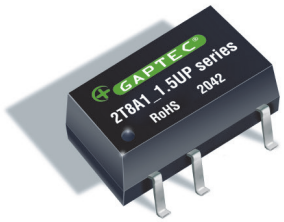
2T8A1_1.5UP series

2W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated
COMPACT SMD PACKAGE



DC-DC Converter 2 Watt

- Operating ambient temperature range: -40 to +105°C
- High efficiency up to 84%
- Compact SMD package
- I/O isolation test voltage 1.5kVDC
- Internal surface mount design
- No external components required
- Industry standard pin-out
- EN60950 approved

The 2T8A1_1.5UP series is designed for use in distributed power supply systems and especially suitable in applications such as pure digital circuits, low frequency analog circuits, noise and interference cancelling circuits, relay-driven circuits and data switching circuits, where

1. **The voltage of the input power supply is relatively stable with a variation of ±10%Vin or less;**
2. **An input to output isolation voltage of up to 1500VDC is necessary;**
3. **The requirement for ripple & noise or a tight output regulation is not as strict.**

Common specifications

Short circuit protection:	1s
Operation temperature:	• 40 - 105°C (3.3V/5V output; Derating when operatingtemperature≥ 71°C, see Fig. 2) • 40 - 105°C (Other output; Derating when operating temperature≥ 85°C, see Fig. 2)
Storage temperature:	-55°C ~+125°C
Storage humidity:	95%RH (Non-condensing)
Case Temperature Rise	25°C TYP (Ta=25°C, nominal input voltage, full load)
Reflow soldering temperature:*	Peak temp.≤245°C, maximum duration time≤60s over 217°C
Case material:	Epoxy resin [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Case Material:	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions:	12.70 x 11.20 x 7.25 mm
Weight:	1.4g TYP.
Cooling:	Free air convection

* The "parallel cable" method is used for Ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;
** At the end of the short circuit duration, the supply voltage must be disconnected from the modules.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 5V input • 12V input • 15V input • 24V input		506/30 212/25 169/18 105/15	-/60 -/50 -/35 -/30	mA mA mA mA
Reflected ripple current*			15		mA
Surge Voltage (1sec. max.)	• 5V input • 12V input • 15V input • 24V input	0.7 0.7 0.7 0.7		9 18 21 30	VDC VDC VDC VDC
Input Filter			Capacitor Filter		
Hot plug			Unavailable		

Note: * Please refer to DC-DC Converter Application Note for detailed description of Reflected ripple current testing method.

Output specifications

Item	Test condition	Min	Typ	Max	Units
voltage accuracy	See output regulation curve (Fig. 1)				
Line regulation	Input voltage change:±1% • 3.3V output • Other outputs			±1.2	%%
Load regulation	10% to 100% load • 3.3VDC output • 5VDC output • 9VDC output • 12VDC output • 15VDC output • 24VDC output			 18 12 9 8 7 6	 % % % % % %
Temperature Coefficient	Full load			±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth • 24V output • Other outputs		 100 100	 200 150	 mVp-p mVp-p
Switching frequency	Full load, nominal input		270		KHz

* The "parallel cable" method is used for Ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;
** At the end of the short circuit duration, the supply voltage must be disconnected from the modules.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 min., leak current lower than 1mA	1500			VDC
Isolation resistance	Input-output, insulation voltage 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		20		pF

Example:
2T8A1_1205S1.5UP
2 = 2Watt; T8 = SMT8; A1 = Series; 12 = 12Vin; 05 = 5Vout;
S = Single output; 1.5 = 1.5kVDC isolation; U=Unregulated output
P = Short circuit protection

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 input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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

EMC specifications					
Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)			
Emissions	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)			
Immunity	ESD	IEC/EN61000-4-2	Contact	±8KV	perf. Criteria B

Product Selection Guide

Certification	Part Number	Input Voltage [V] [Nominal (Range)]	Output Voltage [VDC]	Output current [mA; max/min]	Efficiency [%; Min. / Typ] @ full load	Capacitive Load (µF)
CE	2T8A1_0503S1.5UP	5 (4.5-5.5)	3.3	400/40	68/72	220
CE	2T8A1_0505S1.5UP	5 (4.5-5.5)	5	400/40	75/79	220
CE	2T8A1_0509S1.5UP	5 (4.5-5.5)	9	222/22	78/82	220
CE	2T8A1_0512S1.5UP	5 (4.5-5.5)	12	167/17	78/82	220
CE	2T8A1_0515S1.5UP	5 (4.5-5.5)	15	133/13	79/83	220
CE	2T8A1_1205S1.5UP	12 (10.8-13.2)	5	400/40	75/79	220
CE	2T8A1_1209S1.5UP	12 (10.8-13.2)	9	222/22	78/82	220
CE	2T8A1_1212S1.5UP	12 (10.8-13.2)	12	167/17	78/82	220
CE	2T8A1_1215S1.5UP	12 (10.8-13.2)	15	133/13	79/83	220
CE	2T8A1_1224S1.5UP	12 (10.8-13.2)	24	83/8	80/84	220
-	2T8A1_1505S1.5UP	15 (13.5-16.5)	5	400/40	73/77	220
CE	2T8A1_1515S1.5UP	15 (13.5-16.5)	15	133/13	79/83	220
CE	2T8A1_2405S1.5UP	24 (21.6-26.4)	5	400/40	75/79	220
CE	2T8A1_2409S1.5UP	24 (21.6-26.4)	9	222/22	78/82	220
CE	2T8A1_2412S1.5UP	24 (21.6-26.4)	12	167/17	78/82	220
CE	2T8A1_2415S1.5UP	24 (21.6-26.4)	15	133/13	79/83	220
CE	2T8A1_2424S1.5UP	24 (21.6-26.4)	24	83/8	80/84	220

Typical characteristics

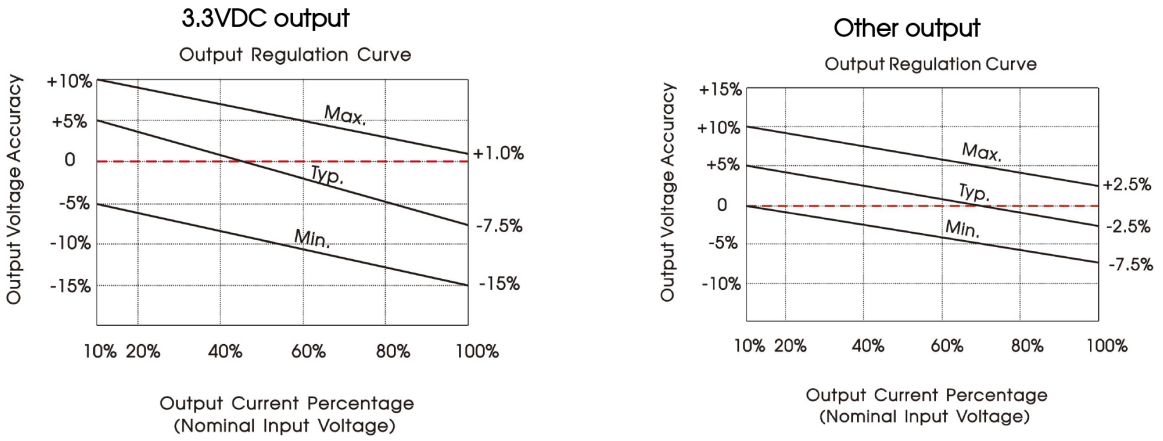


Fig. 1

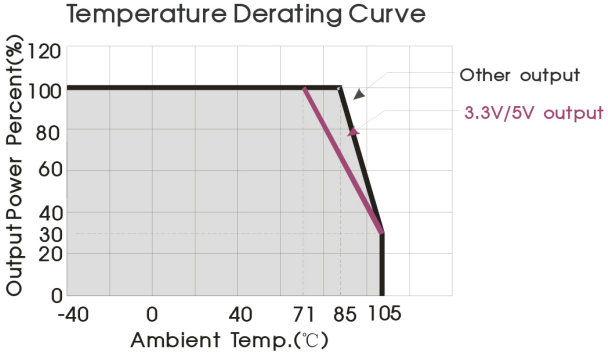
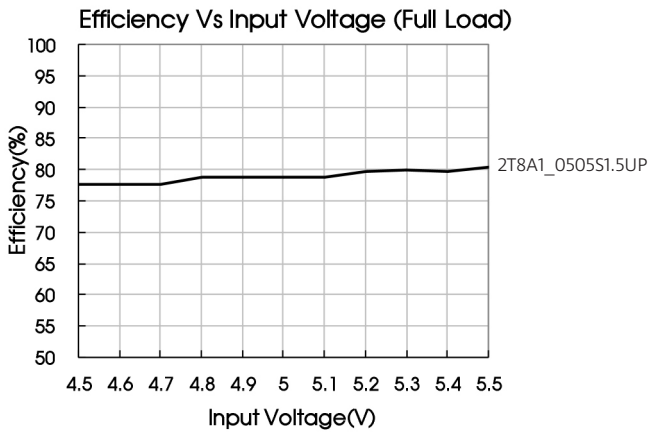
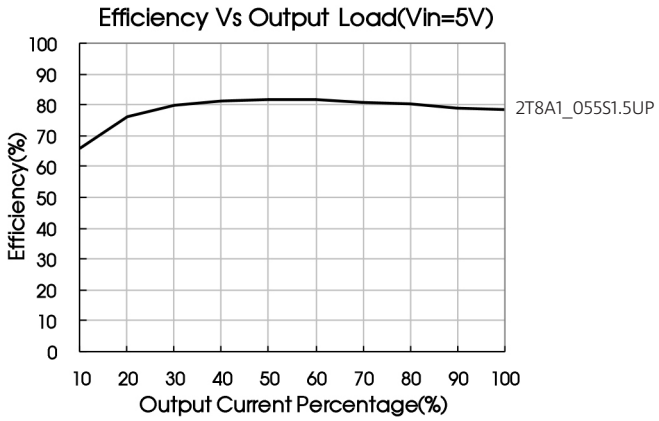


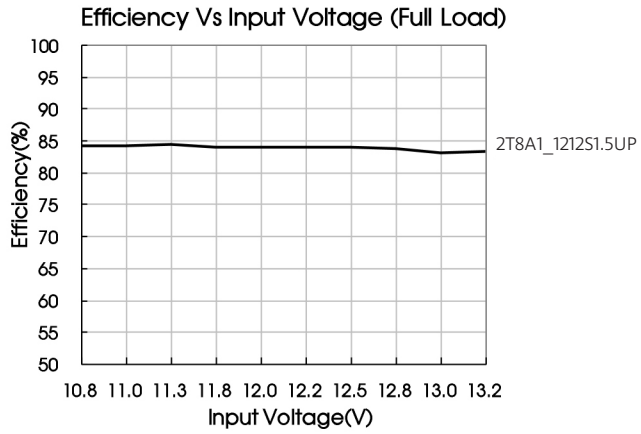
Fig. 2

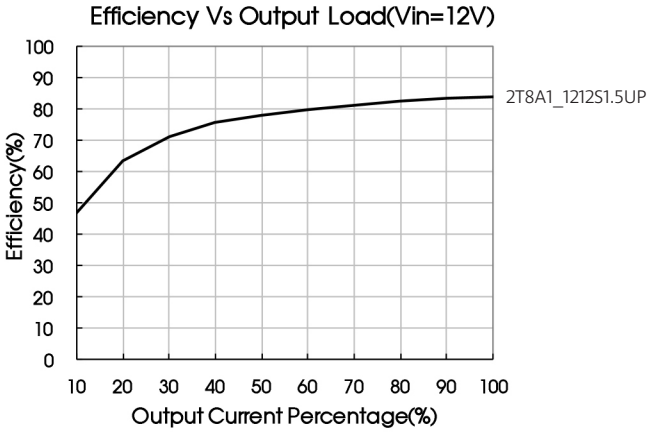
GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

Efficiency









Typical application circuit

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.3.
Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

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

Table 1: Recommended input and output capacitor valu-

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

EMC solution-recommended circuit

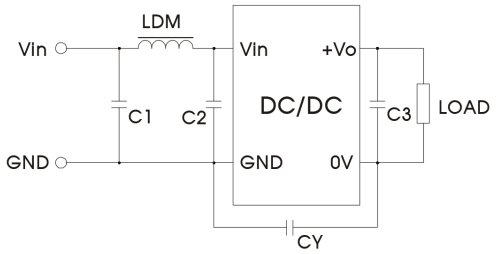


Fig. 4

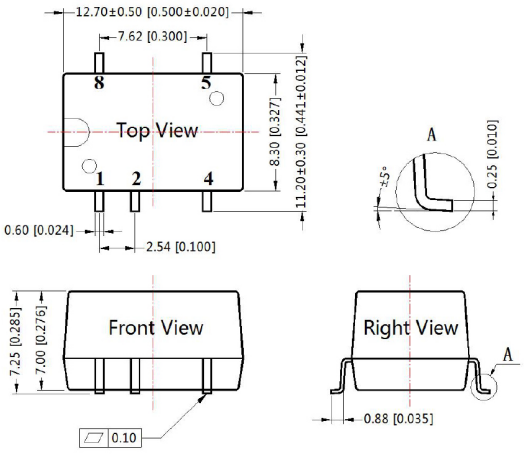
Input voltage (VDC)		5/12/15	24
EMI	C1	4.7μF /50V	
EMI	C2	4.7μF /50V	
EMI	C3	Refer to the Cout in Fig.3	
EMI	CY	-	1nF/2KV
EMI	LDM	6.8μH	

Minimum Output Load Requirement

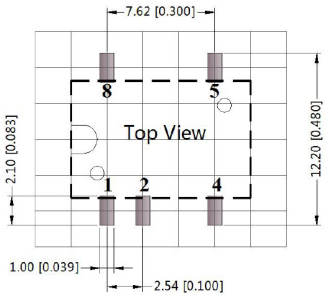
For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

Dimensions and recommended layout

THIRD ANGLE PROJECTION



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



Note:
Grid 2.54*2.54 mm

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

NC : Pin to be isolated from circuitry

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