

# 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
- 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.)
<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	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	Belcore 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			%
	Vi nom 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		100	mV
		12V, 15V & dual		150	mV
Voltage trim range I)	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

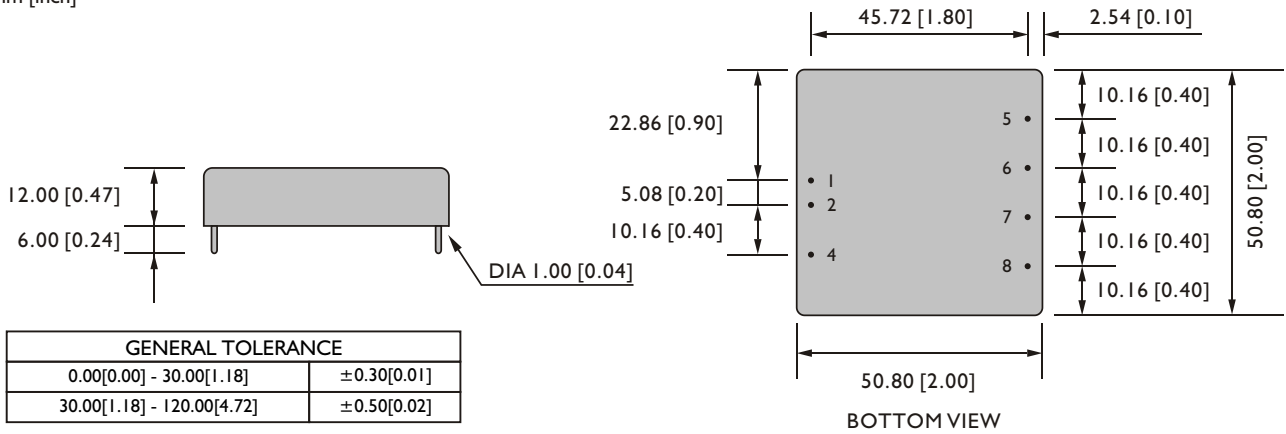
Remote ON / OFF	ON : opened or 5 ~ 10VDC applied, reference to input GND OFF : -0.3 ~ 2VDC applied, reference to input GND
Input reversed	Shunt diode built in, external fuse recommended (12Vin : 3A, 24Vin : 2A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	I 10%min.... I 40%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]

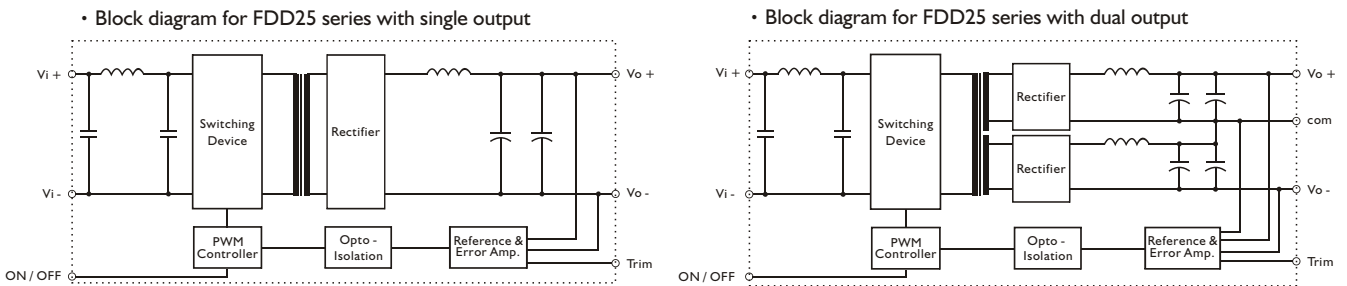


### PIN ASSIGNMENT

#### GENERAL

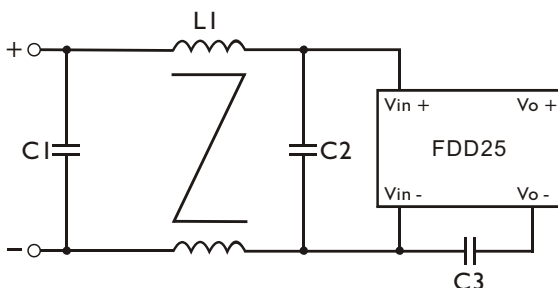
PIN NO.	1	2	4	5	6	7	8
SINGLE	Vi +	Vi -	ON/OFF	NO PIN	Vo +	Vo -	Trim
DUAL	Vi +	Vi -	ON/OFF	Vo +	com	Vo -	Trim

### CIRCUIT SCHEMATIC



### RECOMMENDED CIRCUIT

• Recommended filter for EN55022 Class B compliance

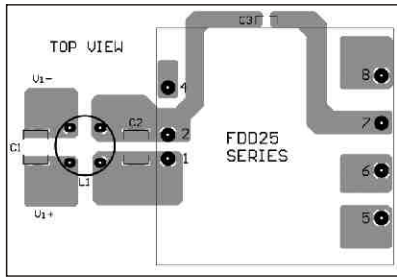


• The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

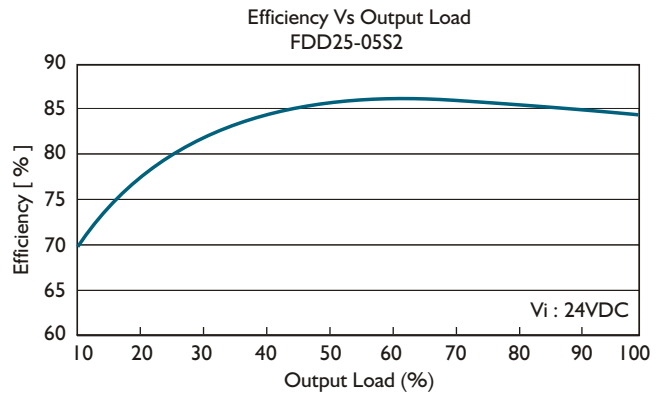
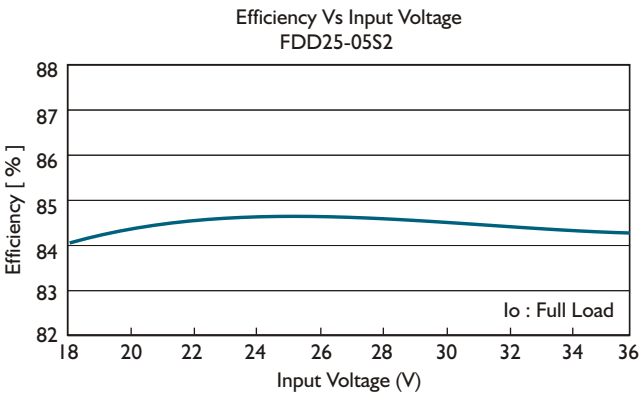
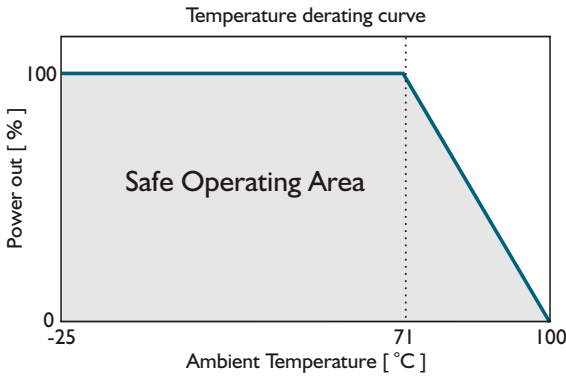
	C1	C2	C3	L1
FDD25-XXX1	4.7 $\mu$ F / 50V MLCC	4.7 $\mu$ F / 50V MLCC	1nF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX2	3.3 $\mu$ F / 50V MLCC	3.3 $\mu$ F / 50V MLCC	1nF / 2KV MLCC	1.5mH Common Choke
FDD25-XXX3	3.3 $\mu$ F / 100V MLCC	3.3 $\mu$ F / 100V MLCC	1nF / 2KV MLCC	1.5mH Common Choke

### RECOMMENDED CIRCUIT

- Recommended EN 55022 Class B filter circuit layout.

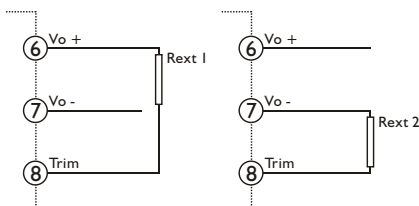


### DERATING AND EFFICIENCY CURVE

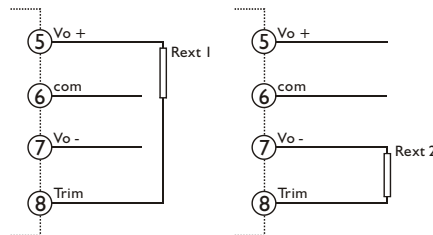


**Fig. 1 Trim connection**

( 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