

CB-1W Series

1W 2:1 Regulated Single & Dual output



Features

- SIP8 / DIP16
- Wide 2:1 Input Range
- 1000 VDC Isolation, Up to 3000 VDC
- Continuous Short Circuit Protection
- Efficiency up to 76%
- Operation Temperature Range -40 ~ 99°C max.
- Plastic Case Standard
- Remote ON/OFF Control (Optional)



PART NUMBER STRUCTURE

CB - **24** **05** **SD** **1** **H** **C**
(1) (2) (3) (4) (5) (6) (7)

(1) Series

(2) Input Voltage Range

05 - 4.5-9 V
12 - 9-18 V
24 - 18-36 V
48 - 36-72 V

(3) Output Voltage

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

(4) Case & Output Type

S - SIP Single Output
D - DIP Single Output
SD - SIP Dual Output
DD - DIP Dual Output
SZ - Option For SIP Dual Output

(5) Watt

(6) Isolation Voltage (Optional)

Blank - 1000 VDC
H - 3000 VDC

(7) Control Pin

Optional For SIP Models

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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)		
CB-053R3S1	4.5-9	15	294	3.3	76	303	68	3300
CB-0505S1	4.5-9	15	294	5	50	200	68	3300
CB-0509S1	4.5-9	40	294	9	28	111	68	470
CB-0512S1	4.5-9	55	293	12	21	83	68	470
CB-0515S1	4.5-9	55	296	15	17	67	68	470
CB-0524S1	4.5-9	70	305	24	10	42	66	220
CB-123R3S1	9-18	15	121	3.3	76	303	69	3300
CB-1205S1	9-18	15	114	5	50	200	73	3300
CB-1209S1	9-18	17	110	9	28	111	76	470
CB-1212S1	9-18	25	111	12	21	83	75	470
CB-1215S1	9-18	20	113	15	17	67	74	470
CB-1224S1	9-18	35	115	24	10	42	73	220
CB-243R3S1	18-36	8	60	3.3	76	303	69	3300
CB-2405S1	18-36	8	60	5	50	200	70	3300
CB-2409S1	18-36	12	56	9	28	111	74	470
CB-2412S1	18-36	12	57	12	21	83	73	470
CB-2415S1	18-36	12	57	15	17	67	73	470
CB-2424S1	18-36	20	60	24	10	42	70	220
CB-483R3S1	36-72	6	32	3.3	76	303	66	3300
CB-4805S1	36-72	6	31	5	50	200	67	3300
CB-4809S1	36-72	8	30	9	28	111	69	470
CB-4812S1	36-72	8	31	12	21	83	67	470
CB-4815S1	36-72	10	30	15	17	67	69	470
CB-4824S1	36-72	10	31	24	10	42	67	220
CB-053R3D1	4.5-9	15	294	3.3	76	303	68	3300
CB-0505D1	4.5-9	15	294	5	50	200	68	3300
CB-0509D1	4.5-9	40	294	9	28	111	68	470
CB-0512D1	4.5-9	55	293	12	21	83	68	470
CB-0515D1	4.5-9	55	309	15	17	67	65	470
CB-0524D1	4.5-9	70	305	24	10	42	66	220
CB-123R3D1	9-18	10	124	3.3	76	303	67	3300
CB-1205D1	9-18	10	114	5	50	200	73	3300
CB-1209D1	9-18	15	110	9	28	111	76	470
CB-1212D1	9-18	25	112	12	21	83	74	470
CB-1215D1	9-18	25	115	15	17	67	73	470
CB-1224D1	9-18	28	116	24	10	42	72	220
CB-243R3D1	18-36	8	60	3.3	76	303	69	3300
CB-2405D1	18-36	10	58	5	50	200	72	3300
CB-2409D1	18-36	12	56	9	28	111	74	470
CB-2412D1	18-36	10	56	12	21	83	74	470
CB-2415D1	18-36	15	56	15	17	67	75	470
CB-2424D1	18-36	15	60	24	10	42	70	220
CB-483R3D1	36-72	6	32	3.3	76	303	66	3300
CB-4805D1	36-72	6	30	5	50	200	69	3300
CB-4809D1	36-72	8	30	9	28	111	69	470
CB-4812D1	36-72	8	31	12	21	83	67	470
CB-4815D1	36-72	10	30	15	17	67	69	470
CB-4824D1	36-72	10	31	24	10	42	67	220

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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)		
CB-053R3SD1	4.5-9	30	287	±3.3	±38	±152	70	±1000
CB-0505SD1	4.5-9	20	282	±5	±25	±100	71	±1000
CB-0509SD1	4.5-9	30	280	±9	±14	±56	72	±220
CB-0512SD1	4.5-9	50	296	±12	±10	±42	68	±220
CB-0515SD1	4.5-9	55	279	±15	±8	±33	71	±220
CB-0524SD1	4.5-9	70	301	±24	±5	±21	67	±100
CB-123R3SD1	9-18	15	123	±3.3	±38	±152	69	±1000
CB-1205SD1	9-18	20	117	±5	±25	±100	71	±1000
CB-1209SD1	9-18	20	115	±9	±14	±56	73	±220
CB-1212SD1	9-18	25	114	±12	±10	±42	74	±220
CB-1215SD1	9-18	35	118	±15	±8	±33	70	±220
CB-1224SD1	9-18	40	127	±24	±5	±21	66	±100
CB-243R3SD1	18-36	8	61	±3.3	±38	±152	69	±1000
CB-2405SD1	18-36	12	59	±5	±25	±100	71	±1000
CB-2409SD1	18-36	10	56	±9	±14	±56	75	±220
CB-2412SD1	18-36	8	56	±12	±10	±42	75	±220
CB-2415SD1	18-36	10	54	±15	±8	±33	76	±220
CB-2424SD1	18-36	25	63	±24	±5	±21	67	±100
CB-483R3SD1	36-72	8	32	±3.3	±38	±152	65	±1000
CB-4805SD1	36-72	6	30	±5	±25	±100	70	±1000
CB-4809SD1	36-72	10	29	±9	±14	±56	72	±220
CB-4812SD1	36-72	10	29	±12	±10	±42	72	±220
CB-4815SD1	36-72	10	29	±15	±8	±33	72	±220
CB-4824SD1	36-72	15	30	±24	±5	±21	71	±100
CB-053R3DD1	4.5-9	30	287	±3.3	±38	±152	70	±1000
CB-0505DD1	4.5-9	20	282	±5	±25	±100	71	±1000
CB-0509DD1	4.5-9	45	280	±9	±14	±56	72	±220
CB-0512DD1	4.5-9	50	296	±12	±10	±42	68	±220
CB-0515DD1	4.5-9	55	264	±15	±8	±33	75	±220
CB-0524DD1	4.5-9	70	301	±24	±5	±21	67	±100
CB-123R3DD1	9-18	15	123	±3.3	±38	±152	69	±1000
CB-1205DD1	9-18	20	117	±5	±25	±100	71	±1000
CB-1209DD1	9-18	20	115	±9	±14	±56	73	±220
CB-1212DD1	9-18	25	115	±12	±10	±42	73	±220
CB-1215DD1	9-18	35	118	±15	±8	±33	70	±220
CB-1224DD1	9-18	40	127	±24	±5	±21	66	±100
CB-243R3DD1	18-36	8	63	±3.3	±38	±152	66	±1000
CB-2405DD1	18-36	12	57	±5	±25	±100	73	±1000
CB-2409DD1	18-36	10	56	±9	±14	±56	75	±220
CB-2412DD1	18-36	10	56	±12	±10	±42	75	±220
CB-2415DD1	18-36	10	57	±15	±8	±33	73	±220
CB-2424DD1	18-36	25	63	±24	±5	±21	67	±100
CB-483R3DD1	36-72	8	32	±3.3	±38	±152	65	±1000
CB-4805DD1	36-72	6	30	±5	±25	±100	70	±1000
CB-4809DD1	36-72	10	29	±9	±14	±56	72	±220
CB-4812DD1	36-72	6	30	±12	±10	±42	71	±220
CB-4815DD1	36-72	10	29	±15	±8	±33	72	±220
CB-4824DD1	36-72	15	30	±24	±5	±21	71	±100

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INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	05V Input	4.5	5	9	VDC
	12V Input	9	12	18	
	24V Input	18	24	36	
	48V Input	36	48	72	
Input Filter		Capacitor			
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Remote ON/OFF Control	Module ON	open or high impedance 0 ~ 0.8VDC Max. (Short circuit Pin 1 and Pin 3) or open circuit			
	Module OFF	4.5 to 15VDC max.(or 3.5mA to 15mA max.) (via R1,D1)			
	OFF idle current		5		mA
Recommended input fuse (slow blow)	05V Input	0.4			A
	12V Input	0.2			
	24V Input	0.1			
	48V Input	0.1			
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		-2.0		+2.0	%
Line Regulation		-0.5		+0.5	%
Load Regulation	From 25% to 100% Load	-1.0		+1.0	%
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output	-5		+5	%
Ripple & Noise	20MHz bandwidth			80	mVpk-pk
Short Circuit Protection		Indefinite (Automatic Recovery)			
Temperature Coefficient		-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load	See Table			

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	05V Input			12	VDC
	12V Input			24	
	24V Input			40	
	48V Input			80	
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.					

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GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1000			VDC
		Suffix "H"	3000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output				60	pF
Switching Frequency			100		650	kHz
MTBF	MIL-HDBK-217 F @ 25°C		1.66			M hours
Safety Approval	IEC / EN / UL 62368-1		DK-63953-UL, E252573			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		99	°C
Maximum Case Temperature				100	°C
Thermal Impedance		42.29			°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		A
ESD	IEC 61000-4-2	Air: ±8kV / Indirect: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

PHYSICAL SPECIFICATIONS

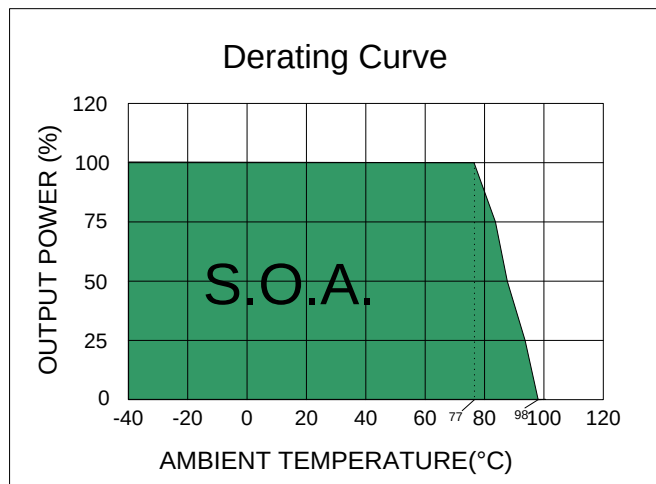
Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	SIP Case : Alloy42 Solder-coated
	DIP Case : Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	SIP Case : 4.5 g , typ.
	DIP Case : 6.0 g , typ.
Dimensions	SIP Case : 0.86" x 0.36" x 0.44"
	DIP Case : 0.92" x 0.55" x 0.40"

CB-1W Series

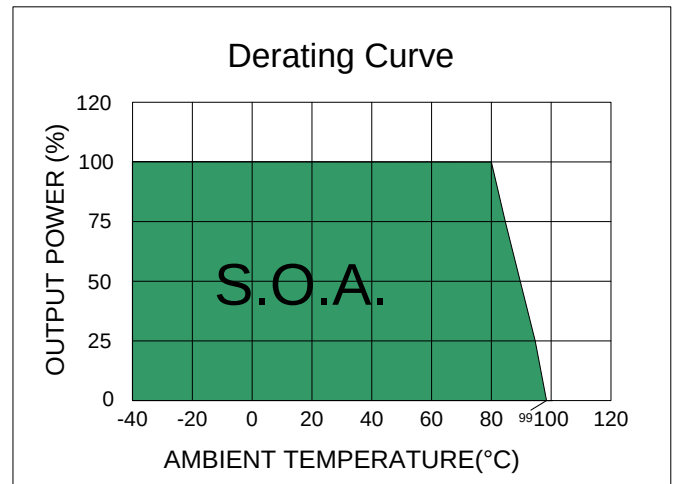
1W 2:1 Regulated Single & Dual output



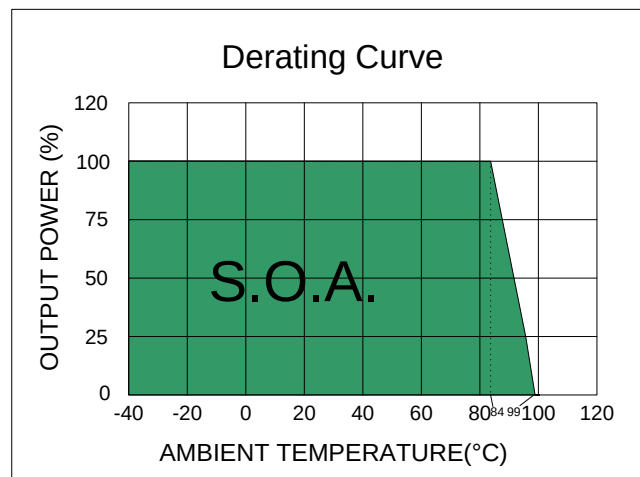
ELECTRICAL CHARACTERISTIC CURVES



Efficiency = 65% ~ 67%



Efficiency = 68% ~ 72%



Efficiency = 73% ~ 76%

CB-1W Series

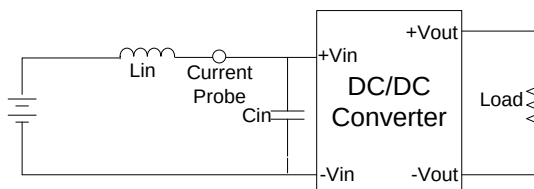
1W 2:1 Regulated Single & Dual output



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

MCU (Master Control Unit)

The MCU Pin Voltage is referenced to $-V_{in}$ (Pin 1)

ON: $0 \sim 0.8V_{DC}$ max. (Short circuit Pin 1 and Pin 3) or open circuit

OFF: 4.5 to $15V_{DC}$ max. (or $3.5mA$ to $15mA$ max.) (via R1,D1)

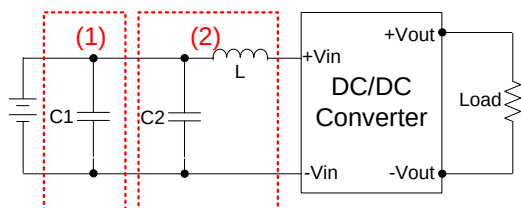
OFF idle current: $5mA$ typ.



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 tes

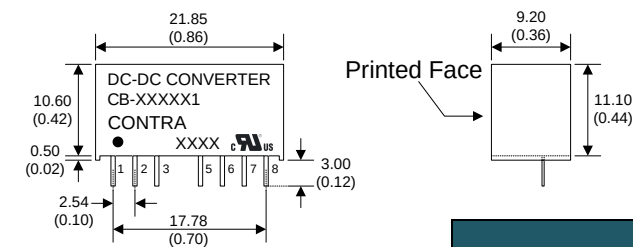


	C1	C2	L
CB-05XXX1	NIPPON Chemi-con KY series 220 μF , 100V	MLCC 100 μF , 100V	12 μH
CB-12XXX1			
CB-24XXX1			
CB-48XXX1			

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MECHANICAL SPECIFICATIONS



SIP8 Package

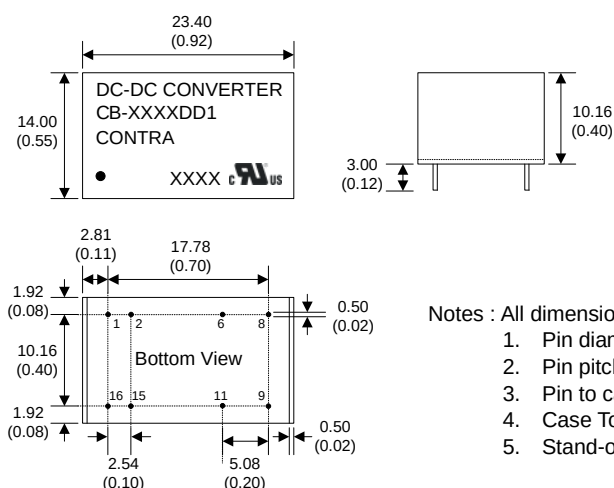
Notes : All dimensions are typical in millimeters (inches).

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)

SIP PIN CONNECTIONS						
PIN NUMBER	SINGLE	SINGLE+C	DUAL/(SD)	DUAL/(SD+C)	DUAL/(SZ)	DUAL/(SZ+C)
1	-Vin	-Vin	-Vin	-Vin	-Vin	-Vin
2	+Vin	+Vin	+Vin	+Vin	+Vin	+Vin
3	N.P.	CTRL	N.C.	CTRL	N.C.	CTRL
5	N.P.	N.C.	N.C.	N.C.	N.C.	N.C.
6	+Vout	+Vout	+Vout	+Vout	+Vout	+Vout
7	-Vout	-Vout	-Vout	-Vout	COM	COM
8	N.C.	N.C.	COM	COM	-Vout	-Vout

*N.P. : No PIN

*N.C. : No Connection



DIP16 Package

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

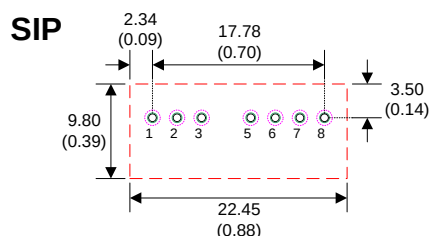
1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Pin to case tolerance: ± 0.5 (± 0.02)
4. Case Tolerance: ± 0.5 (± 0.02)
5. Stand-off tolerance: ± 0.1 (± 0.004)

DIP PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	-Vin	-Vin
6	N.C.	COM
8	N.C.	-Vout
9	+Vout	+Vout
11	-Vout	COM
15	+Vin	+Vin
16	+Vin	+Vin

*N.P. : No PIN

*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS

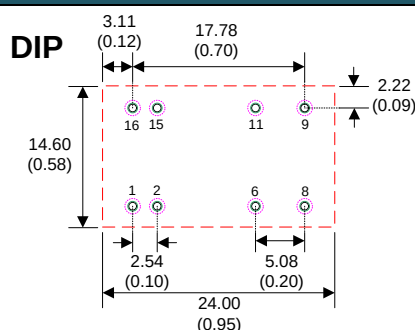


Notes : 1. All dimensions are typical in millimeters (inches).

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)



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

Through hole (black) 1 ~ 16: $\varnothing 0.80$ (0.031)

Top view pad (green) 1 ~ 16: $\varnothing 1.00$ (0.039)

Bottom view pad (pink) 1 ~ 16: $\varnothing 1.60$ (0.063)