1TM14R_3UP series

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

DC-DC Converter 1 Watt

- Achieves high efficiency of up to 83%
- Ensures safety with an isolated voltage of 3000VDC
- Operates effectively within a temperature range of -40°C to +125°C
- Capable of sustaining short circuits without any performance loss
- Made with molding material that meets the UL94 V-0 safety standard
- Requires no heat sink
- Compact size of 9.00 x 7.00 x 3.00 mm

Introducing our new and latest high-performance 1TM14R_3UP series. Our latest module boasts exceptional efficiency, achieving up to 83%, ensuring optimal energy utilization. With an impressive isolated voltage of 3000VDC, this module guarantees superior safety and reliability in various applications. It operates seamlessly across a broad temperature range from -40°C to +125°C, making it versatile for diverse environments. Designed for durability, this module can sustain short circuits without compromising performance. The molding material complies with the stringent UL94 V-0 standard, ensuring high safety and flame resistance.

Additionally, it does not require a heat sink, simplifying installation and integration. Encased in a compact package measuring just 9.00 x 7.00 x 3.00 mm, this module is perfect for applications where space is limited. It is particularly suitable for communication bus isolation as well as digital and analog signal isolation, providing reliable performance across various use cases.

SHORT CIRCUIT PROTECTED

100% RoHS compliant

c UL us
UL62368 - E347551
Pending

Common specifications

Short circuit protection	Continuous,Recovery
Switching frequency	Nominal input voltage, 100% full load 270kHz (min.) - 300kHz (typ.) - 330kHz (max.)
Operating temperature	-40°C ~+125°C (with derating)
Storage temperature	-55°C ~+125°C
Surface temperature rise	20°C ~30°C
Storage humidity	95 %RH (non condensing)
Cooling method	Natural air cooling
Moisture sensitivity level	3
Reflow soldering temperature	The peak temperature Tc is ≤ 245°C, the maximum time above 217°C is 60s
Hot Plug	Unavailable
MTBF (MIL-HDBK-217F@25°C)	3,500,000 Hours
Package size	9.00 x 7.00 x 3.00 mm
Shell material	Black epoxy molding compound, meets UL94V-0 standards

EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (See Figure 2)
EMI	RE	CISPR32/EN55032 CLASS A (no external filter) CLASS B (see Figure 2)
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV Perf.Criteria B

Unless specified specially, parameters in this manual are measured under the conditions of 25°C, 40%~75% humidity, input nominal voltage and rated output load.

Example:
1TM14R_0505S3UP
1 = 1Watt; TM14 = SMT14; R = Series; 05 = 5Vin; 05 = 5Vout; S = Single Output; 3 = 3kVDC isolation; U = Unregulated Output; P = Short Circuit Protection

Output specifications

Item	Test condition	Min	Typ	Max	Units
Line regulation	Input voltage changes within ±1%		±1.2	±1.5	
Load regulation	Load is from 10% to 100%		7	15	%
Temperature drift	100% load			±0.03	%/°C
Output ripple & noise*	20MHz bandwidth		50	100	mVp-p
Output voltage accuracy	See output voltage and load curve.				

Note: *The output ripple voice is measured by abutting method.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolated withstand voltage	Input-output, 1 min., leakage current less than 1mA	3000			VDC
Isolation resistance	Input-output,isolation voltage 500VDC	1			GΩ
Isolation capacitance	Input-output, 100kHz, 0.1V		20	35	pF

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input surge voltage* (1s, max)	5VDC input series	-0.7		8.5	VDC
No load/Full load input current			10/235	15/247	mA
Input filter	Capacitance filtering				

Note: *The input voltage cannot exceed the specified range, otherwise it may cause permanent and irreversible damage.

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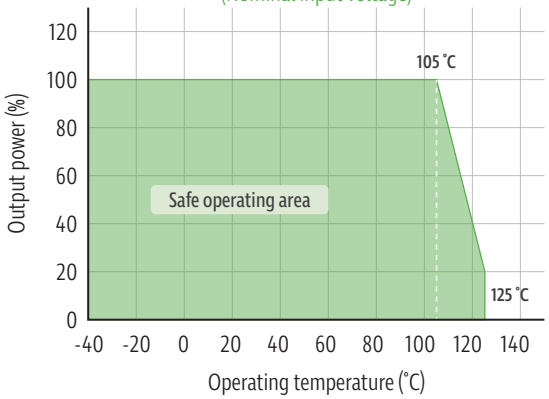
Product Selection Guide - Single output

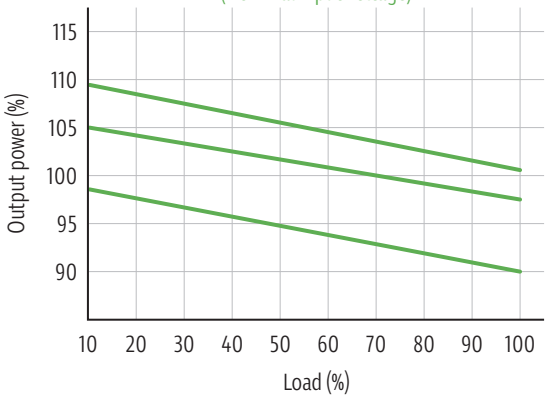
Approval	Model	Input nominal voltage (VDC)	Output Voltage (VDC) nominal	Output Current (mA) min.	Output Current (mA) max.	Full Load efficiency (%) typ.	Capacitive Load (µF) max.
	1TM14R_0505S3UP	5	5	20	200	83	1800

Typical characteristics

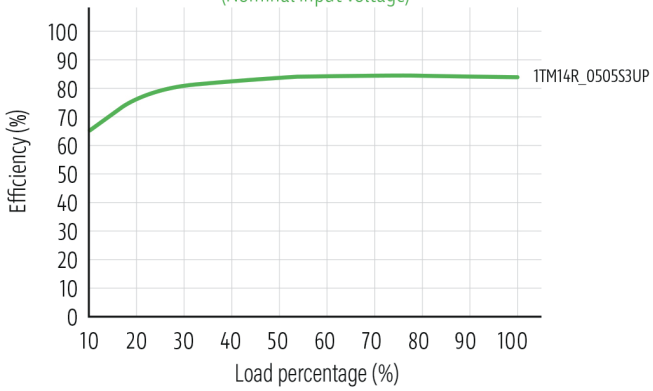
Temperature derating graph
(Nominal input voltage)



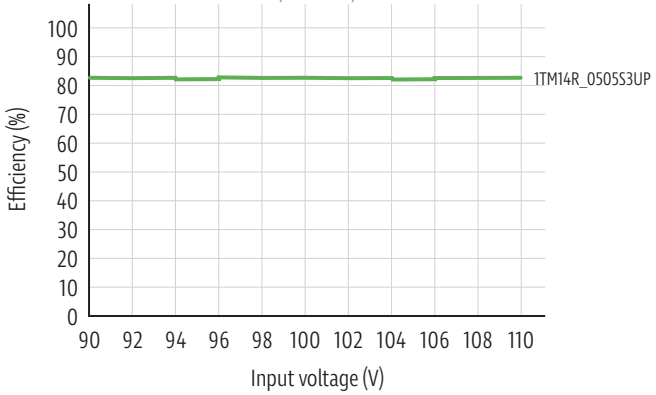
Out voltage vs. load
(Nominal input voltage)



Efficiency vs output load
(Nominal input voltage)



Efficiency vs input voltage
(Full load)



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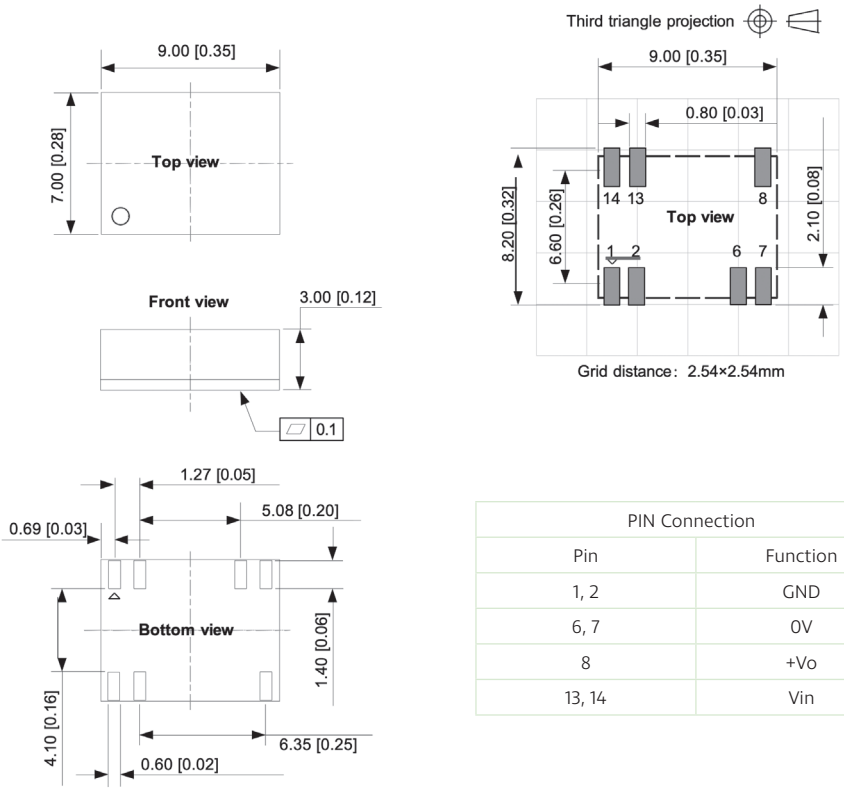
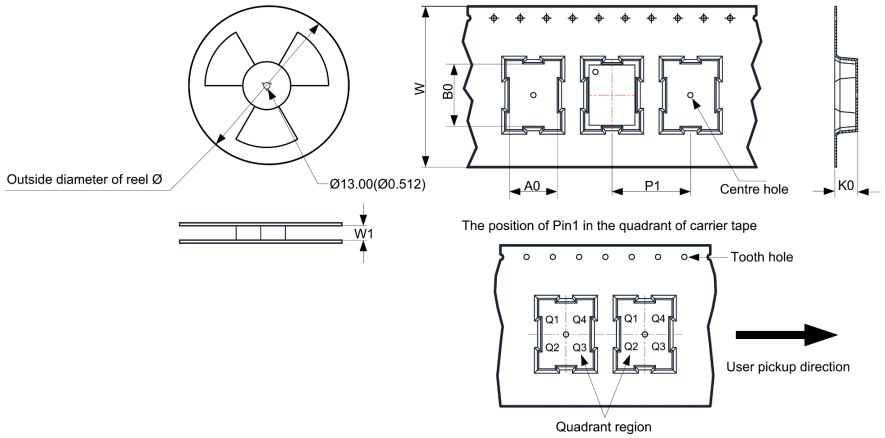
Mechanical dimensions



PIN Connection	
Pin	Function
1, 2	GND
6, 7	0V
8	+Vo
13, 14	Vin

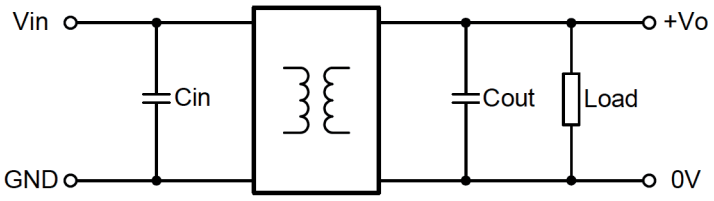
Notes:
Unit: mm (inch)
Unlabeled tolerance: ±0.15mm (0.006")

Footprint dimensions



Model	Package	Pins	Qty per reel (pcs)	Qty per package (pcs)	Outside diameter of reel ø (mm)
1TM14R_0505S3UP	SMD	7	1500	3000	330.0

Recommended test circuit



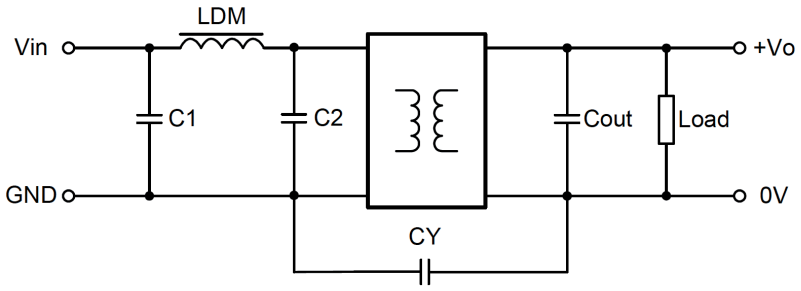
Filter capacitor

For selecting a filter capacitor, please refer to the values in Table 1. If the ESR is less than 1Ω at a frequency of 100kHz, it is recommended to use ceramic or electrolytic capacitors and avoid using tantalum capacitors. The input and output filter capacitors should not have excessively large values, as this may cause startup issues.

Table 1 The reference value of the external capacitor

Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
5	4.7	5	4.7

EMC typical recommended circuit (CLASS B)



EMC	Vin (VDC)	C1 and C2 (μF)	CY (μF)	LDM (μH)	Cout (μF)
EMI	5	4.7	1nF/4kVDC	6.8	Refer to table 1

Note:

1. The voltage ratings for capacitors C1 and C2 should be chosen based on the “input impulse voltage”.
2. The maximum current rating for inductance LDM should be selected according to the actual input current, with a recommendation to choose a value 1.5 times the actual current.
3. It is advised to keep the circuit wiring short and place it as close to the module as possible.

Load requirements

To ensure efficient and reliable operation of this module, the output load should be between 10% and 100% of the rated load. Running with a load less than 10% for extended periods is not recommended, as some performance aspects may not meet the specified indicators in this manual. If the output load is too light, connect a dummy load resistor in parallel at the output terminal. The combined power of the dummy load resistor and the actual load should exceed 10% of the rated load.

Protection function

Under normal conditions, this series of power modules does not include over-current protection. The simplest method to protect the output from overvoltage and overcurrent is to connect a linear regulator with overcurrent protection at the output.