

Revision History				
Rev	ECN #	Approved Date	Approved by	Notes
N/A	N/A	N/A	N/A	N/A

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Orderable:	Designed for: Public Release	Mod. Date: 2/13/2025
TID #: PMP41139	Project Title: HV-LV DCDC ref design	
Number: Mother Board	Rev: A	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: PMP41139 SHB version	Sheet: 2 of 6
Drawn By: Forest Fu	File: PowerStage.SchDoc	Size: B
Engineer: Forest Fu	Contact: http://www.ti.com/support	



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Control Card Interface

TEST

LOGIC CIRCUIT

A

A

B

B

C

C

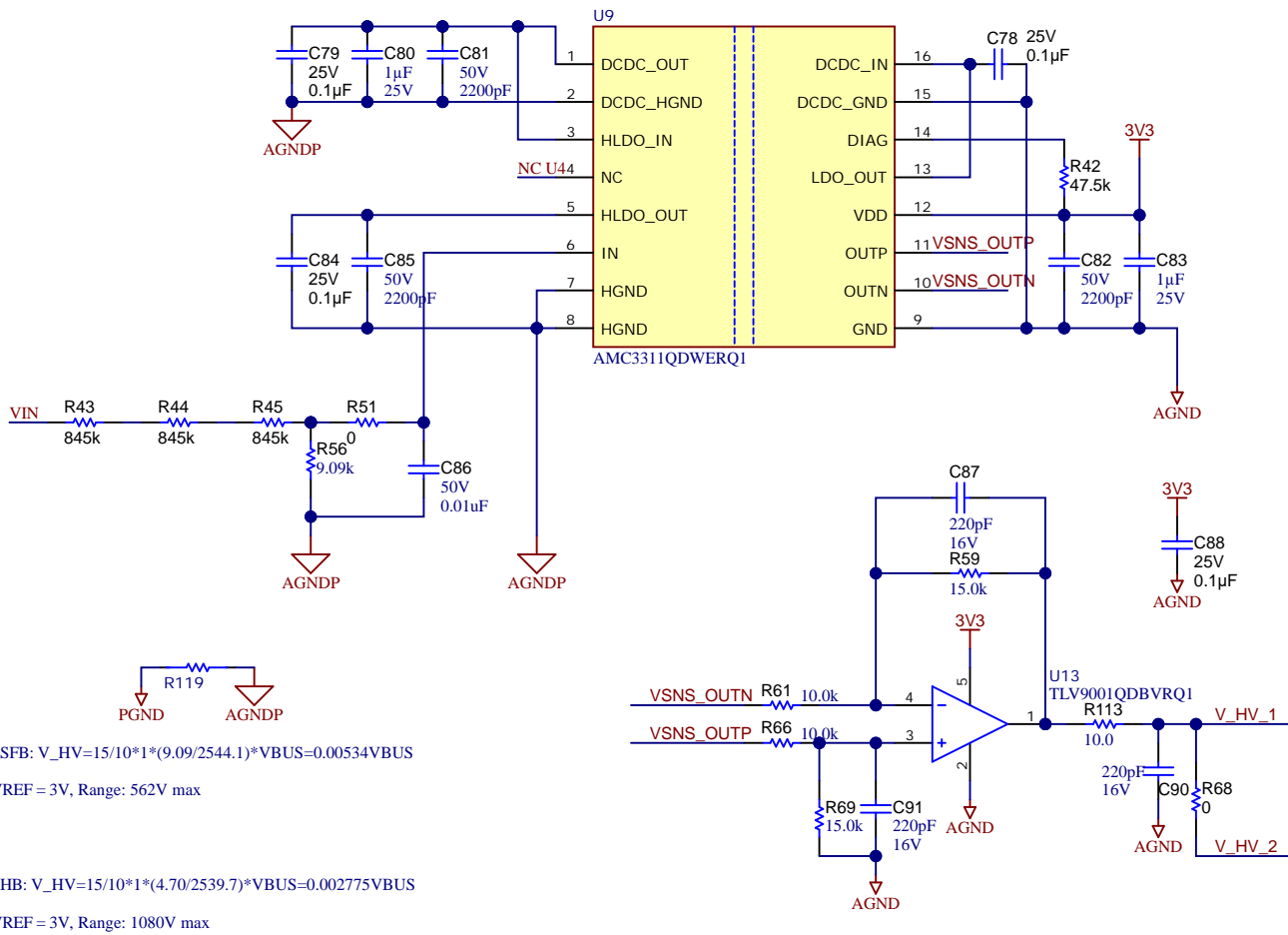
D

D

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Orderable:	Designed for: Public Release	Mod. Date: 12/25/2024
TID #:	Project Title: HV-LV DCDC ref design	
Number: Mother Board	Rev: A	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: PMP41139 SHB version	Sheet: 3 of 6
Drawn By: Forest Fu	File: Controller.SchDoc	Size: B
Engineer: Forest Fu	Contact: http://www.ti.com/support	

Primary Voltage: AMC3311 + TLV9001



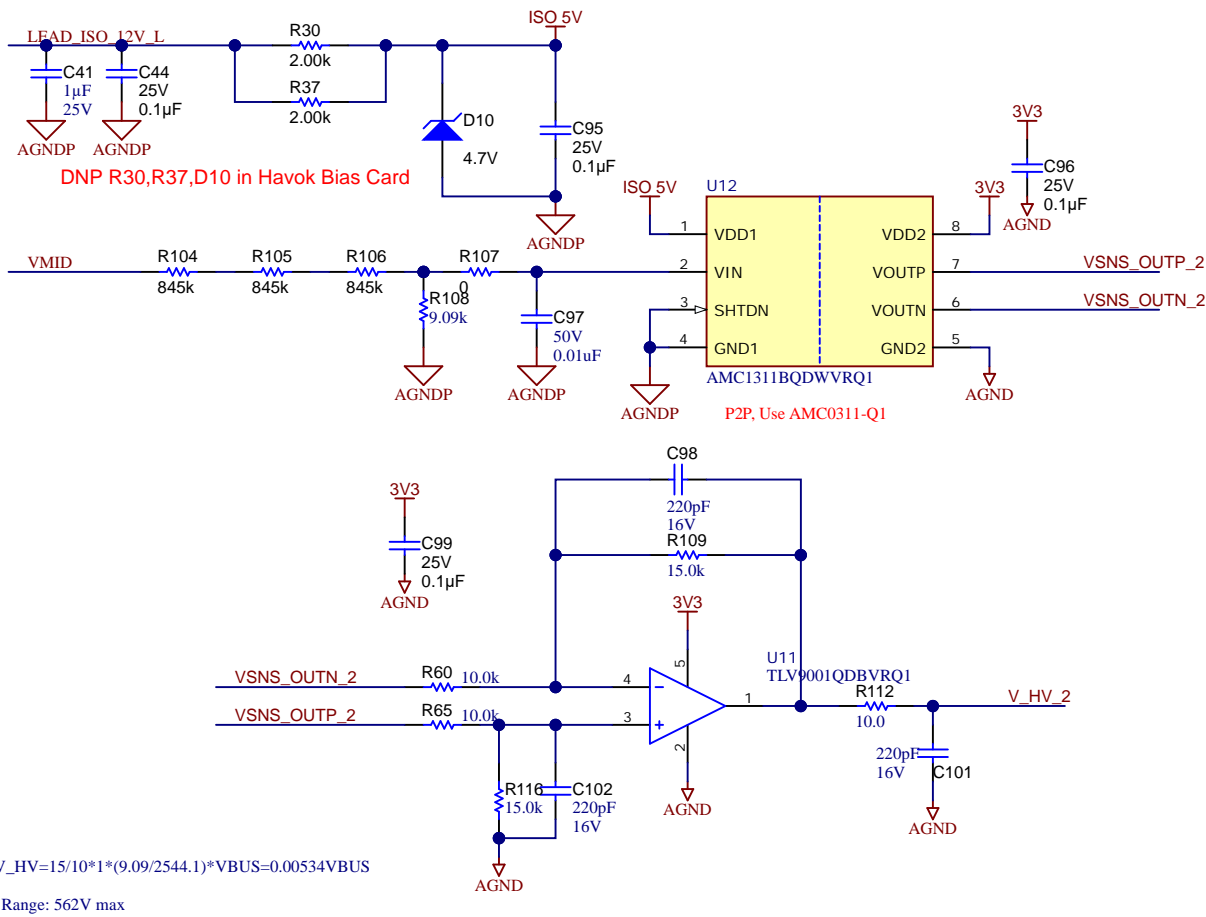
PSFB: $V_{HV} = 15/10 * 1 * (9.09/2544.1) * VBUS = 0.00534 VBUS$

VREF = 3V, Range: 562V max

SHB: $V_{HV} = 15/10 * 1 * (4.70/2539.7) * VBUS = 0.002775 VBUS$

VREF = 3V, Range: 1080V max

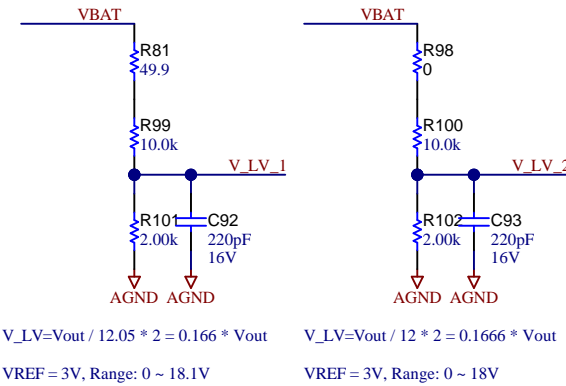
Primary Voltage: AMC0311 + TLV9001



AMC0311: $V_{HV} = 15/10 * 1 * (9.09/2544.1) * VBUS = 0.00534 VBUS$

VREF = 3V, Range: 562V max

Secondary Voltage: Resistor Ladder



$V_{LV} = V_{out} / 12.05 * 2 = 0.166 * V_{out}$

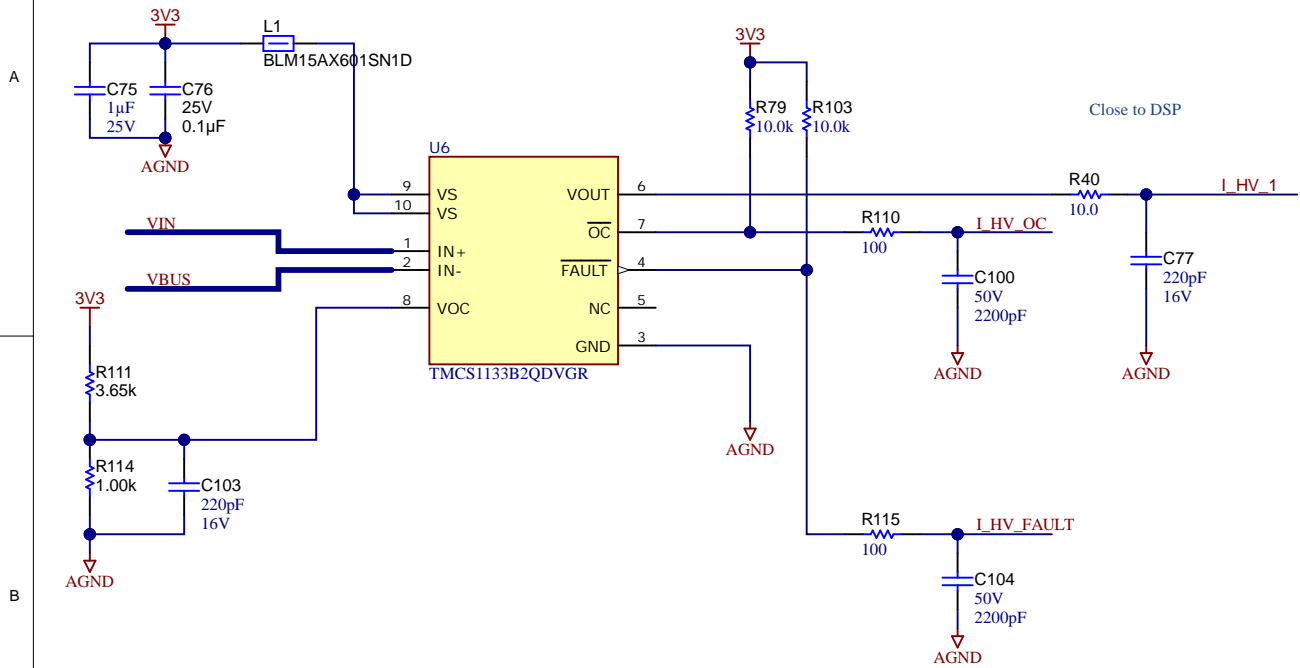
VREF = 3V, Range: 0 ~ 18.1V

$V_{LV} = V_{out} / 12 * 2 = 0.1666 * V_{out}$

VREF = 3V, Range: 0 ~ 18V

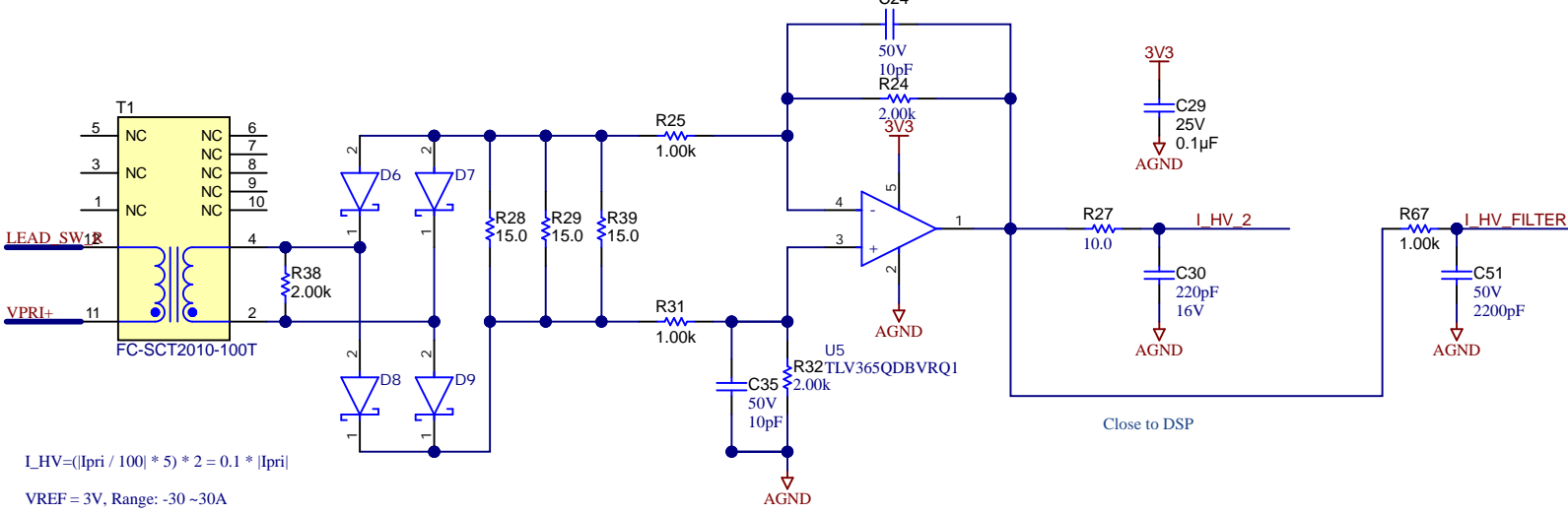
Orderable:	Designed for: Public Release	Mod. Date: 11/12/2024
TID #: PMP41139	Project Title: HV-LV DCDC ref design	
Number: Mother Board	Rev: A	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: PMP41139 SHB version	Sheet: 4 of 6
Drawn By:	File: V Sensor.SchDoc	Size: B
Engineer: Forest Fu	Contact: http://www.ti.com/support	

Primary Input Current: TMCS1133



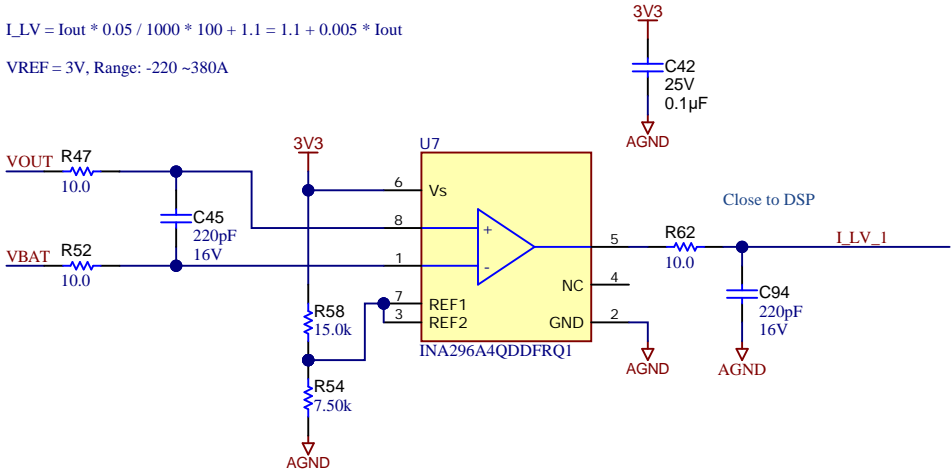
$$OC = 3.3 / 4.65 * 1000 * 2.5 / 50 = 35A$$
$$I_{HV} = -I_{pri} * 50 / 1000 + 1.65 = 1.65 - 0.05 * I_{pri} \quad VREF = 3V, \text{ Range: } -27 \sim 33A$$

Primary Input Current: Current transformer + TLV365



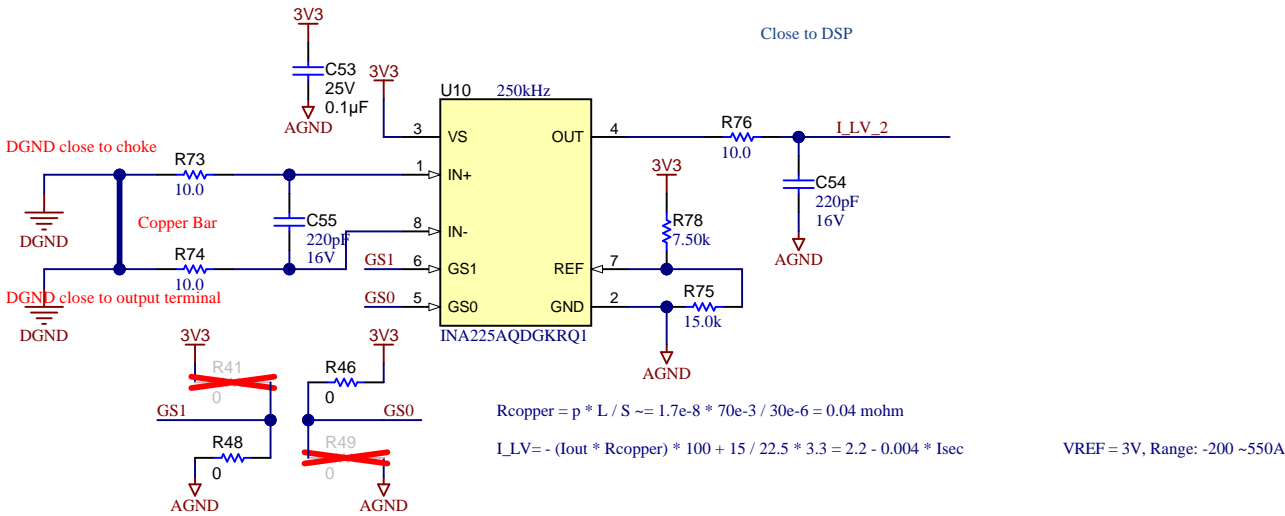
$$I_{HV} = (|I_{pri} / 100| * 5) * 2 = 0.1 * |I_{pri}|$$
$$VREF = 3V, \text{ Range: } -30 \sim 30A$$

Secondary Inductor Current: INA296



$$R_{sense} = 0.05 \text{ mohm}$$
$$I_{LV} = I_{out} * 0.05 / 1000 * 100 + 1.1 = 1.1 + 0.005 * I_{out}$$
$$VREF = 3V, \text{ Range: } -220 \sim 380A$$

Secondary Output Current: INA225



$$R_{copper} = p * L / S \sim 1.7e-8 * 70e-3 / 30e-6 = 0.04 \text{ mohm}$$
$$I_{LV} = - (I_{out} * R_{copper}) * 100 + 15 / 22.5 * 3.3 = 2.2 - 0.004 * I_{sec}$$
$$VREF = 3V, \text{ Range: } -200 \sim 550A$$

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Orderable:	Designed for: Public Release	Mod. Date: 12/19/2024
TID #:	Project Title: HV-LV DCDC ref design	
Number: Mother Board	Rev: A	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: PMP41139 SHB version	Sheet: 5 of 6
Drawn By: Forest Fu	File: I Sensor.SchDoc	Size: B
Engineer: Forest Fu	Contact: http://www.ti.com/support	

PCB Number: Mother Board
PCB Rev: A



PCB
LOGO
FCC disclaimer

PCB
LOGO
WEEE logo



DANGER HIGH VOLTAGE



CAUTION HOT SURFACE



CAUTION HOT SURFACE

LBL1
PCB Label

THT-14-423-10
Size: 0.65" x 0.20 "

ZZ1
Label Assembly Note
This Assembly Note is for PCB labels only

Variant/Label Table	
Variant	Label Text
001	ChangeMe!
002	ChangeMe!

ZZ2
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ3
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

ZZ4
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.

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Orderable:	Designed for: Public Release	Mod. Date: 7/9/2024
TID #: PMP41139	Project Title: HV-LV DCDC ref design	
Number: Mother Board	Rev: A	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: PMP41139 SHB version	Sheet: 5 of 5
Drawn By: Forest Fu	File: DCDC MotherCard_Hardware.SchDoc	Size: B
Engineer: Forest Fu	Contact: http://www.ti.com/support	