1T8A1_3UP series

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

DC-DC Converter 1 Watt

- Compact SMD package
- High efficiency up to 85%
- 3000VDC isolation
- Short circuit protection (SCP)
- Temperature range: -40°C ~ +105°C
- Industry standard pinout
- RoHS compliance
- No-load input current as low as 5mA

The 1T8A1_3UP series is specially designed for applications where an isolated voltage is required in a distributed power supply system.

These products apply to:
1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%)
2) Where isolation is necessary between input and output (isolation voltage ≤3000VDC)
3) Where the regulation of the output voltage and the output ripple noise are not demanding

Such as: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

UL-62368-1 (E347551)

Common specifications

Short circuit protection:	Continuous, automatic recovery
Temperature rise at full load: (Ta= 25°C)	• 3.3V output: 25°C TYP • Others: 15°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C
Storage temperature range:	-55°C ~+125°C
Pin welding resistance temperature:	300°C MAX, 1.5mm from case for 10 sec
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.
Storage humidity range:	< 95%
Casing material:	Black flame-retardant and heat-resistant plastic [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Weight:	1.4g
Dimensions:	13.20*11.40*7.25 mm
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)	• 3.3/5VDC input • 9/12VDC input • 15/24VDC input		270/5 241/12 241/18	286/10 254/20 254/30	mA mA mA
Reflected ripple current			15		mA
Input surge voltage (1 sec. max.)		-0.7		9	VDC
Input filter	Filter capacitor				
Hot plug	Unavailable				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output 100KHz/0.1V		20		pF

Example:
1T8A1_0505S3UP
1 = 1Watt; T8 = SMT8; A1 = Pinning; 5Vin; 5Vout; S = Single output; 3 = 3kVDC; U = Unregulated output; P = Short circuit protection

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope graph				
Line regulation	For Vin change of 1% • 3.3V output • Others			1.5 1.2	% %
Load regulation	10% to 100% load • 3.3V output • 5V output • 9V output • 12V output • 15V output • 24V output		15 10 8 7 6 5	20 15 10 10 10 10	% % % % % %
Temperature drift	100% full load		±0.02		%/°C
Ripple & Noise*	20MHz Bandwidth • 24V output • Others		50 30	100 75	mVp-p mVp-p
Switching frequency	Full load, nominal input		270		KHz

* Ripple and noise tested with "parallel cable" method.

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 Air ±8KV, Contact ±4KV perf. Criteria B

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'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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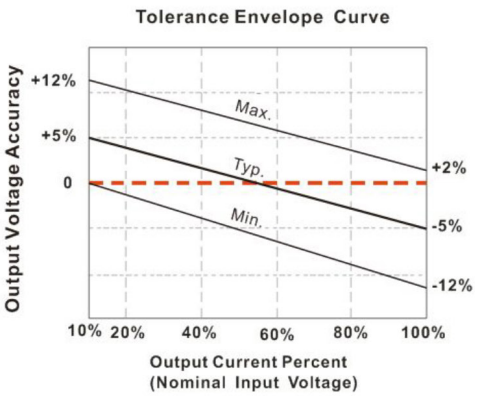
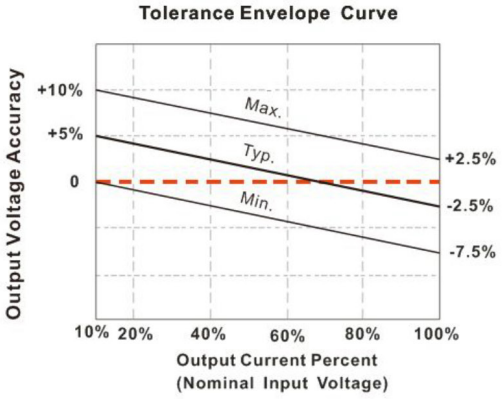
Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA; max/min]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_0503S3UP	5	3.3	303/30	2400	70/74	UL/CE
1T8A1_0505S3UP	5	5	200/20	2400	78/82	UL/CE
1T8A1_0509S3UP	5	9	111/12	1000	79/83	UL/CE
1T8A1_0512S3UP	5	12	84/9	560	79/83	UL/CE
1T8A1_0515S3UP	5	15	67/7	560	79/83	UL/CE
1T8A1_0524S3UP	5	24	42/4	220	81/85	UL/CE

Typical characteristics

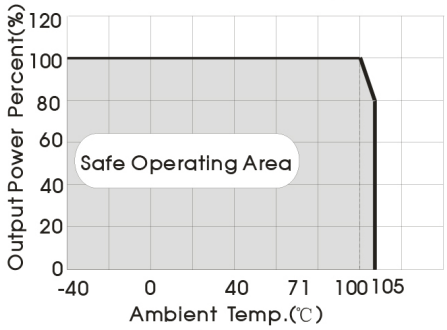
3.3VDC output



Other output

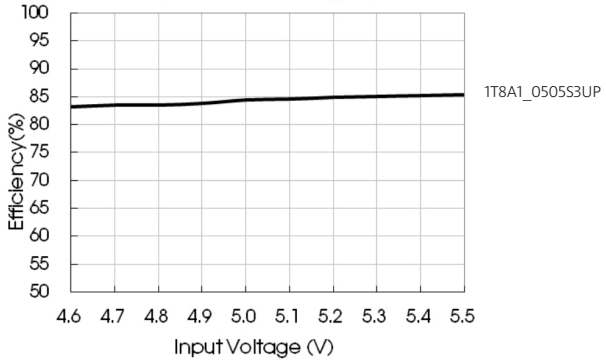


Temperature Derating Curve

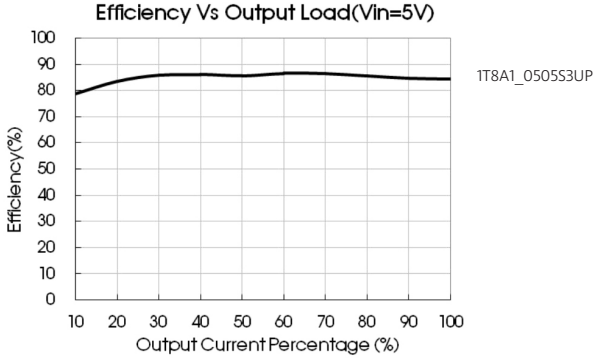


Efficiency

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load(Vin=5V)



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Typical application circuit

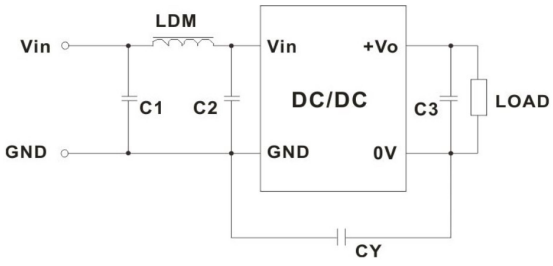
If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1.
Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

Figure 1

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

Table 1

EMC solution-recommended circuit



EMC recommended circuit value table / input voltage 5VDC

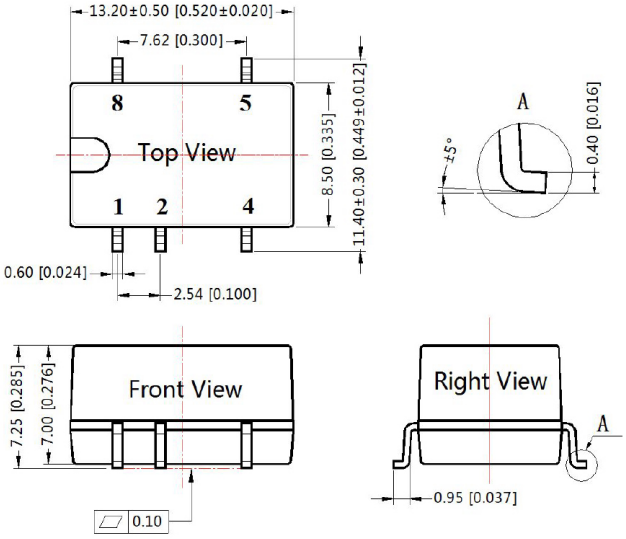
Ouput voltage		3.3/5/9	12/15/24
EMI	C1/C2	4.7μF /25V	
	CY	--	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
	C3	Refer to the Cout in table 1	
	LDM	6.8μH	

Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

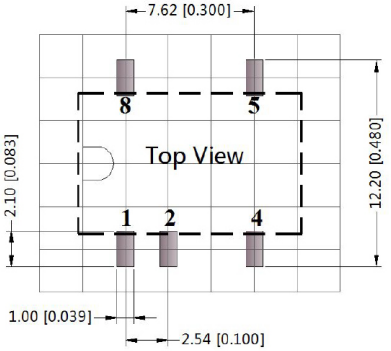
Table 2

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