

# FDC40 SERIES

DC / DC Single, Dual & Triple Output: 40 Watts



## Features

- 2:1 Input range: 12V, 24V and 48VDC
- Single, Dual and Triple outputs
- Industry Standard 2 x 2.0in package
- High efficiency up to 89%
- Regulated output & Short circuit protection
- 1600V isolation
- Five sided continuous copper shield
- High operating temperature +85°C
- Fixed switching frequency
- Remote ON / OFF standard
- Output voltage trim

## Specifications:

<b>Input Voltage</b>	12VDC ( 9 ~ 18 ) 24VDC ( 18 ~ 36 ) 48VDC ( 36 ~ 75 )	<b>Overload Protection</b>	Typically 150% of load
<b>Input Filter</b>	Pi type	<b>Short Circuit protection</b>	Continuous hiccup mode
<b>Input Surge Voltage.</b> ( 100mS )	12V: 36VDC, 24V: 50VDC, 48V:100VDC	<b>Efficiency</b>	Model dependant 81 ~ 89%
<b>Input Reflected Ripple Current</b>	40mA pk-pk @ nominal input & 100% load	<b>Isolation</b>	1600VDC
<b>Start Up time</b>	25mS constant resistive load	<b>Isolation Cap.</b>	500pF
<b>Remote ON/OFF</b> ( Positive logic )	DC-DC ON Open or 3.5V < Vr < 12V DC-DC OFF Short or 0V < Vr < 1.2V Input current of remote control pin: 30mA	<b>Switching Freq.</b>	185KHz
<b>Output power</b>	40 watts	<b>Safety</b>	EN60950-1, UL60950-1
<b>Voltage Accuracy</b>	Single & Dual $\pm 2\%$ Auxiliary: $\pm 5\%$	<b>Case Material</b>	Nickel-coated copper
<b>Voltage Trim</b>	Singles only: $\pm 10\%$ via external resistor	<b>Base Material</b>	Non-conductive black plastic
<b>Minimum Load</b>	3.3V output 20% minimum Other models 10% minimum	<b>Potting</b>	Epoxy UL94-V0
<b>Line Regulation</b>	Single $\pm 0.5\%$ Dual: $\pm 1\%$ Triple Main: $\pm 1\%$ Aux: $\pm 5\%$	<b>Dimensions</b>	77 x 66.5 x 10.2mm
<b>Load Regulation</b>	Single $\pm 0.5\%$ , Dual $\pm 1\%$ Triple Main: $\pm 1\%$ , Triple Aux: $\pm 5\%$	<b>Weight</b>	125g
<b>Cross Regulation</b>	Triple main: $\pm 1\%$ Dual , Triple, Aux: $\pm 5\%$ Asymmetrical load: Min load-100% load	<b>MTBF</b>	1.590 x 10 <sup>6</sup> Hrs
<b>Ripple &amp; noise</b>	See table, 20MHZ bandwidth	<b>Operating Temp</b>	-40°C to +85°C ( with derating )
<b>Temp. Coefficient</b>	$\pm 0.02\%$ / °C	<b>Case Temp</b>	+100°C maximum case temperature
<b>Transient Response</b>	500uS ( 25% load step change )	<b>Thermal Impedance</b>	7.28°C / watt Standard convection 1.62°C / watt with 500LFM
<b>Over Voltage Protection</b>	3.3V: 3.9V: 5.0V: 6.2V 12V: 15V 15V: 18V	<b>Thermal shock</b>	MIL-STD-810F
		<b>Vibration</b>	10-55Hz, 10G, 30min along X, Y,Z
		<b>Humidity</b>	5-95% RH
		<b>EMC</b>	EN55022 Class A Consult office for Class B design
		<b>ESD</b>	EN61000-4-2
		<b>Radiated Immunity</b>	EN61000-4-3
		<b>Fast Transients</b>	EN61000-4-4
		<b>Surge</b>	EN61000-4-5
		<b>Conducted Immunity</b>	EN61000-4-6

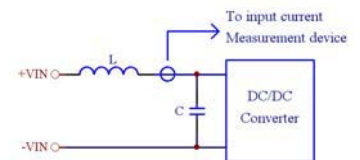
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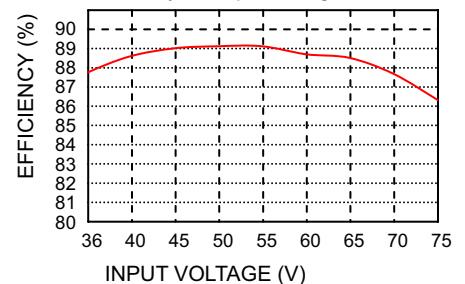
Model	Input V	Output V	Output Current	Output Ripple & Noise	Input Current	Eff (%)	Capacitor Load max
FDC40-12S33	9 – 18 V	3.3 V	10000mA	50mVp-p	3530mA	82	25800uF
FDC40-12S05	9 – 18 V	5 V	8000mA	50mVp-p	4120mA	85	13600uF
FDC40-12S12	9 – 18 V	12 V	3400mA	120mVp-p	4150mA	86	2400uF
FDC40-12S15	9 – 18 V	15 V	2700mA	150mVp-p	4120mA	86	1550uF
FDC40-12D05	9 – 18 V	± 5 V	+7000 / -1000mA	75mVp-p	4330mA	81	12000 / 1700uF
FDC40-12D12	9 – 18 V	± 12 V	± 1800mA	120mVp-p	4550mA	83	± 1200uF
FDC40-12D15	9 – 18 V	± 15 V	± 1400mA	150mVp-p	4430mA	83	± 750uF
FDC40-12D3305	9 – 18 V	3.3 / 5V	4000 / 4000mA	75mVp-p	3730mA	78	10300 / 6800uF
FDC40-12T0512	9 – 18 V	5 / ± 12 V	4000 / ± 850mA	50 / 120mVp-p	4490mA	79	6800 / ± 590uF
FDC40-12T0515	9 – 18 V	5 / ± 15 V	4000 / ± 680mA	50 / 150mVp-p	4430mA	80	6800 / ± 380uF
FDC40-24S33	18 – 36 V	3.3 V	10000mA	50mVp-p	1660mA	87	25800uF
FDC40-24S05	18 – 36 V	5 V	8000mA	50mVp-p	1990mA	88	13600uF
FDC40-24S12	18 – 36 V	12 V	3400mA	120mVp-p	2000mA	89	2400uF
FDC40-24S15	18 – 36 V	15 V	2700mA	150mVp-p	1990mA	89	1550uF
FDC40-24D05	18 – 36 V	± 5 V	+7000 / -1000mA	75mVp-p	2160mA	81	12000 / 1700uF
FDC40-24D12	18 – 36 V	± 12 V	± 1800mA	120mVp-p	2200mA	86	± 1200uF
FDC40-24D15	18 – 36 V	± 15 V	± 1400mA	150mVp-p	2140mA	86	± 750uF
FDC40-24D3305	18 – 36 V	3.3 / 5V	4000 / 4000mA	75mVp-p	1840mA	79	10300 / 6800uF
FDC40-24T0512	18 – 36 V	5 / ± 12 V	4000 / ± 850mA	50 / 120mVp-p	2220mA	80	6800 / ± 590uF
FDC40-24T0515	18 – 36 V	5 / ± 15 V	4000 / ± 680mA	50 / 150mVp-p	2160mA	82	6800 / ± 380uF
FDC40-48S33	36 – 75 V	3.3 V	10000mA	50mVp-p	850mA	85	25800uF
FDC40-48S05	36 – 75 V	5 V	8000mA	50mVp-p	980mA	89	13600uF
FDC40-48S12	36 – 75 V	12 V	3400mA	120mVp-p	1000mA	89	2400uF
FDC40-48S15	36 – 75 V	15 V	2700mA	150mVp-p	1000mA	88	1550uF
FDC40-48D05	36 – 75 V	± 5 V	+7000 / -1000mA	75mVp-p	1060mA	84	12000 / 1700uF
FDC40-48D12	36 – 75 V	± 12 V	± 1800mA	120mVp-p	1100mA	86	± 1200uF
FDC40-48D15	36 – 75 V	± 15 V	± 1400mA	150mVp-p	1070mA	86	± 750uF
FDC40-48D3305	36 – 75 V	3.3 / 5V	4000 / 4000mA	75mVp-p	910mA	80	10300 / 6800uF
FDC40-48T0512	36 – 75 V	5 / ± 12 V	4000 / ± 850mA	50 / 120mVp-p	1060mA	83	6800 / ± 590uF
FDC40-48T0515	36 – 75 V	5 / ± 15 V	4000 / ± 680mA	50 / 150mVp-p	1060mA	83	6800 / ± 380uF

**Notes:**

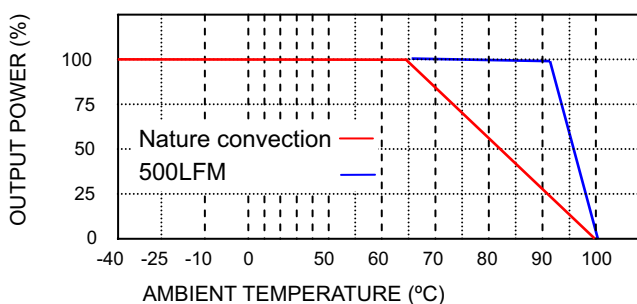
- Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Vsense should be connected to its corresponding +OUTPUT and likewise the sense should be connected to its corresponding -OUTPUT.
- The FDC40 series required a minimum 10% loading on the output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



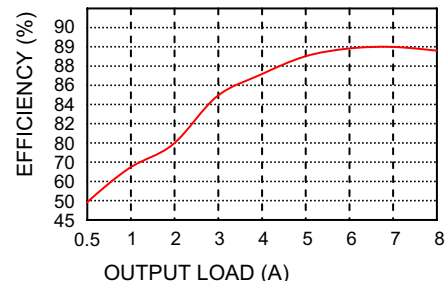
FDC40-48S05 Efficiency VS Input Voltage



FDC40-48S05 Derating Curve

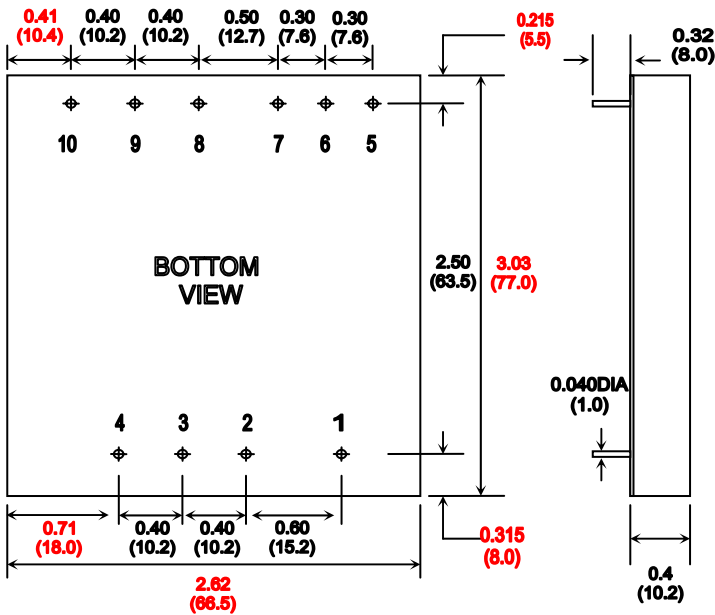


FDC40-48S05 Efficiency VS Output load



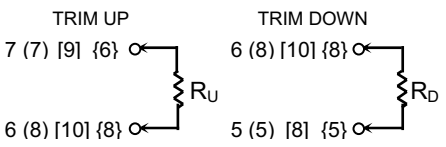
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## EXTERNAL OUTPUT TRIMMING

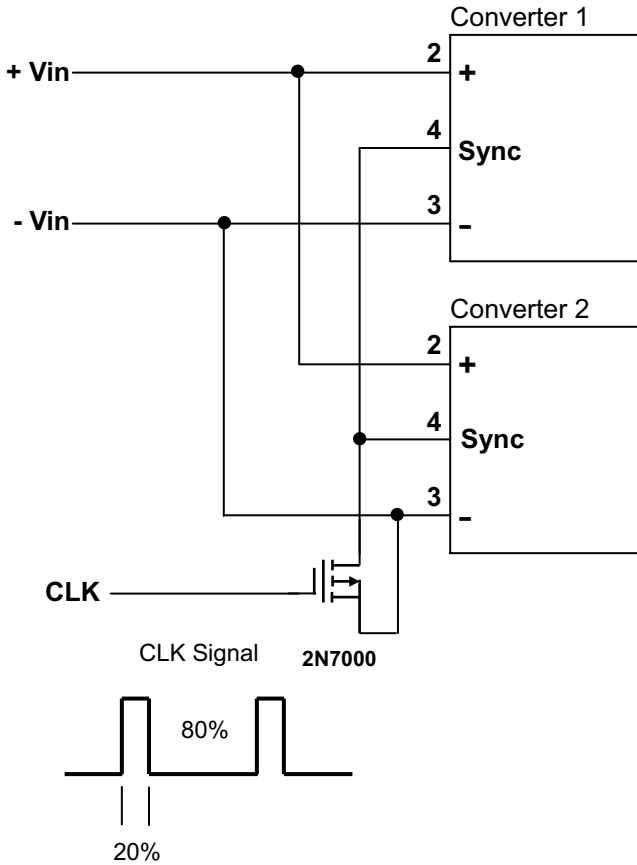
Output can be externally trimmed by using the method shown below.  
 ( ) for dual output trim  
 [ ] for triple output trim  
 { } XXD3305 only trim 3.3V



- All dimensions in Inches (mm)  
 Tolerance: X.XX±0.02 (X.X±0.5)  
 X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.014(0.35)

## Pin Assignment

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

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

## ON/OFF Control application

