POWER MATE TECHNOLOGY CO., LTD.

FDC40 SERIES

40 WATTS DC-DC CONVERTER

- **40 WATTS OUTPUT POWER**
- **2:1 WIDE INPUT VOLTAGE RANGE**
- **DESIGN MEET SAFETY STANDARD**
- **SIX-SIDED CONTINUOUS SHIELD**
- **HIGH EFFICIENCY UP TO 90%**
- **STANDARD 3.0 X 2.6 X 0.4 INCH PACKAGE**
- **FIXED SWITCHING FREQUENCY**

The FDC40 series offer 40 Watts of output power from a 3 x 2.6 x 0.4 inch package. The FDC40 series have 2:1 wide input voltage of 9~18, 18~36 and 36~75VDC. The FDC40 features 1600VDC of isolation, short-circuit and over-voltage protection, as well as six sided shielding. Designed meets the safety of IEC60950-1, EN60950-1 and UL60950-1. All models are particularly suited to telecommunications, industrial, mobile telecom and test equipment applications.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power			40 Watts, max.
Voltage accuracy		Single & Dual Triple 3.3V/5V Auxiliary	± 2% ± 2% ± 5%
Voltage adjustability (Note 5: only for single output)			± 10%
Minimum load (Note 6)	FDC40-XXD3305 3.3VDC output Others		20% min. 10% of FL
Line regulation	LL to HL at Full Load	Single Dual Triple 3.3VDC/5VDC Auxiliary	± 0.5% ± 1% ± 2% ± 5%
Load regulation	10% to 100% FL	Single Dual Triple 3.3VDC/5VDC Auxiliary	± 0.5% ± 1% ± 2% ± 5%
Cross regulation (Note 7)		Dual Triple 3.3VDC/5VDC Auxiliary	± 1% ± 1% ± 5%
Ripple and noise	20MHz bandwidth (Measured with a 0.1μF/50V MLCC)		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time 25% load step change			500μs
Over voltage protection Zener diode clamp	3.3VDC output 5VDC output 12VDC output 15VDC output		3.9VDC 6.2VDC 15VDC 18VDC
Over load protection	% of FL at nominal input		150%, max.
Short circuit protection			Continuous, automatics recovery

INPUT SPECIFICATIONS

Input voltage range		12VDC nominal input 24VDC nominal input 48VDC nominal input	9 ~ 18VDC 18 ~ 36VDC 36 ~ 75VDC
Input filter			Pi type
Input surge voltage		12VDC input 24VDC input 48VDC input	36VDC 100ms, max. 50VDC 100ms, max. 100VDC 100ms, max.
Input reflected ripple(Note 8)			40mAp-p
Start up time	Nominal input and constant resistive load	Powe up Remote ON/OFF	25ms 25ms
Remote ON/OFF (Note 9)		DC-DC ON DC-DC OFF	Open or 3.5V < Vr < 12V Short or 0V < Vr < 1.2V
Remote off input current		Nominal input	30mA

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output Input(Output)to Case	1600VDC, min. 1minute 1000VDC, min. 1minute
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		500pF, max.
Switching frequency		185kHz,±10%
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		FR4 PCB
Potting material		Epoxy (UL94-V0)
Dimensions		3.03 X 2.62 X 0.40 Inch (77.0 X 66.5 X 10.2 mm)
Weight		125g (4.4oz)
MTBF (Note 1)		1.590 x 10^6 hrs

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature		-40ºC ~ +85ºC (with derating)
Maximum case temperature		+100ºC
Storage temperature range		-55ºC ~ +105ºC
Thermal impedance	Natural convection 500LFM	7.28ºC/Watt 1.62ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS

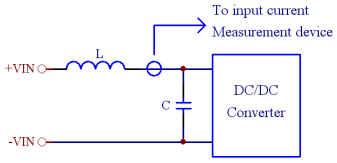
Conducted emissions	EN55022	Class A
Radiated emissions	EN55022	Class A
ESD	EN61000-4-2	Perf. Criteria B
Radiated immunity	EN61000-4-3	Perf. Criteria A
Fast transient	EN61000-4-4	Perf. Criteria B
Surge	EN61000-4-5	Perf. Criteria B
Conducted immunity	EN61000-4-6	Perf. Criteria A

Model Number	Input Range	Output Voltage	Output Current	Output [2] Ripple & Noise	Eff [3] (%)	Capacitor [4] Load max
FDC40-12S33	9 ~ 18 VDC	3.3 VDC	10000mA	50mVp-p	82	25800μF
FDC40-12S05	9 ~ 18 VDC	5 VDC	8000mA	50mVp-p	85	13600μF
FDC40-12S12	9 ~ 18 VDC	12 VDC	3400mA	120mVp-p	86	2400μF
FDC40-12S15	9 ~ 18 VDC	15 VDC	2700mA	150mVp-p	86	1550μF
FDC40-12D05	9 ~ 18 VDC	± 5 VDC	+7000 / -1000mA	75mVp-p	81	12000 / 1700μF
FDC40-12D12	9 ~ 18 VDC	± 12 VDC	± 1800mA	120mVp-p	83	± 1200μF
FDC40-12D15	9 ~ 18 VDC	± 15 VDC	± 1400mA	150mVp-p	83	± 750μF
FDC40-12D3305	9 ~ 18 VDC	3.3 / 5VDC	4000 / 4000mA	75mVp-p	78	10300 / 6800μF
FDC40-12T0512	9 ~ 18 VDC	5 / ± 12 VDC	4000 / ± 850mA	50 / 120mVp-p	79	6800 / ± 590μF
FDC40-12T0515	9 ~ 18 VDC	5 / ± 15 VDC	4000 / ± 680mA	50 / 150mVp-p	80	6800 / ± 380μF
FDC40-24S33	18 ~ 36 VDC	3.3 VDC	10000mA	50mVp-p	87	25800μF
FDC40-24S05	18 ~ 36 VDC	5 VDC	8000mA	50mVp-p	88	13600μF
FDC40-24S12	18 ~ 36 VDC	12 VDC	3400mA	120mVp-p	89	2400μF
FDC40-24S15	18 ~ 36 VDC	15 VDC	2700mA	150mVp-p	89	1550μF
FDC40-24D05	18 ~ 36 VDC	± 5 VDC	+7000 / -1000mA	75mVp-p	81	12000 / 1700μF
FDC40-24D12	18 ~ 36 VDC	± 12 VDC	± 1800mA	120mVp-p	86	± 1200μF
FDC40-24D15	18 ~ 36 VDC	± 15 VDC	± 1400mA	150mVp-p	86	± 750μF
FDC40-24D3305	18 ~ 36 VDC	3.3 / 5VDC	4000 / 4000mA	75mVp-p	79	10300 / 6800μF
FDC40-24T0512	18 ~ 36 VDC	5 / ± 12 VDC	4000 / ± 850mA	50 / 120mVp-p	80	6800 / ± 590μF
FDC40-24T0515	18 ~ 36 VDC	5 / ± 15 VDC	4000 / ± 680mA	50 / 150mVp-p	82	6800 / ± 380μF
FDC40-48S33	36 ~ 75 VDC	3.3 VDC	10000mA	50mVp-p	85	25800μF
FDC40-48S05	36 ~ 75 VDC	5 VDC	8000mA	50mVp-p	89	13600μF
FDC40-48S12	36 ~ 75 VDC	12 VDC	3400mA	120mVp-p	89	2400μF
FDC40-48S15	36 ~ 75 VDC	15 VDC	2700mA	150mVp-p	88	1550μF
FDC40-48D05	36 ~ 75 VDC	± 5 VDC	+7000 / -1000mA	75mVp-p	84	12000 / 1700μF
FDC40-48D12	36 ~ 75 VDC	± 12 VDC	± 1800mA	120mVp-p	86	± 1200μF
FDC40-48D15	36 ~ 75 VDC	± 15 VDC	± 1400mA	150mVp-p	86	± 750μF
FDC40-48D3305	36 ~ 75 VDC	3.3 / 5VDC	4000 / 4000mA	75mVp-p	80	10300 / 6800μF
FDC40-48T0512	36 ~ 75 VDC	5 / ± 12 VDC	4000 / ± 850mA	50 / 120mVp-p	83	6800 / ± 590μF
FDC40-48T0515	36 ~ 75 VDC	5 / ± 15 VDC	4000 / ± 680mA	50 / 150mVp-p	83	6800 / ± 380μF

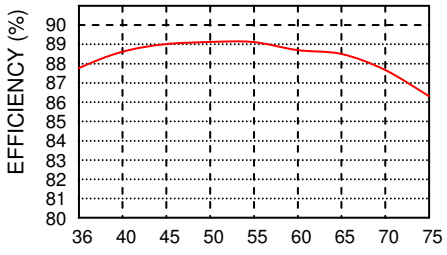
Note

1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40ºC. (Ground fixed and controlled environment)
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and full load
4. Test by minimum input and constant resistive load.
5. Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +SENSE should be connected to its corresponding +OUTPUT and likewise the - SENSE should be connected to its corresponding –OUTPUT.
6. The FDC40 series required a minimum 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
7. Cross regulation:
   Dual output—Asymmetrical load 25% to 100% full load
   Triple output – 3.3VDC / 5VDC 100% load and one of auxiliary 100% load, other auxiliary load change from 25% to 100% load
8. Please add an external filter at converter input terminals when measuring input reflected ripple, as Figure 1.
   L : Simulated source impedance of 12μH.
   C: Nippon chemi-con KY series, 220μF/100V
9. The ON-OFF control pin voltage is reference to negative input.

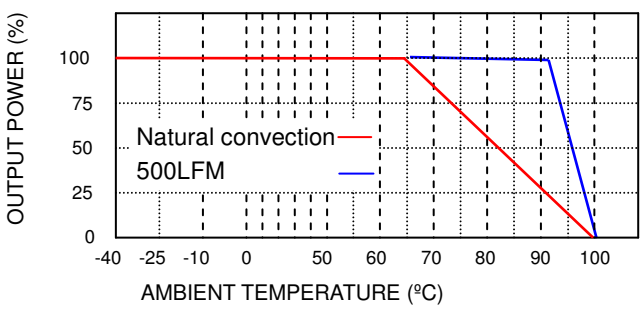
CAUTION: This power module is not internally fused. An input line fuse must always be used.



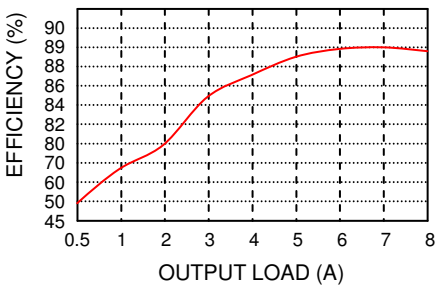
FDC40-48S05
Efficiency VS Input Voltage



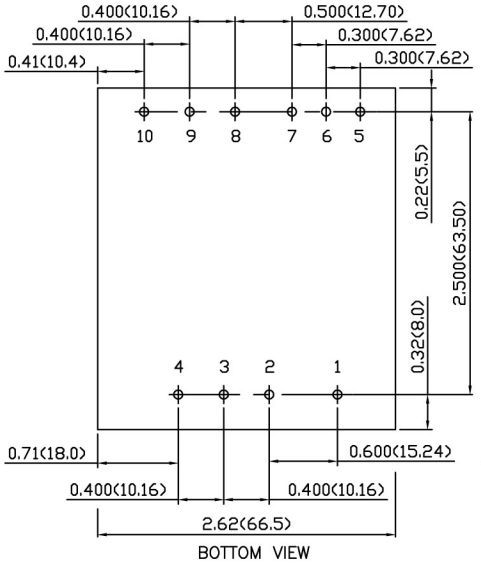
FDC40-48S05 Derating Curve

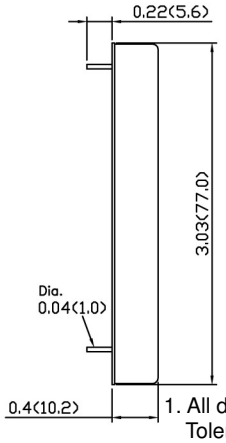


FDC40-48S05
Efficiency VS Output load



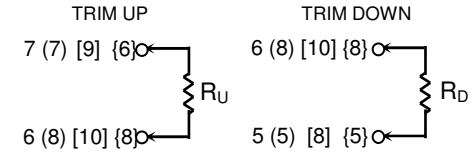
MECHANICAL DRAWING :





EXTERNAL OUTPUT TRIMMING

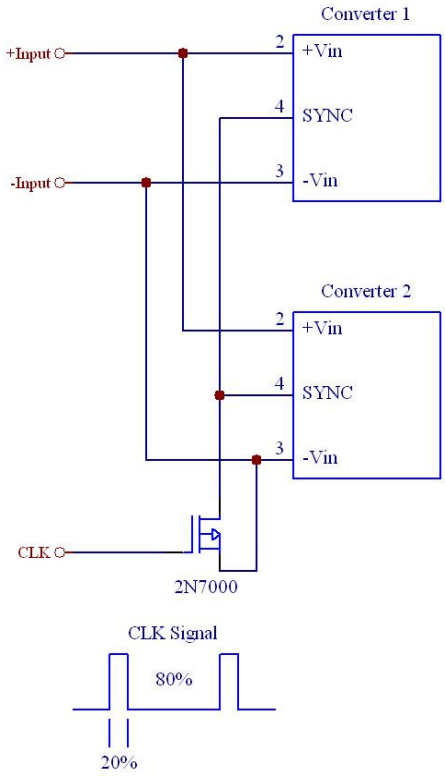
Output can be externally trimmed by using the method shown below.
( ) for dual output trim
[ ] for triple output trim
{ } XXD3305 only trim 3.3V



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)

PIN CONNECTION

PIN	SINGLE	DUAL	TRIPLE	3.3V / 5V
1	CTRL	CTRL	CTRL	CTRL
2	+INPUT	+INPUT	+INPUT	+INPUT
3	-INPUT	-INPUT	-INPUT	-INPUT
4	SYNC	SYNC	SYNC	SYNC
5	+SENSE	+OUTPUT	+ AUX	+3.3V
6	TRIM	COMMON	COMMON (AUX)	COMMON
7	-SENSE	-OUTPUT	- AUX	+5V
8	+OUTPUT	TRIM	+ OUTPUT(PRIMARY)	TRIM
9	-OUTPUT	NC	COMMON(PRIMARY)	NC
10	NO PIN	NC	TRIM	NC



Application of synchronization

1. The unit is capable of external synchronization from an independent time base with a switching rate between 200kHz and 215kHz
2. The amplitude of the synchronizing pulse train is TTL compatible
3. The duty cycle of the CLK should be 20% high and 80% low
4. Synchronization is referenced to negative input (-Vin)