1T8A1_1.5UP series

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

DC-DC Converter 1 Watt

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temp. range: -40°C to +105°C
- Compact SMD package
- I/O isolation test voltage: 1.5kVDC isolation
- Industry standard pin-out
- High efficiency up to 85%

The 1T8A1_1.5UP series series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

UL-62368-1 (E347551)

Common specifications

Short circuit protection	Continuous, self-recovery
Operation temperature	-40°C ~ +105°C (Derating when operating temperature≥100°C,(see Fig. 2))
Storage temperature	-55°C ~ +125°C
Case temperature rise	25°C (Ta=25°C)
Storage Humidity	5%RH ~ 95%RH (Non-condensing)
Reflow Soldering Temperature*	Peak temp.≤245°C, maximum duration time≤60s over 217°C
MTBF	>3,500,000 hours (MIL-HDBK-217F@25°C)
Moisture Sensitivity Level (MSL)	(Level 1) IPC/JEDEC J-STD-020D.1
Casing material	Black flame-retardant, heat-resistant plastic [UL94-V0]
Dimensions:	13.20*11.40*7.25 mm
Weight:	1.4g
Cooling	Free air convection
MSL (Moisture sensitivity level):	J-STD-020D standard - Level 1

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	12VDC input				
	• 5VDC output		102/8	107/-	mA
	• 9/12/15VDC output		101/8	106/-	mA
	• 24VDC output		99/8	103/-	mA
	15VDC input				
	• 5VDC output		82/8	86/-	mA
	• 15VDC output		81/8	85/-	mA
	24VDC input				
	• 5/9/12/15VDC output		51/8	55/-	mA
	• 24VDC output		50/8	53/-	mA
Reflected ripple current			30		mA
Surge voltage (1 sec. max.)		-0.7		18	VDC
		-0.7		21	VDC
		-0.7		30	VDC
Input filter	Capacitance filter				
Hot plug	Unavailable				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 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 output regulation curves				
Line regulation	Input voltage change: ±1%			1.2	%
Load regulation	10% to 100% load				
	• 5V output		10	15	%
	• 9V output		8	10	%
	• 12V output		7	10	%
	• 15V output		6	10	%
	• 24V output		5	10	%
Ripple & Noise*	20MHz Bandwidth				
	• 5/9/12/15VDC DC output		30	75	mVp-p
	• 24VDC output		50	100	mVp-p
Temperature coefficient	full load		±0.02		%/°C
Switching frequency	Full load, nominal input		260		KHz

The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)
EMI	RE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV perf. Criteria B

Example:
1T8A1_0505S1.5UP
1 = 1Watt; T8 = SMT8; A1 = Pinning; 05 = 5Vin; 05 = 5Vout; S = Single output; 1.5 = 1.5kVDC; U = Unregulated output; P = Short circuit

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 data-sheet;
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's 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.

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1T8A1_1.5UP series

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Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_0503S1.5UP	5	3.3	303	2400	70/74	UL/CE
1T8A1_0505S1.5UP	5	5	200	2400	78/82	UL/CE
1T8A1_0509S1.5UP	5	9	111	1000	79/83	UL/CE
1T8A1_0512S1.5UP	5	12	84	560	79/83	UL/CE
1T8A1_0515S1.5UP	5	15	67	560	79/83	UL/CE
1T8A1_0524S1.5UP	5	24	42	220	81/85	UL/CE

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_1205S1.5UP	12	5	200	2400	78/82	UL/CE
1T8A1_1209S1.5UP	12	9	111	1000	79/83	UL/CE
1T8A1_1212S1.5UP	12	12	84	560	79/83	UL/CE
1T8A1_1215S1.5UP	12	15	67	560	79/83	UL/CE
1T8A1_1224S1.5UP	12	24	42	220	81/85	UL/CE

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_1505S1.5UP	15	5	200	2400	78/82	UL/CE
1T8A1_1515S1.5UP	15	15	67	560	79/83	UL/CE

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_2405S1.5UP	24	5	200	2400	76/82	UL/CE
1T8A1_2409S1.5UP	24	9	111	1000	77/83	UL/CE
1T8A1_2412S1.5UP	24	12	111	560	77/83	UL/CE
1T8A1_2415S1.5UP	24	15	67	560	77/83	UL/CE
1T8A1_2424S1.5UP	24	24	42	220	79/85	UL/CE

Design Reference

1. Typical application

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.

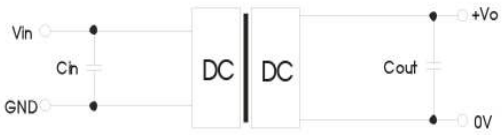


Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
12VDC	2.2µF/25V	5VDC	10µF/16V
15VDC	2.2µF/25V	9VDC	2.2µF/16V
24VDC	1µF/50V	12VDC	2.2µF/25V
--	--	15VDC	1µF/25V
--	--	24VDC	1µF/50V

2. EMC (CLASS B) compliance circuit

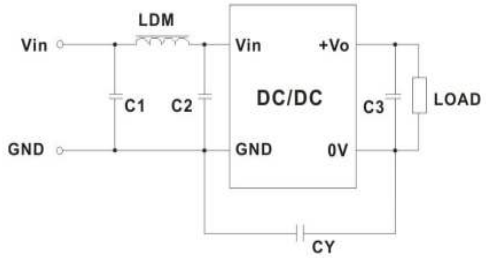


Fig.4

Table 2: EMC recommended circuit value table

EMI	C1	4.7µF /50V
	C2	4.7µF /50V
	CY	270pF/2kV
	C3	Refer to the Cout in table 1
	LDM	6.8µH

3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 1% of the rated output load. If the total required output power is below 1%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 1% minimum.

Typical characteristics

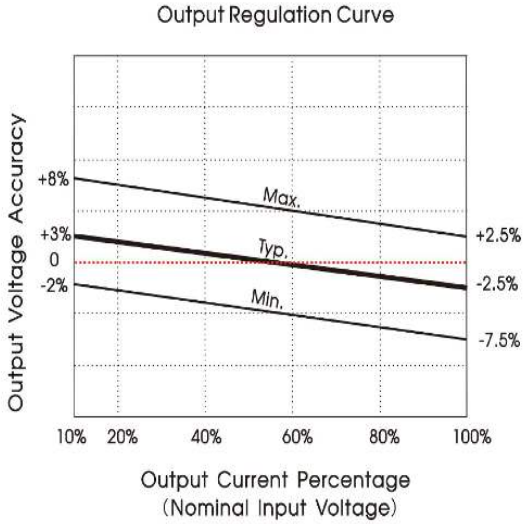


Fig. 1

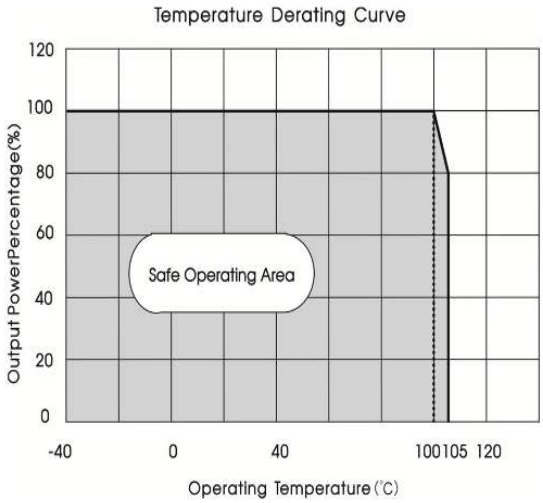
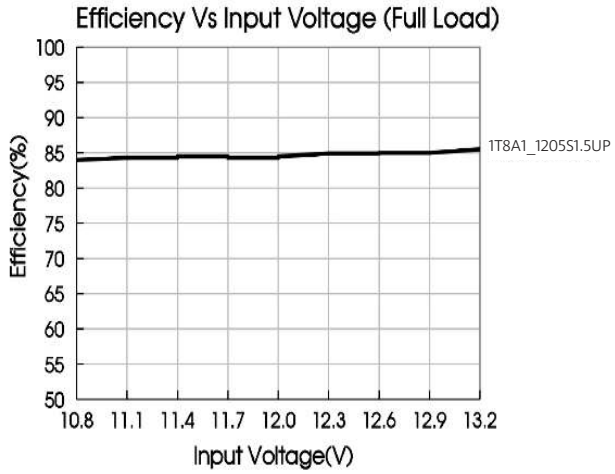
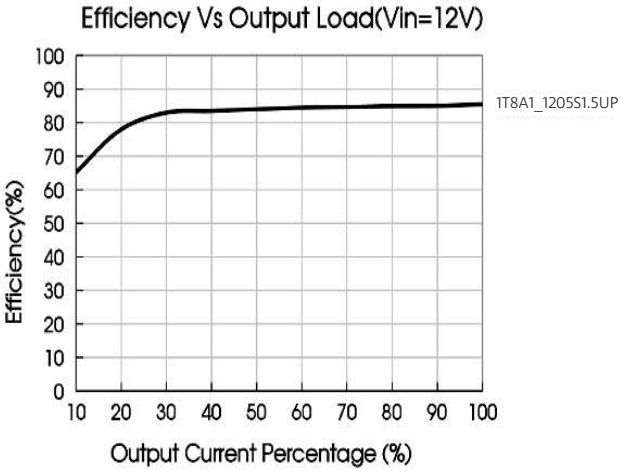
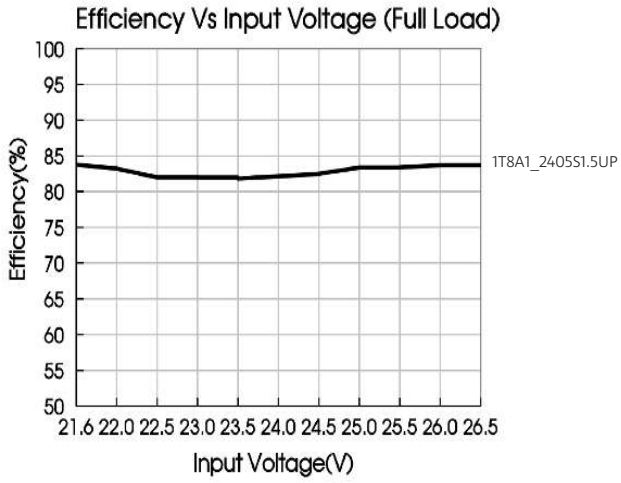
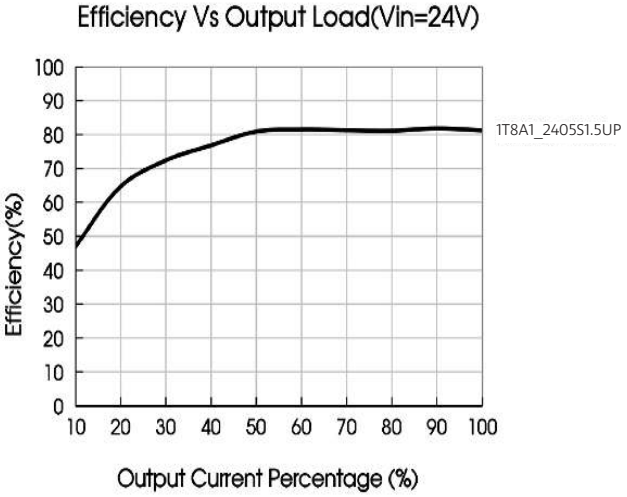


Fig. 2



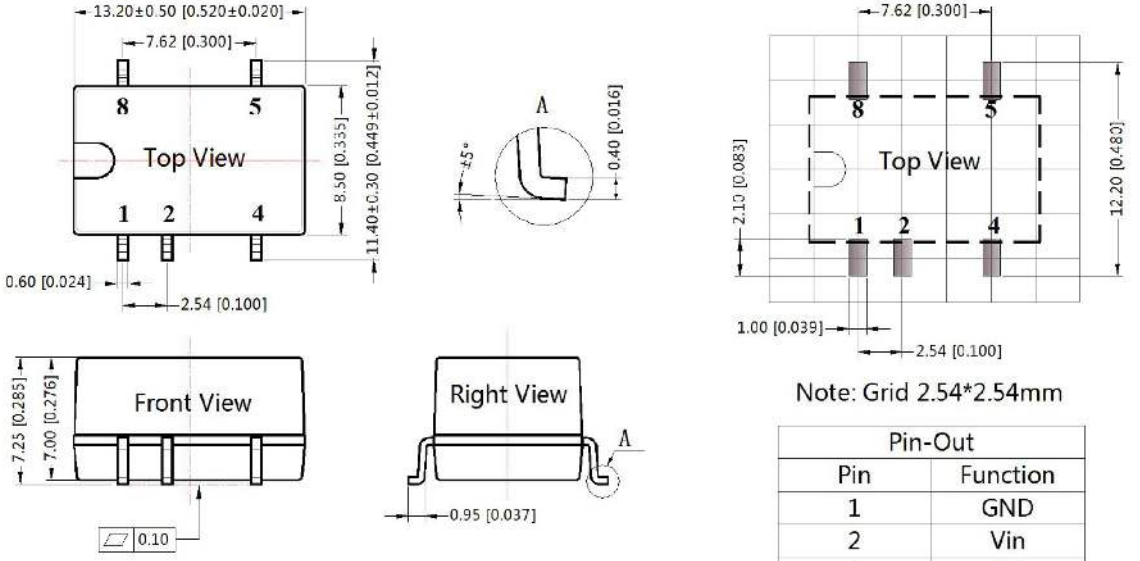






Mechanical dimensions

THIRD ANGLE PROJECTION



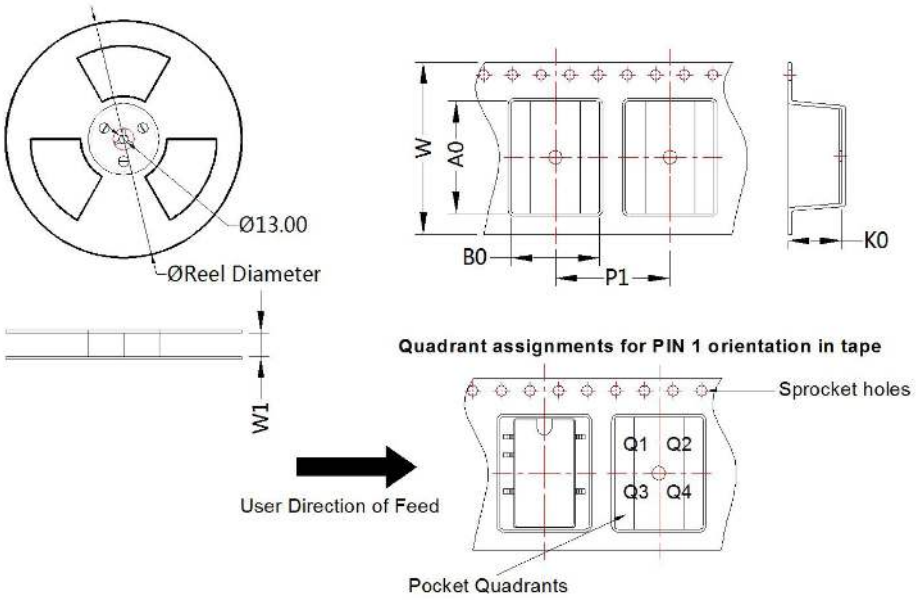
Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Note: Grid 2.54*2.54mm

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

NC: Pin to be isolated from circuitry

Tape and Reel Info



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1