DFC10 Series

Single Output DC-DC Converters

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.

Key Features & Benefits

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

1. MODEL SELECTION

MODEL	INPUT RANGE [4] [VDC]		OUTPUT [VDC]	OUTPUT [mA]
	MIN	*MAX*		
DFC10E12S5	9	18	5	2000
DFC10E12S12	9	18	12	900
DFC10E24S5	18	36	5	2000
DFC10E24S12	18	36	12	900
DFC10E24S15	18	36	15	700

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

2. GENERAL SPECIFICATIONS [1] – ALL MODELS

PARAMETER	CONDITIONS / DESCRIPTION	MIN	TYP	MAX	UNITS
Isolation [2]					
Isolation Voltage	Input to Output 12 V, 24 V	700			VDC
Leakage Current			10		µA
Capacitance	Input to Output		400		pF
Environmental					
Case Operating Range (T_C)	No Derating	-40		90	°C
Case Functional Range[3]		-50		100	°C
Storage Range		-55		105	°C
Thermal Impedance[4]			15		°C/W
General					
MTBF	Calculated		800000		hrs
Weight			1.0/28		oz/g
Chasis Mounting Kit	12 V, 24 V		CM2B2		

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.

3. INPUT SPECIFICATIONS[1]

PARAMETER	CONDITIONS / DESCRIPTION		MIN	TYP	MAX	UNITS
Reflected Ripple[2]		DFC10E12S5 / DFC10E12S12		400 145		mA_{pp} mA_{rms}
		DFC10E24S5 / DFC10E24S12 / DFC10E24S15		210 70		mA_{pp} mA_{rms}
Input Current	Full Load / No Load	DFC10E12S5 DFC10E12S12 DFC10E24S5 DFC10E24S12 DFC10E24S15		1070 / 7 1100 / 12 500 / 7 530 / 10 510 / 10		mA
Efficiency		DFC10E12S5 DFC10E12S12 DFC10E24S5 DFC10E24S12 DFC10E24S15		78 82 83 85 86		%
Switching Frequency				220		kHz
Maximum Input Overvoltage, 100 ms maximum		DFC10E12S5 / DFC10E12S12 DFC10E24S5 / DFC10E24S12 / DFC10E24S15			24 45	VDC
Turn –on Time, 1% Output Error					10	ms

4. OUTPUT SPECIFICATIONS[1]

PARAMETER	CONDITIONS / DESCRIPTION		MIN	TYP	MAX	UNITS
Output Voltage		DFC10E12S5 / DFC10E24S5 DFC10E12S12 / DFC10E24S12 DFC10E24S15		5 12 15		VDC
Output Voltage Accuracy		DFC10E12S5 / DFC10E24S5 DFC10E12S12 / DFC10E24S12 DFC10E24S15	4.95 11.90 14.90	5.00 12.00 15.00	5.05 12.10 15.10	VDC
Rated Load Range		DFC10E12S5 / DFC10E24S5 DFC10E12S12 / DFC10E24S12 DFC10E24S15	0.0		2.0 0.9 0.7	A
Load Regulation	25% Max Load - Max Load	DFC10E12S5 / DFC10E24S5 DFC10E12S12 / DFC10E24S12 DFC10E24S15		0.1 0.2 0.2	0.4	%
Line Regulation	Vin = Min – Max VDC	DFC10E12S5 / DFC10E24S5 DFC10E12S12 / DFC10E24S12 DFC10E24S15		0.01 0.2 0.2	0.2 0.8 0.8	%
Short Term Stability[3]				< 0.05		% / 24 Hrs
Long Term Stability				< 0.1		% / kHrs
Input Ripple Rejection[4]				> 40		dB
Noise, Peak-Peak[2]				60		mV_{pp}
RMS Noise				6		mV_{rms}
Temperature Coefficient				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.

5. 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.

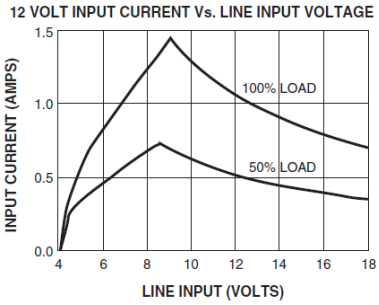
This input capacitor should have an ESR greater than 0.25 ohms. Input capacitors with an ESR less than 0.25 ohms may cause peaking of the input filter and actually degrade circuit performance.

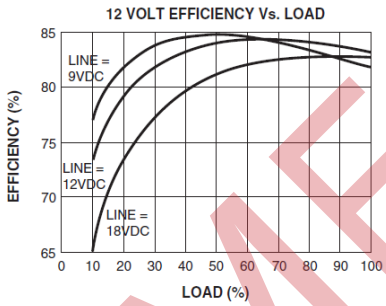
External output capacitance is not required for operation. However, it is recommended that 1 µF to 10 µF of tantalum and 0.001 to 0.1 µF ceramic capacitance be selected for reduced system noise. Additional output capacitance may be added for increased filtering, but should not exceed 400 µF.

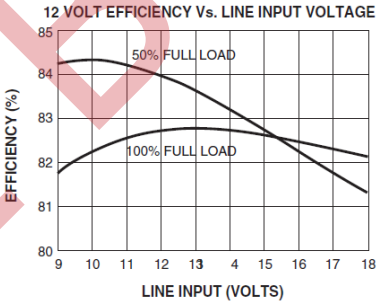
NEGATIVE OUTPUTS

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

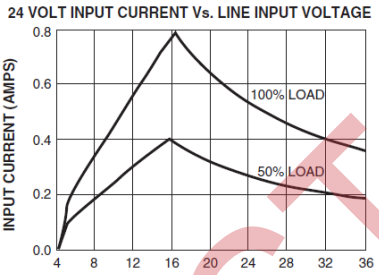
12 VOLT INPUT MODELS

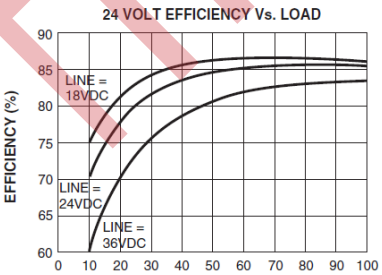


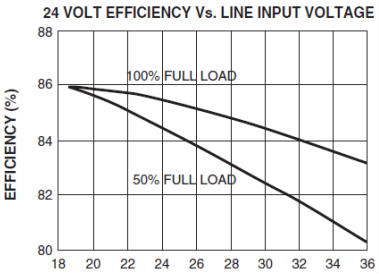


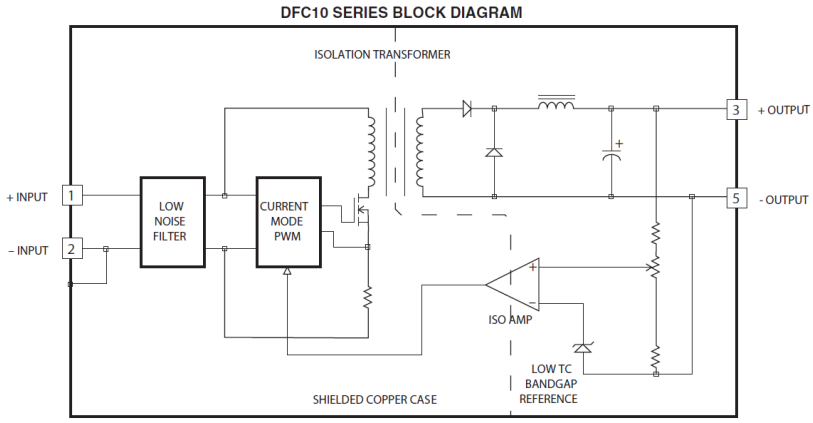


24 VOLT INPUT MODELS









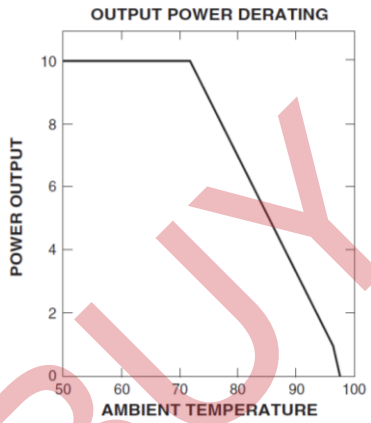


Figure 1. Typical Performance: (Tc = 25°C, Vin = Nom VDC, Rated Load)

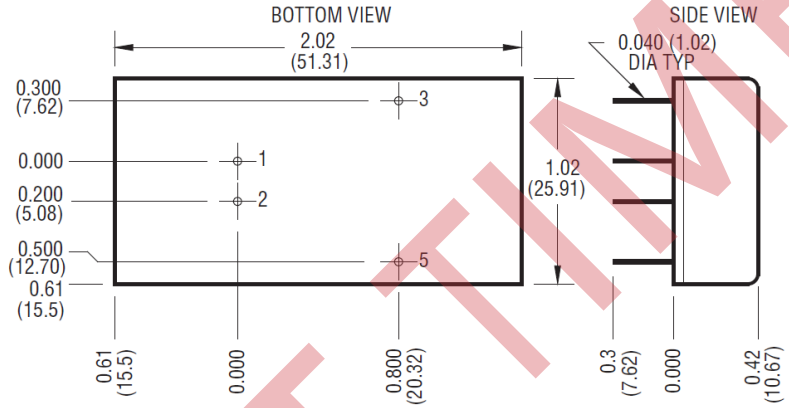


Figure 2. Mechanical Dimensions

PIN	FUNCTION
1	+ INPUT
2	- INPUT
3	+ OUT
4	NO PIN
5	- OUT

Mechanical tolerances unless otherwise noted:

X.XX dimensions: ±0.020 inches
X.XXX dimensions: ±0.005 inches

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.
TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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