



## 2T8A4\_3UP series

2W - Single Output DC-DC converter - Isolated & Unregulated

### DC-DC Converter

2 Watt

-  SMT8 case style
-  Operating temperature range: -40°C to +105°C
-  3000VDC isolation
-  Up to 85% efficiency
-  No-load input current as low as 5mA

Introducing our innovative 2T8A4\_3UP series — designed for versatility, reliability, and compact performance. Housed in an SMT8 case style, these converters operate efficiently across a wide temperature range from -40°C to +105°C, making them suitable for demanding industrial and automotive environments. With isolation rated at 3000 VDC and efficiency levels of up to 85%, the series ensures safe and stable power delivery. A no-load input current as low as 5 mA further supports energy-sensitive applications. Ideal for use in sectors such as energy, industrial control, communication, IoT, and automotive systems.



Common specifications	
Short circuit protection	Continuous, self-recovery
Switching frequency	220kHz (typ.) full load, nominal input voltage
Operating temperature	-40°C - +105°C (with derating)
Storage temperature	-55°C - +125°C
Case temperature rise	+25°C (Ta = 25°C nominal input, output load)
Reflow temperature	Peak temp. ≤240°C, max. duration time ≤60s over 217°C
Storage humidity	5-95% RH (non-condensing)
Input filter	Capacitance Filter
Hot plug	Unavailable
MTBF (MIL-HDBK-217F@25°C)	> 3,500,000 hours
Case material	Black plastic; flame-retardant and heat-resistant (UL94V-0 rated)
Package dimensions	13.50 x 11.10 x 7.25mm
Weight	1.7g (typ.)
Cooling method	Free air convection

Input specifications					
Item	Operating condition	Min	Typ	Max	Units
Input current (full load/no load)	5VDC Input		477/6		mA
	12VDC Input		196/4		
	15VDC Input		161/3		
	24VDC Input		98/3		
Reflected ripple current			30		mA
Impulse voltage	5VDC Input	-0.7		15	VDC
	12VDC Input	-0.7		18	
	15VDC Input	-0.7		21	
	24VDC Input	-0.7		30	

**Example:**  
**2T8A4\_0512S3UP**  
 2 = 2Watt; T8 = SMT8; A4 = Series; 05 = 5Vin; 12 = 12Vout; S = Single Output;  
 3 = 3kVDC isolation; U = Unregulated Output; P = Short circuit protection.

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	See envelope curve figure 1				
Linear regulation	Input voltage variation ±1%			±1.5	%
Load regulation (10% - 100% load)	3.3VDC output		13		%
	5VDC output		10		
	9VDC output		8		
	12VDC output		8		
Ripple & noise	20MHz bandwidth (peak-peak)		50	150	mV
Temperature coefficient	Full load		±0.02		%/°C

Isolation specifications					
Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Isolation resistance	Input-output, isolated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		20		pF

EMC specifications			
EMI	CE	CISPR32/EN55032	CLASS B
EMI	RE	CISPR32/EN55032	CLASS B
EMS	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV perf. criteria B

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at Ta = 25 °C, humidity <75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our corporate standards;
- Product specifications are subject to change without prior notice.

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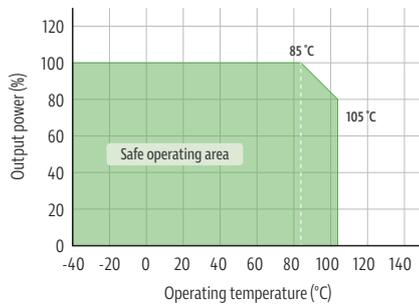
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## Product Selection Guide

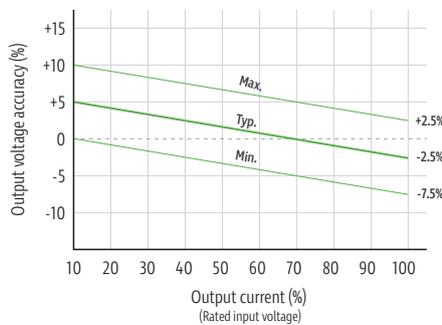
Approval	Part number	Input Voltage (VDC) Nominal	Output Voltage (VDC)	Output Current Max./Min.(mA)	Full Load Efficiency % (typ.)	Capacitive Load ( $\mu$ F) Max.
	2T8A4_0505S3UP	5	5	400/40	83	2400
	2T8A4_0509S3UP	5	9	222/22	83	1200
	2T8A4_0512S3UP	5	12	167/17	84	1000
	2T8A4_0515S3UP	5	15	133/13	84	560
	2T8A4_1205S3UP	12	5	400/40	83	2400
	2T8A4_1209S3UP	12	9	222/22	84	1200
	2T8A4_1212S3UP	12	12	167/17	84	1000
	2T8A4_1215S3UP	12	15	133/13	84	560
	2T8A4_1505S3UP	15	5	400/40	83	2400
	2T8A4_1509S3UP	15	9	222/22	84	1200
	2T8A4_1512S3UP	15	12	167/17	84	1000
	2T8A4_1515S3UP	15	15	133/13	84	560
	2T8A4_2403S3UP	24	3.3	400/40	82	2400
	2T8A4_2405S3UP	24	5	400/40	83	2400
	2T8A4_2409S3UP	24	9	222/22	84	1000
	2T8A4_2412S3UP	24	12	167/17	84	560
	2T8A4_2415S3UP	24	15	133/13	85	560

## Product characteristic curve

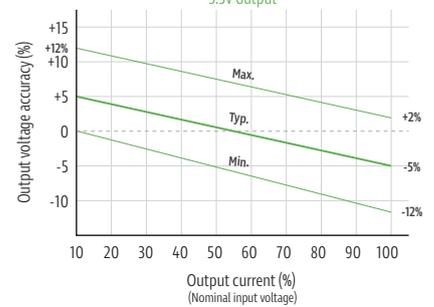
Temperature derating graph



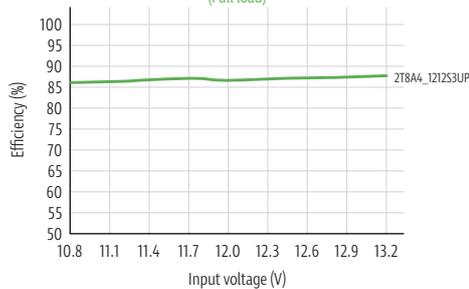
Output regulation curve



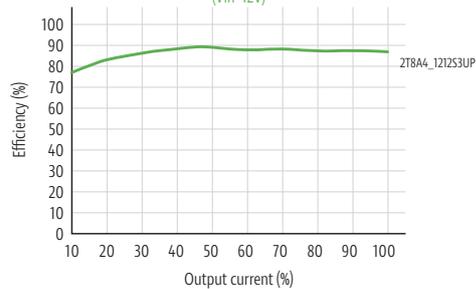
Output regulation curve  
3.3V output



Efficiency vs input voltage  
(Full load)



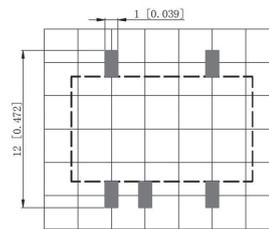
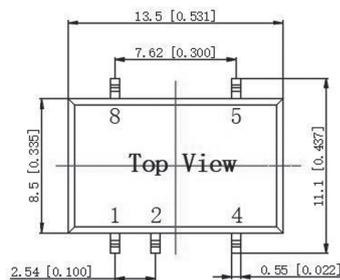
Efficiency vs output load  
(Vin=12V)



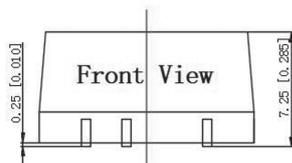
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### Mechanical dimensions



The grid distance is 2.54mm x2.54mm



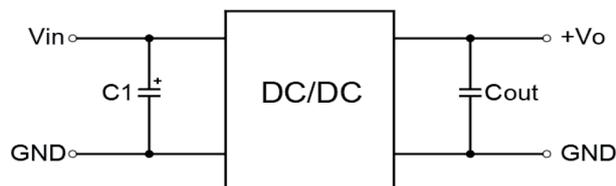
Note:  
Unit: mm [inch]  
Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]

Pin definition table

Pin	Function
1	GND
2	Vin
4	-Vo
5	+Vo
8	NC

NC: cannot be connected to any external circuit

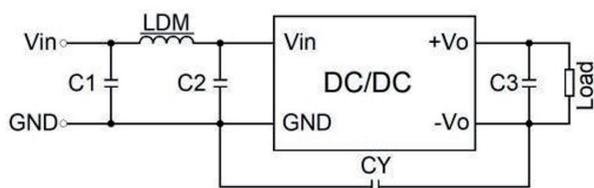
### Recommended circuits for applications



Recommended capacitive load value table

Vin (VDC)	Cin ( $\mu$ F)	Vo (VDC)	Cout ( $\mu$ F)
5VDC	10 $\mu$ F/16V	3.3/5VDC	10 $\mu$ F/10V
12VDC	2.2 $\mu$ F/25V	9/12VDC	2.2 $\mu$ F/25V
15VDC	1 $\mu$ F/25V	15VDC	1 $\mu$ F/25V
24VDC	1 $\mu$ F/25V		
-			
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### Recommended EMC circuit



EMI recommended parameter table

Parameter	Value
C1, C2	4.7 $\mu$ F / 50 $\mu$ F
C3	Refer to the Cout parameter in figure 3
CY	270pF / 3kV
LDM	6.8 $\mu$ H

#### 1. Typical applications

To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals. The application circuit is shown in figure 3 however, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up problems. For each output, the recommended capacitive load values are shown in "Recommended Capacitive Load Value Table" for safe and reliable operation.

#### 2. EMC typical recommended circuit see figure 4

#### 3. Output load requirements

In order to ensure that the module can work efficiently and reliably, the minimum output load should not be less than 10% of the rated load when used. If the power required is really small, connect a resistor in parallel to the output end (the sum of the power consumed by the resistance and the power actually used is greater than or equal to 10% of the rated power).