

# FDC10 SERIES

## FDC10W

DC-DC CONVERTER



2:1 & 4:1 WIDE INPUT RANGE  
UP TO 10 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
- 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	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
FDC10-12S33	9 ~ 18	3.3	2000	17	80	6800
FDC10-12S05	9 ~ 18	5	2000	21	81	4700
FDC10-12S12	9 ~ 18	12	830	38	84	690
FDC10-12S15	9 ~ 18	15	670	36	84	470
FDC10-12D05	9 ~ 18	±5	±1000	39	84	±680
FDC10-12D12	9 ~ 18	±12	±416	47	83	±330
FDC10-12D15	9 ~ 18	±15	±333	45	84	±110
FDC10-24S33	18 ~ 36	3.3	2000	15	80	6800
FDC10-24S05	18 ~ 36	5	2000	22	82	4700
FDC10-24S12	18 ~ 36	12	830	18	84	690
FDC10-24S15	18 ~ 36	15	670	36	84	470
FDC10-24D05	18 ~ 36	±5	±1000	28	83	±680
FDC10-24D12	18 ~ 36	±12	±416	24	85	±330
FDC10-24D15	18 ~ 36	±15	±333	31	84	±110
FDC10-48S33	36 ~ 75	3.3	2000	11	80	6800
FDC10-48S05	36 ~ 75	5	2000	14	84	4700
FDC10-48S12	36 ~ 75	12	830	14	86	690
FDC10-48S15	36 ~ 75	15	670	10	87	470
FDC10-48D05	36 ~ 75	±5	±1000	16	84	±680
FDC10-48D12	36 ~ 75	±12	±416	19	86	±330
FDC10-48D15	36 ~ 75	±15	±333	16	85	±110

Model Number	Input Range	Output Voltage	Output Current @ Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA	%	µF
FDC10-24S33W	9 ~ 36	3.3	2500	13	78	6800
FDC10-24S05W	9 ~ 36	5	2000	11	80	4700
FDC10-24S12W	9 ~ 36	12	830	16	84	690
FDC10-24S15W	9 ~ 36	15	670	26	81	470
FDC10-24D05W	9 ~ 36	±5	416	15	82	±680
FDC10-24D12W	9 ~ 36	±12	±1000	15	80	±330
FDC10-24D15W	9 ~ 36	±15	±416	22	80	±110
FDC10-48S33W	18 ~ 75	3.3	±333	10	76	6800
FDC10-48S05W	18 ~ 75	5	2500	9	81	4700
FDC10-48S12W	18 ~ 75	12	2000	9	84	690
FDC10-48S15W	18 ~ 75	15	830	11	84	470
FDC10-48D05W	18 ~ 75	±5	670	12	82	±680
FDC10-48D12W	18 ~ 75	±12	416	20	78	±330
FDC10-48D15W	18 ~ 75	±15	±1000	20	81	±110

### PART NUMBER STRUCTURE

FDC10	-	48	S	05	-	M1	P	HS
Series name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Version Code	Remote On/Off Option	Assembly Option
		12: 9~18 24: 18~36 48: 36~75	S: Single	33: 3.3 05: 5 12: 12 15: 15		□: Standard Version M1: M1 Version M2: M2 Version	P: Positive logic N: Negative logic	□: None HS: Heat-sink HC: Heat-sink with Clamp
			D: Dual	05: ±5 12: ±12 15: ±15				

FDC10	-	48	S	05	W	-	P	HS
Series name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range		Remote On/Off Option	Assembly Option
		24: 9~36 48: 18~75	S: Single	33: 3.3 05: 5 12: 12 15: 15	4:1		P: Positive logic N: Negative logic	□: None HS: Heat-sink HC: Heat-sink with Clamp
			D: Dual	05: ±5 12: ±12 15: ±15				

### INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	FDC10 series	12Vin(nom)	9	12	18	VDC
		24Vin(nom)	18	24	36	
		48Vin(nom)	36	48	75	
Input reflected ripple current	FDC10W series	24Vin(nom)	9	24	36	VDC
		48Vin(nom)	18	48	75	
Start up time	Constant resistive load	Power up		30		mAp-p
Input surge voltage	100 ms, max.	12Vin(nom)			36	VDC
		24Vin(nom)			50	
		48Vin(nom)			100	
Input filter				Pi type		
Remote ON/OFF (Option)	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3.5 ~ 12VDC		
			DC-DC OFF	Short or 0 ~ 1.2VDC		
		Negative logic	DC-DC ON	Short or 0 ~ 1.2VDC		
		DC-DC OFF	Open or 3.5 ~ 12VDC			
		Input current of Ctrl pin	-0.5		+1.0	mA
		Remote off input current		20		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	%
		Dual		+1.0	
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth	Single	50		mVp-p
		Dual	75		
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		VDC
		Input (Output) to Case	1600		
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				300	pF
Switching frequency		270	300	330	kHz
Safety approvals					UL60950-1 EN60950-1 IEC60950-1
Case material					Nickel-coated copper
Base material					Non-conductive black plastic
Potting material					Epoxy (UL94 V-0)
Weight					27g (0.95oz)
MTBF	MIL-HDBK-217F, Full load				3.342 x 10 <sup>6</sup> hrs

### ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Standard M1 (2) M2, W series	With derating	-25	+85	°C
		Without derating	-40	+85	
		With derating	-40	+85	
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

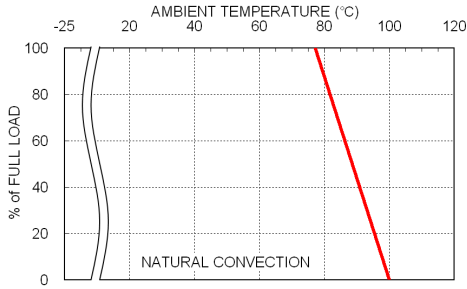
Parameter	Conditions	Level
EMI (3)	EN55022	Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria B
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4 ± 2kV	Perf. Criteria B
Surge (4)	EN61000-4-5 ± 2kV	Perf. Criteria B
Conducted immunity	EN61000-4-6 10 Vr.m.s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

#### Note:

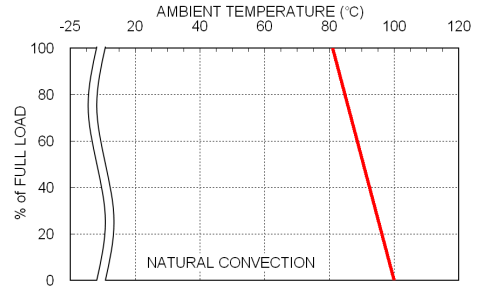
1. Test by minimum input and constant resistive load.
2. M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard and M2 version.
3. The standard module meets EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
4. 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.

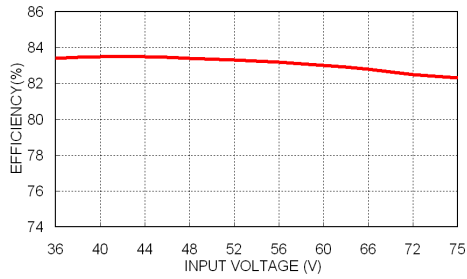
**CHARACTERISTIC CURVE**



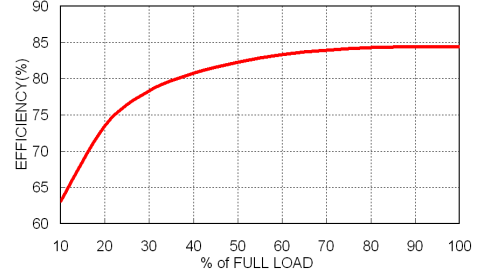
FDC10-48S05 Derating Curve



FDC10-48S05 Derating Curve With Heat-sink

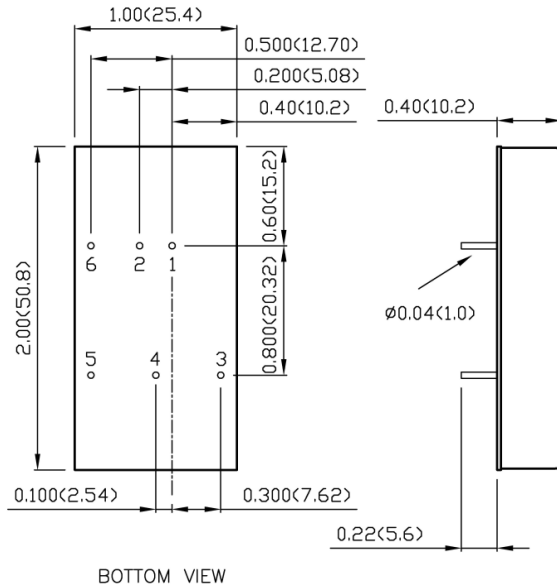


FDC10-48S05 Efficiency vs. Input Voltage



FDC10-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**



**PIN CONNECTION**

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No pin	Common
5	-Vout	-Vout
6	Ctrl(Optional)	Ctrl(Optional)

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)