1T10A4_1.5UP series

1W - Dual Output DC-DC converter - Isolated & Unregulated

DC-DC Converter 1 Watt

- SMT10 package type
- Operating temperature range: -40°C to +105°C
- 1500VDC isolation voltage
- Up to 88% efficiency
- No-load input current as low as 3mA
- MTBF: 3,500,000 hours

Introducing our new 1T10A4_1.5UP series, a compact and energy-efficient DC/DC converter solution designed for reliable performance in space-constrained and demanding applications. Housed in a robust SMT10 package, the series supports modern, high-density PCB layouts. The converters operate over an extended temperature range from –40 °C to +105 °C and provide a 1500 VDC isolation voltage, ensuring safe and stable operation under harsh environmental conditions. With efficiencies of up to 88 % and an ultra-low no-load input current of only 3 mA, the series is well suited for energy-sensitive and always-on applications. A high MTBF of 3,500,000 hours highlights the long-term reliability of the 1T10A4_1.5UP series, making it an excellent choice for industrial, embedded, and high-reliability designs.

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 typ. (Ta = 25°C, nominal input, output load)
Reflow soldering temperature	Peak temp.≤240°C, maximum duration time ≤60s over 217°C
Storage humidity	95% RH (noncondensing)
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	15.24 x 11.40 x 7.25 mm
Weight	1.6g (typ.)
Cooling method	Free air convection

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input current (full load/no load)	5VDC Input 12VDC Input 24VDC Input		243/6 100/5 51/3	256/-- 110/-- 65/--	mA
Reflected ripple current			15		mA
Impulse voltage	5VDC Input 12VDC Input 24VDC Input	-0.7 -0.7 -0.7		9 18 30	VDC

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

Example:
1T10A4_0505D1.5UP
1 = 1Watt; T10 = SMT10; A4 = Series; 05 = 5Vin; 05 = 05Vout; D = Dual Output; 1.5 = 1.5kVDC isolation; U = Unregulated Output; P = Short circuit protection.

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	See Figure 1				
Linear regulation	Input Voltage Variation ±1%		±1.2		%
Load regulation (10% - 100% load)	3.3VDC output 5VDC output Other output		15 10 7	20 15 10	%
Ripple & noise	20MHz Bandwidth(peak-peak)	--	60	150	mV
Temperature coeffcient	Full Load		±0.03	--	%/°C

Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Insulation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500			VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000			MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		20		pF

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. 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;
3. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this datasheet;
4. The maximum capacitive load is tested within the input voltage range and under full load conditions;
5. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
6. All indicator testing methods in this datasheet are based on our company's standards;
7. For specific requirements please contact our technical team directly;
8. Product specifications are subject to change without prior notice.

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Product Selection Guide

Approval	Part number	Input Voltage (VDC) Nominal	Output Voltage (VDC)	Output Current min. (mA)	Output Current max. (mA)	Full Load Efficiency % (typ.)*	Capacitive Load (µF) max. **
	1T10A4_0503D1.5UP	5	±3.3	±15	±152	78	1200
	1T10A4_0505D1.5UP	5	±5	±10	±100	82	1200
	1T10A4_0509D1.5UP	5	±9	±6	±56	83	470
	1T10A4_0512D1.5UP	5	±12	±4	±42	83	220
	1T10A4_0515D1.5UP	5	±15	±4	±34	83	220
	1T10A4_0524D1.5UP	5	±24	±3	±21	83	100
	1T10A4_12153D1.5UP	12	±15	±4	±34	83	220
	1T10A4_24053D1.5UP	24	±5	±10	±100	85	1200
	1T10A4_24153D1.5UP	24	±15	±4	±34	88	220

Product characteristic curve

Temperature derating graph

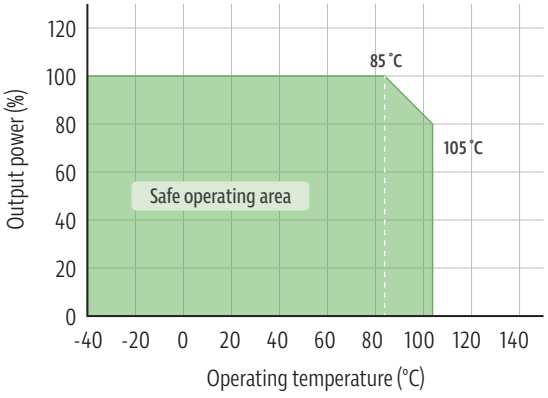


Figure 2

Output regulation curve

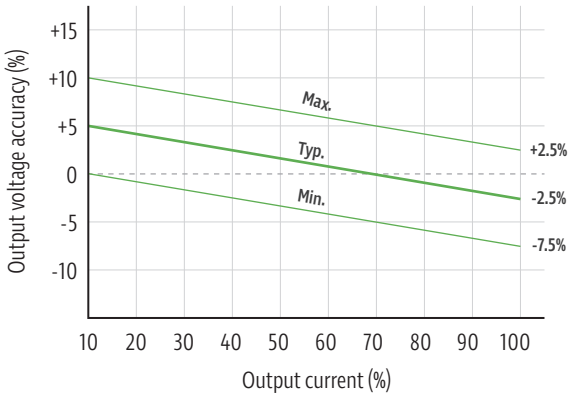


Figure 1-1

Output regulation curve
3.3VDC output

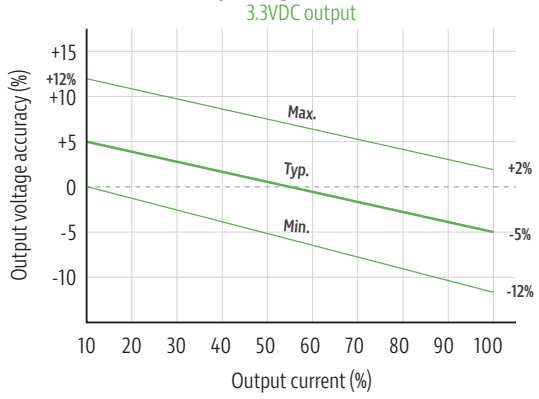


Figure 1-2

Recommended circuits for application

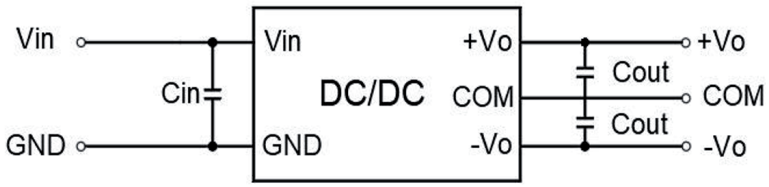


Figure 3

Recommended Capacitive Load Value Table

Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
5/12VDC	4.7uF/16V	3.3/5VDC	10μF
24VDC	1.0uF/50V	9/12/15VDC	2.2μF

Recommended EMC circuit

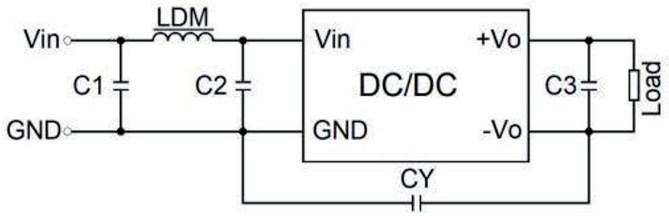


Figure 4

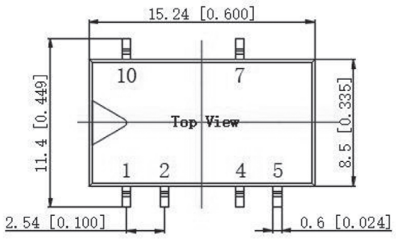
EMI Recommended Parameter Table		
Vin (VDC)	5VDC	24VDC
C1/C2	4.7μF /25V	4.7μF /50V
CY	1nF/2KV	
C3	Refer to the Cout in figure 3	
LDM	6.8μH	

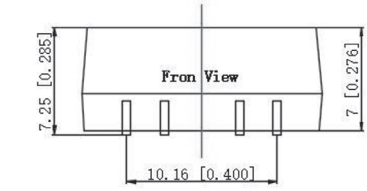
1. Typical applications
If further reduction of input and output ripple is required, a capacitor filtering network can be connected at the input and output terminals, and the application circuit is shown in figure 3.
However, attention should be paid to selecting appropriate filtering capacitors. If the capacitance is too large, it is likely to cause startup problems.
For each output, while ensuring safe and reliable operation, please refer to the recommended capacitive load value table above.

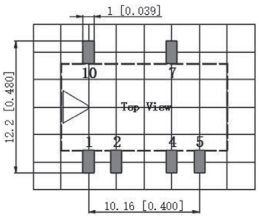
2. EMC typical recommended circuit see figure 4.

3. Output load requirements
To ensure the efficient and reliable operation of the module, its minimum output load should not be less than 10% of the rated load when in use. If your required power is indeed small, please connect a resistor in parallel at the output end (the sum of the power consumed by the resistor and the actual power used is greater than or equal to 10% of the rated power).

Mechanical Dimensions







The grid distance is 2.54mm x2.54mm

Note:
Unit: mm [inch]
Pin section tolerances: ±0.10 [±0.004]
General tolerances: ±0.50 [±0.020]

Pin Definition Table

Pin	Function
1	GND
2	Vin
4	COM
5	-Vo
7	+Vo
10	NC

NC: cannot be connected to any external circuit