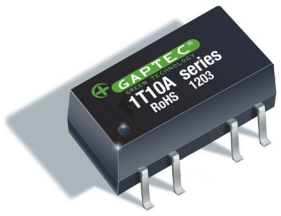
GAPTEC®
GREEN TECHNOLOGY



1T10A Series

1W - Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter 1 Watt

- Small footprint
- Miniature SMD package
- 1.5kVDC Isolation
- Short Circuit Protection (SCP)
- Internal surface mounted design
- Temperature Range: -40°C ~ +105°C
- International Standard Pinout
- No External Component Required
- RoHS Compliance

The 1T10A series are specially designed for applications where an isolated voltage is required in a distributed power supply system.

They are suitable for
1) Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);
2) Where isolation between input and output is necessary (isolation voltage ≤1500VDC);
3) Where the output voltage regulation is not strictly required;
4) Typical application: preceding-stage interference isolation condition; ground-interference canceled condition; digit circuit condition; Voltage-isolation converting condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.

SHORT CIRCUIT PROTECTED

100% RoHS compliant 6/6

c UL us
UL-60950-1 (E347551)

Common specifications

Short circuit protection*:	1s for 1T10A_0524D1.5UP and 1T10A_24xxD1.5UP Others: Continuous, self-recovery
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C Derating when operating temperature up to 100°C
Storage temperature range:	-55°C ~+125°C
Lead temperature	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%RH, non-condensing
Package material:	Epoxy Resin [UL94-V0]
MTBF (MIL-HDFK-217F@25°C):	>3,500,000 hours
Weight:	2.0g

* Supply voltage must be discontinued at the end of short circuit duration for the 1T10A_0524D1.5UP model and the 1T10A_24xxD1.5UP series.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 3.3V input • 5V input • 12V input • 15V input • 24V input		389/25 250/20 104/15 83/12 52/10	–/70 –/60 –/50 –/35 –/30	mA
Reflected ripple current			15		mA
Surge voltage (1sec. max.)	• 3.3V input • 5V input • 12V input • 15V input • 24V input	-0.7 -0.7 -0.7 -0.7 -0.7		5 9 18 21 30	VDC
Input filter	Filter capacitor				
Hot plug	unavailable				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Input-output, isolation voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100KHz/0.1V		20		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See Typical characteristics: tolerance envelope curve				
Line regulation	Input voltage change: ±1%			±1.2	%
Load regulation	10% to 100% load: • 5VDC output • 9VDC output • 12VDC output • 15VDC output • 24VDC output		 12 9 8 7 6		%
Temperature drift	100% full load			±0.03	%/°C
Ripple & noise*	20MHz Bandwidth		60	150	mVp-p
Switching frequency	Full load, nominal input		100		KHz
Reflow Soldering Temperature	Peak temp. ≤245°C, maximum duration time ≤60s at 217°C. For actual application, please refer to IPC/JEDEC J-STD-020D.1.				

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

EMC specifications

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

Example:
1T10A_0505D1.5UP
1 = 1Watt; T10 = SMT10; A = Pinning; 5Vin; 5Vout; D = Dual Output; 1.5 = 1.5kVDC; U = Unregulated Output; P = Short Circuit Protection (SCP)

Note:
1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at nominal input voltage and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25, humidity <75% with nominal input voltage and rated output load;
4. All index testing methods are based on our Company's corporate standards;
5. We can provide product customization service;
6. Specifications are subject to change without prior notice.

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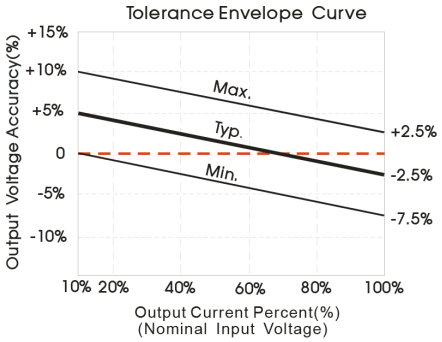
1T10A Series

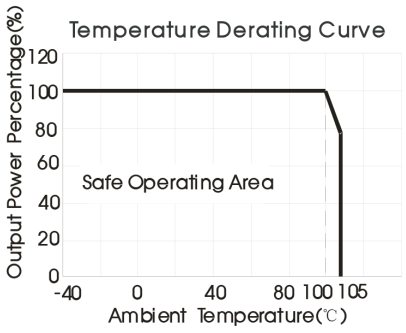
1W - Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Part Number	Input Voltage [VDC] Nominal (Range)	Output Voltage [VDC]	Output Current [mA]	Efficiency [%, min/typ]	Max. capacitive load [µF]
1T10A_0305D1.5UP	3.3 (2.97-3.63)	±5	±100	72/76	100
1T10A_0312D1.5UP	3.3 (2.97-3.63)	±12	±42	73/77	100
1T10A_0315D1.5UP	3.3 (2.97-3.63)	±15	±33	74/78	100
1T10A_0505D1.5UP	5 (4.5-5.5)	±5	±100	76/80	100
1T10A_0509D1.5UP	5 (4.5-5.5)	±9	±56	76/80	100
1T10A_0512D1.5UP	5 (4.5-5.5)	±12	±42	75/79	100
1T10A_0515D1.5UP	5 (4.5-5.5)	±15	±33	77/81	100
1T10A_0524D1.5UP	5 (4.5-5.5)	±24	±21	77/81	100
1T10A_1205D1.5UP	12 (10.8-13.2)	±5	±100	76/80	100
1T10A_1209D1.5UP	12 (10.8-13.2)	±9	±56	76/80	100
1T10A_1212D1.5UP	12 (10.8-13.2)	±12	±42	77/81	100
1T10A_1215D1.5UP	12 (10.8-13.2)	±15	±33	77/81	100
1T10A_1224D1.5UP	12 (10.8-13.2)	±24	±21	77/81	100
1T10A_1515D1.5UP	15 (13.5-16.5)	±15	±33	77/81	100
1T10A_2405D1.5UP	24 (21.6-26.4)	±5	±100	76/80	100
1T10A_2409D1.5UP	24 (21.6-26.4)	±9	±56	76/80	100
1T10A_2412D1.5UP	24 (21.6-26.4)	±12	±42	77/81	100
1T10A_2415D1.5UP	24 (21.6-26.4)	±15	±33	78/82	100
1T10A_2424D1.5UP	24 (21.6-26.4)	±24	±21	74/80	100

Note: The capacitive loads of positive and negative outputs are identical.

Typical characteristics

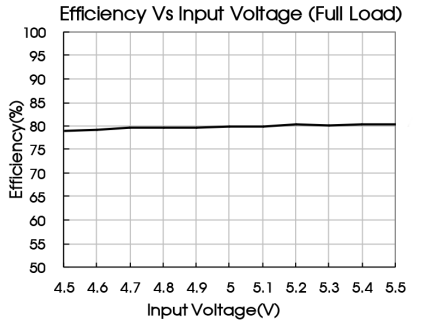


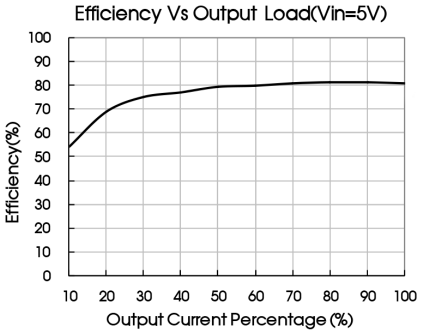


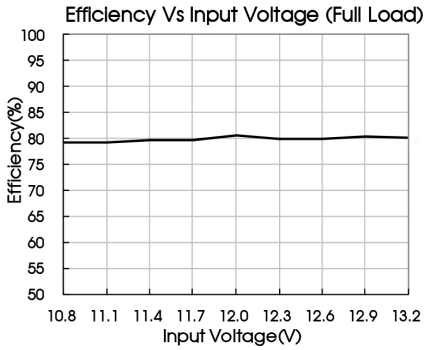
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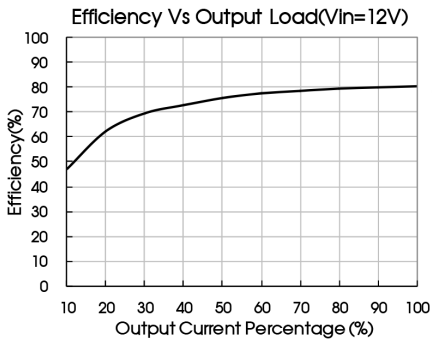
Specifications subject to change without notice.

Efficiency









Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1.

Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 2).

Recommended capacitive load value table

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

Table 1



Fig. 1

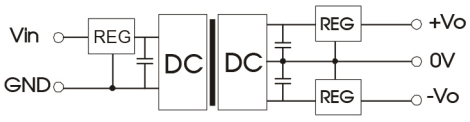
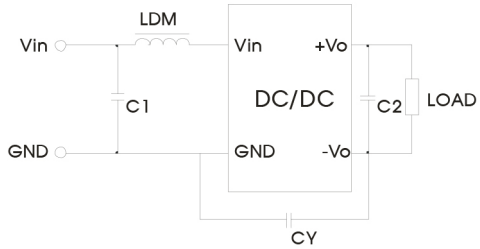


Fig. 2

EMC solution-recommended circuit



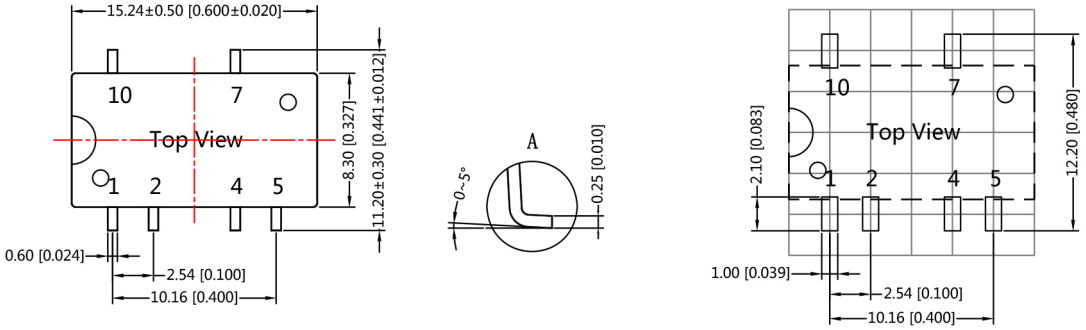
Input voltage (VDC)		3.3/5/12	15/24
EMI	C1	4.7µF/50V	
EMI	C2	Refer to the Cout in typical application circuit, fig. 1	
EMI	LDM	6.8µH	
EMI	CY	–	1nF/2KV

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

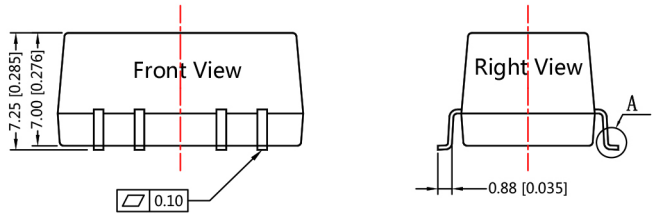
Output load requirements
When using, the minimum load of the module output should not be less than 10% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 10% dummy load in parallel at the output end, the dummy load is generally a resistor, Please note that the resistor needs to be used in derating.

Mechanical dimensions

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	-Vo
7	+Vo
10	NC

NC: No Connection

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10mm [±0.004inch]
General tolerances: ±0.25mm [±0.010inch]