

# FDC05 FDC05W SERIES

DC-DC CONVERTER



2:1 & 4:1 WIDE INPUT RANGE  
UP TO 5 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
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## TECHNICAL SPECIFICATION

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

Model Number	Input Range VDC	Output Voltage VDC	Output Current @ Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load (1) µF
FDC05-12S33	9 ~ 18	3.3	1000	10	76	3700
FDC05-12S05	9 ~ 18	5	1000	10	79	1700
FDC05-12S12	9 ~ 18	12	470	10	81	290
FDC05-12S15	9 ~ 18	15	400	15	80	188
FDC05-12D05	9 ~ 18	±5	±500	20	79	±850
FDC05-12D12	9 ~ 18	±12	±230	15	81	±140
FDC05-12D15	9 ~ 18	±15	±190	20	82	±47
FDC05-24S33	18 ~ 36	3.3	1000	15	73	3700
FDC05-24S05	18 ~ 36	5	1000	15	78	1700
FDC05-24S12	18 ~ 36	12	470	10	81	290
FDC05-24S15	18 ~ 36	15	400	20	81	188
FDC05-24D05	18 ~ 36	±5	±500	15	79	±850
FDC05-24D12	18 ~ 36	±12	±230	20	82	±140
FDC05-24D15	18 ~ 36	±15	±190	20	81	±47
FDC05-48S33	36 ~ 75	3.3	1000	5	73	3700
FDC05-48S05	36 ~ 75	5	1000	10	76	1700
FDC05-48S12	36 ~ 75	12	470	10	82	290
FDC05-48S15	36 ~ 75	15	400	10	82	188
FDC05-48D05	36 ~ 75	±5	±500	10	78	±850
FDC05-48D12	36 ~ 75	±12	±230	10	81	±140
FDC05-48D15	36 ~ 75	±15	±190	10	81	±47

Model Number	Input Range	Output Voltage	Output Current @ Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA	%	μF
FDC05-24S33W	9 ~ 36	3.3	1000	5	77	3700
FDC05-24S05W	9 ~ 36	5	1000	5	80	1700
FDC05-24S12W	9 ~ 36	12	470	5	82	290
FDC05-24S15W	9 ~ 36	15	400	5	81	188
FDC05-24D05W	9 ~ 36	±5	±500	5	80	±850
FDC05-24D12W	9 ~ 36	±12	±230	5	82	±140
FDC05-24D15W	9 ~ 36	±15	±190	10	83	±47
FDC05-48S33W	18 ~ 75	3.3	1000	5	73	3700
FDC05-48S05W	18 ~ 75	5	1000	10	76	1700
FDC05-48S12W	18 ~ 75	12	470	10	82	290
FDC05-48S15W	18 ~ 75	15	400	10	81	188
FDC05-48D05W	18 ~ 75	±5	±500	5	78	±850
FDC05-48D12W	18 ~ 75	±12	±230	10	81	±140
FDC05-48D15W	18 ~ 75	±15	±190	10	81	±47

### PART NUMBER STRUCTURE

Series name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Version Code	Remote On/Off Option	Assembly Option
<b>FDC05 - 48 S 05 - M1 P HS</b>	12: 9~18 24: 18~36 48: 36~75	S: Single  D: Dual	33: 3.3 05: 5 12: 12 15: 15  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
<b>FDC05 - 48 S 05 W - M2 P HS</b>	24: 9~36 48: 18~75	S: Single  D: Dual	33: 3.3 05: 5 12: 12 15: 15  05: ±5 12: ±12 15: ±15	□: Standard Version M2: M2 Version	P: Positive logic N: Negative logic	□: None HS: Heat-sink HC: Heat-sink with Clamp

### INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	FDC05 series	12Vin(nom)	9	12	18	VDC
		24Vin(nom)	18	24	36	
		48Vin(nom)	36	48	75	
	FDC05W series	24Vin(nom)	9	24	36	VDC
		48Vin(nom)	18	48	75	
Input reflected ripple current				20		mAp-p
Start up time	Constant resistive load	Power up			450	ms
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		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	-0.2		+0.2	%
Load regulation	No Load to Full Load	-0.2		+0.2	%
	Single	-1.0		+1.0	
	Dual				
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth		50		mVp-p
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	25% load step change, FL to 1/2 FL ±1% error band		200		µs
Over load protection	% of Iout rated		170		%
Short circuit protection					Continuous, automatic recovery

**GENERAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	1600			VDC
	Input to Output	1600			
	Input (Output) to Case				
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				300	pF
Switching frequency	FDC05 series	270	300	330	kHz
	FDC05W series	180	200	220	
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				7.066 x 10 <sup>6</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Standard M1 <sup>(2)</sup> M2	With derating	-25	+85	°C
		Without derating	-40	+85	
		With derating	-40	+85	
Maximum case temperature				+100	°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**

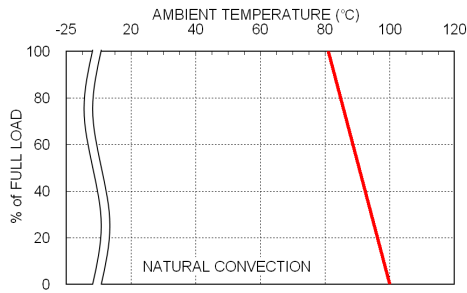
Parameter	Conditions	Level
EMI	EN55022	Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV
Radiated immunity	EN61000-4-3	10 V/m
Fast transient <sup>(3)</sup>	EN61000-4-4	± 2kV
Surge <sup>(3)</sup>	EN61000-4-5	± 1kV
Conducted immunity	EN61000-4-6	10 Vr.m.s
Power frequency magnetic field	EN61000-4-8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

**Note:**

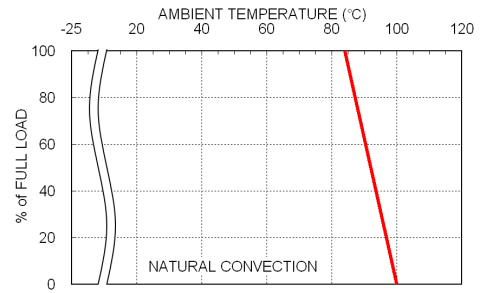
1. Test by minimum input and constant resistive load.
2. M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard and M2 version.
3. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor 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.

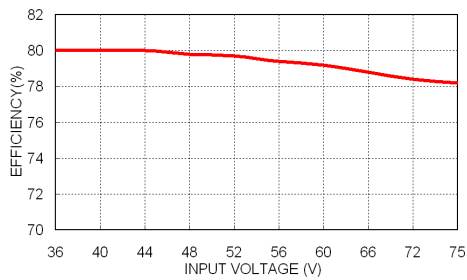
**CHARACTERISTIC CURVE**



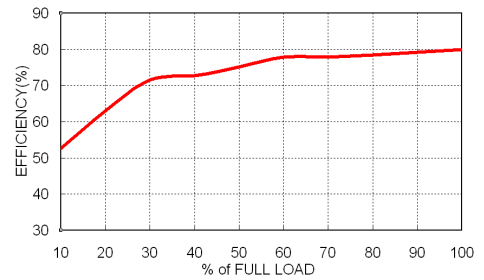
FDC05-48S05 Derating Curve



FDC05-48S05 Derating Curve With Heat-sink

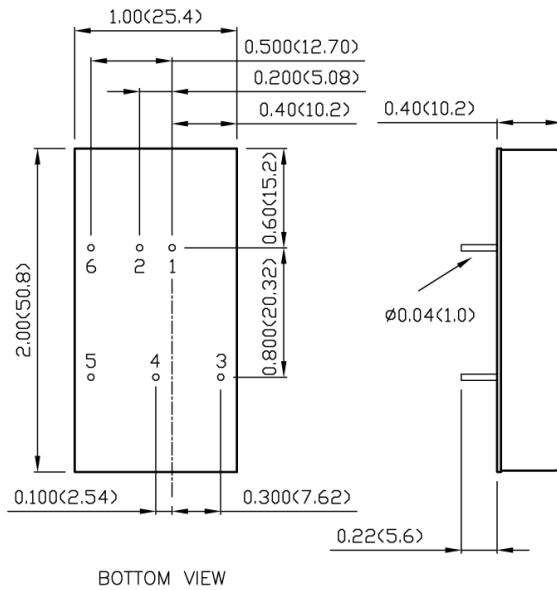


FDC05-48S05 Efficiency vs. Input Voltage



FDC05-48S05 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)

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