Description

The DFC10 Series provides power converter solutions to meet commercial and industrial requirements. With power densities above 11 watts per cubic inch (0.67 watts per cm^3), overcurrent protection, and five-sided shielded case, the DFC10 meets the most rigorous needs in an industry-standard case size. The 220 kHz operating frequency of the DFC10 Series allows an increased power density while including adequate heat sinking and input/output filtering. This eliminates the need for external components in most applications. Full overload protection is provided by pulse-by-pulse current limiting.

Features

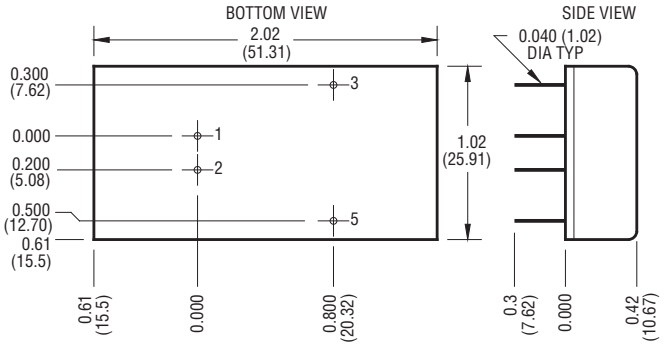
- RoHS lead-solder-exemption compliant
- High power density, up to 11 watts per cubic inch (0.67 watts per cm^3)
- Efficiencies to 83% (Lower for 3.3V)
- Low input-to-output capacitance
- 700V isolation (1544V for 48V converters)
- Continuous overcurrent protection
- 3.3V output available
- 5-Sided, shielded copper case
- Extended input range (2:1)

RoHS Compliant

Selection Chart

Model	Input Range VDC (4)		Output VDC	Output mA
	Min	Max		
DFC10E12S3.3	9	18	3.33	2000
DFC10E12S5	9	18	5	2000
DFC10E12S12	9	18	12	900
DFC10E12S15	9	18	15	700
DFC10E24S3.3	18	36	3.33	2000
DFC10E24S5	18	36	5	2000
DFC10E24S12	18	36	12	900
DFC10E24S15	18	36	15	700
DFC10E48S3.3	36	72	3.33	2000
DFC10E48S5	36	72	5	2000
DFC10E48S12	36	72	12	900
DFC10E48S15	36	72	15	700

Model numbers highlighted in yellow or shaded are not recommended for new designs.



Mechanical tolerances unless otherwise noted:
X.XX dimensions: ±0.020 inches
X.XXX dimensions: ±0.005 inches

Pin	Function
1	+INPUT
2	-INPUT
3	+OUT
4	NO PIN
5	-OUT

General Specifications (1)

All Models			Units
Isolation (2)			
Isolation Voltage Input to Output 12V, 24V Input to Output 48V 10 µA Leakage	MIN MIN	700 1544	VDC
Input to Output Capacitance	TYP	400	pF
Environmental			
Case Operating Range, Tc No Derating	MIN MAX	-40 90	° C
Case Functional Range (3)	MIN MAX	-50 100	° C
Storage Range	MIN MAX	-55 105	° C
Thermal Impedance (4)	TYP	15	° C/Watt
General			
MTBF (Calculated)	TYP	800,000	HRS
Unit Weight	TYP	1.0/28	oz/gm
Chassis Mounting Kit 12V, 24V	CM2B2		
Chassis Mounting Kit 48V	CM2A1		

NOTES

(1) All parameters measured at Tc = 25°C, nominal input voltage and full rated load unless otherwise noted.

(2) The Case is tied to the -Input pin.

(3) The functional temperature range is intended to give an additional data point for use in evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed beyond the case operating range.

(4) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.

Input Parameters (1)								
Model		**DFC10E12S3.3**	**DFC10E12S5**	**DFC10E12S12**	**DFC10E12S15**	**DFC10E24S3.3**	**DFC10E24S5**	**Units**
Reflected Ripple (2)	TYP	280	440			140	210	mA_{PP}
	TYP	90	145			45	70	mA_{rms}
Input Current Full Load No Load	TYP TYP	724 7	1070 7	1100 12	1060 15	344 7	500 7	mA
Efficiency	TYP	76	78	82	83	80	83	%
Switching Frequency	TYP	220						kHz
Maximum Input Overvoltage, 100ms Maximum	MAX	24				45		VDC
Turn-on Time, 1% Output Error	TYP	10						ms
Model		**DFC10E24S12**	**DFC10E24S15**	**DFC10E48S3.3**	**DFC10E48S5**	**DFC10E48S12**	**DFC10E48S15**	**Units**
Reflected Ripple (2)	TYP	210		100	150			mA_{PP}
	TYP	70		35	50			mA_{rms}
Input Current Full Load No Load	TYP TYP	530 10	510 10	176 6	260 6	270 6	260 6	mA
Efficiency	TYP	85	86	78	81	83	84	%
Switching Frequency	TYP	220						kHz
Maximum Input Overvoltage, 100ms Maximum	MAX	45		85				VDC

Output Parameters (1)						
Model		**DFC10E12S3.3 DFC10E24S3.3 DFC10E48S3.3**	**DFC10E12S5 DFC10E24S5 DFC10E48S5**	**DFC10E12S12 DFC10E24S12 DFC10E48S12**	**DFC10E12S15 DFC10E24S15 DFC10E48S15**	**Units**
Output Voltage		3.33	5	12	15	VDC
Output Voltage Accuracy	MIN TYP MAX	3.30 3.33 3.36	4.95 5.00 5.05	11.90 12.00 12.10	14.90 15.00 15.10	VDC
Rated Load Range	MIN MAX	0.0 2.0	0.0 2.0	0.0 0.9	0.0 0.7	A
Load Regulation 25% Max Load - Max Load	TYP MAX	0.1 0.4	0.1 0.4	0.2 0.4	0.2 0.4	%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.5 1.0	0.01 0.2	0.2 0.8	0.2 0.8	%
Short Term Stability (3)	TYP	< 0.05				%/24Hrs
Long Term Stability	TYP	< 0.1				%/kHrs
Input Ripple Rejection (4)	TYP	> 40				dB
Noise, Peak - Peak (2)	TYP	60				mV_{PP}
RMS Noise	TYP	6				mV_{rms}
Temperature Coefficient	TYP MAX	50 150				ppm/°C
Short Circuit Protection from +OUT to -OUT		Continuous, Current Limit Protection				

NOTES

(1) All parameters measured at Tc = 25°C, nominal input voltage and full rated load unless otherwise noted.

(2) Noise measurement bandwidth is 0-20 MHz for peak-peak measurements, 10 kHz to 1 MHz for RMS measurements. Output noise is measured with a 0.01µF / 100V ceramic capacitor in parallel with a 1µf / 35V Tantalum capacitor, 1 inch from the output pins to simulate standard PCB decoupling capacitance.

(3) Short term stability is specified after a 30 minute warmup at full load, constant line and recording the drift over a 24 hour period.

(4) The input ripple rejection is specified for DC to 120 Hz ripple with a modulation amplitude of 1% of Vin.

DFC10 SERIES APPLICATION NOTES

External Capacitance Requirements:

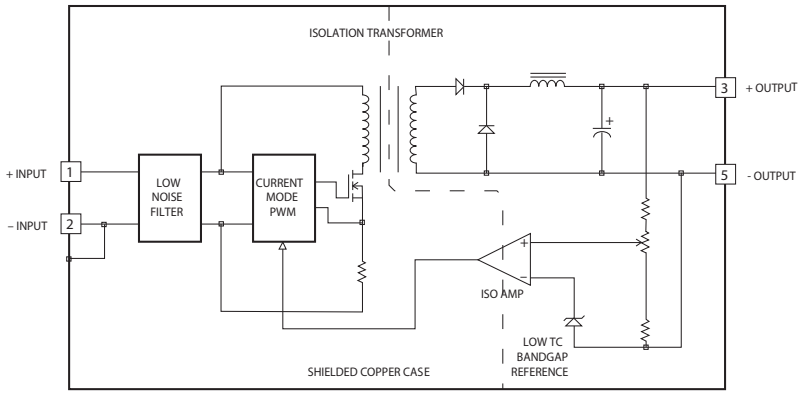
No external capacitance is required for operation of the DFC10 Series. If a capacitive input source is farther than 1" from the converter, an additional capacitor may be required at the input pins for proper operation. This input capacitor should have an ESR greater than 0.25 ohms. Input capacitors with an ESR less than 0.25 ohms may cause peaking of the input filter and actually degrade circuit performance.

External output capacitance is not required for operation. However, it is recommended that 1 µF to 10 µF of tantalum and 0.001 to 0.1 µF ceramic capacitance be selected for reduced system noise. Additional output capacitance may be added for increased filtering, but should not exceed 400 µF.

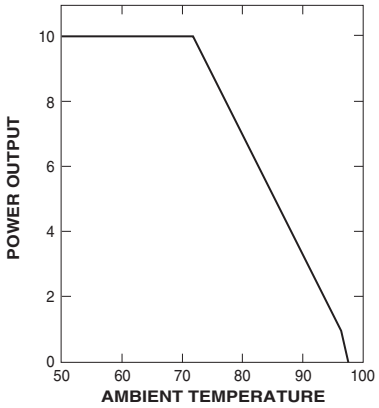
Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

DFC10 SERIES BLOCK DIAGRAM



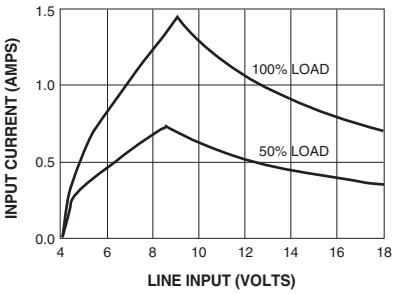
OUTPUT POWER DERATING



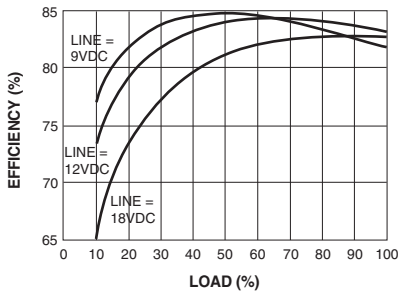
Typical Performance: (Tc=25˚C, Vin=Nom VDC, Rated Load)

Data for 12 Volt Input Models

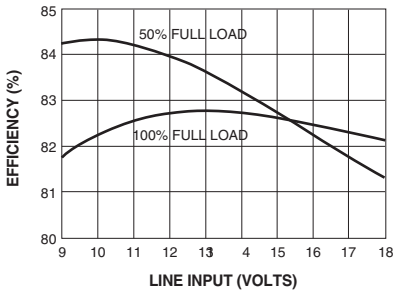
12 VOLT INPUT CURRENT Vs. LINE INPUT VOLTAGE



12 VOLT EFFICIENCY Vs. LOAD

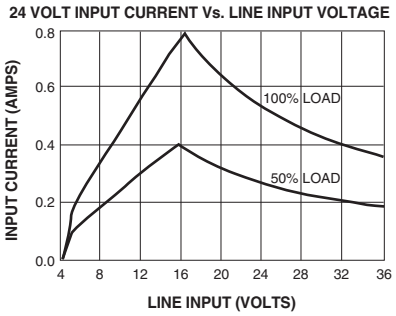


12 VOLT EFFICIENCY Vs. LINE INPUT VOLTAGE

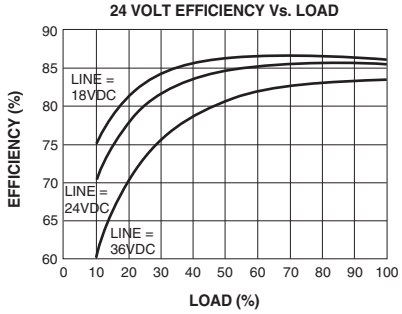


Data for 24 Volt Input Models

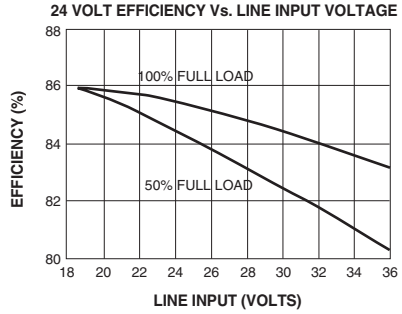
24 VOLT INPUT CURRENT Vs. LINE INPUT VOLTAGE



24 VOLT EFFICIENCY Vs. LOAD

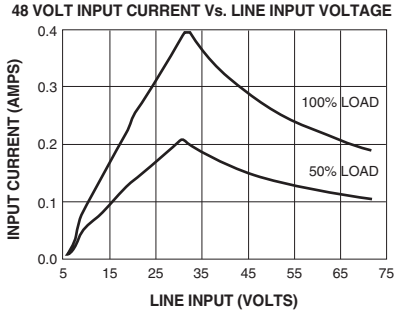


24 VOLT EFFICIENCY Vs. LINE INPUT VOLTAGE

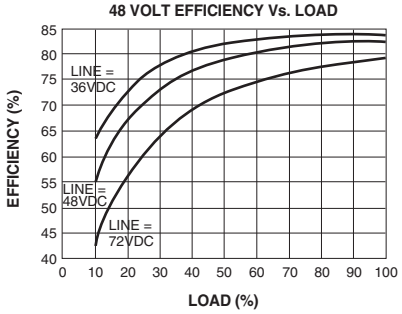


Data for 48 Volt Input Models

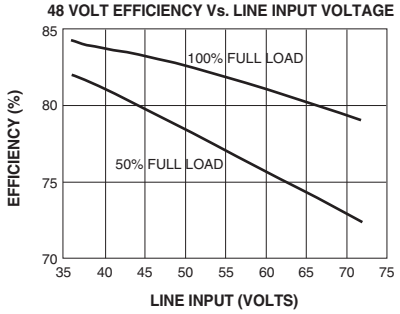
48 VOLT INPUT CURRENT Vs. LINE INPUT VOLTAGE



48 VOLT EFFICIENCY Vs. LOAD



48 VOLT EFFICIENCY Vs. LINE INPUT VOLTAGE



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