DC/DC Converter

FD25-XXSXXB3(C)(-T)(-TS) Series

CE RoHS

Product Typical Features

- Wide input voltage range（4:1）Output Power 25W
- Ultra thin Package ： 9.5mm
- Transfer Efficiency up to 90%
- Stand-by Power Consumption as low as 0.1W
- Output super-fast start up as low as 5mS
- 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
- International standard pin-out

FD25-XXSXXB3(C) is a new designed DIP 2X1 packed, 25W output power DC DC Converter with ultra wide input voltage, low stand by power consumption,super-fast start up, isolated&regulated output function.

Input Specification

Input Surge Voltage（1Sec）	24Vdc Input	50Vdc（Max）
	48Vdc Input	100Vdc （Max）
Under-Voltage Turn-off	6~8VDC@FD25-18SXXB3C Input	
	15~17VDC@FD25-36SXXB3C Input	
Start-up Time	5ms (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 Voltage 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%~200%Io 150%Io（Typ）		
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
Meantime Between Failure	MIL-HDBK-217F@25℃	2X10^{5}Hrs
Product Weight	Average	28g

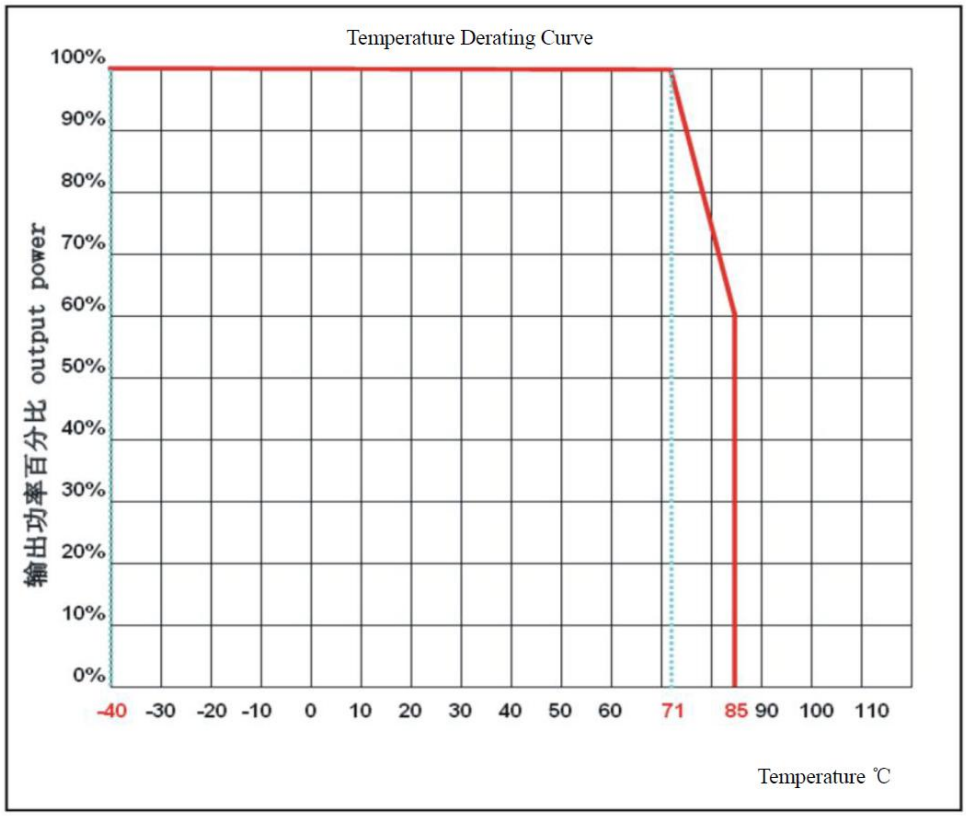
Typical Product List

Part No	Input Voltage Range （VDC）		Output Voltage/Current （Vo/Io）		Input Current (mA) (Nominal Voltage)		Max. Capacitive Load	Ripple & Noise 20MHz （MAX）	Efficiency （%）	
	Normal	Range	Voltage （V）	Current （mA）	Full load （mA）	No Load （mA）	u F	mVp-p （mV）	Min	Typ
*FD25-18S3V3B3(C)	24	9-36	3.3	6000	948	30	10000	100	84	87
FD25-18S05B3(C)			5.0	5000	1157	30	8000	100	87	90
FD25-18S12B3(C)			12	2083	1157	2	2000	100	87	90
*FD25-18S15B3(C)			15	1667	1157	2	1000	100	87	90
FD25-18S24B3(C)			24	1042	1157	2	500	100	87	90
*FD25-36S3V3B3(C)	48	18-75	3.3	6000	474	30	10000	100	84	87
*FD25-36S05B3(C)			5.0	5000	578	30	8000	100	87	90

FD25-36S12B3(C)			12	2083	578	2	2000	100	87	90
* FD25-36S15B3(C)			15	1667	578	2	1000	100	87	90
* FD25-36S24B3(C)			24	1042	578	2	500	100	87	90

1. "*" are models being developing; Suffix "C" is with CTRL function;
2. "-T" suffix for chassis mounting，"-TS" suffix for DIN-Rail mounting, DIN-Rail width is: 35mm；
3. 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;
4. 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 5% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise;

Temperature Derating Curve

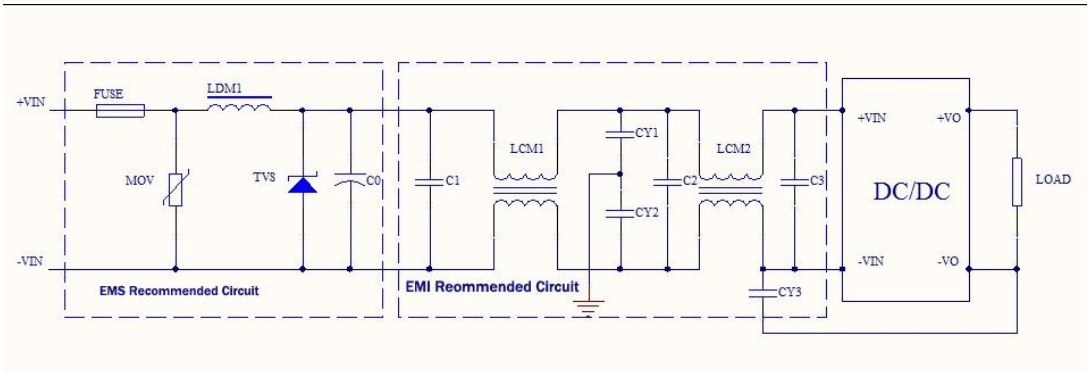


EMC Characteristics

EMI	CE	CISPR22/EN55022 CLASSB （external circuit is needed）	
	RE	CISPR22/EN55022 CLASSB（external circuit is needed）	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV	perf.Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4 ±2KV （external circuit is needed）	perf.Criteria B
	CS	IEC/EN61000-4-6 3Vr.m.s	perf.Criteria A
	Voltage dips, short interruptions	IEC/EN61000-4-29 0%-70%	perf.Criteria B

	and voltage variations immunity		

EMC External Recommended Circuit



Recommended parameter：

Component	48V Input	24V Input
FUSE	According to customer's request	
MOV	14D101K	14D470K
LDM1	56uH	
TVS	SMCJ80A	SMCJ40A
C0	560uF/100V	680uF/100V
C1,C2,C3	4.7uF/100V	4.7uF/100V
LCM1	15mH	
LCM2	56uH	
CY1,CY2,CY3	1nF/2KV	

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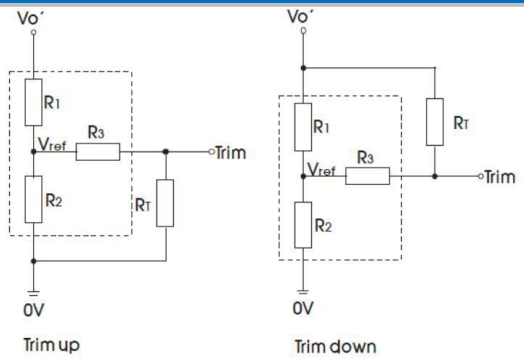
The usage of Trim and Calculating Trim resistor values



Calculating Trim resistor values:

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

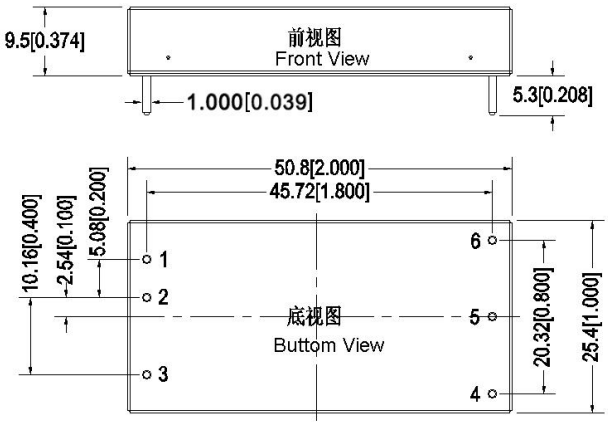
$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

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

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

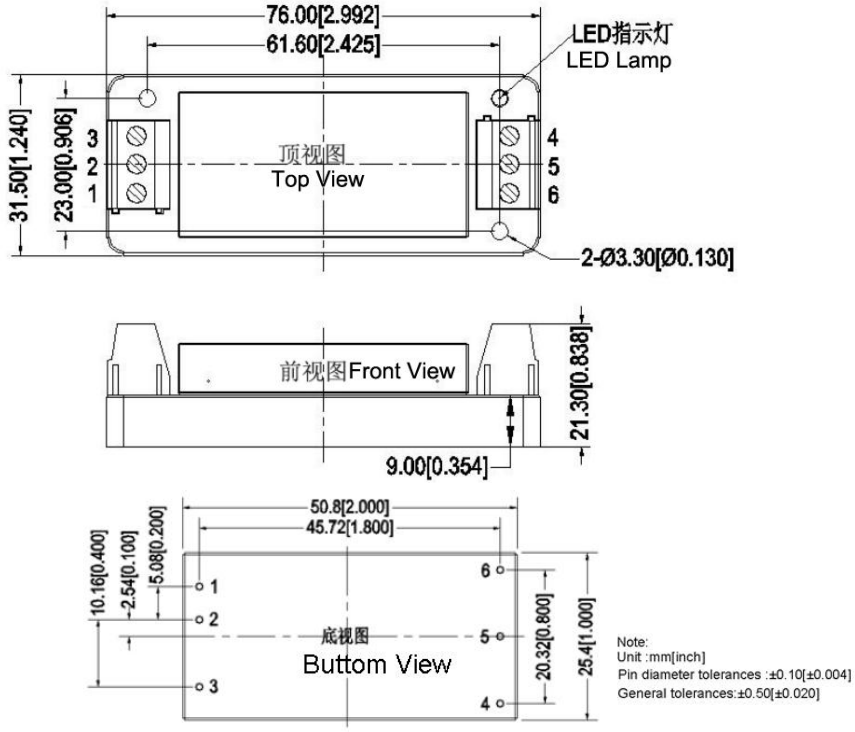
Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	24	14.53	68	1.24
5	24	24	68	2.5
9	12.1	4.62	30	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
24	25.5	2.955	18	2.5

B3 Package Dimension and Pin Function

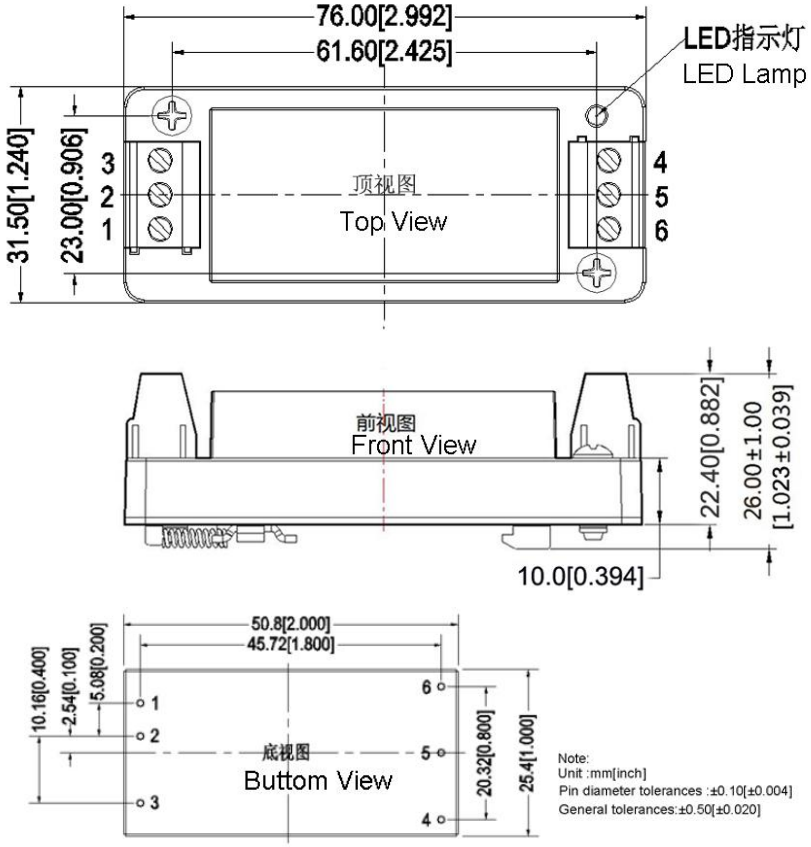


Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

B3-T Package Dimension



B3-TS Package Dimension



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

Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

Package Description

Packing Code	L x W x H	
B3	50.80X25.40X9.5mm	2.000X1.000X0.374inch
B3-T	76X31.5X21.3mm	2.99X1.24X0.838inch
B3-TS	76X31.5X26mm	2.99X1.24X1.023inch

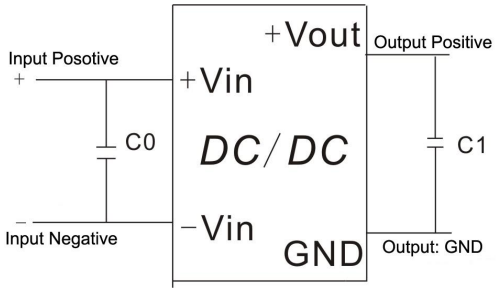
Design and Application Reference

Recommended circuit

2. ① DC/DC test circuit：

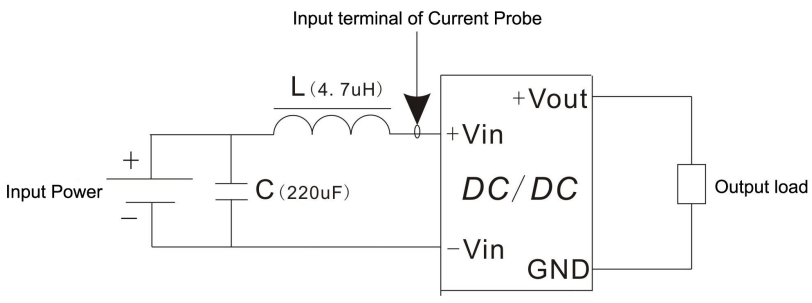
Normal recommended capacitors:

C0：47-100uF；C1：10-22uF.



3. Input reflecting ripple current test circuit:

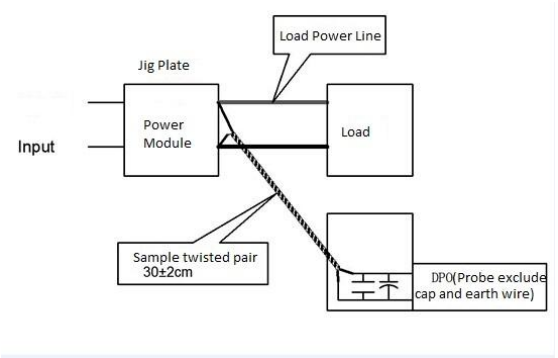
Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage;



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. 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.



Application Reference：

1. The recommended minimum load is 10% or high frequency low resistance electrolytic capacitor above 470uF, or output ripple will rise;
2. Recommend the unbalance loads of dual output to be ≤±5%;
3. The maximum capacitive load is tested under pure resistance and full load condition;
4. Our company could provide whole power supply solution, or customized made items;
5. Due to space limitation, please contact our team for more information;
6.If no special specified, all parameters tested under nominal input voltage, pure resistance rated load and Ta=25℃ conditions.