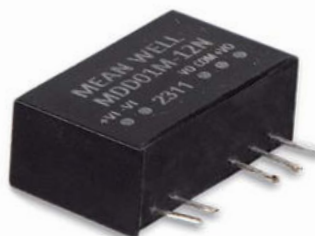
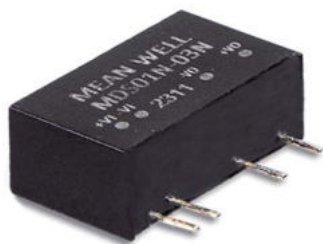




1W SIP Package DC-DC Medical Grade Unregulated Converter

## MDS01-N & MDD01-N series



### Features

- SIP7 package with international standard pinout
- Operating temperature range  $-40 \sim +95^{\circ}\text{C}$
- Comply with IEC/UL62368-1 and LVD IEC60601-1
- Medical safety approved (1xMOPP/2xMOOP) according to IEC60601-1
- Low patient leakage current  $<2\mu\text{A}$
- Protections: Short circuit (Continuous)
- 6KVDC hight I/O isolation (Reinforced insulation)
- Low cost
- 3 years warranty

### Applications

- Medical devices
- Medical oxygen monitor
- CT scanning
- Medical carts
- Oral care equipment
- Telecom / datacom system
- Wireless network
- Industrial control facility

### GTIN CODE

MW Search: <https://www.meanwell.com/serviceGTIN.aspx>

### Description

MDS01-N and MDD01-N series are 1W isolated and unregulated module type medical grade DC-DC converter with SIP7 package. It features international standard pins, a high efficiency up to 84%, wide working temperature range  $-40 \sim +95^{\circ}\text{C}$ , 6KVDC I/P-O/P hight isolation voltage, short circuit protection, etc. The models account for different input voltage  $5\text{V}/12\text{V}/24\text{V} \pm 10\%$ , and various output voltage,  $3.3\text{V}/5\text{V}/12\text{V}/15\text{V}$  for single output and  $\pm 5\text{V}/\pm 12\text{V}/\pm 15\text{V}$  for dual outputs, which are suitable for medical systems, ultra low low leakage current or industrial control, telecommunication field, distributed power architecture, and so on.

### Model Encoding

**MDS01L-12N**

NEW Series

Output voltage ( $3.3/5/12/15\text{Vdc}$ ,  $\pm 5/\pm 12/\pm 15\text{Vdc}$ )

Input voltage (L:  $4.5 \sim 5.5\text{Vdc}$ , M:  $10.8 \sim 13.2\text{Vdc}$ , N:  $21.6 \sim 26.4\text{Vdc}$ )

Rated wattage

Series name { S: Single output  
D: Dual output



1W SIP Package DC-DC Medical Grade Unregulated Converter

**MDS01-N & MDD01-N series**

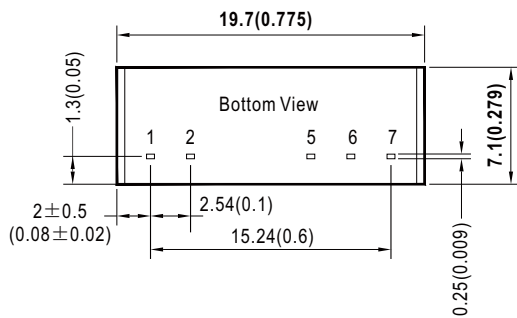
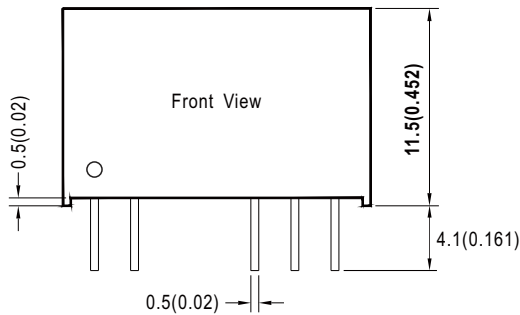
| MODEL SELECTION TABLE |                              |               |           |                   |                   |                      |                          |
|-----------------------|------------------------------|---------------|-----------|-------------------|-------------------|----------------------|--------------------------|
| ORDER NO.             | INPUT                        |               |           | OUTPUT            |                   | EFFICIENCY<br>(TYP.) | CAPACITOR LOAD<br>(MAX.) |
|                       | INPUT VOLTAGE<br>(RANGE)     | INPUT CURRENT |           | OUTPUT<br>VOLTAGE | OUTPUT<br>CURRENT |                      |                          |
|                       |                              | NO LOAD       | FULL LOAD |                   |                   |                      |                          |
| MDS01L-03N            | Normal 5V<br>(4.5 ~ 5.5V)    | 30mA          | 257mA     | 3.3V              | 31 ~ 303mA        | 76%                  | 1000μF                   |
| MDS01L-05N            |                              | 30mA          | 248mA     | 5V                | 20 ~ 200mA        | 79%                  | 1000μF                   |
| MDS01L-12N            |                              | 26mA          | 240mA     | 12V               | 9 ~ 84mA          | 82%                  | 220μF                    |
| MDS01L-15N            |                              | 29mA          | 240mA     | 15V               | 7 ~ 67mA          | 84%                  | 220μF                    |
| MDD01L-05N            |                              | 30mA          | 245mA     | ±5V               | ±10 ~ 100mA       | 78%                  | *330μF                   |
| MDD01L-12N            |                              | 31mA          | 245mA     | ±12V              | ±5 ~ 42mA         | 81%                  | *100μF                   |
| MDD01L-15N            |                              | 28mA          | 238mA     | ±15V              | ±4 ~ 34mA         | 82%                  | *100μF                   |
| MDS01M-03N            | Normal 12V<br>(10.8 ~ 13.2V) | 15mA          | 110mA     | 3.3V              | 31 ~ 303mA        | 75%                  | 1000μF                   |
| MDS01M-05N            |                              | 15mA          | 105mA     | 5V                | 20 ~ 200mA        | 79%                  | 1000μF                   |
| MDS01M-12N            |                              | 15mA          | 103mA     | 12V               | 9 ~ 84mA          | 81%                  | 220μF                    |
| MDS01M-15N            |                              | 15mA          | 105mA     | 15V               | 7 ~ 67mA          | 83%                  | 220μF                    |
| MDD01M-05N            |                              | 16mA          | 107mA     | ±5V               | ±10 ~ 100mA       | 78%                  | *330μF                   |
| MDD01M-12N            |                              | 18mA          | 104mA     | ±12V              | ±5 ~ 42mA         | 80%                  | *100μF                   |
| MDD01M-15N            |                              | 18mA          | 114mA     | ±15V              | ±4 ~ 34mA         | 80%                  | *100μF                   |
| MDS01N-03N            | Normal 24V<br>(21.6 ~ 26.4V) | 8mA           | 55mA      | 3.3V              | 31 ~ 303mA        | 75%                  | 1000μF                   |
| MDS01N-05N            |                              | 8mA           | 52mA      | 5V                | 20 ~ 200mA        | 79%                  | 1000μF                   |
| MDS01N-12N            |                              | 8mA           | 52mA      | 12V               | 9 ~ 84mA          | 82%                  | 220μF                    |
| MDS01N-15N            |                              | 9mA           | 52mA      | 15V               | 7 ~ 67mA          | 81%                  | 220μF                    |
| MDD01N-05N            |                              | 9mA           | 53mA      | ±5V               | ±10 ~ 100mA       | 77%                  | *330μF                   |
| MDD01N-12N            |                              | 9mA           | 53mA      | ±12V              | ±5 ~ 42mA         | 81%                  | *100μF                   |
| MDD01N-15N            |                              | 9mA           | 53mA      | ±15V              | ±4 ~ 34mA         | 81%                  | *100μF                   |

\* For each output

| SPECIFICATION             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                             |                              |                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------|------------------------------------------|
| INPUT                     | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | L: 4.5 ~ 5.5Vdc<br>M: 10.8 ~ 13.2Vdc<br>N: 21.6 ~ 26.4Vdc                   |                              |                                          |
|                           | FILTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Internal capacitor                                                          |                              |                                          |
|                           | PROTECTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Fuse recommended. 500mA Slow-Blow Type for all models                       |                              |                                          |
| OUTPUT                    | VOLTAGE ACCURACY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± 5.0%                                                                      |                              |                                          |
|                           | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1W                                                                          |                              |                                          |
|                           | RIPPLE & NOISE   Note.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 100mVp-p                                                                    |                              |                                          |
|                           | LINE REGULATION   Note.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1.2% for 1% input variation                                                 |                              |                                          |
|                           | LOAD REGULATION   Note.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± 15% for 3.3Vo, 5Vo ; ± 10% for others                                     |                              |                                          |
|                           | SWITCHING FREQUENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30KHz                                                                       |                              |                                          |
| PROTECTION                | SHORT CIRCUIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Protection type : Continuous, automatic recovery                            |                              |                                          |
| ENVIRONMENT               | COOLING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Free-air convection                                                         |                              |                                          |
|                           | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -40 ~ +95℃ (Refer to "Derating Curve")                                      |                              |                                          |
|                           | CASE TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | +105℃                                                                       |                              |                                          |
|                           | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20% ~ 90% RH non-condensing                                                 |                              |                                          |
|                           | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -55 ~ +125℃ , 10 ~ 95% RH non-condensing                                    |                              |                                          |
|                           | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.02% / °C ( 0 ~ 90℃ )                                                      |                              |                                          |
|                           | SOLDERING TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.5mm from case of 1 ~ 3sec./260℃ max.                                      |                              |                                          |
|                           | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes     |                              |                                          |
| SAFETY & EMC<br>( Note.6) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | IEC62368-1 / UL62368-1, LVD IEC60601-1, EAC TP TC 020/2011 approved         |                              |                                          |
|                           | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I/P-O/P:6KVDC                                                               |                              |                                          |
|                           | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I/P-O/P:100M Ohms / 500VDC / 25℃ / 70% RH                                   |                              |                                          |
|                           | ISOLATION LEVEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Primary-secondary: 1xMOPP / 2xMOOP when system input voltage is with 250VAC |                              |                                          |
|                           | ISOLATION CAPACITANCE (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10pF                                                                        |                              |                                          |
|                           | EMC EMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Parameter                                                                   | Standard                     | Test Level / Note                        |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Conducted                                                                   | BS EN/EN55032, BS EN/EN55011 | Class A/B with external components       |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Radiated                                                                    | BS EN/EN55032, BS EN/EN55011 | Class A/B with external components       |
|                           | EMC IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Parameter                                                                   | Standard                     | Test Level / Note                        |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ESD                                                                         | BS EN/EN61000-4-2            | Level 2, ±4KV contact, Level 3, ±8KV air |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Radiated Susceptibility                                                     | BS EN/EN61000-4-3            | Level 2, 3V/m                            |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | EFT/Bursts                                                                  | BS EN/EN61000-4-4            | Level 1, 0.5KV / 5KHz                    |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Surge                                                                       | BS EN/EN61000-4-5            | Level 1, 0.5KV Line to Ground            |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Conducted                                                                   | BS EN/EN61000-4-6            | Level 2, 3V(e.m.f.)                      |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Magnetic Field                                                              | BS EN/EN61000-4-8            | Level 1, 1A/m                            |
| OTHERS                    | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15000Khrs   MIL-HDBK-217F(25℃)                                              |                              |                                          |
|                           | DIMENSION (L*W*H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 19.7*7.1*11.5mm (0.775*0.279*0.452 inch)                                    |                              |                                          |
|                           | CASE MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Non-Conductive black plastic (UL 94V-0 rated)                               |                              |                                          |
|                           | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.8g ; 24pcs/per tube, 2160pcs/90 tube/per carton                           |                              |                                          |
| NOTE                      | 1.All parameters are specified at normal input(L:5Vdc, M:12Vdc, N:24Vdc), rated load, 25℃ 70% RH ambient.<br>2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf & 47µf capacitor.<br>3.Line regulation is measured from low line to high line at rated load.<br>4.Load regulation is measured from 10% to 100% rated load.<br>5.Patient leakage current(2µA max.) and reinforced isolation is based on a 250VAC, 50/60Hz system input voltage.<br>6.The final equipment must be re-confirm that it still meet EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.”(as available on <a href="http://www.meanwell.com">http://www.meanwell.com</a> )<br>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a> |                                                                             |                              |                                          |

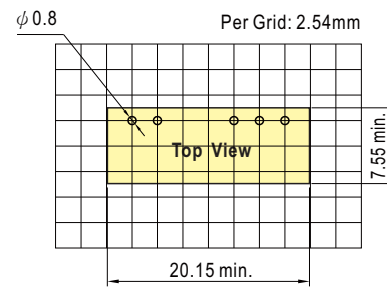
### Mechanical Specification

- All dimensions in mm(inch)
- Tolerance:  $x.x \pm 0.5\text{mm}$  ( $x.xx \pm 0.02"$ )  
 $x.xx \pm 0.10\text{mm}$  ( $x.xxx \pm 0.004"$ )
- Pin pitch tolerance:  $\pm 0.05\text{mm}$  ( $\pm 0.002"$ )



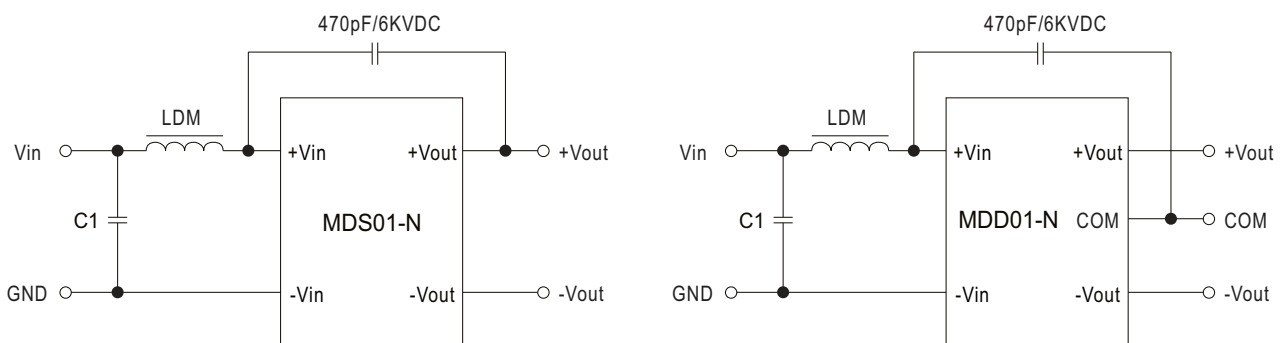
### Plug Assignment

| Pin-Out |                            |                          |
|---------|----------------------------|--------------------------|
| Pin No. | MDS01-N<br>(Single output) | MDD01-N<br>(Dual output) |
| 1       | +Vin                       | +Vin                     |
| 2       | -Vin                       | -Vin                     |
| 5       | -Vout                      | -Vout                    |
| 6       | No pin                     | Common                   |
| 7       | +Vout                      | +Vout                    |



### EMC Suggestion

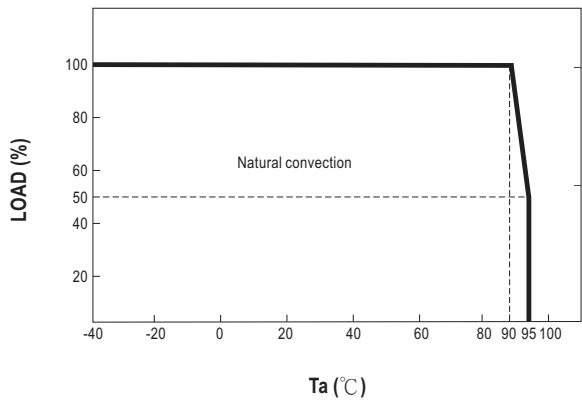
EMC typical recommended circuit (Class A/B)



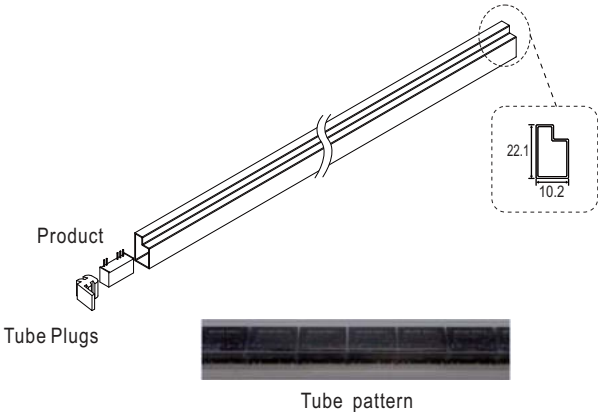
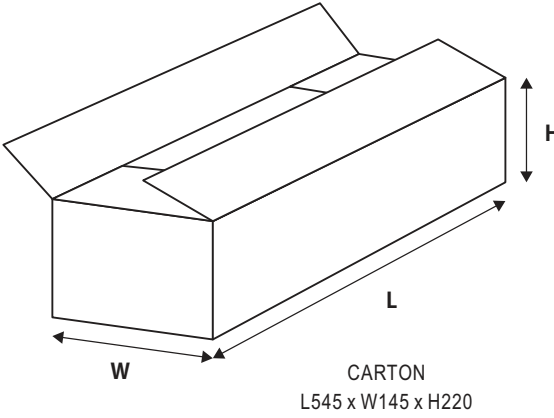
Recommended typical circuit parameters:

| Input | LDM   | C1    |
|-------|-------|-------|
| 5V    | 47μH  | 10μF  |
| 12V   | 47μH  | 10μF  |
| 24V   | 100μH | 4.7μF |

Derating Curve



Packing

| Standard Tube Packing                                                                                                                                                                                                        | MPQ<br>Per Tube<br>(PCS) | One Tube<br>G.W. | Max. Q'TY/<br>Carton(PCS) | One Carton<br>G.W. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------|---------------------------|--------------------|
| <p>Unit : mm</p>   <p>CARTON<br/>L545 x W145 x H220</p> | 24                       | 105.5g           | 2160                      | 9.5Kg              |

Installation Manual

Please refer to : <http://www.meanwell.com/manual.html>