



BD15021

Wide 3:1 Input Voltage Range
15W DC/DC Converter
15S12/48 with shielding connection to -Vin

Key Features

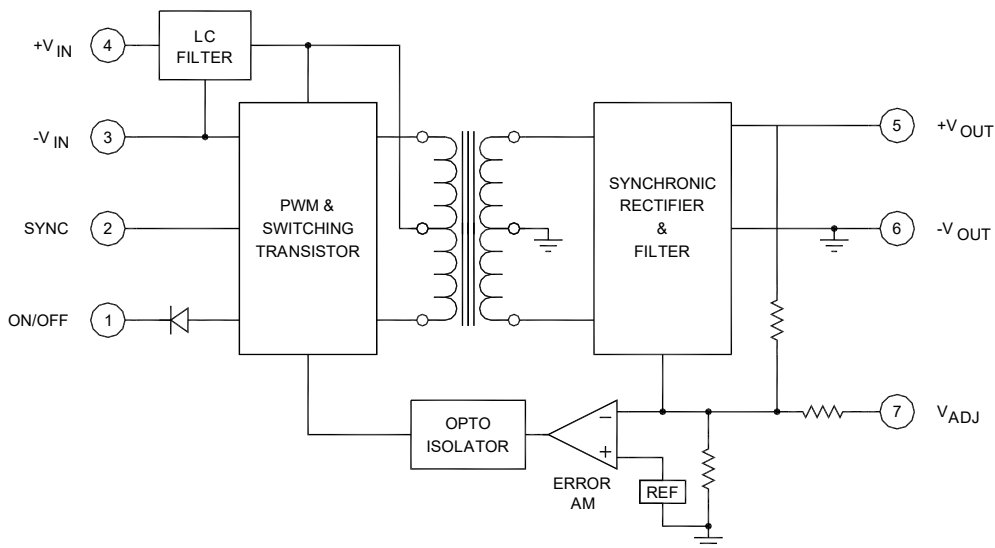
- Wide input voltage range (3:1)
- Efficiency up to 82%
- Input-to-output isolation
- Soft start
- Short circuit protection
- 150µA off state current
- Shielding Connection to -Vin (Input Ground Pin3)
- Output overvoltage protection (OVP)



Beta Dyne is protected under various patents, including but not limited to U.S. Patent numbers: 5,777,519; 6,188,276; 6,262,901; 6,452,818; 6,473,3171.

Functional Description

The BD15021 is a 15S12/48 single output DC/DC converter model that offers a 3:1 input voltage range, 400kHz switching frequency, forward topology and comes packaged in a 2×1×0.395-inch case with an industry standard pin out arrangement. The shielding connection of the BD15021 is to the -Vin (Input Ground Pin3). Six-sided shielding, SMD and improved thermal techniques guarantee reliability.



Typical Block Diagram (Single Output)

Electrical Specifications

INPUT SPECIFICATIONS

Unless otherwise specified, all parameters are given under typical +25°C with nominal input voltage and under full output load conditions.

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range		20	48	60	Vdc
Input Startup Voltage, 48V _{IN}		12			Vdc
Undervoltage Shutdown	48V _{IN} = 11Vdc		8		Vdc
Input Filter	LC				
Reverse Polarity	External series-blocking diode				
No Load Input Current			10		mA
Full Load Input Current			380		mA
Input Surge Current (20μS Spike)				10	A
Short Circuit Current Limit			150		% I _{IN}
Off State Current			150		μA
Remote ON/OFF Control					
Supply ON	Pin 1 Open (Open circuit voltage: 12V Max.)				
Supply OFF		0		0.8	Vdc
Logic Input Reference	-Input for ON/OFF and SYNC				

OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage			12		V
Output Voltage Accuracy			1	2	%
Output Current			1.25		A
Output Voltage Adjustment			5		%
Minimum Load	0% for Single output				% of FL
Ripple & Noise			1	2	%V _{PP} of V _{OUT}
Line Regulation	Minimum V _{IN} to maximum V _{IN} , Output Fully Loaded		1		%
Load Regulation	NL to FL		1		%
Temperature Coefficient @ FL			0.02		%/°C
Transient Response Time	50% FL to FL to 50% FL		100	150	μS
Short Circuit Protection	By input current limiting				
Turn On Delay with Soft Start			2		mS
Output Overvoltage Protection			130	150	% of V _{OUT}

GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency (at full power)	at full output power		82		%
Isolation Voltage (1 min.), Input to Output			1500		Vdc
Isolation Resistance			10 ⁹		Ω
Isolation Capacitance			500		pF
Switching Frequency			400		kHz

ENVIRONMENTAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature, Industrial (Ambient)	See Figure 1	-40		+71	°C
Operating Temperature, Extended		-55		+85	°C
Storage Temperature Range		-55		+125	°C
Thermal Resistance				7.4	°C/W _{DISS}
Maximum Operating Case Temperature				100	°C
Derating	See Figure 1				
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
EMI/RFI	Six-sided continuous shielded metal case				
MTBF	per MIL-HNBK-217F (Ground benign, +25°C)		1.1×10 ⁶		hours

PHYSICAL CHARACTERISTICS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (L×W×H)	2.00×1.00×0.395 in. (50.80×25.40×10.03mm)				
Weight	1.06 oz. (30.3g)				
Case Material	Coated metal				
Shielding Connection	-Input Ground (Pin 3)				

EXTERNAL SYNCHRONIZATION

The converters can be synchronized to an external TTL or CMOS clock signal. Insert a 470pF to 1000pF ceramic capacitor between the driving clock signal and the SYNC pin (Pin 2) of the converter. The frequency of the signal must be between 390kHz

and 430kHz, with a duty cycle of 50% and an amplitude between 3Vdc minimum and 5Vdc typical. See Application Note DC-005: Synchronization.

EXTERNAL TRIMMING OF OUTPUT VOLTAGES (SINGLE)

To trim the output voltage DOWN, connect a 1% 1/8W resistor between the + (plus) output and trim pin of the converter. To trim the output voltage UP, connect a 1% 1/8W resistor between the - (minus) output and trim pins of the converter. For UP/DOWN trimming capability, connect a 10kΩ potentiometer between the + and - output pins, with the wiper arm connected to the trim pin.

The trim resistors/potentiometer can be connected at the converter output pins or the load. However, if connected at the load,

the resistance of the runs becomes part of the feedback network which improves load regulation. If the load is some distance from the converter, the use of #20 gauge wire is recommended to avoid excessive voltage drop due to the resistance of the circuit paths.

See our application notes:

DC-001: Testing Transient Response in DC/DC Converters
DC-004: Thermal Consideration for DC/DC Converters

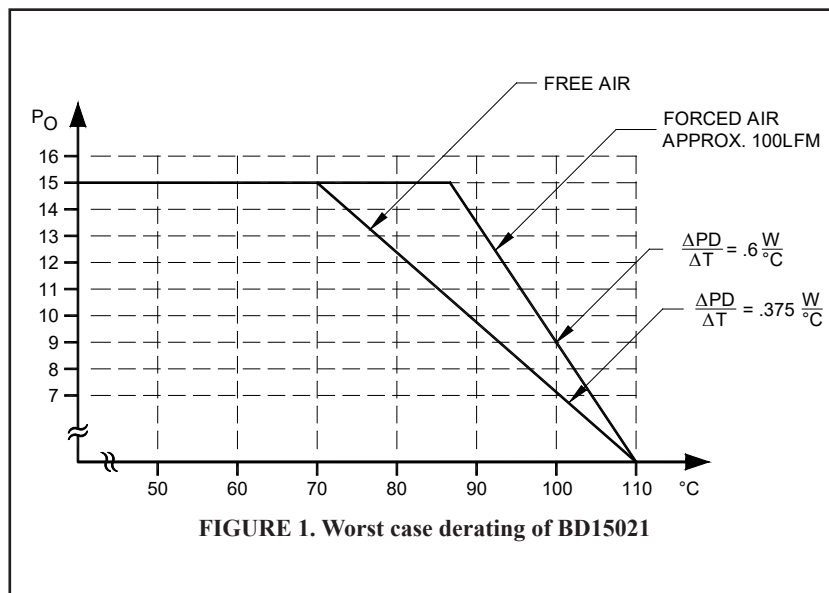


FIGURE 1. Worst case derating of BD15021

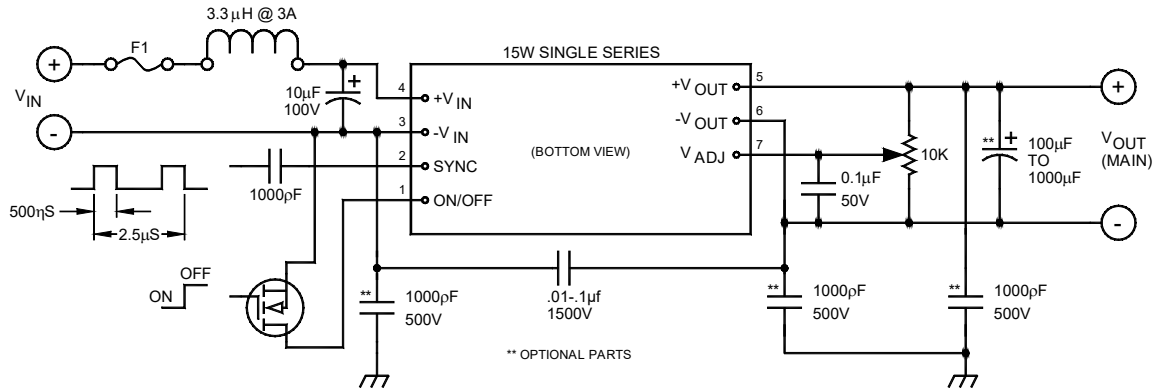
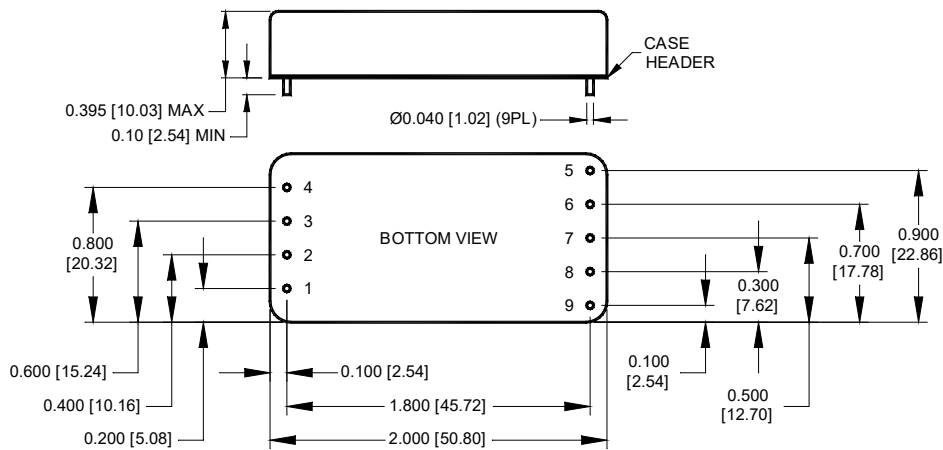


FIGURE 2. Typical connection diagram of BD15021

MECHANICAL SPECIFICATIONS
in inches [mm]



Pin	Function
	SINGLE
1	ON/OFF
2	SYNC
3	-V _{IN}
4	+V _{IN}
5	+OUTPUT
6	-OUTPUT
7	+V _{ADJ}
8	No Pin
9	No Pin