

CBW-9W Series

9W 4:1 Regulated Single & Dual output



Features

- Highest Power Density In SIP8 Package
- Wide 4:1 Input Range
- Smallest Footprint 9W Converter
- Operation Temperature Range -40 ~ 85°C max.
- Efficiency Up To 88%
- Continuous Short Circuit Protection
- I/O Isolation 1600VDC
- Remote ON/OFF Control



CE US CB CE UK CA

PART NUMBER STRUCTURE

CBW - **24** **05** **SD** **9**
(1) (2) (3) (4) (5)

(1) Series

(2) Input Voltage Range

24 - 9-36 V
48 - 18-75 V

(4) Output Type

S - SIP Single Output
SD - SIP Dual Output

(3) Output Voltage

3R3 - 3.3 V
05 - 5.0 V
09 - 9.0 V
12 - 12 V
15 - 15 V
24 - 24 V

(5) Watt

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
CBW-243R3S9	9-36	15	344	3.3	0	2000	80	2600
CBW-2405S9	9-36	15	402	5	0	1600	83	1300
CBW-2409S9	9-36	15	431	9	0	1000	87	800
CBW-2412S9	9-36	15	426	12	0	750	88	560
CBW-2415S9	9-36	15	431	15	0	600	87	560
CBW-2424S9	9-36	15	426	24	0	375	88	200
CBW-2405SD9	9-36	15	402	±5	0	±800	83	±800
CBW-2412SD9	9-36	15	431	±12	0	±375	87	±390
CBW-2415SD9	9-36	15	431	±15	0	±300	87	±200
CBW-483R3S9	18-75	10	174	3.3	0	2000	79	2600
CBW-4805S9	18-75	10	201	5	0	1600	83	1300
CBW-4809S9	18-75	10	221	9	0	1000	85	800
CBW-4812S9	18-75	10	216	12	0	750	87	560
CBW-4815S9	18-75	10	216	15	0	600	87	560
CBW-4824S9	18-75	10	216	24	0	375	87	200
CBW-4805SD9	18-75	10	203	±5	0	±800	82	±800
CBW-4812SD9	18-75	10	221	±12	0	±375	85	±390
CBW-4815SD9	18-75	10	218	±15	0	±300	86	±200

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INPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	24V Input		9	24	36	VDC
	48V Input		18	48	75	
Under Voltage Protection	24V Input	Module ON		8.9		VDC
		Module OFF		7.0		
	48V Input	Module ON		16.0		
		Module OFF		14.0		
Input Filter			Capacitor			
Input Reflected Ripple Current (1)					30	mApk-pk
Start up Time	Nominal Vin and constant resistive load			50		ms
Remote ON/OFF Control	Module ON		open or high impedance			
	Module OFF		2-4mA input current (via 1kΩ)			
	OFF idle current			2.5		mA
	24V Input		2.2			A
	48V Input		1.0			
Note : 1. Measured with a simulated source inductance of 12μH and a source capacitor C _{in} (47μF, ESR<1.0Ω at 100kHz).						

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			-1.0		+1.0	%
Line Regulation			-0.2		+0.2	%
Load Regulation	From 0% to 100% Load	Single Output	-0.5		+0.5	%
		3.3 V Output	-1.0		+1.0	
		Dual Output (Balance load)	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth				75	mVpk-pk
Over Voltage Protection				130		%
Over Load Protection				180		%
Short Circuit Protection			Indefinite (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			
Transient Recovery Time	Nominal Vin and 25% load step change (75%-50%-25% of Io)	For All models		250		µs
Transient Response Deviation		3.3V & 5V Output	-5		+5	%
		Other Output	-3		+3	
Note : 1. Measured with a 1.0uF MLCC and 10uF electrolytic capacitor.						

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ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	24V Input			50	VDC
	48V Input			100	
Soldering Temperature	1.5mm from case 10sec max.			260	°C

Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	1600			VDC
	Case-I/O, and rated for 60sec	1000			
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output			50	pF
Switching Frequency	24 V Input		400		kHz
	48 V Input		500		
MTBF	MIL-HDBK-217 F @ 25°C	900			k hours
Safety Approval	IEC / EN / UL 62368-1	DK-80978-UL, E252573			
Environmental compliance		RoHS			

ENVIRONMENT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		85	°C
Maximum Case Temperature				100	°C
Thermal Impedance	3.3V Output	29.3			°C/W
	Other Output	16.6			
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS

Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Contact: ±6kV	B
RS	IEC 61000-4-3	20V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±2kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	100A/m	A

PHYSICAL SPECIFICATIONS

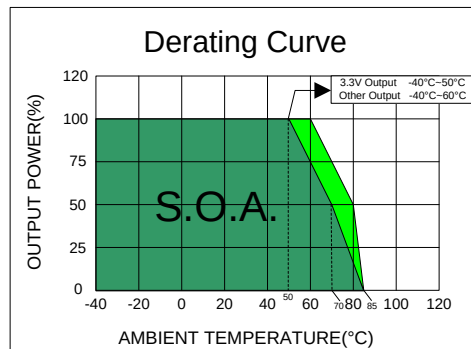
Parameter	Value
Case Material	Copper
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	7.3 g, typ.
Dimensions	0.86" x 0.38" x 0.44"

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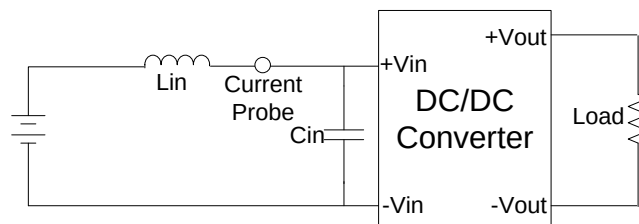
ELECTRICAL CHARACTERISTIC CURVES



TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

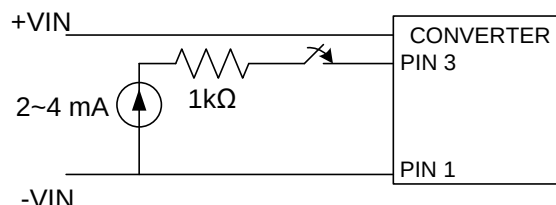
Input reflected ripple current is measured with a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ω at 100kHz) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Remote Module ON / OFF

Input current (2~4mA) via 1k Ω to Pin3, converter OFF.
Open or high impedance, converter ON.



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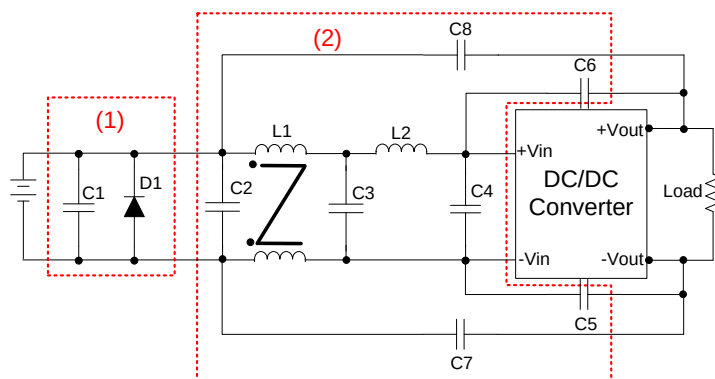
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DESIGN & FEATURE CONFIGURATIONS

EMC Filter

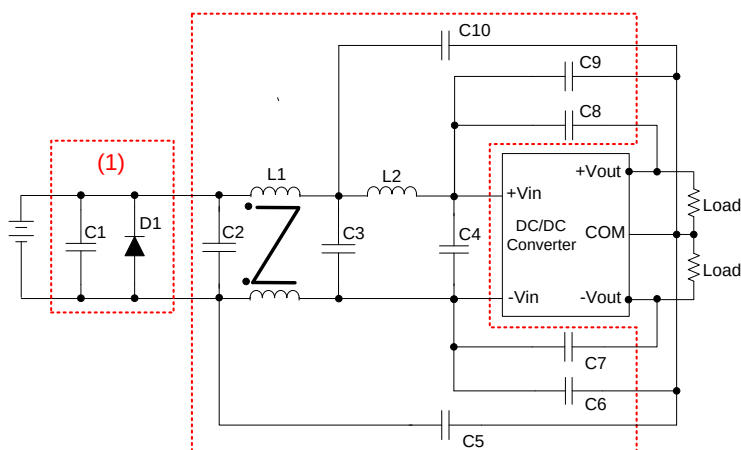
The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.

Single Output models



	C1	D1	C2, C3, C4	C5, C6, C7, C8	L1	L2
CBW-24XXS9	NIPPON Chemi-con KY series 330μF, 100V	SMDJ70A	MLCC 10μF, 35V	MLCC 220pF, 3kV	20μH	20μH
CBW-48XXS9		SMDJ120A	MLCC 4.7μF, 100V	MLCC 1000pF, 3kV	132.8μH	10μH

Dual Output models



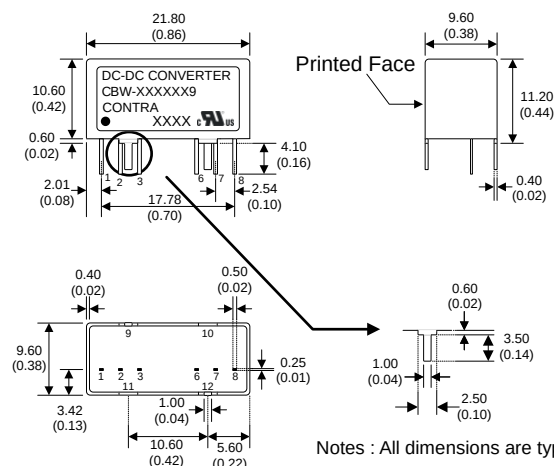
	C1	D1	C2, C3, C4	C5	C6, C10	C7, C8	C9	L1	L2
CBW-24XXSD9	NIPPON Chemi-con KY series 330μF, 100V	SMDJ70A	MLCC 10μF, 35V	MLCC 220pF, 3kV		MLCC 220pF, 3kV	MLCC 1000pF, 3kV	20μH	20μH
CBW-48XXSD9		SMDJ120A	MLCC 4.7μF, 100V		MLCC 220pF, 3kV	MLCC 1000pF, 3kV		132.8μH	10μH

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MECHANICAL SPECIFICATIONS



Notes : All dimensions are typical in millimeters (inches).

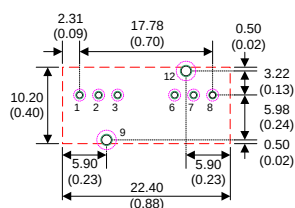
1. Pin dimension tolerance: ± 0.05 (± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Pin to case tolerance: ± 0.5 (± 0.02)
4. Case Tolerance: ± 0.5 (± 0.02)
5. Stand-off tolerance: ± 0.1 (± 0.004)

PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	CTRL	CTRL
6	+Vout	+Vout
7	-Vout	COM
8	N.C.	-Vout
9	Case	Case
10	Stand Off	Stand Off
11	Stand Off	Stand Off
12	Case	Case

*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS



Notes : 1. All dimensions are typical in millimeters (inches).

Through hole (black) 1 ~ 8: $\varnothing 0.80$ (0.031)

Top view pad (green) 1 ~ 8: $\varnothing 1.00$ (0.039)

Bottom view pad (pink) 1 ~ 8: $\varnothing 1.60$ (0.063)

2. All dimensions are typical in millimeters (inches).

Through hole (black) 9 & 12: $\varnothing 1.3$ (0.051)

Top view pad (green) 9 & 12: $\varnothing 1.5$ (0.059)

Bottom view pad (pink) 9 & 12: $\varnothing 2.6$ (0.102)