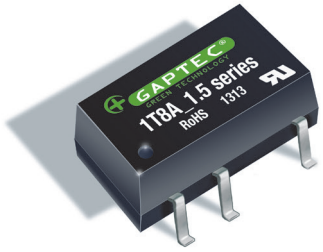
GAPTEC®
GREEN TECHNOLOGY

1T8A_1.5UP Series

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



DC-DC Converter 1 Watt

- **Small footprint**
- **Miniature SMD package style**
- **High efficiency up to 80%**
- **1500VDC isolation**
- **Temperature range: -40°C ~ +105°C**
- **Industry standard pinout**
- **Low temperature rise**
- **Internal SMD construction**
- **No external component required**
- **RoHS compliance**
- **Short circuit protection (SCP)**

c UL us
UL-60950-1 Certified
E347551

CE

The 1T8A_1.5UP Series is specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

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 ≤1500VDC)
3) Where the regulation of the output voltage and the output ripple noise are not demanding

Such as: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.

Common specifications

Short circuit protection*:	1T8A_0303S1.5U/1T8A_0524S1.5UP/ 1T8A_24xxS1.5UP: 1s Others: Continuous, automatic recovery
Temperature rise at full load:	25°C TYP (Ta= 25°C)
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C
Storage temperature range:	-55°C ~+125°C
Lead temperature	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Package material:	Epoxy Resin [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Weight:	1.6g

*Supply voltage must be discontinued at the end of short circuit duration for models 1T8A_03xxS1.5UP, 1T8A_0524S1.5UP and 1T8A_24xxS1.5UP.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 3.3VDC input • 5VDC input • 12VDC input • 15VDC input • 24VDC input		404/25 250/20 104/15 82/10 52/7	-/70 -/60 -/50 -/35 -/30	VDC VDC VDC VDC VDC
Reflected ripple current			15		mA
Input surge voltage (1 sec. max.)	• 3.3VDC input • 5VDC input • 12VDC input • 15VDC input • 24VDC input	-0.7 -0.7 -0.7 -0.7 -0.7		5 9 18 21 30	VDC VDC VDC VDC 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	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output 100KHz/1V		20		pF

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 • 6V output • 9V output • 12V output • 15V output • 24V output		18 12 10 8 7 6 5		% % % % % % %
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.				

* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at DC-DC Application Notes.

EMC specifications

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to EMC recommended circuit)
EMI	RE	CISPR22/EN55022 CLASS B (External Circuit Refer to EMC recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

Model selection:
WCTP_xxyyN##O**
W= Watt; **C=** Case; **T=** Type; **P=** Pinning; ****=** Voltage Variation (omitted ± 10%); **xx=** Vin; **yy=** Vout; **N=** Numbers of Output; **##=** Isolation (kVDC); **O=** output regulation

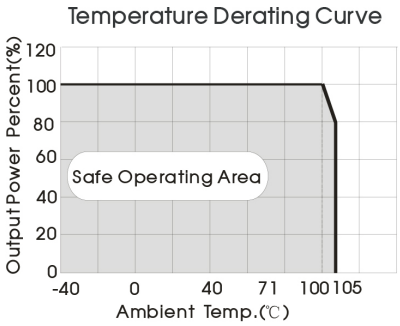
Example:
1T8A_0505S1.5UP
1=1Watt; T8= SMT8; A=Pinning; 5Vin; 5Vout; S=Single output; 1.5=1.5kVDC; U=Unregulated output; P= Short circuit protection

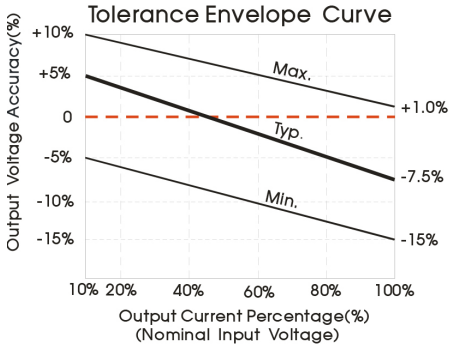
1T8A_1.5UP Series

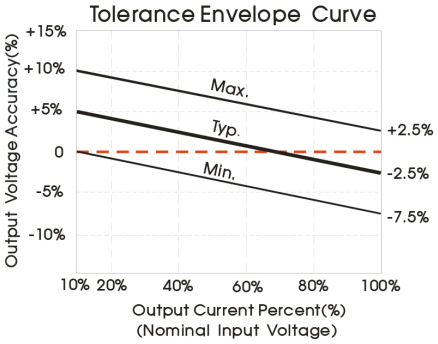
1W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Part Number	Input Voltage [V]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, max]	Certification
1T8A_0303S1.5U	3.3	3.3	303	220	69	CE
1T8A_0305S1.5UP	3.3	5	200	220	74	UL/CE
1T8A_0309S1.5UP	3.3	9	111	220	80	-
1T8A_0312S1.5UP	3.3	12	84	220	80	CE
1T8A_0315S1.5UP	3.3	15	67	220	80	CE
1T8A_0324S1.5UP	3.3	24	42	220	80	CE
1T8A_0503S1.5UP	5	3.3	303	220	72	UL/CE
1T8A_0505S1.5UP	5	5	200	220	80	UL/CE
1T8A_0506S1.5UP	5	6	167	220	80	UL/CE
1T8A_0509S1.5UP	5	9	111	220	80	UL/CE
1T8A_0512S1.5UP	5	12	84	220	80	UL/CE
1T8A_0515S1.5UP	5	15	67	220	80	UL/CE
1T8A_0524S1.5U	5	24	42	220	80	UL/CE
1T8A_1203S1.5UP	12	3.3	303	220	72	UL/CE
1T8A_1205S1.5UP	12	5	200	220	80	UL/CE
1T8A_1209S1.5UP	12	9	111	220	80	UL/CE
1T8A_1212S1.5UP	12	12	84	220	80	UL/CE
1T8A_1215S1.5UP	12	15	67	220	80	UL/CE
1T8A_1224S1.5UP	12	24	42	220	80	CE
1T8A_1505S1.5UP	15	5	200	220	80	CE
1T8A_1509S1.5UP	15	9	111	220	80	-
1T8A_1515S1.5UP	15	15	67	220	80	CE
1T8A_2403S1.5U	24	3.3	303	220	71	-
1T8A_2405S1.5U	24	5	200	220	80	UL/CE
1T8A_2409S1.5U	24	9	111	220	80	UL/CE
1T8A_2412S1.5U	24	12	84	220	80	CE
1T8A_2415S1.5U	24	15	67	220	80	UL/CE
1T8A_2424S1.5U	24	24	42	220	80	UL/CE

Typical characteristics







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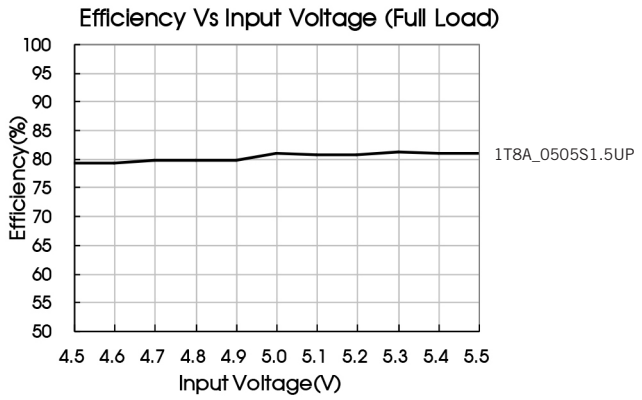
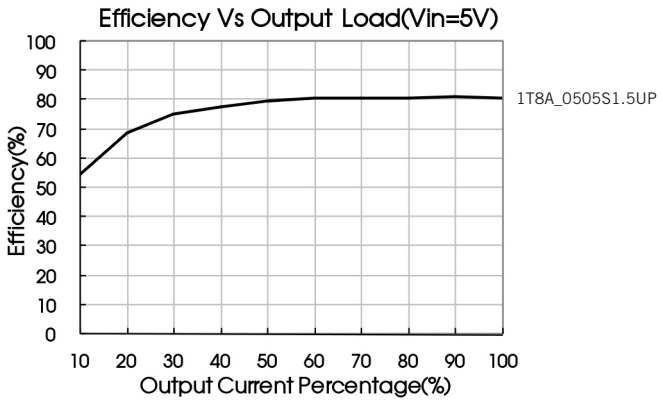
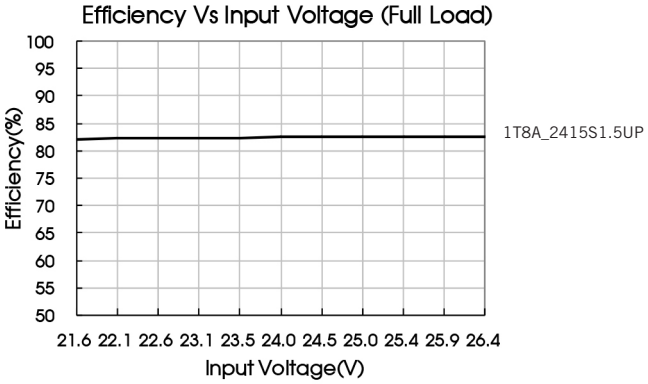
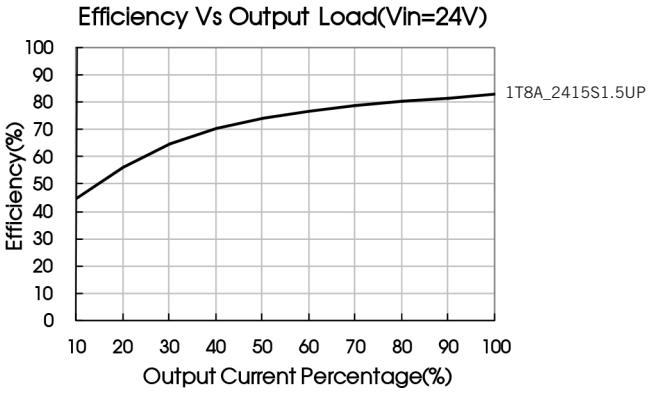
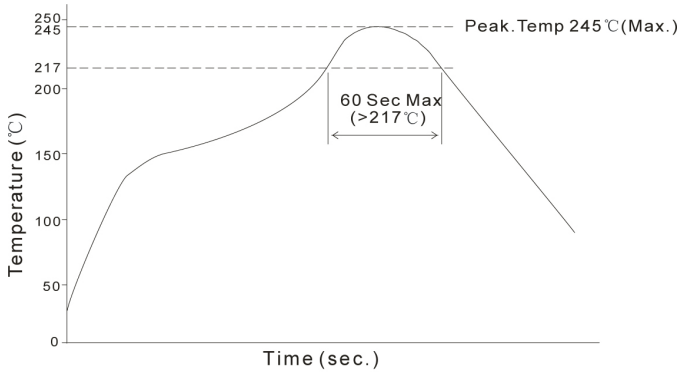








Recommended reflow soldering profile



Note: The curve applies only to the hot air reflow soldering

Typical application circuit

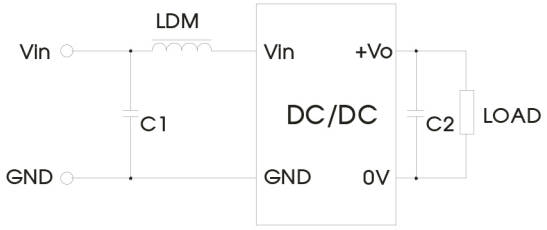
If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1.
Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe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

Figure 1

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

Table 1

EMC solution-recommended circuit

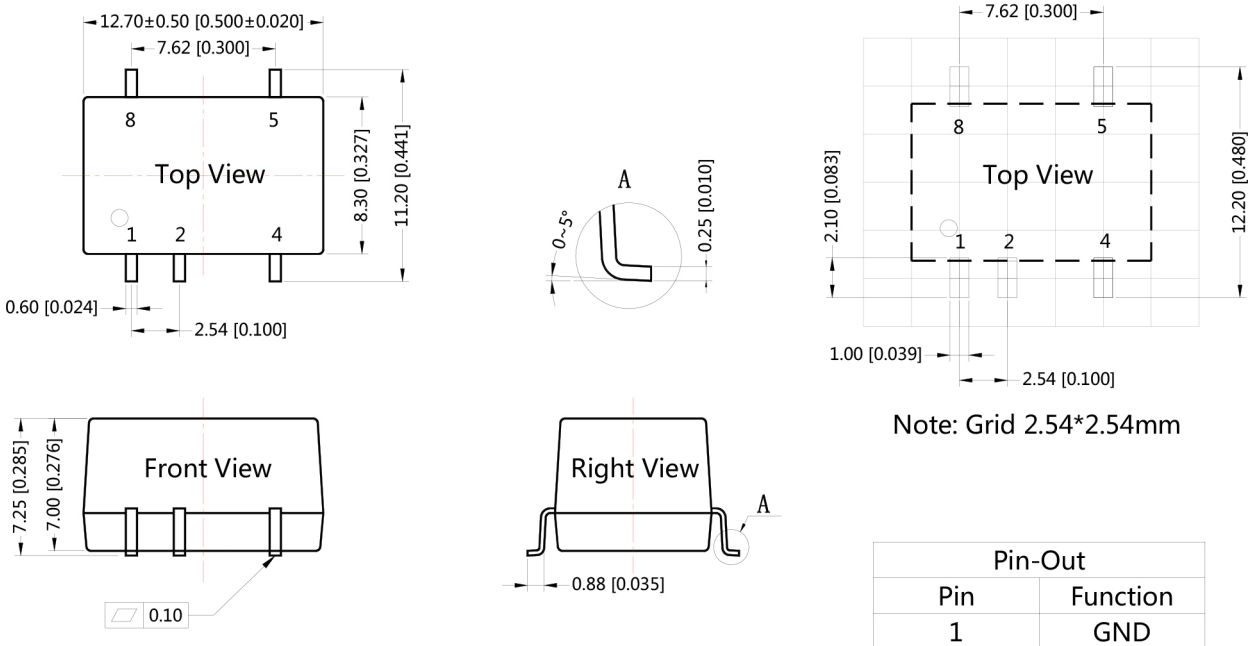


Input voltage (VDC)		3.3/5/12/15/24
EMI	C1	4.7µF /50V
	C2	Refer to the Cout in Fig.1
	LDM	6.8µH

Output load requirements
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on t the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

Mechanical dimensions

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

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

NC: No Connection

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

Note:
1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.