

# FDD25 SERIES

DC - DC CONVERTER  
20 ~ 30W SINGLE & DUAL OUTPUT



## FEATURES

- 2:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT P<sub>i</sub> FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 YEARS WARRANTY

## MODEL LIST

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

### 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	1500			VDC
Isolation resistance	Input - Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / 1V			1000	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	Belcore issue 6@40°C, GB		720000		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 models		20	mA
		24V models		15	mA
		48V models		10	mA
Input voltage w/o damage	Io nom	12V models		20	VDC
		24V models		40	VDC
		48V models		75	VDC
Startup voltage	Io nom	12V models	8.5		VDC
		24V models	15		VDC
		48V models	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	0			%
	single output models 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, I ~ 0.5 Io nom			500	μs
Ripple & noise	Vi nom, Io nom, BW = 20MHz	3.3V & 5V models		100	mV
		12V, 15V & dual		150	mV
Voltage trim range (I)	Vi nom, Io nom	3.3V model	± 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

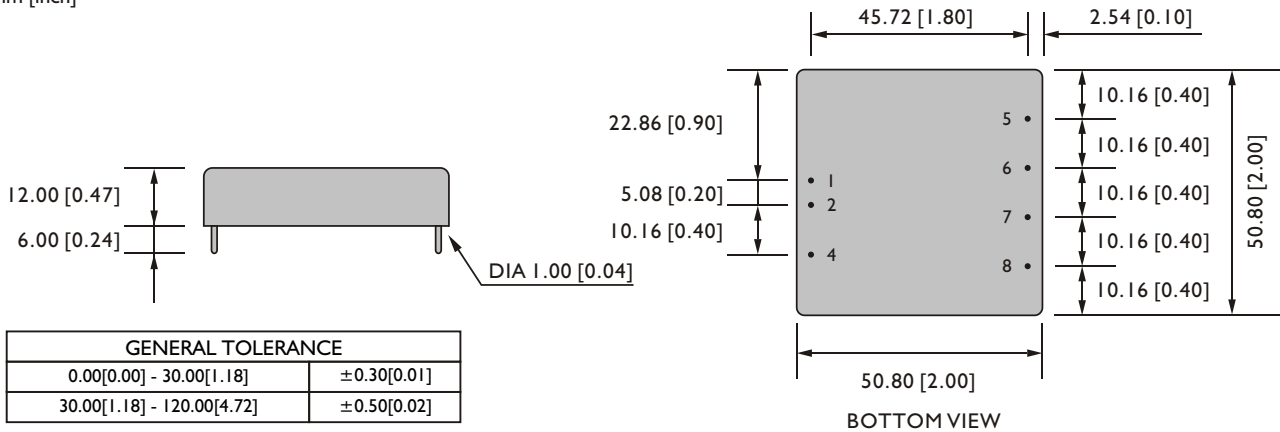
Remote ON / OFF	ON : opened or 5 ~ 10VDC applied, reference to input GND OFF : -0.3 ~ 2VDC applied, reference to input GND
Input reversed	Shunt diode built in, external fuse recommended (12Vin : 3A, 24Vin : 2A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)
Rated over load protection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

### MECHANISM & PIN CONFIGURATION

mm [inch]



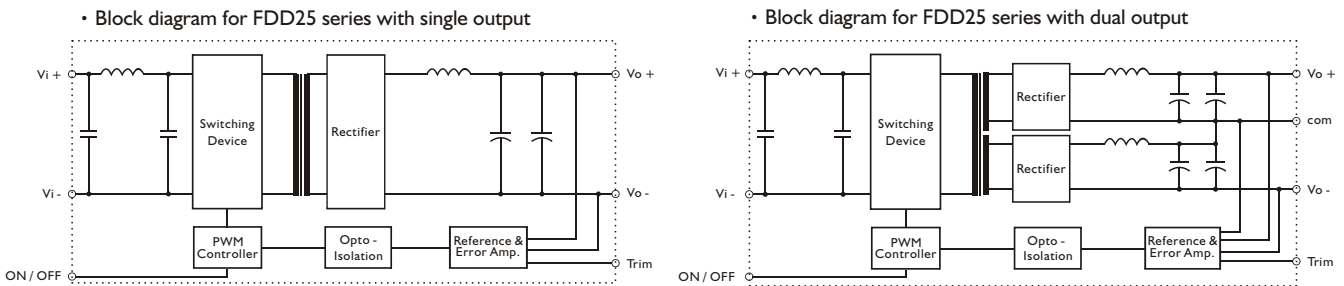
GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

### PIN ASSIGNMENT

#### GENERAL

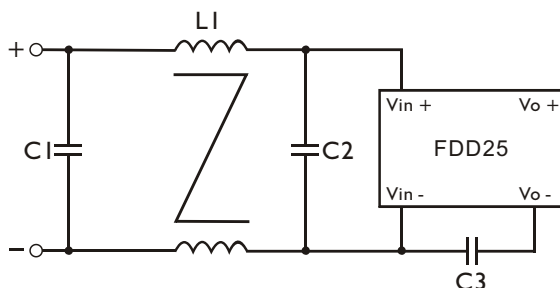
PIN NO.	1	2	4	5	6	7	8
SINGLE	Vi +	Vi -	ON/OFF	NO PIN	Vo +	Vo -	Trim
DUAL	Vi +	Vi -	ON/OFF	Vo +	com	Vo -	Trim

### CIRCUIT SCHEMATIC



### RECOMMENDED CIRCUIT

• Recommended filter for EN55022 Class B compliance

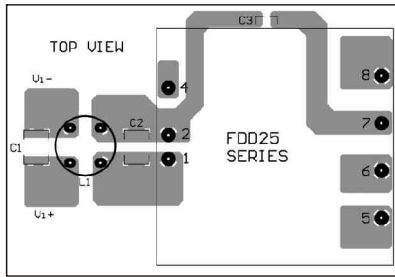


• The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

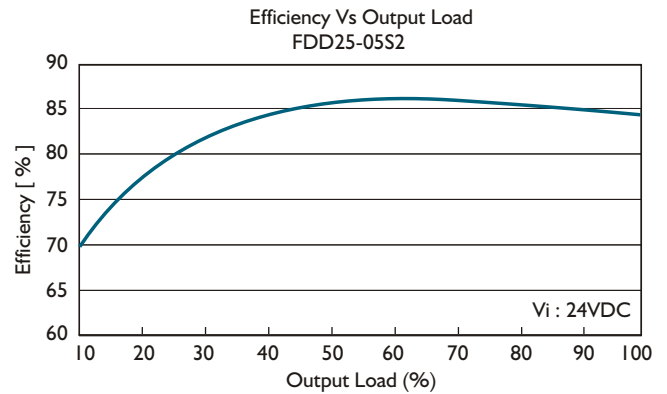
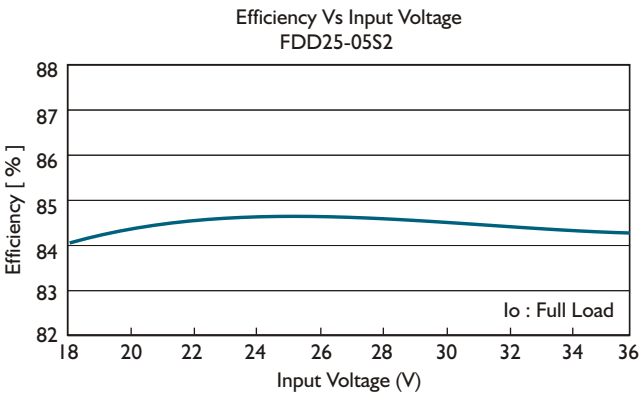
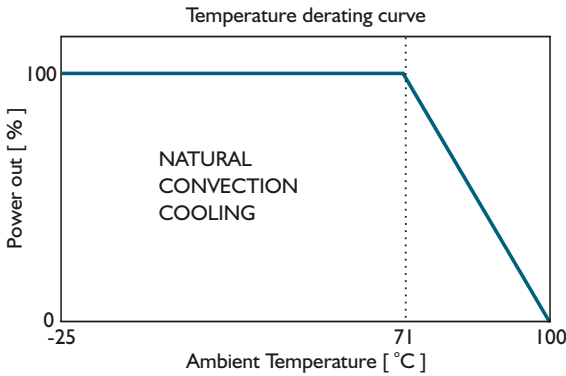
	C1	C2	C3	L1
FDD25-XXX1	4.7 $\mu$ F / 50V MLCC	4.7 $\mu$ F / 50V MLCC	1nF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX2	3.3 $\mu$ F / 50V MLCC	3.3 $\mu$ F / 50V MLCC	1nF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX3	3.3 $\mu$ F / 100V MLCC	3.3 $\mu$ F / 100V MLCC	1nF / 2KV MLCC	1.5mH Common Choke

### RECOMMENDED CIRCUIT

- Recommended EN 55022 Class B filter circuit layout.

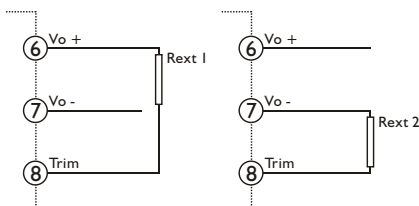


### DERATING AND EFFICIENCY CURVE

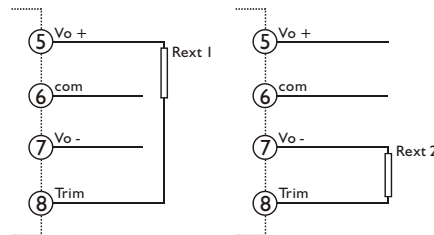


**Fig. 1 Trim connection**

( 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



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