

# FED40W SERIES

DC-DC CONVERTER

4:1 WIDE INPUT RANGE  
UP TO 40Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- STANDARD 2.00 X 1.00 X 0.40 INCH
- SIX-SIDED CONTINUOUS SHIELD
- SAFETY MEETS UL60950-1, EN60950-1, IEC60950-1, & EN50155
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

- RAILWAY SYSTEM
- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	OTP	LOW STANDBY POWER
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## TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA	%	µF
FED40-24S3P3W	9 ~ 36	3.3	10000	15	90	26600
FED40-24S05W	9 ~ 36	5	8000	15	91	20000
FED40-24S12W	9 ~ 36	12	3333	15	92	3900
FED40-24S15W	9 ~ 36	15	2666	15	92	2600
FED40-24S24W	9 ~ 36	24	1666	15	91	1300
FED40-24D12W	9 ~ 36	±12	±1666	15	90	± 2600
FED40-24D15W	9 ~ 36	±15	±1333	15	90	± 1600
FED40-24D24W	9 ~ 36	±24	±833	15	91	±650
FED40-48S3P3W	18 ~ 75	3.3	10000	10	90	26600
FED40-48S05W	18 ~ 75	5	8000	10	91	20000
FED40-48S12W	18 ~ 75	12	3333	10	92	3900
FED40-48S15W	18 ~ 75	15	2666	10	92	2600
FED40-48S24W	18 ~ 75	24	1666	10	91	1300
FED40-48D12W	18 ~ 75	±12	±1666	10	90	± 2600
FED40-48D15W	18 ~ 75	±15	±1333	10	90	± 1600
FED40-48D24W	18 ~ 75	±24	±833	10	91	±650
FED40-110S3P3W	43 ~ 160	3.3	10000	10	88	26600
FED40-110S05W	43 ~ 160	5	8000	10	89	20000
FED40-110S12W	43 ~ 160	12	3333	10	90.5	3900
FED40-110S15W	43 ~ 160	15	2666	10	91	2600
FED40-110S24W	43 ~ 160	24	1666	10	90	1300
FED40-110D12W	43 ~ 160	±12	±1666	10	89	± 2600
FED40-110D15W	43 ~ 160	±15	±1333	10	89	± 1600
FED40-110D24W	43 ~ 160	±24	±833	10	91	±650

## PART NUMBER STRUCTURE

<b>FED40</b>	-	<b>48</b>	<b>S</b>	<b>05</b>	<b>W</b>	-	<b>N</b>	<b>HS</b>
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range		Remote Control Option	Heat-sink
		24: 9-36 48: 18-75 110: 43-160	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24	4:1		□: Positive logic N: Negative logic	□: No Heat-sink HS Heat-sink HC Heat-sink with Clamp
			D: Dual	12: ±12 15: ±15 24: ±24				

**INPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
	110Vin(nom)		43	110	160		
Start-up voltage	24Vin(nom)				9	VDC	
	48Vin(nom)				18		
	110Vin(nom)				43		
Shutdown voltage	24Vin(nom)			8		VDC	
	48Vin(nom)			16			
	110Vin(nom)			40			
Start up time	Constant resistive load	Power up		60		ms	
Input surge voltage	1 second, max.	Remote ON/OFF		60			
		24Vin(nom)				50	VDC
		48Vin(nom)				100	
110Vin(nom)				170			
Input filter					Pi type		
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON		Open or 3 ~ 12VDC		
		(Standard)	DC-DC OFF		Short or 0 ~ 1.2VDC		
		Negative logic	DC-DC ON		Short or 0 ~ 1.2VDC		
		(Option)	DC-DC OFF		Open or 3 ~ 12VDC		
		Input current of Ctrl pin		-0.5	0.5	mA	
		Remote off input current			3	mA	

**OUTPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	No Load to Full Load	Single	-0.5		+0.5	%
		Dual	-1.0		+1.0	%
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%
Voltage adjustability	Single output	3.3Vout, 5Vout, 12Vout	-10		+10	%
		15Vout, 24Vout	-10		+20	
Ripple and noise	Measured by 20MHz bandwidth With a 0.1µF/50V X7R MLCC	3.3Vout, 5Vout		75	100	mVp-p
		12Vout, 15Vout		100	125	
		24Vout		150	200	
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change			250		µs
Over voltage protection	Zener diode clamp	3.3Vout		3.9		VDC
		5Vout		6.2		
		12Vout		15		
		15Vout		20		
		24Vout		30		
Over load protection	% of Iout rated; Hiccup mode			150		%
Short circuit protection			Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			VDC
		Input (Output) to Case	1600			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					1500	pF
Switching frequency			225	250	275	kHz
Safety meets						UL60950-1 EN60950-1 IEC60950-1 EN50155
Case material						Copper
Base material						FR4 PCB
Potting material						Silicone (UL94 V-0)
Weight						32g (1.13oz)
MTBF	MIL-HDBK-217F, Full load.					9.073 x 10 <sup>5</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature		-40		+85	°C
Maximum case temperature				+105	°C
Over temperature protection			+115		°C
Storage temperature range		-55		+125	°C
Thermal impedance (1)	Vertical direction by natural convection (20LFM) Without Heat-sink With Heat-sink		10.8 10.3		°C/W
Thermal shock					MIL-STD-810F
Shock					EN61373, MIL-STD-810F
Vibration					EN61373, MIL-STD-810F
Relative humidity					5% to 95% RH

**EMC SPECIFICATIONS**

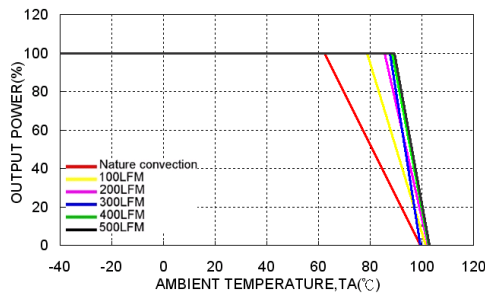
Parameter	Conditions	Level
EMI (2)	EN55011, EN55022	Class A
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (3)	EN61000-4-5 ± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A

**Note:**

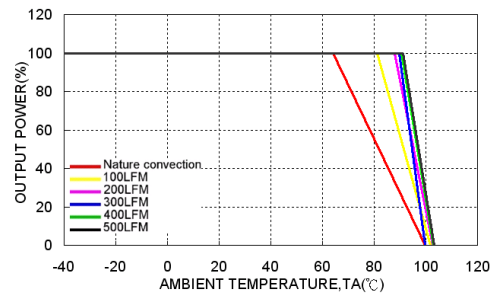
1. Test by minimum input and constant resistive load.
2. The standard modules meets EMI Class A or Class B with external components. For further information, please contact with P-DUKE.
3. The external input components are required if the module has to meet EN61000-4-4, EN61000-4-5.  
 The FED40-24□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.  
 The FED40-48□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.  
 The FED40-110□□□W recommended an aluminum electrolytic capacitor (Ruby-con BXF series, 68µF/200V 3pcs in parallel) and a TVS (SMDJ90A, 90V, 3000Watt peak pulse power 2pcs in series connection ) to connect in parallel

**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

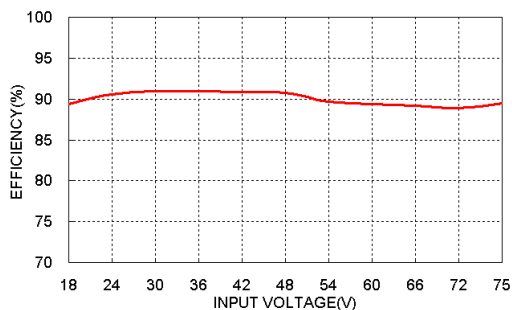
**CHARACTERISTIC CURVE**



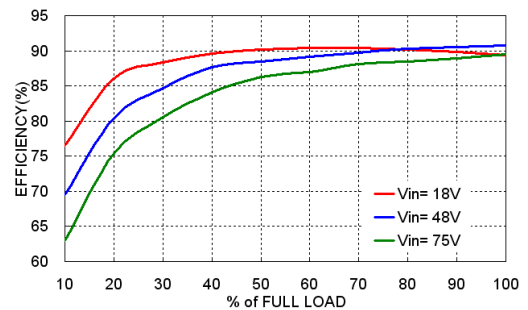
FED40-48S05W Derating Curve



FED40-48S05W Derating Curve with Heat-sink

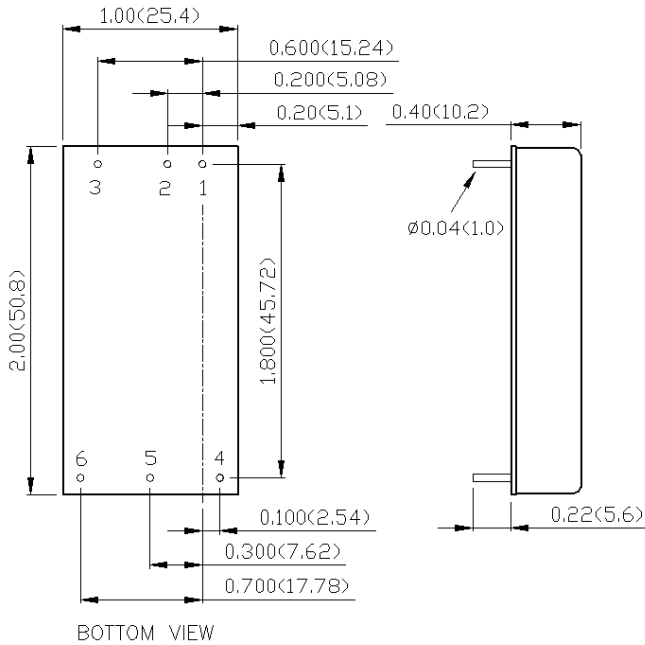


FED40-48S05W Efficiency VS Input Voltage



FED40-48S05W Efficiency VS Output Load

**MECHANICAL DRAWING**

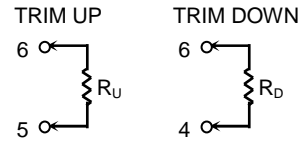


**PIN CONNECTION**

PIN	SINGLE	DUAL
1	+ Vin	+ Vin
2	- Vin	- Vin
3	Ctrl	Ctrl
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout

**EXTERNAL OUTPUT TRIMMING**

Output can be externally trimmed by using the method shown below.



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)  
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)