

DC/DC Converter (M24C Series)

1 Features

- Input DC Voltage range: 18~36V
- Typical input DC voltage: 24V
- Output voltage: 3.3V, 5V, 12V, 15V
- Output power: 50W~100W
- Temperature (T_C) : -55~100°C
- Lead function: Pin-pin replacement with similar product of Vicor
- Forward active clamp-synchronous
- Rectification power structure



58.28×37.08×13.50mm³
Weight: ≤72g

Chart 1 Product type

M24C5M50B	M24C15M50B
M24C3V3M75B	M24C5M100B
M24C12M100B	

2 Scope of application

The application is military and civilian high reliable electronic system in aerospace, ship, weapon, railway and so on.

3 Descriptions

M24C series DC/DC Converters are used by forward circuit topological structure, combine with technology for active clamp and feedback stabilized voltage. The series product isolate input-output, high efficiency, big density for power; they have the function for input under-voltage lockout and short-circuit protection.

Shape of the series products is same to similar products of Vicor's second general modules, and pin-pin replacement with them. Design and manufacture of products are satisfied with the requirements of SJ20668-1998 《Micro-circuit module specifications》 and detailed specifications of products.

4 Technical performance

Form 2 Rated condition and recommended condition

Absolute max rating	Recommended condition
Input voltage: 38V Storage temperature: -55~125°C Shell temperature: 150°C	Input voltage: 18~36V Condition temperature range (T _c) : -55~100°C

Form 3 Electrical Characteristic

No.	Characteristic		Conditions (otherwise specified, -55°C≤T _c ≤125°C, V _{IN} =24V±1.2V)	M24C5M50B		M24C15M50B		M24C3V3M75 B		
				min	max	min	max	min	max	
1	Input under-voltage/V	Open voltage	T _c =25°C, 50% load	-	17.9	-	17.9	-	17.9	
		Shutdown voltage	T _c =25°C, 50% load	12.5	-	12.5	-	14.8	-	
2	Electrical level inhibition /V		T _c =25°C, I _{out} =10A, output inhibition	-	0.2	-	0.2	-	0.2	
3	Insulation resistance /MΩ		T _A =25°C, between two of input, output, bottom plate is 500V(DC)	100	-	100	-	100	-	
4	Output voltage /V		T _c =25°C, full load	4.85	5.15	14.85	15.15	3.234	3.366	
5	Output current /A		T _c =25°C, full load	-	10	-	3.33	-	22.7	
6	Voltage regulation rate /%		V _{in} =18V, 36V full load	T _c =25°C	-	1	-	1	-	2
				T _c =-55°C	-	2	-	2	-	2
				T _c =100°C	-	2	-	2	-	2
				T _c =25°C	-	1	-	1	-	2
7	Load regulation rate /%		Empty load, full load T _c =-55°C T _c =100°C	-	2	-	2	-	2	
8	Temperature coefficient %/°C		full load	-0.02	0.02	-0.02	0.02	-0.02	0.02	
9	Efficiency /%		full load	T _c =25°C	87	-	87	-	87	-
				T _c =-55°C	84	-	84	-	84	-
				T _c =100°C	84	-	84	-	84	-
10	Output ripple voltage(peak-peak) mV		T _A =25°C, BW≤20MHz, full load	-	200	-	200	-	100	

Form 3b Electrical Characteristic

No.	Characteristic	Conditions (otherwise specified,	M24C5M100B	M24C12M100 B
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		-55°C ≤ T _c ≤ 125°C, V _{IN} = 24V ± 1.2V)		min	max	min	max
1	Input under-voltage/V	Open voltage	T _C = 25°C, 50% load	-	17.9	-	17.9
		Shutdown voltage	T _C = 25°C, 50% load	14.8	-	12.5	-
2	Electrical level inhibition /V	T _C = 25°C, I _{out} = 10A, output inhibition		-	0.2	-	0.2
3	Insulation resistance /MΩ	T _A = 25°C, between two of input, output, bottom plate is 500V(DC)		100	-	50	-
4	Output voltage /V	T _C = 25°C, full load		4.9	5.1	11.88	12.12
5	Output current /A	T _C = 25°C, full load		-	20	-	8.33
6	Voltage regulation rate /%	V _{in} = 18V, 36V full load	T _C = 25°C	-	1	-	0.5
			T _C = -55°C	-	2	-	1
			T _C = 100°C	-	1	-	1
7	Load regulation rate /%	Empty load, full load T _C = -55°C T _C = 100°C		-	2	-	2
8	Temperature coefficient /%/°C	full load		-0.02	0.02	-0.02	0.02
9	Efficiency /%	full load	T _C = 25°C	84	-	85	-
			T _C = -55°C	81	-	81	-
			T _C = 100°C				
10	Output ripple voltage(peak-peak) mV	T _A = 25°C, BW ≤ 20MHz, full load		-	150	-	262

5 Circuit block diagram

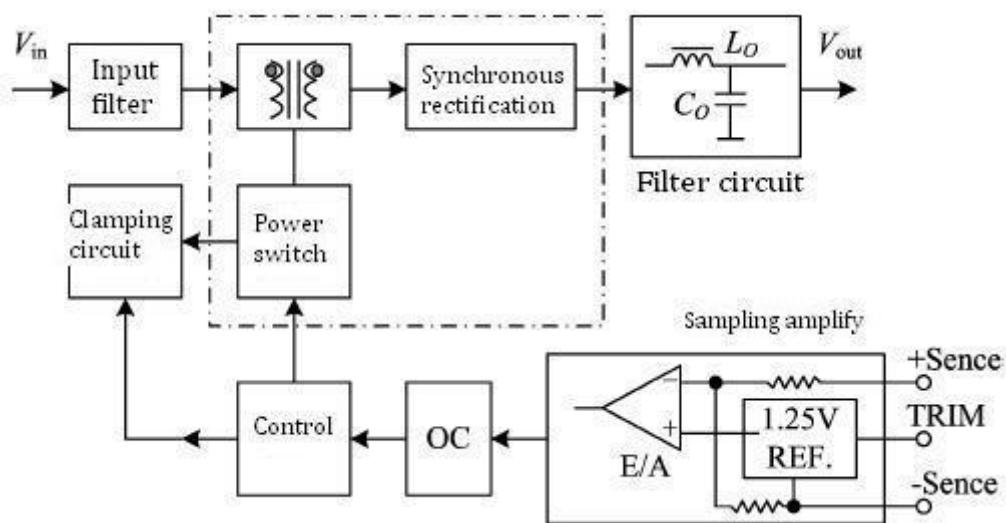


Chart 2 Product elementary diagram

6. Typical characteristic curve

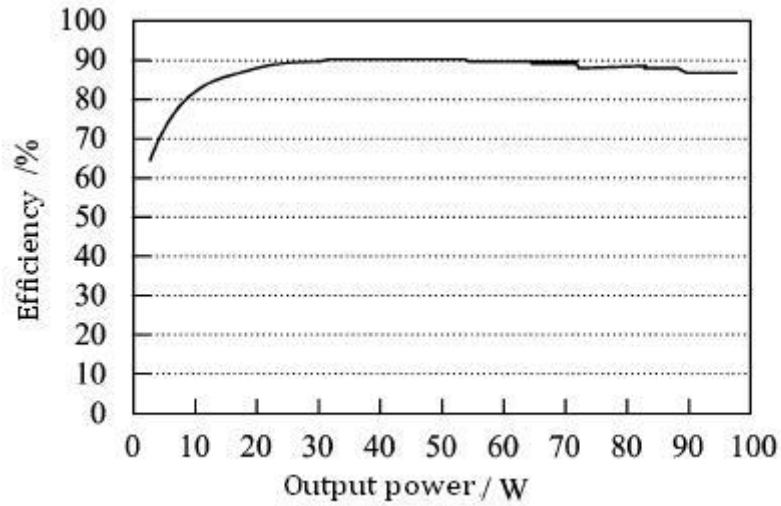
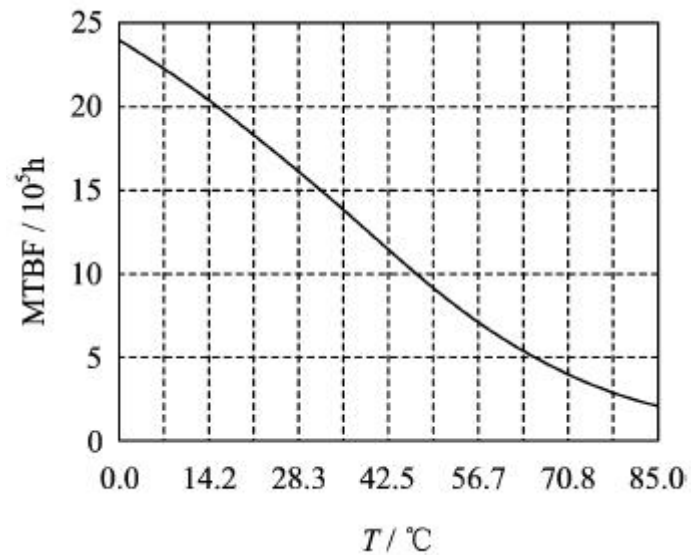


Chart 3 Efficiency (output power)

7. MTBF curve



Char 4 MTBF Temperature Curve

(According to GJB/Z 299B, prediction for ground in good condition, this diagram corresponds to M24C5M100B)

8 Pin Designation

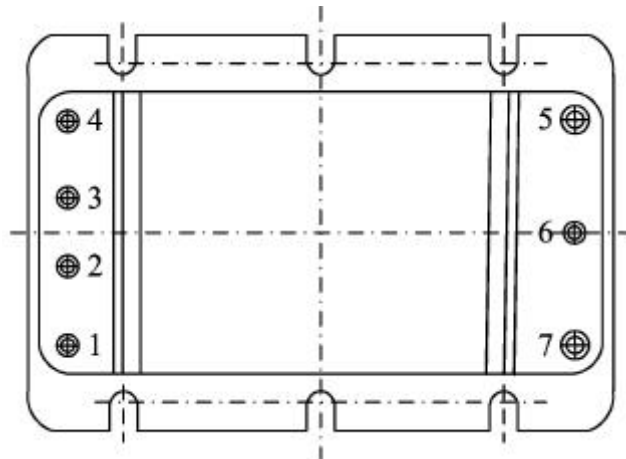
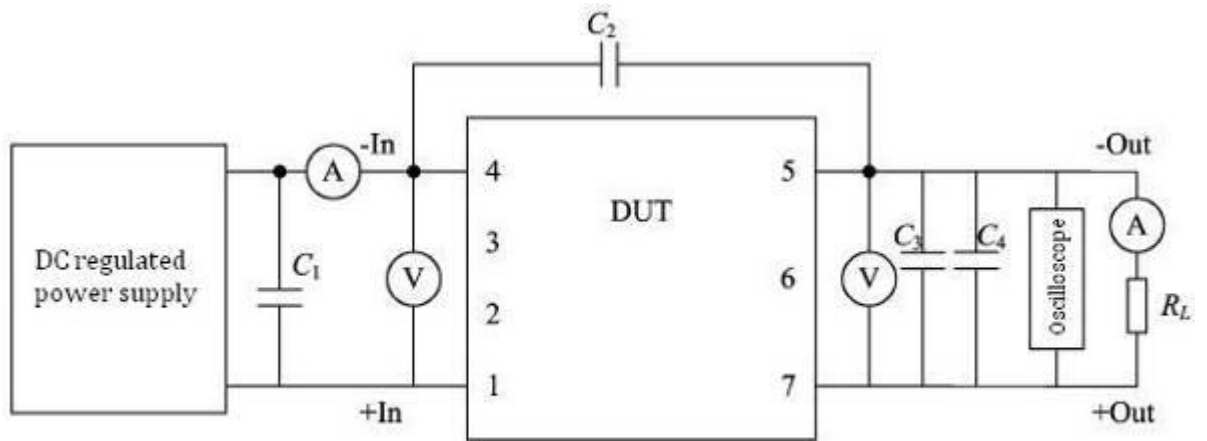


Chart 5 Upward view

Form 4 Pin Designation

No.	Symbol	Function
1	+In	Input positive terminal
2	INH	Inhibition terminal
3	NC	Empty terminal
4	-	Input negative terminal
5	- Out	Output negative terminal
6	TRIM	Regulation terminal
7	+	Output positive terminal

9 Typical application connection



注： $C_1 \leq 22\mu\text{F}$ 、 $C_2 \leq 4700\text{PF}$ 、 $C_3 = C_4 \leq 10\mu\text{F}$

Chart 6 Electrical testing wiring diagram

10. Package Specifications

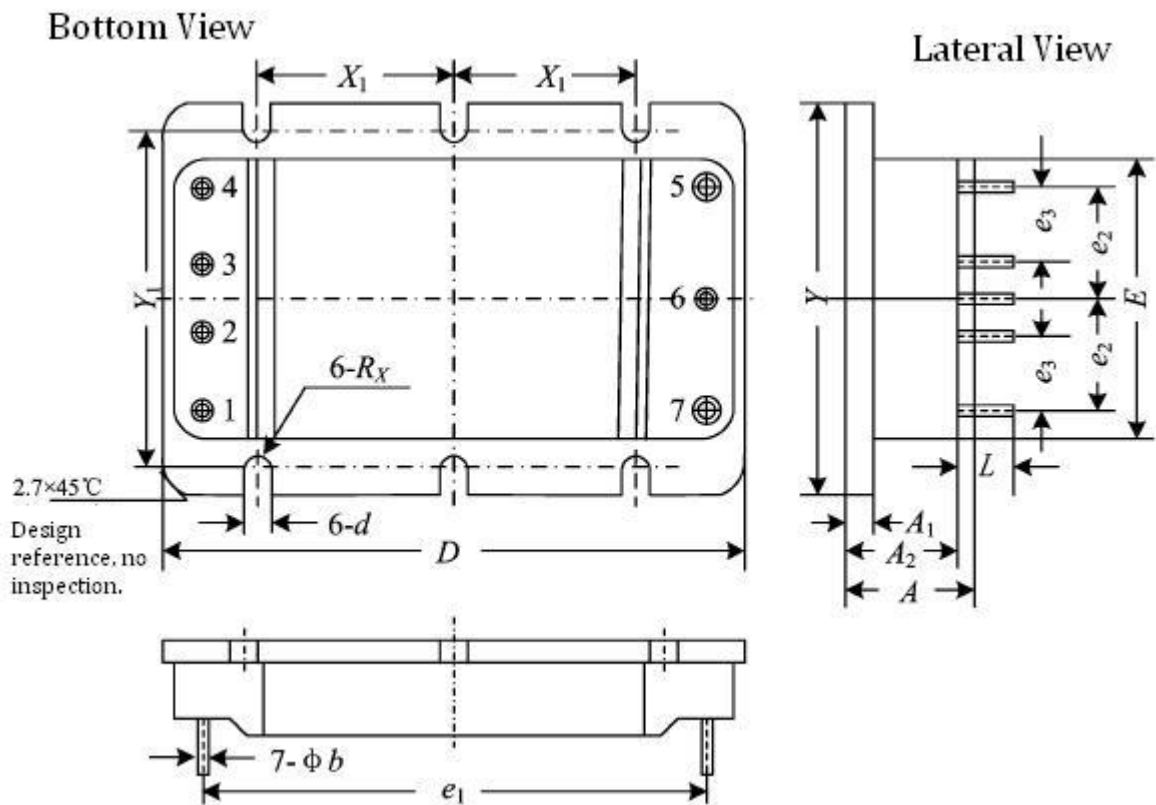


Chart 7 package outline drawing (upward view)

Form 5 Package Outline

Symbol	Data/mm		
	Min	Typical	Min
A	12.20	-	13.50
A ₁	2.80	-	3.30
A ₂	10.65	-	11.40
Φb	1.90	-	2.16
D	57.52	-	58.28
E	26.42	-	27.42
e2	-	10.16	-
e3	-	6.99	-
e1	-	50.80	-
L	4.58	-	-
X1	16.26	-	16.76
Y1	32.01	-	32.51
d	3.17	-	3.55
Y	36.58	-	37.08

11 Ordering Information

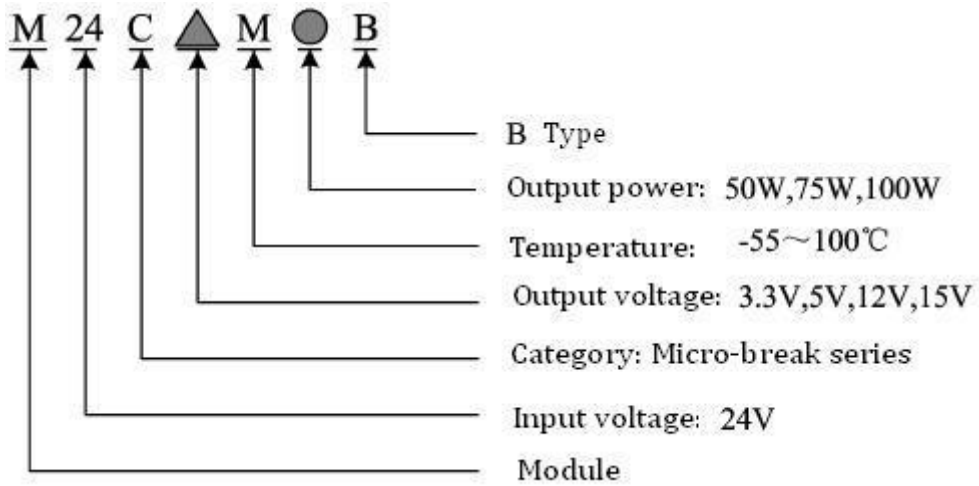


Chart 8 Ordering Information

Application Notes:

- ☆ The influence of external disturbance on the test accuracy should be avoided.
- ☆ The voltage detection point should be kept at the root of the pin of the testing product.
- ☆ Do not plug the product with electricity.
- ☆ Before power the testing product, you must confirm the polarity of the power supply to

avoid damaging products by misconnection. At the same time, please ensure that the power supply voltage and load current does not exceed using limitation of the testing product.

☆ When using the shell temperature can not exceed the specified temperature, or to increase the use of heat sink.

☆ When ordering this device , the detailed electrical specifications shall be based on relevant standards.