Size:
2.00 x 1.00 x 0.40 inches
(50.8 x 25.4 x 10.2 mm)

Applications:
- Wireless Networks
- Telecom/Datacom
- Industry Control Systems
- Distributed Power Architectures
- Semiconductor Equipment

FEATURES

- Input Under Voltage Protection
- High Efficiency up to 92%
- Remote ON/OFF Control
- 2:1 Wide Input Voltage Ranges
- Six-Sided Continuous Shielding
- Low Stand-by Power Consumption
- No Minimum Load Required
- Single and Dual Outputs
- 60 Watts Maximum Output Power
- 1600VDC I/O Isolation
- Short Circuit, Over Voltage, Over Load, & Over Temp. Protection
- Wide Operating Temperature Range: -40°C to +85°C
- CE Mark Meets 2006/95/EC, 2011/95/EC, & 2004/108/EC
- Compliant to RoHS EU Directive 2011/65/EU
- UL60950-1, EN60950-1, & IEC60950-1 Safety Approvals
- Optional Heatsink Available (Suffix "HS")

DESCRIPTION

The CR60 series of DC/DC power converters provides 60 Watts of output power in an industry standard 2.00" x 1.00" x 0.40" package and footprint. This series has single and dual output models with 2:1 wide input voltage ranges of 9-18VDC, 18-36VDC, and 36-75VDC. Some features include high efficiency up to 92%, 1600VDC I/O isolation, six-sided shielding, and remote ON/OFF control. These converters are also protected against short circuit, over voltage, over load, and over temperature conditions. All models are RoHS compliant and have UL60950-1, EN60950-1, and IEC60950-1 safety approvals. This series is best suited for use in wireless networks, telecom/datacom, industry control systems, semiconductor equipment, and distributed power architectures.

MODEL SELECTION TABLE

SINGLE OUTPUT MODELS

Model Number	Input Voltage Range	Output Voltage	Output Current		Output Ripple & Noise	No Load Input Current	Output Power	Efficiency	Maximum Capacitive Load
			Min Load	Max Load					
CR12S33-60	12 VDC (9 - 18 VDC)	3.3 VDC	0mA	12A	75mVp-p	10mA	39.6W	89%	32000µF
CR12S05-60		5 VDC	0mA	12A	75mVp-p	10mA	60W	90.5%	30000µF
CR12S12-60		12 VDC	0mA	5A	100mVp-p	10mA	60W	90.5%	5850µF
CR12S15-60		15 VDC	0mA	4A	100mVp-p	10mA	60W	91.5%	3900µF
CR12S24-60		24 VDC	0mA	2.5A	150mVp-p	10mA	60W	91.5%	2000µF
CR24S33-60	24 VDC (18 - 36 VDC)	3.3 VDC	0mA	12A	75mVp-p	10mA	39.6W	89%	32000µF
CR24S05-60		5 VDC	0mA	12A	75mVp-p	10mA	60W	92%	30000µF
CR24S12-60		12 VDC	0mA	5A	100mVp-p	10mA	60W	92%	5850µF
CR24S15-60		15 VDC	0mA	4A	100mVp-p	10mA	60W	92%	3900µF
CR24S24-60		24 VDC	0mA	2.5A	150mVp-p	10mA	60W	92%	2000µF
CR48S33-60	48 VDC (36 - 75 VDC)	3.3 VDC	0mA	12A	75mVp-p	10mA	39.6W	89%	32000µF
CR48S05-60		5 VDC	0mA	12A	75mVp-p	10mA	60W	92%	30000µF
CR48S12-60		12 VDC	0mA	5A	100mVp-p	10mA	60W	92%	5850µF
CR48S15-60		15 VDC	0mA	4A	100mVp-p	10mA	60W	92%	3900µF
CR48S24-60		24 VDC	0mA	2.5A	150mVp-p	10mA	60W	92%	2000µF

DUAL OUTPUT MODELS

Model Number	Input Voltage Range	Output Voltage	Output Current		Output Ripple & Noise	No Load Input Current	Output Power	Efficiency	Maximum Capacitive Load
			Min Load	Max Load					
CR12D12-60	12 VDC (9 - 18 VDC)	±12 VDC	0mA	±2.5A	100mVp-p	10mA	60W	90%	±3900µF
CR12D15-60		±15 VDC	0mA	±2A	100mVp-p	10mA	60W	90%	±2400µF
CR12D24-60		±24 VDC	0mA	±1.25A	150mVp-p	10mA	60W	90%	±1000µF
CR24D12-60	24 VDC (18 - 36 VDC)	±12 VDC	0mA	±2.5A	100mVp-p	10mA	60W	90%	±3900µF
CR24D15-60		±15 VDC	0mA	±2A	100mVp-p	10mA	60W	90%	±2400µF
CR24D24-60		±24 VDC	0mA	±1.25A	150mVp-p	10mA	60W	90%	±1000µF
CR48D12-60	48 VDC (36 - 75 VDC)	±12 VDC	0mA	±2.5A	100mVp-p	10mA	60W	91%	±3900µF
CR48D15-60		±15 VDC	0mA	±2A	100mVp-p	10mA	60W	91%	±2400µF
CR48D24-60		±24 VDC	0mA	±1.25A	150mVp-p	10mA	60W	91%	±1000µF

NOTES

1. The CR60 series can only meet EMI Class A or Class B with external components added. Please contact factory for more information.
2. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. For 12VDC & 24VDC nominal input models we recommend connecting an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 3000 Watt peak pulse power) diode in parallel. For 48VDC nominal input models we recommend connecting an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ120A, 120V, 3000 Watt peak pulse power) diode connected in parallel.
3. Both positive logic and negative logic remote ON/OFF control is available. Positive logic remote ON/OFF comes standard; for negative logic remote ON/OFF add the suffix "R" to the model number (Ex: CR48S12-60R).
4. Optional heatsink is available. Please call factory for ordering details.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

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SPECIFICATIONS: CR60 SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	12VDC nominal input models 24VDC nominal input models 48VDC nominal input models		9 18 36	12 24 48	18 36 75	VDC
Start-Up Voltage	12VDC nominal input models 24VDC nominal input models 48VDC nominal input models				9 18 36	VDC
Shutdown Voltage	12VDC nominal input models 24VDC nominal input models 48VDC nominal input models			8 16 32		VDC
Input Surge Voltage (1sec, max.)	12VDC nominal input models 24VDC nominal input models 48VDC nominal input models				25 50 100	VDC
Input Current	No Load		See Table			
Input Filter			Pi type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy			-1.0		+1.0	%
Line Regulation	Low line to high line at full load		-0.2		+0.2	%
Load Regulation	No load to full load	Single Output Models Dual Output Models	-0.5 -1.0		+0.5 +1.0	%
Cross Regulation (Dual Output Models)	Asymmetrical load 25% / 100% FL		-5.0		+5.0	%
Voltage Adjustability	Single Output Models	3.3V, 5V, & 12V Output Models 15V & 24V Outputs Models	-10 -10		+10 +20	%
Output Power			See Table			
Output Current			See Table			
Minimum Load			0			%
Maximum Capacitive Load	Minimum input and constant resistive load		See Table			
Ripple & Noise (20MHz BW)	Measured with a 10µF/25V X7R MLCC Measured with a 10µF/25V X7R MLCC Measured with a 4.7µF/50V X7R MLCC	3.3V & 5V Output Models 12V & 15V Output Models 24V Output Models		75 100 150	100 125 200	mVp-p
Transient Response Recovery Time	25% load step change			250		µs
Start-Up Time	Constant resistive load	Power Up Remote On/Off		60 60		ms
Temperature Coefficient			-0.02		+0.02	%/°C
PROTECTION						
Short Circuit Protection			Continuous, automatic recovery			
Over Load Protection	% of rated Iout; hiccup mode			150		%
Over Voltage Protection	Zener diode clamp	3.3V Output Models 5V Output Models 12V Output Models 15V Output Models 24 V Output Models		3.9 6.2 15 20 30		VDC
Over Temperature Protection				+115		°C
GENERAL SPECIFICATIONS						
Efficiency	Nominal input voltage and full load		See Table			
Switching Frequency			225	250	275	kHz
Isolation Voltage	1 minute	Input to Output Input to Case Output to Case	1600 1600 1600			VDC VDC VDC
Isolation Resistance	500VDC		1			GΩ
Isolation Capacitance					2200	pF

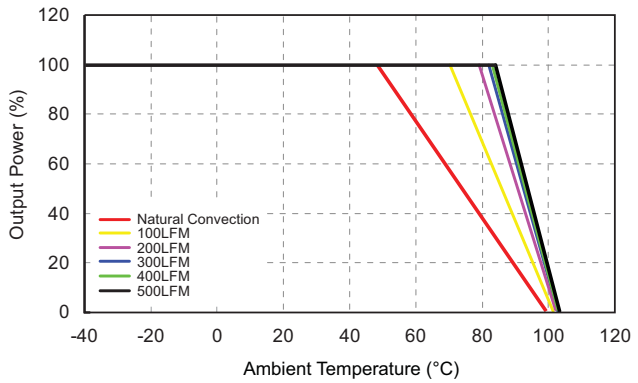
SPECIFICATIONS: CR60 SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

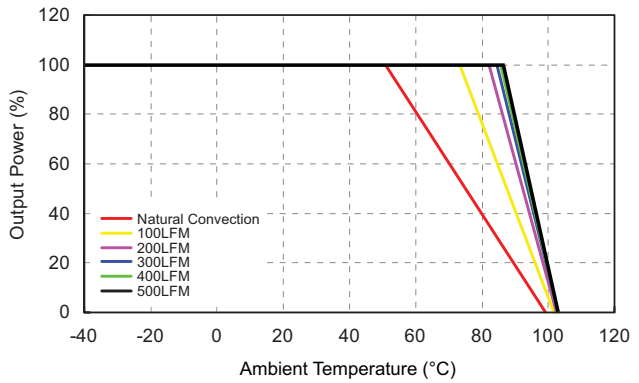
SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
REMOTE ON/OFF (See Note 3)						
Positive Logic (standard)	Referenced to –Input pin	DC/DC ON DC/DC OFF		Open or 3V ~ 12 VDC Short or 0 ~ 1.2 VDC		
Negative Logic (optional)	Referenced to –Input pin	DC/DC ON DC/DC OFF		Short or 0 ~ 1.2 VDC Open or 3V ~ 12 VDC		
Input Current of Remote Control Pin	Nominal Vin		-0.5		+0.5	mA
Remote OFF State Input Current	Nominal Vin			3		mA
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	See derating curves		-40		+85	°C
Maximum Case Temperature					+105	°C
Storage Temperature			-55		+125	°C
Thermal Impedance (See Note 4)	Natural Convection (20LFM)	Without Heatsink With Heatsink		10.8 10.3		°C/W
Relative Humidity			5		95	% RH
Thermal Shock				MIL-STD-810F		
Vibration				MIL-STD-810F		
MTBF	BELLCORE TR-NWT-000332 Case 1: 50% Stress, Ta=40°C MIL-HDBK-217F Ta=25°C, full load (G/B, controlled environment)			2,661,000 hours 98,650 hours		
PHYSICAL SPECIFICATIONS						
Weight				1.16oz (33g)		
Dimensions (L x W x H)				2.00x1.00x0.40 inch (50.8x25.4x10.2 mm)		
Case Material				copper		
Base Material				FR4 PCB		
Potting Material				Silicon (UL94-V0)		
Shielding				Six-sided		
SAFETY & EMC CHARACTERISTICS						
Safety Approvals						IEC60950-1, UL60950-1, EN60950-1
EMI (See Note 1)	EN55022					Class A
ESD	EN61000-4-2	Air ±8kV Contact ±6kV				Perf. Criteria A
Radiated Immunity	EN61000-4-3	20 V/m				Perf. Criteria A
Fast Transient (See Note 2)	EN61000-4-4	±2kV				Perf. Criteria A
Surge (See Note 2)	EN61000-4-5	±2kV				Perf. Criteria A
Conducted Immunity	EN61000-4-6	10 Vrms				Perf. Criteria A

DERATING CURVES

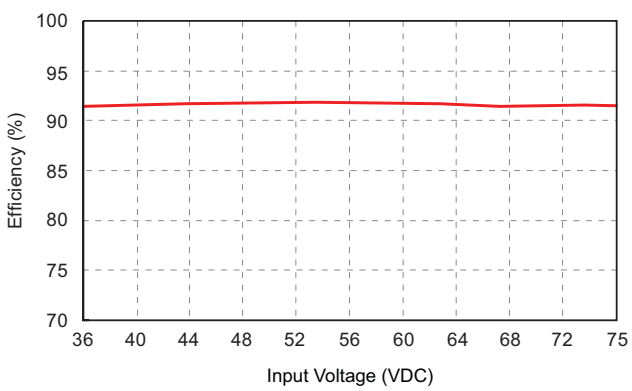
CR48S12-60 Derating Curve

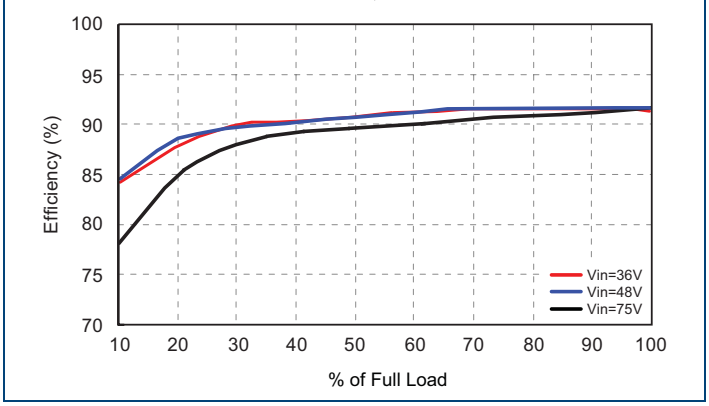


CR48S12-60 Derating Curve with Heatsink



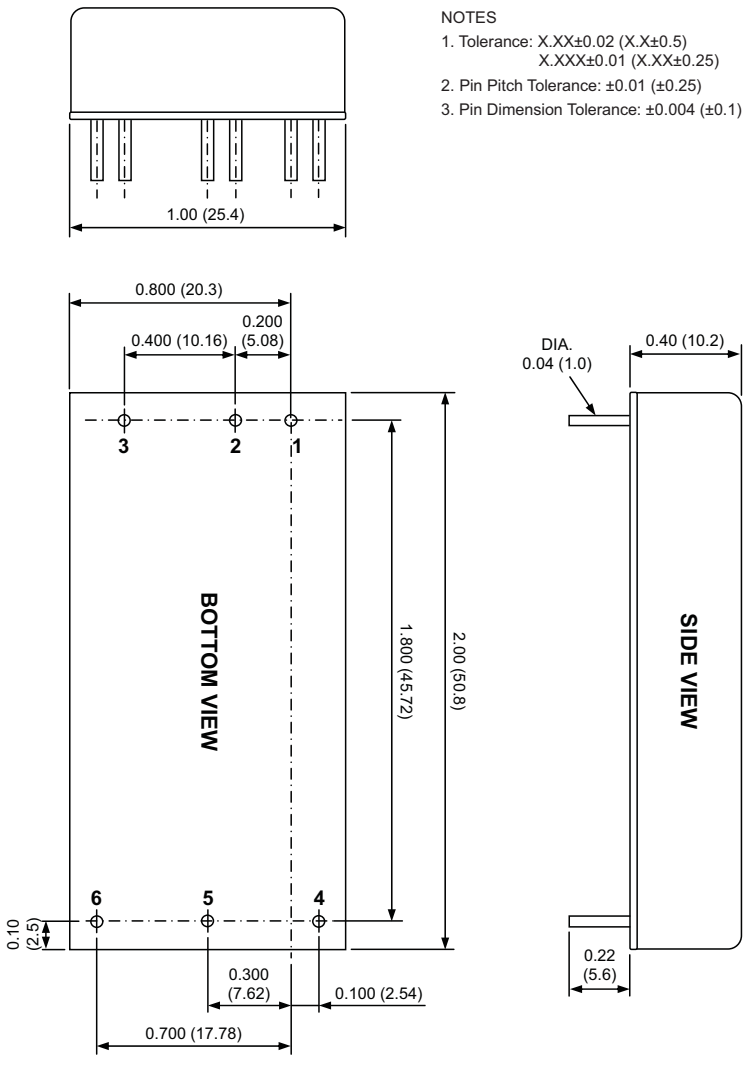
EFFICIENCY CURVES





MECHANICAL DRAWING

Unit: inches (mm)



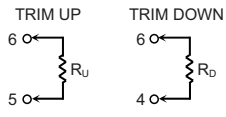
NOTES

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)

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

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



MODEL NUMBER SETUP

CR	48	S	12	-	60	R	H
Series Name	Input Voltage	Output Quantity	Ouptut Voltage		Output Power	Remote ON/OFF	Heatsink
	12: 9-18 VDC	**S:** Single Output	**33:** 3.3 VDC		**60:** 60 Watts	**Blank:** Positive Logic	**Blank:** No Heatsink
	24: 18-36 VDC		**05:** 5 VDC			**R:** Negative Logic	**H:** Heatsink
	48: 36-75 VDC		**12:** 12 VDC				**HC:** Heatsink with clamp
			15: 15 VDC				
			24: 24 VDC				
		D: Dual Output	**12:** ±12 VDC				
			15: ±15 VDC				
			24: ±24 VDC				

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 ISO9001-2008 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.

Contact **Wall Industries** for further information:

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