BTCPower™

Broadband TelCom Power, Inc.

Redefining "Current" Limits In Power Conversion

Prelim. Specification

S15-48-15D

48Vin ±15Vout ±0.5A

Description

The S15 family of high efficiency, low power DC/DC converters offer power levels that exceed other bricks with similar footprints. They are targeted specifically at the telecommunication, industrial electronics, mobile telecommunication and distributed power markets. With a wide input voltage range of 36-75V they are available with output voltages of either 1. 5, 1.8, 2.5, 3.3, 5, 12 or 15 Volts. All models feature an input filter, input undervoltage lockout, overtemperature protection, output current limiting and short circuit protection. The fully enclosed, encapsulated construction with aluminum heat spreader design achieves very efficient heat transfer with no hot spots. The use of patented design concepts facilitate maximum power delivered with the highest efficiency up to 90%. The converters combine creative design concepts with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers requiring maximum power in small footprints.

Applications

- Telecommunications
- Data Communications
- Wireless Communications
- Networking Gear
- Servers, Switches and Data Storage
- Semiconductor Test Equipment
- Distributed Power Architecture

Features

- Delivers up to 15W in 1" x 1.6" format
- High power density up to 28.5W/inch^3
- Synchronous rectification topology
- No airflow or heat sink required
- No minumum load required
- Low profile of only 0.35 inch
- High output current in small footprint
- 1.5V, 1.8V, 2.5V, 3.3V, 5V, 12V, +/-12V or ±15V models
- Wide input operating range 36-75V
- -40°C to +100°C ambient operation
- Input undervoltage lockout
- Output current limit and short circuit protection
- On/Off pin
- Output adjustment +/-10% range
- 2000V, 10M input-to-output isolation
- Enclosed construction with heat spreader for low temperature rise
- Enclosed six-sided metal shield construction for low EMI/RFI
- UL 60950 recognized, TUV EN60950 and CSA C22.2 No. 60950-00 Certified (pending)
- Meets conducted limits of FCC Class B and CEI IEC61204-3 Class B with external filter
- MTBF of 850,000 hours @ 50°C (MIL-HDBK-217F)

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CONVERTER SELECTION

Typical @ T_a=+25°C under nominal line voltage and full load conditions.

Model	Input				Output		Efficiency 75% Load
	Voltage (Volts)		Current (A)		Voltage	Current	
	Nominal	Range	No load	Full load	(Volts)	(Amps)	(%)
S15-48-15D	48	36-75	0.025	0.36	±15.0	±0.5	89

Consult factory for other output voltage configurations.

Outline Information and Summary Specifications

Pin Connection (Function)		
Pin#	**Single Output**	**Dual Output**
1	On/Off	On/Off
2	Vin -	Vin -
3	Vin +	Vin +
4	Vout +	Vout +
5	Trim	Common
6	Vout -	Vout -

All dimensions are in inches [mm]

All pins are dia. 0.040 [1.02]

Pin material: Brass

Pin finish: Gold plated

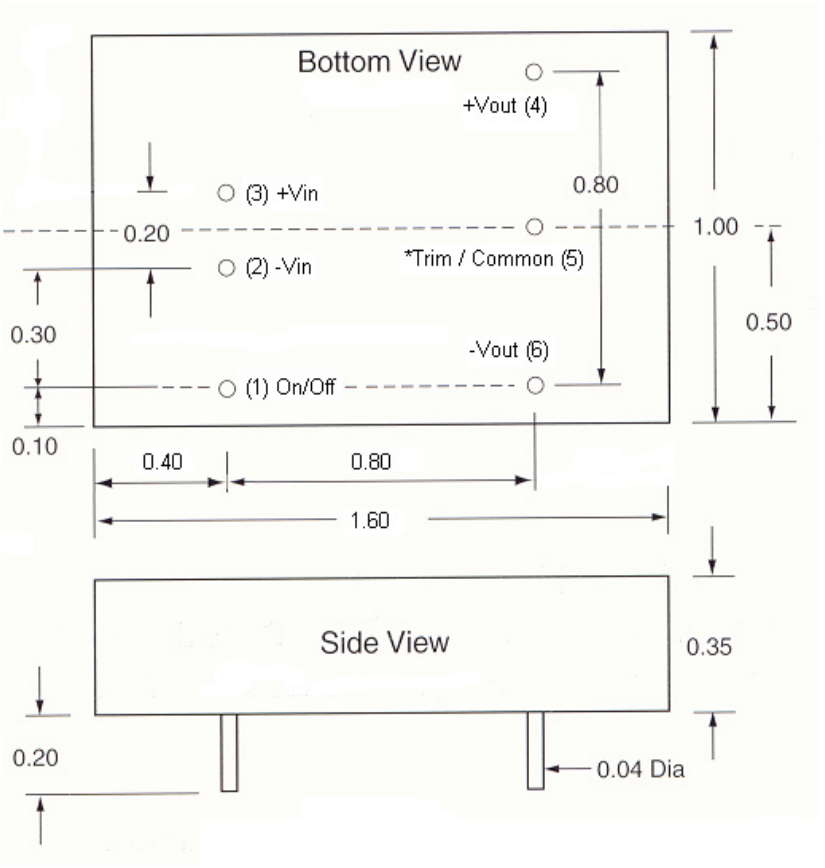
Insulator pad around pins: Silicone rubber

Case: Aluminum material with anodized finish

Weight: 25.2g (0.9oz)

Tolerance			
Inches		Millimeters	
•XX	± 0.020	•X	± 0.5
•XXX	± 0.010	•XX	± 0.25
Pin:	± 0.002	± 0.05	

Note: Pin 5 is NC.



The information and specifications contained in the specification are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice.

Electrical Specifications

Ta=25°C, Vin=48V unless otherwise noted.

PARAMETER	NOTES	MIN	TYP	MAX	UNIT
Absolute maximum rating					
Input voltage		0		80	V
Operating case temperature		-40		100	°C
Storage temperature		-55		125	°C
Humidity				95	%
Input characteristics					
Operating input voltage range		36	48	75	V
Turn on voltage threshold			35		V
Turn off voltage threshold				34	V
Transient withstand	Transient duration: 100ms			100	V
Maximum input current	100% load , 36Vin			0.5	A
Off converter input current	48Vin			31	mA
Output characteristics					
Output voltage set point		±14.7	±15	±15.3	V
Output voltage line regulation	36~75 Vin			±2	%
Output voltage load regulation	10%-100%Load			±2	%
Output voltage total regulation			±2	±3	%
Output voltage overall drift rate			±2	±3	%
Output voltage trim range	No trim function		N/A		%
Output voltage ripple and noise	20Mz bandwidth, 100% Load, 48Vin		60	120	mV(pk-pk)
Output over power protection		100	120	140	%
Over-voltage protection			N/A		
Over-temperature protection			N/A		
Temperature coefficient				±0.04	%/°C
Capacitive Load		0		1,500	µF
Output dynamic characteristics					
Startup time	5% to 95% of the output voltage		10	20	ms
Transient recovery time	25% load change			800	µs
Transient peak deviation	25% load change			2	%Vo
Efficiency (see efficiency curve)					
100% load efficiency	48 Vin		89		%
Isolation characteristics					
Isolation voltage (primary to secondary)	1minute		2000		VDC
Isolation voltage (primary to case)	1minute		1100		VDC
Isolation voltage (secondary to case)	1minute		1100		VDC
Isolation resistance	500VDC, Primary to secondary	10			MΩ
Isolation capacitance	Primary to secondary			1000	pF
Working Voltage	**Working on 500Vdc(max) reference back to Return**				
Feature Characteristics					
Switching frequency		225	250	275	KHz
ON/OFF control (Positive logic) Converter On Converter Off	S15-48-15D	 3 -1		 7 1.2	 V V
ON/OFF control (Negative logic) Converter On Converter Off	N/A				 V V
Output voltage trim range	N/A				%
Calculated MTBF	Bellcore @ 50°C	1,100,000			Hrs
Weight			20.7(0.7)		g(oz)

Basic Operation And Functions

S15-48-15D is a high efficiency, isolated DC/DC converter. Neither heat sink nor airflow is required when the unit operates at ambient temperature of 25°C. The unit has basic control, output adjustment and protection functions.

Input (Pin 2, Pin 3)

Input power Vin(+) must be connected to Positive input pin 3; Input power Vin(-) must be connected to Negative input pin2.

Output (Pin 4, Pin 6)

Output power Vout(+) must be connected to Positive output pin 4; Output power Vout(-) must be connected to Negative output pin6.

Output Common (Pin 5)

Pin 5 is Vout(+) and Vout(-) common pin.

ON/OFF (Pin 1)

Permits the user to maintain unit On/Off, in order to properly sequence different power supplies and reduce power consumption during the standby condition. On/Off pin(pin 1) is referenced to Vin-.

Pin 1 is the "Enable" pin, connecting a TTL compatible pin. A TTL control signal to this pin, according to the specification, turns the unit on or off.

The positive logic unit turns on when the pin is at logic high or open, and turns off at logic low.
The negative logic unit turns on when the pin is at logic low, and turns off at logic high state.
Typical ON/OFF connection is shown in Fig 1.

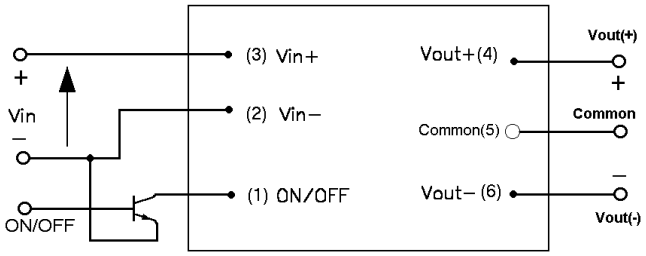


Fig 1. Recommended ON/OFF circuit configuration

Remote Sense

The unit does NOT have remote sense pins.

Trim Pin

S15-48-15D Brick does not have Trim pin.

Protection Features

Input under voltage lockout (UVL)

The input voltage must be at least 35V for the unit to turn on. Once the unit has been turned on, it will shut off when the input voltage drops below 34V.

Output Over-Current Protection (OCP)

The unit is protected against over current or short circuit on the output. When sensing an over current condition, the unit will enter constant current operation and reduce the output voltage. Upon short-circuit condition, the unit will shut down.

After over-current or short circuit condition is removed, the unit will resume normal operation automatically.

Output Over Voltage Protection (OVP)

This unit does NOT have OVP function.

Over Temperature Protection (OTP)

This unit does NOT have OTP function.

Application Considerations

Input source Impedance

The unit has been designed to be stable with no external capacitor when used in a low inductance input and output circuit.

However in many applications, the inductance with the distribution from the power source to the input of the unit can affect the stability of the unit. An external capacitor will improve the stability of the unit. Also in many applications, the user has to use decoupling capacitors at the output load, to ensure the hold up time for the load.

Safety Requirements (SR)

The unit meets UL/CSA/TUV safety requirements per UL60950, TUV EN60950 and CSA C22.2 No.60950-00. Basic insulation is provided between input and output.

Caution:
The unit does NOT have a fuse inside. The safety agencies require an external normal-blow fuse to be used at the input side to achieve maximum safety. The recommended fuse rating is 2A/100V.

If the input source is non-SELV (ELV or a hazardous voltage greater than 60 Vdc and less than or equal to 75 Vdc), for the unit output to be considered meeting the requirements of safety extra low voltage (SELV), all of the following must be met:

- The input source is to be provided with reinforced insulation from any hazardous voltage, including the ac main.
- The input pins of the unit are not operator accessible.
- For the whole system, for safety agencies requirements, and for the combination of the unit input side (primary side) and the output side (secondary side), verify that under a single fault, hazardous voltages do not appear at the unit output side (secondary side).
- Never ground either of the input pins of the unit without grounding one of the output pins. This may allow a non-SELV voltage to appear between the output pin and ground.

Electromagnetic Compatibility (EMC)

The unit's conducted emission meets the requirement of EN55022 Class B Specifications, so the external input filter is needed unless a stricter conducted EMI/EMC limitation is required to satisfy or user has its own requirement on the input.

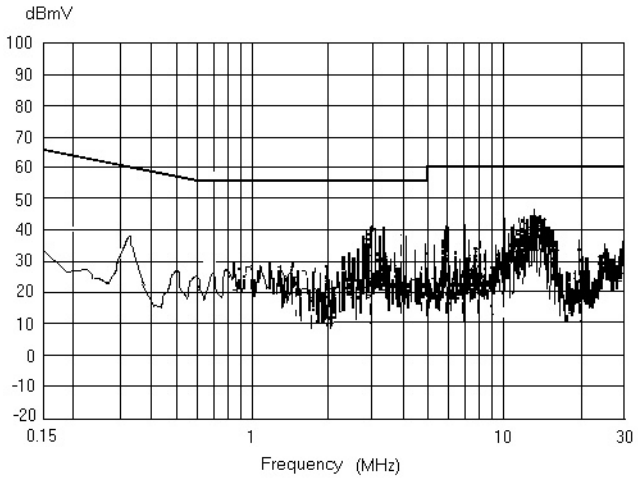


Fig 2. Conducted EMC (150KHz-30MHz) test result, the upper trace is the limit of EN55022 Class B specification

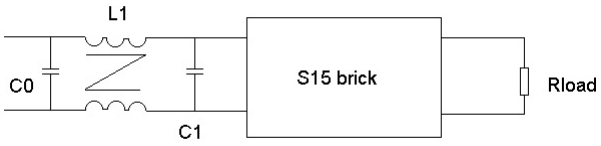


Fig 2A. The external filter circuit

C0 = 1.0 uF 250Vdc film capacitor
C1 = 1.0 uF 100Vdc ceramic capacitor

L1 = 2.2 mH Common mode choke

Input Transient Withstand (ITW)

The unit can withstand input transient voltage with 100V/100ms pulse and never be damaged.