Typical Features

- Wide input voltage range (4:1), output power 40W
- Efficiency up to 88%(Typ.)
- Standby power consumption 0.3W(Typ.)
- Continuous short circuit protection, Self-recovery
- Input under voltage, output over voltage, short circuit, over current protections
- Isolation voltage 1500VDC
- Operating temperature from -40°C to +85°C
- Ultra-slim package: 9.5mm height
- Excellent EMC performance
- International Standard Pinout

Application Field

The **FD40-18SXXB3(C)(-T)(-TS) series** consists of 40W DC-DC converters featuring a 4:1 ultra-wide input range, ultra-fast start-up, and 1500VDC isolation. These modules provide a regulated single output and are available in DIP, chassis (terminal), and DIN-rail packages. Comprehensive protections include Input UVP; Output OCP, SCP, and OVP. Engineered for reliability in industrial control, power systems, telecommunications, railway, and robotics, these converters are ideal for demanding applications. For use in harsh EMI environments, please refer to our recommended application circuits.

Selection Guide

Certificate	Model	Input Voltage Range		Output Voltage/Current (Vo/Io)		Input Current @Nominal Input (Typ)		Max. Capacitive Load	Rated Full-Load Output Efficiency	
		Nominal Value (VDC)	Range Value (VDC)	Voltage (VDC)	Current (mA)	Full Load (mA)	No-load (mA)	uF	Min (%)	Typ (%)
-	FD40-18S12B3(C)	24	9–36	12	3333	1916	20	1000	85	87
-	FD40-18S24B3(C)	24	9-36	24	1666	1894	20	680	86	88

Notes：

1. Model Identification: Suffix "C" indicates the inclusion of Remote Control (Remote ON/OFF) and Trim (Voltage Adjustment) pins; models without this suffix do not include these features.
2. Packaging Options: Suffix "-H" denotes an integrated heatsink; "-T(H)" denotes chassis (terminal) mount (with heatsink); "-TS(H)" denotes DIN-rail mount (with heatsink).
3. Efficiency: All efficiency values are measured at nominal input voltage and rated output load.
4. Max. Capacitive Load: This represents the maximum allowable external capacitance for a successful start-up under rated load. Exceeding this limit may prevent the power supply from starting.
5. No-load/Light-load Operation: To minimize standby power and improve light-load efficiency, the IC operates in Frequency Hopping (Burst) mode. A minimum load of 5% or an external low-ESR electrolytic capacitor (≥ 470μF) is required; otherwise, output ripple may increase significantly.
6. Product Range: This list is for reference only. For models not listed, please contact our Sales Department.

Input Specifications

Items	Test Conditions	Min.	Typ.	Max.	Unit
Standby Power Consumption	Input Voltage Range	/	0.3	/	W
Maximum input current	Input Voltage Range	/	/	5.2	A
Start-up voltage	24 V nominal input	/	/	9	VDC
Under-Voltage Protection (UVP)	24V nominal input	7	8	8.8	VDC
Input inrush voltage (1sec.max)	24 V nominal input	-0.7	/	40	VDC
Reflected ripple current	Nominal input	/	150	/	mA
Input Filter	/	Pi-type filter			
Recommended Input Fuse	/	8,000 mA (fast-acting)			
Hot plug	/	N/A			
Ctrl (Remote Control)	Module On	Floating or High Level(3.0V–12VDC)			
	Module Off	Connected to -Vin or low level (0–1.2 VDC)			
	Off-state Input Current	/	1	/	mA

*Note: The voltage of Ctrl is relative to the input -Vin.

Output Specifications

Items	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Input Voltage Range	/	±0.5	±1	%
Voltage Regulation	Input Voltage Range (Max. output power≦rated power)	/	±0.5	±2	%
Load regulation	Nominal input, 10%–100% of rated load	/	±1	±2	%
Ripple & Noise	0%–100% load, 20 MHz bandwidth	/	50	100	mVp-p
Dynamic response time	25% of nominal load step, Input Voltage Range	/	300	500	us
Dynamic response deviation	25% of rated load step, Nominal Input Voltage	/	±3	±5	%
Temperature Coefficient	/	/	/	±0.02	%/°C
Start-up delay time	Input Nominal Voltage	/	30	60	ms
Output voltage adjustment (Trim)	Input Voltage Range	90	/	110	%Vo
Output Startup Overshoot		/	/	10	%Vo
Output Overvoltage protection		110	120	200	%Vo
Output Over-current Protection (OCP)		110	150	200	%Io
Short-circuit protection(SCP)		Sustainable, Self-recovery			

Note: Ripple & noise testing uses the parallel cable method; see the Ripple & Noise Test Instructions for details.

GeneralSpecifications

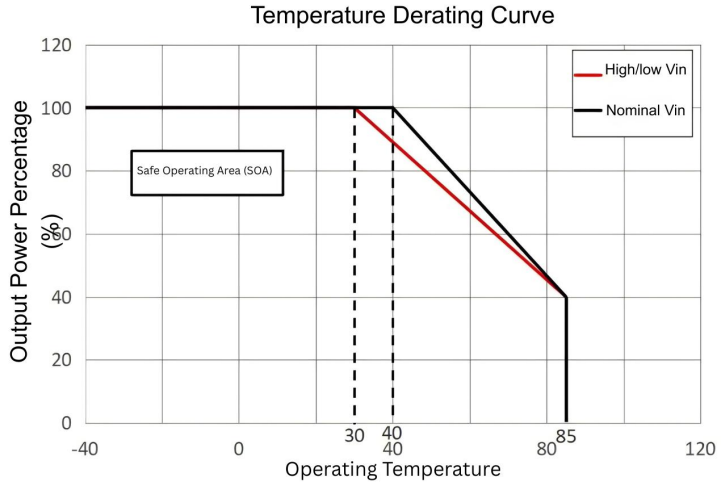
Items	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Operating Mode (PWM)	/	300	/	kHz
Operating Temperature	Use the reference temperature Derating Curve	-40	/	+85	°C
Storage Temperature	/	-55	/	+125	
Maximum case temperature	Within the operating curve range	/	/	+105	
Pin Soldering Temperature	1.5 mm from the case, 10s	/	/	300	
Relative Humidity	Non-condensing	5	/	95	%RH
Isolation Voltage	I/P-O/P, test 1min, leakage current <1 mA	1500	/	/	VDC
	I/P-O/P, test 1min, leakage current <1mA	1500	/	/	VDC

Isolation Capacitance	Input-Output, 100 kHz/0.1 V	/	2000	/	pF
Insulation Resistance	Input-Output, 500 VDC	100	/	/	MΩ
MTBF	MIL-HDBK-217F @ 25°C	1000	/	/	K hours
Cooling Method	Natural Convection				
Vibration	10–150 Hz, 5 G, 0.75 mm along X, Y, and Z				
Enclosure Material	Metal (Aluminum)				
Weight/Dimensions	Package Type	Weight (typ.)	Dimensions L x W x H		
	FD40-XXSXXB3(C)	28g	50.8 x 25.4 x 9.5 mm	2.00 x 1.00 x 0.374 in	
	FD40-XXSXXB3(C)-H	40g	50.8 x 25.4 x 19.5 mm	2.00 x 1.00 x 0.767 in	
	FD40-XXSXXB3(C)-T	49g	76 x 31.5 x 21.3 mm	2.99 x 1.24 x 0.838 in	
	FD40-XXSXXB3(C)-TH	61g	76 x 31.5 x 28.5 mm	2.99 x 1.24 x 1.122 in	
	FD40-XXSXXB3(C)-TS	69g	76 x 31.5 x 26 mm	2.99 x 1.24 x 1.023 in	
	FD40-XXSXXB3(C)-TSH	81g	76 x 31.5 x 33.2 mm	2.99 x 1.24 x 1.307 in	

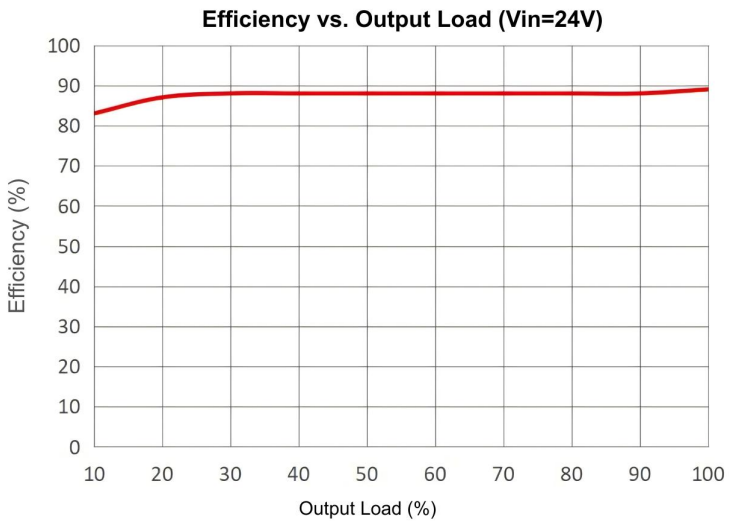
EMC Performance

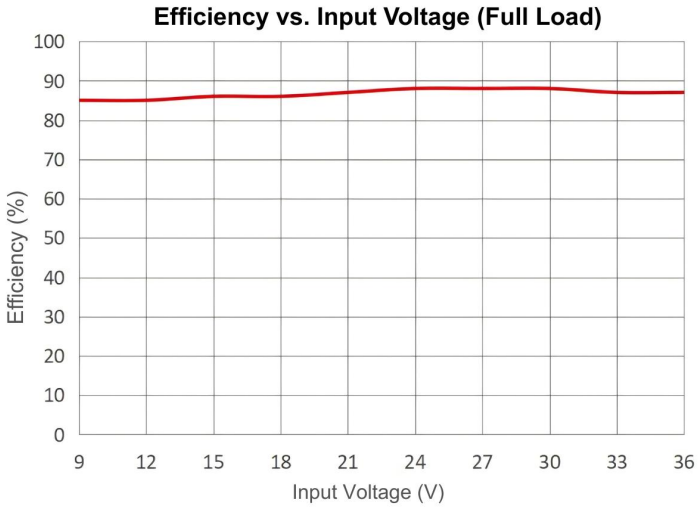
Total Item		Sub-item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR 32/EN 55032	CLASS B (with the Recommended External Circuit)
		RE	CISPR 32/EN 55032	CLASS B (with the Recommended External Circuit)
	EMS	Radiated Immunity	IEC/EN 61000-4-3	10 V/m Perf. Criteria A (with the Recommended External Circuit)
		CS	IEC/EN 61000-4-6	10 V r.m.s Perf.Criteria A (with the Recommended External Circuit)
		ESD	IEC/EN 61000-4-2	Contact ±6 KV Air ±8 KV Perf. Criteria A
		Surge Immunity	IEC/EN 61000-4-5	±2 KV Perf. Criteria A (with the Recommended External Circuit)
		EFT	IEC/EN 61000-4-4	±2 KV Perf. Criteria A (with the Recommended External Circuit)
		Magnetic field immunity	IEC/EN 61000-4-8	100 A/m Perf.Criteria A (with the Recommended External Circuit)

Temperature Derating Curve

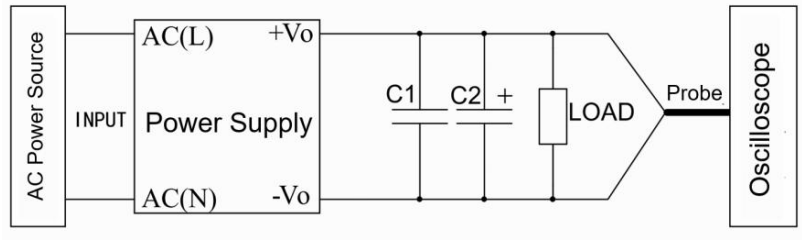


Product Efficiency Curves





Ripple & Noise Test Instruction (Parallel Cable Method, 20 MHz Bandwidth)



1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1μF) and one high-frequency low-resistance electrolytic capacitor C2(10μF) are connected in parallel with the probe.

2. Ripple & Noise Test Setup: Connect the module input to the power source and the output to the electronic load via a test fixture. Measure the output directly from the module's output pins using a dedicated sampling lead. Use insulated power cables with a gauge (AWG) suitable for the rated output current.

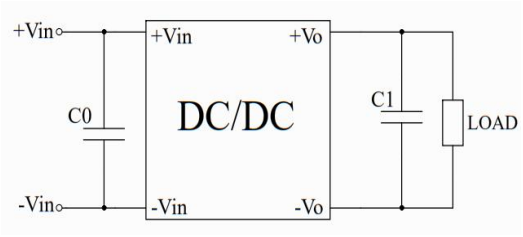
Application Reference:

1. Max. Capacitive Load: Measured under pure resistive full-load conditions.

2. Support: We offer comprehensive power solutions and custom product designs. Due to space limitations, please contact our technical or sales team for further inquiries.

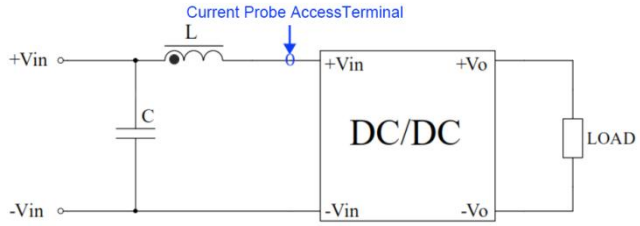
Recommended Circuits for Application

1. All this series of converters will be tested according to this circuit diagram before shipping. Increasing the capacity of C0 or C1 can decrease the output ripple, but the output capacitance must be less than the maximum capacitive load.



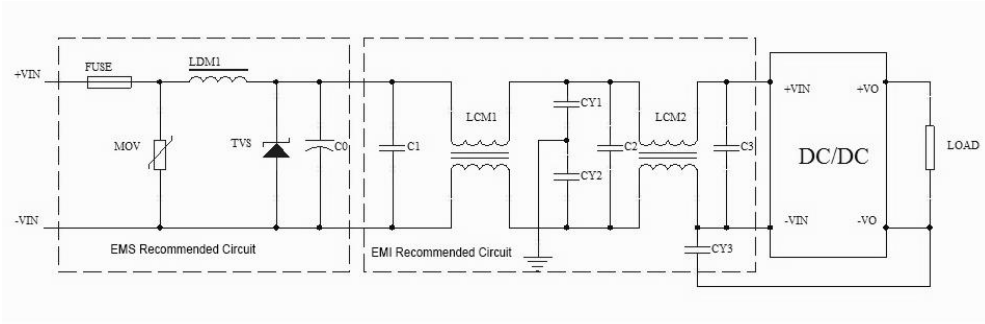
Components	Parameters
C0	47-100μF/200V
C1	22μF/100V

2. Input Reflected Ripple Current Test Circuit



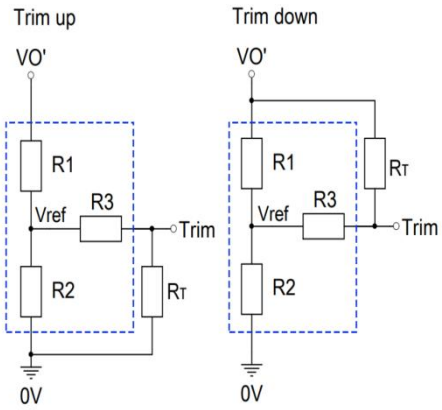
Components	Parameters
C	220μF/200V
L	4.7μH/15A

3. Recommended EMC circuit diagram



Components	Vin=24VDC
FUSE	Per Load Req.
MOV	14D201K
LDM1	56μH
TVS	SMCJ40A
C0	680μF/100V
C1,C2,C3	4.7μF/100V
LCM1	15mH
LCM2	56μH
CY1,CY2,CY3	1nF/2KV

4. Trim and calculation of Trim resistance



Note: Trim up & down circuits, the components in the dotted area are inside of the converter.

Calculation formula of Trim resistance:

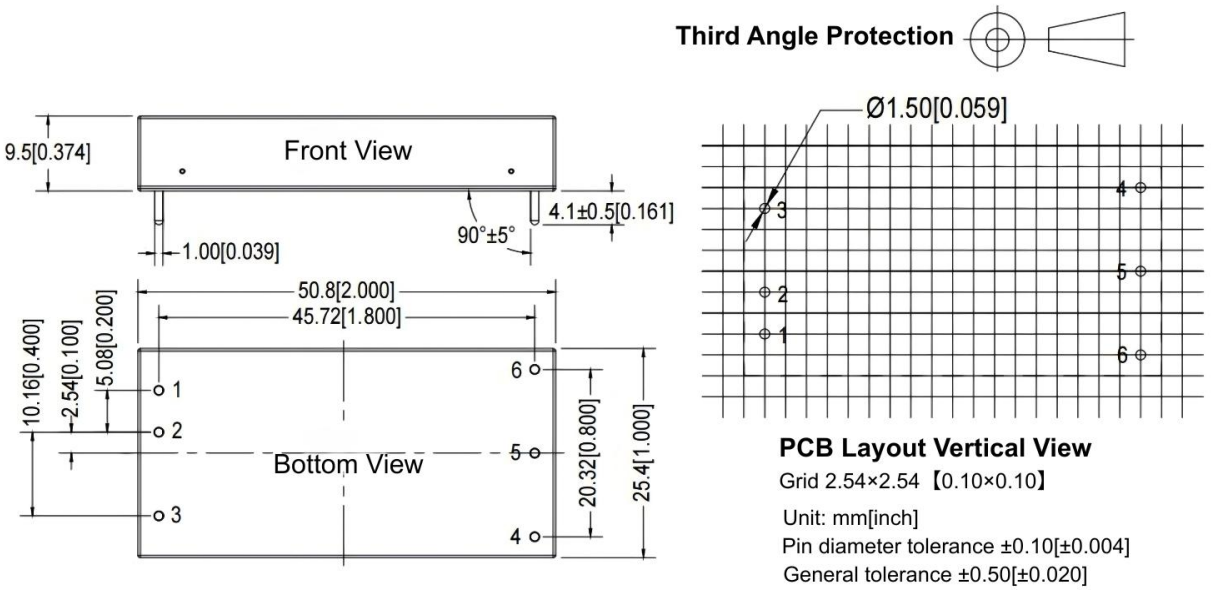
$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

RT is the Trim resistor, α is a custom parameter, and Vo' is the actual voltage of Trim up or Trim down.

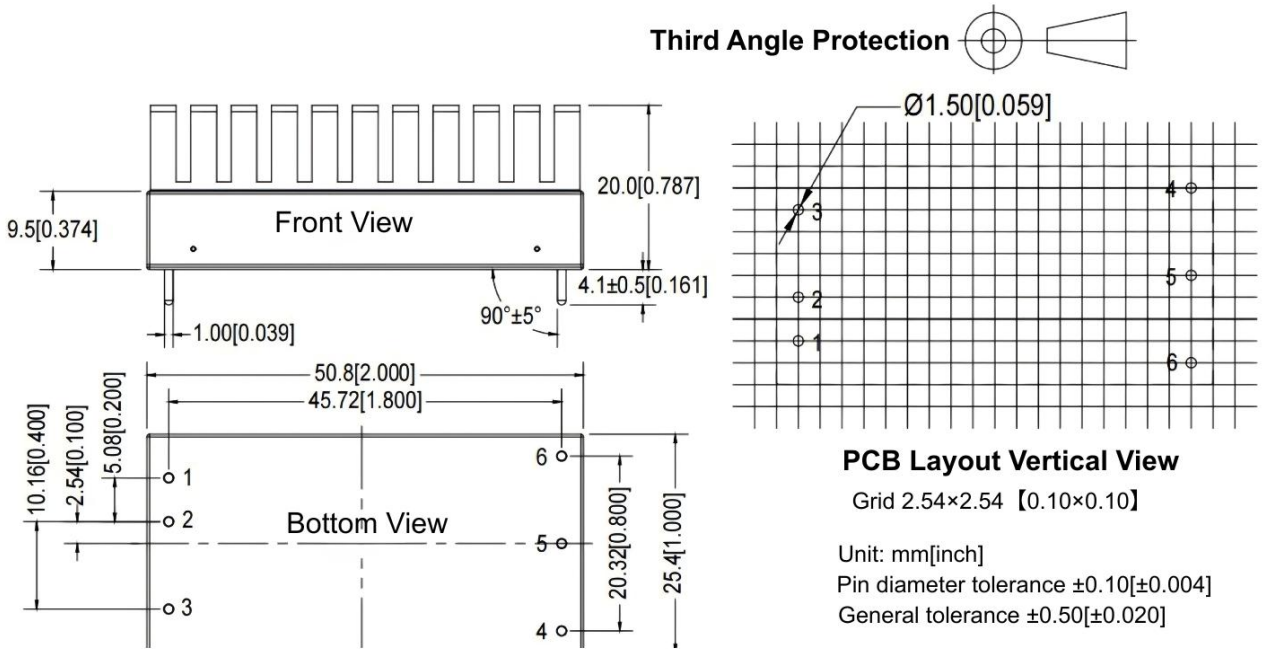
Output Voltage	Trim internal circuit parameters			
Vo (DC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref (V)
3.3	24	14.53	68	1.25
5	24	24	68	2.5
9	12.1	4.62	30	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
24	25.5	2.955	18	2.5

Mechanical Dimension (Without heat-sink)



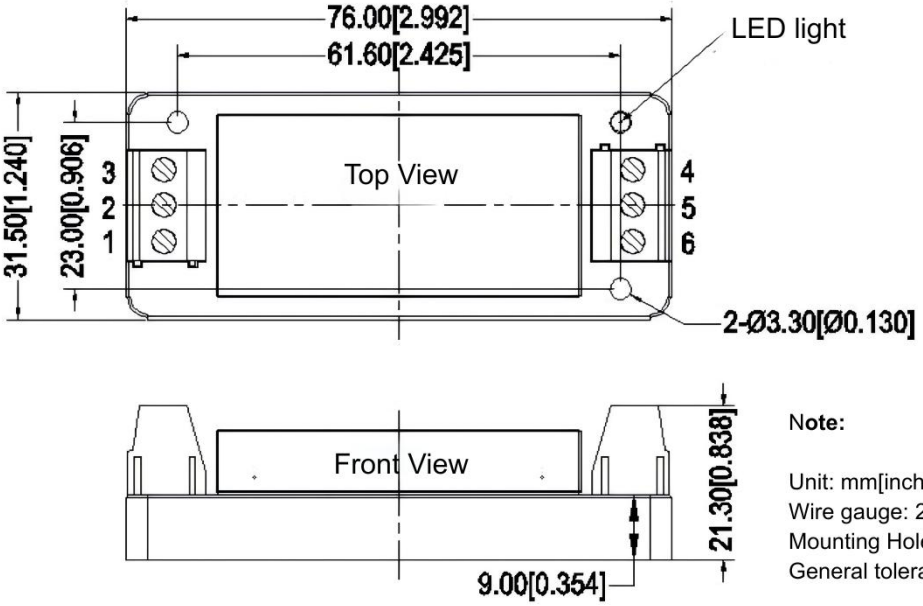
Pin No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

-H Mechanical Dimension (With heat-sink)



Pin No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

-T Mechanical Dimension (Without heat-sink)

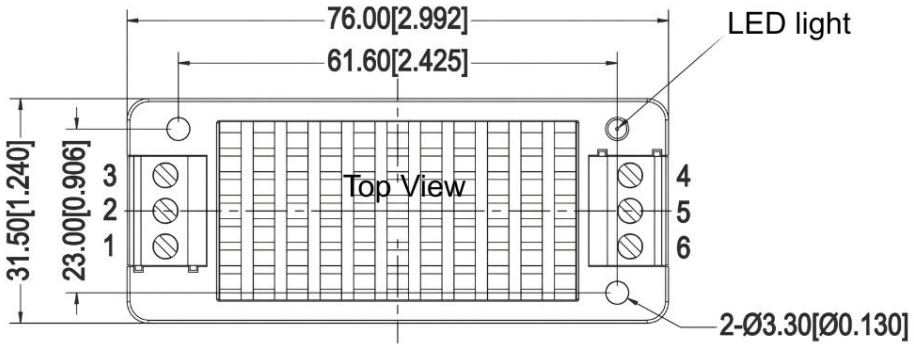


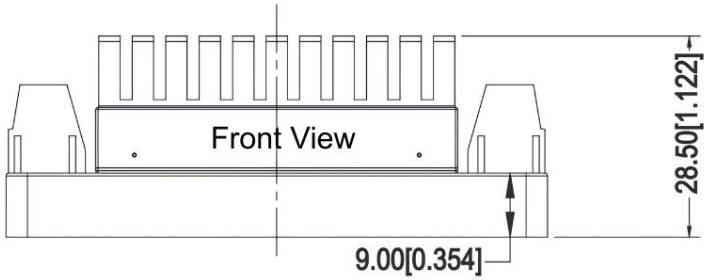
Note:

Unit: mm[inch]
Wire gauge: 24-12 AWG
Mounting Hole Tightening Torque:0.4 N·m max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

-TH Mechanical Dimension (With heat-sink)



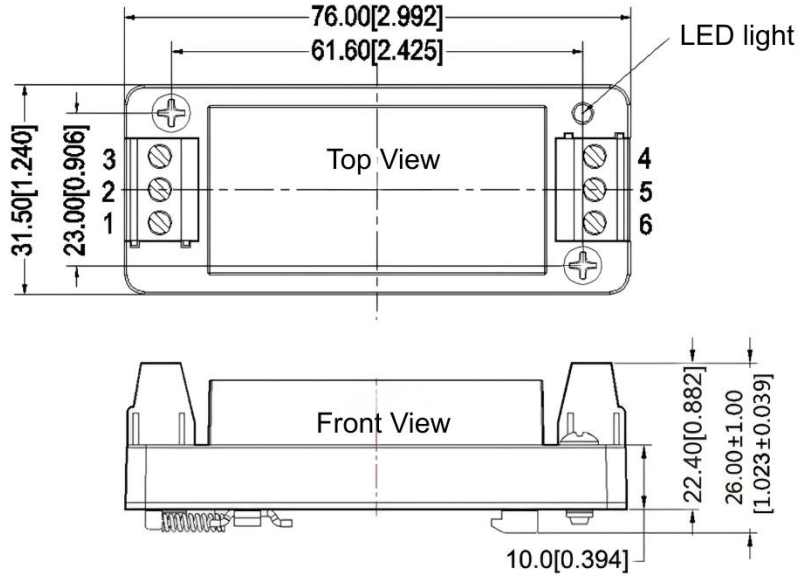


Note:

Unit: mm[inch]
Wire gauge: 24-12 AWG
Mounting Hole Tightening Torque:0.4 N·m max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

TS Mechanical Dimension (Without heat-sink)

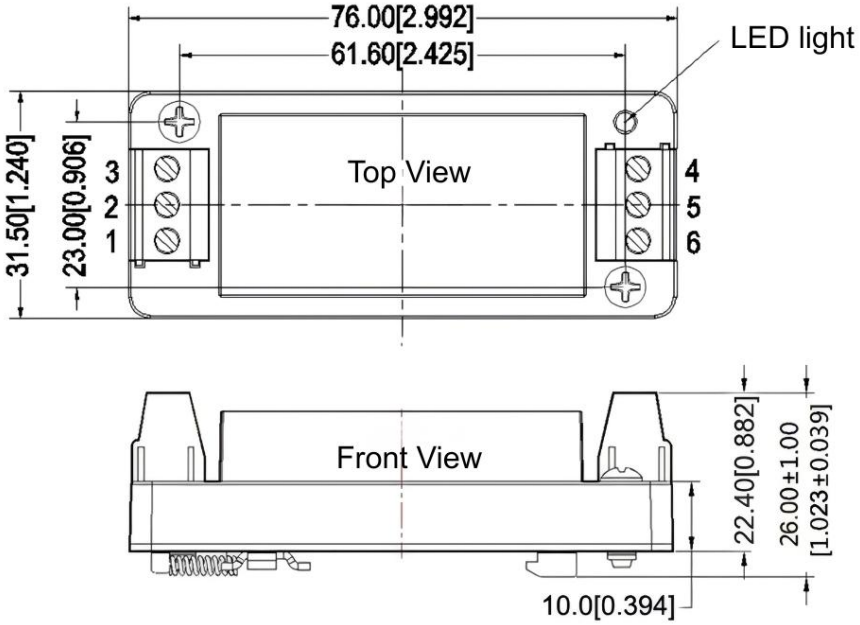


Note:

Unit: mm[inch]
Wire gauge: 24-12 AWG
Mounting Hole Tightening Torque:0.4 N·m max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

TSH Mechanical Dimension (With heat-sink)



Note:

Unit: mm[inch]
Wire gauge: 24-12 AWG
Mounting Hole Tightening Torque:0.4 N·m max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
FD40-18SXXB3C	+Vin	-Vin	Ctrl	Trim	-Vo	+Vo
	Positive Input	Negative Input	Remote Control (ON/OFF)	Output Voltage Trimming	Negative Output	Positive Output

Other Models Pin-out Function Description

Pin/Terminal No.	1	2	3	4	5	6
FD40-18SXXB3	-Vin	+Vin	Ctrl	NP	-Vo	+Vo
	Positive Input	Negative Input	Remote Control(On/Off)	No Pin	Negative Output	Positive Output

Application Notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.

2. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.

3. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.

4. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

5. All values or indicators in this datasheet had been tested based on Aipupower test specifications.

6.Specifications apply to standard models only; non-standard products may vary. Contact our technical team for details.

7. Aipupower can provide customization service.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: https://www.aipupower.com