 40-Pin QFN Pin Out

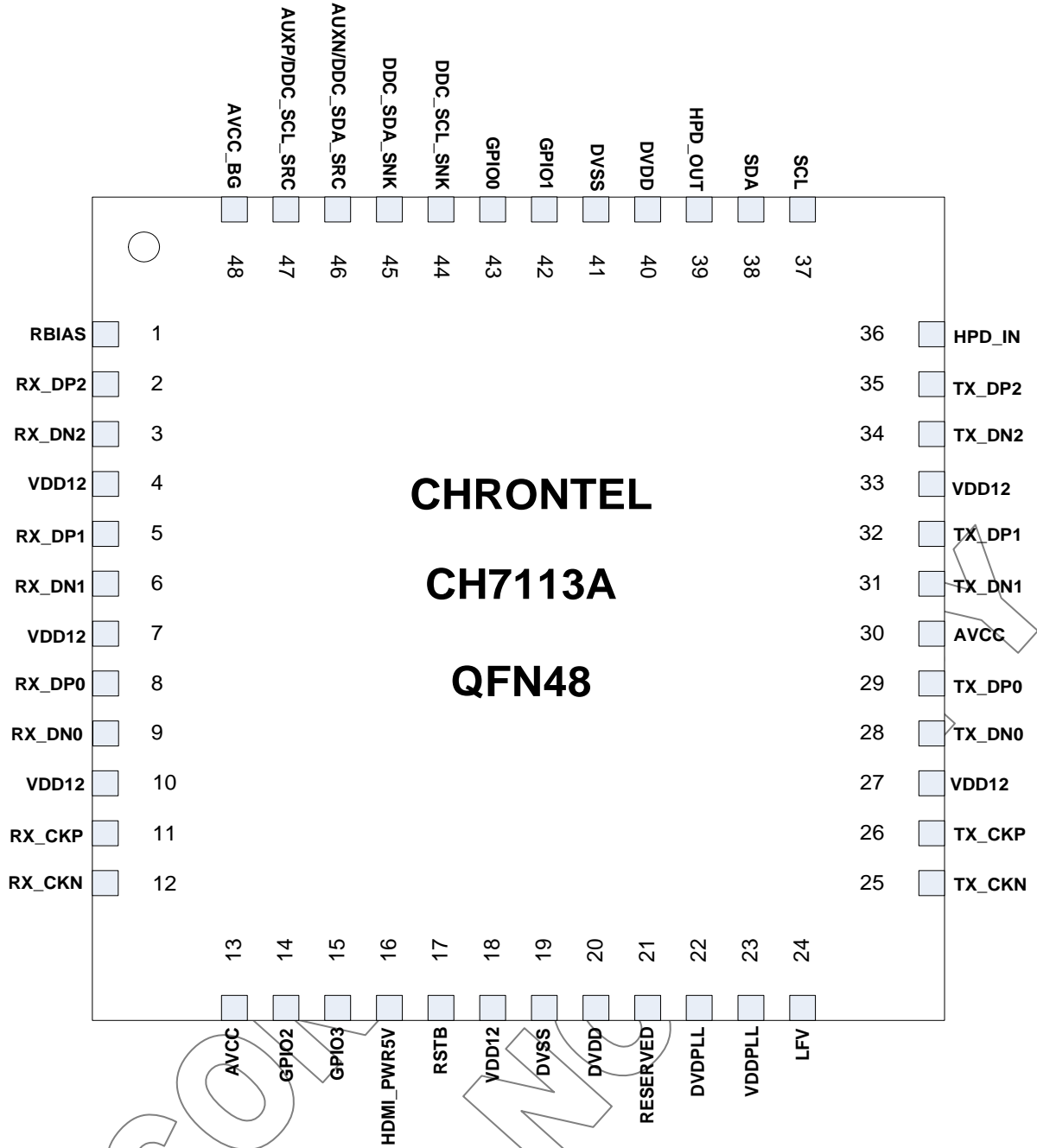


Figure 3: 48-Pin QFN Pin Out

1.2 Pin Description

Table 1: 40 Pin Name Descriptions

Pin #	Type	Symbol	Description
2	Out	HPD_OUT	HDMI Hot Plug Output
3	In/out	SPD	Serial Port Data Input / Output This pin functions as the bi-directional data pin of the serial port. External pull-up 6.8 KΩ resistor is required
4	In	SPC	Serial Port Clock Input This pin functions as the clock pin of the serial port. External pull-up 6.8 KΩ resistor is required
5	In	RXP5V	Power 5V Input from HDMI Source
6	Out	TXP5V	Power 5V Out to HDMI Sink
7	In	HPD_IN	HDMI Hot Plug Input
8,21,22,27,28		RESERVED	Reserved Pins
12~15, 17~20	Out	TXCKN/P TX_DN/P[2:0]	HDMI Output Port These pins provide the differential signal output for the HDMI/DVI .
7	Out	TX_DDC_SCL	Serial Port Clock Output to HDMI/DVI Sink The pin should be connected to clock signal of HDMI DDC. This pin requires a pull-up 1.8 kΩ resistor to the desired voltage level
8	In/Out	TX_DDC_SDA	Serial Port Data to HDMI/DVI Sink The pin should be connected to data signal of HDMI DDC. This pin requires a pull-up 1.8 kΩ resistor to the desired voltage level
29,30	In/Out	RX_DDC_SCL RX_DDC_SDA	Serial Port input from HDMI Source The pin should be connected to HDMI DDC from HDMI source
31~34, 36~39	In	RX_CKN/P RX_DN/P[2:0]	HDMI Input Port These pins accept differential pairs signals from the HDMI / DisplayPort / Dual Mode transmitter.
1,11,16,35	Power	VDD12	1.2V Power Supply
7	Power	DVDD	Power Supply (1.2V)
10,26,40	Power	VDD33	3.3V Power Supply
Thermal Pad	Power	GND	Analog Ground

Table 2: 48 Pin Name Descriptions

Pin #	Type	Symbol	Description
1	Input	RBIAS	External Reference Current Set This pin sets the external reference current. A 1 kΩ with 1% tolerance resistor should be connected between this pin and ground using short and wide traces
2,3,5,6,8,9,11,12	In	RX_CKN/P, RX_DN/P[2:0]	HDMI Input / DP Dual Mode Main Link Inputs These pins accept differential pairs signals from the HDMI / DisplayPort Dual Mode transmitter.
14,15,42,43	In/Out	GPIO[3:0]	General Purpose Input and Output Pins
17	In	RSTB	Chip Reset Input
21		RESERVED	Reserved Pin
24	In	LFV	External Capacitor One 1uf capacitor should be connected between this pin and the ground
25,26,28,29,31,32,34,35	Out	TX_CKP/N, TX_DP/N[2:0]	TMDS/FRL Outputs
36	In	HPD_IN	HDMI Transmitter Hot Plug Input
37	In/out	SDA	Serial Port Data Input / Output This pin functions as the bi-directional data pin of the serial port. External pull-up 6.8 KΩ resistor is required
38	In	SCL	Serial Port Clock Input This pin functions as the clock pin of the serial port. External pull-up 6.8 KΩ resistor is required
39	Out	HPD_OUT	HDMI / DP Dual Mode Receiver Hot Plug Output
44,45	In/Out	DDC_SCL_OUT DDC_SDA_OUT	Serial Port Data to HDMI Receiver The pin should be connected to data signal of HDMI DDC. This pin requires a pull-up 1.8 kΩ resistor to the desired voltage level
46,47	In/Out	AUXP/DDC_SCL_IN AUXN/DDC_SDA_IN	AUX Channel / Serial Port Input The pin should be connected to HDMI DDC or DisplayPort AUX Channel control
4,7,10,15,18,20,22,23,27,33,40	Power	VDDI2, DVDD, VDDPLL, DVDP LL	1.2V Power Supply
13,30,48	Power	AVCC, AVCC_B G	Analog Power Supply (3.3V)
19,41, Thermal Pad	Power	DVSS	Ground

2.0 PACKAGE DIMENSION

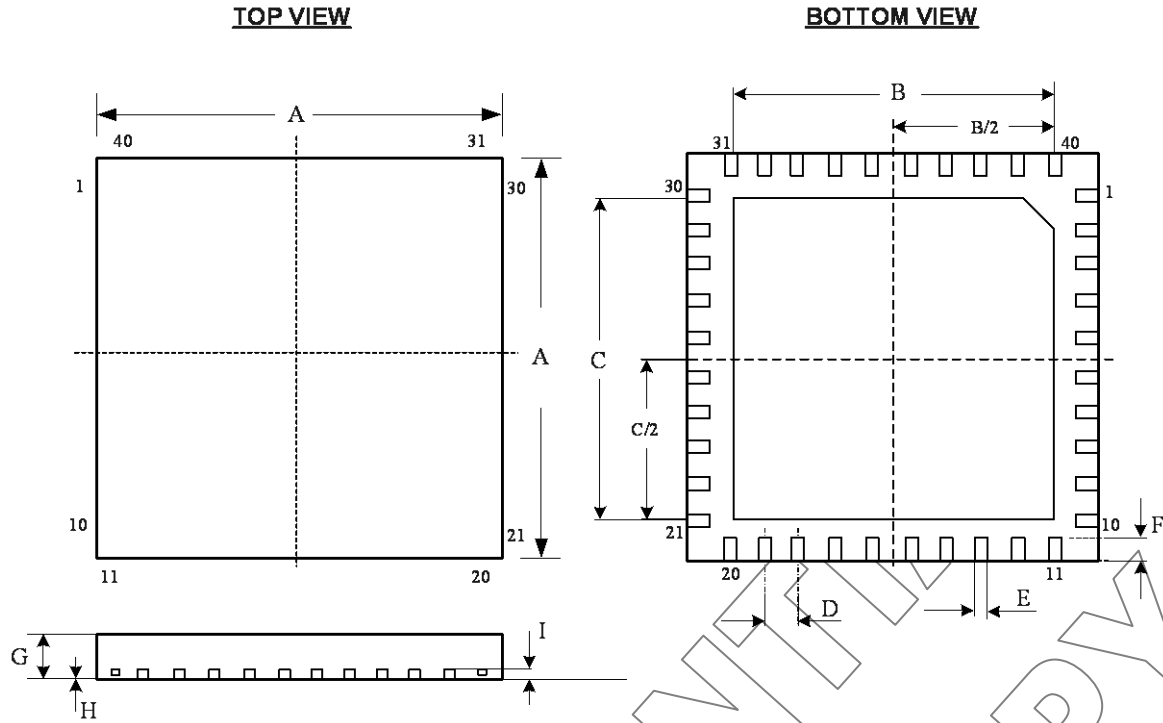


Figure 4: 40 Pin VQFN Package

Table 3: 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	0.8	0	0.203
	MAX	5.10	3.40	3.40		0.25	0.45	1.0	0.05	REF

Notes:

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

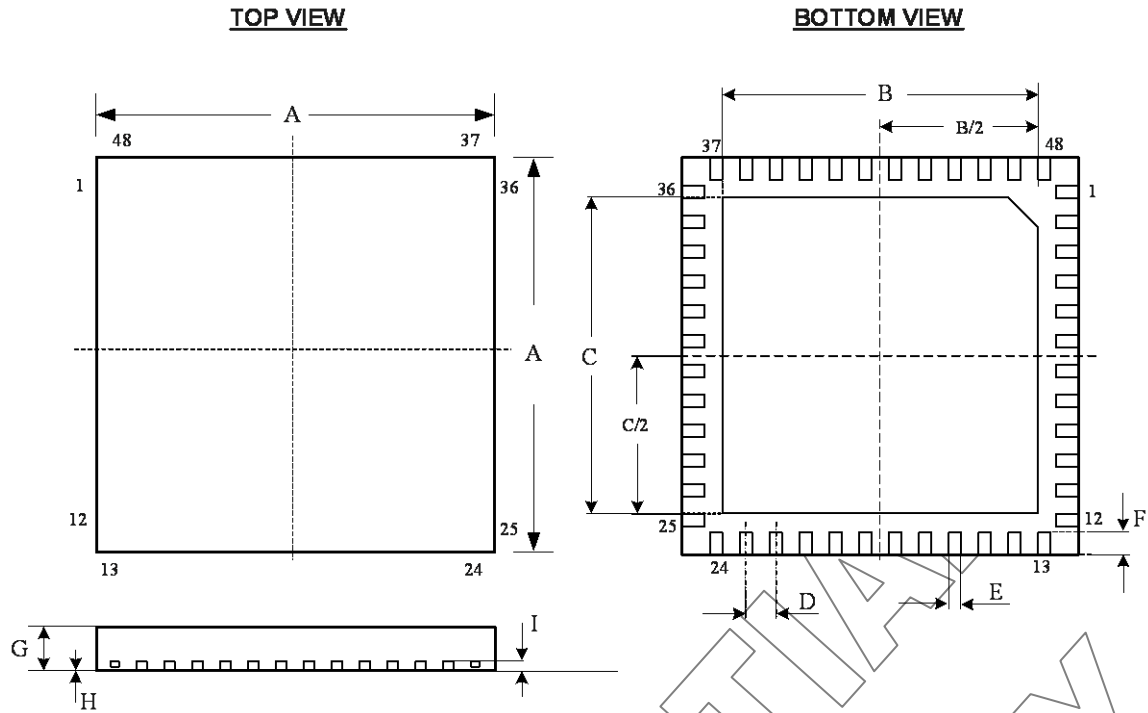


Figure 5: 48 Pin QFN Package

Table of Dimensions

No. of Leads		SYMBOL								
48 (6 X 6 mm)		A	B	C	D	E	F	G	H	I
Milli-meters	MIN	5.90	4.35	4.35	0.4	0.13	0.30	0.70	0	0.20
	NOM	6.00	4.50	4.50		0.19	0.40	0.75	-	-
	MAX	6.10	4.65	4.65		0.25	0.50	0.80	0.05	0.203

Notes:

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

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ORDERING INFORMATION			
Part Number	Package Type	Operating Temperature Range	Minimum Order Quantity
CH7110A-BF	40 QFN, Lead-free	Commercial : 0 to 70°C	490/Tray
CH7110A-BFI	40 QFN, Lead-free	Industrial : -40 to 85°C	490/Tray
CH7113A-BF	48 QFN, Lead-free	Commercial : 0 to 70°C	490/Tray
CH7113A-BFI	48 QFN, Lead-free	Industrial : -40 to 85°C	490/Tray

Chrontel

www.chrontel.com

E-mail: sales@chrontel.com