1T8A4_3UP series

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

DC-DC Converter 1 Watt

- SMD8 package type
- Operating temperature range: -40°C to +105°C
- 1500VDC isolation voltage
- Up to 88% efficiency
- No-load input current as low as 5mA
- MTBF: 3,500,000 hours

Introducing our new 1T8A4_3UP series — a compact, high-performance DC-DC converter line in a space-saving SMD8 package, engineered for demanding, thermally challenging applications. Operating reliably across a wide temperature range from –40°C to +105°C and featuring a reinforced 3000 VDC isolation voltage, this series delivers robust electrical protection and excellent long-term stability. With efficiency levels of up to 88% and a no-load input current as low as 5 mA, the converters offer highly efficient power usage even in low-load or standby conditions. An impressive MTBF of 3,500,000 hours underscores the durability and reliability of the design, making the 1T8A4_3UP series an ideal choice for modern high-density, high-efficiency system architectures.

UL62368 - E347551

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 soldering temperature	Peak temp. ≤245°C, maximum duration time ≤60s over 217°C
Storage humidity	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 11.00 x 7.25 mm
Weight	1.7g (typ.)
Cooling method	Free air convection

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input current (full load/no load)	3.3VDC Input 5VDC Input 12VDC Input 15VDC Input 24VDC Input		370/6 230/5 99/4 78/3 51/3	--/17 --/15 --/15 --/15 --/15	mA
Reflected ripple current			15		mA
Impulse Voltage	3.3VDC Input 5VDC Input 12VDC Input 15VDC Input 24VDC Input	-0.7 -0.7 -0.7 -0.7 -0.7		9 15 18 21 30	VDC

Example:
1T8A4_0512S3UP
1 = 1Watt; 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%)	3.3VDC output Others output			±1.5 ±1.2	%
Load regulation (10% - 100% Load)	3.3VDC output 5VDC output 9VDC output 12VDC output 15VDC output 24VDC output		15 10 9 8 7 6		%
Ripple & Noise	20MHz bandwidth (peak to peak)		60	120	mV
Temperature Coeffcient	Full load		±0.03	--	%/°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

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. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this datasheet are based on our company's standards;
6. Product specifications are subject to change without prior notice.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

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.
	1T8A4_0303S3UP	3.3	3.3	30	303	80	2400
	1T8A4_0305S3UP	3.3	5	20	200	82	2400
	1T8A4_0309S3UP	3.3	9	11	111	83	1200
	1T8A4_0312S3UP	3.3	12	8	84	84	820
	1T8A4_0503S3UP	5	3.3	30	303	82	3000
	1T8A4_0505S3UP	5	5	20	200	85	3000
	1T8A4_0509S3UP	5	9	11	111	86	1200
	1T8A4_0512S3UP	5	12	8	84	86	820
	1T8A4_0515S3UP	5	15	7	67	86	680
	1T8A4_0524S3UP	5	24	4	42	87	330
	1T8A4_1203S3UP	12	3.3	30	303	82	3000
	1T8A4_1205S3UP	12	5	20	200	85	3000
	1T8A4_1209S3UP	12	9	11	111	86	1200
	1T8A4_1212S3UP	12	12	8	84	86	820
	1T8A4_1215S3UP	12	15	7	67	86	680
	1T8A4_1224S3UP	12	24	4	42	88	330
	1T8A4_1505S3UP	15	5	20	200	86	3000
	1T8A4_1512S3UP	15	12	8	84	87	820
	1T8A4_1515S3UP	15	15	7	67	88	680
	1T8A4_2403S3UP	24	3.3	30	303	82	3000
	1T8A4_2405S3UP	24	5	20	200	85	3000
	1T8A4_2409S3UP	24	9	11	111	86	1200
	1T8A4_2412S3UP	24	12	8	84	87	820
	1T8A4_2415S3UP	24	15	7	67	87	680
	1T8A4_2424S3UP	24	24	4	42	88	330

Product characteristic curve

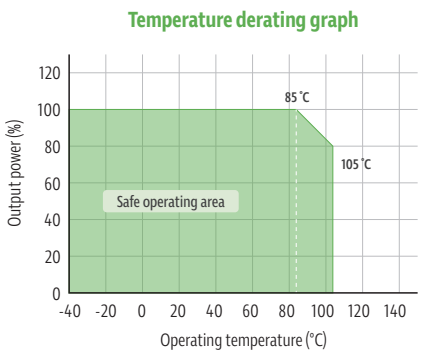


Figure 2

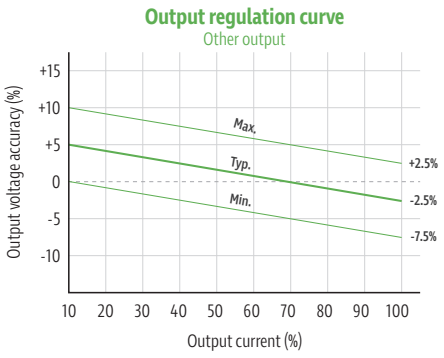


Figure 1-1

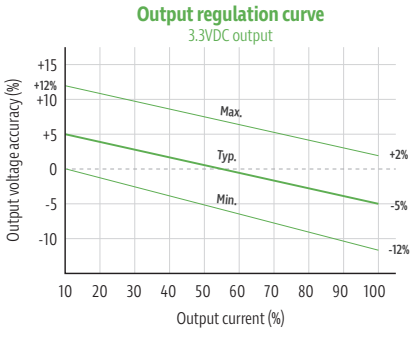
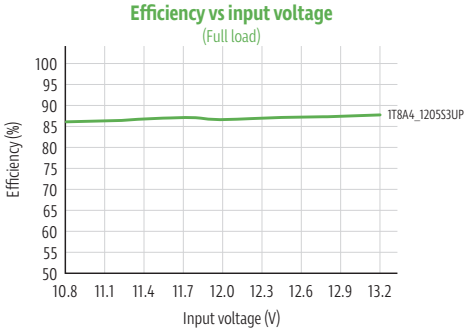
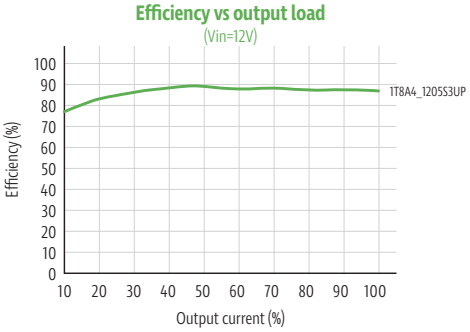
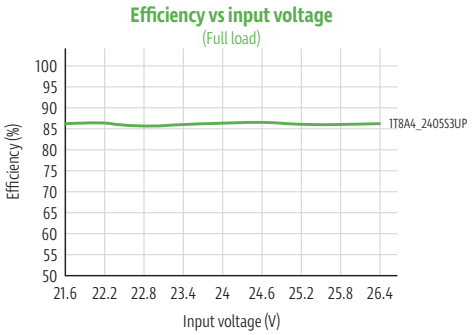


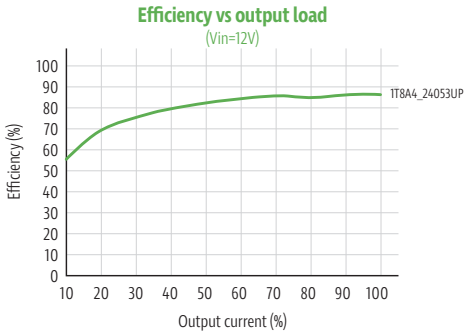
Figure 1-2





Product characteristic curve





Recommended circuits for applications

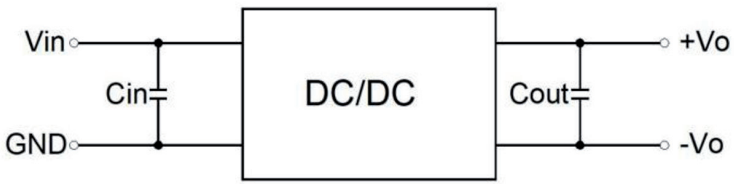


Figure 3

Recommended capacitive load value table

Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
3.3/5	10	3.3/5	10
12	4.7	9	4.7
15	2.2	12	2.2
24	1	15	1
--	--	24	0.47

Recommended EMC circuit

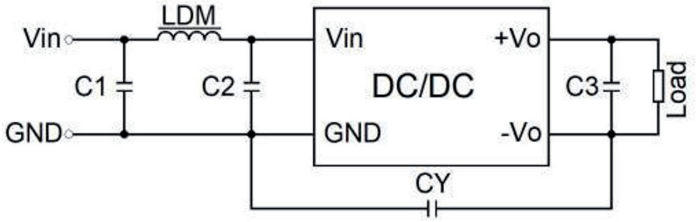


Figure 4

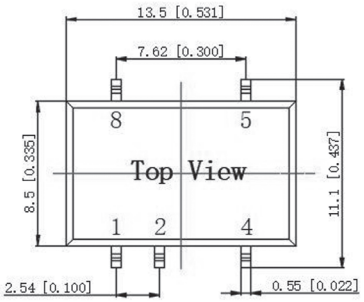
EMI recommended parameter table		
EMI	C1, C2	4.7μF / 50μF
	C3	Refer to the Cout parameter in Figure 3
	CY	270pF / 3kV
	LDM	6.8μH

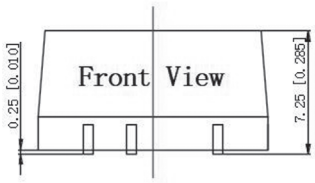
1. Typical applications
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals.The application circuit is shown in figure 3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is 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.

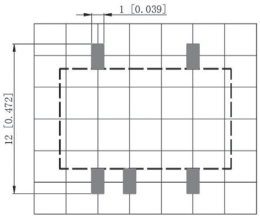
2. EMC typical recommended circuit (see figure 4)

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).

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	-Vo
5	+Vo
8	NC

NC: cannot be connected to any external circuit