

# THCV215 / THCV216 Evaluation Kit



V-by-One<sup>®</sup> HS Dual Link Evaluation Board

Parts Number: THEVA215-V2, THEVA216-V2

## 1. General Description

THEVA215-V2 and THEVA216-V2 are designed to evaluate THCV215 and THCV216 for transmission video data. Each has one THCV215 or THCV216. This kit can transmit video data of “Full-HD / 60Hz / 30bit” and “HD / 120Hz / 30Bit”.

Table 1 Color Width

Width	Link	LVDS Clock Freq.
18bit	Single/Dual	20MHz to 100MHz
24bit	Single/Dual	20MHz to 100MHz
32bit	Single/Dual	20MHz to 85MHz
40bit	Single/Dual	20MHz to 75MHz

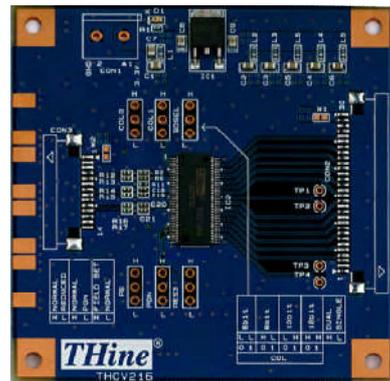
## 2. Features

- Color width selectable : 18/24/32/40 bit
- Single/Dual Link selectable
- Wide Frequency Range
- PLL requires no external components
- V-by-One<sup>®</sup> HS standard version 1.4 compliant

## 3. Overview

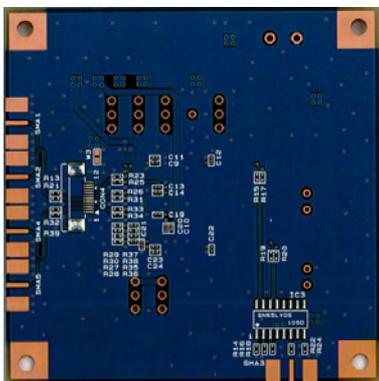


(a) THEVA215-V2 (Top Side)

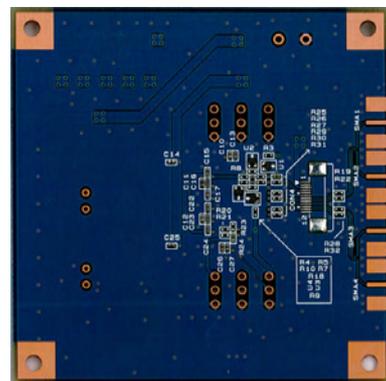


(b) THEVA216-V2 (Top Side)

Figure 1 THEVA215-V2 and THEVA216-V2 Top Side View



(a) THEVA215-V2 (Bottom Side)



(b) THEVA216-V2 (Bottom Side)

Figure 2 THEVA215-V2 and THEVA216-V2 Bottom Side View

## 4. Power Supply Set Up

This chapter shows power supply condition.

**Caution: Please 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. Please use “CON1” connector typically.

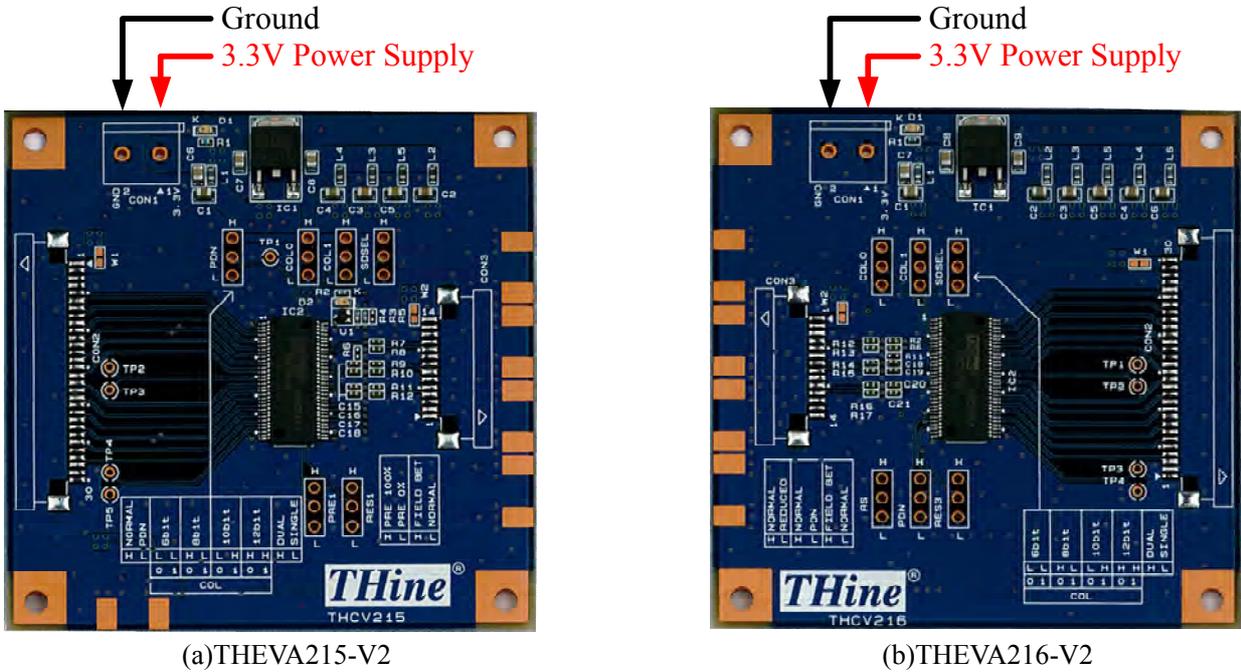


Figure 3 Power Supply for Evaluation Board

### Power Supply from / to Connector

3.3V power supply can be connected to Header1 and CON2 by using W1, W2 and W3 solder jumper.

#### THEVA215-V2

- W1: Connect the 3.3V power supply with pin#1 and 2 of CON2.
- W2: Connect the 3.3V power supply with pin#13 and 14 of CON3.
- W3: Connect the 3.3V power supply with pin#11 and 12 of CON4.

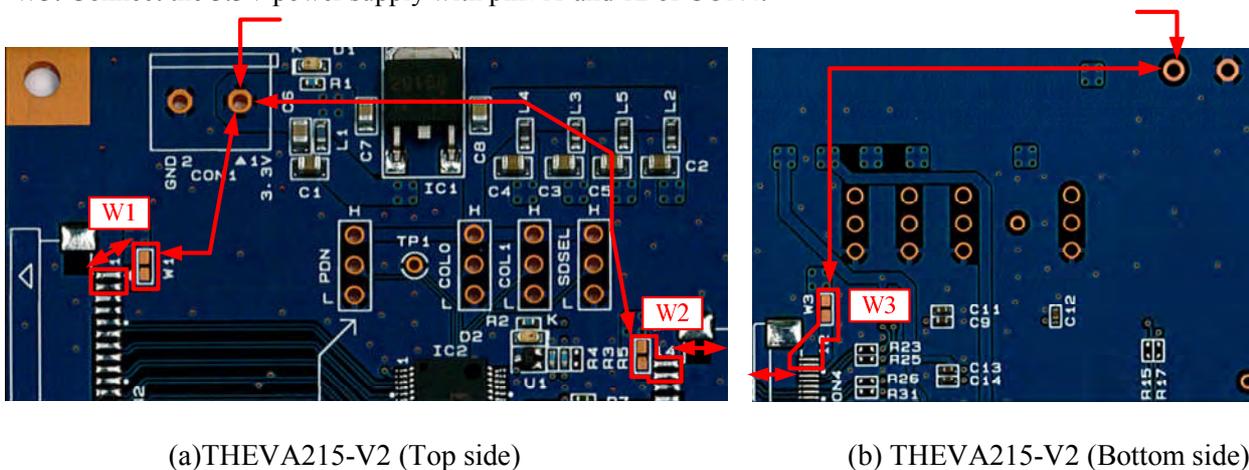


Figure 4 THEVA215-V2 Power Supply from / to Each Connector

**THEVA216-V2**

W1: Connect the 3.3V power supply with pin#29 and 30 of CON2.

W2: Connect the 3.3V power supply with pin#1 and 2 of CON3.

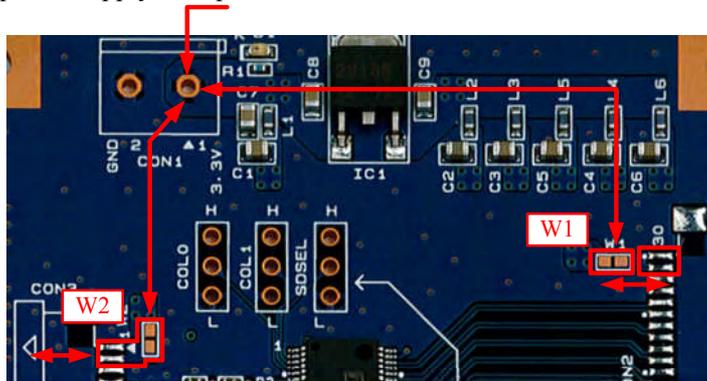


Figure 5 THEVA216-V2 Power Supply from / to Each Connector

**5. V-by-One<sup>®</sup> HS Input / Output Connector Select**

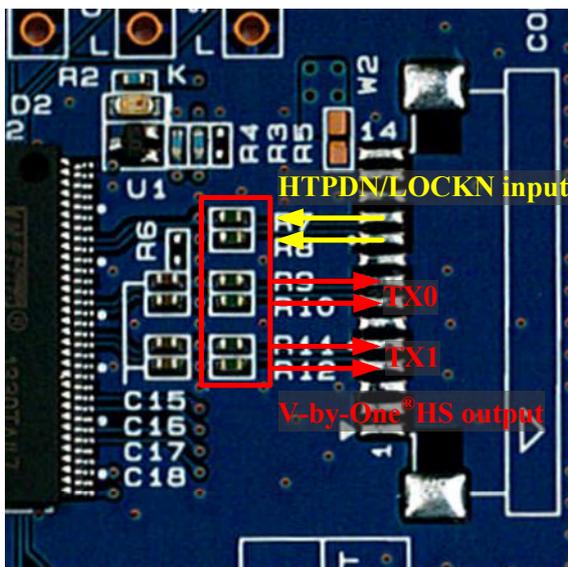
V-by-One<sup>®</sup> HS input / output connector can be selected by using 0ohm resistors.

**(1) 1mm Pitch Connector (Default Setting)**

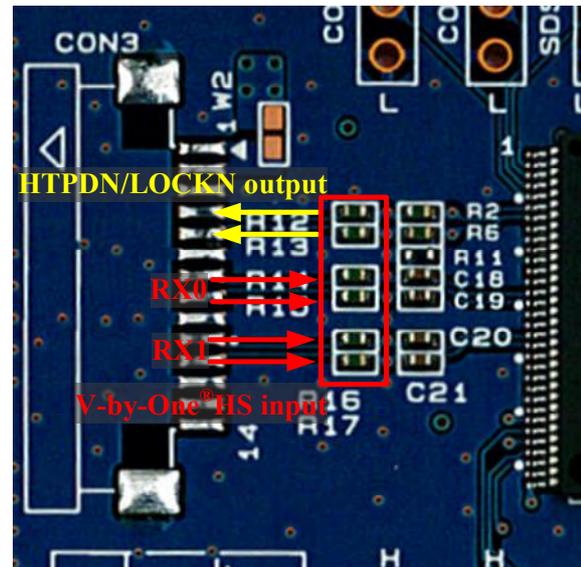
Please mount / unmount following 0ohm resistors to use 1mm pitch connector.

Table 2

	Mount	Unmount
THEVA215-V2	R7, R8, R9, R10, R11, R12	R23, R25, R26, R31, R33, R34
THEVA216-V2	R12, R13, R14, R15, R16, R17	R25, R26, R27, R29, R30, R31



(a)THEVA215-V2 (Top side)



(b)THEVA216-V2 (Top side)

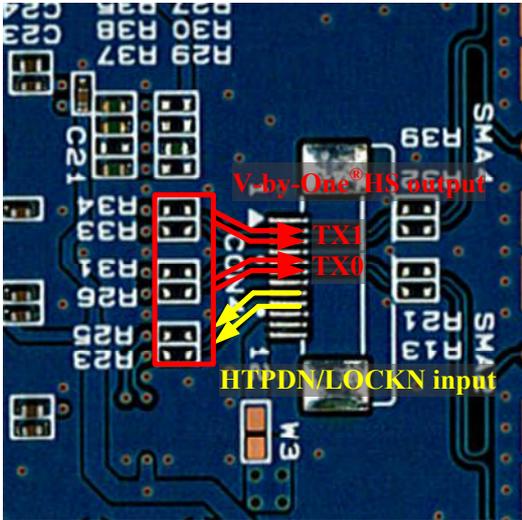
Figure 6 Resistor Mounting for 1mm Pitch Connector

**(2) 0.5mm Pitch Connector**

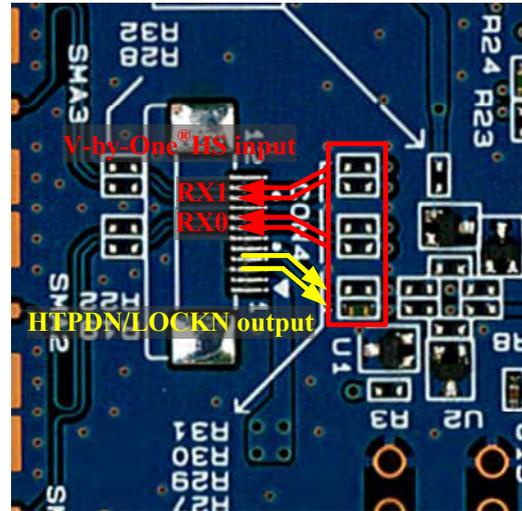
Please mount / unmount following 0ohm resistors to use 0.5mm pitch connector.

Table 3

	Mount	Unmount
<b>THEVA215-V2</b>	R23, R25, R26, R31, R33, R34	R7, R8, R9, R10, R11, R12
<b>THEVA216-V2</b>	R25, R26, R27, R29, R30, R31	R12, R13, R14, R15, R16, R17



(a)THEVA215-V2 (Bottom side)



(b)THEVA216-V2 (Bottom side)

Figure 7 Resistor Mounting for 0.5mm Pitch Connector

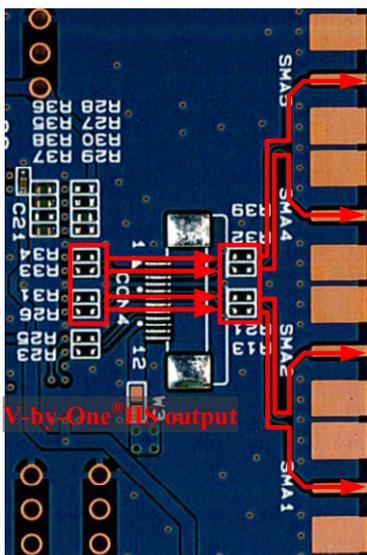
**(3) SMA Connector**

Please mount / unmount following 0ohm resistors to use SMA connector.

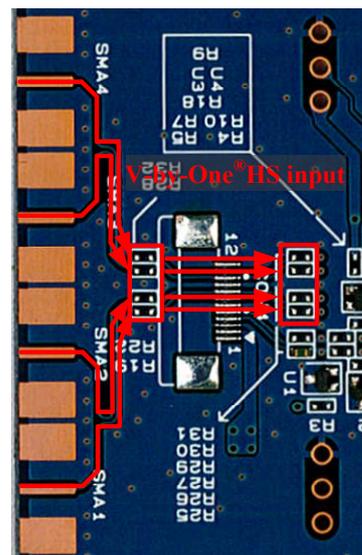
\*HTPDN and LOCKN signals don't have SMA connector input / output connection.

Table 4

	Mount	Unmount
<b>THEVA215-V2</b>	R26, R31, R33, R34, R23, R25, R26, R31, R33, R34	R7, R8, R9, R10, R11, R12
<b>THEVA216-V2</b>	R27, R29, R30, R31, R25, R26, R27, R29, R30, R31	R12, R13, R14, R15, R16, R17



(a)THEVA215-V2 (Bottom side)



(b)THEVA216-V2 (Bottom side)

Figure 8 Resistor Mounting for SMA Connector

## 6. Function Setting

Setting pin of each board is shown in yellow area of figure9. 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.

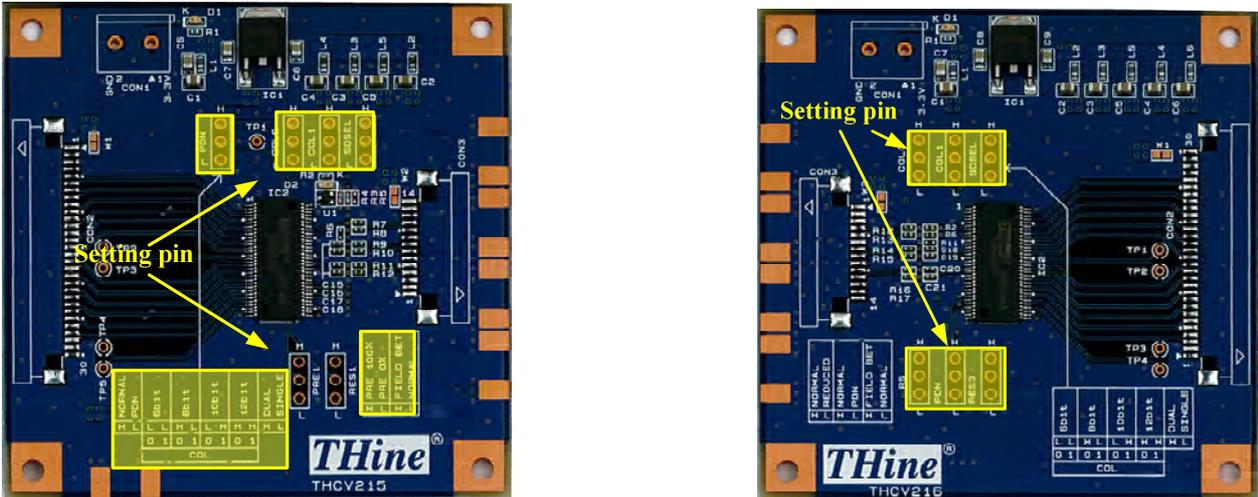


Figure 9 Position of Function Setting Pin

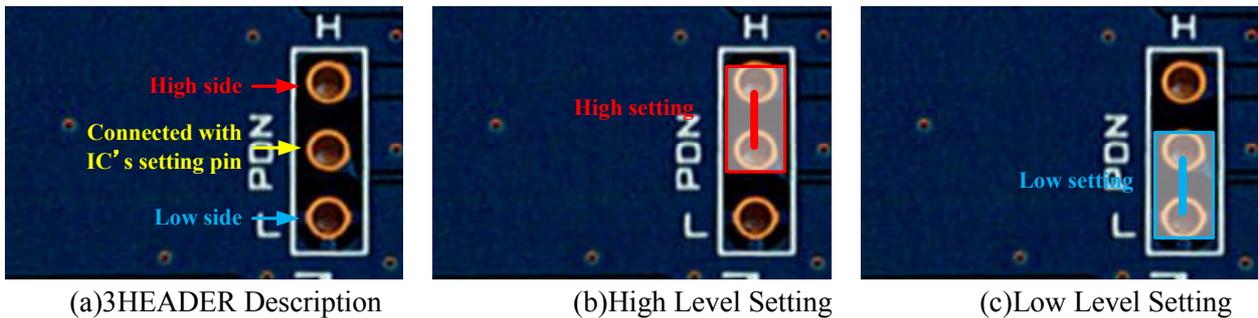


Figure 10 High / Low Setting Description

## 7. Clock Input from SMA Connector

THEVA215-V2 can also choose the TTL clock input from SMA connector, and it will be converted to LVDS clock signal by LVDS Buffer IC(SN65LVDS105S). If you want to use SMA connector for clock input, please mount the IC and resistor as below.

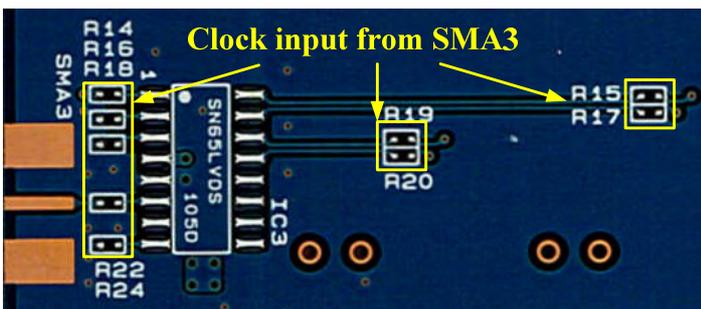


Figure 11 TTL Clock Input Connector Select

Table 5

R14	10kohm
R15	0ohm
R16	10kohm
R17	0ohm
R18	10kohm
R19	0ohm
R20	0ohm
R22	0ohm
R24	10kohm

### 8. Status Indicate LED

The following table shows indicating status of each LED.

Table 6

	THEVA215-V2	THEVA216-V2
D1	3.3V Power Supply Indicator	
D2	LOCKN Status Indicator	

### 9. LOCKN Sharing , HTPDN Omission and Level Shift

#### LOCK sharing

LOCKN connection can be shared with V-by-One<sup>®</sup>HS trace. When you share the LOCKN signal, Please mount 1k ohm resistors to share the LOCKN signal, and unmount the 0ohm resistors shown in Figure 12.

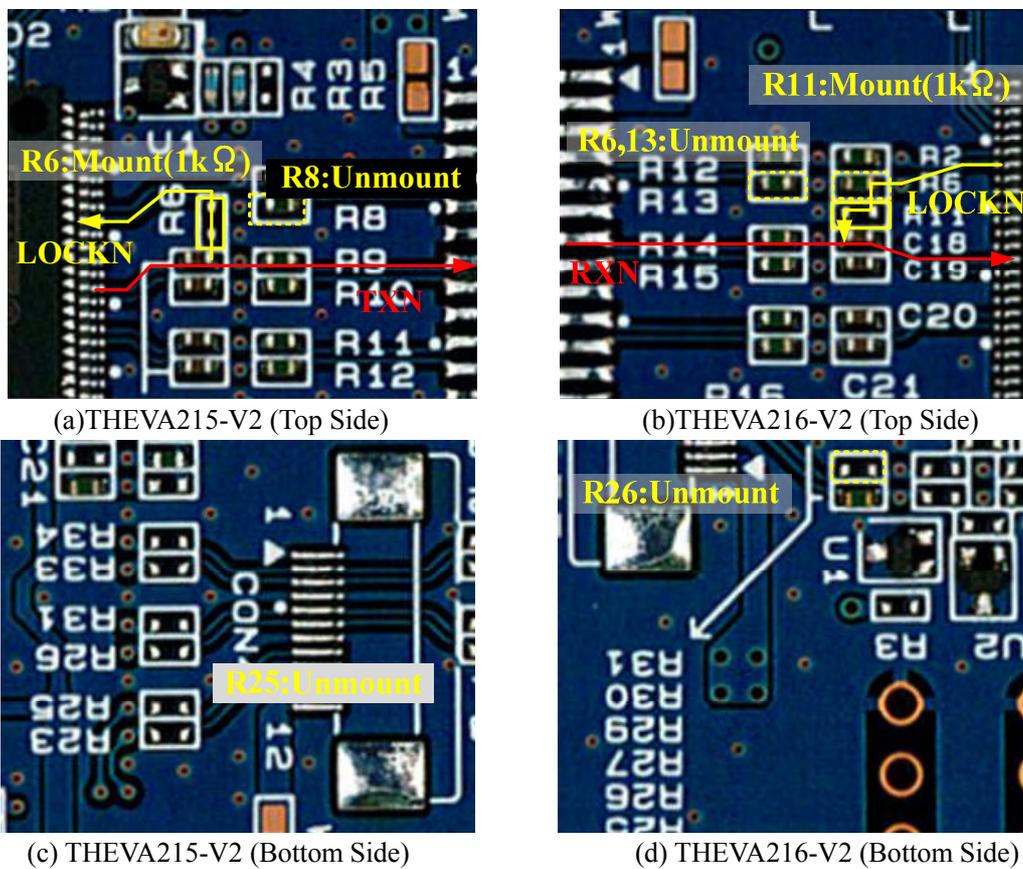


Figure 12 LOCKN Sharing

**HTPDN Signal Omission**

HTPDN signal can be omitted by using 1k ohm resistor. When you omit the HTPDN signal, Please mount 1k ohm resistors to pull down the HTPDN signal at transmitter side, and unmount the 0ohm resistors shown in Figure 13. When the HTPDN omission using, HTPDN output from receiver side is open connection.

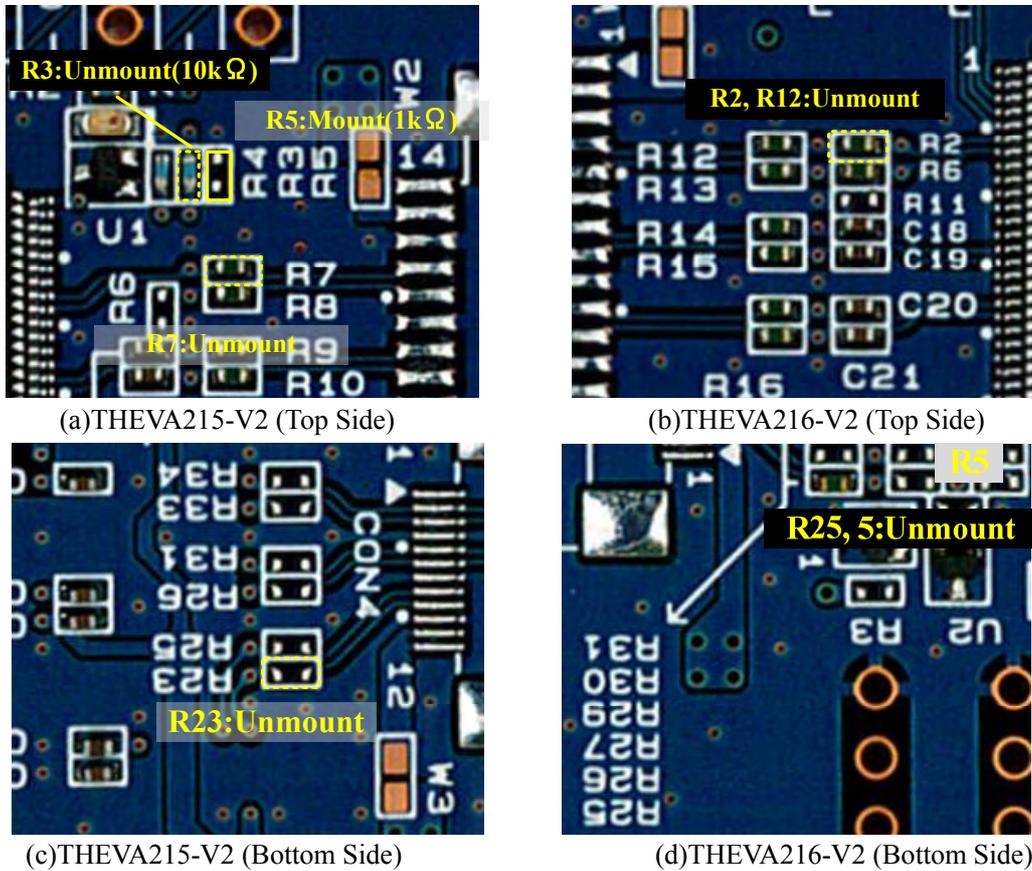


Figure 13 HTPDN Signal Omission

**HTPDN and LOCKN Level Shift**

When using THCV216 with high VDD V-by-One<sup>®</sup> HS transmitter, user have to take care of HTPDN/LOCKN connection because THCV216 HTPDN/LOCKN output pins absolute maximum ratings are VDL+0.3V; therefore high VDD pull-up at transmitter side can cause violation of usage. THEVA216-V2 can shift the HTPDN/LOCKN level by the additional circuit. If you want to connect THCV216 with high VDD V-by-One<sup>®</sup> HS transmitter, please mount and unmount the IC and resistors as Figure 14.

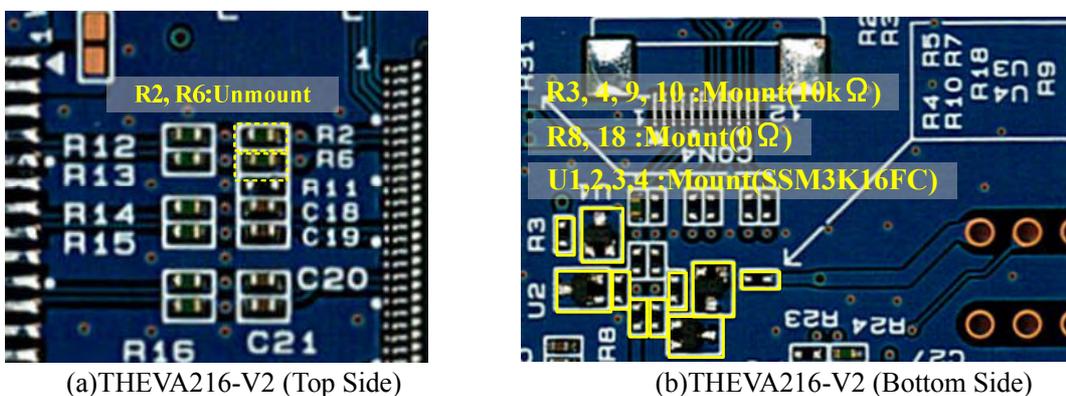


Figure 14 HTPDN and LOCKN Level Shift

## 10. Function

This chapter shows function setting of THEVA215-V2 and THEVA216-V2.

Table 7 THEVA215-V2 Function Setting Description

Silk	Symbol	Function
PDN	PDN	Power down input. H: Normal Operation L: Power Down(CML output High Fix, other Hi-Z)
COL0, 1	COL0,1	Color depth select input L,L : 6bit H, L : 8bit L,H : 10bit H,H : 12bit
SDSEL	SDSEL	Single/Dual select input H: Channel0, Channel1 Enable L: Channel0 Enable, Channel1 Disable
RRE1	PRE1	Pre emphasis level select input H : 100% L : 0%
RES1	Reserved1	Field BET mode enable input H : Field BET Mode Enable L : Normal Operation

Table 8 THEVA216-V2 Function Setting Description

Silk	Symbol	Function
COL0, 1	COL0,1	Color depth select input L,L : 6bit H, L : 8bit L,H : 10bit H,H : 12bit
SDSEL	SDSEL	Single/Dual select input H: Channel0, Channel1 Enable L: Channel0 Enable, Channel1 Disable
RS	RS	Direction of RS pin depends on Reserved3. LVDS swing range select input when Reserved3=L. H: Normal Swing (350mV typ.) L: Reduced Swing (200mV typ.) Field BET output when Reserved3=H, Goes LOW when errors detected.
PDN	PDN	Power down input. H: Normal Operation L: Power Down(CML output High Fix, other Hi-Z)
RES3	Reserved3	Field BET mode enable input H : Field BET Mode Enable L : Normal Operation

# 11. Schematic

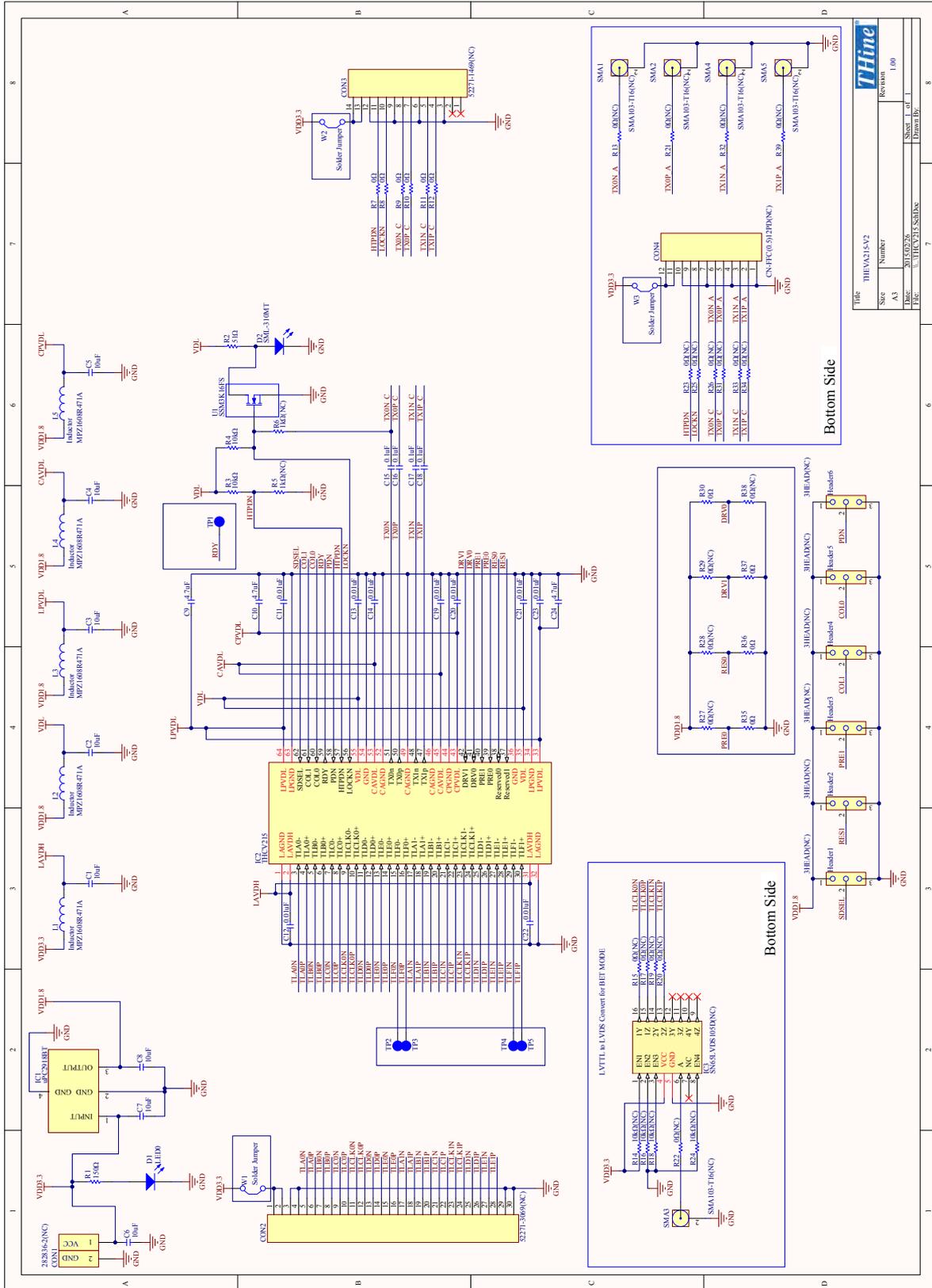


Figure 15 THEVA215-V2 Schematic



## 12. Bills of Materials

Table 9 THEVA215-V2 BOM

TYPE	Value / Part No.	Package	SPEC	Reference No.	Q'ty	Note
Capacitor	10uF	2012	16V	C1, C2, C3, C4, C5, C6, C7, C8	8	
Capacitor	4.7uF	1005	16V	C9, C10, C24	3	
Capacitor	0.01uF	1005	16V	C11, C12, C13, C14, C19, C20, C21, C22, C23	9	
Capacitor	0.1uF	1005	16V	C15, C16, C17, C18	4	
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)12PD(NC)	0.5mm pitch	12pin	CON4	1	
Connector	SMA103-T16(NC)	1.6mm	PCB End Jack	SMA1, SMA2, SMA3, SMA4, SMA5	5	
Header	3HEAD(NC)	2.54mm pitch	---	Header1, Header2, Header3, Header4, Header5, Header6	6	
IC	uPC2918BT	SC-63	1A	IC1	1	
IC	THCV215	TSSOP64	---	IC2	1	
IC	SN65LVDS105D(NC)	TSSOP	4V	IC3	1	
IC	SSM3K16FS	SSM	RON15Ω	U1	1	
Inductor	MPZ1608R471A	1608	1.2A	L1, L2, L3, L4, L5	5	
LED0	SML-310MT	1608	GREEN	D1,D2	1	
Resistor	51Ω	1005	0.1W	R2	1	
Resistor	150Ω	1005	0.1W	R1	1	
Resistor	10kΩ	1005	0.1W	R3, R4	3	
Resistor	1kΩ(NC)	1005	0.1W	R5, R6	2	
Resistor	0Ω	1005	1A	R7, R8, R9, R10, R11, R12, R30, R35, R36, R37	10	
Resistor	0Ω(NC)	1005	1A	R13, R15, R17, R19, R20, R21, R22, R23, R25, R26, R27, R28, R29, R31, R32, R33, R34, R38, R39	19	
Resistor	10kΩ(NC)	1005	0.1W	R14, R16, R18, R24	4	

Table 10 THEVA216-V2 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	4.7uF	1005	16V	C10, C11, C12, C27	4	
Capacitor	0.01uF	1005	16V	C13, C14, C15, C16, C17, C22, C23, C24, C25, C26	10	
Capacitor	0.1uF	1005	16V	C18, C19, C20, C21	4	
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)12PD(NC)	0.5mm pitch	12pin	CON4	1	
Connector	SMA103-T16(NC)	1.6mm	PCB End Jack	SMA1, SMA2, SMA3, SMA4	4	
Header	3HEAD(NC)	2.54mm pitch	---	Header1, Header2, Header3, Header4, Header5, Header6	6	
IC	uPC2918BT	SC-63	1A	IC1	1	
IC	THCV216	TSSOP64	---	IC2	1	
IC	SSM3K16FS	SSM	RON15Ω	U1, U2, U3, U4	4	
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, R6, R12, R13, R14, R15, R16, R17, R23,R24, R25	10	
Resistor	10kΩ(NC)	1005	0.1W	R3, R4, R9, R10	4	
Resistor	0Ω(NC)	1005	1A	R5, R7, R8, R18, R19, R20, R21, R22, R26, R27, R28, R29, R30, R31, R32	16	
Resistor	1kΩ(NC)	1005	0.1W	R11	1	

### **13. Set Items**

Table 11 Set Items

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

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

---

## **14. Notices and Requests**

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