

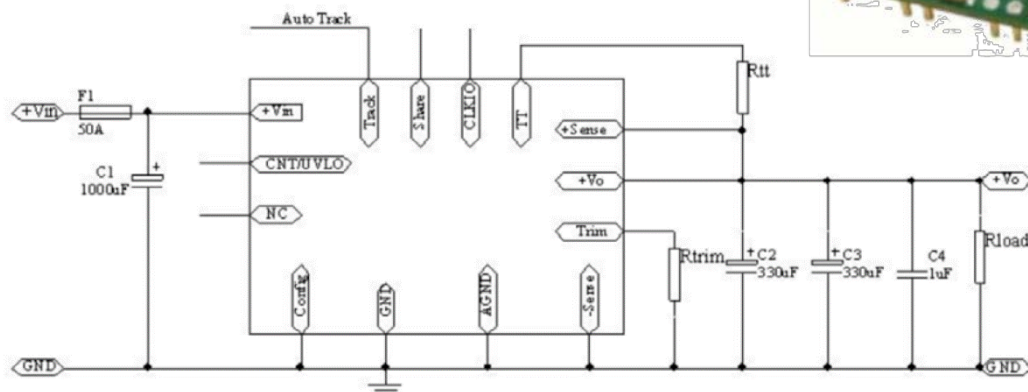
1. Features:

- Power Module Size 38.61mm x 25.9mm x 9.64mm SIP.
- Maximum Peak Current: 50A.
- Input Voltage Range from 4.5V to 14 V.
- Output Voltage Range from 0.7 to 3.6 V.
- Protections (OCP, UVLO, OTP).
- Operating Temperature Range: -40°C to 85°C
- RoHS.

2. Applications:

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

3. Typical Application Circuit:



4. Description:

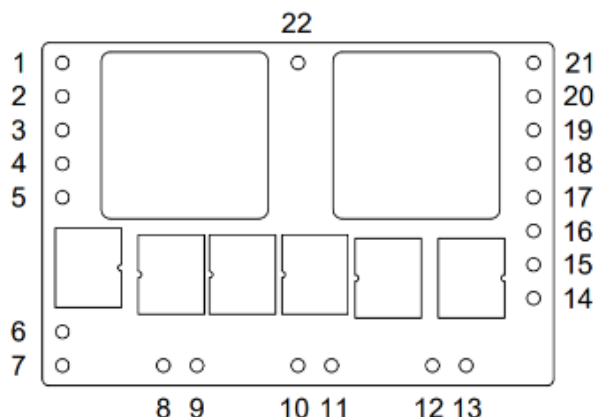
This product is a non-isolated step-down power module featuring a wide input voltage range and an adjustable output voltage. It delivers an output current of up to 50 A and adopts an SIP (Single In-line Package) design, peck efficiency to 95%, providing excellent ease of use and seamless integration into various applications. In addition, the module incorporates comprehensive protection features, including OCP (Over-Current Protection), OVP (Over-Voltage Protection), and UVLO (Under-Voltage Lockout), along with an automatic retry function to ensure reliable and safe system operation.

Type	Vin Typical (V)	Vo Typical (V)	Suggested Fsw	Typical Application	Module Size L x W x H (mm)
SIP	12.0	1.8	600kHz	Communications	38.61 x 25.9 x 9.64

5. Order Number Examples:

Part number	VIN	VOUT	Module Size L x W x H (mm)	Configuration
PD12N7F050	12.0V	0.7 to 3.6V	38.61 x 25.9 x 9.64	Non-Isolated step-down power module

6. Pin Configuration:



7. Pin Description:

PIN NO.	NAME	DESCRIPTION
1	CONFIG	When two modules share current, the module whose CONFIG pin is connected to ground is the master module, and the one connected to VIN is the slave module. Leave floating when not sharing current.
2	Share	When two modules share current, connect the Share pins of both modules together. Leave floating when not sharing current.
3	COMP	When two modules share current, connect the Comp pins of both modules together. Leave floating when not sharing current.
4	AGND	Module analog ground. Provides the return path for Rset. When two modules share current, connect this pin together. Rset should only be connected on the master module.
5	CLKIO	When two modules share current, connect the CLKIO pins of both modules together. Leave floating when not used.
6,7,14,15	VIN	Input voltage pin. Place input capacitors between this pin and GND.
8,9,12,13	GND	Common ground.
10,11	VO	Regulator output voltage. Place output capacitors between this pin and GND.
16	-Sense	Sense compensation. The -Sense pin should be connected to GND.
17	+Sense	Sense compensation. The +Sense pin should be connected to Vo.
18	Trim	By adjusting the value of the Rtrim resistor, the output voltage can be set.
19	TT	TurboTrans(TT) fast transient response function enhances the module's dynamic load regulation.
20	Track	This analog input pin allows the output voltage to follow an externally applied voltage.
21	CNT/UVLO	Pulling this pin low disables module output. Leaving it open or pulling it high enables normal operation. Connecting a resistor between this pin and GND allows modification of the input under-voltage lockout threshold.
22	NC	No connection.

8.1 Suggested Operating Conditions ⁽¹⁾:

- Supply Voltage VIN.....4.5V to 14V
- Output Voltage VOUT.....0.75V to 3.6V
- Single Output (2 phase) Maximum Continuous Current 50A
- Operating Temperature.....-40°C to +85°C

8.2 Absolute Maximum Ratings ⁽²⁾:

- Supply Voltage VIN.....16V
- EN Pin.....-0.3V to 16V
- VOUT Pin.....-0.3V to 4.0V
- Trim Pin.....-0.3V to 4.0V
- 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}		4.1		4.4	v
EN input high threshold	V _{EN_H}		3	-	14	V
EN input low threshold	V _{EN_L}		0	-	0.6	V
OUTPUT ELECTRICAL						
Output Voltage	V _{OUT}		0.70	-	3.6	V
Output Current	I _{OUT}		0	-	50	A
Output Accuracy	V _{ACC}		-1	-	1	%Vo
Output Ripple	Ripple	1uF MLCC , 330uF x2 tantalum	-	-	100	mV
Load regulation	V _{LOAD}		-	±0.5	±1	%Vo
Line regulation	V _{LINE}		-	±0.5	±1	%Vo
Transient	Tr	2.5A/μs ,Vin=12V 50%~100% I _{nom} W/O TT Co=66uF	-	±150	±280	mV
			-	100	200	us
		2.5A/us ,VIN=12V 50%~100%I _{nom} , W/TT,Co=330uF,Rtt=short	-	±45	±200	mV
			-	100	150	us
Over Current Protection	I _{OCP}		55	80	125	A
Soft-Start	T _{rise}		-	8	20	ms
Power On Delay	T _{Delay}		-	6	20	ms
Capacitive load	Co	With TT	660	-	1000	uF
		Without TT	660	-	8000	uF

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*Due to continuous product improvement, all specifications are subject to change without prior notice. Kindly contact an ITG field application engineer or a sales representative prior to purchase.



PD12N7F050



11. Revision History:

Revision table

Date	Version	Changes
20251022	Rev. P01	New Document