ELECTRICAL SPECIFICATION:

Parameters	Symbol	Value	Note
Input Voltage	VIN	4.75V~26.5V	
Output Voltage	VOUT	3.0V~21V	
Output Current	IOUT	3A	

OUTPUT LINE-DROP COMPENSATION

In charger applications, the large load will cause voltage drop in the output cable. The MPN24AD03-UP has a built-in cable compensation function. The adjustable Line Compensation (mV)/A is set according to the following equation 1:

$$I_{OUT} \times R_{SENSE} \times k \times \left[\frac{(R_{FB\_T}+R_{FB\_B})}{R_{FB\_B}}\right] \quad \text{(EQ.1)}$$

When R4=$R_{EN/COMP\_SEL} = 360k\Omega \ or \ Floating \ , k = 0.8$

$R_{EN/COMP\_SEL} = 180k\Omega \ , k = 1.2$

$R_{EN/COMP\_SEL} = 91k\Omega \ , k = 1.6$

$R_{EN/COMP\_SEL} = 43k\Omega \ , disable \ Line \ Compensation$

OUTPUT OVER CURRENT LIMIT

The Output Current limit is set at 3.5A by default with an external resistance R1=R_{SENSE} =10mΩ , When the (CSP_OUT) - (CSN_OUT) voltage gets higher than 35mV and reaches the current limit, the driver is turned off. MPN24AD03-UP provides the lower output over current protection by external sense resistor, R_{sense}. Please refer to below equation 2 to get the lower limit.

$$I_{OCP} = 35mV / \ R_{SENSE} \quad \text{(EQ.2)}$$

PROGRAMMING OUTPUT VOLTAGE

PROGRAMMING OUTPUT VOLTAGE:

Method 1:

The module has an internal 1V±1.0% reference voltage. The output voltage can be programmed by the dividing resistor (R_2 and R_3). The output voltage can be calculated by Equation 3, resistor choice may be referred to TABLE 1.

$$V_{OUT} = 1 \times \left(1 + \frac{R_2}{R_3}\right) \quad \text{(EQ.3)}$$

$$R_3 \leq 100k\Omega \ \text{, at } V_{OUT} = 3.3V \sim 21V$$

TABLE 1. Resistor values for common output voltages

VOUT (V)	R_2(kΩ)	R_3(kΩ)
3.3	57.5	25
5.0	100	25
9.0	200	25
12.0	275	25
20.0	475	25

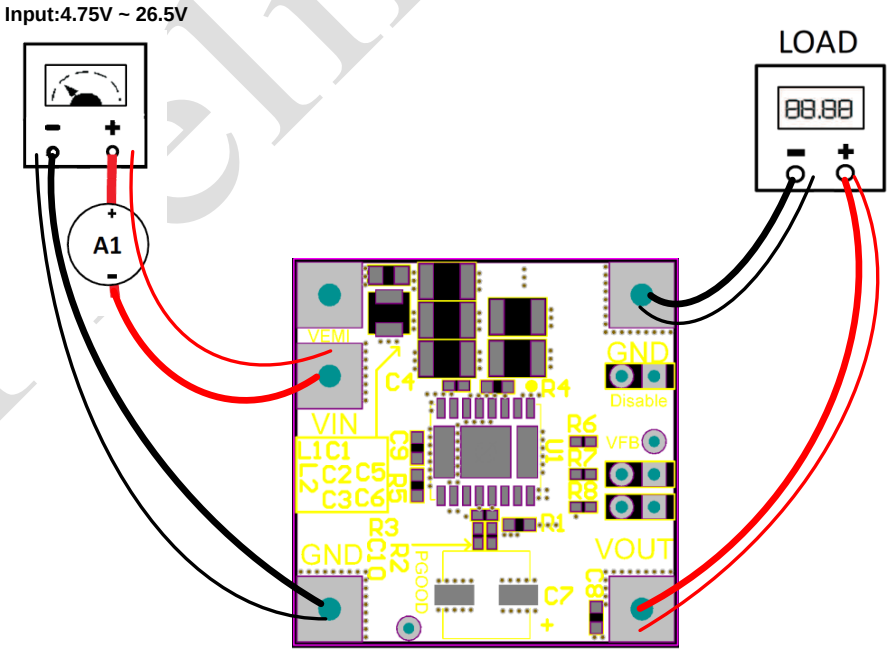


Figure 1. MPN24AD03-UP Recommended Test Setup

PROGRAMMING OUTPUT VOLTAGE: (Cont.)

Method 2:

The Vout can be adjusted by varying the voltage at the Vfb pin from a negative voltage source. See Table 2 for setting.

TABLE 2. Vout vs negative voltage

VOUT (V)	VFB (V)
6.0	0
9.0	-3
12.0	-6
20.0	-14

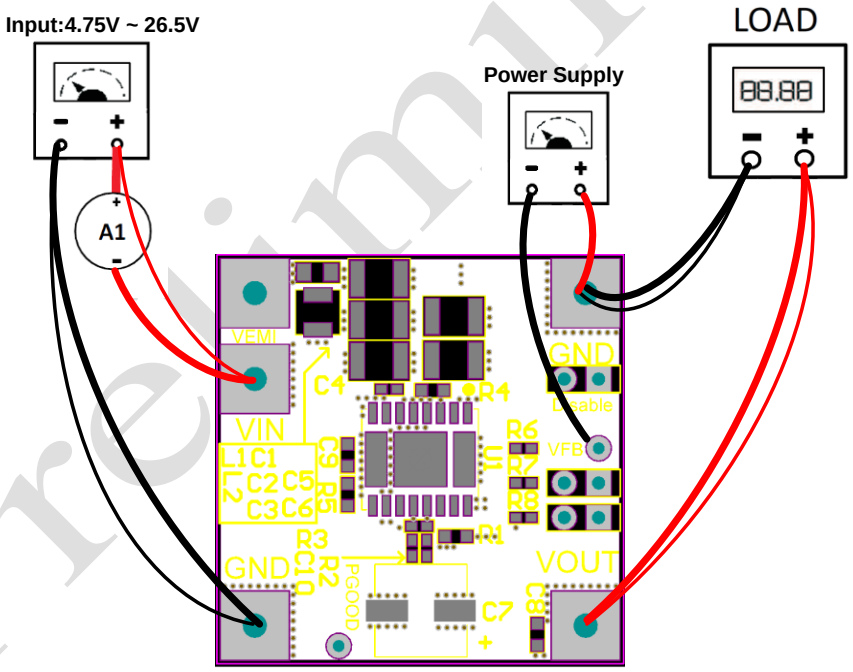
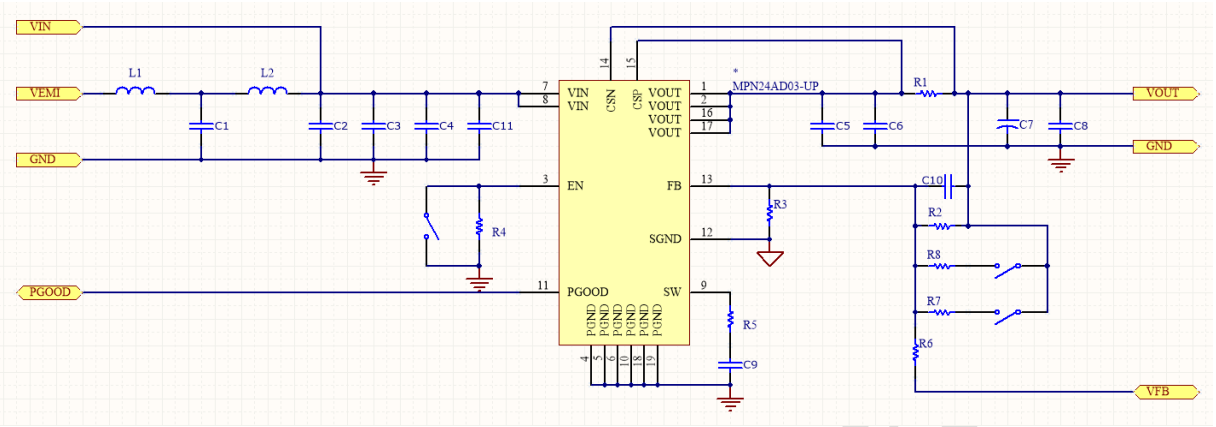


Figure 2. MPN24AD03-UP Recommended Test Setup

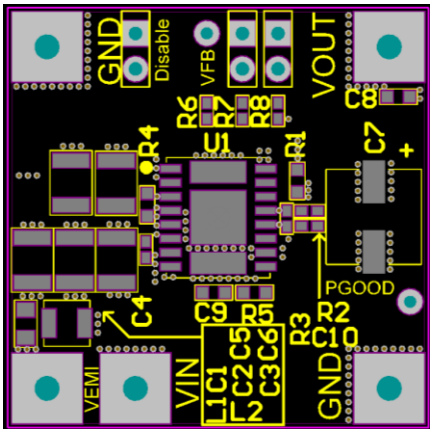
EVALUATION BOARD SCHEMATIC:



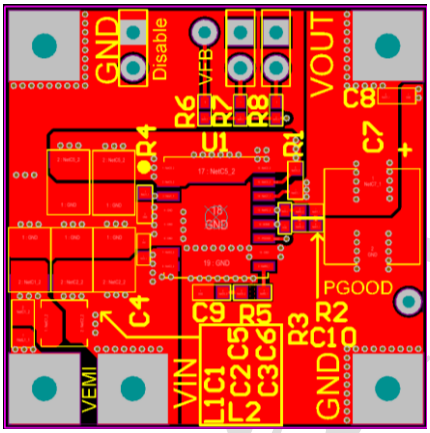
BOM LIST:

COUNT	REF DES	DESCRIPTION	PART NUMBER	MFR
2	C2,C3,	MLCC,10uF/50V 1210 X7R	GRM32ER71H106KA12	Murata
1	C4	MLCC,10nF/50V 0402 X7R	0402B103K500	WALSIN
1	C6	MLCC,22uF/25V 1210 X7R	GRM32ER61E226ME15	Murata
1	C7	ALUM POLY, 56uF/25V	APXG250ARA560MF61G	United Chemi-Con
1	C8	MLCC,0.1uF/25V 0603 X7R	GRM188R71H104KA93D	Murata
0	C1,C5 C9,C10,C11	DXP		
1	R1	Resistor,10m Ohm,±1%,0603	RLM-0816-4F-R010-FNH	Cyntec
2	R2,R6	Resistor,100K Ohm,±1%,0402	Std	Cyntec
1	R3	Resistor,25K Ohm,±1%,0402	Std	Cyntec
1	R4	Resistor,180k Ohm,±1%,0402	Std	Cyntec
0	R5,R7,R8	DXP		
0	L1,L2	DXP		
1	U2	Power module, 7.4*8.6*6.0mm	MPN24AD03-UP	Cyntec

PRIENTED CIRCUIT BOARD LAYOUT:



Top Component Side



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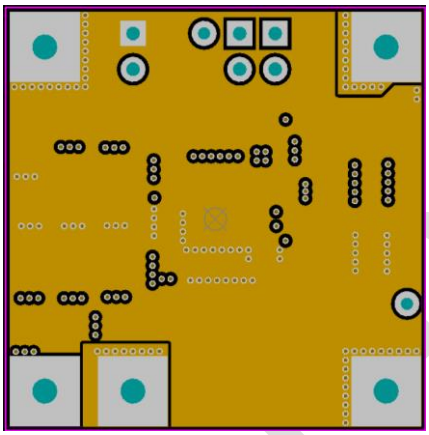

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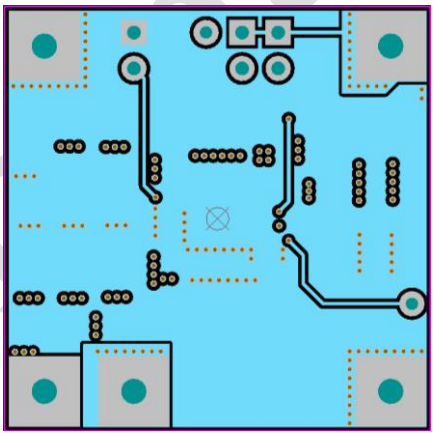

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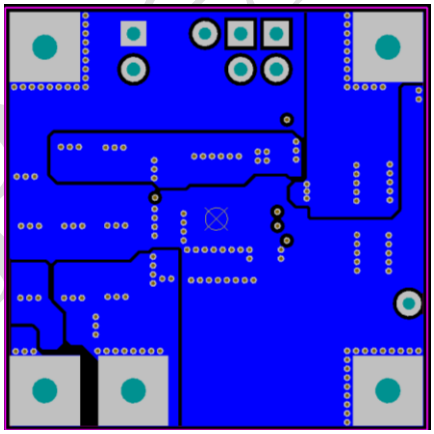
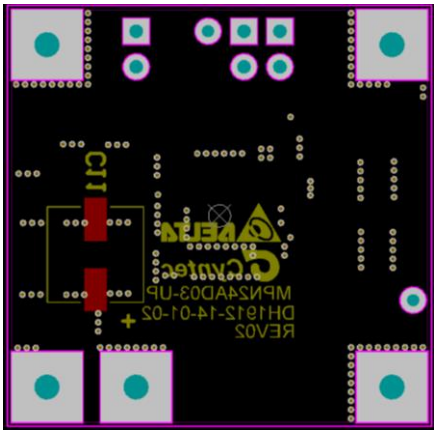


Bottom Layer



Bottom Component Side

REVERSION HISTORY:

Date	Revision	Changes
2020.03.04	00	Issue initial preliminary EVB guide.
2020.08.14	01	Add PGOOD function