POWER MATE TECHNOLOGY CO.,LTD.

FDC20-SERIES

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

UL E193009
TUV
CB
CE MARK

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. The FDC20 and FDC20-W features 1600VDC of isolation, short-circuit and over-voltage protection, as well as six sided shielding. A safety approval to 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			20 Watts max
Voltage accuracy	Full load and nominal Vin	Single & Dual Triple 3.3V/5V Auxiliary	± 1% ± 1% ± 5%
Voltage adjustability			± 10%
Minimum load (Note 1)			10% of FL
Line regulation	LL to HL at Full Load	Single (W) Dual (W) Triple 3.3V/5V Auxiliary	± 0.2% ± 0.5% ± 1% ± 5%
Load regulation	25% to 100% FL	Single Dual Triple 3.3V/5V Auxiliary	± 0.5% ± 3% ± 2% ± 5%
Cross regulation (Note 2)		Dual Triple 3.3V/5V Auxiliary	± 5% ± 2% ± 5%
Ripple and noise	20MHz bandwidth	Single Dual Triple 3.3V/5V Auxiliary	75mVp-p 100mVp-p 50mVp-p 1% of Vout
Temperature coefficient			±0.02% / ºC, max
Transient response recovery time	25% load step change	Single Dual Triple	250 uS 250 uS 500 uS
Over voltage protection Zener diode clamp	3.3V output 5V output 12V output 15V output		3.9V 6.2V 15V 18V
Over load protection	% of FL at nominal input		150%,max
Short circuit protection			Hiccup, automatics recovery

INPUT SPECIFICATIONS			
Input voltage range	FDC20	12V nominal input	9 – 18VDC
		24V nominal input	18 – 36VDC
		48V nominal input	36 – 75VDC
	FDC20-W	24V nominal input	9 – 36VDC
		48V nominal input	18 – 75VDC
Input filter			Pi type
Input surge voltage 100mS max	12V input 24V input 48V input		36VDC 50VDC 100VDC
Input reflected ripple (Note 3)	Nominal Vin and full load		25mAp-p
Start up time	Nominal Vin and constant resistive load	Power up	20mS typ
Remote ON/OFF (Note 4) (Positive logic)	DC-DC ON DC-DC OFF		Open or 3.5V < Vr < 12V Short or 0V < Vr < 1.2V
Remote off input current	Nominal Vin		20mA

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 5)		1.928 x 10^6 hrs
ENVIRONMENTAL SPECIFICATIONS		
Operating temperature range		-40ºC ~ +85ºC (with derating)
Maximum case temperature		+100ºC
Storage temperature range		-55ºC ~ +105ºC
Thermal impedance (Note 6)	Nature convection Nature convection with heat-sink	10ºC/watt 8.24ºC/watt
Thermal shock		MIL-STD-810D
Vibration		10~55Hz, 10G, 30minutes along X,Y and Z
Relative humidity		5% to 95% RH
EMC CHARACTERISTICS		
Conducted emissions	EN55022	Class A
Radiated emissions	EN55022 EN55022(Note 7)	Class A Class B
ESD	EN61000-4-2	Perf. CriteriaB
Radiated immunity	EN61000-4-3	Perf. CriteriaA
Fast transient	EN61000-4-4	Perf. CriteriaB
Surge	EN61000-4-5	Perf. CriteriaB
Conducted immunity	EN61000-4-6	Perf. CriteriaA

Model Number	Input Range	Output Voltage	Output Current	Input Current [8]	Eff [9] (%)	Capacitor[10] Load max
FDC20-12S33	9 – 18 VDC	3.3 VDC	4000mA	1507mA	77	13000uF
FDC20-12S05	9 – 18 VDC	5 VDC	4000mA	2193mA	80	6800uF
FDC20-12S12	9 – 18 VDC	12 VDC	1670mA	2110mA	83	2200uF
FDC20-12S15	9 – 18 VDC	15 VDC	1330mA	2083mA	84	755uF
FDC20-12D05	9 – 18 VDC	± 5 VDC	± 2000mA	2136mA	82	± 3400uF
FDC20-12D12	9 – 18 VDC	± 12 VDC	± 833mA	2110mA	83	± 680uF
FDC20-12D15	9 – 18 VDC	± 15 VDC	± 666mA	2110mA	83	± 450uF
FDC20-12T3312	9 – 18 VDC	3.3 / ± 12 VDC	3000 / ± 300mA	1900mA	79	4700 / ± 220uF
FDC20-12T3315	9 – 18 VDC	3.3 / ± 15 VDC	3000 / ± 250mA	1933mA	79	4700 / ± 220uF
FDC20-12T0512	9 – 18 VDC	5 / ± 12 VDC	2000 / ± 300mA	1885mA	80	4700 / ± 220uF
FDC20-12T0515	9 – 18 VDC	5 / ± 15 VDC	2000 / ± 250mA	1919mA	80	4700 / ± 220uF
FDC20-24S33 (W)	18 – 36 (9 – 36) VDC	3.3 VDC	4000mA	733 (764mA)	79 (76)	13000uF
FDC20-24S05 (W)	18 – 36 (9 – 36) VDC	5 VDC	4000mA	1082 (1111mA)	81 (79)	6800uF
FDC20-24S12 (W)	18 – 36 (9 – 36) VDC	12 VDC	1670mA	1018 (1082mA)	86 (81)	2200uF
FDC20-24S15 (W)	18 – 36 (9 – 36) VDC	15 VDC	1330mA	1018 (1082mA)	86 (81)	755uF
FDC20-24D05 (W)	18 – 36 (9 – 36) VDC	± 5 VDC	± 2000mA	1028 (1111mA)	85 (79)	± 3400uF
FDC20-24D12 (W)	18 – 36 (9 – 36) VDC	± 12 VDC	± 833mA	1016 (1068mA)	86 (82)	± 680uF
FDC20-24D15 (W)	18 – 36 (9 – 36) VDC	± 15 VDC	± 666mA	1015 (1068mA)	86 (82)	± 450uF
FDC20-24T3312	18 – 36 VDC	3.3 / ± 12 VDC	3000 / ± 300mA	914mA	82	4700 / ± 220uF
FDC20-24T3315	18 – 36 VDC	3.3 / ± 15 VDC	3000 / ± 250mA	967mA	79	4700 / ± 220uF
FDC20-24T0512	18 – 36 VDC	5 / ± 12 VDC	2000 / ± 300mA	907mA	83	4700 / ± 220uF
FDC20-24T0515	18 – 36 VDC	5 / ± 15 VDC	2000 / ± 250mA	922mA	83	4700 / ± 220uF
FDC20-48S33 (W)	36 – 75 (18 – 75) VDC	3.3 VDC	4000mA	367 (377mA)	79 (77)	13000uF
FDC20-48S05 (W)	36 – 75 (18 – 75) VDC	5 VDC	4000mA	543 (548mA)	82 (80)	6800uF
FDC20-48S12 (W)	36 – 75 (18 – 75) VDC	12 VDC	1670mA	509 (536mA)	86 (82)	2200uF
FDC20-48S15 (W)	36 – 75 (18 – 75) VDC	15 VDC	1330mA	506 (532mA)	86 (82)	755uF
FDC20-48D05 (W)	36 – 75 (18 – 75) VDC	± 5 VDC	± 2000mA	514 (541mA)	85 (81)	± 3400uF
FDC20-48D12 (W)	36 – 75 (18 – 75) VDC	± 12 VDC	± 833mA	502 (527mA)	87 (83)	± 680uF
FDC20-48D15 (W)	36 – 75 (18 – 75) VDC	± 15 VDC	± 666mA	502 (527mA)	87 (83)	± 450uF
FDC20-48T3312	36 – 75 VDC	3.3 / ± 12 VDC	3000 / ± 300mA	457mA	82	4700 / ± 220uF
FDC20-48T3315	36 – 75 VDC	3.3 / ± 15 VDC	3000 / ± 250mA	464mA	82	4700 / ± 220uF
FDC20-48T0512	36 – 75 VDC	5 / ± 12 VDC	2000 / ± 300mA	448mA	84	4700 / ± 220uF
FDC20-48T0515	36 – 75 VDC	5 / ± 15 VDC	2000 / ± 250mA	456mA	84	4700 / ± 220uF

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

Note

1. The FDC20 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.
2. 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
3. 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 100uF/100V
4. The ON/OFF control pin voltage is referenced to -Vin
5. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40ºC. (Ground fixed and controlled environment)
6. Heat sink is optional and P/N: 7G-0011A.
   Operation temperature range please see curve.
7. The FDC20 meets EN55022 class B only with external components connected before the input pin to converter.
8. Maximum value at nominal input voltage and full load.
9. Typical value at nominal input voltage and full load.
10. Test by minimum Vin and constant resistive load.
11. The FDC20-24D3305 and FDC20-48D3305 are safety approval pending.

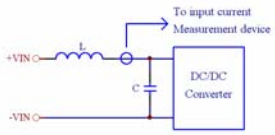
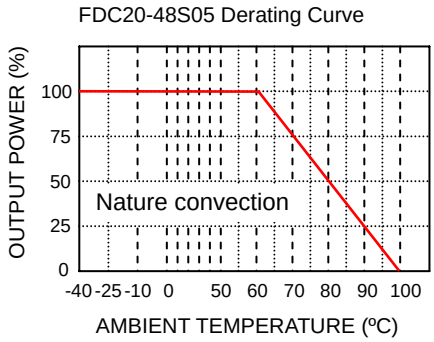
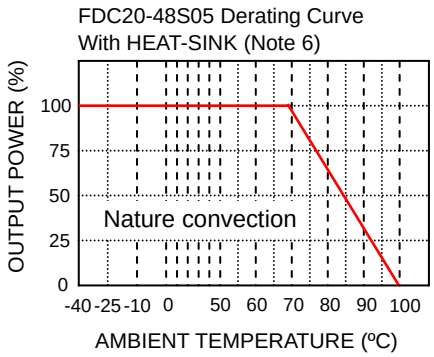
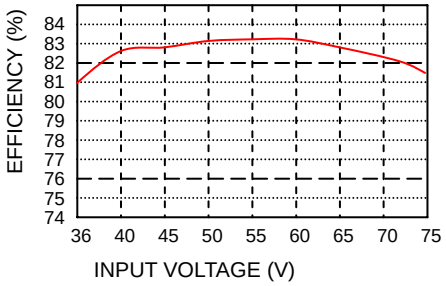


Figure 1

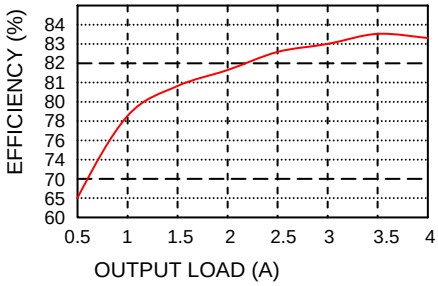


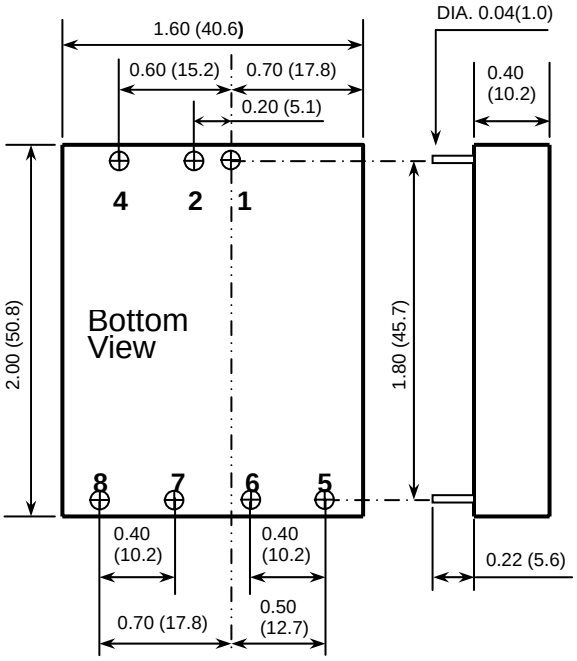


FDC20-48S05
Efficiency VS Input Voltage



FDC20-48S05
Efficiency VS Output load





1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
2. Pin pitch tolerance ±0.014(0.35)

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

EXTERNAL OUTPUT TRIMMING

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