

FDD05 SERIES

DC - DC CONVERTER
5 ~ 6W SINGLE & DUAL OUTPUT



FEATURES

- 4:1 & 3:1 & 2:1 WIDE INPUT RANGE
- I/O ISOLATION
- 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.)
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Single Output Models

FDD05 - 05S	20~60 VDC	135 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S	20~60 VDC	160 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S	20~60 VDC	155 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F
FDD05 - 05S1	9~18 VDC	550 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S1	9~18 VDC	635 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S1	9~18 VDC	625 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F
FDD05 - 05S2	18~36 VDC	275 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S2	18~36 VDC	315 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S2	18~36 VDC	305 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F
FDD05 - 05S3	36~72 VDC	135 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S3	36~72 VDC	160 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S3	36~72 VDC	155 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F
FDD05 - 05S4	9~36 VDC	275 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S4	9~36 VDC	315 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S4	9~36 VDC	310 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F
FDD05 - 05S5	18~72 VDC	135 mA	5 WATTS	+ 5 VDC	1000 mA	72%	74%	2200 μ F
FDD05 - 12S5	18~72 VDC	160 mA	6 WATTS	+ 12 VDC	500 mA	72%	74%	1500 μ F
FDD05 - 15S5	18~72 VDC	155 mA	6 WATTS	+ 15 VDC	400 mA	72%	74%	270 μ F

Dual Output Models

FDD05 - 05D	20~60 VDC	140 mA	5 WATTS	\pm 5 VDC	\pm 500 mA	73%	75%	\pm 680 μ F
FDD05 - 12D	20~60 VDC	160 mA	6 WATTS	\pm 12 VDC	\pm 250 mA	75%	77%	\pm 150 μ F
FDD05 - 15D	20~60 VDC	155 mA	6 WATTS	\pm 15 VDC	\pm 200 mA	75%	77%	\pm 68 μ F
FDD05 - 05D1	9~18 VDC	570 mA	5 WATTS	\pm 5 VDC	\pm 500 mA	73%	75%	\pm 680 μ F
FDD05 - 12D1	9~18 VDC	645 mA	6 WATTS	\pm 12 VDC	\pm 250 mA	75%	77%	\pm 150 μ F
FDD05 - 15D1	9~18 VDC	630 mA	6 WATTS	\pm 15 VDC	\pm 200 mA	75%	77%	\pm 68 μ F
FDD05 - 05D2	18~36 VDC	280 mA	5 WATTS	\pm 5 VDC	\pm 500 mA	73%	75%	\pm 680 μ F
FDD05 - 12D2	18~36 VDC	315 mA	6 WATTS	\pm 12 VDC	\pm 250 mA	75%	77%	\pm 150 μ F
FDD05 - 15D2	18~36 VDC	310 mA	6 WATTS	\pm 15 VDC	\pm 200 mA	75%	77%	\pm 68 μ F
FDD05 - 05D3	36~72 VDC	140 mA	5 WATTS	\pm 5 VDC	\pm 500 mA	73%	75%	\pm 680 μ F
FDD05 - 12D3	36~72 VDC	160 mA	6 WATTS	\pm 12 VDC	\pm 250 mA	75%	77%	\pm 150 μ F

MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT (typ.)	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
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Dual Output Models

FDD05 - 15D3	36~72 VDC	155 mA	6 WATTS	± 15 VDC	± 200 mA	75%	77%	± 68 μ F
FDD05 - 05D4	9~36 VDC	280 mA	5 WATTS	± 5 VDC	± 500 mA	73%	75%	± 680 μ F
FDD05 - 12D4	9~36 VDC	315 mA	6 WATTS	± 12 VDC	± 250 mA	75%	77%	± 150 μ F
FDD05 - 15D4	9~36 VDC	310 mA	6 WATTS	± 15 VDC	± 200 mA	75%	77%	± 68 μ F
FDD05 - 05D5	18~72 VDC	140 mA	5 WATTS	± 5 VDC	± 500 mA	73%	75%	± 680 μ F
FDD05 - 12D5	18~72 VDC	160 mA	6 WATTS	± 12 VDC	± 250 mA	75%	77%	± 150 μ F
FDD05 - 15D5	18~72 VDC	155 mA	6 WATTS	± 15 VDC	± 200 mA	75%	77%	± 68 μ 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	80			KHz
Isolation voltage	Input - Output	1500			VDC
Isolation resistance	Input - Output, @ 500VDC	100			M Ω
Isolation capacitance	100KHz / 1V			330	PF
Ambient temperature	Operating at Vi nom, Io nom	-25		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+ 90	°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		1120000		Hours
Cooling	Free air convection				

INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit	
Input voltage range	Ta min ... Ta max, Io nom	2 : I models	9	12	18	VDC
			18	24	36	VDC
			36	48	72	VDC
		3 : I models	20	48	60	VDC
		4 : I models	9	24	36	VDC
			18	48	72	VDC
No load input current	Vi nom, Io = 0	12V models			40	mA
		24V models			25	mA
		48V models			15	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		8.5	VDC	
		48V models		16	VDC	
Input filter	Pi type					

SPECIFICATION

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

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)	20			%
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 20% - 100% FL			± 10	%
Startup time	Vi nom, Io nom			30	ms
Transient recovery time	Vi nom, I ~0.5 Io nom			3	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz			150	mV
Efficiency	Vi nom, Io nom, Po / Pi	Up to 77%, See model list and efficiency curve			

CONTROL AND PROTECTION

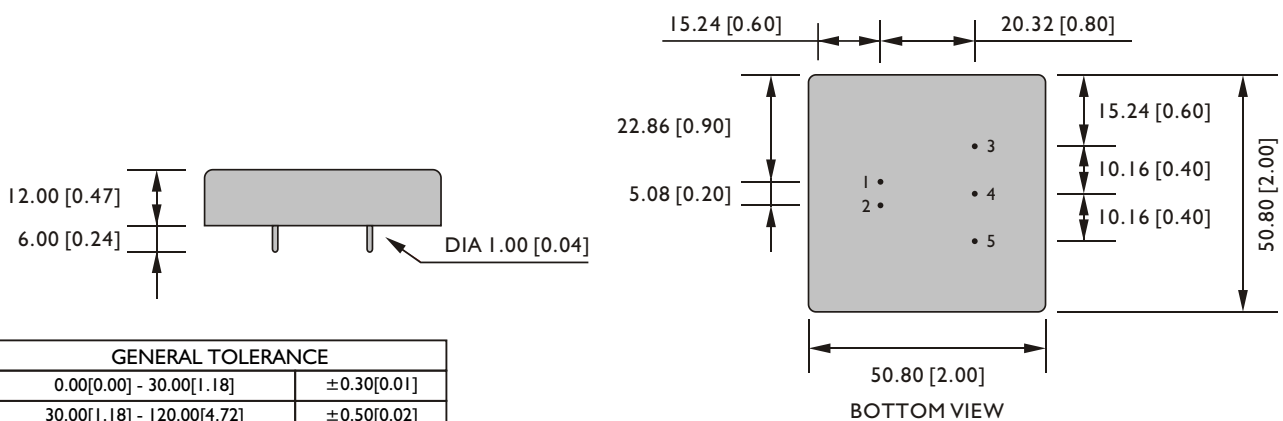
Input reversed	External shunt diode, external fuse recommended (12Vin : 1.5A, 24Vin : 1.5A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)

PHYSICAL CHARACTERISTICS

Case size	50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches)
Case material	Plastic
Weight	45 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]

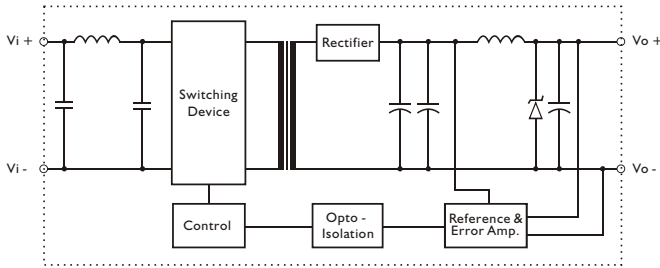
PIN ASSIGNMENT

GENERAL

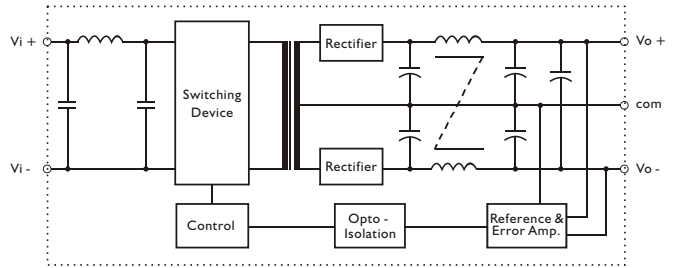
PIN NO.	1	2	3	4	5
SINGLE	Vi+	Vi-	Vo+	NO PIN	Vo-
DUAL	Vi+	Vi-	Vo+	com	Vo-

CIRCUIT SCHEMATIC

• Block diagram for FDD05 series with single output

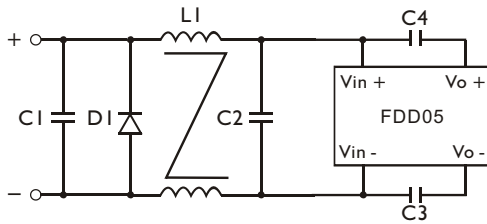


• Block diagram for FDD05 series with dual output



RECOMMENDED CIRCUIT

• Recommended filter for EN55022 Class B compliance

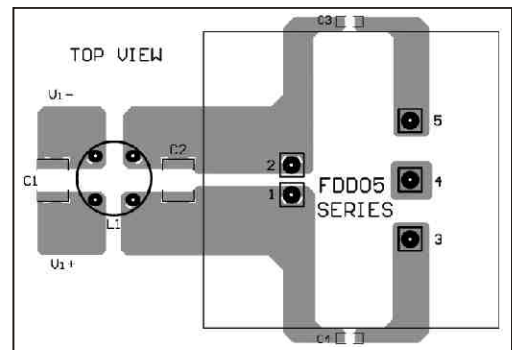


NOTE: D1 - Reverse Diode (2A/100V)

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

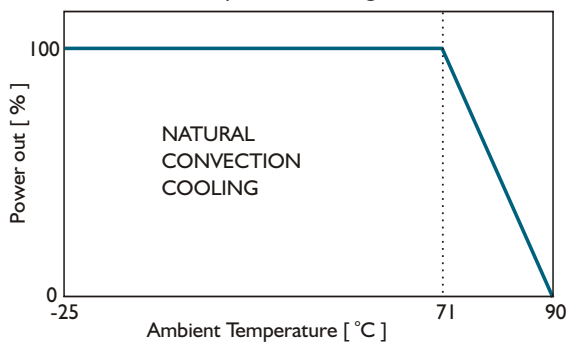
	C1	C2	C3	C4	L1
FDD05-XXS1/S2/S4 XXD1/D2/D4	6.8 μ F / 50V MLCC	3.3 μ F / 50V MLCC	1nF/2KV MLCC	1nF/2KV MLCC	0.5mH Common Choke
FDD05-XXS/S3/S5 XXD/D3/D5	4.7 μ F / 100V MLCC	4.7 μ F / 100V MLCC	1nF/2KV MLCC	1nF/2KV MLCC	3mH Common Choke

• Recommended EN 55022 Class B filter circuit layout.

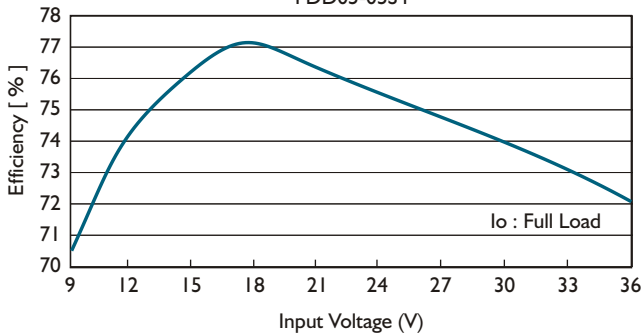


DERATING AND EFFICIENCY CURVE

Temperature derating curve



Efficiency Vs Input Voltage
FDD05-05S4



Efficiency Vs Output Load
FDD05-05S4

