



FEATURES

- 20 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 4A
- STANDARD 2" X 1.6" X 0.4" PACKAGE
- HIGH EFFICIENCY UP TO 87%
- 2:1 AND 4:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- 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
Semiconductor Equipment

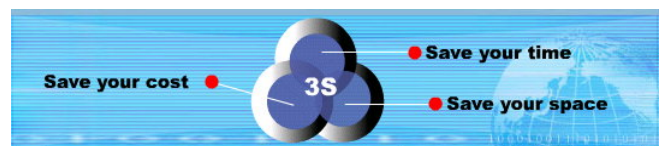
DESCRIPTION

The FDC20 and FDC20-W series offer 20 Watts of output power from a 2 x 1.6 x 0.4 inch package. The FDC20 series with 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC. The FDC20-W series with 4:1 wide input voltage of 9-36 and 18-75VDC.

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25°C otherwise noted

OUTPUT SPECIFICATIONS			
Output power		20 Watts max	
Voltage accuracy	Full load	Single & Dual ± 1%	
	and nominal Vin	Triple 3.3V/5V ± 1%	
		Auxiliary ± 5%	
Minimum load (Note 6)		See Table	
Voltage adjustability		± 10%	
Line regulation	LL to HL at Full Load	Single (W)	± 0.2%
		Dual (W)	± 0.5%
		Triple 3.3V/5V	± 1%
		Auxiliary	± 5%
Load regulation	Min. Load to Full Load	Single	± 0.5%
		Dual	± 3%
		Triple 3.3V/5V	± 2%
		Auxiliary	± 5%
Cross regulation (Note 7)		Dual	± 5%
		Triple 3.3V/5V	± 2%
		Auxiliary	± 5%
Ripple and noise	20MHz bandwidth	See table	
Temperature coefficient		±0.02% / °C, max	
Transient response recovery time	25% load step change	Single	250 uS
		Dual	250 uS
		Triple	500 uS
Over voltage protection	3.3V output	3.9V	
	5V output	6.2V	
	Zener diode clamp	12V output	15V
		15V output	18V
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 1.60 X 0.40 Inch (50.8 X 40.6 X 10.2 mm)	
Weight		48g (1.69oz)	
MTBF (Note 1)	BELLCORE TR-NWT-000332	1.928 x 10 ⁶ hrs	
	MIL-HDBK-217F	7.650 x 10 ⁵ hrs	

INPUT SPECIFICATIONS			
Input voltage range	FDC20	12V nominal input	9 – 18VDC
		24V nominal input	18 – 36VDC
	FDC20-W	48V nominal input	36 – 75VDC
		24V nominal input	9 – 36VDC
	48V nominal input	18 – 75VDC	
Input filter			Pi type
Input surge voltage 100mS max	12V input		36VDC
	24V input		50VDC
	48V input		100VDC
Input reflected ripple current	Nominal Vin and full load		25mA p-p
Start up time	Nominal Vin and constant resistive load		Power up 20mS typ
Remote ON/OFF (Note 8) (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	Nominal Vin	-0.5~1.0mA	
Remote off state input current	Nominal Vin	20mA	
ENVIRONMENTAL SPECIFICATIONS			
Operating temperature range	-40°C ~ +85°C (with derating)		
Maximum case temperature	+100°C		
Storage temperature range	-55°C ~ +105°C		
Thermal impedance (Note 9)	Nature convection	10°C/watt	
	Nature convection with heat-sink	8.24°C/watt	
Thermal shock	MIL-STD-810F		
Vibration	10~55Hz, 10G, 30minutes along X,Y and Z		
Relative humidity	5% to 95% RH		
EMC CHARACTERISTICS			
EMI (Note 10)	EN55022	Class A	
ESD	EN61000-4-2	Air	± 8KV
		Contact	± 6KV
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2KV	Perf. Criteria B
Surge (Note 11)	EN61000-4-5	± 1KV	Perf. Criteria B
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A



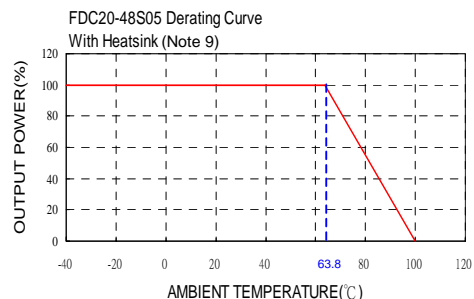
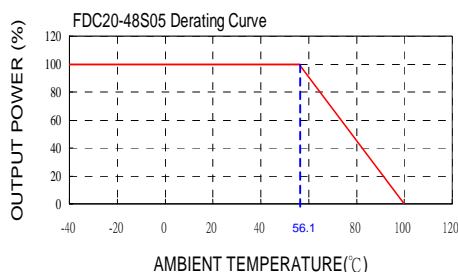


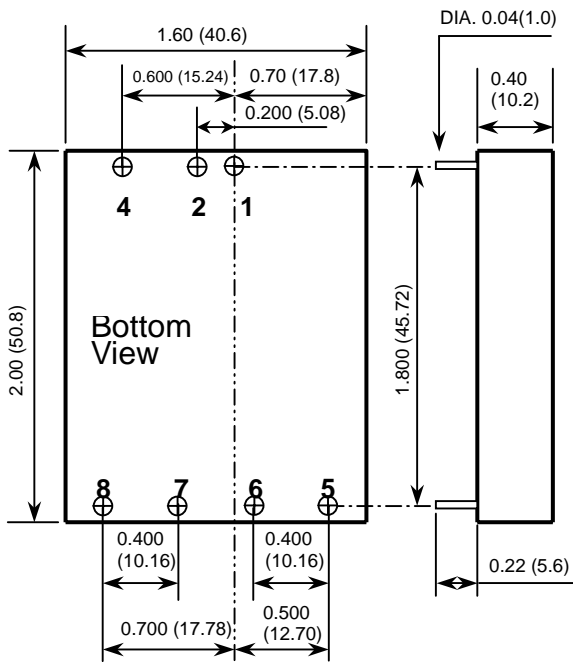
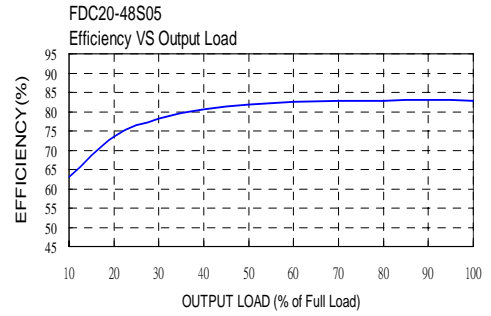
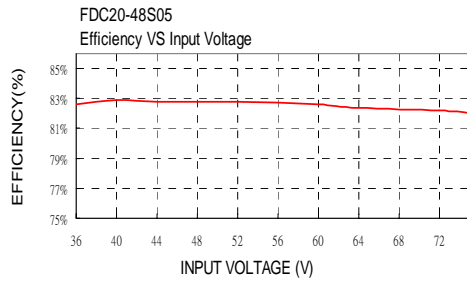
Model Number	Input Range	Output Voltage	Output Current		Output Ripple & Noise	Input Current		Eff ⁽⁴⁾ (%)	Capacitor ⁽⁵⁾ Load max
			Min. load	Full load		No load ⁽³⁾	Full load ⁽²⁾		
FDC20-12S33	9 – 18 VDC	3.3 VDC	280mA	4000mA	75mVp-p	40mA	1507mA	77	13000uF
FDC20-12S05	9 – 18 VDC	5 VDC	280mA	4000mA	75mVp-p	15mA	2193mA	80	6800uF
FDC20-12S12	9 – 18 VDC	12 VDC	134mA	1670mA	75mVp-p	40mA	2110mA	83	2200uF
FDC20-12S15	9 – 18 VDC	15 VDC	106mA	1330mA	75mVp-p	20mA	2083mA	84	755uF
FDC20-12D05	9 – 18 VDC	± 5 VDC	± 140mA	± 2000mA	100mVp-p	15mA	2136mA	82	± 3400uF
FDC20-12D12	9 – 18 VDC	± 12 VDC	± 67mA	± 833mA	100mVp-p	35mA	2110mA	83	± 680uF
FDC20-12D15	9 – 18 VDC	± 15 VDC	± 53mA	± 666mA	100mVp-p	35mA	2110mA	83	± 450uF
FDC20-12T3312	9 – 18 VDC	3.3 / ± 12 VDC	300 / ± 30mA	3000 / ± 300mA	50 / ± 120mVp-p	20mA	1900mA	79	4700 / ± 220uF
FDC20-12T3315	9 – 18 VDC	3.3 / ± 15 VDC	300 / ± 25mA	3000 / ± 250mA	50 / ± 150mVp-p	35mA	1933mA	79	4700 / ± 220uF
FDC20-12T0512	9 – 18 VDC	5 / ± 12 VDC	200 / ± 30mA	2000 / ± 300mA	50 / ± 120mVp-p	20mA	1885mA	80	4700 / ± 220uF
FDC20-12T0515	9 – 18 VDC	5 / ± 15 VDC	200 / ± 25mA	2000 / ± 250mA	50 / ± 150mVp-p	40mA	1919mA	80	4700 / ± 220uF
FDC20-24S33 (W)	18 – 36 (9 – 36) VDC	3.3 VDC	280mA	4000mA	75mVp-p	10(20)mA	733 (764mA)	79 (76)	13000uF
FDC20-24S05 (W)	18 – 36 (9 – 36) VDC	5 VDC	280mA	4000mA	75mVp-p	10(10)mA	1082 (1111mA)	81 (79)	6800uF
FDC20-24S12 (W)	18 – 36 (9 – 36) VDC	12 VDC	134mA	1670mA	75mVp-p	10(20)mA	1018 (1082mA)	86 (81)	2200uF
FDC20-24S15 (W)	18 – 36 (9 – 36) VDC	15 VDC	106mA	1330mA	75mVp-p	15(20)mA	1018 (1082mA)	86 (81)	755uF
FDC20-24D05 (W)	18 – 36 (9 – 36) VDC	± 5 VDC	± 140mA	± 2000mA	100mVp-p	20(15)mA	1028 (1111mA)	85 (79)	± 3400uF
FDC20-24D12 (W)	18 – 36 (9 – 36) VDC	± 12 VDC	± 67mA	± 833mA	100mVp-p	25(20)mA	1016 (1068mA)	86 (82)	± 680uF
FDC20-24D15 (W)	18 – 36 (9 – 36) VDC	± 15 VDC	± 53mA	± 666mA	100mVp-p	30(25)mA	1015 (1068mA)	86 (82)	± 450uF
FDC20-24T3312	18 – 36 VDC	3.3 / ± 12 VDC	300 / ± 30mA	3000 / ± 300mA	50 / ± 120mVp-p	20mA	914mA	82	4700 / ± 220uF
FDC20-24T3315	18 – 36 VDC	3.3 / ± 15 VDC	300 / ± 25mA	3000 / ± 250mA	50 / ± 150mVp-p	20mA	967mA	79	4700 / ± 220uF
FDC20-24T0512	18 – 36 VDC	5 / ± 12 VDC	200 / ± 30mA	2000 / ± 300mA	50 / ± 120mVp-p	25mA	907mA	83	4700 / ± 220uF
FDC20-24T0515	18 – 36 VDC	5 / ± 15 VDC	200 / ± 25mA	2000 / ± 250mA	50 / ± 150mVp-p	10mA	922mA	83	4700 / ± 220uF
FDC20-48S33 (W)	36 – 75 (18 – 75) VDC	3.3 VDC	280mA	4000mA	75mVp-p	10(15)mA	367 (377mA)	79 (77)	13000uF
FDC20-48S05 (W)	36 – 75 (18 – 75) VDC	5 VDC	280mA	4000mA	75mVp-p	10(10)mA	543 (548mA)	82 (80)	6800uF
FDC20-48S12 (W)	36 – 75 (18 – 75) VDC	12 VDC	134mA	1670mA	75mVp-p	15(10)mA	509 (536mA)	86 (82)	2200uF
FDC20-48S15 (W)	36 – 75 (18 – 75) VDC	15 VDC	106mA	1330mA	75mVp-p	25(10)mA	506 (532mA)	86 (82)	755uF
FDC20-48D05 (W)	36 – 75 (18 – 75) VDC	± 5 VDC	± 140mA	± 2000mA	100mVp-p	15(10)mA	514 (541mA)	85 (81)	± 3400uF
FDC20-48D12 (W)	36 – 75 (18 – 75) VDC	± 12 VDC	± 67mA	± 833mA	100mVp-p	15(15)mA	502 (527mA)	87 (83)	± 680uF
FDC20-48D15 (W)	36 – 75 (18 – 75) VDC	± 15 VDC	± 53mA	± 666mA	100mVp-p	20(20)mA	502 (527mA)	87 (83)	± 450uF
FDC20-48T3312	36 – 75 VDC	3.3 / ± 12 VDC	300 / ± 30mA	3000 / ± 300mA	50 / ± 120mVp-p	10mA	457mA	82	4700 / ± 220uF
FDC20-48T3315	36 – 75 VDC	3.3 / ± 15 VDC	300 / ± 25mA	3000 / ± 250mA	50 / ± 150mVp-p	10mA	464mA	82	4700 / ± 220uF
FDC20-48T0512	36 – 75 VDC	5 / ± 12 VDC	200 / ± 30mA	2000 / ± 300mA	50 / ± 120mVp-p	15mA	448mA	84	4700 / ± 220uF
FDC20-48T0515	36 – 75 VDC	5 / ± 15 VDC	200 / ± 25mA	2000 / ± 250mA	50 / ± 150mVp-p	15mA	456mA	84	4700 / ± 220uF

⁽¹²⁾FDC20-24D3305 and FDC20-48D3305, Output 3.3V(3A)/5V(2A), Detail Spec. Contact Factory.

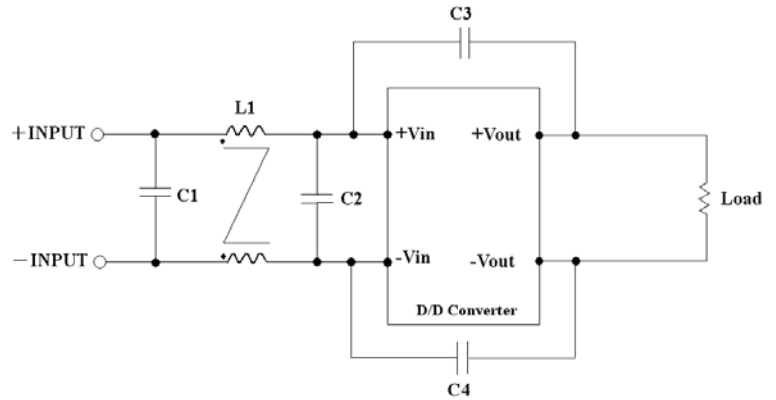
Note

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C. MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment).
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The output requires a minimum 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
- The ON/OFF control pin voltage is referenced to -Vin
- Heat sink is optional and P/N: 7G-0011A and the operation temperature range please see curve.
- The FDC20 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
Recommend: 12Vin : 6.8μF/50V 1812 MLCC . 24Vin : N/A. 48Vin : 2.2μF/100V 1812 MLCC .
- An external filter capacitor is required if the module has to meet EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220 μ F/100V, ESR 48mΩ .
- The FDC20-24D3305 and FDC20-48D3305 are safety approval pending.





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)

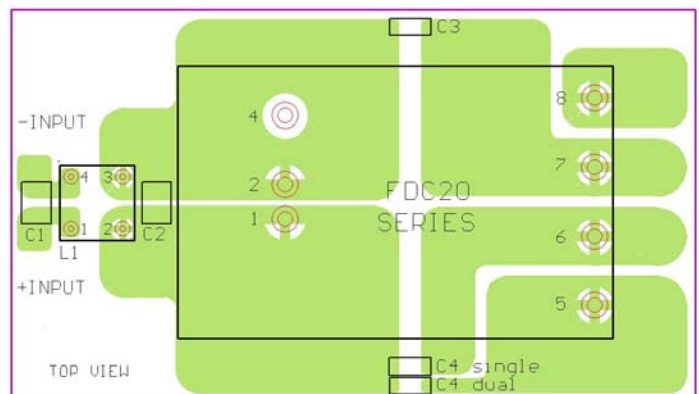
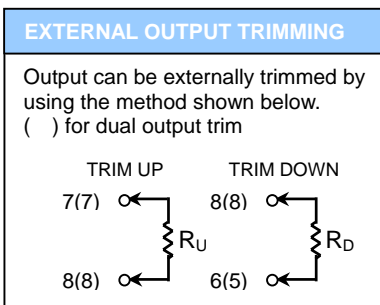


Recommended Filter for EN55022 Class B Compliance

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

	C1	C2	C3	C4	L1
FDC20-12xxx	4.7uF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048
FDC20-24xxx	4.7uF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048
FDC20-48xxx	2.2uF/100V 1812 MLCC	2.2uF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	450uH Common Choke PMT-048

PIN CONNECTION			
PIN	SINGLE	DUAL	TRIPLE
1	+ INPUT	+ INPUT	+ INPUT
2	- INPUT	- INPUT	- INPUT
4	CTRL	CTRL	CTRL
5	NO PIN	+ OUTPUT	+ AUXILIARY
6	+ OUTPUT	COMMON	+3.3V / +5V
7	- OUTPUT	- OUTPUT	COMMON
8	TRIM	TRIM	- AUXILIARY



Recommended EN55022 Class B Filter Circuit Layout