

THCV233 / THCV234 Evaluation Kit



V-by-One®HS Single Link Evaluation Board

Parts Number: THEVA233-V3, THEVA234-V3

1. General Description

THEVA233-V3 and THEVA234-V3 boards are designed to evaluate THCV233 and THCV234 for transmission of Video data. The supply voltage range are "3.0V to 3.6V" or "5V". THCV233 and THCV234 are V-by-One®HS High-speed video data transmitter/receiver.

Table 1 Operation Mode and Spec

	Width	Link	LVDS Clock Freq. *1
THCV233	24bit	Si/So,	20MHz to 100MHz
		Si/Do	40MHz to 100MHz
	32bit	Si/So,	20MHz to 85MHz
		Si/Do	40MHz to 85MHz
THCV234	24bit	Si/So,	20MHz to 100MHz
		Di/So	40MHz to 100MHz
	32bit	Si/So,	20MHz to 85MHz
		Di/So	40MHz to 85MHz

*1 This is typical value, refer to the datasheet for detail.

Si/So:Single-in/Single-out, Si/Do:Single-in/Dual-out

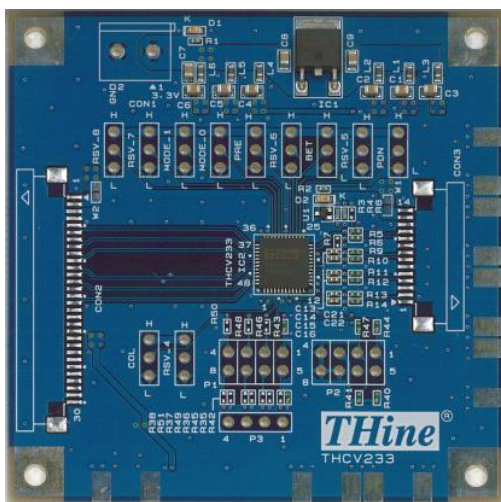
Si/DDo:Single-in/Distributed Dual-out

Di/So:Dual-in/Single-out, Di/SSo:Dual-in/Selected Single-out

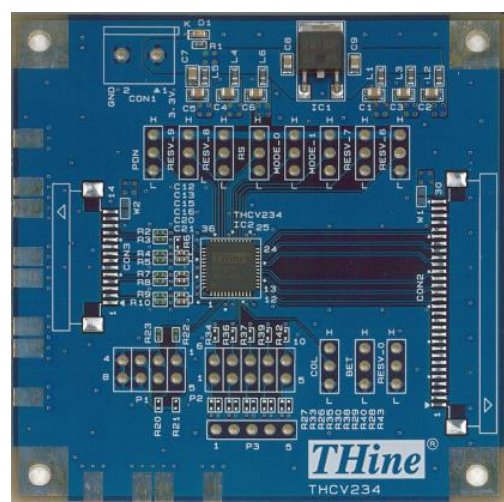
2. Features

- LVDS Input Internal Termination
- CORE 1.8v, LVDS 3.3v
- Package: 48 pin QFN
- EU RoHS Compliant
- High speed CML-Link
 - Data Width Selectable: 24/32 bit
 - Single/Dual Link Selectable
 - AC Coupling
 - Wide Frequency Range
 - CDR Requires no External Freq. Reference
 - Supports Spread Spectrum Clocking: Up to 30kHz/±0.5%(center spread)

3. Overview

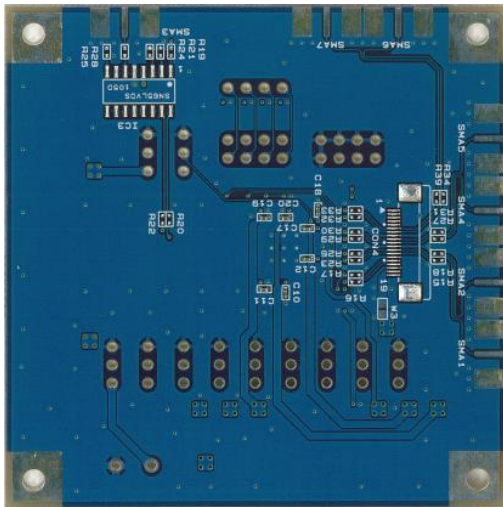


(a) THEVA233-V3 (Top Side)

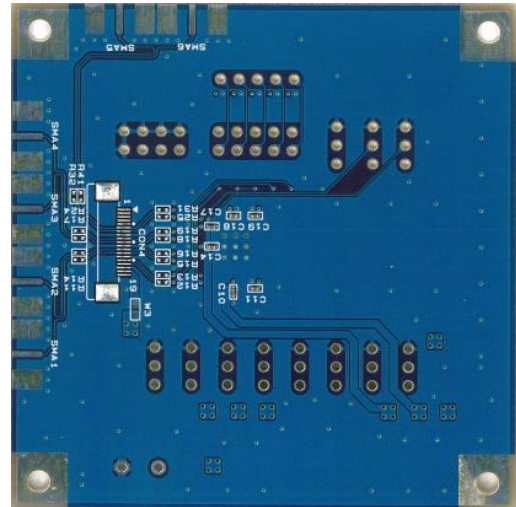


(b) THEVA234-V3 (Top Side)

Figure 1 THEVA233-V3 and THEVA234-V3 Top Side View



(a) THEVA233-V3 (Bottom Side)



(b) THEVA234-V3 (Bottom Side)

Figure 2 THEVA233-V3 and THEVA234-V3 Bottom Side View

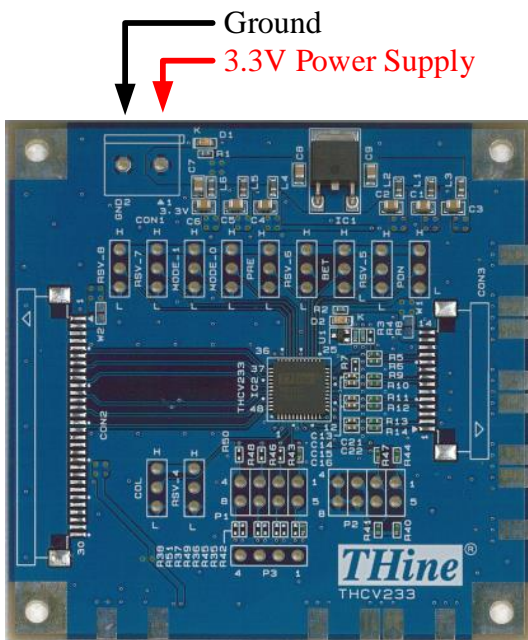
4. Power Supply Set Up

This chapter shows power supply condition.

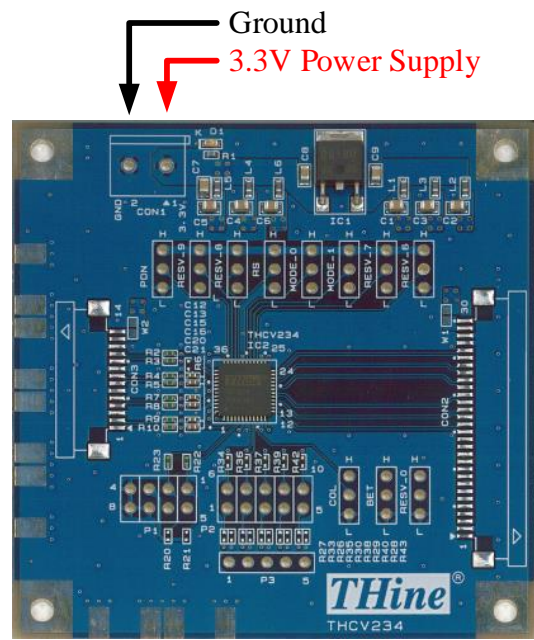
Caution: Check if there is no power-GND short on below red trace before supplying any power.

3.3V Power Supply to Each Board

Each evaluation board requires 3.3V power supply to “CON1” connector typically.



(a)THEVA233-V3



(b)THEVA234-V3

Figure 3 Power Supply for Evaluation Board

Power Supply from / to Connector

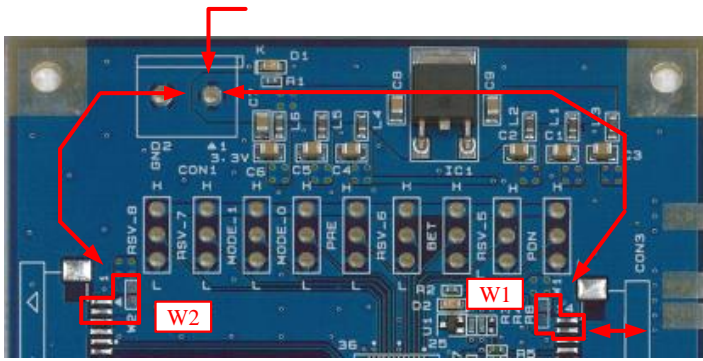
3.3V power supply can be connected to CON2, CON3 and CON4 by using W1, W2 and W3 solder jumper.

THEVA233-V3

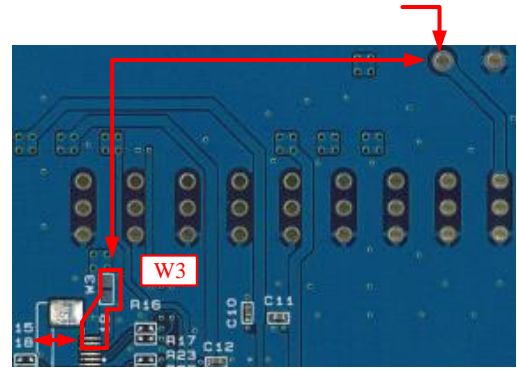
W1: Connect the 3.3V power supply with pin#13 and 14 of CON3.

W2: Connect the 3.3V power supply with pin#1 and 2 of CON2.

W3: Connect the 3.3V power supply with pin#18 and 19 of CON4.



(a)THEVA233-V3 (Top Side)



(b) THEVA233-V3 (Bottom Side)

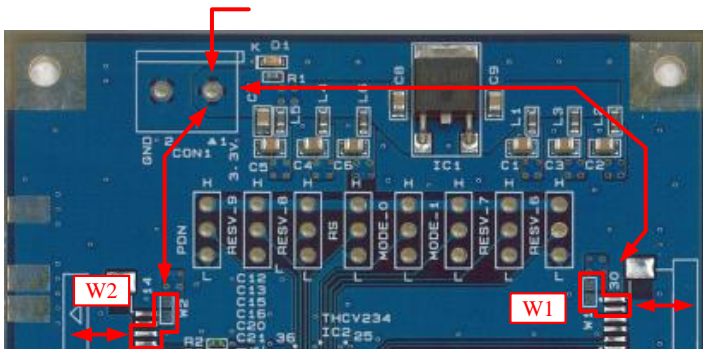
Figure 4 THEVA233-V3 Power Supply from / to Each Connector

THEVA234-V3

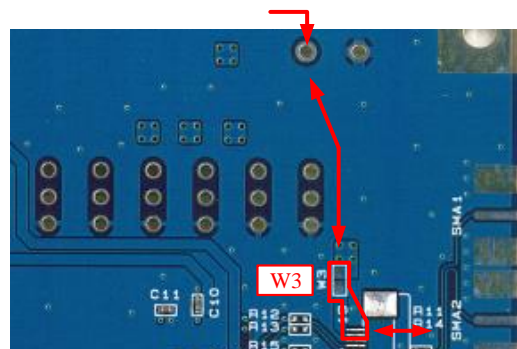
W1: Connect the 3.3V power supply with pin#13 and 14 of CON3.

W2: Connect the 3.3V power supply with pin#1 and 2 of CON2

W3: Connect the 3.3V power supply with pin#18 and 19 of CON4.



(a)THEVA234-V3 (Top Side)



(b) THEVA234-V3 (Bottom Side)

Figure 5 THEVA234-V3 Power Supply from / to Each Connector

5. V-by-One®HS Input / Output Connector Select

V-by-One®HS input / output connector can be selected by using 0ohm resistors.

(1) 1mm Pitch Connector (Default Setting)

Mount / Unmount following 0ohm resistors to use 1mm pitch connector.

	Mount	Unmount
THEVA233-V3	R5,R6,R9,R10,R11,R12	R16,R17,R23,R26,R29,R30,R32,R33
THEVA234-V3	R2,R3,R4,R5,R7,R8	R12,R13,R15,R16,R18,R19,R25,R31

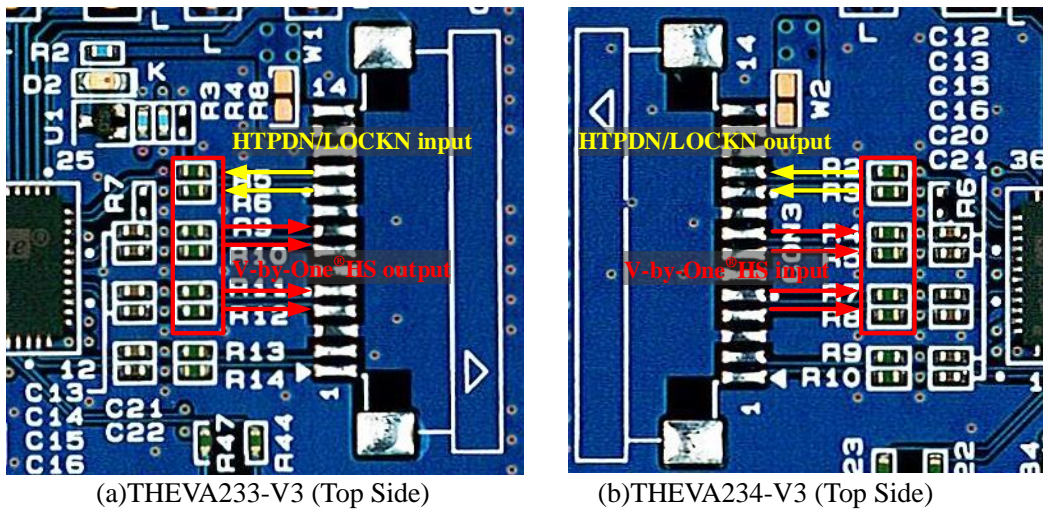


Figure 6 Resistors Mounting for 1mm Pitch Connector

(2) 0.5mm Pitch Connector

Mount / Unmount following 0ohm resistors to use 0.5mm pitch connector.

	Mount	Unmount
THEVA233-V3	R16,R17,R23,R26,R29,R30	R5,R6,R9,R10,R11,R12,R13,R14 R15,R18,R27,R31,R34,R39
THEVA234-V3	R12,R13,R15,R16,R18,R19	R2,R3,R4,R5,R7,R8,R9,R10 R11,R14,R17,R24,R32,R41

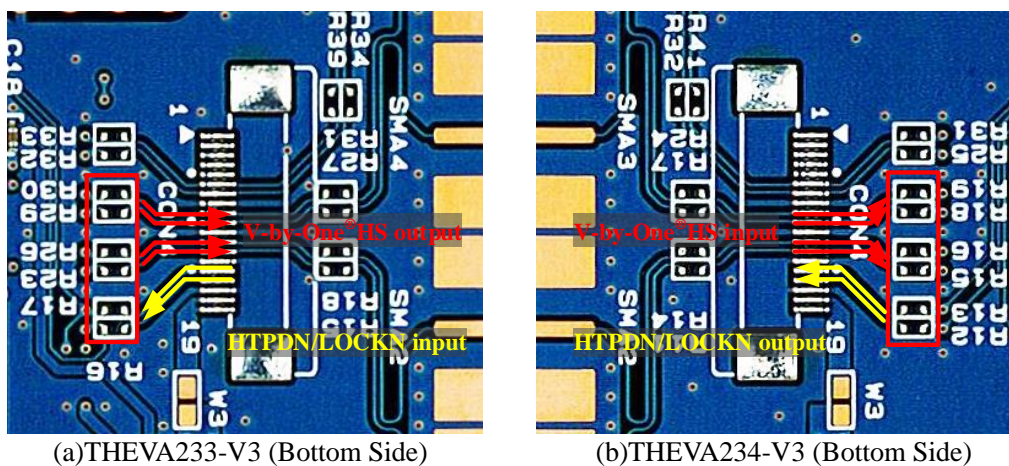


Figure 7 Resistors Mounting for 0.5mm Pitch Connector

(3) SMA connector

Mount / Unmount following 0ohm resistors to use SMA connector.

*HTPDN and LOCKN signals don't have SMA connector input / output connection.

	Mount	Unmount
THEVA233-V3	R23,R26,R29,R30,R32,R33 R15,R18,R27,R31,R34,R39	R9,R10,R11,R12,R13,R14
THEVA234-V3	R44, R46, R47, R48	R12, R15, R20, R23

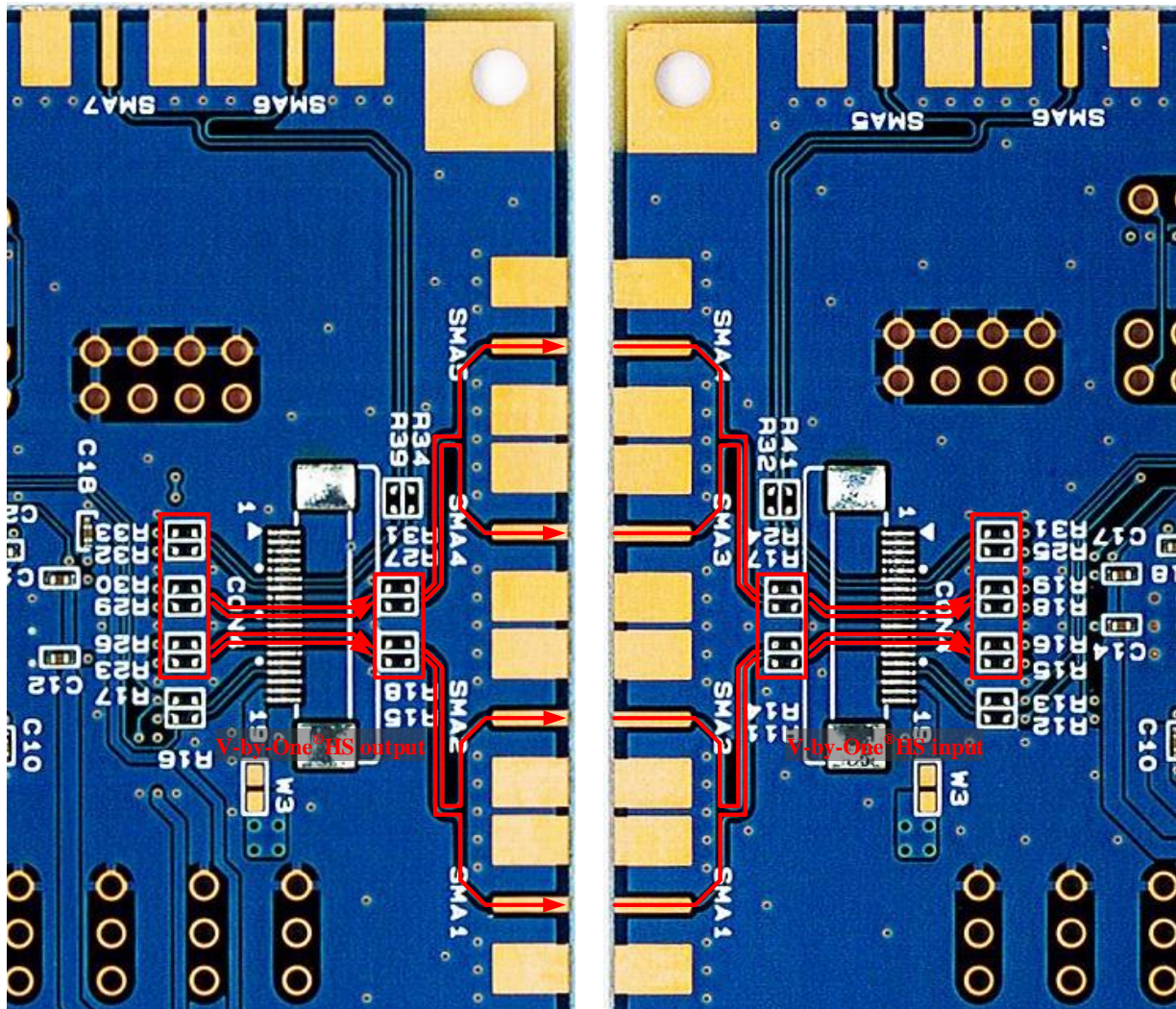


Figure 8 Resistors Mounting for SMA Connector

6. Function setting

Setting pin except DEIN of each board is shown in yellow area of Figure 9. Pin#2 of each 3HEADER is connected to IC's setting pin.

Each setting pin's high or low setting can set by connecting pin#2 of 3HEADER and high level or low level.

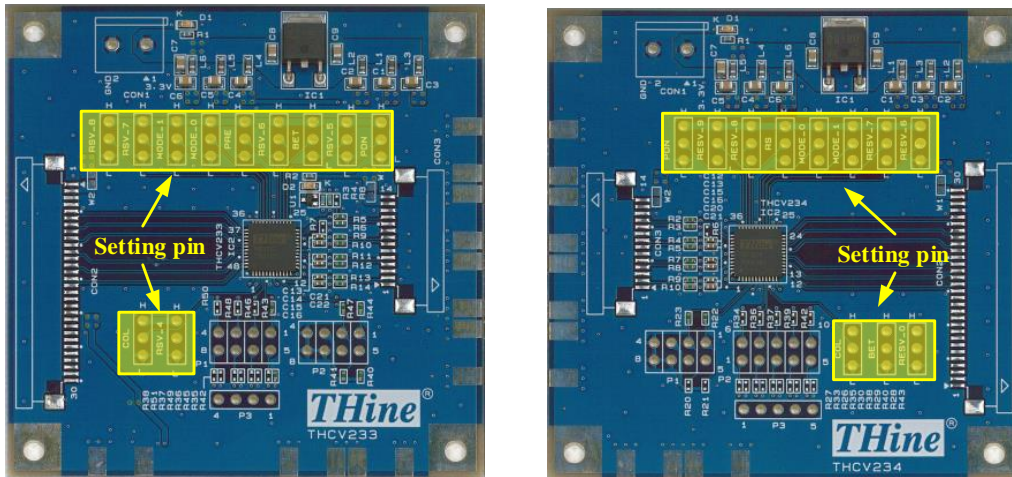
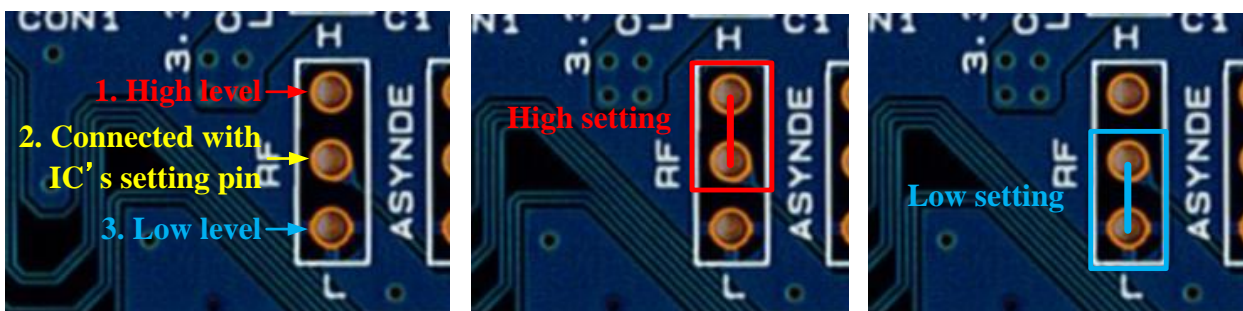


Figure 9 Position of Function Setting Pin



(a)3HEADER Description

(b)High Level Setting

(c)Low Level Setting

Figure 10 High / Low Setting Description

DEIN Setting

Setting of DEIN pin is shown in yellow area of Figure11. Connect HEADER when DEIN is set low. Mount R35 and unmount R42 to set DEIN high.

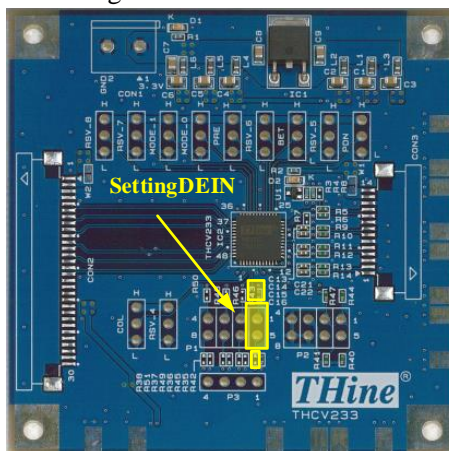


Figure 11 Setting DEIN

7. Clock Input from SMA Connector

THEVA233-V3 can also choose the LVDS clock input from SMA connector by using 0ohm resistors and LVDS buffer. If you want to use SMA connector for clock input, mount the 0ohm resistors, LVDS buffer and so on.

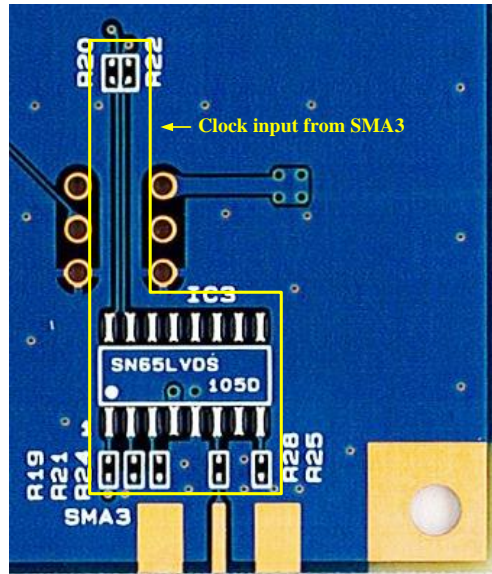


Figure 12 LVDS Clock Input Connector Select

8. Status Indicate LED

The following table shows indicating status of each LED.

Table 2 LED Description

	THEVA233-V3	THEVA234-V3
D1	3.3V Power Supply Indicator	
D2	LOCKN Status Indicator	

9. LOCKN Sharing and HTPDN Omission

LOCKN Sharing

LOCKN connection can be shared with V-by-One[®]HS trace. When you share the LOCKN signal, mount 1k ohm resistors to share the LOCKN signal, and unmount the 0ohm resistors shown in Figure 13.

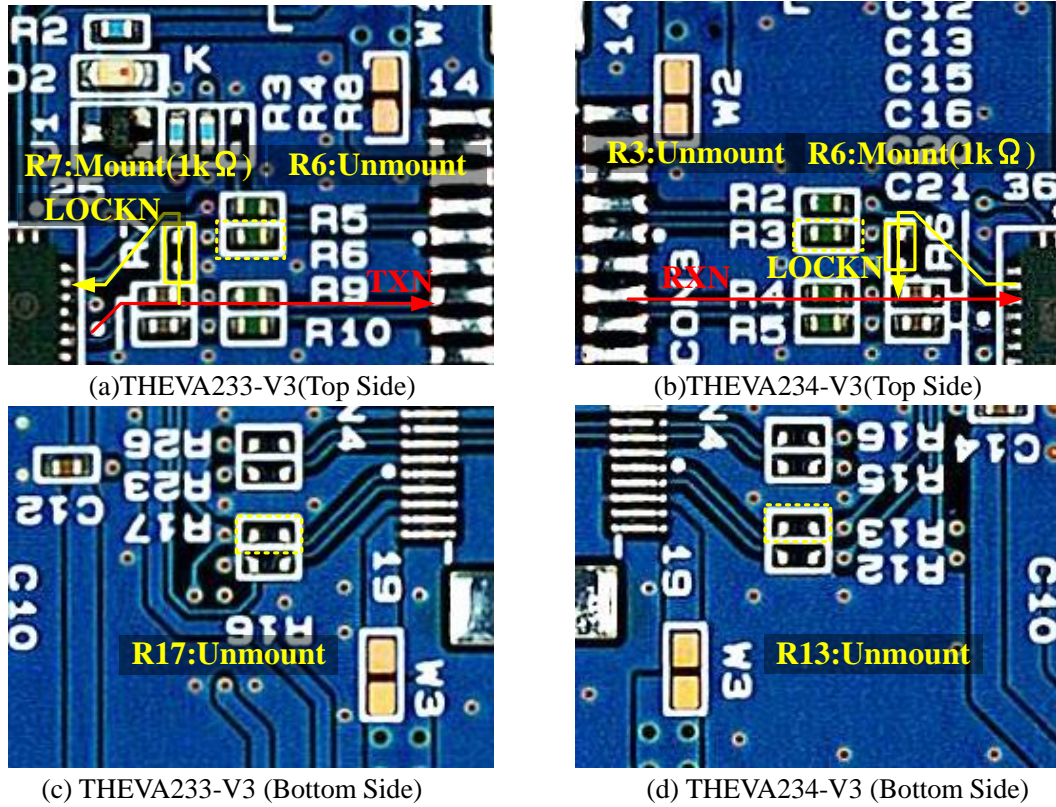


Figure 13 LOCKN Sharing

HTPDN Signal Omission

HTPDN signal can be omitted by using 1k ohm resistor. When you omit the HTPDN signal, mount 1k ohm resistor to pull down the HTPDN signal at transmitter side, and unmount the 0ohm resistors shown in Figure 14. When the HTPDN omission using, HTPDN output from receiver side is open connection.

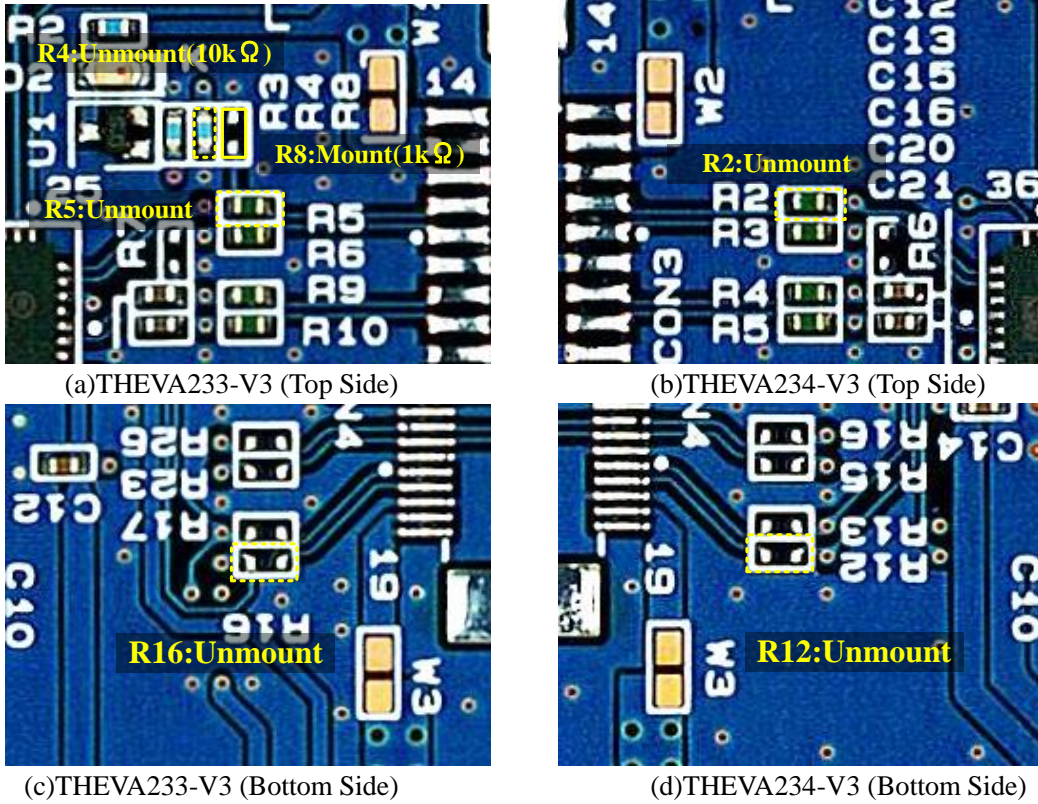


Figure 14 HTPDN Omission

10. Function

This chapter shows function setting of THEVA233-V3 and THEVA234-V3.

Table 3 THEVA233-V3 Function Setting Description

Silk	Pin Name	Function
PDN	PDN	H: Normal Operation, L: Power Down
BET	BET	Field-BET entry. H : Field BET Operation, L : Normal Operation
PRE	PRE	Pre-Emphasis level select input for High-speed CML Link. H : 100%, L : 0%
MODE_1	MODE[1]	Operation mode select input for High-speed CML-Link. MODE[1:0] =LL : Single-in/Distribution Dual-out =LH : Single-in/Single-out =HL : Single-in/Dual-out =HH : Reserved (Forbidden)
MODE_0	MODE[0]	
COL	COL	Data width setting for High-speed CML-Link. H : 24bit, L : 32bit
RSV_4	Reserved [4]	It must be connected to GND.
RSV_7	Reserved [7]	
RSV_6	Reserved [6]	
RSV_8	Reserved [8]	

Table 4 THEVA234-V3 Function Setting Description

Silk	Pin Name	Function
PDN	PDN	H: Normal Operation, L: Power Down
BET	BET	Field-BET entry. H : Field BET Operation, L : Normal Operation
RS	RS	LVDS output swing range select input. H : Normal Swing (350mv@typ.) L : Reduced Swing (200mv@typ.) Latch select input under Field-BET operation H : Latched Result, L : NOT Latched Result
MODE_1	MODE[1]	Operation mode select input. MODE[1:0] =LL : Dual-in/Selected single-out(Lane0) =LH : Dual-in/Single-out =HL : Dual-in/Selected single-out(Lane1) =HH : Single-in/Single-out
MODE_0	MODE[0]	
COL	COL	Data width setting for High-speed CML-Link. H : 24bit, L : 32bit
RSV_0	Reserved [0]	It must be connected to GND.
RSV_6	Reserved [6]	
RSV_7	Reserved [7]	
RSV_8	Reserved [8]	

11. Schematic

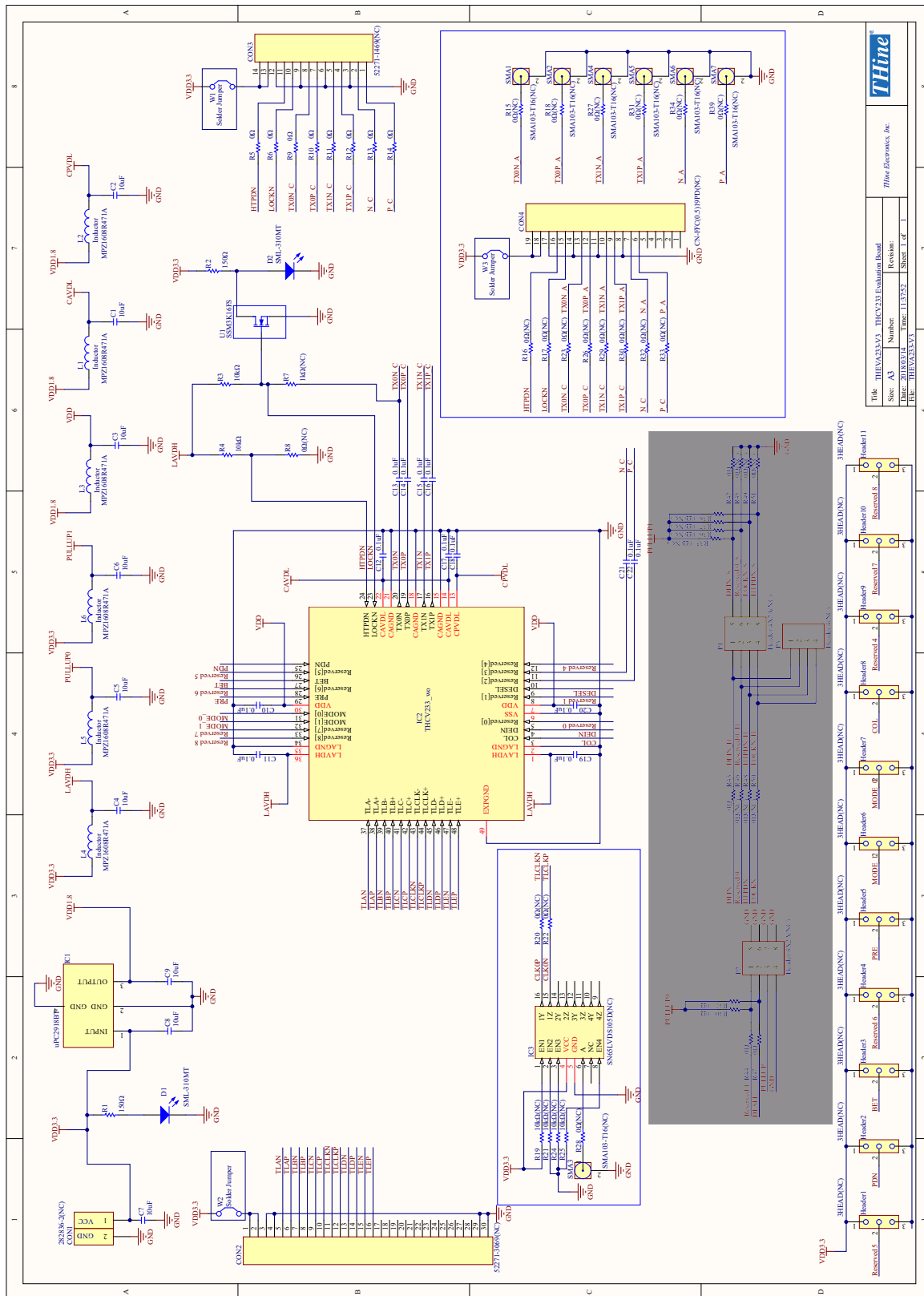


Figure 15 THEVA233-V3 Schematic

12. Bills of Materials

Table 5 THEVA233-V3 BOM

TYPE	Value / Part No.	Package	SPEC	Reference No.	Q'ty	Note
Capacitor	10uF	2012	16V	C1, C2, C3, C4, C5, C6, C7, C8, C9	9	
Capacitor	0.1uF	1005	16V	C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22	13	
Connector	SMA103-T16(NC)	1.6mm	PCB End Jack	SMA1, SMA2, SMA3, SMA4, SMA5, SMA6, SMA7	7	
Connector	52271-3069(NC)	1mm_pitch	30pin	CON2	1	
Connector	CN-FFC(0.5)19PD(NC)	0.5mm_pitch	19pin	CON4	1	
Connector	52271-1469(NC)	1mm_pitch	14pin	CON3	1	
Connector	282836-2(NC)	5mm_pitch	2pin	CON1	1	
Header	3HEAD(NC)	2.54mm_pitch	---	Header1, Header2, Header3, Header4, Header5, Header6, Header7, Header8, Header9, Header10, Header11	11	
Header	Header 4(NC)	2.54mm_pitch	---	P3	1	
Header	Header 4X2A(NC)	2.54mm_pitch	---	P1, P2	2	
IC	SN65LVDS105D(NC)	TSSOP	4V	IC3	1	
IC	THCV233	QFN48	---	IC2	1	
IC	uPC2918BT	SC-63	1A	IC1	1	
IC	SSM3K16FS	SSM	RON15Ω	U1	1	
Inductor	MPZ1608R471A	1608	1.2A	L1, L2, L3, L4, L5, L6	6	
LED0	SML-310MT	1608	GREEN	D1, D2	2	
Resistor	150Ω	1005	0.1W	R1	1	
Resistor	150Ω	1005	0.1W	R2	1	
Resistor	10kΩ(NC)	1005	0.1W	R19, R21, R24, R25	4	
Resistor	10kΩ	1005	0.1W	R3, R4	2	
Resistor	1kΩ(NC)	1005	0.1W	R7	1	
Resistor	0Ω(NC)	1005	0.1W	R8, R15, R16, R17, R18, R20, R22, R23, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R45, R46, R48, R49, R50, R51	29	
Resistor	0Ω	1005	0.1W	R5, R6, R9, R10, R11, R12, R13, R14, R40, R41, R42, R43, R44, R47	14	

Table 6 THEVA234-V3 BOM

TYPE	Value / Part No.	Package	SPEC	Reference No.	Q'ty	Note
Capacitor	10uF	2012	16V	C1, C2, C3, C4, C5, C6, C7, C8, C9	9	
Capacitor	0.1uF	1005	16V	C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21	12	
Connector	282836-2(NC)	5mm_pitch	2pin	CON1	1	
Connector	52271-3069(NC)	1mm_pitch	30pin	CON2	1	
Connector	52271-1469(NC)	1mm_pitch	14pin	CON3	1	
Connector	CN-FFC(0.5)19PD(NC)	0.5mm_pitch	19pin	CON4	1	
Connector	SMA103-T16(NC)	1.6mm	PCB End Jack	SMA1, SMA2, SMA3, SMA4, SMA5, SMA6	6	
Header	3HEAD(NC)	2.54mm_pitch	---	Header1, Header2, Header3, Header4, Header5, Header6, Header7, Header8, Header9, Header10, Header11	11	
Header	Header 4X2A(NC)	2.54mm_pitch	---	P1	1	
Header	Header 5X2A(NC)	2.54mm_pitch	---	P2	1	
Header	Header 5(NC)	2.54mm_pitch	---	P3	1	
IC	uPC2918BT	SC-63	1A	IC1	1	
IC	THCV234	QFN48	---	IC2	1	
Inductor	MPZ1608R471A	1608	1.2A	L1, L2, L3, L4, L5, L6	6	
LED0	SML-310MT	1608	GREEN	D1	1	
Resistor	150Ω	1005	0.1W	R1	1	
Resistor	0Ω	1005	1A	R2, R3, R4, R5, R7, R8, R9, R10, R22, R23	10	
Resistor	1kΩ(NC)	1005	0.1W	R6	1	
Resistor	0Ω(NC)	1005	1A	R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43	31	

13. Set Items

Table 7 Set Items

TYPE	Part No.
DC Connector	282836-2
FFC Connector for V-by-One®HS Link	52271-1469
FFC 14pin 1mm pitch for V-by-One®HS Link	98267-0299
Pin Header	---

It's possible to mount these parts on this board and use.

14. Notices and Requests

Please kindly read, understand and accept this “Notices and Requests” before using this product.

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2. The circuit diagrams described in this material are examples of the application which may not always apply to design of respective customers. THine Electronics, Inc. (“THine”) is not responsible for possible errors and omissions in this material. Please note if the errors or omissions should be found in this material, THine may not be able to correct them immediately.
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4. This product is presumed to be used for general electric device, not for applications which require extremely high-reliability/safety (including medical device concerned with critical care, aerospace device, or nuclear power control device). Also, when using this product for any device concerned with control and/or safety of transportation mean, traffic signal device, or other various types of safety device, such use must be after applying appropriate measures to the product.
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