



- 60 WATTS OUTPUT POWER
- 2:1 WIDE INPUT VOLTAGE RANGE
- DESIGN MEET SAFETY STANDARD
- SIX-SIDED CONTINUOUS SHIELD
- HIGH EFFICIENCY UP TO 90%
- 3.94" X 2.76" X 0.75" PACKAGE
- FIXED SWITCHING FREQUENCY

The FDC60 series offer 60 watts of output power from a 3.94 x 2.76 x 0.75 inch package. The FDC60 series have 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC. The FDC60 features 1600VDC of isolation, short-circuit and over-voltage protection, as well as six sided shielding. Designed meets the safety of EN60950 and UL1950. 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 25°C otherwise noted

### OUTPUT SPECIFICATIONS

Output power	60 Watts max	
Voltage accuracy	Full load and nominal Vin	± 2%
Voltage adjustability	± 10%	
Minimum load (Note 1)	FDC60-XXD3305 3.3V output Others	800mA, min 10% of FL
Line regulation	LL to HL at Full Load	± 0.5%
Load regulation	10% to 100% FL	± 0.5%
Cross regulation (Note 2)	± 5%	
Ripple and noise	20MHz bandwidth	1%/p-p of Vout max
Temperature coefficient	±0.02% / °C, max	
Transient response recovery time	25% load step change	500uS
Over voltage protection Zener diode clamp	3.3V output	3.9V
	5V output	6.2V
	12V output	15V
	15V output	18V
Short circuit protection	Hiccup, automatics recovery	

### INPUT SPECIFICATIONS

Input voltage range	12V nominal input	9 – 18VDC
	24V nominal input	18 – 36VDC
	48V nominal input	36 – 75VDC
Input filter	Pi type	
Input surge voltage 100mS max	12V input	36VDC
	24V input	50VDC
	48V input	100VDC
Input reflected ripple (Note 3)	Nominal Vin and full load	40mA <sub>p-p</sub>
Start up time	Nominal Vin and constant resistor load	25mS typ
Remote ON/OFF	DC-DC ON	Open or 3.5V < Vr < 12V
	DC-DC OFF	Short or 0V < Vr < 1.2V
Remote off input current	Nominal input	30mA

### GENERAL SPECIFICATIONS

Efficiency	See table
Isolation voltage	1600VDC, min
Isolation resistance	10 <sup>9</sup> ohms, min
Isolation capacitance	1000pF, max
Switching frequency	200KHz, typ
Design meet safety standard	UL1950, EN60950
Case material	Nickel-coated copper
Base material	Non-conductive black plastic
Potting material	Epoxy (UL94-V0)
Dimensions	3.94 X 2.76 X 0.75 Inches (100.2 X 70.0 X 19.0 mm)
Weight	280g (9.86oz)
MTBF (Note 4)	1.533 x 10 <sup>6</sup> hrs

### ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-25°C ~ +71°C (with derating)
Maximum case temperature	+95°C
Storage temperature range	-25°C ~ +100°C
Thermal impedance	5.2°C/watt
Thermal shock	MIL-STD-810D
Vibration	10~55Hz, 2G, 30minutes along X,Y and Z
Relative humidity	5% to 95% RH

### EMC CHARACTERISTICS

Conducted emissions	EN55022	Level A
Radiated emissions	EN55022	Level A
Conducted immunity	EN61000-4-6	Perf. Criteria2
Radiated immunity	EN61000-4-3	Perf. Criteria2
Surge	EN61000-4-5	Perf. Criteria2
Fast transient	EN61000-4-4	Perf. Criteria2
ESD	EN61000-4-2	Perf. Criteria2



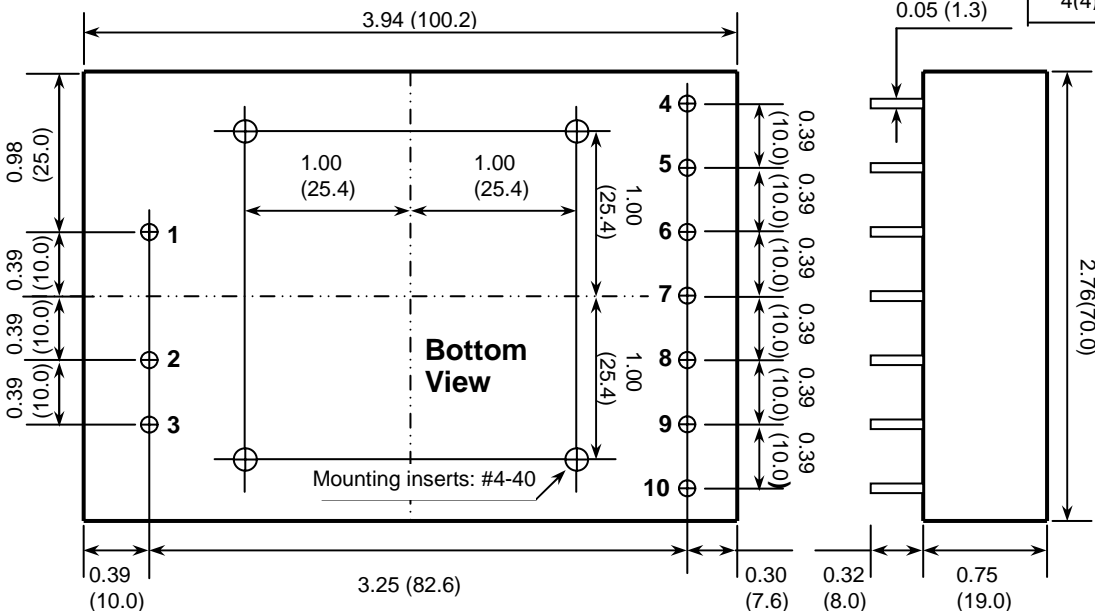
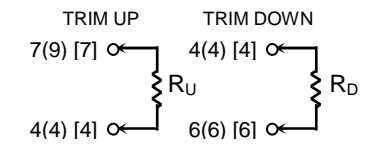
Model Number	Input Range	Output Voltage	Output Current	Input Current <sup>(5)</sup>	Eff <sup>(6)</sup> (%)	Capacitor <sup>(7)</sup> Load max
FDC60-12S33	9 – 18 VDC	3.3 VDC	15A	5430mA	80	38700uF
FDC60-12S05	9 – 18 VDC	5 VDC	12A	6330mA	83	20400uF
FDC60-12S12	9 – 18 VDC	12 VDC	5A	6250mA	84	3550uF
FDC60-12S15	9 – 18 VDC	15 VDC	4A	6250mA	84	2300uF
FDC60-12D05	9 – 18 VDC	± 5 VDC	+10 / -2A	6500mA	81	17000 / 3400uF
FDC60-12D12	9 – 18 VDC	± 12 VDC	± 2.5A	6250mA	84	± 900uF
FDC60-12D15	9 – 18 VDC	± 15 VDC	± 2A	6250mA	84	± 600uF
FDC60-12D3305	9 – 18 VDC	3.3 / 5VDC	6 / 6A	5770mA	76	16000 / 10200uF
FDC60-24S33	18 – 36 VDC	3.3 VDC	15A	2750mA	79	38700uF
FDC60-24S05	18 – 36 VDC	5 VDC	12A	3090mA	85	20400uF
FDC60-24S12	18 – 36 VDC	12 VDC	5A	2980mA	88	3550uF
FDC60-24S15	18 – 36 VDC	15 VDC	4A	2940mA	89	2300uF
FDC60-24D05	18 – 36 VDC	± 5 VDC	+10 / -2A	3130mA	84	17000 / 3400uF
FDC60-24D12	18 – 36 VDC	± 12 VDC	± 2.5A	3050mA	86	± 900uF
FDC60-24D15	18 – 36 VDC	± 15 VDC	± 2A	3010mA	87	± 600uF
FDC60-24D3305	18 – 36 VDC	3.3 / 5VDC	6 / 6A	2700mA	81	16000 / 10200uF
FDC60-48S33	36 – 75 VDC	3.3 VDC	15A	1310mA	83	38700uF
FDC60-48S05	36 – 75 VDC	5 VDC	12A	1520mA	86	20400uF
FDC60-48S12	36 – 75 VDC	12 VDC	5A	1470mA	89	3550uF
FDC60-48S15	36 – 75 VDC	15 VDC	4A	1450mA	90	2300uF
FDC60-48D05	36 – 75 VDC	± 5 VDC	+10 / -2A	1540mA	85	17000 / 3400uF
FDC60-48D12	36 – 75 VDC	± 12 VDC	± 2.5A	1450mA	90	± 900uF
FDC60-48D15	36 – 75 VDC	± 15 VDC	± 2A	1450mA	90	± 600uF
FDC60-48D3305	36 – 75 VDC	3.3 / 5VDC	6 / 6A	1310mA	83	16000 / 10200uF

**Note**

- The FDC60 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
- Simulated source impedance of 12uH. 12uH inductor in series with +Vin.
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)
- Maximum value at nominal input voltage and full load
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load.

**EXTERNAL OUTPUT TRIMMING**

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



- All dimensions in Inches (mm)
- Pin Pitch tolerance ±0.014(0.35)

**PIN CONNECTION**

PIN	SINGLE	DUAL	D3305	PIN	SINGLE	DUAL	D3305
1	+ INPUT	+ INPUT	+ INPUT	6	+OUTPUT	+OUTPUT	+3.3V
2	- INPUT	- INPUT	- INPUT	7	- OUTPUT	COM	COM
3	CTRL	CTRL	CTRL	8	- OUTPUT	COM	COM
4	TRIM	TRIM	TRIM	9	NO PIN	- OUTPUT	+ 5V
5	+OUTPUT	+OUTPUT	+3.3V	10	NO PIN	- OUTPUT	+ 5V