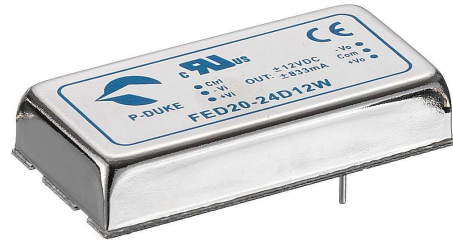


# FED20W SERIES

DC-DC CONVERTER



4 : 1 ULTRA WIDE INPUT RANGE  
UP TO 20Watts



## FEATURES

- 1600VDC INPUT TO OUTPUT ISOLATION
- STANDARD 2.00 X 1.00 X 0.40 INCH
- SIX-SIDED CONTINUOUS SHIELD
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- 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
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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
FED20-24S3P3W	9 ~ 36	3.3	5500	50	85	18000
FED20-24S05W	9 ~ 36	5	4000	65	88	9600
FED20-24S12W	9 ~ 36	12	1670	22	86	1650
FED20-24S15W	9 ~ 36	15	1330	22	86	1050
FED20-24D05W	9 ~ 36	±5	±2000	55	88	±4800
FED20-24D12W	9 ~ 36	±12	±833	30	87	±825
FED20-24D15W	9 ~ 36	±15	±667	30	87	±525
FED20-48S3P3W	18 ~ 75	3.3	5500	35	85	18000
FED20-48S05W	18 ~ 75	5	4000	35	88	9600
FED20-48S12W	18 ~ 75	12	1670	15	87	1650
FED20-48S15W	18 ~ 75	15	1330	15	87	1050
FED20-48D05W	18 ~ 75	±5	±2000	35	89	±4800
FED20-48D12W	18 ~ 75	±12	±833	17	88	±825
FED20-48D15W	18 ~ 75	±15	±667	17	88	±525

## PART NUMBER STRUCTURE

FED20	-	48	S	05	W	-	N	HS
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range		Remote Control Option	Assembly Option
		24: 9~36 48: 18~75	S: Single	3P3: 3.3 05: 5 12: 12 15: 15	4:1		□: Positive logic N: Negative logic	□: None HS: Heat-sink HC: Heat-sink & Clamp
			D: Dual	05: ±5 12: ±12 15: ±15				

**INPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
Input reflected ripple current			20			mAp-p	
Start up voltage	24Vin(nom)					VDC	
	48Vin(nom)		9				
Shutdown voltage	24Vin(nom)		7.5			VDC	
	48Vin(nom)		15				
Start up time	Constant resistive load	Power up	20			ms	
		Remote ON/OFF	20				
Input surge voltage	100 ms, max.	24Vin(nom)				VDC	
		48Vin(nom)	50				
Input filter			Pi type				
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 12VDC			mA
		(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		
Remote off input current			2.5		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	Single	-0.2		+0.2	%
		Dual	-0.5		+0.5	
Load regulation	No Load to Full Load	Single	-0.5		+0.5	%
		Dual	-1.0		+1.0	
Cross regulation	Asymmetrical load 25%/100% FL		-5.0		+5.0	%
Voltage adjustability	Single output		-10		+10	%
Ripple and noise	20MHz bandwidth With a 0.1µF/50V MLCC	Single	3.3Vout		60	mVp-p
			Others		75	
		Dual	All		100	
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	18			
Over load protection	% of Iout rated		150			%
Short circuit protection			Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			
		Input (Output) to Case	1600			
Case grounding			Connect case to -Vin with decoupling Y Cap			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			1500			pF
Switching frequency			360	400	440	kHz
Safety approvals			UL60950-1 EN60950-1 IEC60950-1			
Case material			Nickel-coated copper			
Base material			FR4 PCB			
Potting material			Epoxy (UL94 V-0)			
Weight			27g (0.95oz)			
MTBF	MIL-HDBK-217F, Full load		1.851 x 10 <sup>6</sup>			hrs

## ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		+66	°C
	With derating	+66		+105	
Maximum case temperature				+105	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink	12		°C/W
		With heat-sink	10		
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

## EMC SPECIFICATIONS

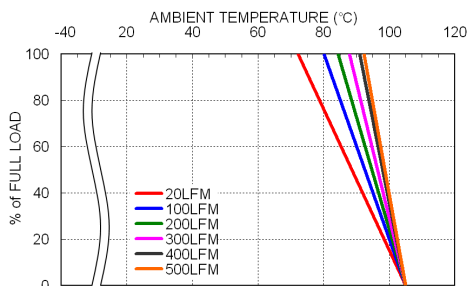
Parameter	Conditions	Level
EMI <sup>(2)</sup>	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria B
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient <sup>(3)</sup>	EN61000-4-4 ±2kV	Perf. Criteria B
Surge <sup>(3)</sup>	EN61000-4-5 ±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

### Note:

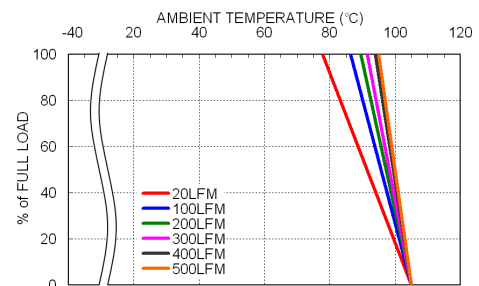
- Test by minimum input and constant resistive load.
- The standard module meets EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220µF/100V.

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

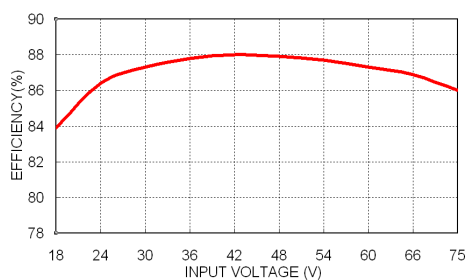
## CHARACTERISTIC CURVE



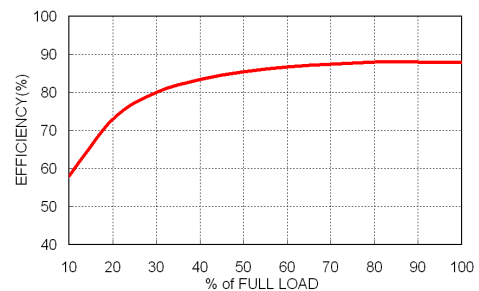
FED20-48S05W Derating Curve



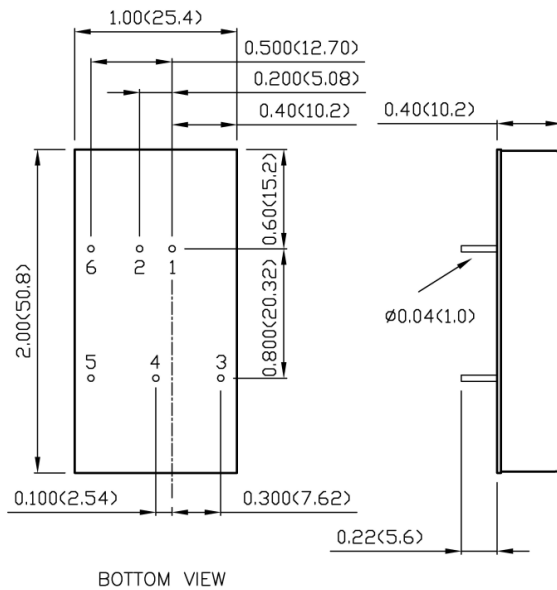
FED20-48S05W Derating Curve With Heat-sink



FED20-48S05W Efficiency vs. Input Voltage



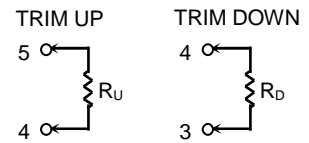
FED20-48S05W Efficiency vs. Output Load

**MECHANICAL DRAWING**

**PIN CONNECTION**

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

**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)