

**FEATURES**

- High Efficiency up to 91%
- Fixed Switching Frequency
- 2:1 Wide Input Voltage Range
- Six-Sided Continuous Shielding
- Standard 2.0 x 1.0 x 0.40 Inches
- Negative Logic Remote ON/OFF Option
- ISO9001 Certified Manufacturing Facilities
- Compliant to RoHS EU Directive 2002/95/EC
- Design Meets UL60950-1, EN60950-1, and IEC60950-1
- CE Mark Meets 2006/95/EC, 93/68/EEC, and 89/336 EEC

**APPLICATIONS**

- Measurement
- Telecom/Datacom
- Wireless Networks
- Industry Control Systems
- Semiconductor Equipment



**SPECIFICATIONS: CB Series**

All specifications apply are typical nominal input, full load, and @ 25°C ambient unless otherwise noted

**INPUT SPECIFICATIONS**

Input Voltage Range .....	12V nominal input .....	9 - 18 VDC
	24V nominal input .....	18 - 36 VDC
	48V nominal input .....	36 - 75 VDC
Input Filter .....		Pi type
Input Surge Voltage (100ms max).....	12V input.....	25 VDC
	24V input.....	50 VDC
	48V input.....	100 VDC
Input Reflected Ripple Current (nominal Vin and full load).....		20mA <sub>p-p</sub>
Start Up Time (nominal Vin and constant resistive load)		
Power Up.....		30ms typ.
Remote ON/OFF.....		30ms typ.
Start Up Voltage .....	12V input.....	9 VDC
	24V input.....	18 VDC
	48V input.....	36 VDC
Shutdown Voltage.....	12V input.....	8 VDC
	24V input.....	16 VDC
	48V input .....	32 VDC
Remote ON/OFF (Note 6)		
Positive Logic (standard).....	DC-DC ON.....	Open or 3V < Vr < 12V
	DC-DC OFF .....	Short or 0V < Vr < 1.2V
Negative Logic (optional).....	DC-DC ON.....	Short or 0V < Vr < 1.2V
	DC-DC OFF .....	Open or 3V < Vr < 12V
Input Current of Remote Control Pin (nominal Vin).....		-0.5mA ~ +0.5mA
Remote Off Input Current (nominal Vin) .....		3mA

**OUTPUT SPECIFICATIONS**

Output Voltage.....	see table
Voltage Accuracy (nominal Vin and full load).....	±1%
Voltage Adjustability (single outputs).....	±10%
Output Current.....	see table
Output Power .....	30 watts max.
Line Regulation (LL to HL at FL) .....	±0.2%
Load Regulation (min load to full load)	
Single Output Models.....	±0.5%
Dual Output Models .....	±1%
Cross Regulation (Dual) (Asymmetrical load 25% / 100% FL) .....	±5%
Minimum Load.....	0%
Ripple/Noise (20 MHz BW) .....	see table
(measured with a 0.1µF/50V MLCC)	
Transient Response Recovery Time (25% load step) .....	250µs

**PHYSICAL SPECIFICATIONS**

Potting Material.....	Epoxy (UL94-V0)
Case Material .....	Nickel-coated copper
Base Material .....	FR4 PCB
Shielding .....	six-sided
Weight.....	30.5g (1.07 oz)
Dimensions (L x W x H).....	2.0 x 1.0 x 0.40 inches
	50.8 x 25.4 x 10.2 mm

**PROTECTION SPECIFICATIONS**

Over Voltage Protection.....	1.5V output.....	2.0V
(zener diode clamp)	2.5V output.....	3.3V
	3.3V output.....	3.9V
	5V, 5.1V, ±5V outputs .....	6.2V
	12V & ±12V outputs .....	15V
	15V & ±15V outputs .....	18V
Over Load Protection (% of full load at nominal input) .....		150% typ.
Short Circuit Protection.....		Hiccup, automatic recovery
Over Temperature Protection.....		+115°C typ.

**GENERAL SPECIFICATIONS**

Efficiency.....	see table
Switching Frequency .....	430KHz typ.
Isolation Voltage	
Input to Output.....	1600VDC min.
Input to case.....	1600VDC min.
Output to Case .....	1600VDC min.
Isolation Resistance.....	10 <sup>9</sup> ohms min.
Isolation Capacitance .....	1500pF max.
Case Grounding .....	Connect case to-Vin with decoupling Y cap.

**ENVIRONMENTAL SPECIFICATIONS**

Operating Temperature.....	-40°C ~ +50°C (w/o derating)
	+50°C ~ +85°C (w/ derating)
Maximum Case Temperature.....	+105°C
Storage Temperature.....	-55°C ~ +125°C
Relative Humidity.....	5% to 95% RH
Thermal Impedance (Note 7)	
Natural Convection .....	12°C / Watt
Natural Convection with Heatsink.....	10°C / Watt
Temperature Coefficient .....	±0.02% / °C max
Thermal Shock .....	MIL-STD-810F
Vibration.....	MIL-STD-810F
MTBF for Single & Dual Output Models (Note 1)	
BELLCORE-TR-NWT-000332.....	3.173 X 10 <sup>6</sup> hrs
MIL-HDBK-217F.....	5.548 x 10 <sup>5</sup> hrs

**SAFETY & EMC**

Design Meets Safety Standards.....	IEC60950-1, UL60950-1 (Note 10), EN60950-1
EMI (Note 8).....	EN55022..... Class A
ESD.....	EN61000-4-2..... Air ±8KV Perf. Criteria A
	Contact ±6KV
Radiated Immunity.....	EN61000-4-3..... 10V/m Perf. Criteria A
Fast Transient (Note 9).....	EN61000-4-4..... ±2KV Perf. Criteria A
Surge (Note 9).....	EN61000-4-5..... ±1KV Perf. Criteria A
Conducted Immunity.....	EN61000-4-6..... 10 Vrms Perf. Criteria A

Due to advances in technology, specifications subject to change without notice.

**OUTPUT VOLTAGE / CURRENT RATING CHARTS**

SINGLE OUTPUT MODELS									
Model Number	Input Range	Output Voltage	Output Current		Output <sup>(4)</sup> Ripple & Noise	Input Current		Efficiency <sup>(4)</sup>	Capacitor <sup>(5)</sup> Load max
			Min. load	Full load		No load <sup>(3)</sup>	Full load <sup>(2)</sup>		
CB12S1.5-8500	12 VDC (9-18 VDC)	1.5 VDC	0mA	8500mA	100mVp-p	70mA	1416mA	79%	20000µF
CB12S2.5-8000		2.5 VDC	0mA	8000mA	100mVp-p	100mA	2083mA	84%	20000µF
CB12S3.3-8000		3.3 VDC	0mA	8000mA	100mVp-p	90mA	2716mA	85%	20000µF
CB12S5-6000		5 VDC	0mA	6000mA	100mVp-p	130mA	3012mA	87%	14400µF
CB12S5.1-6000		5.1 VDC	0mA	6000mA	100mVp-p	130mA	3072mA	87%	14400µF
CB12S12-2500		12 VDC	0mA	2500mA	150mVp-p	90mA	2941mA	89%	3000µF
CB12S15-2000	15 VDC	0mA	2000mA	150mVp-p	80mA	2941mA	89%	2000µF	
CB24S1.5-8500	24 VDC (18-36 VDC)	1.5 VDC	0mA	8500mA	100mVp-p	50mA	700mA	80%	20000µF
CB24S2.5-8000		2.5 VDC	0mA	8000mA	100mVp-p	50mA	1028mA	85%	20000µF
CB24S3.3-8000		3.3 VDC	0mA	8000mA	100mVp-p	50mA	1325mA	87%	20000µF
CB24S5-6000		5 VDC	0mA	6000mA	100mVp-p	75mA	1453mA	90%	14400µF
CB24S5.1-6000		5.1 VDC	0mA	6000mA	100mVp-p	75mA	1482mA	90%	14400µF
CB24S12-2500		12 VDC	0mA	2500mA	150mVp-p	40mA	1437mA	91%	3000µF
CB24S15-2000	15 VDC	0mA	2000mA	150mVp-p	30mA	1437mA	91%	2000µF	
CB48S1.5-8500	48VDC (36-75VDC)	1.5 VDC	0mA	8500mA	100mVp-p	45mA	350mA	80%	20000µF
CB48S2.5-8000		2.5 VDC	0mA	8000mA	100mVp-p	45mA	514mA	84%	20000µF
CB48S3.3-8000		3.3 VDC	0mA	8000mA	100mVp-p	30mA	663mA	86%	20000µF
CB48S5-6000		5 VDC	0mA	6000mA	100mVp-p	45mA	727mA	88%	14400µF
CB48S5.1-6000		5.1 VDC	0mA	6000mA	100mVp-p	45mA	750mA	88%	14400µF
CB48S12-2500		12 VDC	0mA	2500mA	150mVp-p	40mA	718mA	90%	3000µF
CB48S15-2000	15 VDC	0mA	2000mA	150mVp-p	40mA	718mA	91%	2000µF	

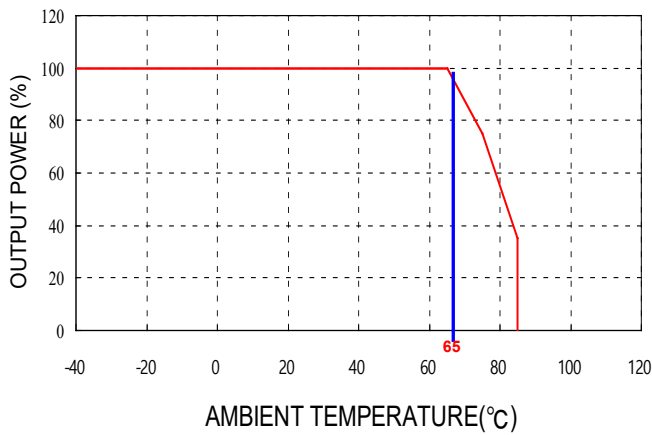
DUAL OUTPUT MODELS									
Model Number	Input Range	Output Voltage	Output Current		Output <sup>(4)</sup> Ripple & Noise	Input Current		Efficiency <sup>(4)</sup>	Capacitor <sup>(5)</sup> Load max
			Min. load	Full load		No load <sup>(3)</sup>	Full load <sup>(2)</sup>		
CB12D5-3000	12 VDC (9-18 VDC)	±5 VDC	0mA	±3000mA	100mVp-p	90mA	3012mA	87%	±3000µF
CB12D12-1250		±12 VDC	0mA	±1250mA	150mVp-p	50mA	3012mA	87%	±2000µF
CB12D15-1000		±15 VDC	0mA	±1000mA	150mVp-p	40mA	3012mA	87%	±1300µF
CB24D5-3000	24 VDC (18-36 VDC)	±5 VDC	0mA	±3000mA	100mVp-p	70mA	1453mA	90%	±3000µF
CB24D12-1250		±12 VDC	0mA	±1250mA	150mVp-p	30mA	1471mA	89%	±2000µF
CB24D15-1000		±15 VDC	0mA	±1000mA	150mVp-p	30mA	1453mA	90%	±1300µF
CB48D5-3000	48VDC (36-75VDC)	±5 VDC	0mA	±3000mA	100mVp-p	35mA	727mA	90%	±3000µF
CB48D12-1250		±12 VDC	0mA	±1250mA	150mVp-p	30mA	744mA	88%	±2000µF
CB48D15-1000		±15 VDC	0mA	±1000mA	150mVp-p	20mA	735mA	89%	±1300µF

**NOTES**

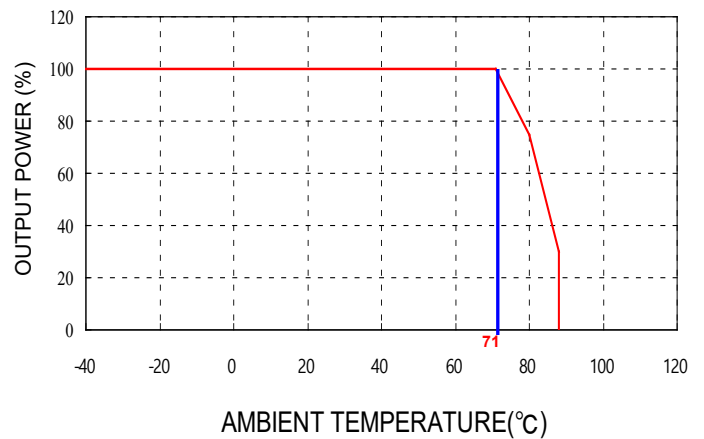
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment). MIL-STD-217F Notice2 @Ta=25°C, Full load (Ground, Benign, controlled environment)
- Maximum value at nominal input voltage.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The ON/OFF control pin voltage is referenced to -Vin.  
To order negative logic ON/OFF control add the suffix "R" (Ex: CB48S5-6000R)
- Heat sink is optional, consult factory for ordering details.
- The CB series can meet EN55022 Class A with an external capacitor in parallel with the input pins.  
Recommended: 12Vin: 10µF/25V X7R 1812 MLCC  
24Vin: 4.7µF/50V X7R 1812 MLCC  
48Vin: 2.2µF/100V X7R 1812 MLCC
- An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.  
The filter capacitor suggested: 12Vin & 24Vin Nippon chemi-con KY series, 330µF/50V, ESR 55mΩ.  
48Vin Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.
- This product is Listed to applicable standards and requirements by UL.

**DERATING CURVES & EFFICIENCY GRAPHS**

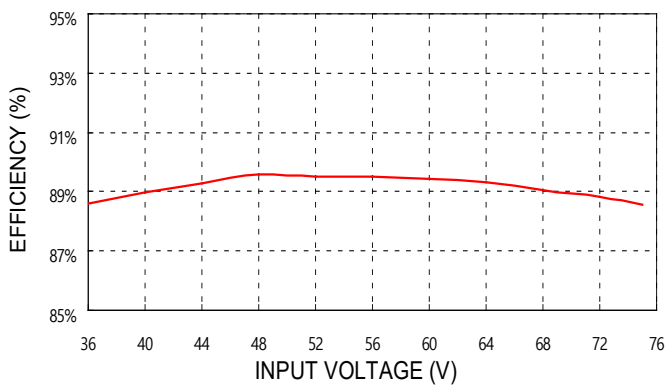
**CB48S5-6000 DERATING CURVE**



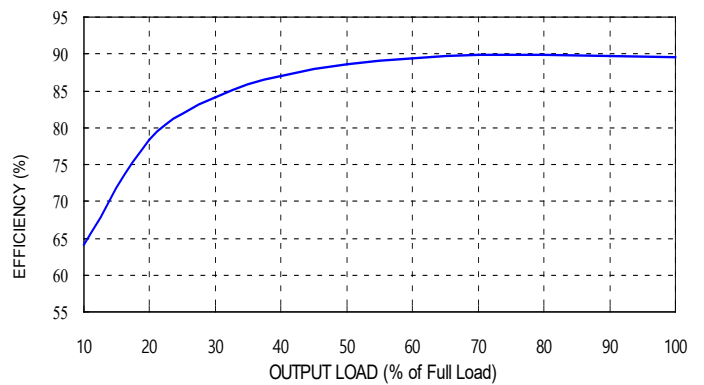
**CB48S5-6000 DERATING CURVE WITH HEATSINK**



**CB48S5-6000 EFFICIENCY VS INPUT VOLTAGE**

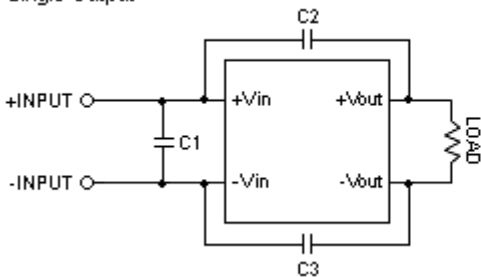


**CB48S5-6000 EFFICIENCY VS OUTPUT LOAD**

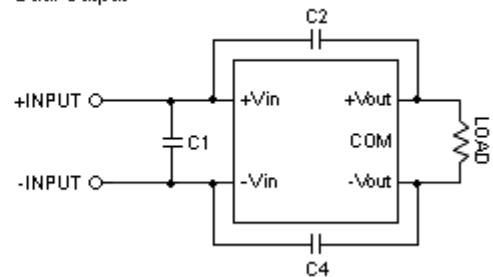


**Recommended Filters for EN55022 Class A Compliance**

Single Output



Dual Output

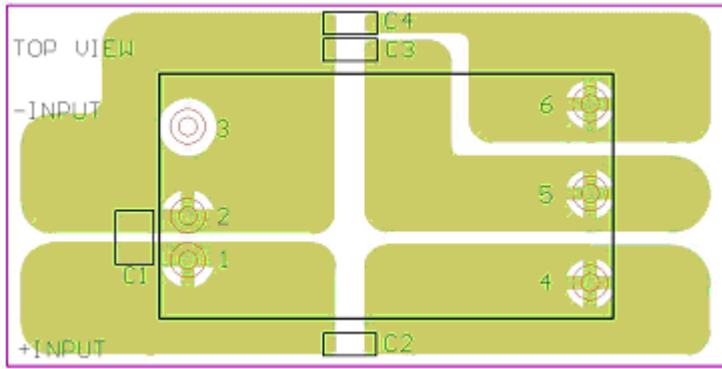


The components used in the figures above together with the manufacturers' part numbers for these components are as follows

Single Output	C1	C2 & C3
CB12Sxx-xxxx	10µF/25V 1812 MLCC	1000pF/2KV 1808 MLCC
CB24Sxx-xxxx	6.8µF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
CB48Sxx-xxxx	2.2µF/100V 1812 MLCC	1000pF/2KV 1808 MLCC

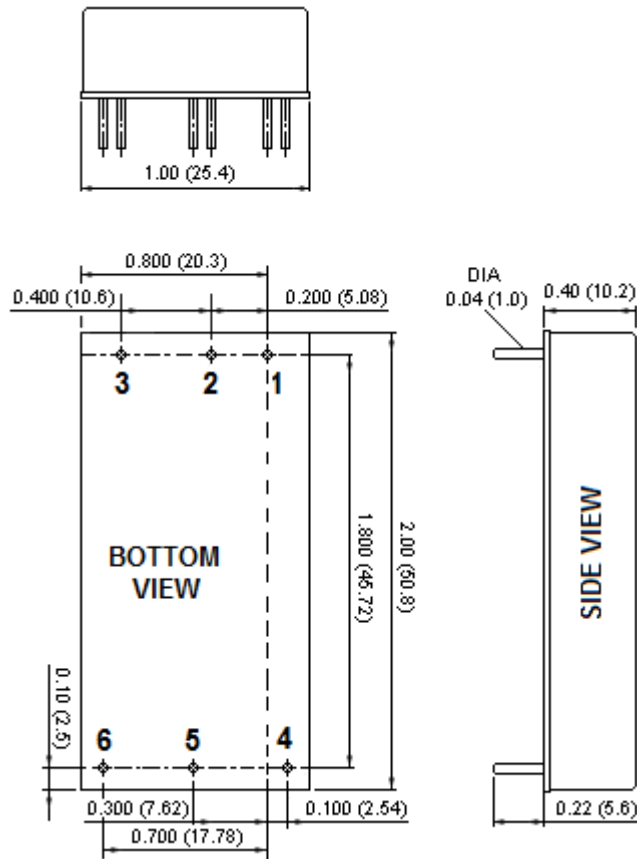
Dual Output	C1	C2 & C4
CB12Sxx-xxxx	10µF/25V 1812 MLCC	1000pF/2KV 1808 MLCC
CB24Dxx-xxxx	6.8µF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
CB48Dxx-xxxx	2.2µF/100V 1812 MLCC	1000pF/2KV 1808 MLCC

**Recommended EN55022 Class A Filter Circuit Layout**

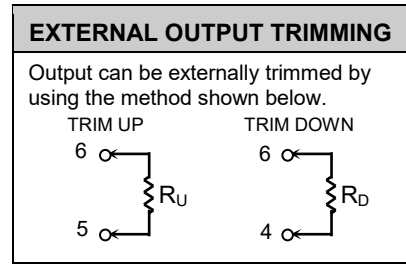


**MECHANICAL DRAWING**

Unit: inches (mm)



PIN CONNECTIONS		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+ INPUT	+ INPUT
2	-INPUT	-INPUT
3	CTRL	CTRL
4	+OUTPUT	+OUTPUT
5	-OUTPUT	COMMON
6	TRIM	-OUTPUT



Single Output Models only

1. Tolerance: X.XX±0.02 (X.X±0.5)  
 X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

## COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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