

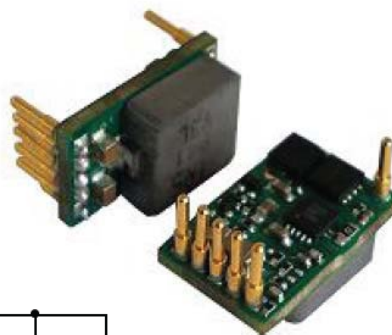
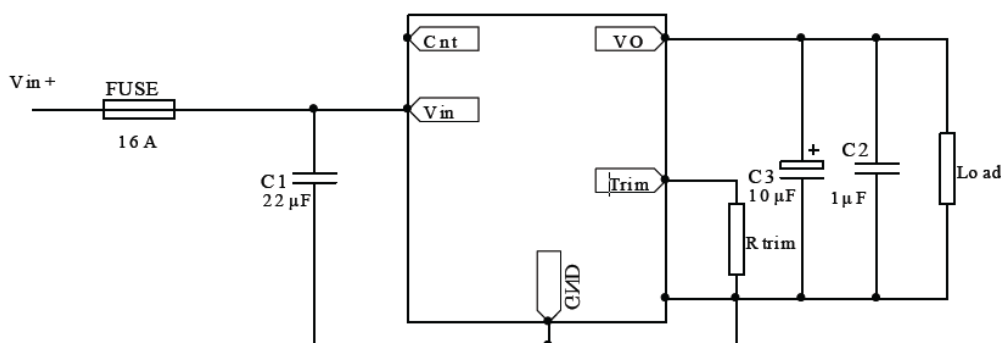
1. Features :

- Power Module Size 10.4mm x 16.5mm x 10.2mm SIP.
- Maximum Output Current 10 A.
- Input Voltage Range from 3.3V to 14 V.
- Output Voltage Range from 0.59V to 5.1 V
- Protections (OCP, UVLO, OTP)
- Operating Temperature Range: -40°C to 85°C
- RoHS UL/IEC/EN60950compliant

2. Applications :

- High performance Computing.
- Data Center..
- Communications System.
- Automation

3. Typical Application Circuit:

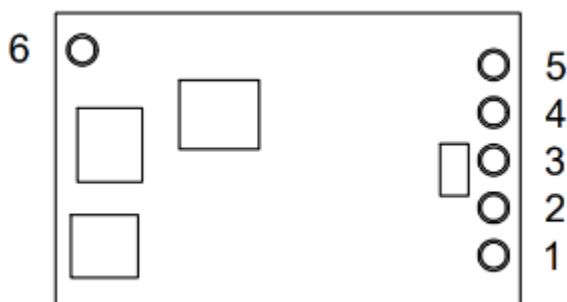


Type	Vin Typical (V)	VOUT Typical (V)	Suggested Fsw	Typical Application	Module Size L x W x H (mm)
SIP	12.0	1.8	600KHz	Communications	10.4 x 16.5x 10.2

5. Order Number Examples

Part number	VIN	VOUT	Module Size L x W x H (mm)	Configuration
PD12N6C010	12.0V	0.59V to 5.1 V	10.4 x 16.5x 10.2	Non-Isolated step-down power module

6. Pin Configuration:



7. Pin Description:

PIN NO.	NAME	DESCRIPTION
1	EN	This function is achieved by applying the appropriate control level .
2	VIN	Input voltage pin. Place input capacitors between this pin and GND.
3	GND	Common ground
4	VOUT	Regulator output voltage. Place output capacitors between this pin and GND.
5	Trim	By adjusting the value of the Rtrim resistor, the output voltage can be set.
6	Support or Sense	Sense compensation. The +Sense pin should be connected to Vo.

8.1 Suggested Operating Conditions ⁽¹⁾:

- Supply Voltage VIN 3.3 V to 14 V
- Output Voltage.....0.59 V to 5.1 V
- Single Output Maximum Continuous Current 10 A
- Operating Temperature..... - 40 °C to + 85 °C

8.2 Absolute Maximum Ratings ⁽²⁾:

- Supply Voltage VIN 16 V
- EN Pin-0.3V to 14V
- VOUT Pin-0.3V to 5.5V
- Trim Pin-0.3V to 5.5V
- Junction Temperature 125 °C
- Storage Temperature – 55 °C to + 125 °C

Notes:

(1). Exceeding these ratings may damage the device.

(2). The device is not guaranteed to function outside of its operating conditions.

9. Electrical Characteristics:

Conditions: Ta = 25°C for typical value 1000uF electrolytic capacitor and 330uF x 2 tantalum

Parameter	Symbol	Condition	Min	Typ	Max	Units
INPUT ELECTRICAL						
Input Voltage	V _{IN}		4.5	12	14	V
VIN Under Voltage Lockout Threshold Rising	V _{INR}		1.8		2.9	v
VIN Under Voltage Lockout Threshold Hysteresis	V _{IN_HYS}			200		mV
EN input high threshold	V _{EN_H}		0.8	-	14	V
EN input low threshold	V _{EN_L}		0	-	0.3	V
OUTPUT ELECTRICAL						
Output Voltage	V _{OUT}		0.59	-	5.1	V
Output Current	I _{OUT}		0	-	10	A
Load regulation	V _{LOAD}		-	±0.5	±1	%VO
Line regulation	V _{LINE}		-	±0.2	±0.5	%VO
Transient	Tr	0.1A/μs , Vin=12V 50%~100% I _{nom}	-	±150	±150	mV
			-	20	50	us
Over Current Protection	I _{OCP}		12	-	-	A
Soft-Start	T _{rise}		-	5	-	mS
Power On Delay	T _{Delay}		-	10	-	mS
Capacitive load	Co	Vo=0.59 , 0.9V	0	-	8400	uF
		Vo=1.8 , 2.5V	0	0	2200	uF

9. ELECTRICAL Characteristics (continue):

Conditions: Ta = 25°C for typical value

Parameter	Symbol	Condition	Min	Typ	Max	Units
Other						
Efficiency	η	Vin=12V, Vo=0.9V, 10A		81		%
		Vin=12V, Vo=1.8V, 10A		84		%
		Vin=12V, Vo=2.5V, 10A		92		%
		Vin=12V, Vo=5.0V, 10A		95		%
Switch Frequency	FSW		-	600	-	kHz
Over Temperature Protection	OTP		100	105	110	°C

10. Output Voltage Adjustment

The output voltage can be adjusted from 0.59 V to 5.1 V by changing the external resistor Rtrim connected between the TRIM pin and GND, as shown in Figure 10-1. The relationship between output voltage and Rtrim is given by the following equation:

$$R_{trim} = \frac{1.182}{(V_{out} - 0.591)}$$

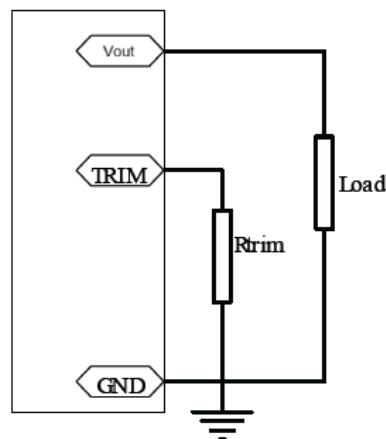
where V_{out} is the desired output voltage.

Table 10-1 provides the recommended resistor values for common output voltages. For best accuracy, we recommend using resistors with 1% or 0.5% tolerance.

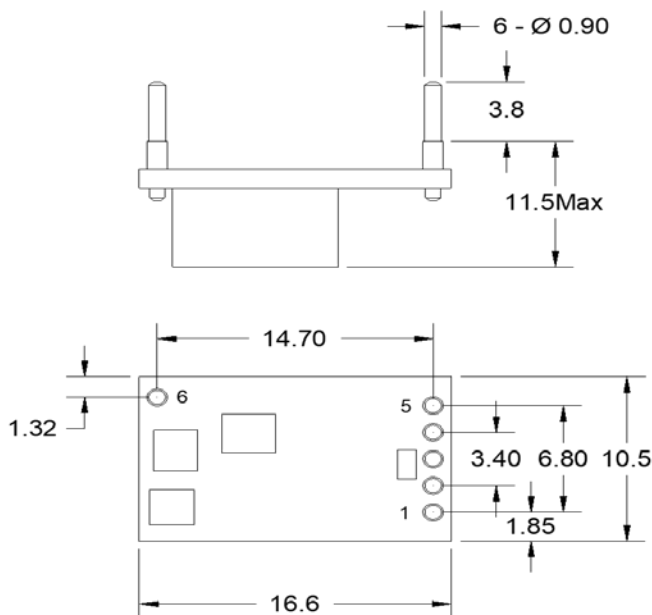
Table 10-1 – External Resistor Values for Output Voltage Adjustment

Vout (V)	R-trim (kΩ)
0.59	open
0.9	3.825
1.2	1.941
1.8	0.978
2.5	0.619
3.3	0.436
5.0	0.268
5.1	0.262

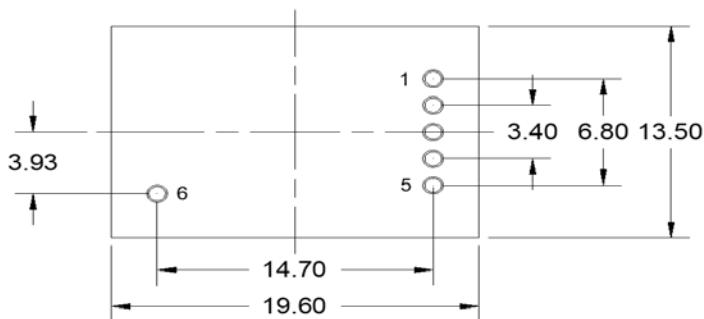
Figure 10-1 – Output Voltage Adjustment Circuit



11. Mechanical Information :



Recommend Board Layout





PD12N6C010



12. Revision History

Revision table

Date	Version	Changes
20251022	Rev. P01	New document