



THCV215/216-2LANE Evaluation Kits

SerDes transmitter and receiver evaluation board

1. General Descriptions

THCV215/216-2LANE Evaluation Kits are designed to evaluate THCV215 and THCV216 for transmission of video data. Each has one THCV215 or THCV216.

This kits can transmit video data of “Full-HD / 60 Hz / 30 bit” and “HD / 120 Hz /30 bit”.

The supply voltage range are “3.0V to 3.6V” or “5.0V to 12.0V”.

2. Block Diagram

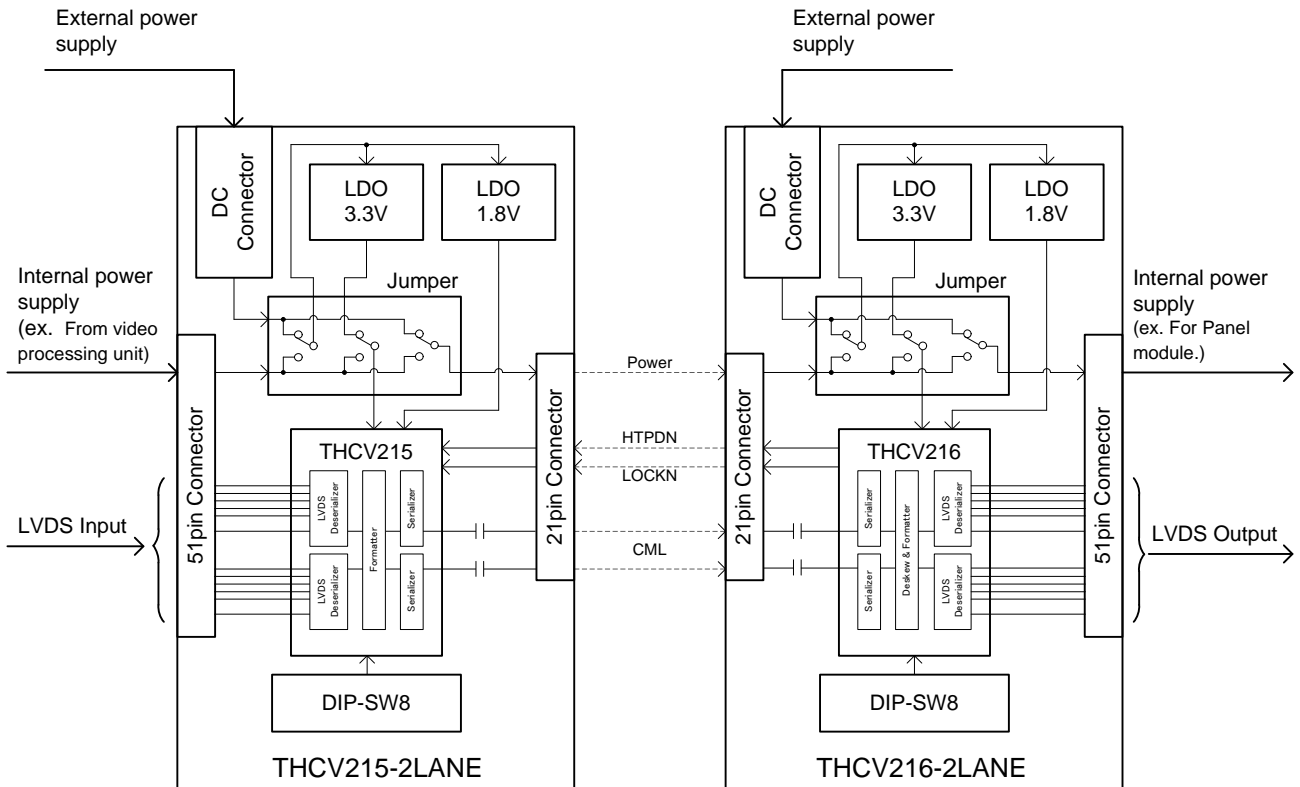


Figure 2-1. Block Diagram



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3. Connector

This chapter shows the connector to connect the THCV215 and THCV216.

Table 3-1. Pin assignments of LVDS connector (51 pin)

THCV215_CN101		Descriptions	THCV216_CN102	
Pin No.	Symbol		Symbol	Pin No.
1	Vcc	Supply voltage from video processing unit, And for Panel module (Internal Supply)	Vcc	51
2				50
3				49
4				48
5				47
6	NC	Non Connected	NC	46
7	GND	Ground	GND	45
8				44
9				43
10	TLA0-	LVDS data input/output	RLA0-	42
11	TLA0+		RLA0+	41
12	TLB0-		RLB0-	40
13	TLB0+		RLB0+	39
14	TLC0-		RLC0-	38
15	TLC0+	RLC0+	37	
16	GND	Ground	GND	36
17	TLCLK0-	LVDS clock input/output	RLCLK0-	35
18	TLCLK0+		RLCLK0+	34
19	GND	Ground	GND	33
20	TLD0-	LVDS data input/output	RLD0-	32
21	TLD0+		RLD0+	31
22	TLE0-		RLE0-	30
23	TLE0+		RLE0+	29
24	GND		Ground	GND
25	TLA1-	LVDS data input/output	RLA1-	27
26	TLA1+		RLA1+	26
27	TLB1-		RLB1-	25
28	TLB1+		RLB1+	24
29	TLC1-		RLC1-	23
30	TLC1+	RLC1+	22	
31	GND	Ground	GND	21
32	TLCLK1-	LVDS clock input/output	RLCLK1-	20
33	TLCLK1+		RLCLK1+	19
34	GND	Ground	GND	18
35	TLD1-	LVDS data input/output	RLD1-	17
36	TLD1+		RLD1+	16
37	TLE1-		RLE1-	15
38	TLE1+		RLE1+	14
39	GND	Ground	GND	13
40	NC	Non Connected	NC	12
41				11
42				10
43				9
44				8
45				7
46				6
47				5
48				4
49				3
50				2
51	1			

Table 3-2. Pin assignments of CML connector (21 pin)

THCV215_CN102		Descriptions	THCV216_CN101	
Pin No.	Symbol		Symbol	Pin No.
21	Vcc	Supply voltage from THCV215 to THCV216	Vcc	1
20				2
19				3
18				4
17				5
16	GND	Ground	GND	6
15				7
14				8
13				9
12				HTPDN
11	LOCKN	Lock detect	LOCKN	11
10	GND	Ground	GND	12
9	Tx0n	V-by-One® HS Channel0 (CML)	Rx0n	13
8	Tx0p		Rx0p	14
7	GND	Ground	GND	15
6	GND		GND	16
5	Tx1n	V-by-One® HS Channel1 (CML)	Rx1n	17
4	Tx1p		Rx1p	18
3	GND	Ground	GND	19
2	NC	Non Connected	NC	20
1				21



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4. Power supplies set up

This chapter shows the power supplies set up by the jumper.

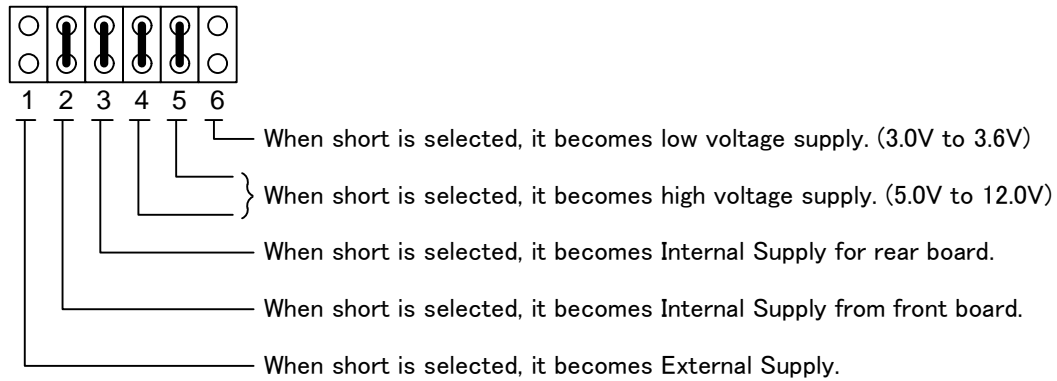


Figure 4. power supply setting with the jumper

Example4-1 : Internal Supply 5.0 V to 12.0V (Default Setting)

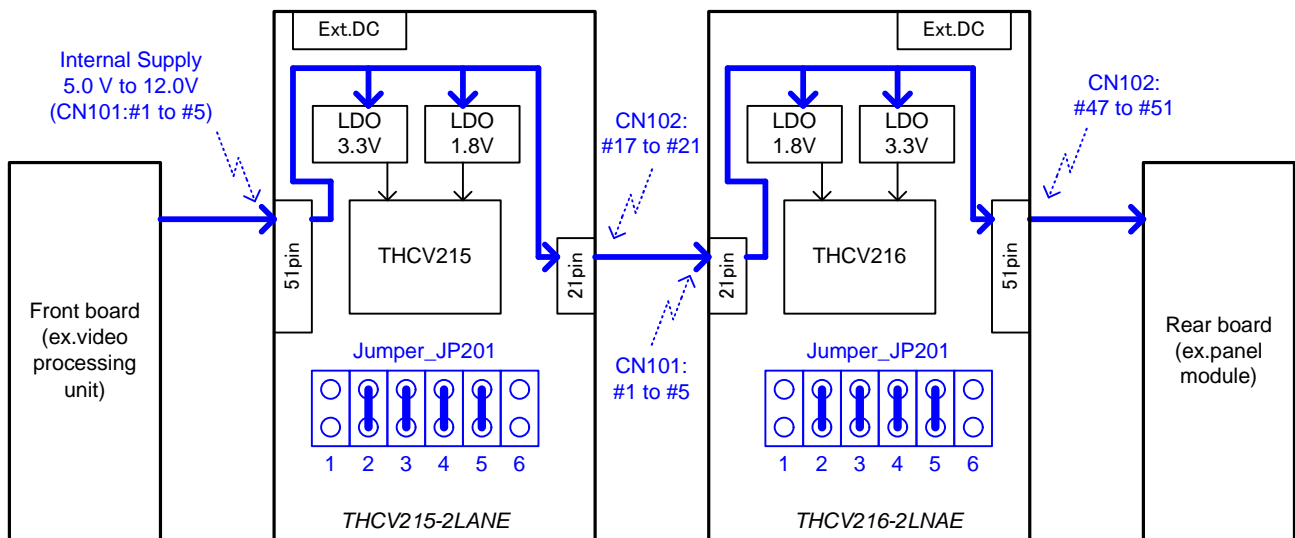


Figure 4-1. Internal Supply 5.0V to 12.0V



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4. Power supplies (Continued)

Example4-2 : External Supply 5.0V to 12.0V

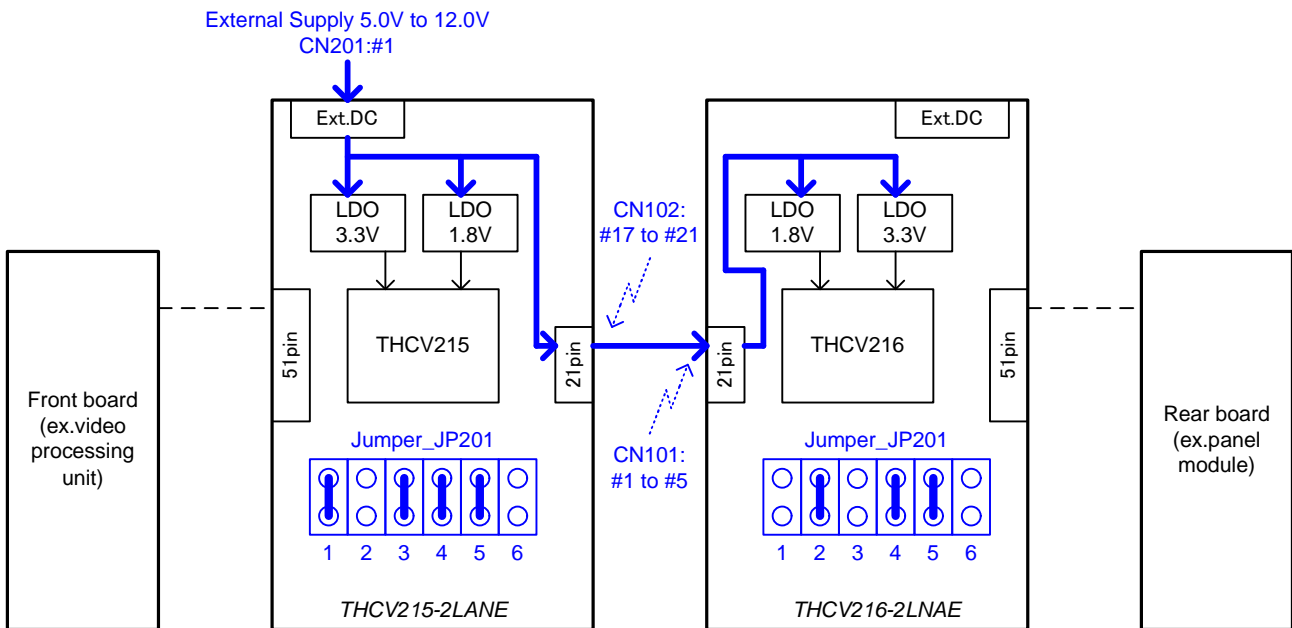


Figure 4-2. External Supply 5.0V to 12.0V

Example4-3 : External Supply 3.0V to 3.6V

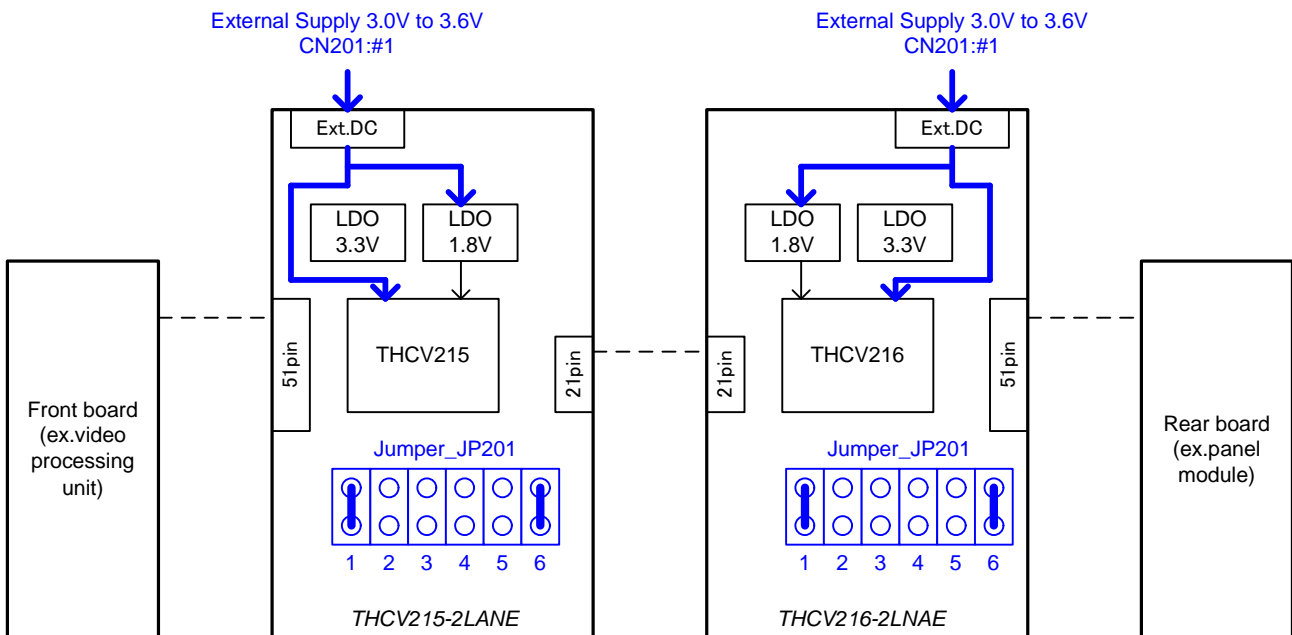


Figure 4-3. External Supply 3.0V to 3.6V



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5. Function setting

This chapter shows the DIP switches of the control settings.

Table 5-1. DIP switches on the THCV215-2LANE Board

SW#	Symbol	Default Setting	Function															
1	SDSEL	High (2 lane)	Selects the Lanes. Low : 1 lane High : 2 lane															
2	COL1	High	Selects the color depth. <table border="1"> <thead> <tr> <th>COL1</th> <th>COL0</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>Low</td> <td>6 bit mode</td> </tr> <tr> <td>Low</td> <td>High</td> <td>8 bit mode</td> </tr> <tr> <td>High</td> <td>Low</td> <td>10 bit mode</td> </tr> <tr> <td>High</td> <td>High</td> <td>Not available</td> </tr> </tbody> </table>	COL1	COL0	Function	Low	Low	6 bit mode	Low	High	8 bit mode	High	Low	10 bit mode	High	High	Not available
COL1	COL0	Function																
Low	Low	6 bit mode																
Low	High	8 bit mode																
High	Low	10 bit mode																
High	High	Not available																
3	COL0	Low																
4	PDN	High (Normal)	Selects the power down. Low : Power down (CML output High Fix, other Hi-Z) High : Normal operation															
5	DRV1	Low	Selects the drive strength. Must be set to DRV1=Low and to DRV0=High															
6	DRV0	High																
7	PRE1	Low (0%)	Selects the pre-emphasis level. Low : 0% High : 100%															
8	RES1	Low (Normal)	Selects the Field BET Mode. * Low : Normal operation (default) High : Field BET Mode enable															

* Please see the datasheet for details. (THCV215-216_Rev.x.xx_x.pdf)

Table 5-2. DIP switches on the THCV216-2LANE Board

SW#	Symbol	Default Setting	Function															
1	SDSEL	High (2 lane)	Selects the Lanes. Low : 1 lane High : 2 lane															
2	COL1	High	Selects the color depth. <table border="1"> <thead> <tr> <th>COL1</th> <th>COL0</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>Low</td> <td>6 bit mode</td> </tr> <tr> <td>Low</td> <td>High</td> <td>8 bit mode</td> </tr> <tr> <td>High</td> <td>Low</td> <td>10 bit mode</td> </tr> <tr> <td>High</td> <td>High</td> <td>Not available</td> </tr> </tbody> </table>	COL1	COL0	Function	Low	Low	6 bit mode	Low	High	8 bit mode	High	Low	10 bit mode	High	High	Not available
COL1	COL0	Function																
Low	Low	6 bit mode																
Low	High	8 bit mode																
High	Low	10 bit mode																
High	High	Not available																
3	COL0	Low																
4	PDN	High (Normal)	Selects the power down. Low : Power down High : Normal operation															
5	RES3	Low (Normal)	Selects the Field BET Mode. * Low : Normal operation (default) High : Field BET Mode enable															
6	NC	Low	Not connected															
7	NC	Low																
8	RS	Low (Normal)	Direction of RS pin depends on RES3. Selects the LVDS swing range when RES3=Low High : Normal swing (350 mV typ.) Low : Reduced swing (200mV typ.) Field BET output when RES3=High															

* Please see the datasheet for details. (THCV215-216_Rev.x.xx_x.pdf)



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6. Other functional Descriptions

This chapter shows other function.

6-1. About LED on the board.

- D201 detects power on.
- D401 detects the lock.

6-2. THCV215 Link Ready function (RDY)

This is a CMOS output for indicating the link status. If link is ready RDY = High.

*See the schematic of page 7 for details.

6-3. THCV216 Field BET mode settings.

Please detach Jumper (JP101) for Field BET mode.

*See the schematic of page 8 for details.



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7. Schematic

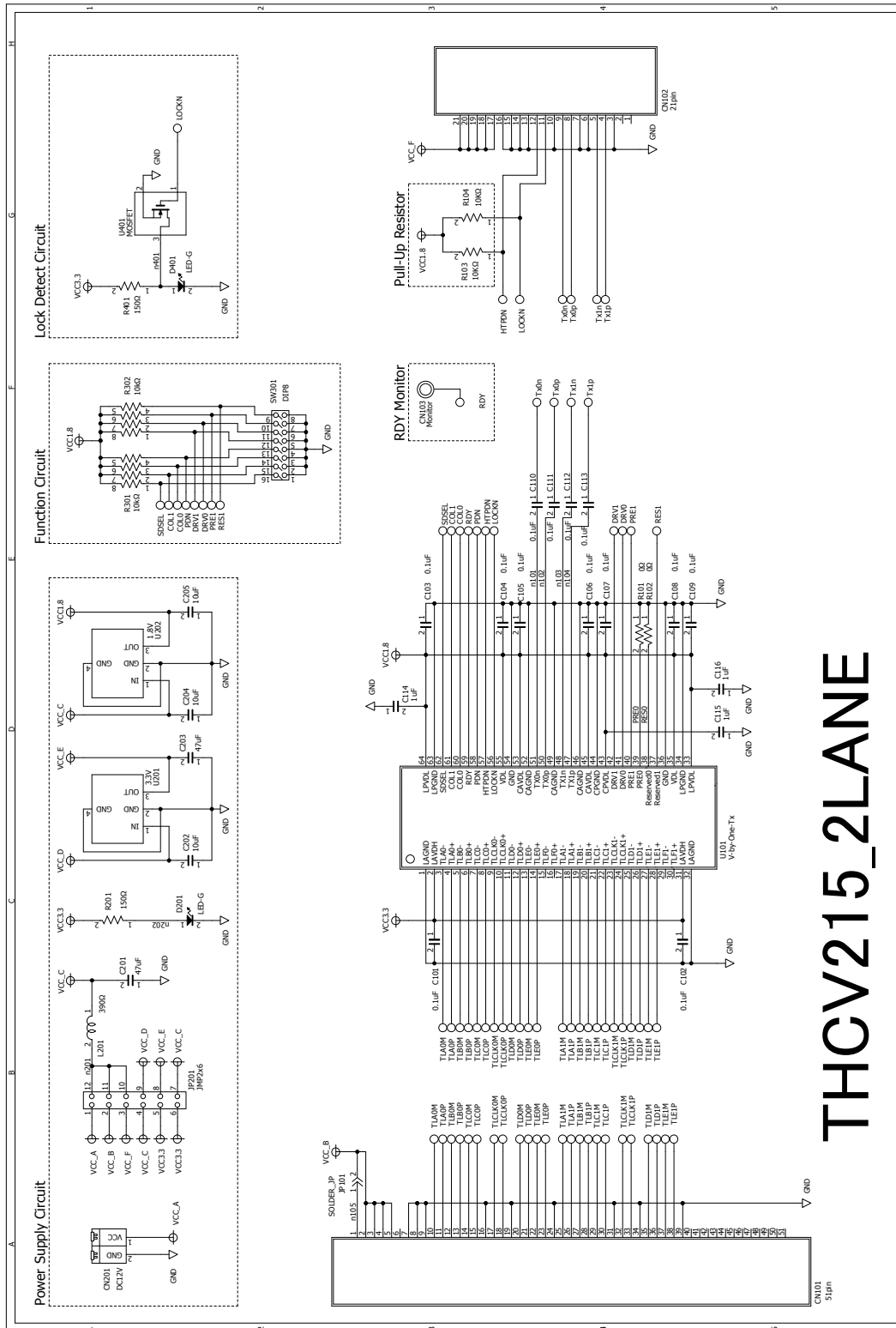


Figure 7-1. THCV215-2LANE schematic

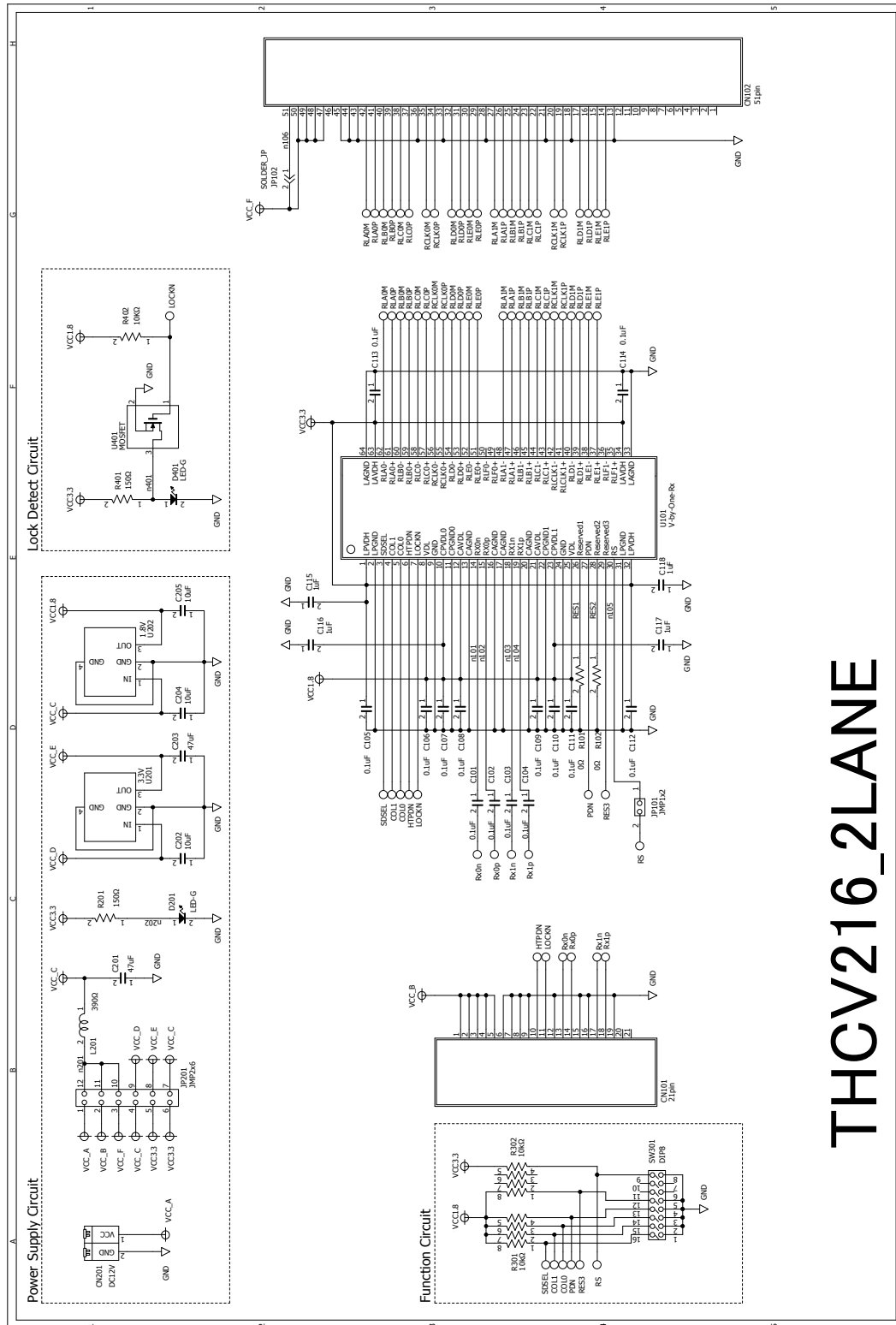
THCV215_2LANE



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7. Schematic (Continued)



THCV216_2LANE

Figure 7-2. THCV216-2LANE schematic



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8. Bills of Materials (BOM)

Table 8-1. BOM for THCV215-2LANE

Designator	Description	PKG	Part Number	Manufacturer
C101	0.1uF	1005	GRM155B31C104KA87	Murata
C102	0.1uF	1005	GRM155B31C104KA87	Murata
C103	0.1uF	1005	GRM155B31C104KA87	Murata
C104	0.1uF	1005	GRM155B31C104KA87	Murata
C105	0.1uF	1005	GRM155B31C104KA87	Murata
C106	0.1uF	1005	GRM155B31C104KA87	Murata
C107	0.1uF	1005	GRM155B31C104KA87	Murata
C108	0.1uF	1005	GRM155B31C104KA87	Murata
C109	0.1uF	1005	GRM155B31C104KA87	Murata
C110	0.1uF	1005	GRM155B31C104KA87	Murata
C111	0.1uF	1005	GRM155B31C104KA87	Murata
C112	0.1uF	1005	GRM155B31C104KA87	Murata
C113	0.1uF	1005	GRM155B31C104KA87	Murata
C114	1uF	1608	GRM188B31H105KA92	Murata
C115	1uF	1608	GRM188B31H105KA92	Murata
C116	1uF	1608	GRM188B31H105KA92	Murata
C201	47uF	3225	GRM32EB31A476ME20L	Murata
C202	10uF	2012	GRM21BB31C106KE15	Murata
C203	47uF	3225	GRM32EB31A476ME20L	Murata
C204	10uF	2012	GRM21BB31C106KE15	Murata
C205	10uF	2012	GRM21BB31C106KE15	Murata
CN101	51pin	3804	FX15SC-51S-0.5SH	HRS
CN102	21pin	2304	FX16-21S-0.5SH	HRS
CN201	DC12V	1105	ML-800-S1H-2P	Sato-parts
D201	LED-G	1608	SML-310MT	ROHM
D401	LED-G	1608	SML-310MT	ROHM
JP201	JMP2x6	2.54mm	2*6-PinHeaders	-
L201	390Ω	1608	MPZ1608R391A	TDK
R101	0Ω	1005	MCR01MZPJ000	ROHM
R102	0Ω	1005	MCR01MZPJ000	ROHM
R103	10KΩ	1005	MCR01MZPF103	ROHM
R104	10KΩ	1005	MCR01MZPF103	ROHM
R201	150Ω	1608	MCR03EZPFX151	ROHM
R301	10kΩ	2010	EXB-28V103JX	KOA
R302	10kΩ	2010	EXB-28V103JX	KOA
R401	150Ω	1608	MCR03EZPFX151	ROHM
SW301	DIP8	2206	A6S-8104-H	Omuron
U101	V-by-OneHS-Tx	TSSOP64	THCV215	THine
U201	3.3V	SC-63	uPC2933BT-AZ	NEC
U202	1.8V	SC-63	uPC2918BT-AZ	NEC
U401	MOSFET	1616	SSM3K16FS	Toshiba

Table 8-2. BOM for THCV216-2LANE

Designator	Description	PKG	Part Number	Manufacturer
C101	0.1uF	1005	GRM155B31C104KA87	Murata
C102	0.1uF	1005	GRM155B31C104KA87	Murata
C103	0.1uF	1005	GRM155B31C104KA87	Murata
C104	0.1uF	1005	GRM155B31C104KA87	Murata
C105	0.1uF	1005	GRM155B31C104KA87	Murata
C106	0.1uF	1005	GRM155B31C104KA87	Murata
C107	0.1uF	1005	GRM155B31C104KA87	Murata
C108	0.1uF	1005	GRM155B31C104KA87	Murata
C109	0.1uF	1005	GRM155B31C104KA87	Murata
C110	0.1uF	1005	GRM155B31C104KA87	Murata
C111	0.1uF	1005	GRM155B31C104KA87	Murata
C112	0.1uF	1005	GRM155B31C104KA87	Murata
C113	0.1uF	1005	GRM155B31C104KA87	Murata
C114	0.1uF	1005	GRM155B31C104KA87	Murata
C115	1uF	1608	GRM188B31H105KA92	Murata
C116	1uF	1608	GRM188B31H105KA92	Murata
C117	1uF	1608	GRM188B31H105KA92	Murata
C118	1uF	1608	GRM188B31H105KA92	Murata
C201	47uF	3225	GRM32EB31A476ME20L	Murata
C202	10uF	2012	GRM21BB31C106KE15	Murata
C203	47uF	3225	GRM32EB31A476ME20L	Murata
C204	10uF	2012	GRM21BB31C106KE15	Murata
C205	10uF	2012	GRM21BB31C106KE15	Murata
CN101	21pin	2304	FX16-21S-0.5SH	HRS
CN102	51pin	3804	FX15SC-51S-0.5SH	HRS
CN201	DC12V	1105	ML-800-S1H-2P	Sato-parts
D201	LED-G	1608	SML-310MT	ROHM
D401	LED-G	1608	SML-310MT	ROHM
JP101	JMP1x2	2.54mm	1*2-PinHeaders	-
JP201	JMP2x6	2.54mm	2*6-PinHeaders	-
L201	390Ω	1608	MPZ1608R391A	TDK
R101	0Ω	1005	MCR01MZPJ000	ROHM
R102	0Ω	1005	MCR01MZPJ000	ROHM
R201	150Ω	1608	MCR03EZPFX151	ROHM
R301	10kΩ	2010	EXB-28V103JX	KOA
R302	10kΩ	2010	EXB-28V103JX	KOA
R401	150Ω	1608	MCR03EZPFX151	ROHM
R402	10KΩ	1005	MCR01MZPF103	ROHM
SW301	DIP8	2206	A6S-8104-H	Omuron
U101	V-by-OneHS-Rx	TSSOP64	THCV216	THine
U201	3.3V	SC-63	uPC2933BT-AZ	NEC
U202	1.8V	SC-63	uPC2918BT-AZ	NEC
U401	MOSFET	1616	SSM3K16FS	Toshiba



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9. Layout

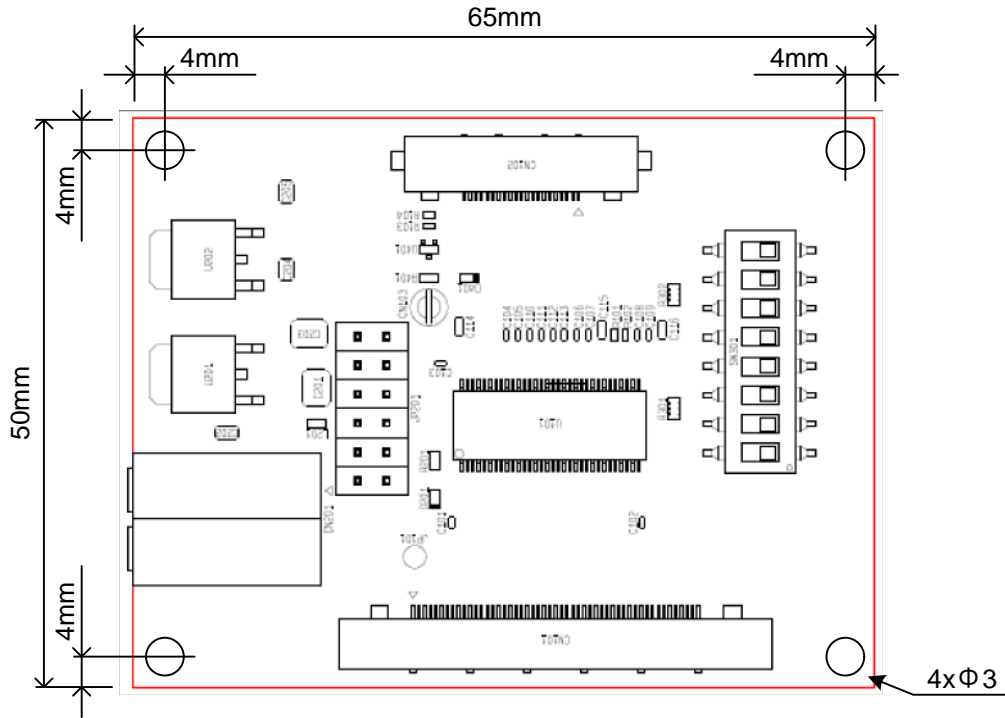


Figure 9-1. Component Placement Guide of THCV215-2LANE

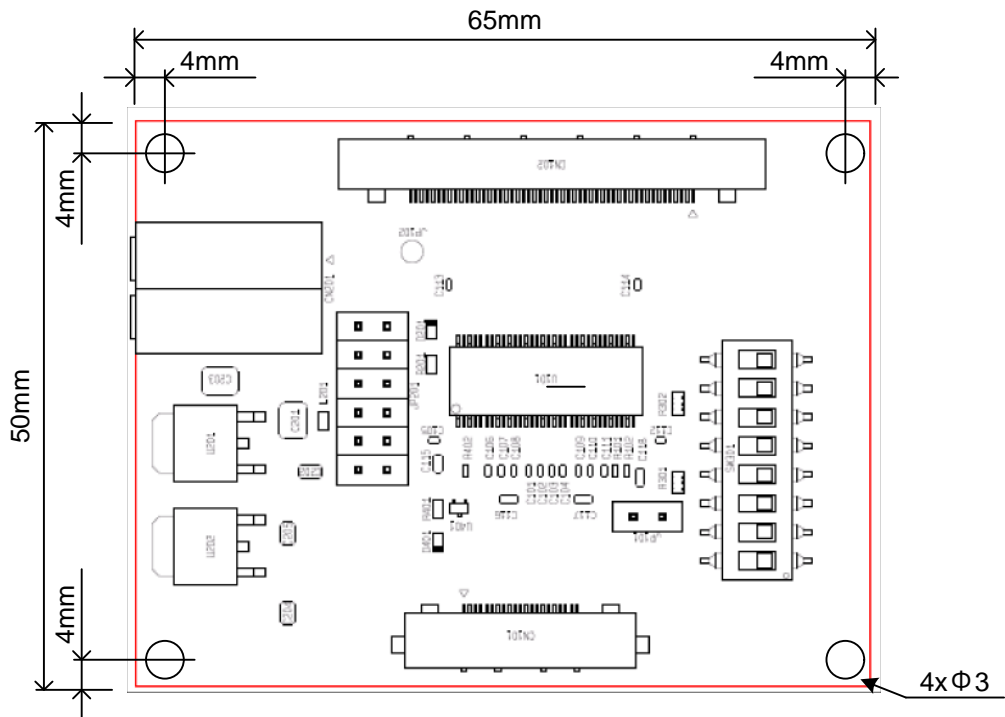


Figure 9-2. Component Placement Guide of THCV216-2LANE



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9. Layout (Continued)

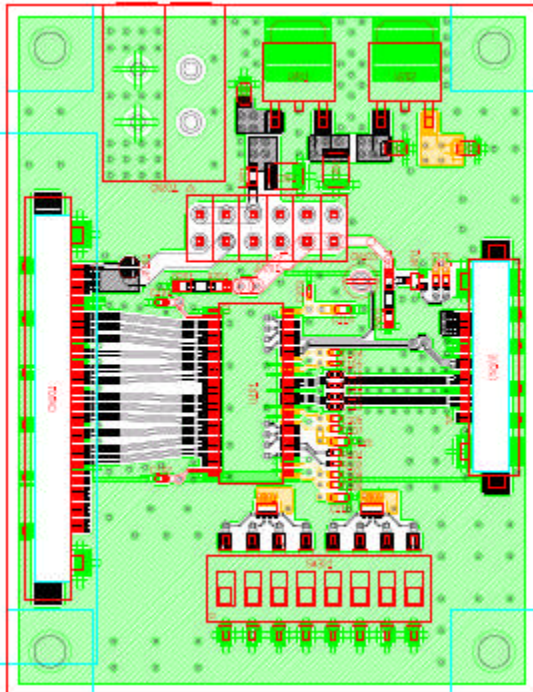


Figure 9-3. Component Side of THCV215-2LANE

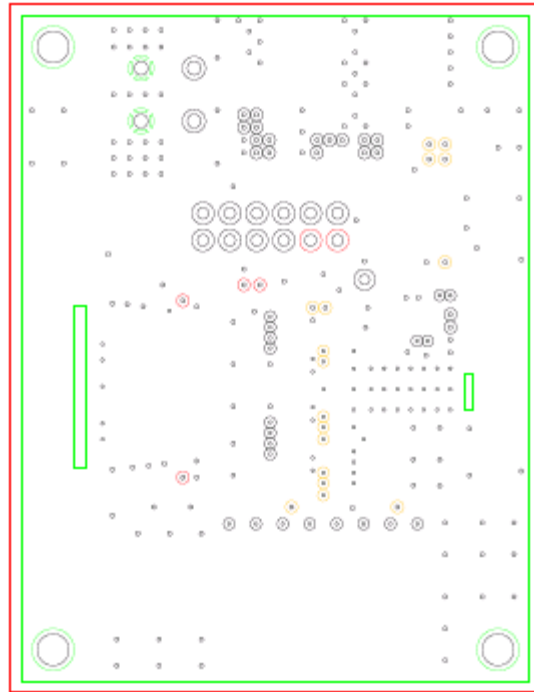


Figure 9-4. Ground Plane of THCV215-2LANE

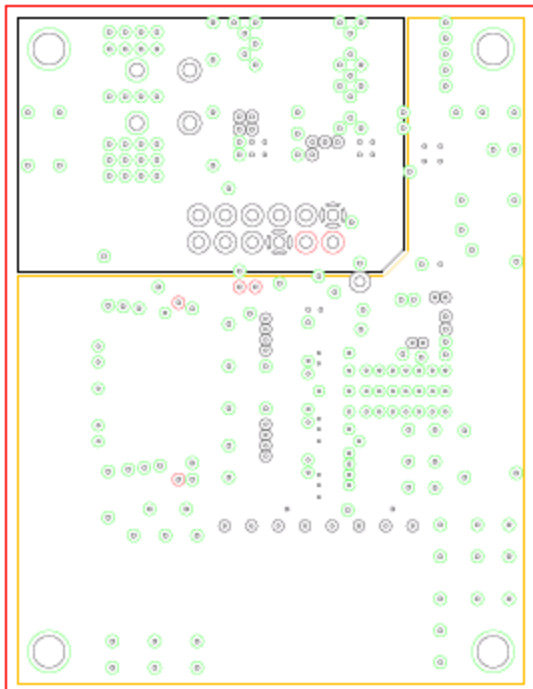


Figure 9-5. Power Plane of THCV215-2LANE

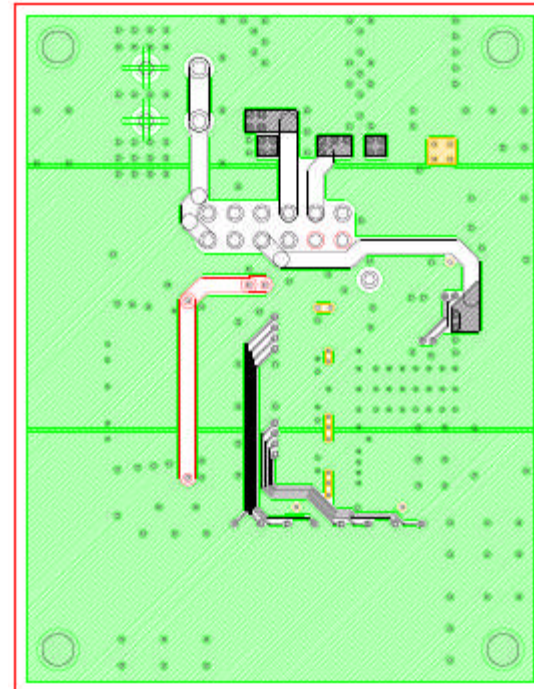


Figure 9-6. Solder Side of THCV215-2LANE



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9. Layout (Continued)

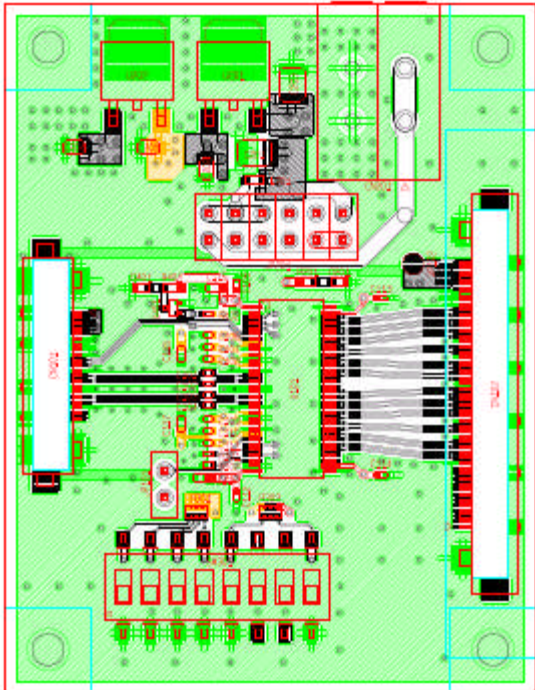


Figure 9-7. Component Side of THCV216-2LANE

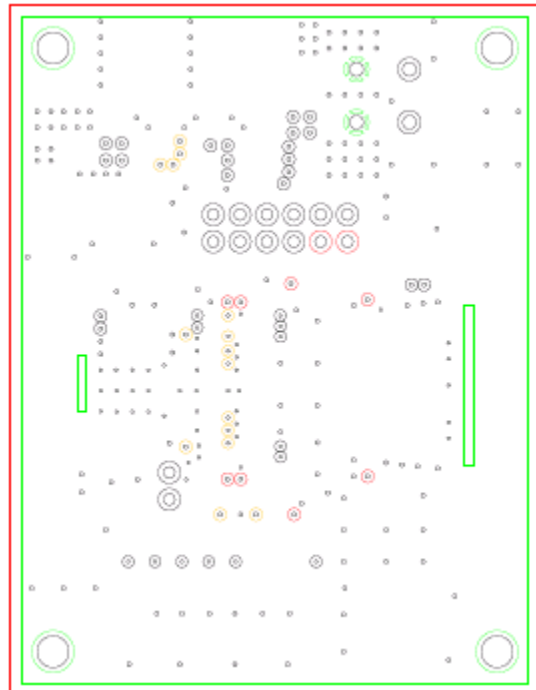


Figure 9-8. Ground Plane of THCV216-2LANE

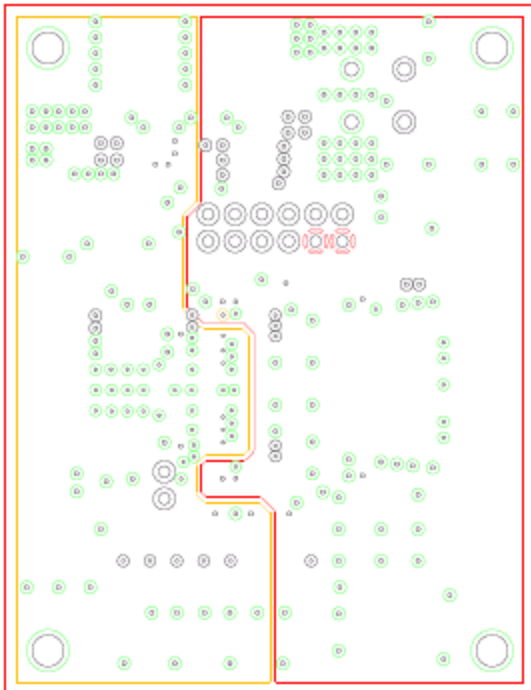


Figure 9-9. Power Plane of THCV216-2LANE

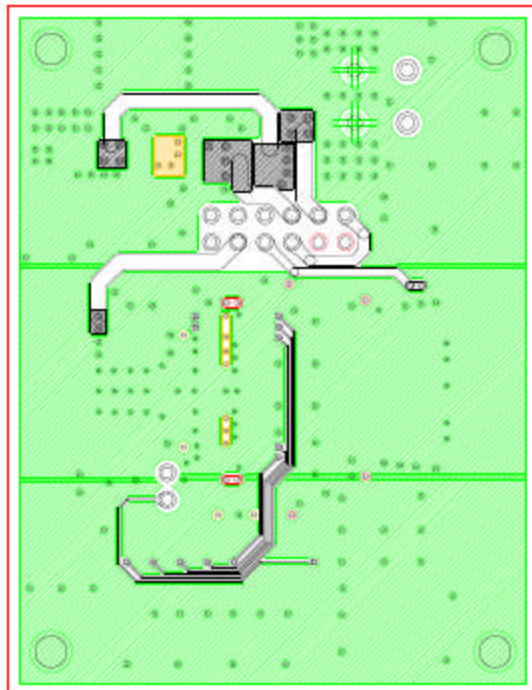


Figure 9-10. Solder Side of THCV216-2LANE



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10. Cable

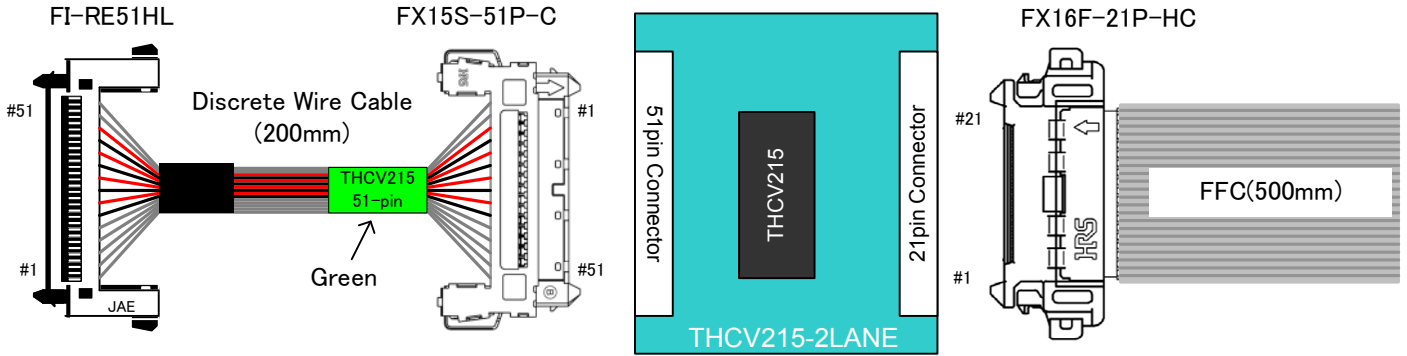


Figure 10-1. Cable of THCV215-2LANE

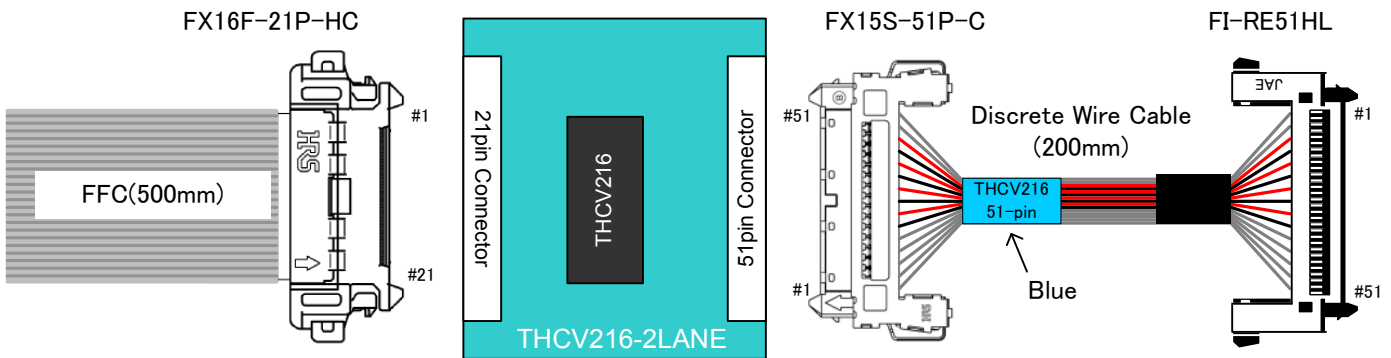


Figure 10-2. Cable of THCV216-2LANE



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Notices and Requests

1. The product specifications described in this material are subject to change without prior notice.
2. The circuit diagrams described in this material are examples of the application which may not always apply to the customer's design. We are not responsible for possible errors and omissions in this material. Please note if errors or omissions should be found in this material, we may not be able to correct them immediately.
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5. This product is presumed to be used for general electric equipment, not for the applications which require very high reliability (including medical equipment directly concerning people's life, aerospace equipment, or nuclear control equipment). Also, when using this product for the equipment concerned with the control and safety of the transportation means, the traffic signal equipment, or various Types of safety equipment, please do it after applying appropriate measures to the product.
6. Despite our utmost efforts to improve the quality and reliability of the product, faults will occur with a certain small probability, which is inevitable to a semi-conductor product. Therefore, you are encouraged to have sufficiently redundant or error preventive design applied to the use of the product so as not to have our product cause any social or public damage.
7. Please note that this product is not designed to be radiation-proof.
8. Customers are asked, if required, to judge by themselves if this product falls under the category of strategic goods under the Foreign Exchange and Foreign Trade Control Law.

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