

### Features

- ◇ 2 Watt Output Power
- ◇ Output Current up to 606mA
- ◇ Un-Regulated Output
- ◇  $\pm 10\%$  Input Voltage Range
- ◇ Efficiency up to 82%
- ◇ 5600VDC Isolation Voltage
- ◇ SMD-16pin Package
- ◇ Industrial Standard Pin-out
- ◇ UL94V-0 Package Material
- ◇ Operating Temperature Range  $-40\sim 71^{\circ}\text{C}$   
(Non-Derating)
- ◇ 3 Years Warranty



### Description

T12NH series are isolated 2 Watt DC/DC converters with ultra-high 5600VDC (4000VAC) isolation in miniature SMD-16pin packages, and allow a 10% range input voltage of 5V, 12V and 24V to convert to a standard output voltage of 3.3V, 5V, 12V, 15V,  $\pm 5\text{V}$ ,  $\pm 12\text{V}$  and  $\pm 15\text{V}$ .

### Applications

- △ Automatic Control System
- △ Industry Computer
- △ Communication System
- △ Distribute Power System
- △ Movable/Portable Test Equipment
- △ Local Power System
- △ Other Applications meet Specifications.

### General Specifications

Parameter	Condition	Min.	Typ.	Max.
Storage Temperature	Ambient	-55	---	+125 $^{\circ}\text{C}$
Operating Temperature	Ambient	-40	---	+71 $^{\circ}\text{C}$
	Case	-40	---	+90 $^{\circ}\text{C}$
Relative Humidity		---	---	95 %
Isolation Voltage	Input to Output, 60 sec.	5.6KVDC	---	---
Isolation Resistance	Input to Output	10 G ohm	---	---
Isolation Capacitance	Input to Output	---	---	20 pF
Switching Frequency	Max. Load	---	50 KHz	---
MTBF	Vin-N, Max. Load, 25 $^{\circ}\text{C}$	---	2 MHrs	
Weight	Silicon	---	2.5 g	
Dimensions	0.94 x 0.54 x 0.32 inch ( 23.8 x 13.7 x 8.25 mm )			
Case Material	Non-Conductive Black Plastic (Meets UL94V-0)			

**Selection Guide**

Part Number	Input			Output			Efficiency	Load Regulation	Cap. Load <sup>(7)</sup>
	Voltage	Current		Voltage	Current				
	Nominal (Low ~ High)	No Load	Max. Load	Typ.	Min.	Max.	Max. Load	Max.	Max.
		Typ.	Typ.				Typ.		
	VDC	mA	mA	VDC	mA	mA	%	%	μF
T12NH-0503S	5 ( 4.5~5.5 )	70	555	3.3	12.1	606	72	± 14	470
T12NH-0505S			513	5	8	400	76	± 13	470
T12NH-0512S			507	12	3.3	167	79	± 11	470
T12NH-0515S			503	15	2.7	133	80	± 10	470
T12NH-0505D			513	± 5	± 4	± 200	76	± 13	220
T12NH-0512D			504	± 12	± 1.7	± 83	79	± 10	220
T12NH-0515D			503	± 15	± 1.3	± 67	80	± 10	220
T12NH-1203S	12 (10.8~13.2)	30	225	3.3	12.1	606	74	± 14	470
T12NH-1205S			214	5	8	400	78	± 12	470
T12NH-1212S			206	12	3.3	167	81	± 9	470
T12NH-1215S			205	15	2.7	133	81	± 9	470
T12NH-1205D			216	± 5	± 4	± 200	77	± 11	220
T12NH-1212D			210	± 12	± 1.7	± 83	79	± 10	220
T12NH-1215D			212	± 15	± 1.3	± 67	79	± 9	220
T12NH-2403S	24 (21.6~26.4)	20	116	3.3	12.1	606	72	± 10	470
T12NH-2405S			111	5	8	400	75	± 9	470
T12NH-2412S			108	12	3.3	167	77	± 7	470
T12NH-2415S			105	15	2.7	133	79	± 7	470
T12NH-2405D			110	± 5	± 4	± 200	76	± 9	220
T12NH-2412D			109	± 12	± 1.7	± 83	76	± 8	220
T12NH-2415D			107	± 15	± 1.3	± 67	78	± 8	220

**Note:**

- 1) All specifications are measured at nominal input voltage, constant resistive load between Min. and Max. output current, and probe bandwidth should be under 20MHz, Ta = +25°C.
- 2) When the Load is at No-Load or lower than Min. output current, the DC/DC converters will not be damaged; however, all the parameters may be not reaching all specifications listed.
- 3) Output Ripple & Noise Test please refer to E-Chin Technology Co., Ltd. proposed test-method.
- 4) Load Regulation and Line Regulation calculation please refer to E-Chin Technology Co., Ltd. proposed formula.
- 5) An external fuse is needed at the front end of DC/DC converters for a protection as a recommended settlement in order to avoid a surge current or a maximum input current.
- 6) "Vin-H" means "Vin-High", "Vin-N" means "Vin-Nominal", and "Vin-L" means "Vin-Low".
- 7) The total Capacitive Loads of output should be lower than the value written above.
- 8) Other Input Voltages, Output Voltages and Specifications would be available, please contact us.

### Input Specifications

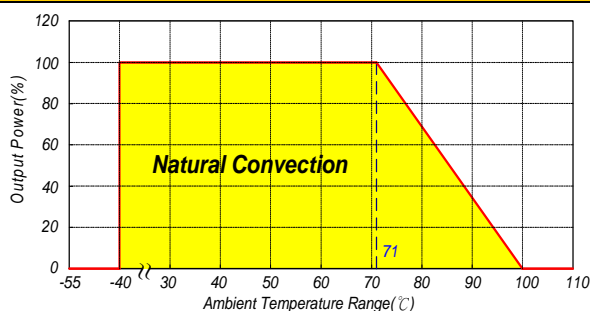
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	5VDC models	4.5	5	5.5 V
	12VDC models	10.8	12	13.2 V
	24VDC models	21.6	24	26.4 V
Input Filter	All models	Internal L-C Filter		

### Output Specifications

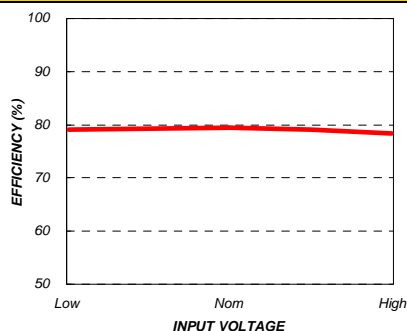
Parameter	Condition	Min.	Typ.	Max.
Output Voltage Accuracy	Vin-N, Max. Load	---	± 2.0	± 4.0 %
Balance Regulation	Vin-N, Max. Load, Dual Output	---	± 0.5	± 1.0 %
Line Regulation	Vin-L to Vin-H @ Max. Load	---	± 1.2	± 1.5 %
Load Regulation	Io = 20% to 100% Load @ Vin-N	See Model Selection Guide		
Temperature Drift	Lowest to Highest Temp.	---	± 0.01	± 0.02 %/°C
Ripple & Noise	Peak to Peak, Each Output, 20MHz	---	80	120 mV
Short Circuit Protection	Continuous, Auto-Recovery			

### Characteristic Curve

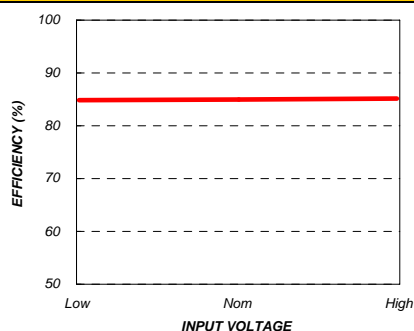
#### Derating Curve



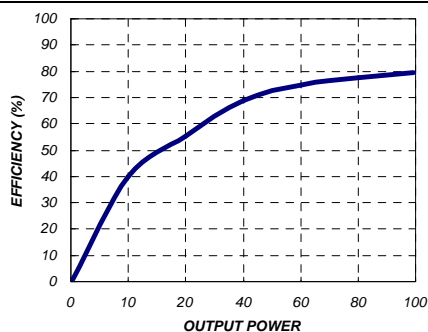
#### Efficiency-Curve



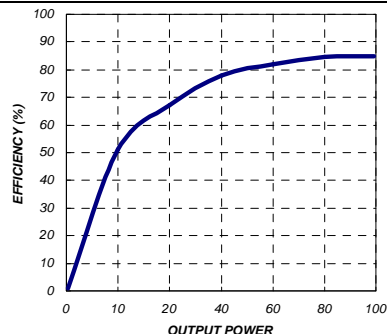
Input Voltage vs. Efficiency, Vo= 3.3V, 5V & ±5V



Input Voltage vs. Efficiency, Other Output Voltages



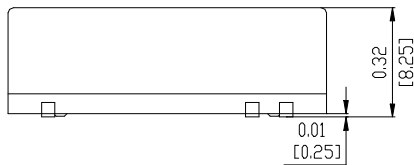
Output Power vs. Efficiency, Vo= 3.3V, 5V & ±5V



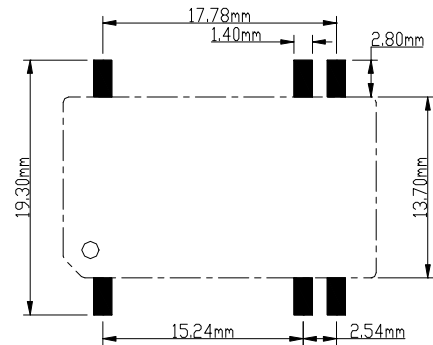
Output Power vs. Efficiency, Other Output Voltages

**Package Dimension**

**Front View**

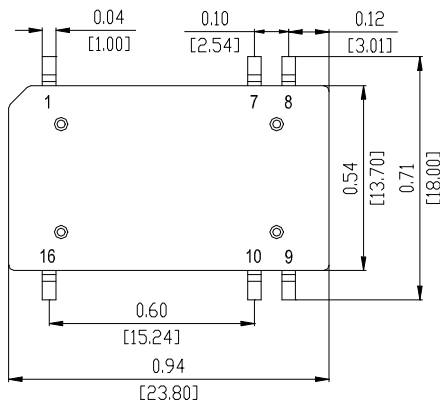


**Recommend Footprint Details (Top View)**



*Single & Dual Output*

**Bottom View**



**Pin Functions**

Pin No.	Single Output	Dual Output
1	-Vin	-Vin
7	N.C.	N.C.
8	N.C.	Commond
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

N.C.: No Connect

**Note:**

All dimensions in inch [mm]

Tolerance : XX.X± 0.01 [XX.X±0.25]

XX.XX± 0.01 [XX.XX±0.25]

Pin pitch tolerance ±0.01 [±0.25]

Pin dimension tolerance ±0.004 [±0.1]