

2D14C_S3 & 2D14C_D3 Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter 2 Watt

- ⊕ High efficiency up to 85%
- ⊕ High density, high stability
- ⊕ 3000VDC Isolation
- ⊕ DIP package
- ⊕ Short circuit protection (SCP)
- ⊕ No heat sink required
- ⊕ Temperature range: -40°C ~ +85°C
- ⊕ No external component required
- ⊕ Industry standard pinout
- ⊕ RoHS compliance

The 2D14C_S3 & 2D14C_D3 series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$)
- 2) Where isolation is necessary between input and output (isolation voltage $\leq 3000\text{VDC}$)
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding. Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.



UL-60950-1 (E347551)

Common specifications	
Short circuit protection*:	• Continuous, self-recovery • 1 sec. MAX for following models: 2D14C_24xxS3/2D14C_24xxD3/ 2D14C_0512S3/ 2D14C_0515S3/ 2D14C_0524S3
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C – +85°C
Storage temperature range:	-55°C – +125°C
Lead temperature	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Case material:	Epoxy resin [UL94-V0]
MTBF:	>3,500,000 hours
Weight:	2.8g

* Supply voltage must be discontinued at the end of short circuit duration.

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy	See tolerance envelope graph					
Line regulation	For V_{in} change of 1%			±1.2	%	
Load regulation	10% to 100% load					
	• 5V output		10		%	
	• 9V output		9		%	
	• 12V output		8		%	
	• 15V output		7		%	
• 24V output		6		%		
Temperature drift	100% full load			±0.03	%/°C	
Ripple & Noise*	20MHz Bandwidth		75	200	mVp-p	
Switching frequency	Full load, nominal input		100		KHz	

*Test ripple and noise by "parallel cable" method. See detailed operation instructions.

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input filter	Filter capacitor					
Input current (full load / no load)	• 5VDC input		500/25	-/60	mA	
	• 12VDC input		208/15	-/50	mA	
	• 15VDC input		167/15	-/35	mA	
	• 24VDC input		105/10	-/30	mA	
Reflected ripple current			15		mA	
Surge voltage (1sec. max.)	• 5VDC input	-0.7		9	VDC	
	• 12VDC input	-0.7		18	VDC	
	• 15VDC input	-0.7		21	VDC	
	• 24VDC input	-0.7		30	VDC	

EMC specifications			
EMI	CE	CISPR22/EN55022 CLASS B (see EMC recommended circuit)	
EMI	RE	CISPR22/EN55022 CLASS B (see EMC recommended circuit)	
EMS	ESD - 2D14C_D3	IEC/EN61000-4-2 perf. Criteria B	Contact ±6KV
	ESD - 2D14C_S3	IEC/EN61000-4-2 perf. Criteria B	Contact ±8KV

Example:

2D14C_0505D3UP

2 = 2Watt; D14= DIP14; C = Pinning; 5Vin; 5Vout; D = Dual Output; 3 = 3kVDC; U = Unregulated Output; P = Short Circuit Protection

Note:

1. Operation under minimum load will not damage the converter. However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at $T_a = 25^\circ\text{C}$, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC	
Isolation resistance	Test at 500VDC	1000			MΩ	
Isolation capacitance	Input-output, 100KHz/0.1V					
	• 24V input		50		pF	
	• other input		20		pF	

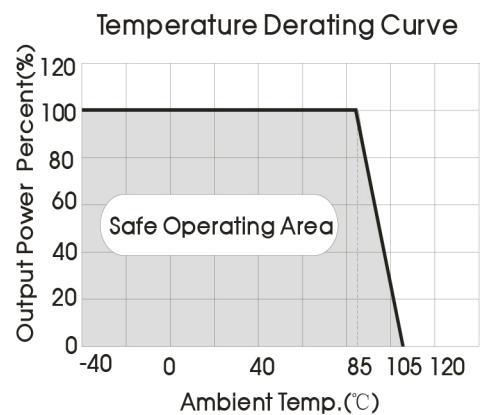
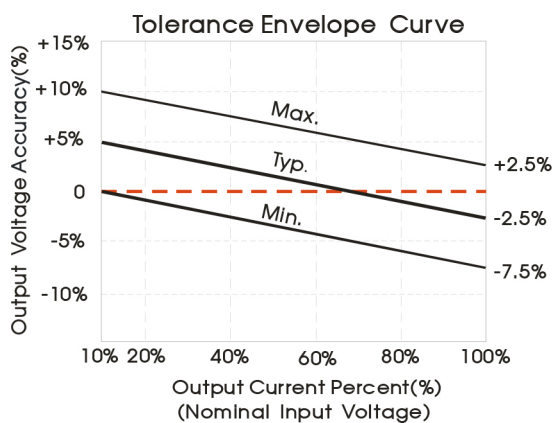
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Part Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency [% , typ]	Max. capacitive load* [μF]
2D14C_0505S3UP	5	5	400	80	220
2D14C_0509S3UP	5	9	222	84	220
2D14C_0512S3U	5	12	167	84	220
2D14C_0515S3U	5	15	133	84	220
2D14C_0524S3U	5	24	83	84	220
2D14C_1205S3UP	12	5	400	80	220
2D14C_1212S3UP	12	12	167	82	220
2D14C_1215S3UP	12	15	133	84	220
2D14C_1224S3UP	12	24	83	85	220
2D14C_1505S3UP	15	5	400	80	220
2D14C_1509S3UP	15	9	167	84	220
2D14C_1515S3UP	15	15	133	82	220
2D14C_2405S3U	24	5	400	80	220
2D14C_2409S3U	24	9	222	85	220
2D14C_2412S3U	24	12	167	83	220
2D14C_2415S3U	24	15	133	84	220
2D14C_2424S3U	24	24	83	85	220
2D14C_0505D3UP	5	±5	±200	80	100
2D14C_0509D3UP	5	±9	±111	84	100
2D14C_0512D3UP	5	±12	±83	84	100
2D14C_0515D3UP	5	±15	±67	84	100
2D14C_1205D3UP	12	±5	±200	80	100
2D14C_1212D3UP	12	±12	±83	83	100
2D14C_1215D3UP	12	±15	±67	85	100
2D14C_1224D3UP	12	±24	±42	85	100
2D14C_1509D3UP	5	±9	±111	84	100
2D14C_1515D3UP	5	±15	±67	84	100
2D14C_2405D3U	24	±5	±200	79	100
2D14C_2412D3U	24	±12	±83	83	100
2D14C_2415D3U	24	±15	±67	84	100
2D14C_2424D3U	24	±24	±42	84	100

* The capacitive loads of positive and negative outputs are identical.

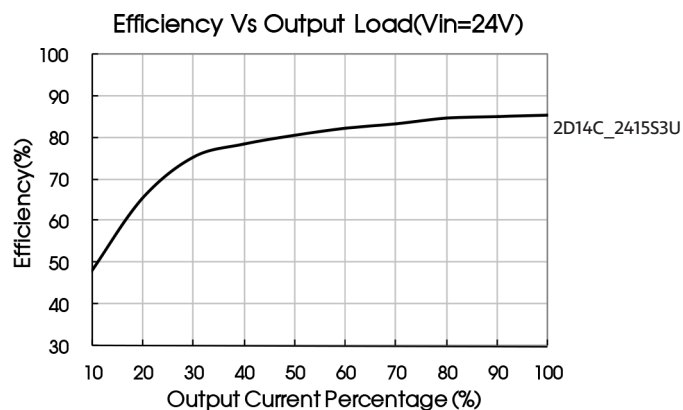
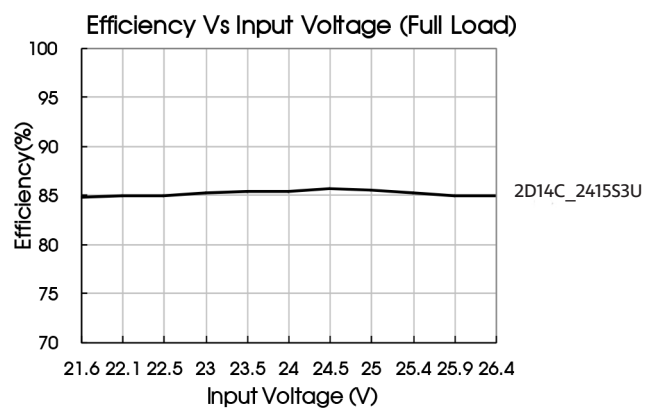
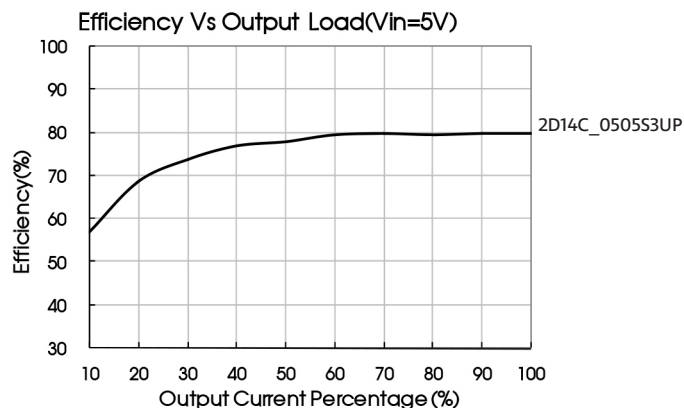
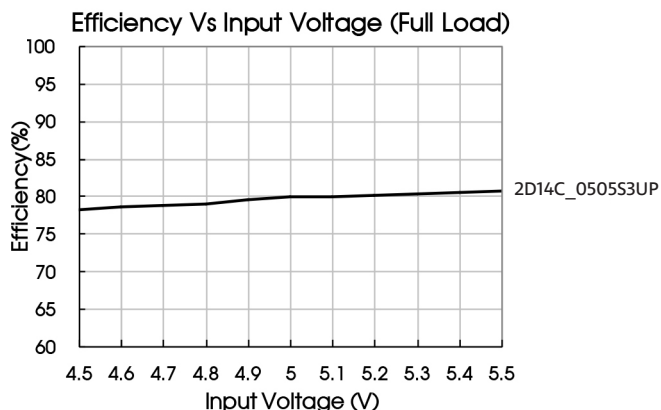
Typical characteristics



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Efficiency



Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.1. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running well, the recommended capacitive load values as shown in Table 1.

Dual



Single



Figure 1

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	0.47
-	-	24	0.47	±24	0.47

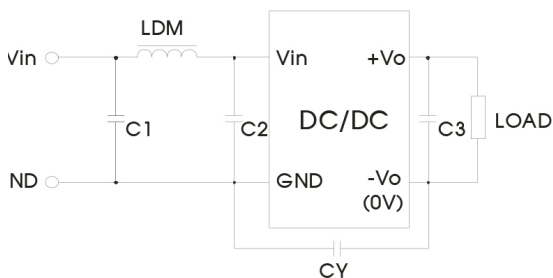
Table 1

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

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EMC typical recommended circuit (Class B)



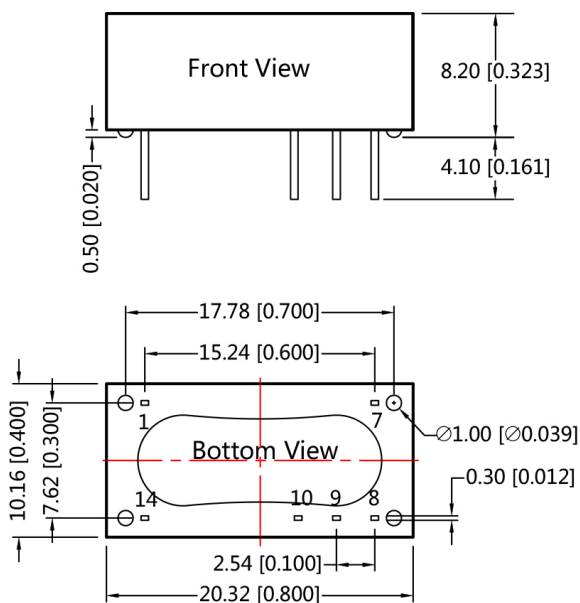
Input voltage (VDC)		5/12/15	24
EMI	C1/C2	4.7 μ F/50V	
	CY	--	1nF/3KV
	C3	Refer to the Cout in Fig.3	
	LDM	6.8 μ H	

Note: 1. 24V input series is subject to CY (CY : 1nF/3KV).
2. It is not needed to add the component in the peripheral circuit when the parameter with the symbol of "--".

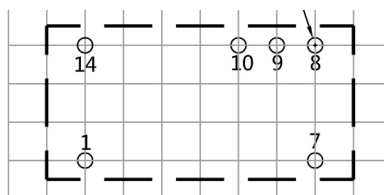
Output load requirements

To ensure the module works efficiently and reliably during operation, the minimum output load should be no less than 10% of the full load. If the actual output power is low, please connect a resistor to the output terminal in parallel, with a recommended resistance which is 10% of the rated power, and derating is required during operation.

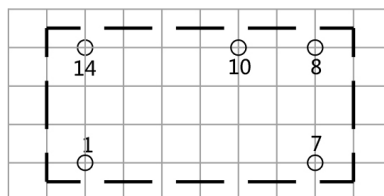
Mechanical dimensions



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$]
General tolerances: $\pm 0.25\text{mm}$ [$\pm 0.010\text{inch}$]



Single



Note : Grid 2.54*2.54mm

Table 1

Pin	Pin-Out	
	Single	Dulas
1	GND	GND
7	NC	NC
8	+Vo	+Vo
9	No Pin	0V
10	0V	-Vo
14	Vin	Vin

NC:No connection