

FDC20(W) SERIES

DC / DC Single, Dual & Triple Output: 20 Watts



Features

- 2:1 standard input range
- 4:1 wide Input range option 9~36V & 18~75V
- Single, Dual and Triple output models
- Industry Standard 2 x 1.6in package
- High efficiency up to 83%
- Regulated output & Short circuit protection
- 1600V isolation
- Five sided continuous copper shield
- Remote ON / OFF - Standard
- High operating temperature +85°C
- Output voltage trim on Single and Dual output models
- Safety EN60950, UL1950

Specifications:

Input Voltage	12VDC (9 ~ 18) 24VDC (18 ~ 36) 48VDC (36 ~75)	Short Circuit protection	Continuous hiccup mode
Option (W) models	24VDC (9 ~ 36) 48VDC (18 ~ 75)	Efficiency	Model dependant 77 ~ 87%
Input Filter	Pi type	Isolation	1600VDC
Input Surge Voltage. (100mS)	12V: 36VDC 24V: 50VDC. 48V: 100VDC	Isolation Cap.	300pF
Input Reflected Ripple Current	25mA pk-pk (@ nominal input & 100% load	Switching Freq.	300KHz
Start Up time	20mS constant resistive load	Safety	EN60950-1, UL60950-1
Remote ON/OFF	DC-DC ON Open or 3.5 V < Vr < 12V DC-DC OFF Short or 0V < Vr < 1.2V Input current of remote control pin: 1mA Remote off state input current: 20mA	Case Material	Nickel-coated copper
Output power	20 watts	Base Material	Non-conductive black plastic
Voltage Accuracy	±1.0% Singles & Dual ±5% Auxiliary outputs	Potting	Epoxy UL94-V0
Minim Load	See table	Dimensions	50.8 x 40.6 x 10.2mm
Voltage Trim	±10% via external trim network	Weight	48g
Line Regulation	Min to 100% load Singles & Duals ±0.5% Auxiliary ±5%	MTBF	1.928 x 10 ⁶ Hrs
Load Regulation	Min to 100% load Singles ±0.5% Duals ±3% Auxiliary ±5%	Operating Temp	-40°C to +85°C (with derating)
Cross Regulation	±5% Asymmetrical load: (Min -100% load)	Case Temp	+100°C maximum case temperature
Ripple & noise	See table. 20MHZ bandwidth	Thermal Impedance	10°C / watt Standard convection 8.24°C / watt with optional heatsink
Temp. Coefficient	±0.02% / °C	Thermal shock	MIL-STD-810F
Transient Response	Singles & Duals 250uS Triple 500us (25% load step change)	Vibration	10-55Hz, 10G, 30min along X, Y,Z
Over Voltage Protection	3.3V: 3.9V 5.0V: 6.2V 12V: 15V 15V: 18V	Humidity	5-95% RH
Overload Protection	Typically 150% of load	EMC	EN55022 Class A Consult office for Class B design
		ESD	EN61000-4-2
		Radiated Immunity	EN61000-4-3
		Fast Transients	EN61000-4-4
		Surge	EN61000-4-5
		Conducted Immunity	EN61000-4-6

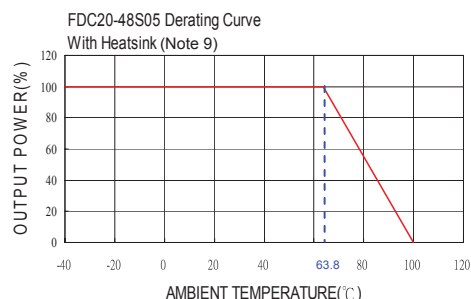
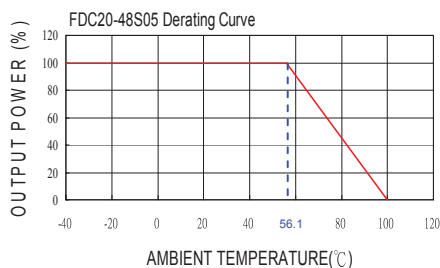
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Model	Input V	Output V	Output Current		Output Ripple & Noise	Input Current		Eff (%)	Capacitor Load max
			Min. load	Full load		No load	Full Load		
FDC20-12S33	9 – 18 V	3.3 V	280mA	4000mA	75mVp-p	40mA	1507mA	77	13000uF
FDC20-12S05	9 – 18 V	5 V	280mA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

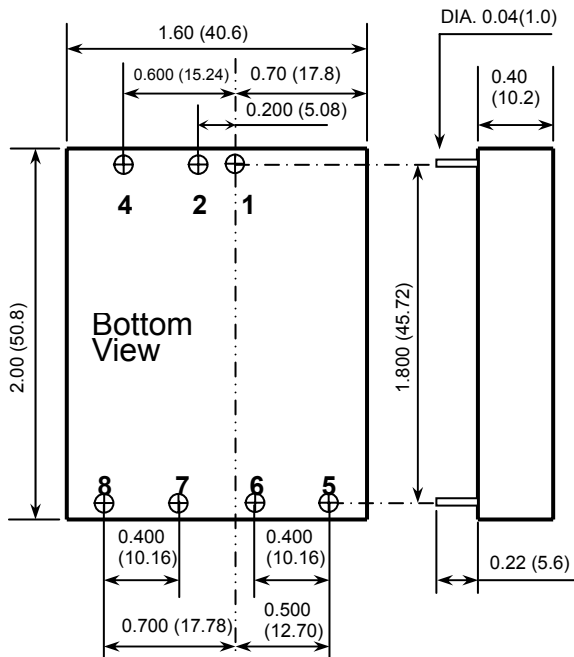
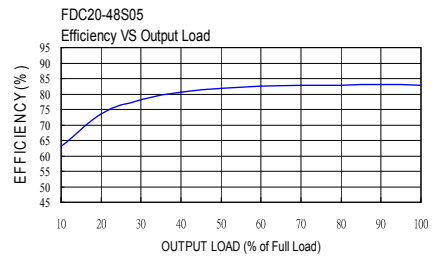
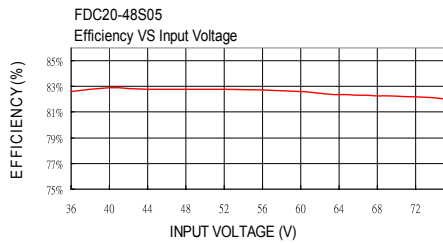
Notes:

1. MTBF as per BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)
2. Typical value at nominal input voltage and full load, resistive
3. Minimum loading on the output required to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
4. 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
5. The ON/OFF control pin voltage is referenced to -Vin
6. Heat sink is optional and **P/N: 7G-0011A** and the operation temperature range please see curve.
7. 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 .
8. An external filter capacitor is required if the module has to meet EN61000-4-5.
Recommend filter capacitor : Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.
9. The FDC20-24D3305 and FDC20-48D3305 contact factory for more details.



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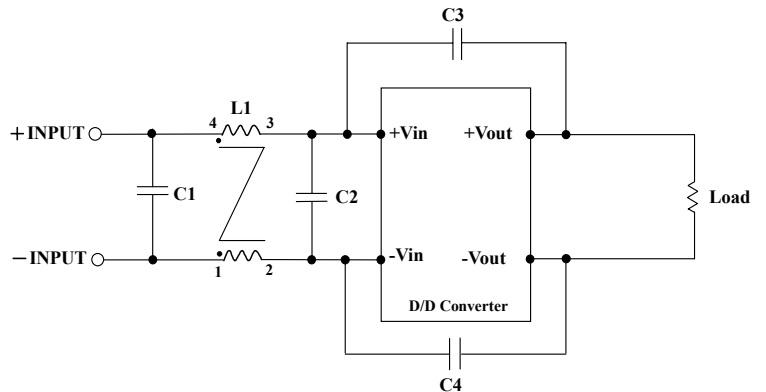
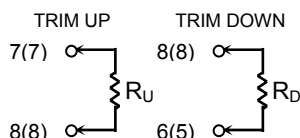
- All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

Pin Assignment

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

EXTERNAL OUTPUT TRIMMING

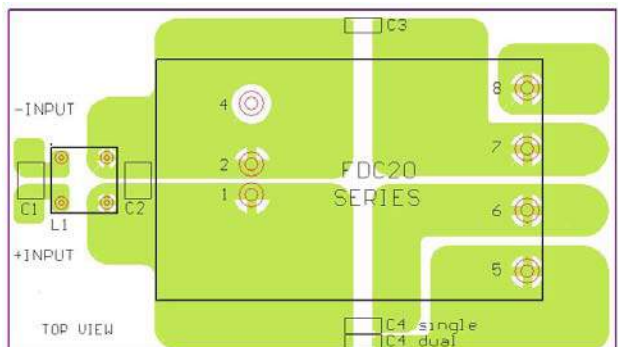
Output can be externally trimmed by using the method shown below.
() for dual output trim



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



Recommended EN55022 Class B Filter Circuit Layout