DC/DC Converter

FD30-XXSXXB3(C)(-T)(-TS) Series

Typical Feature

- ◆Wide input voltage range 4:1, Output Power 30W
- ◆Ultra thin Package: 9.5mm
- ◆Efficiency up to 90%(Typ.)
- ◆Stand-by Power Consumption as low as 0.2W
- ◆Output super-fast start up as low as 20mS
- ◆Continuous Short Circuit protection, Self-recovery
- ◆Input under voltage, output over voltage, short-circuit, over current protection
- ◆Switching Frequency 350KHz
- ◆Isolation Voltage 1500VDC
- ◆Operating Temperature: -40°C~+85°C
- ◆Good EMI performance
- ◆Meet IEC62368/UL62368/EN62368 test standard
- ◆Certified by CE, RoHS

FD30-XXSXXB3(C)Series ----- 30W, ultra-wide voltage input, ultra-high standby power consumption, ultra-fast startup, isolated regulated output, DIP package, DC-DC module power supply. When the product is used in an environment with relatively harsh electromagnetic compatibility, please refer to the application circuit provided by our company.

Typical Product List

Certificate	Part No	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) (Nominal Voltage)		Max. Capacitive Load	Ripple & Noise 20MHz (MAX)	Efficiency (%)	
		Nominal	Range	Voltage (V)	Current (mA)	Full load (mA)	No Load (mA)	u F	mVp-p (mV)	Min	Typ.
CE/ROHS	FD30-18S3V3B3(C)	24	9-36	3.3	6000	948	30	10000	100	84	87
CE/ROHS	FD30-18S05B3(C)			5.0	6000	1388	30	8000	100	87	90
CE/ROHS	FD30-18S09B3(C)			9.0	3333	1480	2	3300	100	86	89
CE/ROHS	FD30-18S12B3(C)			12	2500	1388	2	2000	100	87	90
CE/ROHS	FD30-18S15B3(C)			15	2000	1388	2	1000	100	87	90
CE/ROHS	FD30-18S18B3(C)			18	1667	1388	2	1000	100	85	88
CE/ROHS	FD30-18S24B3(C)			24	1250	1396	8	500	100	87	90
CE/ROHS	FD30-36S3V3B3(C)	48	18-75	3.3	6000	474	30	10000	100	84	87

CE/ROHS	FD30-36S05B3(C)			5.0	6000	694	30	7000	100	87	90
CE/ROHS	FD30-36S09B3(C)			9.0	3333	730	2	3300	100	86	89
CE/ROHS	FD30-36S12B3(C)			12	2500	694	2	2000	100	87	90
CE/ROHS	FD30-36S15B3(C)			15	2000	694	2	1000	100	87	90
CE/ROHS	FD30-36S18B3(C)			18	1667	730	2	1000	100	85	88
CE/ROHS	FD30-36S24B3(C)			24	1250	694	2	500	100	87	90

Note 1: The product with suffix "C" has CTRL control function, and the product without suffix "C" does not have CTRL control function

Note 2: -T is a wiring package, -TS is a rail package, and the rail width is 35mm; -H is with a heat sink

Note 3: The maximum capacitive load refers to the capacitance capacity allowed to be connected to the output when the power supply is fully loaded. If the capacity exceeds this, the power supply may not start.

Note 4: In order to reduce no-load power consumption and improve light-load efficiency, the IC works in a frequency-shaking state when no-load and light-load.

Note 5: The output cannot be no-loaded, and at least 10% load or a high-frequency, low-resistance electrolytic capacitor of 470uF or more must be carried, otherwise the output voltage ripple will increase.

Note 6: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

Input Specification

Input Surge Voltage(1Sec)	24Vdc Input	50Vdc (Max)
	48Vdc Input	100Vdc (Max)
Under-Voltage Turn-off	6~8VDC FD30-18SXXB3C Input	
	15~17VDC FD30-36SXXB3C Input	
Turn on delay Time	20ms (Typ.)	
Input Filter	Pi filter	
CTRL*	Module turn-on	No connection or connect to high level (3.5V-12VDC)
	Module shut-off	Connect to -Vin or low level (0-1.2VDC)
	Current value for shut off	1mA(Typ.)
Reflected Ripple Current	Input full range, connect to test tools	100mA

Note: *The voltage of CTRL is relative to -Vin.

Output Specification

Output Voltage Accuracy	Full voltage full load	Vo	≤±2.0% (Max)
Line Regulation	Nominal load, full voltage range	Vo	≤±1.0%
Load Regulation	10% ~ 100% rated load	Vo	≤±2.0%
Ripple & Noise	10% ~ 100% rated load	≤100mVp-p (20MHz bandwidth)	
Output Over-voltage Protection	110%~200%Vo		
Output Voltage Adjustment	Trim-pin function	±10%(Typ.)	

Output Short circuit Protection	Hiccup, continuous, self-recovery		
Output Over-current protection	110%~300%Io		
Dynamic Response	25% nominal load step change	△Vo/△t	≤±5.0%/500μs; (3V3,5.0V Series≤±8.0%/500μs)

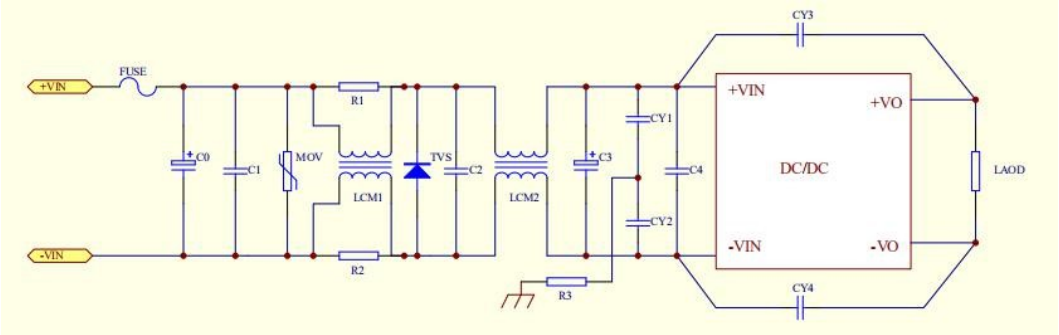
General Specification

Switching Frequency	Typical	350KHz
Isolation Capacitor	Typical	2000pF
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +85℃
Storage Temperature	-	-55℃ ~ +125℃
Max Case Temperature	Within Operating Curve	+105℃
Relative Humidity	No condensing	5%~95%
Case Material	-	Aluminum Metal Case
Isolation Voltage	Input to Output	1500Vdc ≤ 0.5mA / 1min
MTBF	MIL-HDBK-217F@25℃	2X10^{5}Hrs
Product Weight	Average	28g

EMC Characteristics

EMI	CE	CISPR22/EN55032 CLASSB (external circuit is needed)	
	RE	CISPR22/EN55032 CLASSB (external circuit is needed)	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV Air ±6KV	perf.Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf.Criteria A(external circuit is needed)
	EFT	IEC/EN61000-4-4 ±2KV	perf.Criteria B(external circuit is needed)
	Surge	IEC/EN61000-4-5 ±2KV	perf.Criteria B(external circuit is needed)
	CS	IEC/EN61000-4-6 3Vr.m.s	perf.Criteria A(external circuit is needed)
	Voltage dips and interruptions	IEC/EN61000-4-29 0%-70%	perf.Criteria B

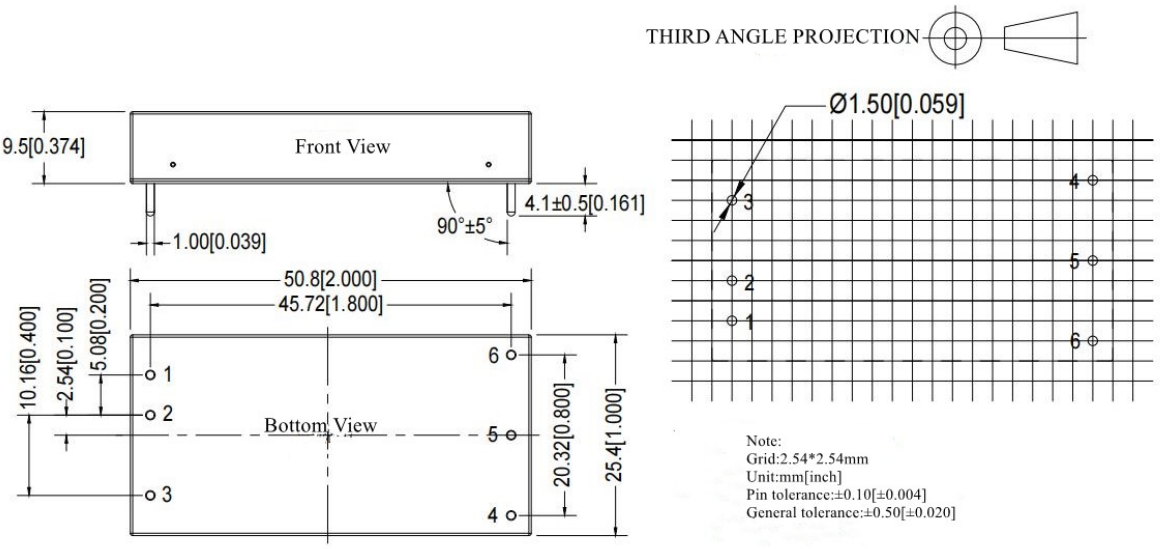
Recommended External Circuit for EMC



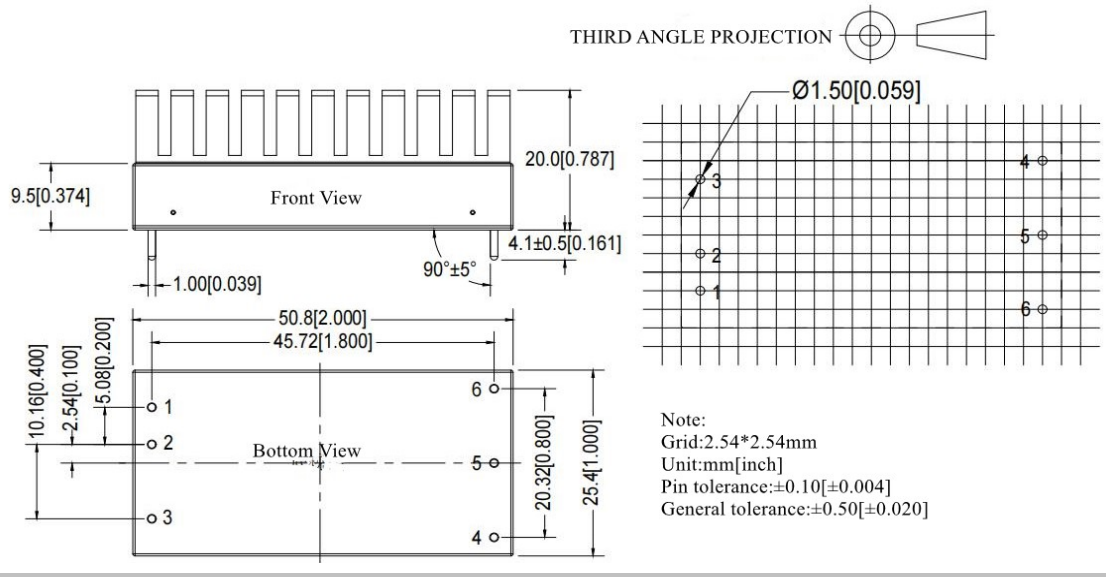
Recommended Parameter:

Component	48V Input	24V Input
FUSE	According to customer's request	
MOV	14D101K	14D470K
LDM1	33mH	
TVS	SMCJ80A	SMCJ40A
C0	560uF/100V	680uF/100V
C1,C2,C4	4.7uF/100V	4.7uF/100V
C3	100uF/100V	
LCM2	33uH	
CY1,CY2,CY3,CY4	2.2nF/2KV	
R1,R2	1.2KΩ 1206	
R3	25Ω 1W	

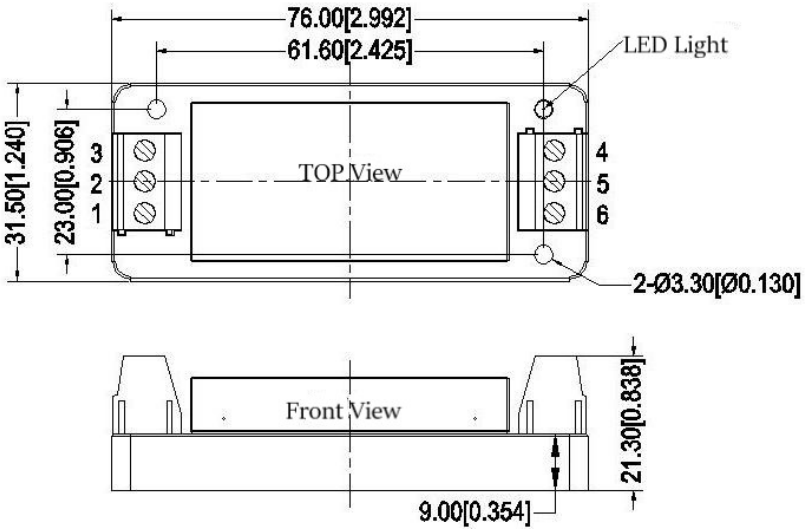
B3 Package Dimension and Pin Function



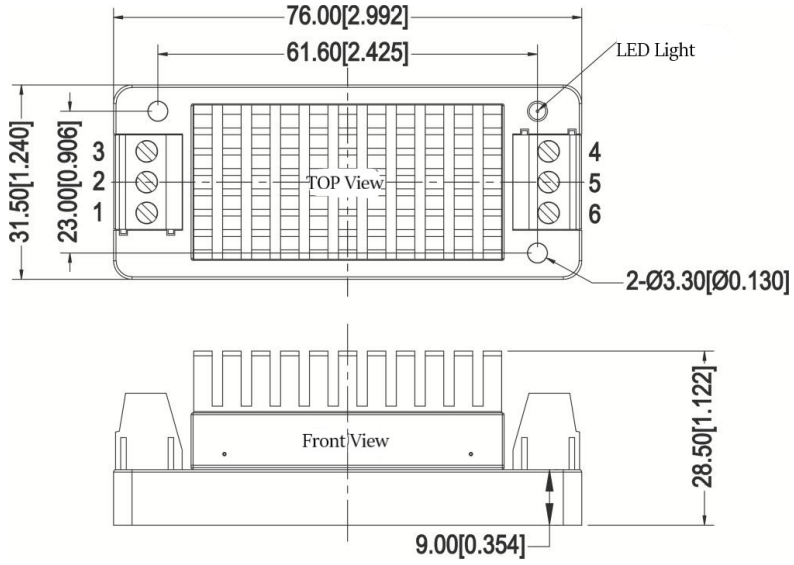
B3-H Package(with Heat-sink) Dimension and Pin Function



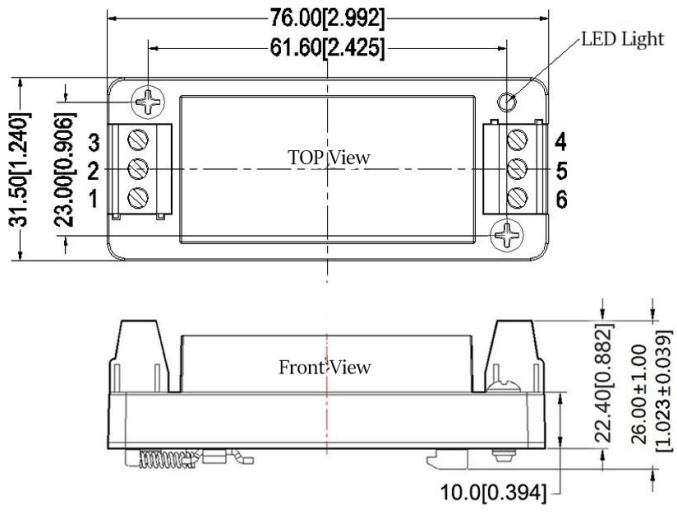
B3-T Package Dimension and Pin Function



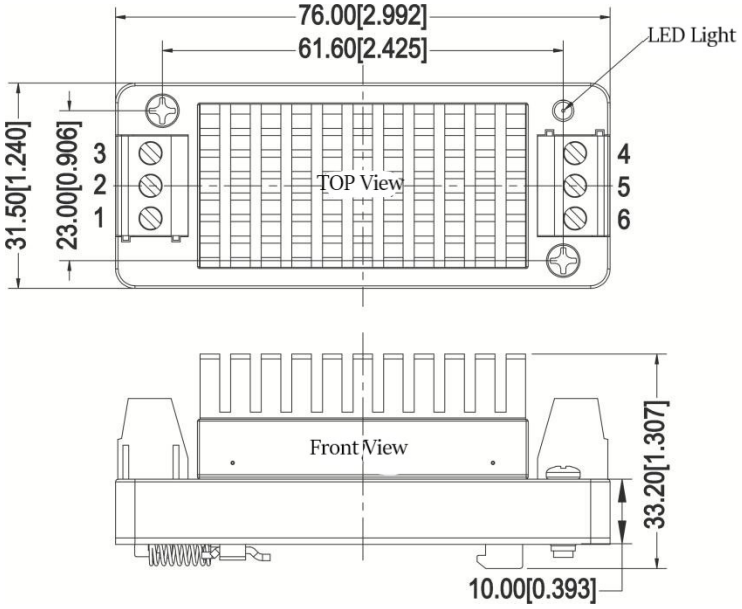
B3-TH(with heat-sink) Package Dimension and Pin Function



B3-TS Package Dimension and Pin Function



B3-TSH(with heat-sink) Package Dimension and Pin Function



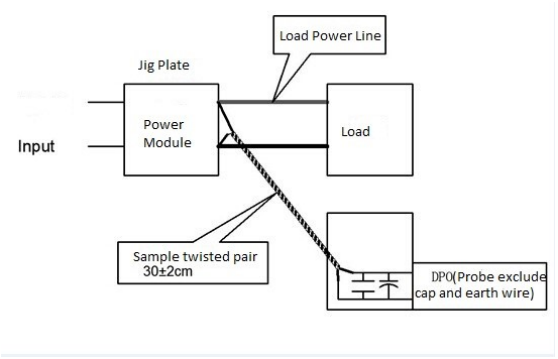
Packing Code	L x W x H	
B3(without Heat Sink)	50.80X25.40X9.5mm	2.000X1.000X0.374inch
B3-H(with Heat Sink)	50.80X25.40X19.5mm	2.000X1.000X0.767inch
B3-T(without Heat Sink)	76X31.5X21.3mm	2.99X1.24X0.838inch
B3-TH(with Heat Sink)	76X31.5X28.5mm	2.99X1.24X1.122inch
B3-TS(without Heat Sink)	76X31.5X26mm	2.99X1.24X1.023inch
B3-TSH(with Heat Sink)	76X31.5X33.2mm	2.99X1.24X1.307inch

Single(S)	1	2	3	4	5	6
	+Vin	-Vin	CTRL	Trim	-Vo	+Vo

Ripple & Noise Test Instruction (Twisted pair method, 20MHz bandwidth)

1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 47uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set on the Sample Mode.

2) The output ripple noise test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.

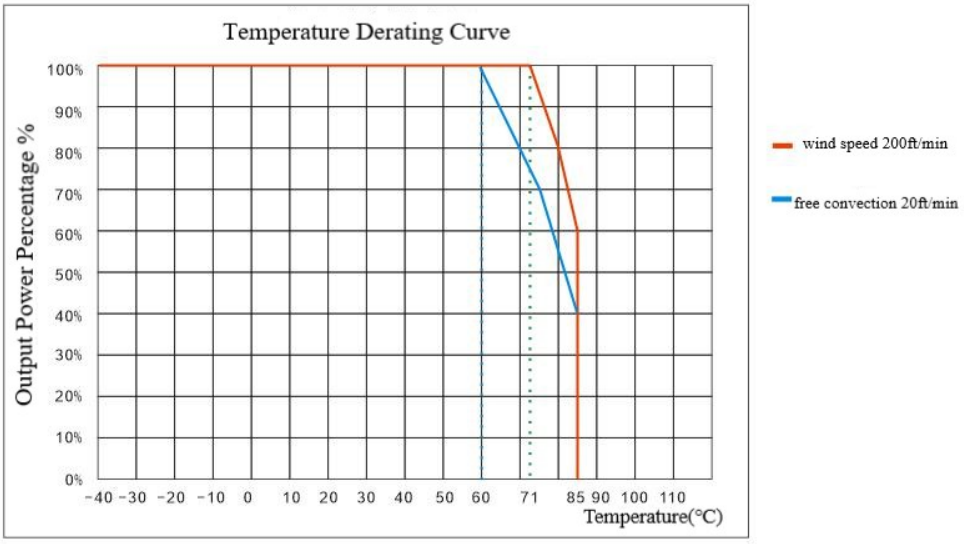


Note:

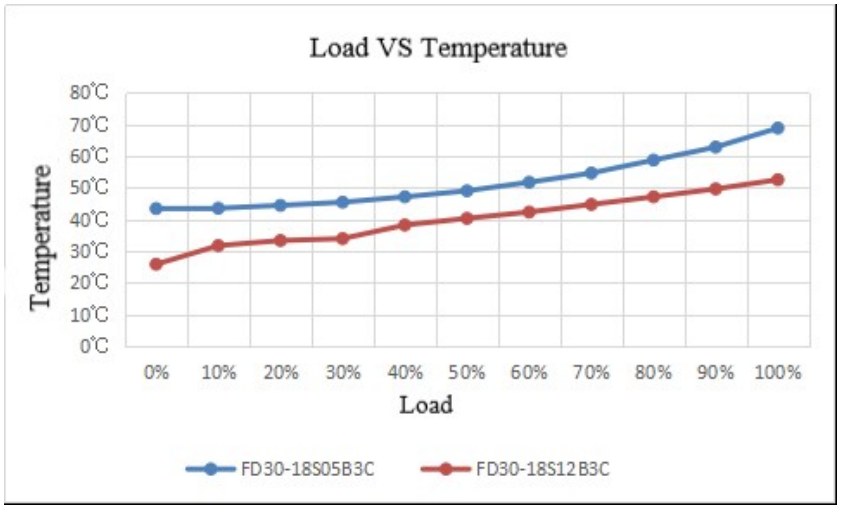
1. It is recommended to connect a ⩾10% load or a high-frequency resistance E-cap(⩾470uF) load at output to avoid the output ripple increasing.

2.Recommend the unbalance loads of dual output to be ≤±5%;

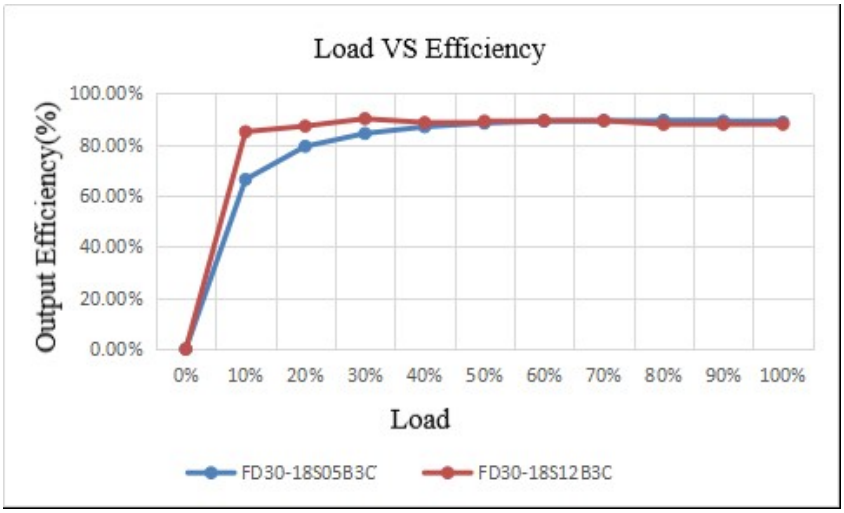
Temperature Derating Curve



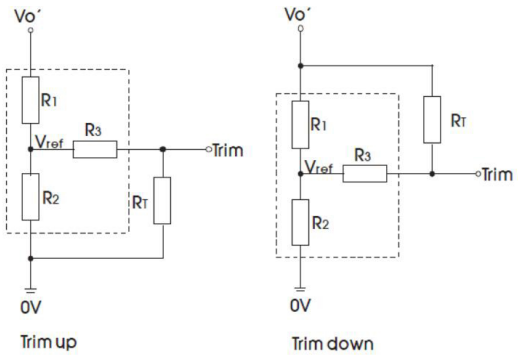
Load VS Temperature Curve



Load VS Efficiency



Trim and Calculation of Trim resistor values



Calculating Trim resistor values:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

RT= Trim Resistor value;
a= self-defined parameter, no actual meaning;
Vo' is the actula voltage to increas or desearse;

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

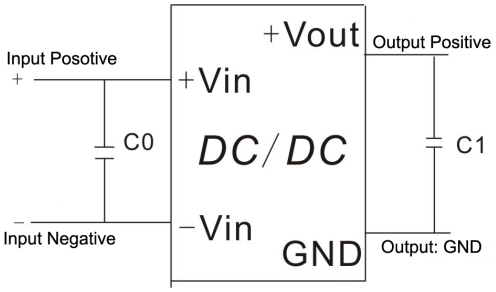
Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	24	14.53	68	1.24
5	24	24	68	2.5
9	12.1	4.62	30	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
18	30	4.78	30	2.5
24	25.5	2.955	18	2.5

Recommended Circuits for Application

1. DC/DC test circuit:

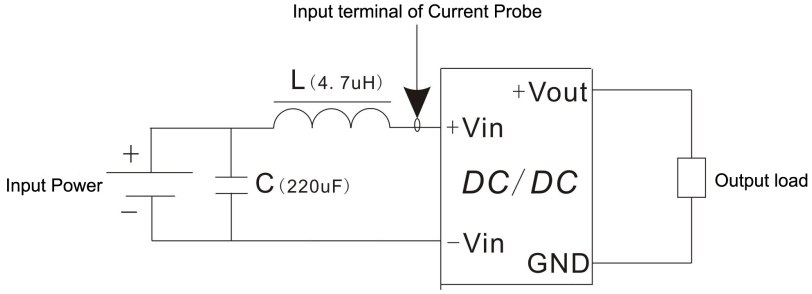
Normal recommended capacitors:

C0:47-100uF; C1:10-22uF.



2. Input reflecting ripple current test circuit:

Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage.



Note:

1. The maximum capacitive load is tested at full load of pure resistance.
2. The products should be used according to the specifications in this manual, otherwise it could be permanently damaged.
3. The product performances in this manual cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performances in this manual cannot be guaranteed if it works at over-load condition.
5. Unless otherwise specified, all values or indicators in this manual are tested at Ta=25℃, rated input voltage and rated load (pure resistance load).
6. All values or indicators in this manual had been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed in this manual, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirement.
8. Aipupower can provide customization service.
9. The product specifications may be modified without a prior notice. Please refer to the published data sheet in Aipupower website.

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