CMB-1W Series

1W 2:1 Regulated Single & Dual output

Features

- SIP6 Package
- Wide 2:1 Input Range
- 1500VDC Isolation
- Fully regulated output
- No minimum load required
- Continuous Short Circuit Protection
- Efficiency up to 84%
- Operation Temperature Range -40 ~ 90°C max.

PART NUMBER STRUCTURE

CMB- 05 05 S 1
(1) (2) (3) (4) (5)

(1) Series

(2) Input Voltage Range
- **05 -** 4.5-9 V
- **12 -** 9-18 V
- **24 -** 18-36 V
- **48 -** 36-75 V

(3) Output Voltage
- **3R3 -** 3.3 V
- **05 -** 5.0 V
- **12 -** 12 V
- **15 -** 15 V
- **24 -** 24 V

(4) Output Type
- **S -** Single Output
- **D -** Dual Output

(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)		
CMB-0505S1	4.5-9	35	250	5	0	200	80	1680
CMB-0512S1	4.5-9	35	241	12	0	83	83	820
CMB-0515S1	4.5-9	35	244	15	0	67	82	680
CMB-0524S1	4.5-9	35	244	24	0	42	82	470
CMB-123R3S1	9-18	20	104	3.3	0	303	80	1680
CMB-1205S1	9-18	20	103	5	0	200	81	1680
CMB-1212S1	9-18	20	99	12	0	83	84	820
CMB-1215S1	9-18	20	100	15	0	67	83	680
CMB-1224S1	9-18	20	100	24	0	42	83	470
CMB-2405S1	18-36	10	51	5	0	200	81	1680
CMB-2412S1	18-36	10	50	12	0	83	83	820
CMB-2415S1	18-36	10	51	15	0	67	82	680
CMB-2424S1	18-36	10	50	24	0	42	83	470
CMB-4805S1	36-75	7	26	5	0	200	79	1680
CMB-4812S1	36-75	7	26	12	0	83	79	820
CMB-4815S1	36-75	7	26	15	0	67	79	680
CMB-4824S1	36-75	7	27	24	0	42	78	470
CMB-0512D1	4.5-9	35	250	±12	0	±42	80	±470
CMB-0515D1	4.5-9	35	250	±15	0	±33	80	±330
CMB-1205D1	9-18	20	103	±5	0	±100	81	±470
CMB-1212D1	9-18	20	102	±12	0	±42	82	±470
CMB-1215D1	9-18	20	104	±15	0	±33	80	±330
CMB-2412D1	18-36	10	51	±12	0	±42	81	±470
CMB-2415D1	18-36	10	51	±15	0	±33	81	±330
CMB-4812D1	36-75	7	26	±12	0	±42	79	±470
CMB-4815D1	36-75	7	27	±15	0	±33	78	±330

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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	75	
Input Filter		Capacitor			
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		30		ms
Recommended input fuse (slow blow)	05V Input	0.6			A
	12V Input	0.4			
	24V Input	0.2			
	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			-0.2		+0.2	%
Load Regulation	From 0% to 100% Load	Singlel Output	-1.0		+1.0	%
		Dual Output	-2.0		+2.0	
	From 5% to 100% Load	Dual Output	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth				50	mVpk-pk
Short Circuit Protection			Continuous (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)			500		μs
Transient Response Deviation			-3		+3	%

Note：
1. Measured with a 1.0μF MLCC.

ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1000 ms)	05V Input			15	VDC
	12V Input			25	
	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.

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GENERAL SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Isolation Voltage	Input-output, and rated for 60sec	1500			VDC
	Case-I/O, and rated for 60sec	1500			
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output		70		pF
Switching Frequency		150		550	kHz
MTBF	MIL-HDBK-217 F @ 25°C	2.8			M hours
Safety Approval	IEC / EN / UL 62368-1	DK-98703-UL, E252573			
Environmental compliance		RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Operating Ambient Temperature	See the Derating Curve	-40		90	°C
Maximum Case Temperature				105	°C
Thermal Impedance		47.7			°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	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	10A/m	A

PHYSICAL SPECIFICATIONS	
Parameter	**Value**
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	3.0 g, typ.
Dimensions	0.67" x 0.30" x 0.43”

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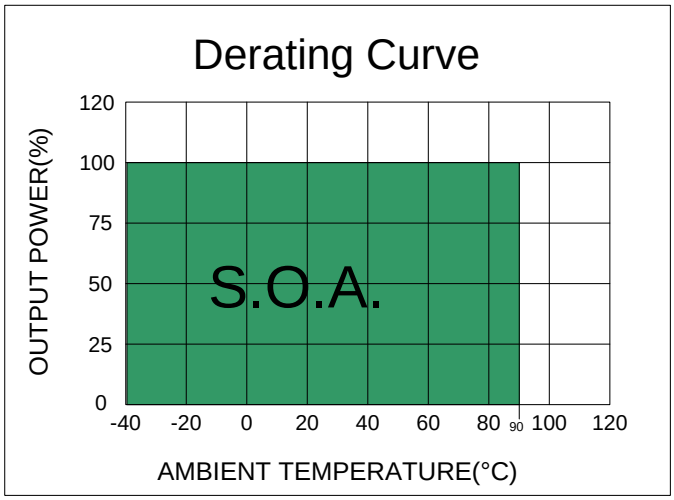
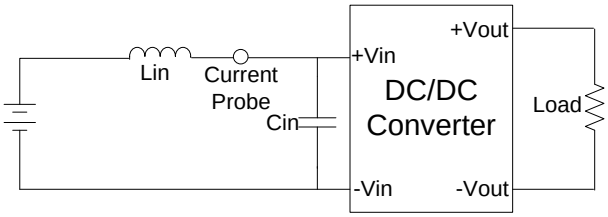
ELECTRICAL CHARACTERISTIC CURVES



TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

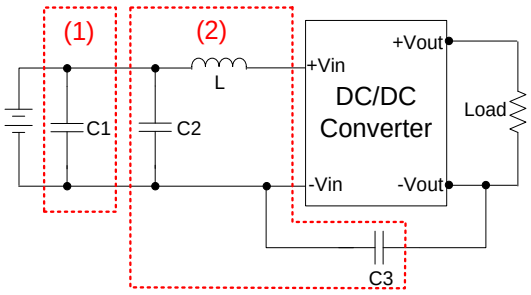
Input reflected ripple current is measured with a source inductor Lin (12μH) and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz) at nominal input and full load.



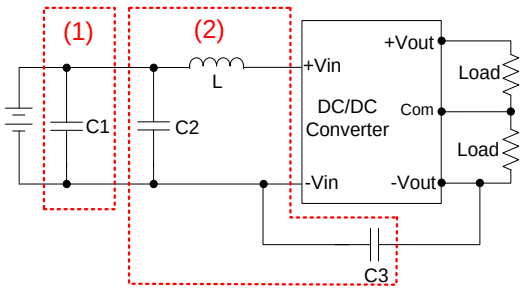
DESIGN & FEATURE CONFIGURATIONS

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	C1	C2	C3	L
CMB-05XXS1	NIPPON Chemi-con KY series 330μF, 100V	MLCC 4.7μF, 50V	MLCC 220pF, 3kV	4.7μH
CMB-12XXS1				
CMB-24XXS1				18μH
CMB-48XXS1		MLCC 4.7μF, 100V		



Dual	C1	C2	C3	L
CMB-05XXD1	NIPPON Chemi-con KY series 330μF, 100V	MLCC 4.7μF, 50V	MLCC 220pF, 3kV	4.7μH
CMB-12XXD1				
CMB-24XXD1				18μH
CMB-48XXD1		MLCC 4.7μF, 100V		

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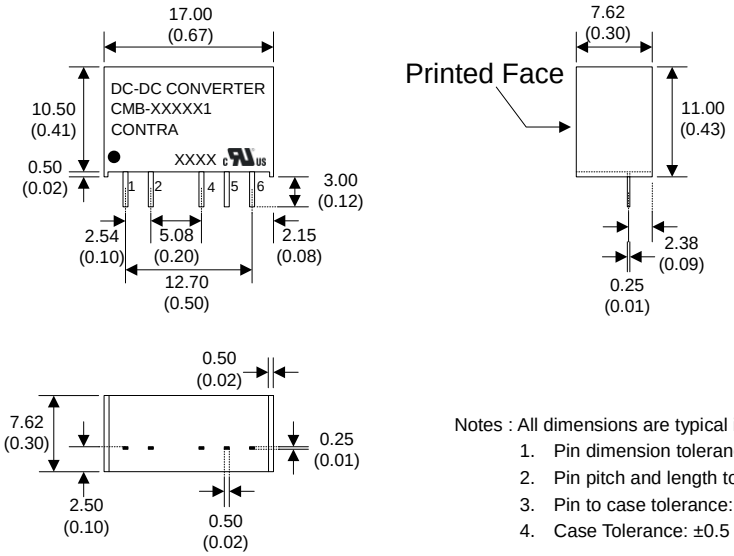
MECHANICAL SPECIFICATIONS



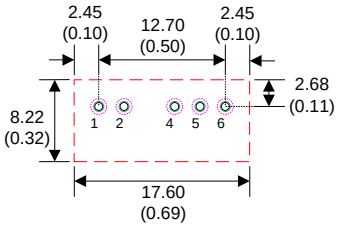
PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
4	+Vout	+Vout
5	N.P.	COM
6	-Vout	-Vout

*N.P.：No PIN

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)

RECOMMENDED FOOTPRINT DETAILS



Notes：1. All dimensions are typical in millimeters (inches).
Through hole (black) 1 ~ 6: Ø0.80 (0.031)
Top view pad (green) 1 ~ 6: Ø1.00 (0.039)
Bottom view pad (pink) 1 ~ 6: Ø1.60 (0.063)