FDD25 SERIES



DC - DC CONVERTER

20 ~ 30W SINGLE & DUAL OUTPUT

FEATURES

- 2:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 3 YEARS WARRANTY

MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT (typ.)	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
Single Output Models								
FDD25 - 03S1	9~18 VDC	2.1 A	20 WATTS	+3.3 VDC	6000 mA	77%	79%	7000 μF
FDD25 - 05S1	9~18 VDC	2.55 A	25 WATTS	+ 5 VDC	5000 mA	81%	83%	7000 μF
FDD25 - 12S1	9~18 VDC	2.45 A	25 WATTS	+ 12 VDC	2100 mA	84%	86%	3500 μF
FDD25 - 15S1	9~18 VDC	2.42 A	25 WATTS	+ 15 VDC	1700 mA	85%	87%	1000 μF
FDD25 - 03S2	18~36 VDC	1.05 A	20 WATTS	+3.3 VDC	6000 mA	78%	80%	7000 μF
FDD25 - 05S2	18~36 VDC	1.24 A	25 WATTS	+ 5 VDC	5000 mA	83%	85%	7000 μF
FDD25 - 12S2	18~36 VDC	1.45 A	30 WATTS	+ 12 VDC	2500 mA	84%	86%	3500 μF
FDD25 - 15S2	18~36 VDC	1.45 A	30 WATTS	+ 15 VDC	2000 mA	86%	88%	1000 μF
FDD25 - 03S3	36~72 VDC	0.5 A	20 WATTS	+3.3 VDC	6000 mA	78%	80%	7000 μF
FDD25 - 05S3	36~72 VDC	0.6 A	25 WATTS	+ 5 VDC	5000 mA	83%	85%	7000 μF
FDD25 - 12S3	36~72 VDC	0.71 A	30 WATTS	+ 12 VDC	2500 mA	85%	87%	3500 μF
FDD25 - 15S3	36~72 VDC	0.7 A	30 WATTS	+ 15 VDC	2000 mA	86%	88%	1000 μF
Dual Output Models								
FDD25 - 12D1	9~18 VDC	2.5 A	25 WATTS	± 12 VDC	± 1050 mA	83%	85%	± 470 μF
FDD25 - 15D1	9~18 VDC	2.47 A	25 WATTS	± 15 VDC	± 850 mA	85%	87%	± 220 μF
FDD25 - 12D2	18~36 VDC	1.45 A	30 WATTS	± 12 VDC	± 1250 mA	85%	87%	± 470 μF
FDD25 - 15D2	18~36 VDC	1.44 A	30 WATTS	± 15 VDC	± 1000 mA	86%	88%	± 220 μF
FDD25 - 12D3	36~72 VDC	0.73 A	30 WATTS	± 12 VDC	± 1250 mA	85%	87%	± 470 μF
FDD25 - 15D3	36~72 VDC	0.72 A	30 WATTS	± 15 VDC	± 1000 mA	87%	89%	± 220 μF

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		200		KHz
Isolation voltage	Input - Output	1,500			VDC
Isolation resistance	Input - Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / 1V			1,000	PF
Ambient temperature	Operating at Vi nom, Io nom	-25		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+100	°C
Derating	Vi nom		See derating curve		
Storage temperature	Non operational	-40		+100	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			± 0.02	% / °C
Dimension			L50.8 x W50.8 x H12.0		mm
MTBF	Bellcore issue 6@40°C, GB		720,000		Hours
Cooling	Free air convection				

INPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Input voltage range	Ta min ... Ta max, Io nom		9	12	18	VDC
			18	24	36	VDC
			36	48	72	VDC
No load input current	Vi nom, Io = 0	12V			20	mA
		24V			15	mA
		48V			10	mA
Input voltage w/o damage	Io nom	12V			20	VDC
		24V			40	VDC
		48V			75	VDC
Startup voltage	Io nom	12V		8.5		VDC
		24V		15		VDC
		48V		35		VDC
Input filter	Pi type					

OUTPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom				± 2	%
Minimum load	Vi nom	single output models	0			%
		dual output models (each output)	10			%
Line regulation	Io nom, Vi min ...Vi max				± 1	%
Load regulation	Vi nom, Io 0 ...Io nom, single output models				± 2	%
	Vi nom, Io min ...Io nom, dual output models				± 5	%
Cross regulation (Dual model)	Aymmetrical load 10% - 100% FL				± 5	%
Startup time	Vi nom, Io nom				30	ms
Transient recovery time	Vi nom, 1 ~ 0.5 Io nom				500	μs
Ripple & noise	Vi nom, Io nom, BW = 20MHz	3.3V & 5V			100	mV
		12V, 15V & dual			150	mV
Voltage trim range 1)	Vi nom, Io nom	3.3V		± 5		%
		5V, 12V, 15V & dual		± 10		%
Efficiency	Vi nom, Io nom, Po / Pi			Up to 89%, See model list and efficiency curve		

NOTE 1 : Pls refer to Fig 1 & Table 1 for connection and resistance recommended.

CONTROL AND PROTECTION

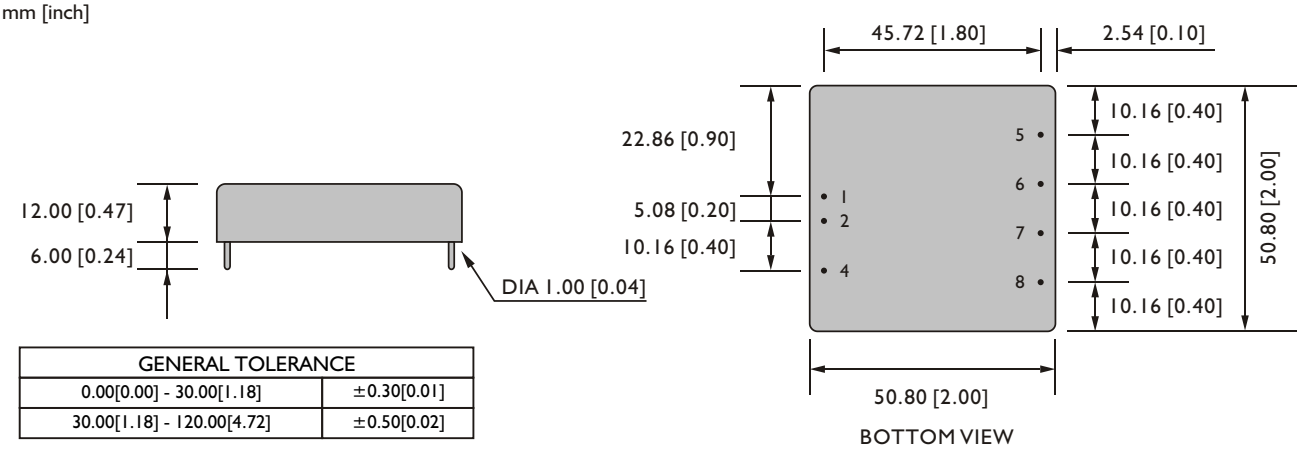
Remote ON / OFF	ON : opened or 5 ~ 10VDC applied, reference to input GND
	OFF : -0.3 ~ 2VDC applied, reference to input GND
Input reversed	Shunt diode built in, external fuse recommended (12Vin : 3A, 24Vin : 2A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	110%min....140%max

PHYSICAL CHARACTERISTICS

Case size	50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches)
Case material	Plastic base / Metal case
Weight	70 g
Potting material	Epoxy

MECHANISM & PIN CONFIGURATION

mm [inch]



GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

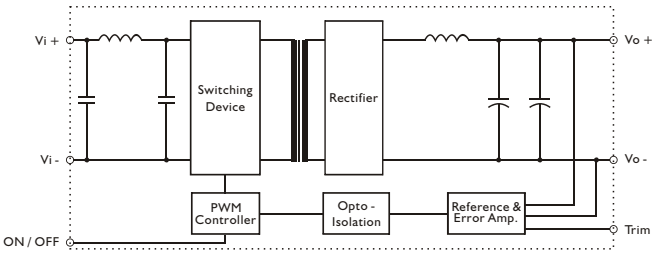
PIN ASSIGNMENT

GENERAL

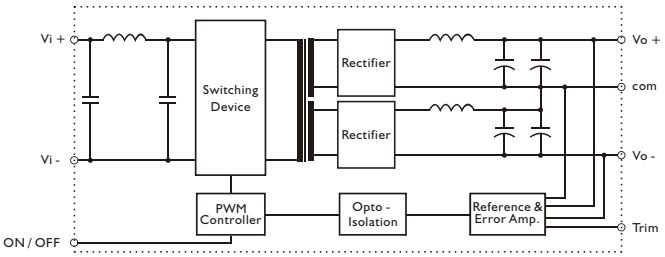
PIN NO.	1	2	4	5	6	7	8
SINGLE	Vi+	Vi -	ON/OFF	NO PIN	Vo +	Vo -	Trim
DUAL	Vi+	Vi -	ON/OFF	Vo +	com	Vo -	Trim

CIRCUIT SCHEMATIC

• Block diagram for FDD25 series with single output

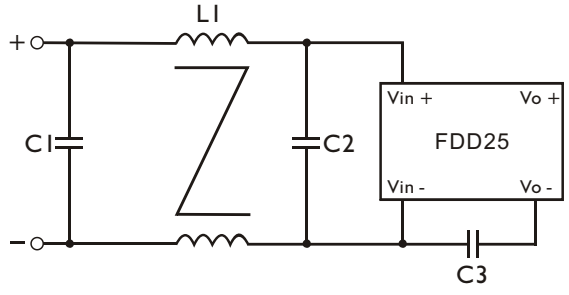


• Block diagram for FDD25 series with dual output



RECOMMENDED CIRCUIT

• Recommended filter for EN55022 Class B compliance

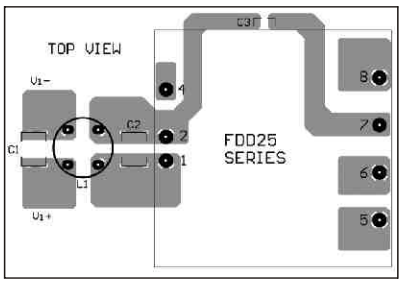


• The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

	C1	C2	C3	L1
FDD25-XXX1	4.7μF / 50V MLCC	4.7μF / 50V MLCC	InF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX2	3.3μF / 50V MLCC	3.3μF / 50V MLCC	InF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX3	3.3μF / 100V MLCC	3.3μF / 100V MLCC	InF / 2KV MLCC	1.5mH Common Choke

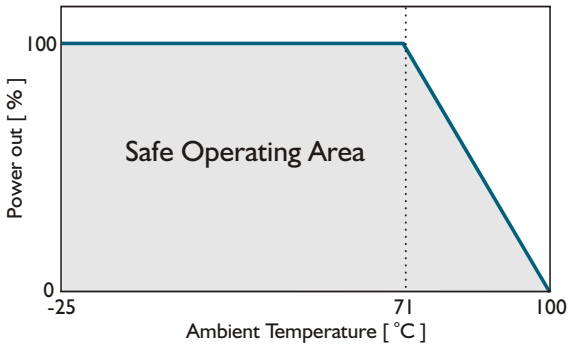
RECOMMENDED CIRCUIT

• Recommended EN 55022 Class B filter circuit layout.

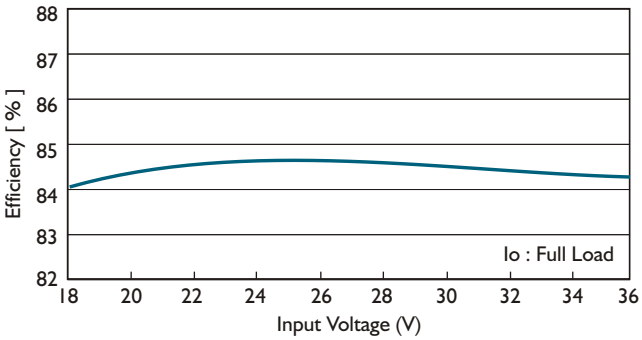


DERATING AND EFFICIENCY CURVE

Temperature derating curve



Efficiency Vs Input Voltage
FDD25-05S2



Efficiency Vs Output Load
FDD25-05S2

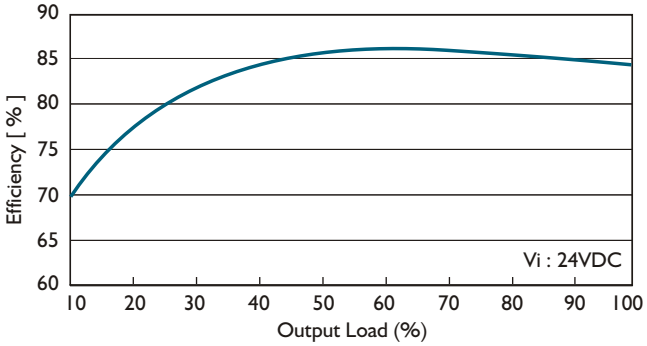
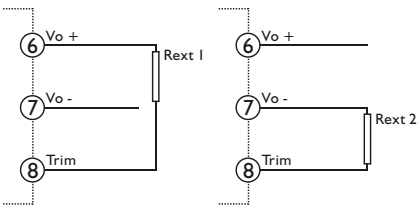


Fig. 1 Trim connection

(For Single output)



(For Dual output)

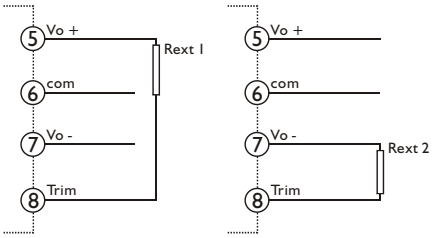


Table 1 Typical resistor values for various output voltage adjustment settings

Type	Rext 1		Rext 2	
	Vo nom -2.5%	Vo nom -5%	Vo nom +2.5%	Vo nom +5%
FDD25-03SX	3.3KΩ	1KΩ	12KΩ	5.6KΩ
Type	Vo nom -5%	Vo nom -10%	Vo nom +5%	Vo nom +10%
FDD25-05SX	6.8KΩ	680Ω	4.7KΩ	680Ω
FDD25-12SX	22KΩ	6.2KΩ	6.2KΩ	0Ω
FDD25-15SX	150KΩ	6.2KΩ	20KΩ	3.9KΩ
FDD25-12DX	150KΩ	68KΩ	10KΩ	1.5KΩ
FDD25-15DX	330KΩ	180KΩ	27KΩ	6.8KΩ