



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

Applications:

- Railway Systems
- 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
- 4:1 Ultra Wide Input Voltage Ranges
- Six-Sided Continuous Shielding
- Low Stand-by Power Consumption
- No Minimum Load Required
- Single and Dual Outputs
- 40 Watts Maximum Output Power
- EN50155 & EN45545-2 Railway Standards
- 1600VDC I/O Isolation for 24Vin and 48Vin, 3000VDC I/O Isolation for 110Vin
- Short Circuit, Over Voltage, Over Load, & Over Temp. Protection
- Wide Operating Temperature Range: -40°C to +85°C
- CE Marked
- Compliant to RoHS II & REACH
- EN60950-1, UL60950-1, IEC60950-1, EN62368-1, UL62368-1, and IEC62368-1 Safety Approvals
- Optional Heatsink Available (Suffix "HS")

DESCRIPTION

The CRW series of DC/DC power converters provides 40 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 4:1 ultra wide input voltage ranges of 9-36VDC, 18-75VDC, and 43-160VDC. Some features include high efficiency up to 92%, high 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 II & REACH compliant and have EN60950-1, UL60950-1, IEC60950-1, EN62368-1, UL62368-1, and IEC62368-1 safety approvals. This series is best suited for use in wireless networks, industry control systems, telecom/datacom, semiconductor equipment, distributed power architectures, and railway systems.

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					
CRW24S33-33	24 VDC (9 - 36 VDC)	3.3 VDC	0mA	10A	75mVp-p	15mA	33W	90%	26600µF
CRW24S05-40		5 VDC	0mA	8A	75mVp-p	15mA	40W	91%	20000µF
CRW24S12-40		12 VDC	0mA	3.333A	100mVp-p	15mA	40W	92%	3900µF
CRW24S15-40		15 VDC	0mA	2.666A	100mVp-p	15mA	40W	92%	2600µF
CRW24S24-40	48 VDC (18 - 75 VDC)	24 VDC	0mA	1.666A	150mVp-p	15mA	40W	91%	1300µF
CRW48S33-33		3.3 VDC	0mA	10A	75mVp-p	10mA	33W	90%	26600µF
CRW48S05-40		5 VDC	0mA	8A	75mVp-p	10mA	40W	91%	20000µF
CRW48S12-40		12 VDC	0mA	3.333A	100mVp-p	10mA	40W	92%	3900µF
CRW48S15-40	110 VDC (43 - 160 VDC)	15 VDC	0mA	2.666A	100mVp-p	10mA	40W	92%	2600µF
CRW48S24-40		24 VDC	0mA	1.666A	150mVp-p	10mA	40W	91%	1300µF
CRW110S33-33		3.3 VDC	0mA	10A	75mVp-p	10mA	33W	88%	26600µF
CRW110S05-40		5 VDC	0mA	8A	75mVp-p	10mA	40W	89%	20000µF
CRW110S12-40		12 VDC	0mA	3.333A	100mVp-p	10mA	40W	90.5%	3900µF
CRW110S15-40		15 VDC	0mA	2.666A	100mVp-p	10mA	40W	91%	2600µF
CRW110S24-40		24 VDC	0mA	1.666A	150mVp-p	10mA	40W	90%	1300µF

MODEL SELECTION TABLE

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					
CRW24D12-40	24 VDC (9 - 36 VDC)	±12 VDC	0mA	±1.666A	100mVp-p	15mA	40W	90%	±2600µF
CRW24D15-40		±15 VDC	0mA	±1.333A	100mVp-p	15mA	40W	90%	±1600µF
CRW24D24-40		±24 VDC	0mA	±0.833A	150mVp-p	15mA	40W	91%	±650µF
CRW48D12-40	48 VDC (18 - 75 VDC)	±12 VDC	0mA	±1.666A	100mVp-p	10mA	40W	90%	±2600µF
CRW48D15-40		±15 VDC	0mA	±1.333A	100mVp-p	10mA	40W	90%	±1600µF
CRW48D24-40		±24 VDC	0mA	±0.833A	150mVp-p	10mA	40W	91%	±650µF
CRW110D12-40	110 VDC (43 - 160 VDC)	±12 VDC	0mA	±1.666A	100mVp-p	10mA	40W	89%	±2600µF
CRW110D15-40		±15 VDC	0mA	±1.333A	100mVp-p	10mA	40W	89%	±1600µF
CRW110D24-40		±24 VDC	0mA	±0.833A	150mVp-p	10mA	40W	91%	±650µF

SPECIFICATIONS: CRW 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	24VDC nominal input models		9	24	36	VDC	
	48VDC nominal input models		18	48	75		
	110VDC nominal input models		43	110	160		
Start-Up Voltage	24VDC nominal input models				9	VDC	
	48VDC nominal input models				18		
	110VDC nominal input models				43		
Shutdown Voltage	24VDC nominal input models			8		VDC	
	48VDC nominal input models			16			
	110VDC nominal input models			40			
Input Surge Voltage (1sec, max.)	24VDC nominal input models				50	VDC	
	48VDC nominal input models				100		
	110VDC nominal input models				170		
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	-0.5		+0.5	%	
		Dual Output Models	-1.0		+1.0		
Cross Regulation	Asymmetrical load 25% / 100% FL, Dual Output Models		-5.0		+5.0	%	
Voltage Adjustability	Single Output Models	3.3V, 5V, & 12V Output Models	-10		+10	%	
		15V & 24V Outputs Models	-10		+20		
Output Power			See Table				
Output Current			See Table				
Maximum Capacitive Load	Minimum input and constant resistive load		See Table				
Ripple & Noise	Measured by 20MHz bandwidth and with a 0.1µF/50V X7R MLCC capacitor	3.3V & 5V Output Models		75	100	mVp-p	
		12V & 15V Output Models		100	125		
		24V Output Models		150	200		
Transient Response Recovery Time	25% load step change			250		µs	
Start-Up Time	Constant resistive load	Power Up		60		ms	
		Remote On/Off		60			
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		3.9		VDC	
		5V Output Models		6.2			
		12V Output Models		15			
		15V Output Models		20			
		24V Output Models		30			
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	110Vin(nom)	Input to Output	3000		VDC	
			Input (Output) to Case	1600			
		Others	Input to Output	1600		VDC	
		Input (Output) to Case	1600				
Isolation Resistance	500VDC		1			GΩ	
Isolation Capacitance					1500	pF	
REMOTE ON/OFF (See Note 3)							
Positive Logic (standard)	Referenced to –Vin pin	DC/DC ON	Open or 3V ~ 12 VDC				
		DC/DC OFF	Short or 0 ~ 1.2 VDC				
Negative Logic (optional)	Referenced to –Vin pin	DC/DC ON	Short or 0 ~ 1.2 VDC				
		DC/DC OFF	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	

SPECIFICATIONS: CRW 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.

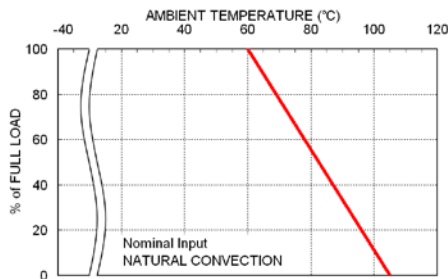
SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	See derating curves		-40		+85	°C
Maximum Case Temperature					+105	°C
Storage Temperature			-55		+125	°C
Thermal Impedance (See Note 4)	Vertical Direction by Natural Convection (20LFM)	Without Heatsink		10.8		°C/W
		With Heatsink		10.3		
Relative Humidity			5		95	% RH
Thermal Shock			EN61373, MIL-STD-810F			
Vibration			EN61373, MIL-STD-810F			
MTBF	BELLCORE TR-NWT-000332 Case 1: 50% Stress, Ta=40°C		2,661,000 hours			
	MIL-HDBK-217F, full load		907,300 hours			
PHYSICAL SPECIFICATIONS						
Weight			1.13oz (32g)			
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 Continuous			
SAFETY & EMC CHARACTERISTICS						
Safety Approvals	EN60950-1, UL60950-1, IEC60950-1, EN62368-1, UL62368-1, IEC62368-1					
EMI (See Note 1)	EN55011, 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			
Power Frequency Magnetic Field	EN61000-4-8	100A/m continuous; 1000/m 1 second	Perf. Criteria A			

NOTES

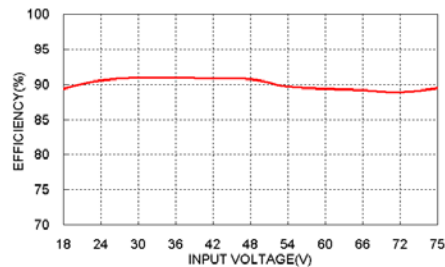
- The CRW series can only meet EMI Class A or Class B with external components added. Please contact factory for more information.
 - An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
For 24VDC nominal input models we recommend connecting an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/1000V) and a TVS (SMDJ58V, 3000 Watt peak pulse power) to connect in parallel.
For 48VDC 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) to connect in parallel.
For 110VDC nominal input models we recommend connecting three aluminum electrolytic capacitors (Ruby-con BXF series, 68µF/200V 3pcs in parallel) connected) (SMDJ90A, 90V, 3000 Watt peak pulse power 2pcs in series connection) to connect in parallel.
 - 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: CRW48S05-40R).
 - Test by minimum input and constant resistive load. 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.
Due to advances in technology, specifications subject to change without notice.

DERATING CURVES

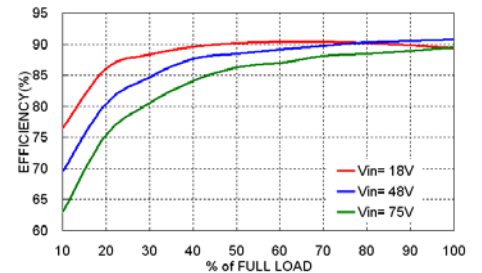
Derating Curve



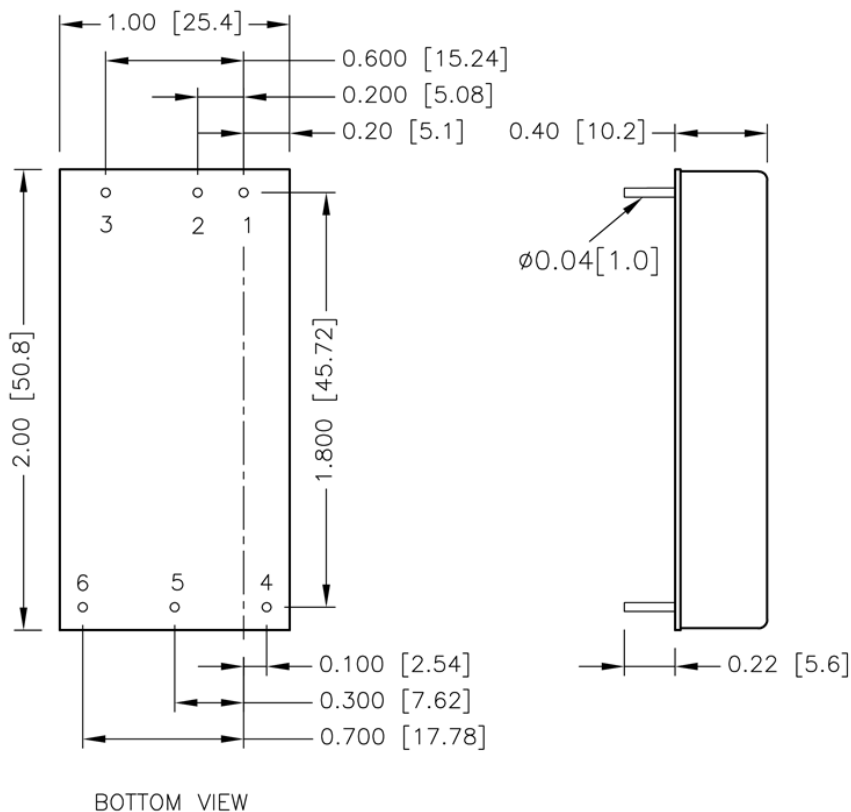
CRW48S05-40
Efficiency vs. Input Voltage



CRW48S05-40
Efficiency vs. Output Load



MECHANICAL DRAWING



PIN CONNECTION

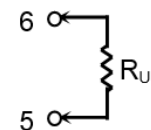
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	+Vout	+Vout
5	-Vout	Common
6	Trim	-Vout

EXTERNAL OUTPUT TRIMMING

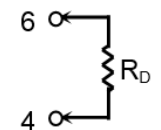
EXTERNAL OUTPUT TRIMMING

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

TRIM UP



TRIM DOWN

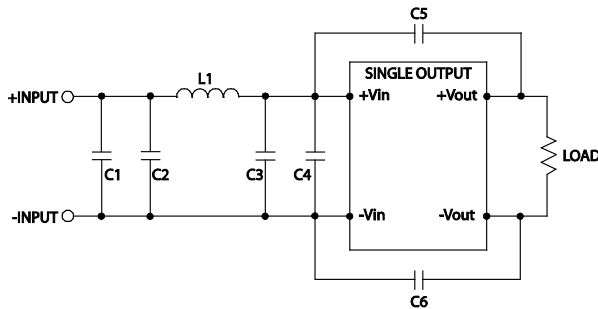


Notes:

1. All Dimensions in inch (mm)
2. Tolerance: $x.xx \pm 0.02$ ($x.x \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
3. Pin pitch tolerance ± 0.01 (0.25)
4. Pin dimension tolerance ± 0.004 (0.1)

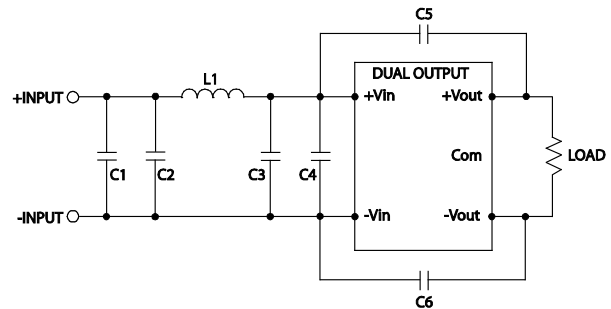
RECOMMENDED EMI FILTER

Suggested Schematic for EN55022 Conducted Emission Class A Limits



In order to meet conducted emissions EN55022 Class A the following components are needed.

SINGLE OUTPUT MODELS						
Model	C1	C2	C3	C4	C5, C6	L1
CRW24SXX-40	N/A	6.8µF/50V 1812 MLCC	N/A	6.8µF/50V 1812 MLCC	1000pF/2KV 1206 MLCC	2.2µH SMD Inductor PMT-097
CRW48SXX-40	N/A	4.7µF/50V 1812 MLCC	N/A	4.7µF/50V 1812 MLCC	1000pF/2KV 1206 MLCC	10µH SMD Inductor PMT-070
CRW110SXX-40	Ruby-con BXF series 68µF/200V	N/A	1µF/250V 1812 MLCC	1µF/250V 1812 MLCC	1000pF/2KV 1206 MLCC	22µH SMD Inductor PMT-098



In order to meet conducted emissions EN55022 Class A the following components are needed.

DUAL OUTPUT MODELS						
Model	C1	C2	C3	C4	C5, C6	L1
CRW24DXX-40	N/A	6.8µF/50V 1812 MLCC	N/A	6.8µF/50V 1812 MLCC	1000pF/2KV 1206 MLCC	2.2µH SMD Inductor PMT-097
CRW48DXX-40	N/A	4.7µF/50V 1812 MLCC	N/A	4.7µF/50V 1812 MLCC	1000pF/2KV 1206 MLCC	10µH SMD Inductor PMT-070
CRW110DXX-40	Ruby-con BXF series 68µF/200V	N/A	1µF/250V 1812 MLCC	1µF/250V 1812 MLCC	1000pF/2KV 1206 MLCC	22µH SMD Inductor PMT-098

MODEL NUMBER SETUP

CRW	48	S	05	-	40	R	H
Series Name	Input Voltage	Output Quantity	Output Voltage		Output Power	Remote ON/OFF	Heatsink
	24: 9-36 VDC 48: 18-75 VDC 110: 43-160 VDC	S: Single Output D: Dual Output	33: 3.3 VDC 05: 5 VDC 12: 12 VDC 15: 15 VDC 24: 24 VDC 12: ±12 VDC 15: ±15 VDC 24: ±24 VDC		33: 33 Watts 40: 40 Watts	Blank: Positive Logic R: Negative Logic	Blank: No Heatsink H: Heatsink HC: Heatsink with clamp

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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