



## 1T8E\_1U 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 70%
- + 1000VDC isolation
- + Temperature range: -40°C ~ +85°C
- + Industry standard pinout
- + Low temperature rise
- + Internal SMD construction
- + No external component required
- + RoHS compliance



The 1T8E\_1U 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  $\leq \pm 10\%$ )
- 2) Where isolation is necessary between input and output (isolation voltage  $\leq 1000\text{VDC}$ )
- 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:	1 second
Temperature rise at full load:	25°C TYP (Ta = 25°C)
Cooling:	Free air convection
Operation temperature range:	-40°C ~ +85°C
Storage temperature range:	-40°C ~ +100°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:	1g
MSL (Moisture sensitivity level):	J-STD-020D standard - Level 2

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input voltage			5		VDC
Input voltage range			$\pm 10$		%
Filter	Capacitor				

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input to Output (2sec/0.5mA)	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy			$\pm 5$		%
Line regulation	For Vin change of 1%		1.2		%
Load regulation	10% to 100% load		15		%
		• 3.3V			
		• 5V		15	
		• 9V		9	
		• 12V		7.5	
• 15V	7				
Transient response setting time	50% load step change		350		μs
Temperature drift	100% full load			$\pm 0.03$	%/°C
Ripple & Noise*	20MHz Bandwidth			100	mVp-p
Switching frequency	Full load, nominal input		100		KHz

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

### Example:

**1T8E\_0505S1U**  
**1 = 1Watt; T8 = SMT8; E = Series; 05 = 5Vin; 05 = 5Vout;**  
**S = Single output; 1 = 1kVDC; U = Unregulated output**

### 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.

Part Number	Input Voltage [V]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [μF, Max.]	Efficiency [%, typ]
1T8E_xx03S1U	3.3; 5; 9; 12; 15	3.3	303	220	65
1T8E_xx05S1U	3.3; 5; 9; 12; 15	5	200	220	70
1T8E_xx09S1U	3.3; 5; 9; 12; 15	9	110	220	75
1T8E_xx12S1U	3.3; 5; 9; 12; 15	12	84	220	78
1T8E_xx15S1U	3.3; 5; 9; 12; 15	15	67	220	80

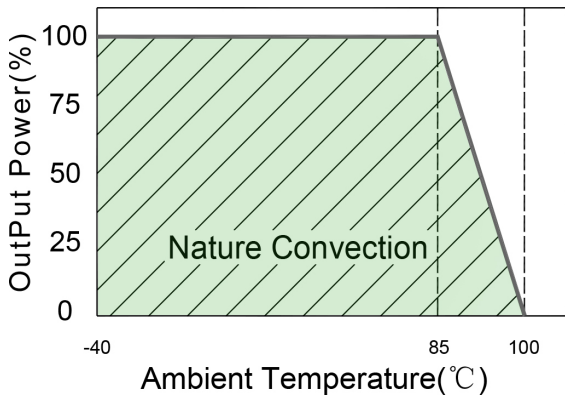
- xx = Input Voltage (possible for other input and output voltage combinations on request)  
 Vin = 3.3VDC, xx = 03  
 Vin = 5VDC, xx = 05  
 Vin = 9VDC, xx = 09  
 Vin = 12VDC, xx = 12  
 Vin = 15VDC, xx = 15

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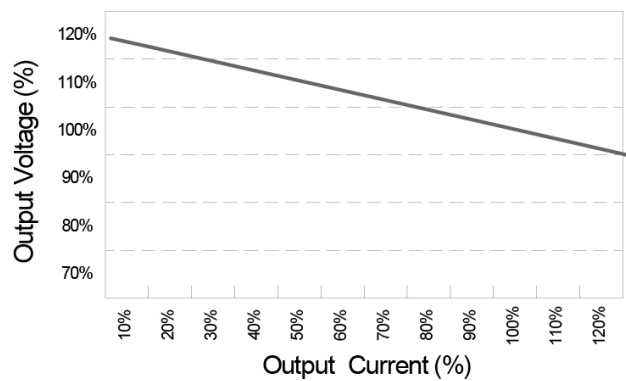
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## Typical characteristics

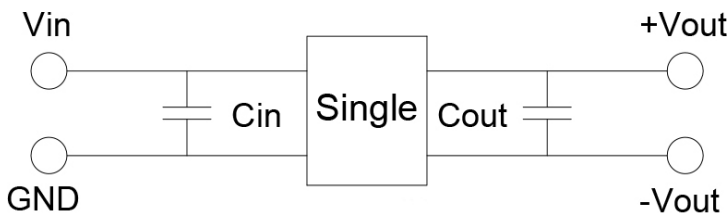
Temperature derating graph



Tolerance envelope graph



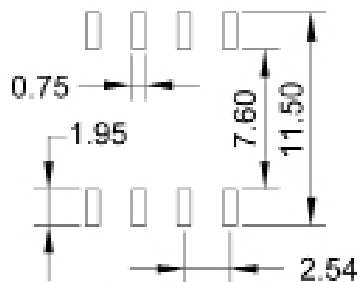
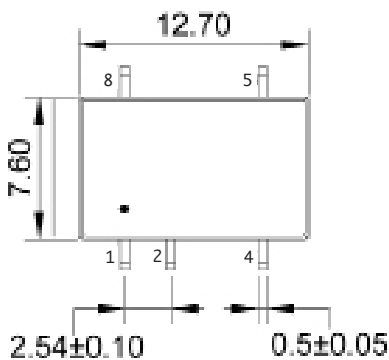
## Recommended test circuit



3.3V: Cin 4.7uF, 25V  
 5V: Cin 4.7uF, 25V  
 9V: Cin 4.7uF, 25V  
 12V: Cin 2.2uF, 25V  
 15V: Cin 1uF, 50V

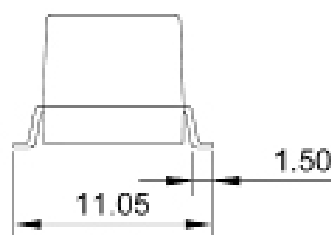
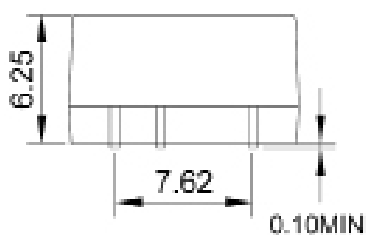
3.3V: Cout 22uF, 16V  
 5V: Cout 10uF, 25V  
 9V: Cout 4.7uF, 25V  
 12V: Cout 2.2uF, 25V  
 15V: Cout 1uF, 50V

## Mechanical dimensions



SUGGESTED PAD LAYOUT

PIN	Single
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	NC



**Note:**  
 Unit: mm[inch]  
 General tolerances: ±0.25mm[±0.010inch]

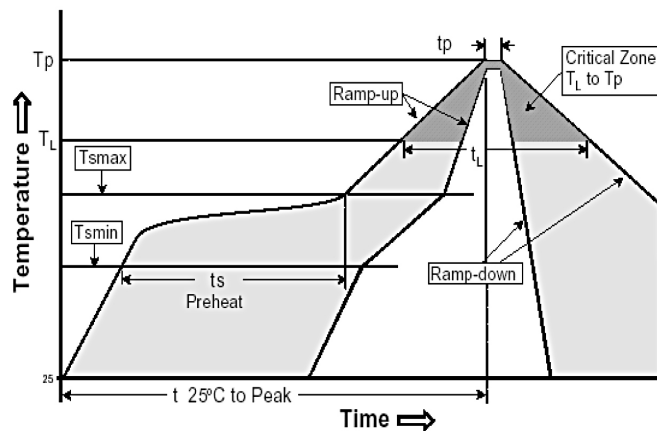
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## RoHS compliant type

Our RoHS parts just can withstand IR Reflow peak temperature: 240°C MAX as the following profile:

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts max to Tp)	3°C /second max.
Preheat -Temperature Min (Ts min) -Temperature Max (Ts max) -Time (ts min to ts max)	150°C 200°C 60-180 seconds
Time maintained above -Temperature (TL) -Time (tL)	217°C 60-150 seconds
Peak/Classification Temperature (Tp)	240°C max.
Time within 5°C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6°C/seconds max.
Time 25°C to Peak Temperature	6 minutes max.



## Packing informations

