

Typical Feature

- ◆ Wide input voltage range 4:1, Output Power 30W
- ◆ Ultra thin Package: 9.5mm
- ◆ Transfer Efficiency up to 90%
- ◆ 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) is 30W, ultra wide input voltage, low stand by power consumption, super-fast start up, isolated& regulated output function, DIP package DC/DC Converter. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

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)
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	87	90
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	FD30-36S24B3(C)			24	1250	694	2	500	100	87	90

- Suffix "C" is with CTRL function;
- "-T" suffix for chassis mounting, "-TS" suffix for DIN-Rail mounting, DIN-Rail width is: 35mm; Suffix "-H" means with heatsink.
- Max capacitive load is, when the power supply is fully loaded, the max capacity could be connected to output, if exceed, the power supply cannot start-up;
- To reduce no load power consumption and improve efficiency of light-load, IC will be flitter frequency under no-load and light-load Operating.
- Output cannot be no load, at least with 10% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise;

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
Start-up Time	20ms (Typ.)	
Input Filter	Pi filter	
CTRL*	Module turn-on	Suspended or connect to High level (3.5V-12VDC)
	Module turn-off	Connect to -Vin or connect to low level (0-1.2VDC)
	Input current when switched off	1mA(Typ.)
Reflected Ripple Current	Input full range, connect to test tools	100mA

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

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% nominal load	Vo	±2.0%
Ripple & Noise	Nominal load, nominal voltage	≤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		

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Dynamic Response	25% nominal load step change	$\Delta V_o/\Delta t$	$\leq \pm 5.0\%/500\mu s$; (3V3,5.0V Series $\leq \pm 8.0\%/500\mu s$)
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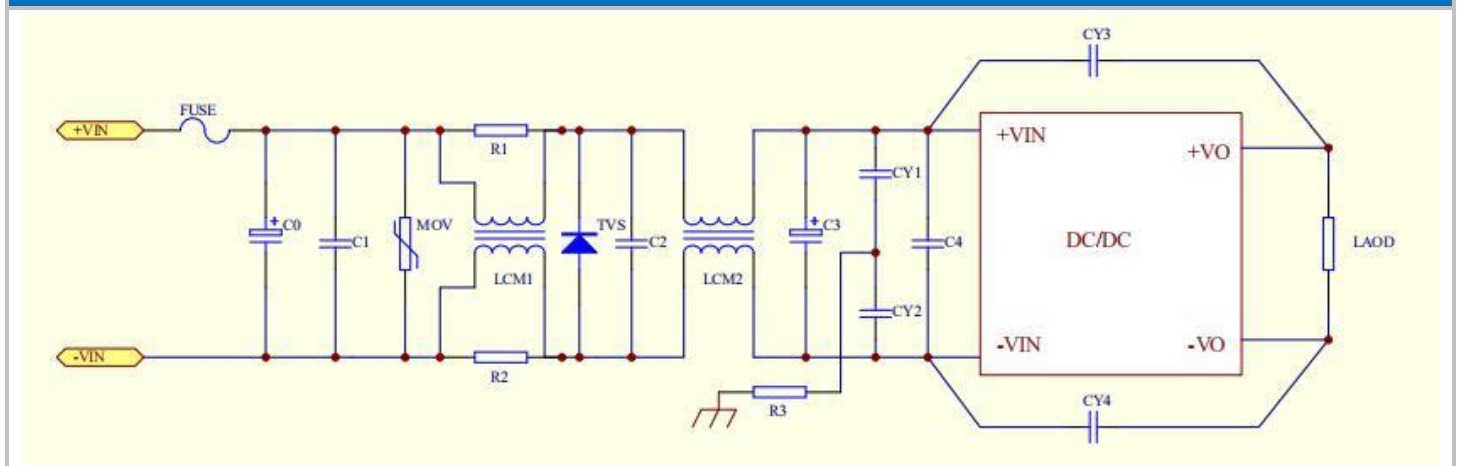
General Specification

Switching Frequency	Typical	350KHz
Isolation Capacitor	Typical	2000pF
Operating Temperature	Refer to Temperature Derating Curve	-40°C ~ +85°C
Storage Temperature	-	-55°C ~ +125°C
Max Case Temperature	Within Operating Curve	+105°C
Relative Humidity	No condensing	5%~95%
Case Material	-	Aluminum Metal Case
Isolation Voltage	Input to Output	1500Vdc $\leq 0.5mA / 1min$
MTBF	MIL-HDBK-217F@25°C	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 $\pm 4KV$ Air $\pm 6KV$	perf.Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf.Criteria A(external circuit is needed)
	EFT	IEC/EN61000-4-4 $\pm 2KV$	perf.Criteria B(external circuit is needed)
	Surge	IEC/EN61000-4-5 $\pm 2KV$	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

EMC External Recommended Circuit

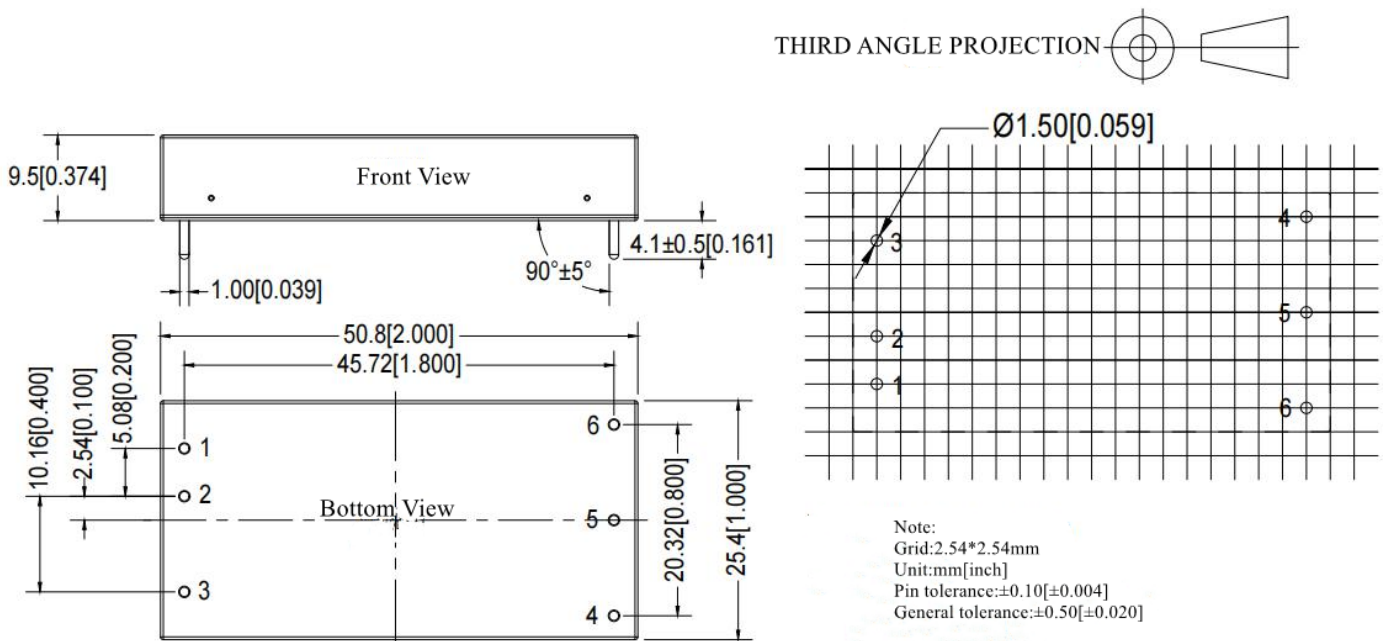




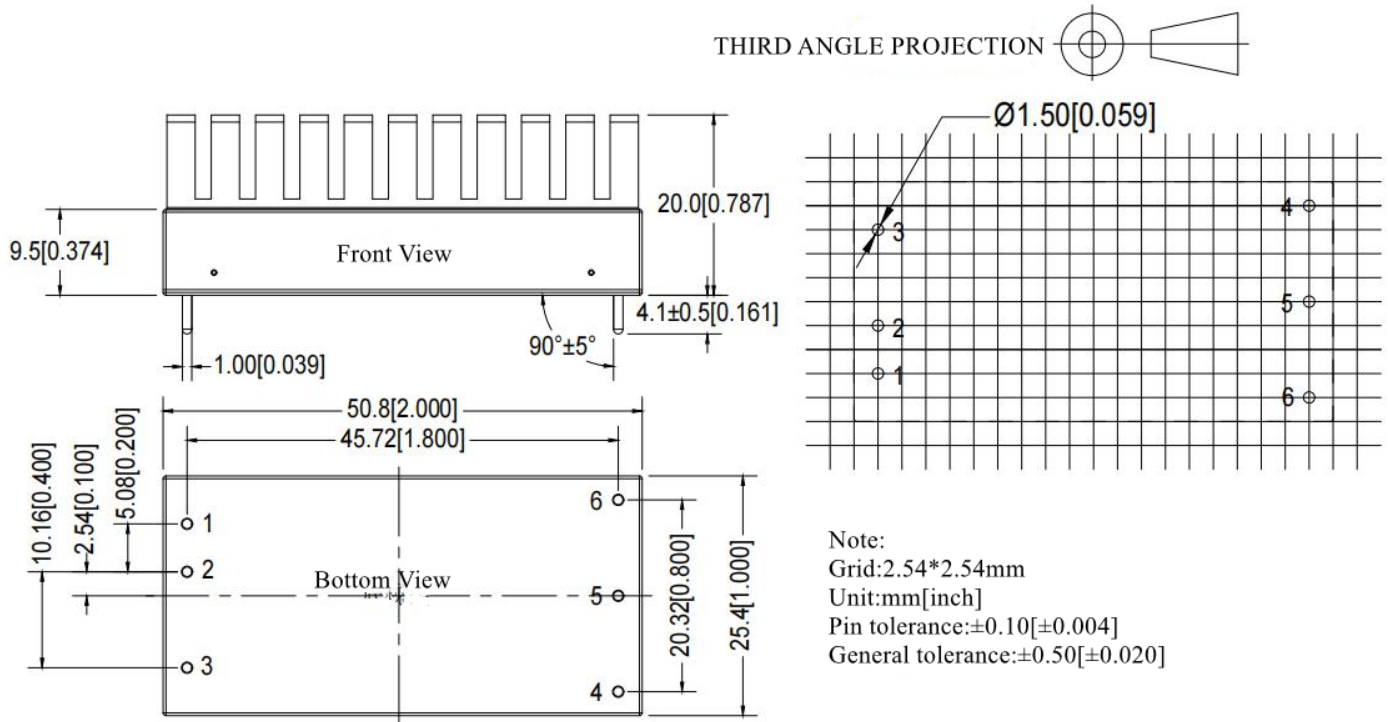
Recommended Parameter:

Component	48V Input	24V Input
FUSE	According to customer's request	
MOV	14D101K	14D470K
LDM1	33uH	
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	

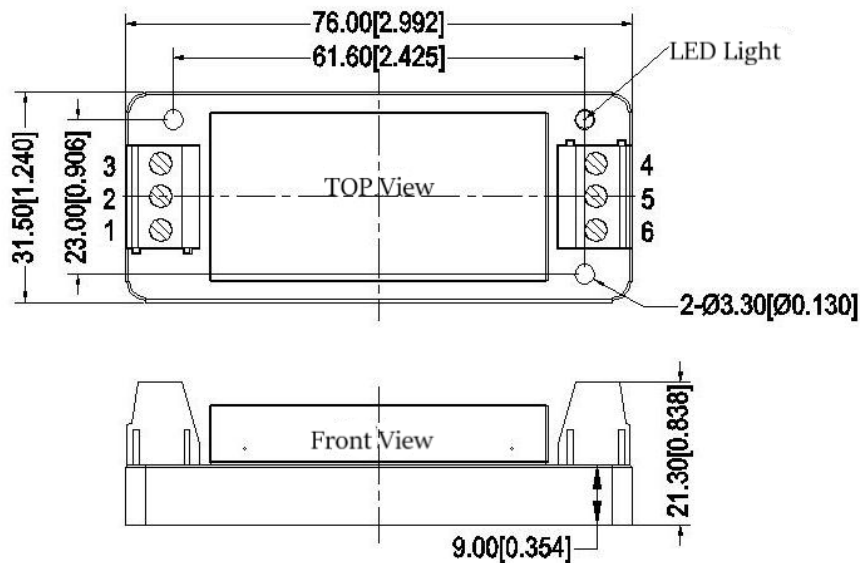
B3 Package Dimension and Pin Function



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

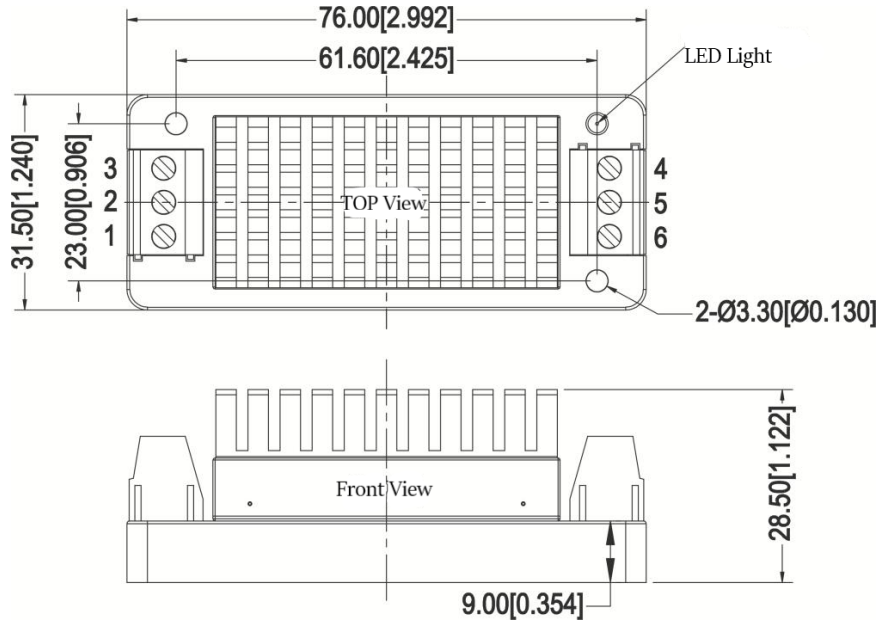


B3-T Package Dimension and Pin Function

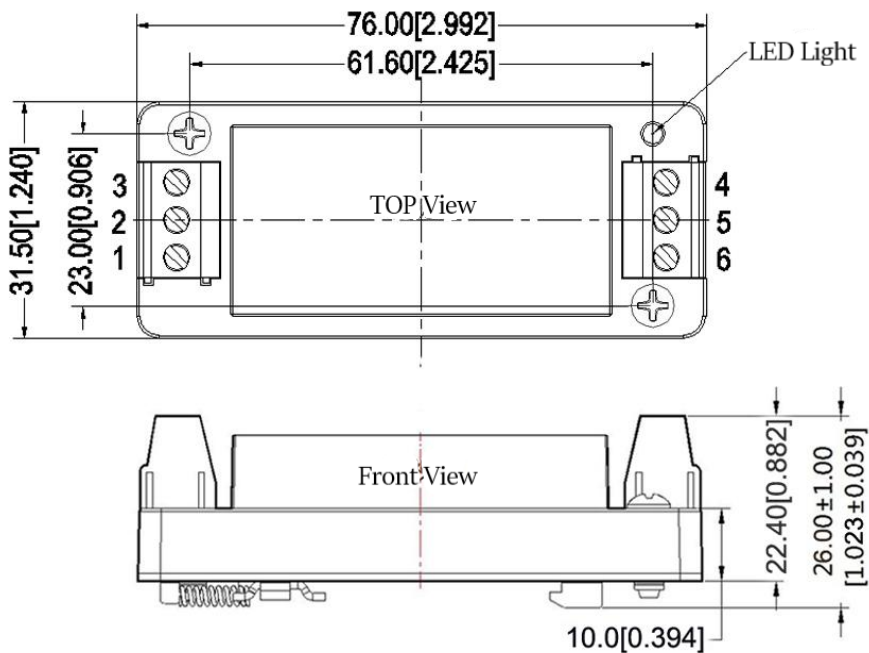




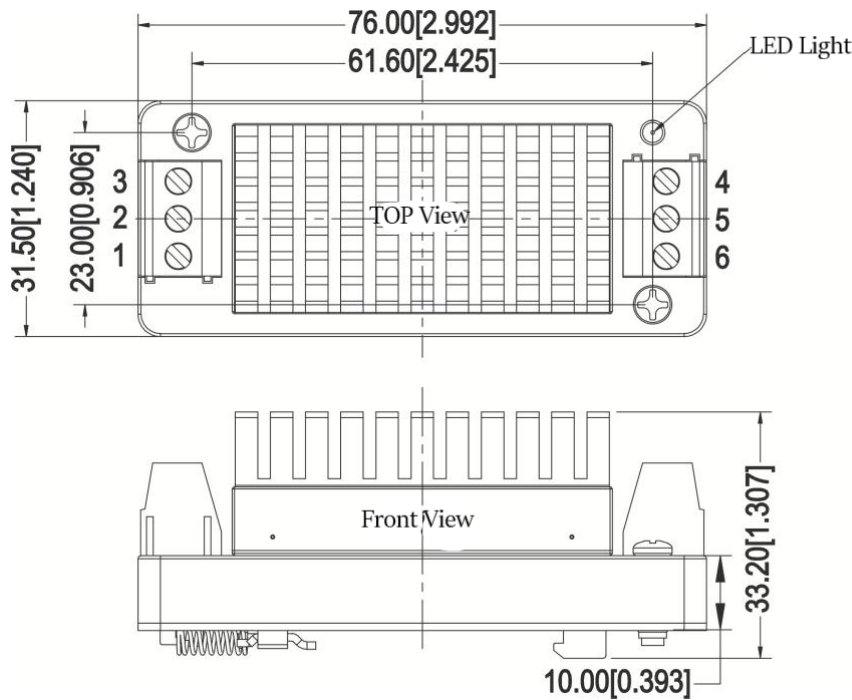
B3-TH(with heat-sink) Package Dimension and Pin Function



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

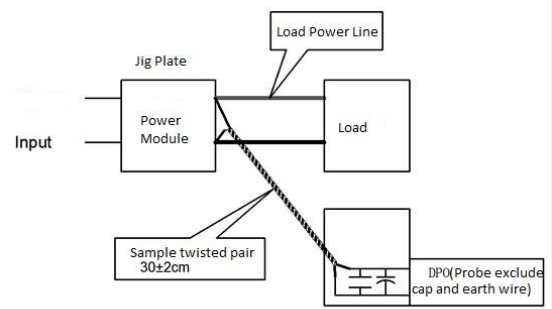
Ripple & Noise Test (Twisted pair method 20MHz bandwidth)

Ripple & Noise Test:

1.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

2. Output Ripple & Noise Test Method:

Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



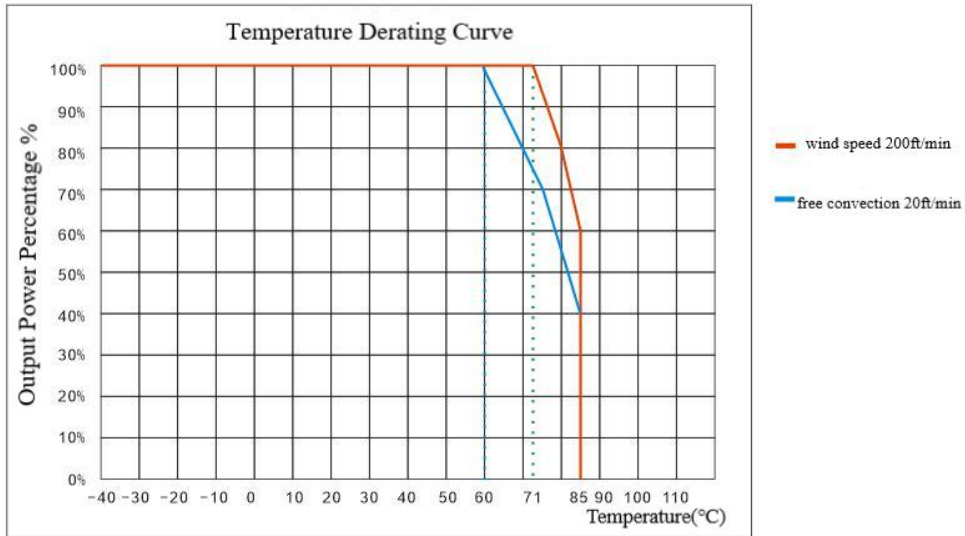
Note:

1.The recommended minimum load is 10% or above 470uF high frequency low resistance electrolytic capacitor, or output ripple will

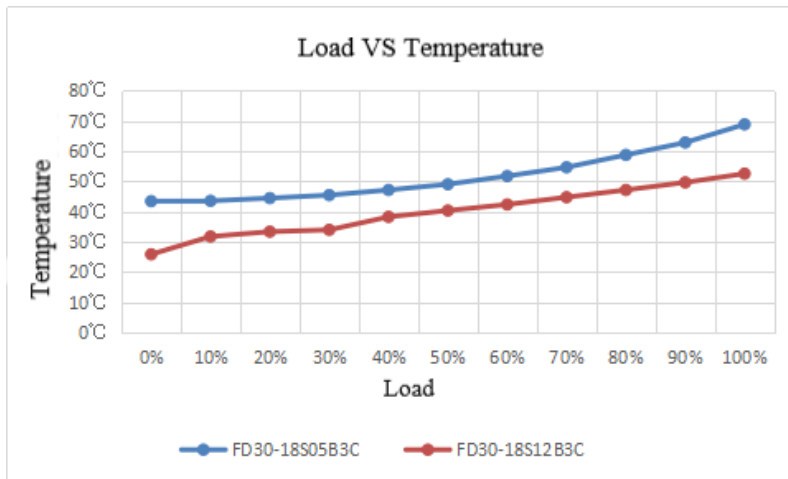
rise;

2.Recommend the unbalance loads of dual output to be $\pm 5\%$;

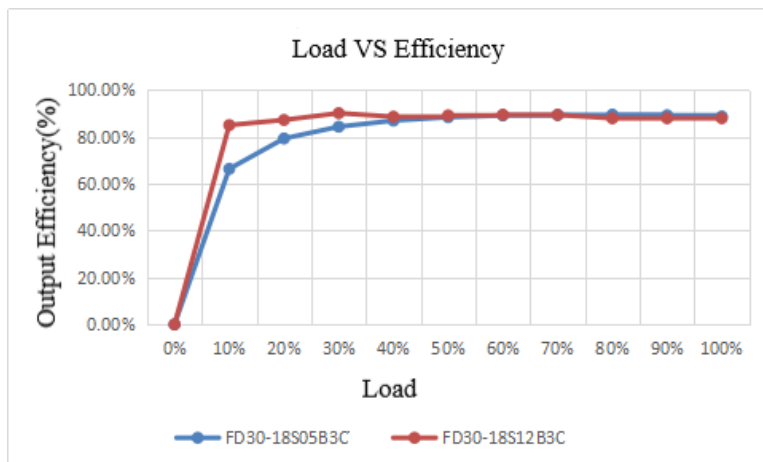
Temperature Derating Curve



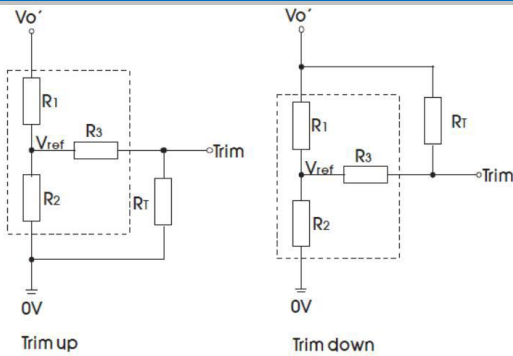
Load VS Temperature Curve



Load VS Efficiency



The usage of Trim and Calculating Trim resistor values



Calculating Trim resistor values:

$$\text{up: } R_T = \frac{\alpha R_2}{R_2 - \alpha} - R_3 \quad \alpha = \frac{V_{ref}}{V_{o'} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{\alpha R_1}{R_1 - \alpha} - R_3 \quad \alpha = \frac{V_{o'} - V_{ref}}{V_{ref}} \cdot R_2$$

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

The usage circuit of the Trim circuit(dashed line shows internal resistor network)

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

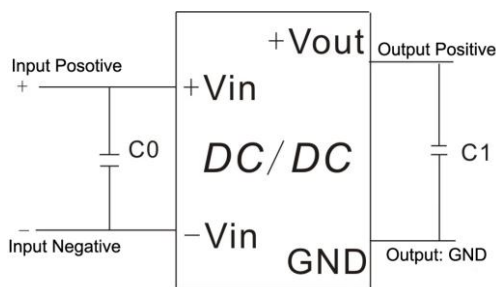
Design and Application Reference

Recommended circuit

1. DC/DC test circuit:

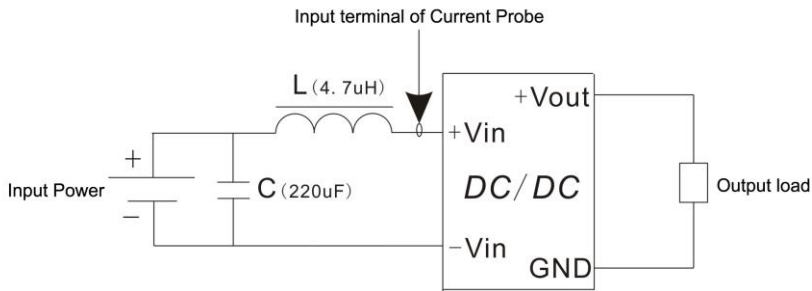
Normal recommended capacitors:

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 product should be used under the specification range, otherwise it will cause permanent damage to it.
2. If the product worked beyond the load range or below the minimum load, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
3. Unless otherwise specified, data in this datasheet should be tested under conditions of $T_a=25^{\circ}\text{C}$, humidity<75% when inputting nominal voltage and outputting rated load(pure resistance load);
4. All index testing methods in this datasheet are based on our Company's corporate standards
5. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
6. We can provide customized product service;
7. The product specification may be changed at any time without prior notice.