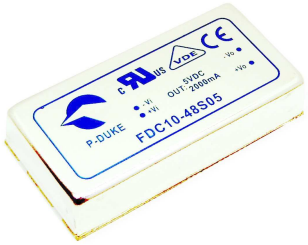
POWER MATE TECHNOLOGY CO.,LTD.

FDC10(W) SERIES



FEATURES

- 10 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 2.5A
- STANDARD 2.0 X 1.0 X 0.4 INCH PACKAGE
- HIGH EFFICIENCY UP TO 87%
- 2:1 AND 4:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY (300KHz)
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

Negative & Positive logic Remote On/Off

DESCRIPTION

The FDC10 and FDC10-W series offer 10 watts of output power from a 2.0 x 1.0 x 0.4 inch package. FDC10 series have 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC. FDC10-W series have 4:1 ultra wide input voltage of 9-36 and 18-75VDC.

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25ºC otherwise noted.

OUTPUT SPECIFICATIONS			
Output power			10 Watts, max.
Voltage accuracy	Full load and nominal Vin		± 1%
Minimum load			0%
Line regulation	LL to HL at Full Load		± 0.2%
Load regulation	No Load to Full Load	Single Dual	± 0.5% ± 1%
Cross regulation(Dual)	Asymmetrical load 25% / 100% FL		± 5%
Ripple and noise	20MHz bandwidth	Single Dual	See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µS
Over voltage protection Zener diode clamp	3.3V output 5V output 12V output 15V output		3.9VDC 6.2VDC 15VDC 18VDC
Over load protection	% of FL at nominal input		150%, max.
Short circuit protection			Hiccup, automatics recovery

GENERAL SPECIFICATIONS		
Efficiency		See table
Isolation voltage		1600VDC, min.
Isolation resistance		10^9 ohms, min.
Isolation capacitance		300pF, max.
Switching frequency		300KHz, typ.
Approvals and standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		Non-conductive black plastic
Potting material		Epoxy (UL94-V0)
Dimensions		2.00 X 1.00 X 0.40 Inch (50.8 X 25.4 X 10.2 mm)
Weight		27g (0.95oz)
MTBF (Note 1)	BELLCORE TR-NWT-000332 MIL-HDBK-217F	1.976×10^6 hrs 1.416×10^6 hrs

INPUT SPECIFICATIONS			
Input voltage range	FDC10	12V nominal input 24V nominal input 48V nominal input	9 – 18VDC 18 – 36VDC 36 – 75VDC
	FDC10-W	24V nominal input 48V nominal input	9 – 36VDC 18 – 75VDC
Input filter			Pi type
Input surge voltage 100mS max		12V input 24V input 48V input	36VDC 50VDC 100VDC
Input reflected ripple current		Nominal Vin and full load	30mAp-p
Start up time	Nominal Vin and constant resistive load	Power up	20mS, typ.
Remote ON/OFF (Option) (Note 6)			
(Positive logic)	DC-DC ON		Open or 3.5V < Vr < 12V
	DC-DC OFF		Short or 0V < Vr < 1.2V
(Negative logic)	DC-DC ON		Short or 0V < Vr < 1.2V
	DC-DC OFF		Open or 3.5V < Vr < 12V
Input current of remote control pin		Nominal Vin	-0.5mA ~ +1mA
Remote off state input current		Nominal Vin	20mA

ENVIRONMENTAL SPECIFICATIONS		
Operating ambient temperature (Reference derating curve)	Standard M1 (Note 7) M2 (W series)	-25ºC ~ +85ºC (with derating) -40ºC ~ +85ºC (non-derating) -40ºC ~ +85ºC (with derating)
Maximum case temperature		+100ºC
Storage temperature range		-55ºC ~ +105ºC
Thermal impedance (Note 8)	Nature convection Nature convection with heat-sink	12ºC/watt 10ºC/watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS			
EMI (Note 9)	EN55022		Class A
ESD	EN61000-4-2	Air ± 8KV Contact ± 6KV	Perf. Criteria B
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (Note 10)	EN61000-4-4	± 2KV	Perf. Criteria B
Surge (Note 10)	EN61000-4-5	± 1KV	Perf. Criteria B
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

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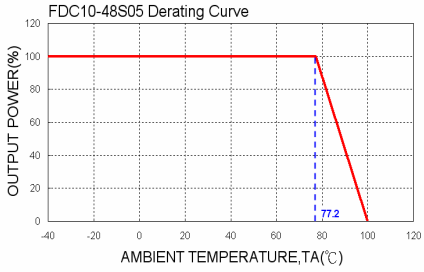
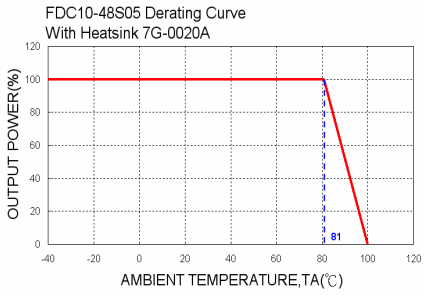
10 WATTS DC-DC CONVERTER

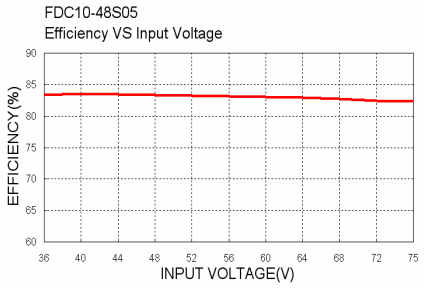
Model Number	Input Range	Output Voltage	Output Current		Output (4) Ripple & Noise	Input Current		Eff (4) (%)	Capacitor(5) Load max
			Min. load	Full load		No load (3)	Full load (2)		
FDC10-12S33	9 – 18 VDC	3.3 VDC	0mA	2000mA	50mVp-p	17mA	724mA	80	6800μF
FDC10-12S05	9 – 18 VDC	5 VDC	0mA	2000mA	50mVp-p	21mA	1082mA	81	4700μF
FDC10-12S12	9 – 18 VDC	12 VDC	0mA	830mA	50mVp-p	38mA	1037mA	84	690μF
FDC10-12S15	9 – 18 VDC	15 VDC	0mA	670mA	50mVp-p	36mA	1046mA	84	470μF
FDC10-12D05	9 – 18 VDC	± 5 VDC	0mA	± 1000mA	75mVp-p	39mA	1042mA	84	± 680μF
FDC10-12D12	9 – 18 VDC	± 12 VDC	0mA	± 416mA	75mVp-p	47mA	1053mA	83	± 330μF
FDC10-12D15	9 – 18 VDC	± 15 VDC	0mA	± 333mA	75mVp-p	45mA	1041mA	84	± 110μF
FDC10-24S33 (W)	18 – 36 (9 – 36) VDC	3.3 VDC	0mA	2000(2500mA)	50mVp-p	15(13mA)	362(465mA)	80(78)	6800μF
FDC10-24S05 (W)	18 – 36 (9 – 36) VDC	5 VDC	0mA	2000mA	50mVp-p	22(11mA)	534 (548mA)	82 (80)	4700μF
FDC10-24S12 (W)	18 – 36 (9 – 36) VDC	12 VDC	0mA	830mA	50mVp-p	18(16mA)	519 (519mA)	84 (84)	690μF
FDC10-24S15 (W)	18 – 36 (9 – 36) VDC	15 VDC	0mA	670mA	50mVp-p	36(26mA)	523 (544mA)	84 (81)	470μF
FDC10-24D05 (W)	18 – 36 (9 – 36) VDC	± 5 VDC	0mA	± 1000mA	75mVp-p	28(15mA)	527 (534mA)	83 (82)	± 680μF
FDC10-24D12 (W)	18 – 36 (9 – 36) VDC	± 12 VDC	0mA	± 416mA	75mVp-p	24(15mA)	513 (547mA)	85 (80)	± 330μF
FDC10-24D15 (W)	18 – 36 (9 – 36) VDC	± 15 VDC	0mA	± 333mA	75mVp-p	31(22mA)	520 (548mA)	84 (80)	± 110μF
FDC10-48S33 (W)	36 – 75 (18 – 75) VDC	3.3 VDC	0mA	2000(2500mA)	50mVp-p	11(10mA)	181(239mA)	80(76)	6800μF
FDC10-48S05 (W)	36 – 75 (18 – 75) VDC	5 VDC	0mA	2000mA	50mVp-p	14(9mA)	260 (270mA)	84 (81)	4700μF
FDC10-48S12 (W)	36 – 75 (18 – 75) VDC	12 VDC	0mA	830mA	50mVp-p	14(9mA)	253 (259mA)	86 (84)	690μF
FDC10-48S15 (W)	36 – 75 (18 – 75) VDC	15 VDC	0mA	670mA	50mVp-p	10(11mA)	252 (262mA)	87 (84)	470μF
FDC10-48D05 (W)	36 – 75 (18 – 75) VDC	± 5 VDC	0mA	± 1000mA	75mVp-p	16(12mA)	260 (267mA)	84 (82)	± 680μF
FDC10-48D12 (W)	36 – 75 (18 – 75) VDC	± 12 VDC	0mA	± 416mA	75mVp-p	19(20mA)	254 (281mA)	86 (78)	± 330μF
FDC10-48D15 (W)	36 – 75 (18 – 75) VDC	± 15 VDC	0mA	± 333mA	75mVp-p	16(20mA)	256 (270mA)	85 (81)	± 110μF

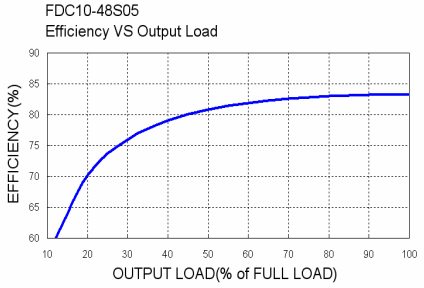
Note

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load of standard type.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The ON/OFF control pin voltage is referenced to -Vin.
   To order positive logic ON/OFF control add the suffix-P (Ex: FDC10-12S05-P); To order negative logic ON-OFF control add the suffix-N (Ex: FDC10-12S05-N)
7. M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard and M2 version.
8. Heat sink is optional and P/N: 7G-0020C-F.
9. The FDC10 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
   Recommend: 12Vin : 4.7μF/25V 1210 MLCC .
   24Vin : 2.2μF/50V 1812 MLCC .
   48Vin : 1.5μF/100V 1812 MLCC .
10. 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, ESR 48mΩ.









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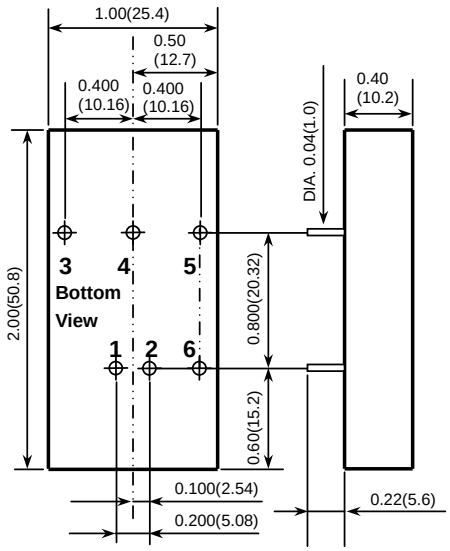
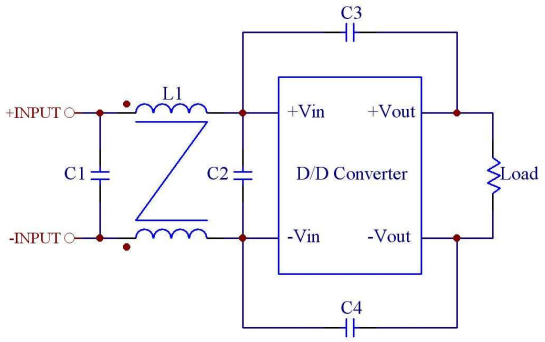
10 WATTS DC-DC CONVERTER



1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

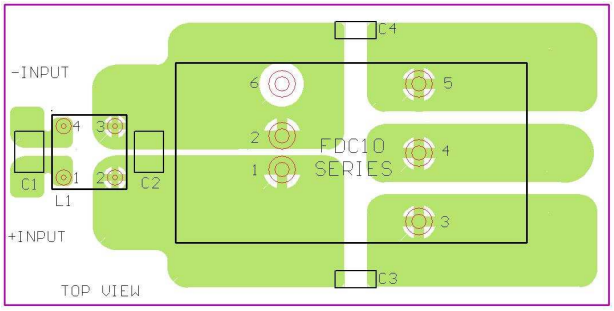
PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	+ OUTPUT	+ OUTPUT
4	NO PIN	COMMON
5	- OUTPUT	- OUTPUT
6	CTRL (Option)	CTRL (Option)



Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
FDC10-12xxx	3.3μF/50V 1812 MLCC	N/A	1000P/2KV MLCC	1000P/2KV MLCC	325μH Common Choke PMT-050
FDC10-24xxx	2.2μF/50V 1812 MLCC	N/A	1000P/2KV MLCC	1000P/2KV MLCC	325μH Common Choke PMT-050
FDC10-48xxx	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	1000P/2KV MLCC	1000P/2KV MLCC	325μH Common Choke PMT-050



Recommended EN55022 Class B Filter Circuit Layout

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