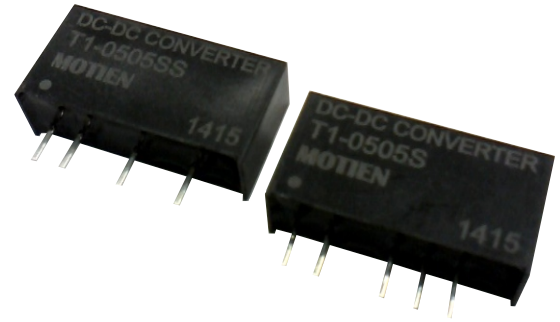


# T1 Series

1W High temperature Single & Dual output

## Features

- 7 Pin SIL Package
- 1500 VDC Isolation
- Up to 3000 VDC Isolation
- Continuous Short Circuit Protection
- Low Ripple and Noise
- Efficiency up to 81%
- -40 ~ 105°C Operation Temperature Range
- Non-Conductive Black Plastic Case



The T1 series is a family of high operation temperature 1W single & dual output DC-DC converters. These converters achieve low cost, high efficiency, extra high temperature operation, continuous short circuit protection and SIP 7 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 5, 12, 24 Vdc with output voltage of 5, 12, 15, ±5, ±12, ±15 Vdc.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS		
Voltage accuracy	See tolerance envelope curve	
Ripple & noise (20 MHz bandwidth)(1)	75mVpk-pk	
Line regulation	±1.2% / Per 1% Vin Change	
Load regulation(From 10% to 100% Load)	Input 5VDC	10%
	Other Input	7.5%
Cross Regulation (Dual Output) (2)	±4%	
Temperature coefficient	±0.02%/°C	
Short Circuit Protection	Continuous, auto recovery	
Capacitor load(3)	See table	

INPUT SPECIFICATIONS	
Voltage Range	±10%
Input Current	See table, typ.
No-Load Input Current	See table, typ.
Input Filter	Capacitors
Input Reflected Ripple Current (4)	15mA pk-pk
Start up Time (Nominal Vin and constant resistive load)	20mS, typ.

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	1500~3000Vdc
Input/Output	50 pF Typ.
I/O Isolation Capacitance	1000M Ohm
I/O Isolation Resistance	Variable 50kHz
Switching Frequency	95% rel H
Humidity	>3.6 Mhrs.
Reliability Calculated MTBF(MIL-HDBK-217 F)	IEC 60950-1
Safety Standard	

EMC SPECIFICATIONS		
Radiated Emissions	EN55032	CLASS B
Conducted Emissions (5)	EN55032	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT	IEC 61000-4-4	Perf. Criteria A
SURGE(6)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

PHYSICAL SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	C5191R-H Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	2.4g, Typ
Dimensions	SIP Case 0.76"x0.24"x0.39"

ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-40°C~105°C (See Derating Curve)
	-40°C~95°C (For 100% Load)
Maximum Case Temperature	115°C
Storage Temperature	-55°C~125°C
Cooling	Nature Convection

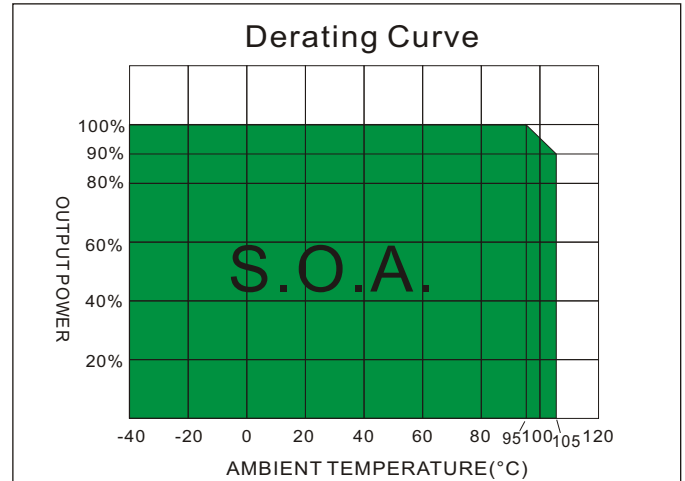
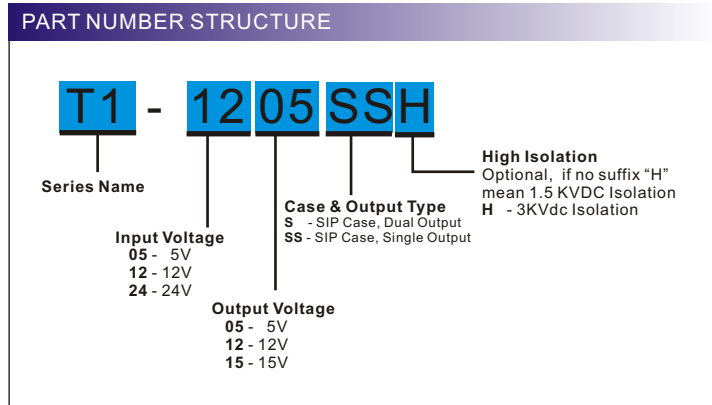
ABSOLUTE MAXIMUM RATINGS(7)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Surge Voltage(1Sec)	9 Vdc, max.
	18 Vdc, max.
	30 Vdc, max.
Soldering Temperature (1.5mm from case 10secmax.)	260°C, max.

## NOTE

1. Measured with a 0.1μF ceramic capacitor and 10μF Electrolytic capacitor.
2. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±4%.
3. Tested by minimal Vin and constant resistive full load.
4. Measured Input reflected ripple current with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
5. Input filter components (C1, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.
6. Input components (C2,D1) are used to help meet surge test requirement for the module. C2 and D1 recommended nichicon HE series and Lision 3.0SMCJ series.
7. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

The information and specifications contained in this data sheet are believed to be correct at time of publication. However, MOTIEN Technologies accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice. No rights under any patent accompany the sale of any such product(s) or information contained herein.

# T1 - 1W High Temperature Single & Dual output



## MODEL SELECTION GUIDE

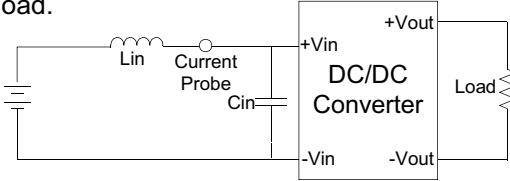
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL (% ,typ.)	Capacitor Load @LF (µF ,max.)
		No-Load (mA ,max.)	Full Load (mA ,typ.)				
T1-0505SS	5 ( 4.5 ~ 5.5 )	40	253	5	200	80	220
T1-0512SS	5 ( 4.5 ~ 5.5 )	40	253	12	83.3	80	100
T1-0515SS	5 ( 4.5 ~ 5.5 )	40	253	15	66.7	80	100
T1-1205SS	12 ( 10.8 ~ 13.2 )	18	105	5	200	80	220
T1-1212SS	12 ( 10.8 ~ 13.2 )	18	105	12	83.3	80	100
T1-1215SS	12 ( 10.8 ~ 13.2 )	18	104	15	66.7	81	100
T1-2405SS	24 ( 21.6 ~ 26.4 )	9	53	5	200	80	220
T1-2412SS	24 ( 21.6 ~ 26.4 )	9	53	12	83.3	80	100
T1-2415SS	24 ( 21.6 ~ 26.4 )	9	53	15	66.7	80	100
T1-0505S	5 ( 4.5 ~ 5.5 )	40	253	±5	±100	80	±100
T1-0512S	5 ( 4.5 ~ 5.5 )	40	253	±12	±41.67	80	±47
T1-0515S	5 ( 4.5 ~ 5.5 )	40	250	±15	±33.33	81	±47
T1-1205S	12 ( 10.8 ~ 13.2 )	18	105	±5	±100	80	±100
T1-1212S	12 ( 10.8 ~ 13.2 )	18	105	±12	±41.67	80	±47
T1-1215S	12 ( 10.8 ~ 13.2 )	18	105	±15	±33.33	80	±47
T1-2405S	24 ( 21.6 ~ 26.4 )	9	53	±5	±100	80	±100
T1-2412S	24 ( 21.6 ~ 26.4 )	9	53	±12	±41.67	80	±47
T1-2415S	24 ( 21.6 ~ 26.4 )	9	53	±15	±33.33	80	±47

Suffix "H" means 3 K Vdc isolation

**TEST CONFIGURATIONS**

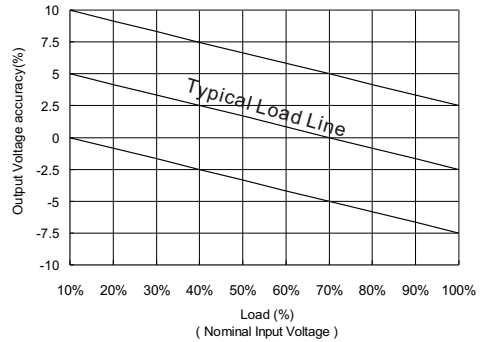
**Input Reflected Ripple Current Test Step**

Input reflected ripple current is measured through a source inductor  $L_{in}$  (12 $\mu$ H) and a source capacitor  $C_{in}$  (47 $\mu$ F, ESR<1.0 $\Omega$  at 100KHz) at nominal input and full load.



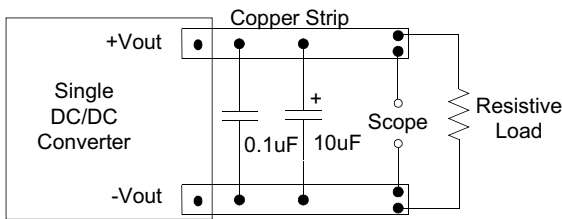
**Output Voltage Tolerance Envelope Curve**

The voltage tolerance envelope shows typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading.



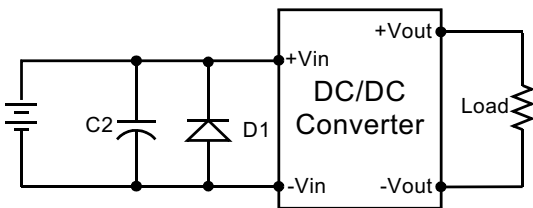
**Output Ripple & Noise Measurement Test**

Measured with a 0.1 $\mu$ F MLCC capacitor and a 10 $\mu$ F Electrolytic capacitor. The Scope measurement bandwidth is 0-20MHz.



**SURGE Filter**

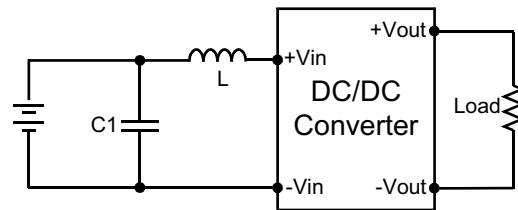
Input components (C2, D1) are used to help meet surge test requirement for the module.



	C2	D1
T1-05XXXX	1000 $\mu$ F/35V	3.0SMCJ9.0AG
T1-12XXXX	1000 $\mu$ F/35V	3.0SMCJ18AG
T1-24XXXX	330 $\mu$ F/50V	3.0SMCJ28AG

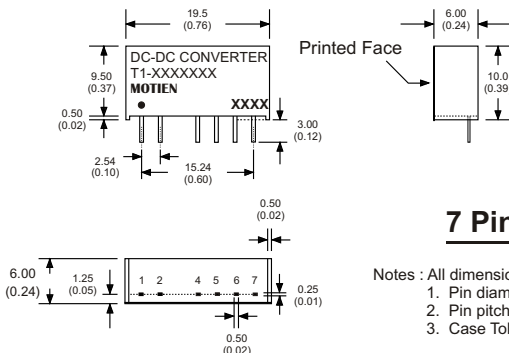
Input filter components (C1, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

**EMI Filter**



	C1	L
T1-05XXXX	1206, 4.7 $\mu$ F/50V	6.8 $\mu$ H
T1-12XXXX	1206, 4.7 $\mu$ F/50V	6.8 $\mu$ H
T1-24XXXX	1206, 4.7 $\mu$ F/50V	6.8 $\mu$ H

**MECHANICAL SPECIFICATIONS**



**7 Pin SIL Package**

- Notes : All dimensions are typical in millimeters ( inches ).
1. Pin diameter: 0.5 $\pm$ 0.05 ( 0.02 $\pm$ 0.002 )
  2. Pin pitch and length tolerance:  $\pm$ 0.35 (  $\pm$ 0.014 )
  3. Case Tolerance:  $\pm$ 0.5 (  $\pm$ 0.02 )

**PIN CONNECTIONS**

PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input	-V Input
4	-V Output	-V Output	N.P.	N.P.
5	N.P.	Common	-V Output	-V Output
6	+V Output	+V Output	N.P.	Common
7	N.P.	N.P.	+V Output	+V Output