

# FED40 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 40 Watts



## 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

- 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
FED40-12S3P3	9 ~ 18	3.3	10000	20	90	26600
FED40-12S05	9 ~ 18	5	8000	20	91	20000
FED40-12S12	9 ~ 18	12	3333	20	91	3900
FED40-12S15	9 ~ 18	15	2666	20	91	2600
FED40-12S24	9 ~ 18	24	1666	20	91	1300
FED40-12D12	9 ~ 18	±12	±1666	20	90	± 2600
FED40-12D15	9 ~ 18	±15	±1333	20	91	± 1600
FED40-12D24	9 ~ 18	±24	±833	20	91	±650
FED40-24S3P3	18 ~ 36	3.3	10000	15	91	26600
FED40-24S05	18 ~ 36	5	8000	15	92	20000
FED40-24S12	18 ~ 36	12	3333	15	92	3900
FED40-24S15	18 ~ 36	15	2666	15	92	2600
FED40-24S24	18 ~ 36	24	1666	15	91	1300
FED40-24D12	18 ~ 36	±12	±1666	15	90	± 2600
FED40-24D15	18 ~ 36	±15	±1333	15	91	± 1600
FED40-24D24	18 ~ 36	±24	±833	15	91	±650
FED40-48S3P3	36 ~ 75	3.3	10000	10	91	26600
FED40-48S05	36 ~ 75	5	8000	10	92	20000
FED40-48S12	36 ~ 75	12	3333	10	92	3900
FED40-48S15	36 ~ 75	15	2666	10	92	2600
FED40-48S24	36 ~ 75	24	1666	10	92	1300
FED40-48D12	36 ~ 75	±12	±1666	10	91	± 2600
FED40-48D15	36 ~ 75	±15	±1333	10	91	± 1600
FED40-48D24	36 ~ 75	±24	±833	10	90	±650

## PART NUMBER STRUCTURE

FED40	-	48	S	05	-	N	HS
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Remote Control options	Heat-sink
		12: 9~18 24: 18~36 48: 36~75	S: Single  D: Dual	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 12: ±12 15: ±15 24: ±24		<input type="checkbox"/> : Positive logic N: Negative logic	<input type="checkbox"/> : No Heat-sink HS: Heat-sink HC: Heat-sink with Clamp

**INPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)		9	12	18	VDC
	24Vin(nom)		18	24	36	
	48Vin(nom)		36	48	75	
Start-up voltage	12Vin(nom)				9	VDC
	24Vin(nom)				18	
	48Vin(nom)				36	
Shutdown voltage	12Vin(nom)			8		VDC
	24Vin(nom)			16		
	48Vin(nom)			32		
Start up time	Constant resistive load	Power up		60		ms
Input surge voltage	1 second, max.	12Vin(nom)			25	VDC
		24Vin(nom)			50	
		48Vin(nom)			100	
Input filter				Pi type		
Remote ON/OFF	Referred to -Vin pin	Positive logic (Standard)	DC-DC ON		Open or 3 ~ 12VDC	
		Negative logic (Option)	DC-DC OFF		Short or 0 ~ 1.2VDC	
			DC-DC ON		Short or 0 ~ 1.2VDC	
		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			
Case material			Copper			
Base material			FR4 PCB			
Potting material			Silicone (UL94 V-0)			
Weight			32g (1.13oz)			
MTBF	MIL-HDBK-217F, Full load.		1.066 x 10 <sup>6</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	Vertical direction by natural convection (20LFM) Without Heat-sink With Heat-sink		10.8 10.3		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

**EMC SPECIFICATIONS**

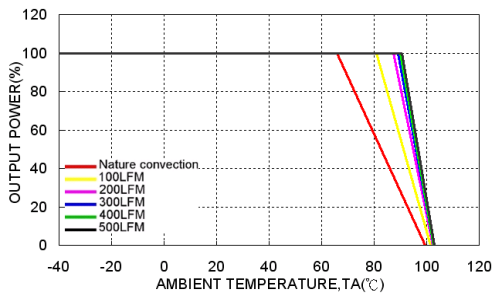
Parameter	Conditions	Level
EMI <sup>(2)</sup>	EN55022	Class A
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Fast transient <sup>(3)</sup>	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge <sup>(3)</sup>	EN61000-4-5 ± 2kV	Perf. Criteria A
Conducted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

**Note:**

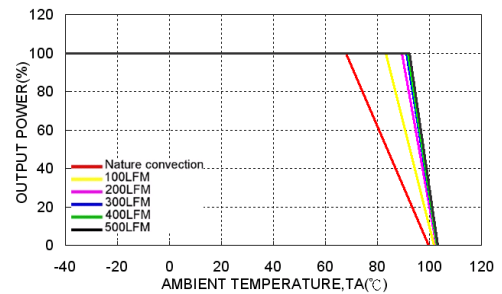
1. Test by minimum input and constant resistive load.
2. The standard modules meets EMI Class A or Class B with external components. For further information, please contact with P-DUKE.
3. The external input components are required if the module has to meet EN61000-4-4, EN61000-4-5.  
 The FED40-12□□□ 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 FED40-24□□□ recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ64A, 64V, 3000Watt peak pulse power) to connect in parallel.  
 The FED40-48□□□ 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.

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

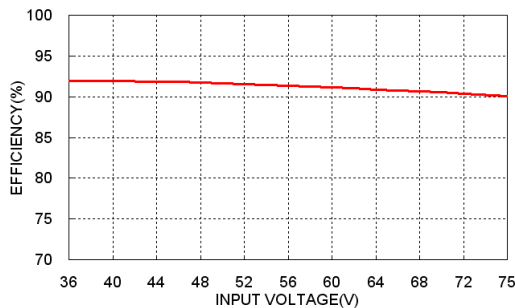
**CHARACTERISTIC CURVE**



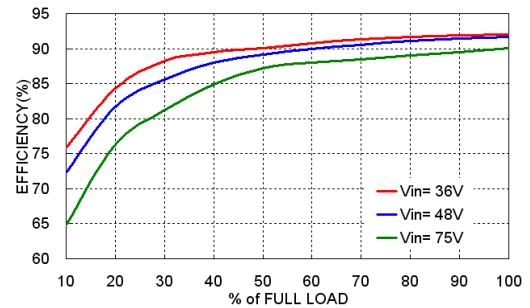
FED40-48S05 Derating Curve



FED40-48S05 Derating Curve with Heat-sink

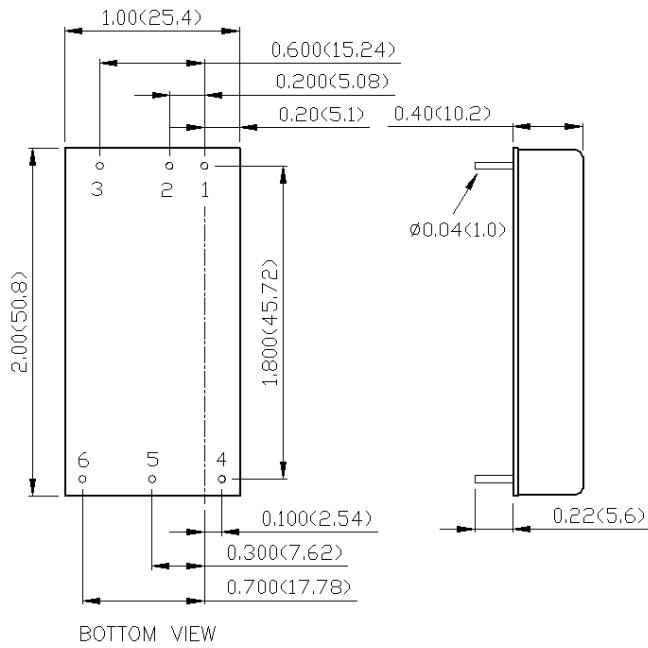


FED40-48S05 Efficiency VS Input Voltage



FED40-48S05 Efficiency VS Output Load

**MECHANICAL DRAWING**

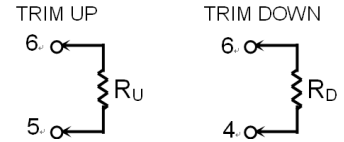


**PIN CONNECTION**

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)