

# Description

The DFC15 Series of DC-DC converters is designed to provide a wide range of PCB power solutions. The converters feature dual-output filters for low noise. Trim and remote On/Off features give flexibility to designs. The output of the converter is electrically isolated, thereby allowing the output to be configured as a positive or negative output voltage. The ultrawide input range, from 20 to 60 volts, allows use in many industrial and communication applications.

Model Selection						
Model	Input Range VDC		Output	Output		
	Min	Max	VDC	mA		
DFC15U48S5	20	60	5	3000		
DFC15U48S12	20	60	12	1250		
DFC15U48S15	20	60	15	1000		

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

General Specifications (1)							
All Models	Units						
ON/OFF Function (2)							
OFF Logic Level or Pin Open	MIN	8.0	VDC				
OFF Logic Level	MAX	2.0	VDC				
Input Resistance	TYP	100	Kohms				
Converter Idle Current ON/OFF Pin Low	TYP	<1	mA				
Isolation (3)							
Isolation Voltage Input to Output 10 μA Leakage	MIN	700	VDC				
Input to Output Capacitance	TYP	300	pF				
Output Trim Function							
Input Resistance	TYP	20	Kohms				
Open Circuit Voltage	MIN	±5	%				
Environmental							
Case Operating Range, Tc No Derating	MIN MAX	-40 90	i C				
Storage Range	MIN MAX	-55 105	i C				
Thermal Impedance (5)	TYP	10	i C/Watt				
General							
MTBF (Calculated)	TYP	800,000	HRS				
Unit Weight	TYP	2/57	oz/gm				
Chassis Mounting Kit	CM2A1						

### Features

- · RoHS lead solder exemption compliant
- · Up to 15 watts output power
- Efficiencies to 83%
- · Very low Off current
- 700 V isolation
- · Dual-stage output filter
- -40 °C to +90 °C operation
- Ultra-wide range input (3:1)
- Remote On/Off and Trim





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

Pin	Function
1	+INPUT
2	-INPUT
3	ON/OFF
4	NO PIN
5	+OUT
6	-OUT
7	TRIM

#### Notes

- (1) All parameters measured at Tc = 25°C, nominal input voltage and full rated load unless otherwise noted.
- (2) The ON/OFF pin is the Open Collector TTL, CMOS, and relay compatible. The input to this pin is referenced to Pin 2 (-Input) and is protected to +75VDC.
- (3) The Case is tied to Pin 3, +Input pin.
- (4) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.



Input Parameters (1)							
Model			DFC15U48S5	DFC15U48S12	DFC15U48S15	Units	
Voltage Range		MIN TYP MAX		20.0 48.0 60.0		VDC	
Input Current	Full Load No Load	TYP TYP	950 2	915 4	905 4	mA	
Efficiency		TYP	79	82	83	%	
Switching Frequency		TYP	120		kHz		
Maximum Input Overvo No Damage	oltage, 100ms	MAX	75		VDC		
Turn-on Time, 1% Out	put Error	TYP	5 10		ms		

Output Parameters (1)						
Model		DFC15U48S5	DFC15U48S12	DFC15U48S15	Units	
Output Voltage		5	12	15	VDC	
Rated Load (3)	MIN MAX	0 3000	0 1250	0 1000	mA	
Voltage Range 100% Load	MIN TYP MAX	4.95 5.00 5.05	11.90 12.00 12.10	14.90 15.00 15.10	VDC	
Load Regulation 25-100% Full Load	TYP MAX	0.5 0.75	0.1 0.2	0.1 0.2	%	
Line Regulation Vin = Min-Max VDC	TYP MAX	0.1 0.15	0.01 0.1	0.01 0.1	%	
Short Term Stability (4)	TYP	< 0.02			%/24Hrs	
Long Term Stability	TYP		< 0.05		%/kHrs	
Input Ripple Rejection (5)	TYP	> 60			dB	
Noise, 0-20MHz bw (2)	TYP	75	60	60	mV <sub>PP</sub>	
RMS Noise	TYP	3	2	2	mV <sub>ms</sub>	
Temperature Coefficient	TYP MAX	50 150		ppm/°C		
Short Circuit Protection +OUT to -OUT			Continuous Current	Limit	*	

#### 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. RMS noise is measured over a 0.01-1 MHz bandwidth. To simulate standard PCB decoupling practices, output noise is measured with a 1μF/35V tantalum capacitor located 1 inch away from the converter. converter.
- (3) Minimum load required for rated regulation only. Dynamic response may degrade if run at less than 25% full load.
  (4) Short term stability is specified after a 30-minute warmup at full load, and with constant line, load and ambient conditions.
- (5) The input ripple rejection is specified for DC to 120 Hz ripple with a modulation amplitude of 1% Vin.





## **DFC15 Series Application Notes:**

## **External Capacitance Requirements**

No external capacitance is required for operation of the DFC15 Series. However, for maximum performance, it is recommended that the DFC15 Series use a capacitor of sufficient ripple current capacity connected across the input pins if a capacitive input source is farther than 1" from the converter. To meet the reflected ripple requirements of the converter, an input impedance of less than 0.05 Ohms from DC to 200 kHz is required. External output capacitance is not required for operation, however it is recommended that 1  $\mu$ F to 10  $\mu$ F of tantalum and 0.001 to 0.1  $\mu$ F ceramic capacitance be selected for reduced system noise. Additional output capacitance may be added for increased filtering, but should not exceed 400  $\mu$ F.

### **Negative Outputs**

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

### **Remote ON/OFF Operation**

The remote ON/OFF pin may be left floating if this function is not used. It is recommended to drive this pin with an open collector arrangement or a relay contact. When the ON/OFF pin is pulled low with respect to the -INPUT, the converter is placed in a low power drain state. Do not drive this input from a logic gate directly; there is a 100 kV internal pull-up resistor to a 9 volt source.

### Output Trim

The TRIM pin may be used to adjust the output  $\pm 5\%$  from the nominal setting. This function allows adjustment for voltage drops in the system wiring, as well 5.2 volt outputs for ECL applications. Figure 1 shows the proper connections to use this function. A trimpot value of 10 kV should be used for 5 volt outputs. A trimpot value of 20 kV should be used for 12 and 15 volt outputs. If the TRIM function is not required, the pin may be left floating.





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

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