POWER MATE TECHNOLOGY CO., LTD.

FDC05(W) SERIES

5 WATTS DC-DC CONVERTER

FEATURES

- **5 WATTS OUTPUT POWER**
- **OUTPUT CURRENT UP TO 1000mA**
- **STANDARD 2.00 X 1.00 X 0.40 INCH PACKAGE**
- **HIGH EFFICIENCY UP TO 83%**
- **2:1 AND 4:1 WIDE INPUT VOLTAGE RANGE**
- **SIX-SIDED CONTINUOUS SHIELD**
- **FIXED SWITCHING FREQUENCY**
- **CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC**
- **SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1**
- **ISO9001 CERTIFIED MANUFACTURING FACILITIES**
- **COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU**

OPTIONS

Negative & Positive logic Remote On/Off

APPLICATIONS

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

DESCRIPTION

The FDC05 and FDC05-W series offer 5 watts of output power from a 2 x 1 x 0.4 inch package without derating to 71ºC ambient temperature. FDC05 series have 2:1 wide input voltage of 9~18VDC, 18~36VDC and 36~75VDC. FDC05-W series have 4:1 ultra wide input voltage of 9~36VDC and 18~75VDC.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power			5 Watts, max.
Voltage accuracy			± 1%
Minimum load			0%
Line regulation	LL to HL at Full Load		± 0.2%
Load regulation	No load to Full load	Single	± 0.2%
		Dual	± 1%
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL		± 5%
Ripple and noise	20MHz bandwidth		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response	25% load step change		Single 200µs
recovery time	FL to 1/2 FL ±1% error band		Dual 200µs
Over load protection	% of FL at nominal input		170%
Short circuit protection			Continuous, automatics recovery

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation Voltage	Input to Output	1600VDC, min.1minute
	Input (Output) to Case	1600VDC, min.1minute
Isolation resistance	500VDC	10^9ohms, min.
Isolation capacitance		300pF, max.
Switching frequency	Standard	300kHz±10%
	"W" series	200kHz±10%
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		Non-conducted 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	3.145 x 10^6 hrs
	MIL-HDBK-217F	2.326 x 10^6 hrs

INPUT SPECIFICATIONS

Input voltage range	FDC05	12VDC nominal input	9 ~ 18VDC
		24VDC nominal input	18 ~ 36VDC
		48VDC nominal input	36 ~ 75VDC
	FDC05-W	24VDC nominal input	9 ~ 36VDC
		48VDC nominal input	18 ~ 75VDC
Input filter			Pi type
Input surge voltage		12VDC input	36VDC 100ms, max.
		24VDC input	50VDC 100ms, max.
		48VDC input	100VDC 100ms, max.
Input reflected ripple current			20mAp-p
Start up time	Nominal input and Constant resistive load	Power up	450ms, max.
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 input	-0.5mA ~ +1mA
Remote off state input current		Nominal input	2.5mA

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature (Reference derating curve)	Standard	-25ºC ~ +85ºC (with derating)
	M1 (Note 7)	-40ºC ~ +85ºC (non-derating)
	M2 (W series)	-40ºC ~ +85ºC (with derating)
Maximum case temperature		+100ºC
Storage temperature range		-55ºC ~ +125ºC
Thermal impedance (Note 8)	Natural convection	12ºC/watt
	Natural convection with Heat-sink	10ºC/watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS

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

FDC05(W) SERIES

5 WATTS DC-DC CONVERTER

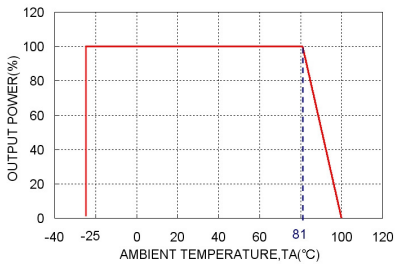
Model Number	Input Range	Output Voltage	Output Current		Output [2] Ripple & Noise	No load[3] Input Current	Eff [4] (%)	Capacitor Load max[5]
			Min. load	Full load				
FDC05-12S33	9 ~ 18 VDC	3.3 VDC	0mA	1000mA	50mVp-p	10mA	76	3700μF
FDC05-12S05	9 ~ 18 VDC	5 VDC	0mA	1000mA	50mVp-p	10mA	79	1700μF
FDC05-12S12	9 ~ 18 VDC	12 VDC	0mA	470mA	50mVp-p	10mA	81	290μF
FDC05-12S15	9 ~ 18 VDC	15 VDC	0mA	400mA	50mVp-p	15mA	80	188μF
FDC05-12D05	9 ~ 18 VDC	± 5 VDC	0mA	± 500mA	50mVp-p	20mA	79	± 850μF
FDC05-12D12	9 ~ 18 VDC	± 12 VDC	0mA	± 230mA	50mVp-p	15mA	81	± 140μF
FDC05-12D15	9 ~ 18 VDC	± 15 VDC	0mA	± 190mA	50mVp-p	20mA	82	± 47μF
FDC05-24S33 (W)	18 ~ 36 (9 ~ 36) VDC	3.3 VDC	0mA	1000mA	50mVp-p	15(5mA)	73 (77)	3700μF
FDC05-24S05 (W)	18 ~ 36 (9 ~ 36) VDC	5 VDC	0mA	1000mA	50mVp-p	15(5mA)	78 (80)	1700μF
FDC05-24S12 (W)	18 ~ 36 (9 ~ 36) VDC	12 VDC	0mA	470mA	50mVp-p	10(5mA)	81 (82)	290μF
FDC05-24S15 (W)	18 ~ 36 (9 ~ 36) VDC	15 VDC	0mA	400mA	50mVp-p	20(5mA)	81 (81)	188μF
FDC05-24D05 (W)	18 ~ 36 (9 ~ 36) VDC	± 5 VDC	0mA	± 500mA	50mVp-p	15(5mA)	79 (80)	± 850μF
FDC05-24D12 (W)	18 ~ 36 (9 ~ 36) VDC	± 12 VDC	0mA	± 230mA	50mVp-p	20(5mA)	82 (82)	± 140μF
FDC05-24D15 (W)	18 ~ 36 (9 ~ 36) VDC	± 15 VDC	0mA	± 190mA	50mVp-p	20(10mA)	81 (83)	± 47μF
FDC05-48S33 (W)	36 ~ 75 (18 ~ 75) VDC	3.3 VDC	0mA	1000mA	50mVp-p	5(5mA)	73 (73)	3700μF
FDC05-48S05 (W)	36 ~ 75 (18 ~ 75) VDC	5 VDC	0mA	1000mA	50mVp-p	10(10mA)	76 (76)	1700μF
FDC05-48S12 (W)	36 ~ 75 (18 ~ 75) VDC	12 VDC	0mA	470mA	50mVp-p	10(10mA)	82 (82)	290μF
FDC05-48S15 (W)	36 ~ 75 (18 ~ 75) VDC	15 VDC	0mA	400mA	50mVp-p	10(10mA)	82 (81)	188μF
FDC05-48D05 (W)	36 ~ 75 (18 ~ 75) VDC	± 5 VDC	0mA	± 500mA	50mVp-p	10(5mA)	78 (78)	± 850μF
FDC05-48D12 (W)	36 ~ 75 (18 ~ 75) VDC	± 12 VDC	0mA	± 230mA	50mVp-p	10(10mA)	81 (81)	± 140μF
FDC05-48D15 (W)	36 ~ 75 (18 ~ 75) VDC	± 15 VDC	0mA	± 190mA	50mVp-p	10(10mA)	81 (81)	± 47μF

Note

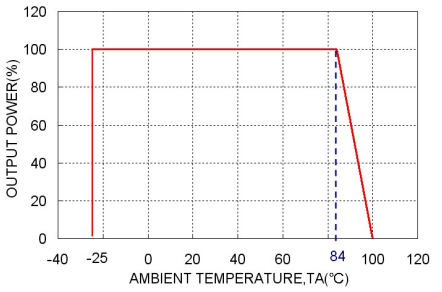
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The CTRL pin voltage is referenced to -INPUT
   To order positive logic ON/OFF control add the suffix-P (Ex: FDC05-48S05-P)
   To order negative logic ON/OFF control add the suffix-N (Ex: FDC05-48S05-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. 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.

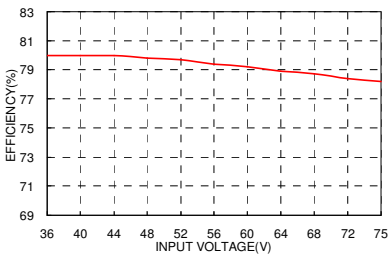
FDC05-48S05 Derating Curve



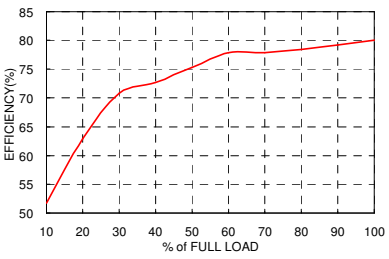
FDC05-48S05 Derating Curve With Heat-sink (Note 8)

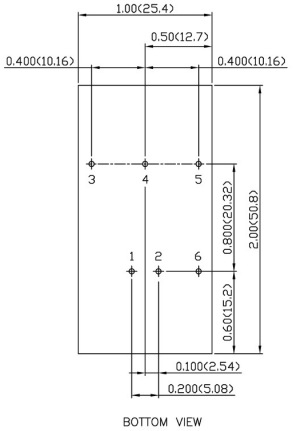


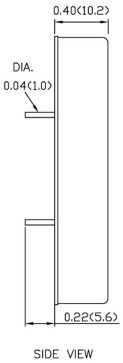
FDC05-48S05 Efficiency VS Input Voltage



FDC05-48S05 Efficiency VS Output Load







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)

1. All dimensions in Inch (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)