



## MSN12VD30-FR series EVB Guide

### Electrical Specification:

Parameters	Symbol	Value	Note
Input Voltage	VIN	4.5V~14.0V	
Output Voltage	VOUT	0.5V to 2.5V (10mV/step) 0.25V to 1.52V (5mV/step)	
Output Current	IOUT	30A	
VDD	VDD50	5.0V	
	VDD33	3.3V	
Frequency	Fs	714KHz	
Input capacitor	Cin	10uF/16V /1206 /X7R x3pcs 100nF/16V/0402/X7R x1pcs	
Output capacitor	Cout	Module side : 22uF/6.3V/0805 /X6S x 7pcs 10uF/10V/0603/X7T x 5pcs 470uF/2.5V POSCAP x 3 pcs	

### Output Voltage Setting:

The MP0/MP1 is multi-purpose pin achieve difference output voltage when pin pull high or pull low. The default value is in following table.

Table1 Output Voltage Setting by MP0 and MP1:

	MSN12VD30-FR-VDC1	MSN12VD30-FR-VDA1	MSN12VD30-FR-VDT1
MP0=0, MP1=0	1.25V	0.72V	0.72V
MP0=1, MP1=0	1.0V	0.75V	0.75V
MP0=0, MP1=1	1.1V	0.85V	0.80V
MP0=1, MP1=1	1.2V	0.95V	0.90V

## Connections and Operating Instructions:

The MSN12VD30-FR series demo board requires a single +12 V supply for the input power. Operating from a single +3.3V (VDD33) and +5.0V (VDD50) supply to the MSN12VD30-FR series, an on-chip low drop-out (LDO) regulator generates an internal +1.2V voltage. Module operation is initialized by an internal threshold based power-on reset circuit. The MSN12VD30-FR series can deliver up to 30A load current. Table 2 lists the connectors, switches and test points on the board.

Table2 Connections:

Label		Descriptions
Power connectors	VIN	Connect input power (+12 V) to this connector.
	GND	Return of input power.
	VOUT	Connect a load (30 A max.) to this connector.
	GND	Return of output power.
VDD inputs Connector	VDD33	Apply an external 3.3 V supply for the bias voltage.
	VDD50	Apply an external 5 V supply for the bias voltage.
	GND	Return of VDD power.
Jumper	Disable	Float = Module on, Short= Module off.
Jumper	MP0	Float = MP0 pull high, Short= MP0 pull low
Jumper	MP1	Float = MP1 pull high, Short= MP1 pull low
VIS+, VIS-	VIN_Sense	VIS+: VIN_Sense, VIS-: GND_Sense
VOS+, VOS-	VIN_Sense	VOS+: VOUT_Sense, VOS-: GND_Sense
connector	VALRT#	SVID active low ALERT# signal.
	SDA	PMBus line for SDA.
	SCL	PMBus line for SCL.
	RESET#	Test points to sense RESET# signal.
	AVRRDY	Test points to sense AVRRDY signal.
	AVRDY	Test points to sense VRHOT signal.
	PINALRT#	Test points to sense PINALRT# signal.
	SVID_CLK	Test points to sense SVID clock line.
	SVID_DIO	Test points to sense SVID data line.

## Quick Start Guide:

1. Choose the VID voltage by short MP0 or MP1 to GND by jumper.
2. Give the 3.3V power and then 5V power as following figure.
3. Give the 12V Power and Loading as following figure
4. At Default, AVREN is enabled by pulling high to 3.3V Power by 100kΩ on EVB. And short AVREN to GND by disable jumper to disable module.
5. Connect the SCL, SDA and GND to dongle to do the PMBus communication.

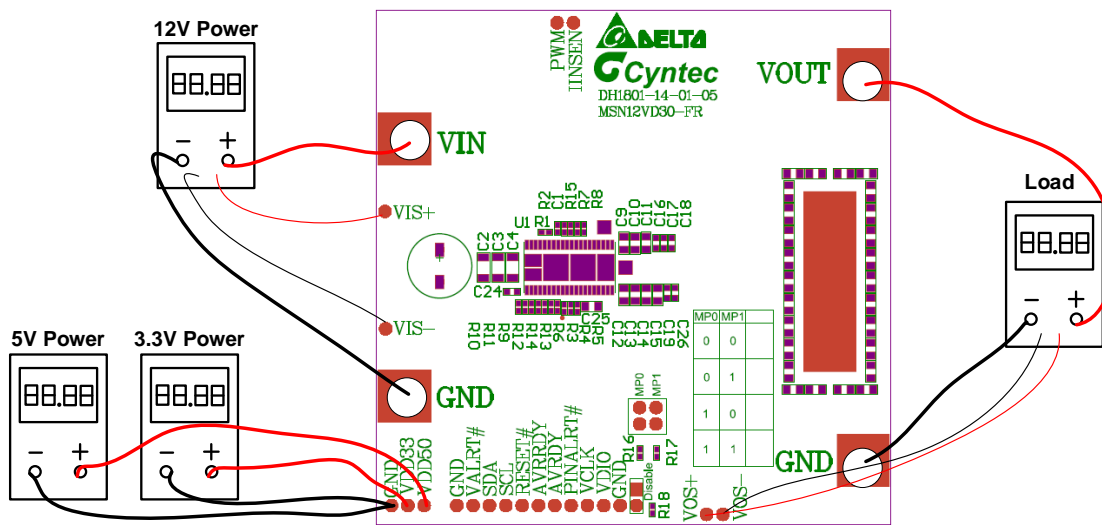


Figure 1: Evaluation Board (Top) Overview

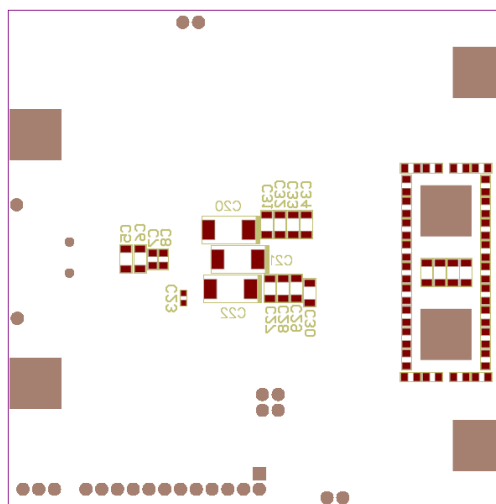


Figure 2: Evaluation Board (Bottom) Overview

## Reference Design Board Schematic:

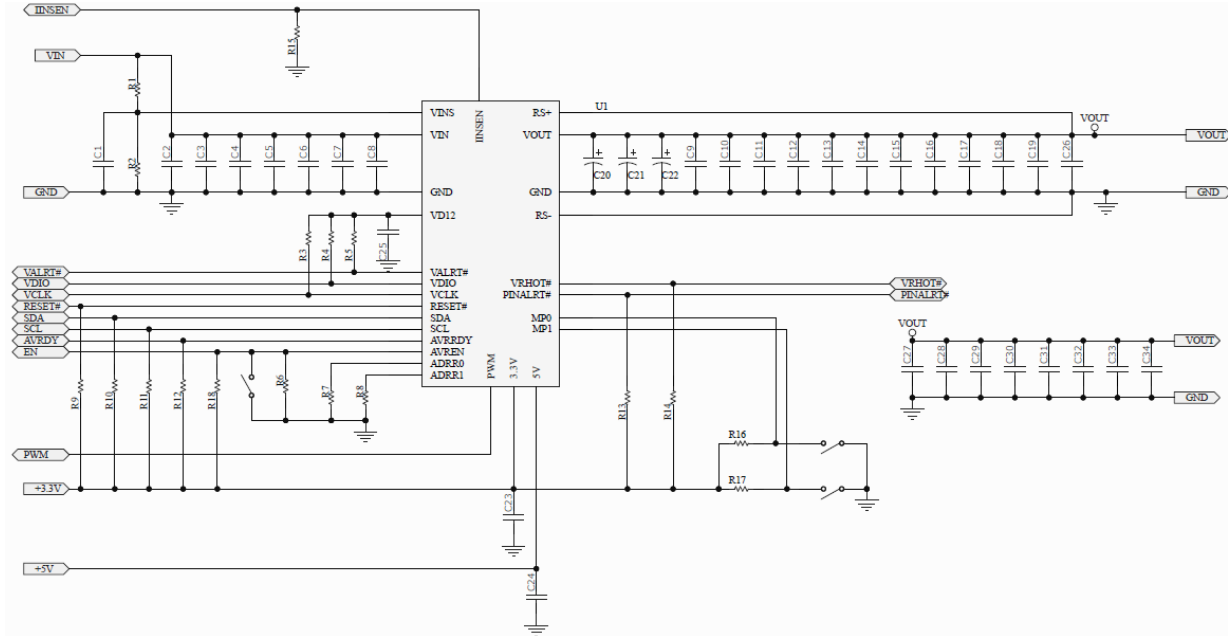
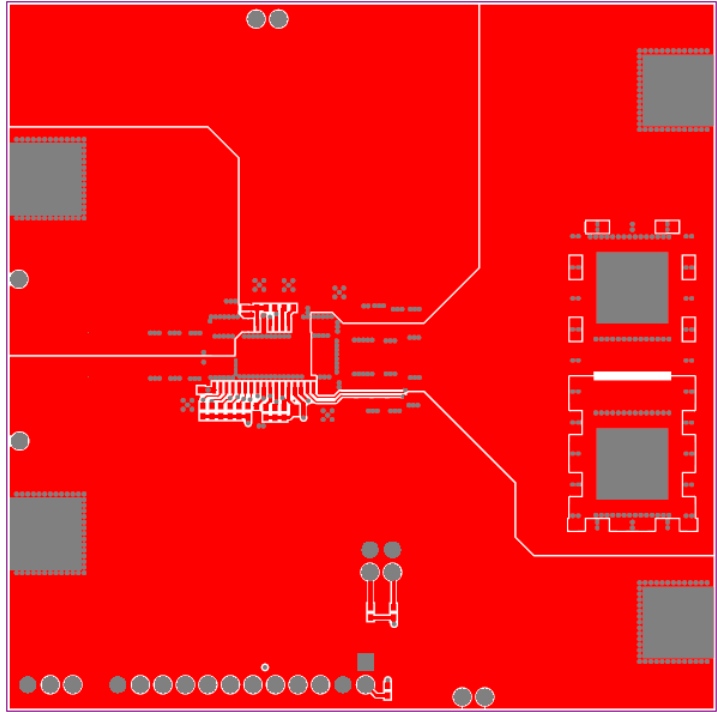


Figure 3: Reference Design Board Schematic

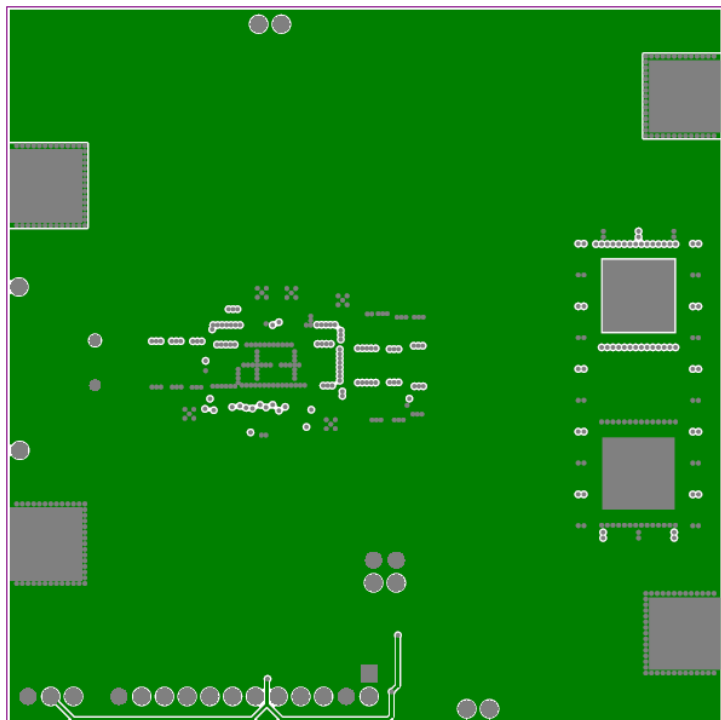
## BOM List:

COUNT	REF DES	DESCRIPTION	PART NUMBER	MFR
1	U1	Power Module,	MSN12VD30-FR series	CYNTEC
3	C20, C21, C22	POSCAP SMD 470uF/2.5V	2R5TPE470M9	Panasonic
3	C2, C3, C4	CAP MC SMD 10uF/16V/1206/X7R	GRM31CR71C106KAC7	Murata
7	C9,C10,C11,C12,C13, C14,C15	CAP MC SMD 22uF/6.3V/0805/X6S	GRM21BC80J226ME51L	Murata
5	C16, C17, C18, C19, C26	CAP MC SMD 10uF/10V/0603/X7T	GRM188D71A106MA73D	Murata
2	C23, C24	CAP MC SMD 2.2uF/10V/0603/X7R	GRM188R71A225KE15D	Murata
1	C25	CAP MC SMD 1uF/16V/0603/X7R	GRM188R71C105KA15D	Murata
1	C1, C8	CAP MC SMD 100nF/16V/0402/X7R	GRM155R71C104KA88	Murata
4	R1, R16, R17, R18	RES SMD 1/16W 100kohm 0402		CYNTEC
1	R2	RES SMD 1/16W 1.5kohm 0402		CYNTEC
10	R3, R4, R5, R9, R10, R11, R12, R13, R14, R15	RES SMD 1/16W 1.0kohm 0402		CYNTEC
1	R7	RES SMD 1/16W 16kohm 0402		CYNTEC
1	R8	RES SMD 1/16W 4.02kohm 0402		CYNTEC
0	C5, C6, C7, C27-C34, R6	N.C		

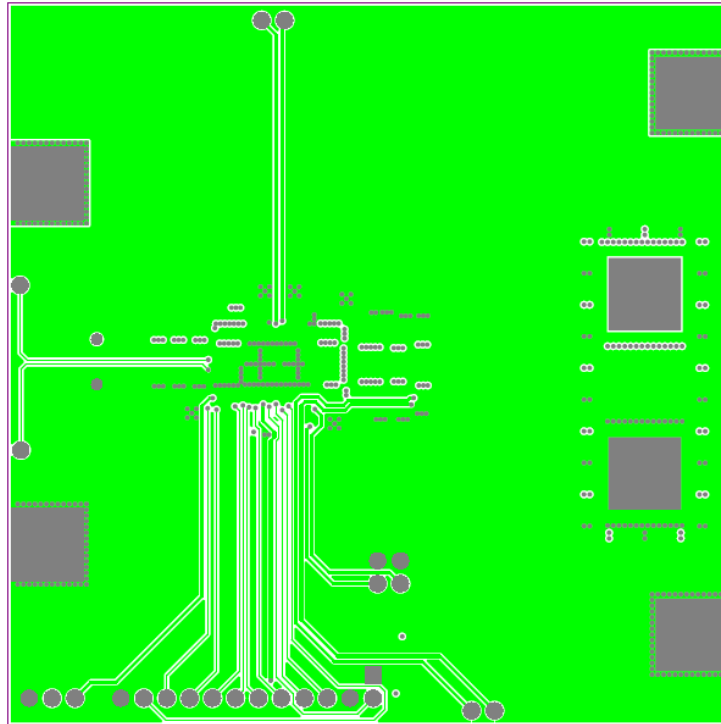
## Printed Circuit Board Layout:



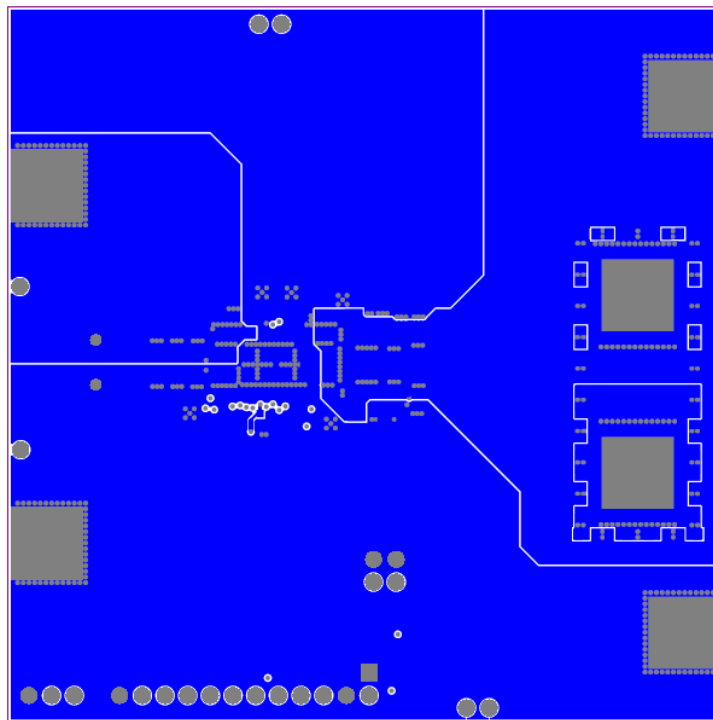
TOP Layer



Middle Layer 1



Middle Layer 2



Bottom Layer



## MSN12VD30-FR series EVB Guide

### Revision History:

Date	Revision	Changes
2019.01.07	P01	Initial EVB guide.
2021.11.29	P02	Modify the BOM and schematic
2022.03.15	P03	Modify MSN12VD30-FR-VDC1, MP0=0, MP1=0, output voltage
2022.11.03	P04	Add C8=0.1uF to BOM consistent with the datasheet schematic