

Last Updated: Oct 29, 2017

Project: **BMS_Current_Sense.PrjPcb**

Title: **BMS Current Sense Block Diagram**

Project Lead: **Taiping Li**

Size: **Letter**

Date: **10/31/2017**

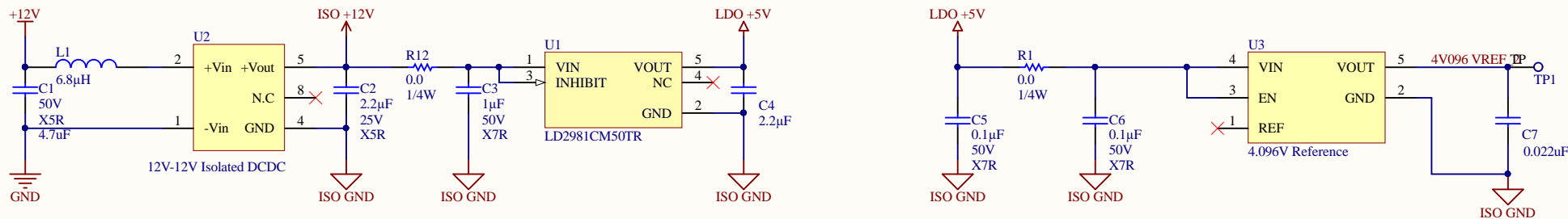
Revision: **1.4**

Sheet **1** of **3**



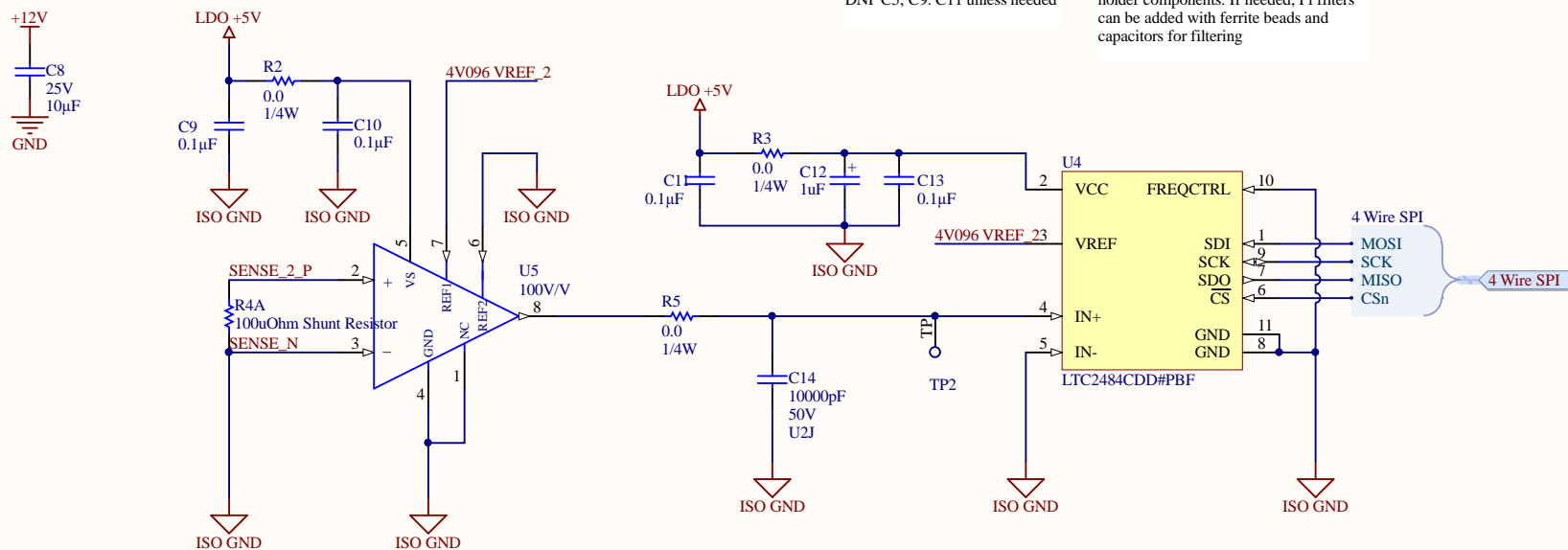
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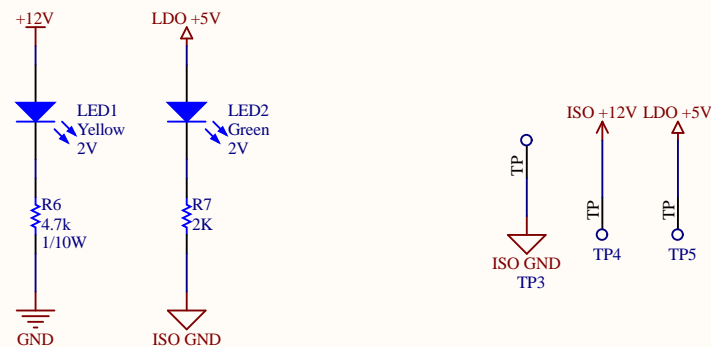


DNP C5, C9, C11 unless needed

R12, C5, R1, C9, R2, C11, R3 are place holder components. If needed, Pi filters can be added with ferrite beads and capacitors for filtering



Using the internal resistor divider (Fig 29 of INA240 Datasheet, Oct 2016) to get the mid voltage point of the 4.096V reference. Isense = 0 when Vout = Vref/2



Project: **BMS_Current_Sense.PrjPcb**

Title: **BMS Current Sense Board**

Project Lead: Taiping Li

Size: Letter

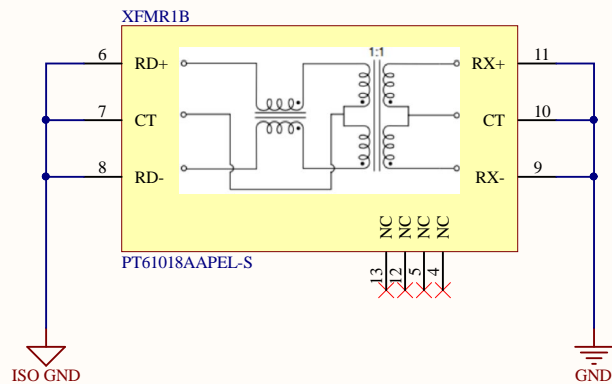
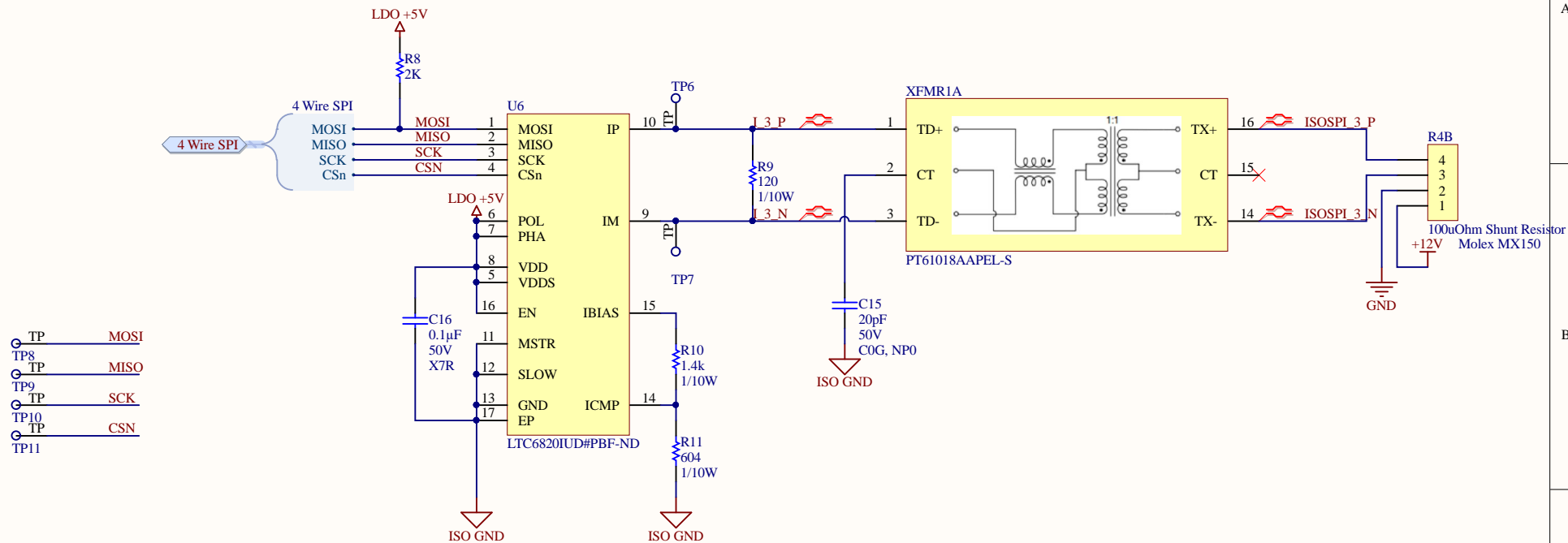
Revision: 1.4

Date: 10/31/2017

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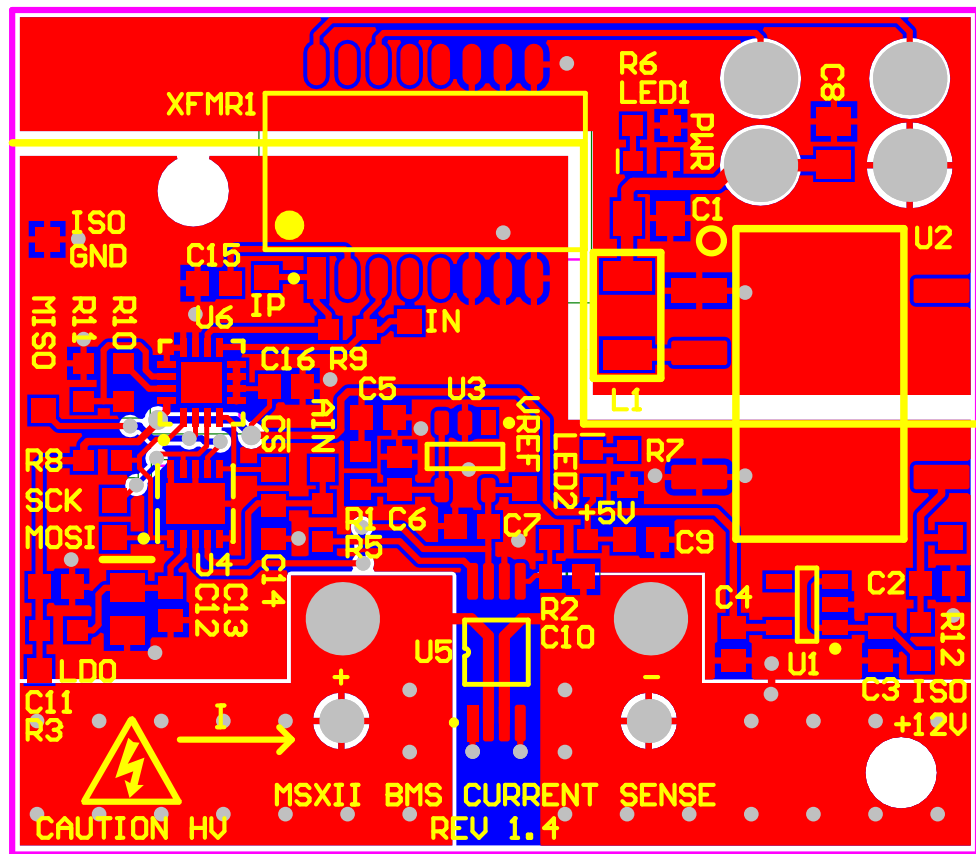


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Project: **BMS_Current_Sense.PrjPcb**Title: **BMS Current Sense isoSPI Interface**Project Lead: **Taiping Li**Size: **Letter**Revision: **1.4**Date: **10/31/2017**Sheet **3** of **3**

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Bill of Materials

BMS Current Sense Block Diagram

Source Data From: BMS_Current_Sense.PrjPcb
Project: BMS_Current_Sense.PrjPcb
Variant: None

Creation Date: 10/31/2017 11:24:20 AM
Print Date: 31-Oct-17 11:24:27 AM

Production Quantity: 1
Currency: <none>

Footprint	Comment	LibRef	Designator	Description	Quantity	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Order Qty 1	Supplier Subtotal 1	Manufacturer 1	Manufacturer Part Number 1
CAP_0805	CAP CER 4.7UF 50V 10% X5R 0805	CAP CER 4.7UF 50V 10% X5R 0805	C1	4.7µF ±20% 50V Ceramic Capacitor X5R 0805 (2012 Metric)	1	Digi-Key	490-12395-1-ND	0.56	1	\$ 0.56	Murata Electronics North America	GRT21BR61H475ME13L
CAP_0603	CAP CER 2.2UF 25V 10% X5R 0603	CAP CER 2.2UF 25V 10% X5R 0603	C2, C4	2.2µF ±10% 25V Ceramic Capacitor X5R 0603 (1608 Metric)	2	Digi-Key	490-10731-1-ND	0.21	2	\$ 0.42	Murata Electronics North America	GRM188R61E225KA12D
CAP_0603	CAP CER 1UF 50V 10% X7R 0603	CAP CER 1UF 50V 10% X7R 0603	C3	1µF ±10% 50V Ceramic Capacitor X7R 0603 (1608 Metric)	1	Digi-Key	587-3247-1-ND	0.34	1	\$ 0.34	Taiyo Yuden	UMK107AB7105KA-T
CAP_0603	CAP CER 0.1UF 50V 10% X7R 0603	CAP CER 0.1UF 50V 10% X7R 0603	C6, C10, C13, C16	0.10µF ±10% 50V Ceramic Capacitor X7R 0603 (1608 Metric)	4	Digi-Key	478-5052-1-ND	0.13	4	\$ 0.52	AVX Corporation	06035C104KAT2A
CAP_0603	CAP CER 0.022uF	CAP CER 0.022UF 50V 10% X7R 0603	C7	0.022µF ±10% 50V Ceramic Capacitor X7R 0603 (1608 Metric)	1	Digi-Key	490-1517-1-ND	0.15	1	\$ 0.15	Murata Electronics North America	GRM188R71H223KA01D
CAP_0805	CAP CER 10uF 25V 10% X5R 0805	CAP CER 10uF 25V 10% X5R 0805	C8	10µF ±10% 25V Ceramic Capacitor X5R 0805 (2012 Metric)	1	Digi-Key	490-5523-1-ND	0.28	1	\$ 0.28	Murata Electronics North America	GRM21BR61E106KA73L
CAP_TANTALUM 0805	1uF	CAP TANT 1UF 25V 10% 0805	C12	1µF Molded Tantalum Capacitors 25V 0805 (2012 Metric) 8 Ohm	1	Digi-Key	478-8928-1-ND	0.95	1	\$ 0.95	AVX Corporation	TAJR105K025RNJ
CAP_0603	CAP CER 10nF 50V 5% X7R 0603	CAP CER 10nF 50V 5% X7R 0603	C14	10000pF ±5% 50V Ceramic Capacitor U2J 0603 (1608 Metric)	1	Digi-Key	399-13384-1-ND	0.35	1	\$ 0.35	KEMET	C0603C103J5JAC7867
CAP_0603	CAP CER 20PF 50V ±5% COG/NP0 0603	CAP CER 20PF 50V ±5% COG/NP0 0603	C15	20pF ±5% 50V Ceramic Capacitor C0G, NP0 0603 (1608 Metric)	1	Digi-Key	490-1410-1-ND	0.15	1	\$ 0.15	Murata Electronics North America	GRM1885C1H200JA01D
NLFV32T-6R8M-EF/IND 6.8uH	IND 260mA 20% 1210	IND 6.8uH 260mA 20% 1210	L1	6.8µH Shielded Wirewound Inductor 260mA 204 mOhm Max 1210 (3225 Metric)	1	Digi-Key	445-15776-1-ND	0.59	1	\$ 0.59	TDK Corporation	NLFV32T-6R8M-EF
LED_0603	LED YELLOW CLEAR 2.1V 0603	LED YELLOW CLEAR 2.1V 0603	LED1	Yellow 590nm LED Indication - Discrete 2V 0603 (1608 Metric)	1	Digi-Key	732-4981-1-ND	0.19	1	\$ 0.19	Würth Electronics Inc.	150060YS75000
LED_0603	LED GREEN CLEAR 2V 0603	LED GREEN CLEAR 2V 0603	LED2	Green 572nm LED Indication - Discrete 2V 0603 (1608 Metric)	1	Digi-Key	732-4980-1-ND	0.19	1	\$ 0.19	Würth Electronics Inc.	150060VS75000
RES_0603	RES 0.0 OHM 1/4W 0603	RES 0.0 OHM 1/4W 0603	R1, R2, R3, R5, R12	RES SMD 0.0 OHM JUMPER 1/4W 0603	5	Digi-Key	541-0.0SBCT-ND	0.21	5	\$ 1.05	Vishay Dale	CRCW0603000020EAHP
RES SHUNT 100UOHM 60MM	100uOhm Shunt Resistor	RES SHUNT 100UOHM 5% 36W 60MM	R4	100 µOhms ±5% 36W Shunt, Battery Specialized Resistor Metal Element ±175ppm/°C Shunt Fixture, 60mm Pitch	1	Digi-Key	541-1906-ND	16.24	1	\$ 16.24	Vishay Dale	WSBM8518L1000JK
RES_0603	RES 4.7K OHM 1% 1/10W 0603	RES 4.7K OHM 1% 1/10W 0603	R6	4.7k Ohm ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Moisture Resistant Thick Film	1	Digi-Key	311-4.70KHRCT-ND	0.14	1	\$ 0.14	Yageo	RC0603FR-074K7L
RES_0603	RES 2K OHM 1% 1/10W 0603	RES 2K OHM 1% 1/10W 0603	R7, R8	2k Ohm ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Moisture Resistant Thick Film	2	Digi-Key	311-2.00KHRCT-ND	0.14	2	\$ 0.28	Yageo	RC0603FR-072KL
RES_0603	RES 120 OHM 1% 1/10W 0603	RES 120 OHM 1% 1/10W 0603	R9	RES SMD 120 OHM 1% 1/10W 0603	1	Digi-Key	311-120HRCT-ND	0.14	1	\$ 0.14	Yageo	RC0603FR-07120RL
RES_0603	RES 1.4k OHM 1% 1/10W 0603	RES 1.4k OHM 1% 1/10W 0603	R10	RES SMD 1.4K OHM 1% 1/10W 0603	1	Digi-Key	311-1.40KHRCT-ND	0.14	1	\$ 0.14	Yageo	RC0603FR-071K4L
RES_0603	RES 604 OHM 1% 1/10W 0603	RES 604 OHM 1% 1/10W 0603	R11	RES SMD 604 OHM 1% 1/10W 0603	1	Digi-Key	311-604HRCT-ND	0.14	1	\$ 0.14	Yageo	RC0603FR-07604RL
Test Point	Test Point	Test Point	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11		11							
SOT95P280X145-5N	IC REG LDO 5V 0.1A SOT23-5	IC REG LDO 5V 0.1A SOT23-5	U1	Linear Voltage Regulator IC Positive Fixed Output 5V 100mA SOT-23-5	1	Digi-Key	497-7787-1-ND	0.84	1	\$ 0.84	STMicroelectronics	LD2981CM50TR
IC, Isolated DCDC	IC DCDC ISOLATED 12V 1W 8-SMD 5-LEAD	IC DCDC ISOLATED 12V 1W 8-SMD 5-LEAD	U2	Isolated Module DC DC Converter 1 Output 12V 84mA 10.8V - 13.2V Input	1	Digi-Key	1470-2950-1-ND	6.52	1	\$ 6.52	XP Power	ISE1212A
IC OP AMP GP RR 10MHZ SOT-23-5	4.096V Reference	IC VREF SERIES 4.096V 5MA SOT23-5	U3	Series Voltage Reference IC ±0.2% 5mA SOT-23-5	1	Digi-Key	LM4120AIM5-4.1/NOPBCT-ND	2.93	1	\$ 2.93	Texas Instruments	LM4120AIM5-4.1/NOPB
IC ADC LTC2484 10-DFN	IC ADC 24BIT 100V/V	IC ADC 24BIT 10-DFN	U4	24 Bit Analog to Digital Converter 1 Input 1 Sigma-Delta 10-DFN (3x3)	1	Digi-Key	LTC2484CDD#PBF-ND	7.03	1	\$ 7.03	Linear Technology	LTC2484CDD#PBF
IC CURRENT AMPLIFIER INA240 TSSOP-8		IC CURRENT AMPLIFIER INA240 8-TSSOP	U5	Current Sense Amplifier 1 Circuit 8-TSSOP	1	Digi-Key	296-45090-1-ND	3.79	1	\$ 3.79	Texas Instruments	INA240A3PWR
IC COMM INTERFACE ISOSPI 16-QFN	IC ISOSPI COMM INTERFACE LTC6820IUD	IC ISOSPI COMM INTERFACE LTC6820IUD	U6	IC COMM INTERFACE ISOSPI 16-QFN	1	Digi-Key	LTC6820IUD#PBF-ND	7	1	\$ 7.00	Linear Technology	LTC6820IUD#PBF
IC, PULSE XFMR 1CT:1CT 350UH SMD	IC PULSE XFMR 1CT:1CT 350UH SMD	IC PULSE XFMR 1CT:1CT 350UH SMD	XFMR1	PULSE XFMR 1CT:1CT 350UH SMD	1	Digi-Key	PT61018AAPEL-SCT-ND	2.48	1	\$ 2.48	Bourns Inc.	PT61018AAPEL-S
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