

CB-9W Series

9W 2:1 Regulated Single & Dual output



Features

- Highest Power Density In SIP8 Package
- Wide 2:1 Input Range
- Smallest Footprint 9W Converter
- Operation Temperature Range -40 ~ 85°C max.
- Efficiency Up To 90%
- Continuous Short Circuit Protection
- I/O Isolation 1600VDC
- Remote ON/OFF Control



UL[®] CB CE UK
CA

PART NUMBER STRUCTURE

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

(1) Series

(2) Input Voltage Range

12 - 9-18 V
24 - 18-36 V
48 - 36-75 V

(4) Output Type

S - SIP Single Output
SD - SIP Dual Output

(5) Watt

(3) Output Voltage

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

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

Model Number	Certification	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)		
CB-123R3S9	CE/UL/CB	9-18	15	688	3.3	0	2000	80	2600
CB-1205S9	CE/UL/CB	9-18	15	794	5	0	1600	84	1300
CB-1209S9	CE/UL/CB	9-18	15	862	9	0	1000	87	800
CB-1212S9	CE/UL/CB	9-18	15	852	12	0	750	88	560
CB-1215S9	CE/UL/CB	9-18	15	852	15	0	600	88	470
CB-1224S9	CE/UL/CB	9-18	15	843	24	0	375	89	200
CB-1205SD9	CE/UL/CB	9-18	15	794	±5	0	±800	84	±800
CB-1212SD9	CE/UL/CB	9-18	15	852	±12	0	±375	88	±390
CB-1215SD9	CE/UL/CB	9-18	15	862	±15	0	±300	87	±200
CB-243R3S9	CE/UL/CB	18-36	15	344	3.3	0	2000	80	2600
CB-2405S9	CE/UL/CB	18-36	15	397	5	0	1600	84	1300
CB-2409S9	CE/UL/CB	18-36	15	431	9	0	1000	87	800
CB-2412S9	CE/UL/CB	18-36	15	426	12	0	750	88	560
CB-2415S9	CE/UL/CB	18-36	15	421	15	0	600	89	470
CB-2424S9	CE/UL/CB	18-36	15	421	24	0	375	89	200
CB-2405SD9	CE/UL/CB	18-36	15	402	±5	0	±800	83	±800
CB-2412SD9	CE/UL/CB	18-36	15	426	±12	0	±375	88	±390
CB-2415SD9	CE/UL/CB	18-36	15	426	±15	0	±300	88	±200
CB-483R3S9	CE	36-75	10	170	3.3	0	2000	81	2600
CB-4805S9	CE/UL/CB	36-75	10	198	5	0	1600	84	1300
CB-4809S9	CE	36-75	10	213	9	0	1000	88	800
CB-4812S9	CE/UL/CB	36-75	10	213	12	0	750	88	560
CB-4815S9	CE	36-75	10	211	15	0	600	89	470
CB-4824S9	CE	36-75	10	211	24	0	375	89	200
CB-4805SD9	CE	36-75	10	194	±5	0	±800	86	±800
CB-4812SD9	CE	36-75	10	211	±12	0	±375	89	±390
CB-4815SD9	CE	36-75	10	208	±15	0	±300	90	±200

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INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	12V Input		9	12	18	VDC
	24V Input		18	24	36	
	48V Input		36	48	75	
Under Voltage Protection	12V Input	Module ON		8.9		VDC
		Module OFF		7.0		
	24V Input	Module ON		16.0		
		Module OFF		13.0		
	48V Input	Module ON		33.0		
		Module OFF		30.0		
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
Recommended input fuse (slow blow)	12V Input		2.0			A
	24V Input		1.0			
	48V Input		0.5			
Note : 1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (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				150		%
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 Single Output	-5		+5	%
		Other Output	-3		+3	
Note : 1. Measured with a 1.0μF MLCC and 10μF electrolytic capacitor.						

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ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			25	VDC
	24V Input			50	
	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	12 V & 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		33.2			°C/W
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

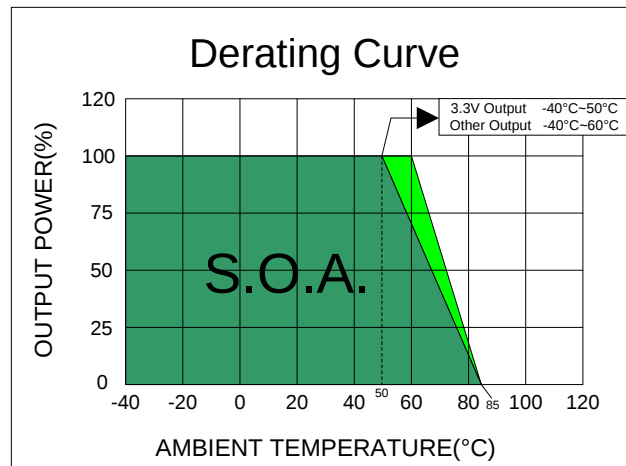
Parameter	Value
Case Material	Copper
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	7.3 g, typ.
Dimensions	0.86" x 0.38" x 0.44"

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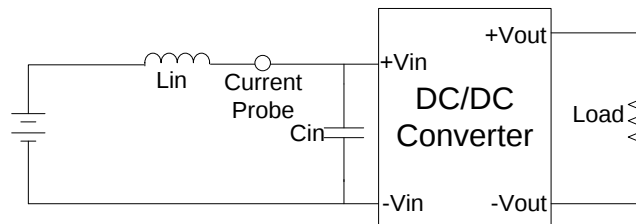
ELECTRICAL CHARACTERISTIC CURVES



TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

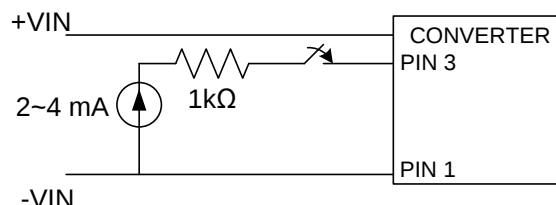
Input reflected ripple current is measured with a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Remote Module ON / OFF

Input current ($2\sim 4mA$) via $1k\Omega$ to Pin3, converter OFF.
Open or high impedance, converter ON.



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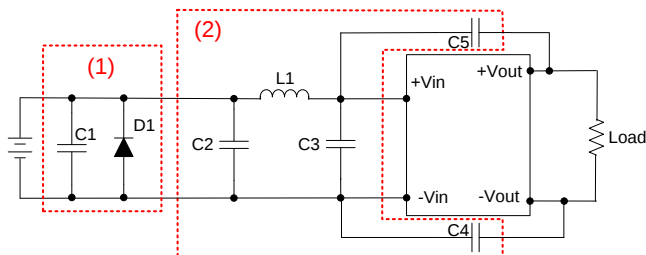
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DESIGN & FEATURE CONFIGURATIONS

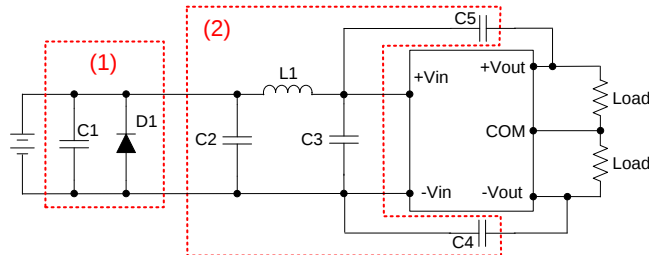
EMC Filter

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

Single Output Model

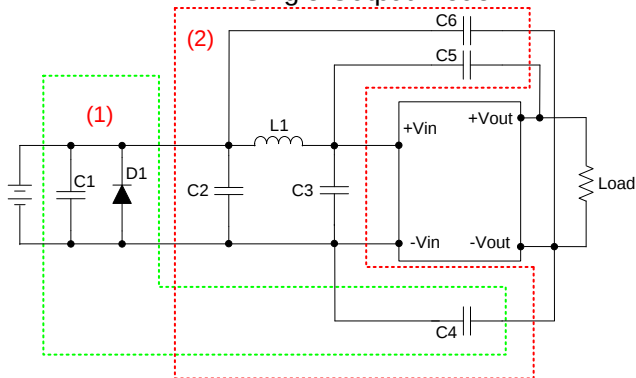


Dual Output Model

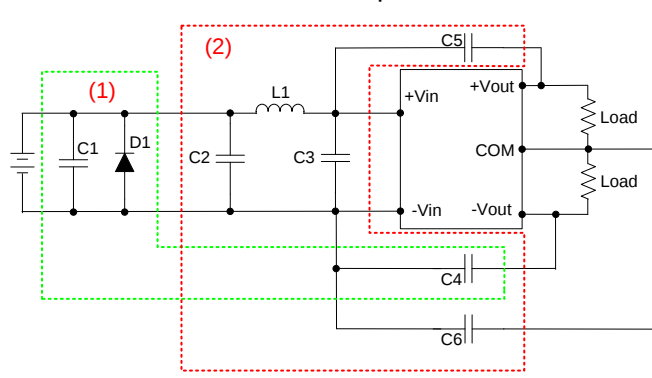


	C1	D1	C2	C3	C4, C5	L1
CB-12XXX9	NIPPON Chemi-con KY series	SMDJ26A	MLCC 10 μ F, 35V		MLCC 1000pF, 3kV	3.3 μ H
CB-24XXX9	330 μ F, 100V	SMDJ70A	MLCC 4.7 μ F, 100V	MLCC 4.7 μ F, 100V		10 μ H

Single Output Model



Dual Output Model

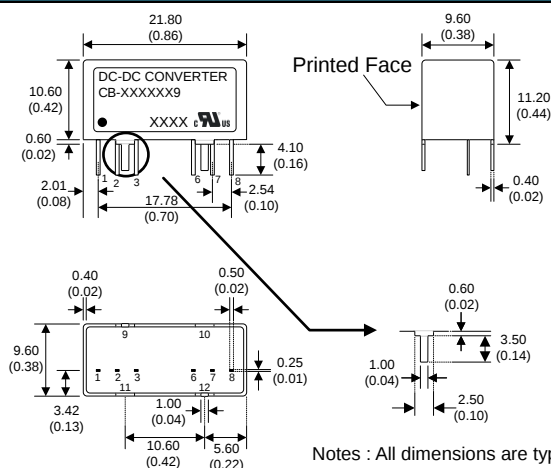


	C1	D1	C2, C3	C4, C5	C6	L1
CB-48XXX9	NIPPON Chemi-con KY series	SMDJ120A	MLCC 4.7 μ F, 100V	MLCC 1000pF, 3kV	MLCC 220pF, 3kV	10 μ H
	330 μ F, 100V					

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MECHANICAL SPECIFICATIONS



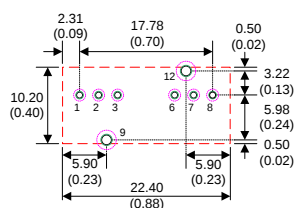
Notes : All dimensions are typical in millimeters (inches).

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)