

### ■ Features

- SIP7 package with international standard pinout
- Operating temperature range -40 ~ +95°C
- Comply with IEC/UL62368-1 and LVD IEC60601-1
- Medical safety approved (1xMOPP/2xMOOP) according to IEC60601-1
- Low patient leakage current <2μA
- Protections: Short circuit (Continuous)
- 6KVDC high 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

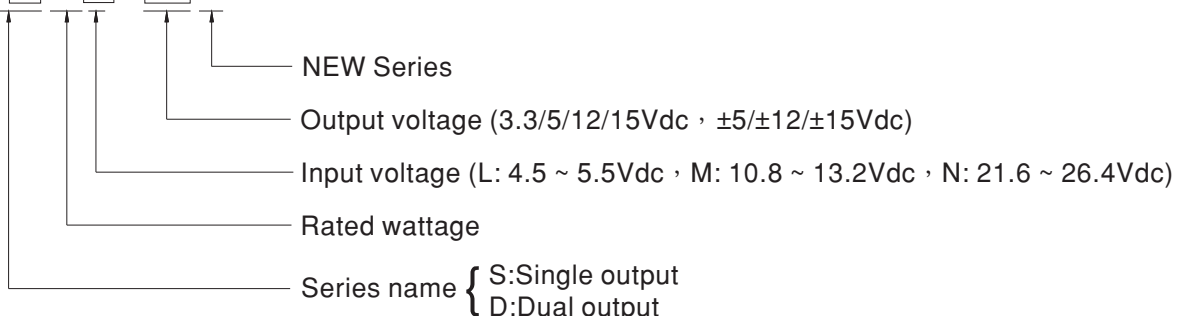
MW Search: <https://www.meanwell.com/serviceGTIN.aspx>

### ■ Description

MDS02-N and MDD02-N series are 2W isolated and unregulated module type medical grade DC-DC converter with SIP7 package. It features international standard pins, a high efficiency up to 86%, wide working temperature range -40~+95°C, 6KVDC I/P-O/P high isolation voltage, short circuit protection, etc. The models account for different input voltage 5V/12V/24V±10%, and various output voltage, 3.3V/5V/12V/15V for single output and ±5V/±12V/±15V for dual outputs, which are suitable for medical systems, ultra low leakage current or industrial control, telecommunication field, distributed power architecture, and so on.

### ■ Model Encoding

**MDS02L-12N**





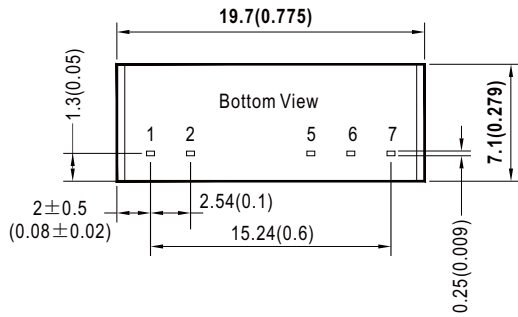
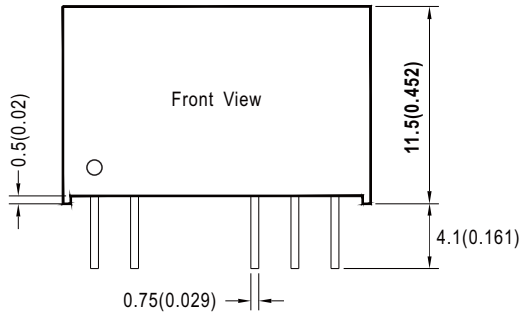
MODEL SELECTION TABLE							
ORDER NO.	INPUT			OUTPUT		EFFICIENCY (TYP.)	CAPACITOR LOAD (MAX.)
	INPUT VOLTAGE (RANGE)	INPUT CURRENT		OUTPUT VOLTAGE	OUTPUT CURRENT		
		NO LOAD	FULL LOAD				
MDS02L-03N	Normal 5V (4.5 ~ 5.5V)	40mA	505mA	3.3V	61 ~ 606mA	77%	1000μF
MDS02L-05N		40mA	490mA	5V	40 ~ 400mA	80%	1000μF
MDS02L-12N		40mA	470mA	12V	17 ~ 167mA	83%	330μF
MDS02L-15N		40mA	460mA	15V	13 ~ 134mA	86%	330μF
MDD02L-05N		37mA	490mA	±5V	±20 ~ 200mA	82%	*680μF
MDD02L-12N		43mA	473mA	±12V	±9 ~ 84mA	84%	*150μF
MDD02L-15N		46mA	455mA	±15V	±7 ~ 67mA	86%	*150μF
MDS02M-03N	Normal 12V (10.8 ~ 13.2V)	28mA	215mA	3.3V	61 ~ 606mA	75%	1000μF
MDS02M-05N		28mA	210mA	5V	40 ~ 400mA	77%	1000μF
MDS02M-12N		23mA	200mA	12V	17 ~ 167mA	84%	330μF
MDS02M-15N		23mA	200mA	15V	13 ~ 134mA	83%	330μF
MDD02M-05N		25mA	205mA	±5V	±20 ~ 200mA	80%	*680μF
MDD02M-12N		25mA	203mA	±12V	±9 ~ 84mA	83%	*150μF
MDD02M-15N		25mA	194mA	±15V	±7 ~ 67mA	84%	*150μF
MDS02N-03N	Normal 24V (21.6 ~ 26.4V)	10mA	108mA	3.3V	61 ~ 606mA	78%	1000μF
MDS02N-05N		12mA	103mA	5V	40 ~ 400mA	81%	1000μF
MDS02N-12N		12mA	100mA	12V	17 ~ 167mA	84%	330μF
MDS02N-15N		12mA	98mA	15V	13 ~ 134mA	85%	330μF
MDD02N-05N		11mA	102mA	±5V	±20 ~ 200mA	83%	*680μF
MDD02N-12N		10mA	102mA	±12V	±9 ~ 84mA	83%	*150μF
MDD02N-15N		10mA	100mA	±15V	±7 ~ 67mA	84%	*150μF

\* For each output

SPECIFICATION				
INPUT	VOLTAGE RANGE	L: 4.5 ~ 5.5Vdc M: 10.8 ~ 13.2Vdc 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	2W		
	RIPPLE & NOISE <small>Note.2</small>	100mVp-p		
	LINE REGULATION <small>Note.3</small>	1.2% for 1% input variation		
	LOAD REGULATION <small>Note.4</small>	±15% for 3.3Vo, 5Vo ; ±10% for others		
	SWITCHING FREQUENCY (Typ.)	20KHz		
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +95°C (Refer to "Derating Curve")		
	CASE TEMPERATURE	+105°C		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.02% / °C (0 ~ 90°C)		
	SOLDERING TEMPERATURE	1.5mm from case of 1 ~ 3sec./260°C max.		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes		
SAFETY & EMC ( <small>Note.6</small> )	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°C / 70% RH		
	ISOLATION LEVEL	Primary-secondary: 1xMOPP / 2xMOOP when system input voltage is with 250VAC		
	ISOLATION CAPACITANCE (Typ.)	25pF		
	EMC EMISSION	<b>Parameter</b>	<b>Standard</b>	<b>Test Level / Note</b>
		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	<b>Parameter</b>	<b>Standard</b>	<b>Test Level / Note</b>
		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	12900Khrs MIL-HDBK-217F(25°C)		
	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	<p>1.All parameters are specified at normal input(L:5Vdc, M:12Vdc, N:24Vdc), rated load, 25°C 70% RH ambient.</p> <p>2.Ripple &amp; noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf &amp; 47µf capacitor.</p> <p>3.Line regulation is measured from low line to high line at rated load.</p> <p>4.Load regulation is measured from 10% to 100% rated load.</p> <p>5.Patient leakage current(2µA max.) and reinforced isolation is based on a 250VAC, 50/60Hz system input voltage.</p> <p>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>)</p> <p>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a></p>			

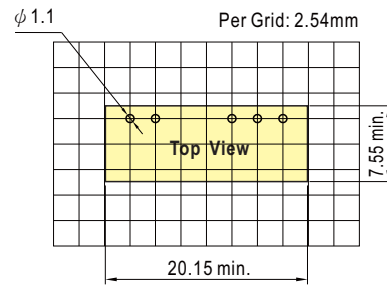
**Mechanical Specification**

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



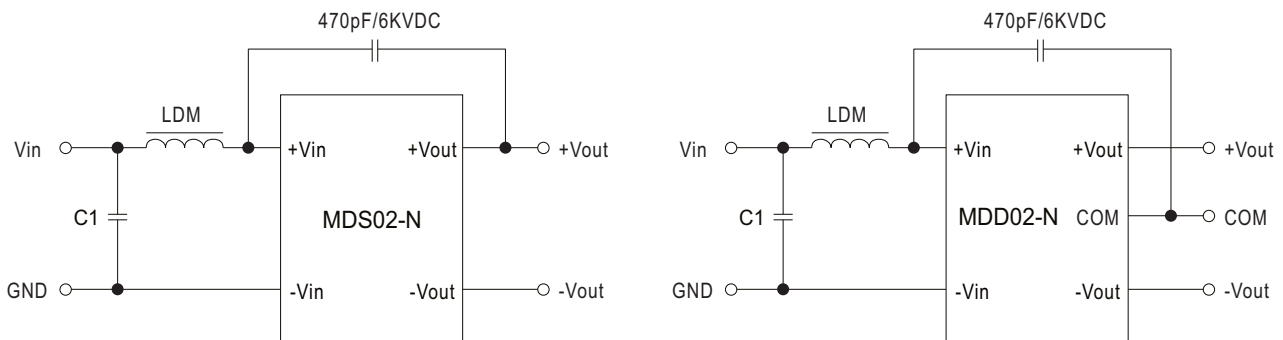
**Plug Assignment**

Pin-Out		
Pin No.	MDS02-N (Single output)	MDD02-N (Dual output)
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No pin	Common
7	+Vout	+Vout



**EMC Suggestion**

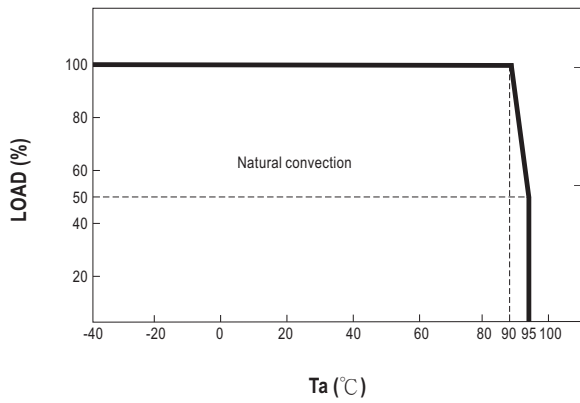
EMC typical recommended circuit (Class A/B)



Recommended typical circuit parameters:

Input	LDM	C1
5V	47 $\mu$ H	22 $\mu$ F
12V	47 $\mu$ H	10 $\mu$ F
24V	100 $\mu$ H	22 $\mu$ F

■ Derating Curve



■ Packing

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

■ Installation Manual

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