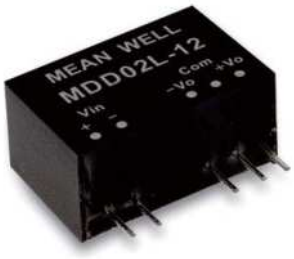
2W SIP Package DC-DC Medical Grade Unregulated Converter MDS02 & MDD02 series





ANSI/AAMI ES60601-1

Medical

Features

- SIP7 package with international standard pinout
- Operating temperature range -40 ~ +85℃
- Medical safety approved (1xMOPP/2xMOOP) according to ANSI/AAMI ES60601-1
- Low patient leakage current <2μA
- Protection: Short circuit(3 second max.)
- 6KVDC or 4.2VAC hight I/O isolation (Reinforced isolation)
- Low cost
- 3 years warranty

Applications

- Medical devices
- Medical oxygen monitor
- CT scanning
- Medical carts
- Oral care equipment

GTIN CODE

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

Description

MDS02 and MDD02 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 85%, wide working temperature range -40~+85℃, 6KVDC or 4.2KVAC I/P-O/P hight isolation voltage, short circuit protection, etc. The models account for different input voltage 5V/12V/24V±10%, and various output voltage, 5V/12V/15V for single output and ±5V/±9V/±12V/±15V for dual outputs, which are suitable for medical systems, ultra low leakage current.

Model Encoding

MD S 02 L – 12

- 12: Output voltage (5/12/15Vdc，±5/±9/±12/±15Vdc)
- L: Input voltage (L: 4.5 ~ 5.5Vdc，M: 10.8 ~ 13.2Vdc，N: 21.6 ~ 26.4Vdc)
- 02: Rated wattage
- S: Series name { S:Single output / D:Dual output }

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-05	Normal 5V (4.5 ~ 5.5V)	35mA	510mA	5V	40 ~ 400mA	77%	1000μF
MDS02L-12		47mA	510mA	12V	17 ~ 167mA	80%	470μF
MDS02L-15		65mA	510mA	15V	13 ~ 133mA	79%	470μF
MDD02L-05		35mA	500mA	±5V	±20 ~ 200mA	78%	*470μF
MDD02L-09		47mA	500mA	±9V	±12 ~ 111mA	81%	*470μF
MDD02L-12		60mA	510mA	±12V	±9 ~ 83mA	78%	*220μF
MDD02L-15		65mA	510mA	±15V	±7 ~ 67mA	79%	*220μF
MDS02M-05	Normal 12V (10.8 ~ 13.2V)	15mA	215mA	5V	40 ~ 400mA	75%	1000μF
MDS02M-12		16mA	205mA	12V	17 ~ 167mA	83%	470μF
MDS02M-15		17mA	200mA	15V	13 ~ 133mA	84%	470μF
MDD02M-05		17mA	210mA	±5V	±20 ~ 200mA	78%	*470μF
MDD02M-09		21mA	205mA	±9V	±12 ~ 111mA	83%	*470μF
MDD02M-12		18mA	205mA	±12V	±9 ~ 83mA	83%	*220μF
MDD02M-15		24mA	205mA	±15V	±7 ~ 67mA	82%	*220μF
MDS02N-05	Normal 24V (21.6 ~ 26.4V)	8mA	106mA	5V	40 ~ 400mA	80%	1000μF
MDS02N-12		9mA	103mA	12V	17 ~ 167mA	83%	470μF
MDS02N-15		9mA	100mA	15V	13 ~ 133mA	85%	470μF
MDD02N-05		11mA	106mA	±5V	±20 ~ 200mA	77%	*470μF
MDD02N-09		11mA	103mA	±9V	±12 ~ 111mA	83%	*470μF
MDD02N-12		11mA	103mA	±12V	±9 ~ 83mA	82%	*220μF
MDD02N-15		12mA	103mA	±15V	±7 ~ 67mA	82%	*220μF

* For each output

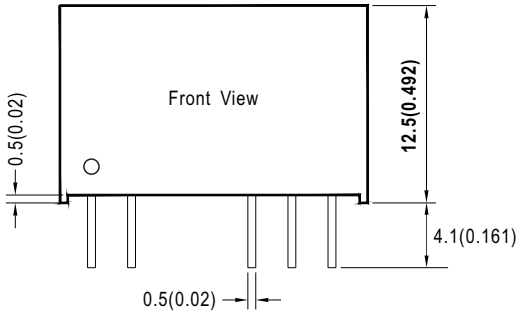
SPECIFICATION				
INPUT	VOLTAGE RANGE	L: 4.5 ~ 5.5Vdc M: 10.8 ~ 13.2Vdc N: 21.6 ~ 26.4Vdc		
	SURGE VOLTAGE (100ms max.)	5Vin models : 9Vdc 12Vin models : 18Vdc 24Vin models : 30Vdc		
	FILTER	Internal capacitor		
	PROTECTION	Fuse recommended. 500mA Slow-Blow Type for all models		
OUTPUT	VOLTAGE ACCURACY	±5.0%		
	RATED POWER	2W		
	RIPPLE & NOISE Note.2	75mVp-p		
	LINE REGULATION Note.3	1.2% for 1% input variation		
	LOAD REGULATION Note.4	±10%		
	SWITCHING FREQUENCY (Typ.)	100KHz		
PROTECTION	SHORT CIRCUIT	3 second max.		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +85℃ (Refer to "Derating Curve")		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125℃, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.02% / ℃ (0 ~ 85℃)		
	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 (Note.6)	SAFETY STANDARDS	UL60601-1, EAC TP TC 020/2011 approved		
	WITHSTAND VOLTAGE	I/P-O/P:6KVDC or 4.2KVAC		
	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, 50/60Hz		
	ISOLATION CAPACITANCE (Typ.)	5pF		
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**
		Conducted	BS EN/EN55011(CISPR11)	Class B
		Radiated	BS EN/EN55011(CISPR11)	Class B
	EMC IMMUNITY	**Parameter**	**Standard**	**Test Level / Note**
		ESD	BS EN/EN61000-4-2	Level 2, ±8KV contact
OTHERS	MTBF	3500Khrs MIL-HDBK-217F(25℃)		
	DIMENSION (L*W*H)	19.5*9.8*12.5mm (0.77*0.386*0.492 inch)		
	CASE MATERIAL	Non-Conductive black plastic (UL 94V-0 rated)		
	PACKING	4.2g ; 25pcs/per tube, 3000pcs/120 tube/per carton		

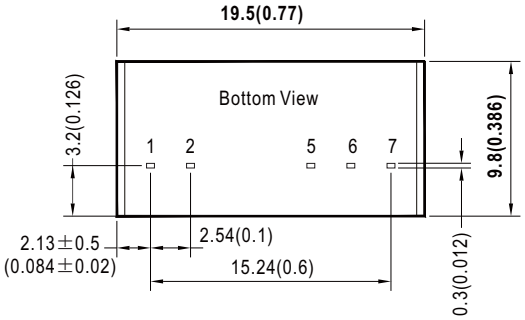
NOTE

1.All parameters are specified at normal input(L:5Vdc, M:12Vdc, N:24Vdc), rated load, 25℃ 70% RH ambient.
2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1μf & 47μf capacitor.
3.Line regulation is measured from low line to high line at rated load.
4.Load regulation is measured from 10% to 100% rated load.
5.Patient leakage current(2μA max.) and reinforced isolation is based on a 250VAC, 50/60Hz system input voltage.
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 http://www.meanwell.com)
※ Product Liability Disclaimer ： For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

■ Mechanical Specification

- All dimensions in mm(inch)
- Tolerance:x.x±0.25mm(x.xx±0.01")
  x.xx±0.10mm(x.xxx±0.004")
- Pin pitch tolerance:±0.05mm (±0.002")



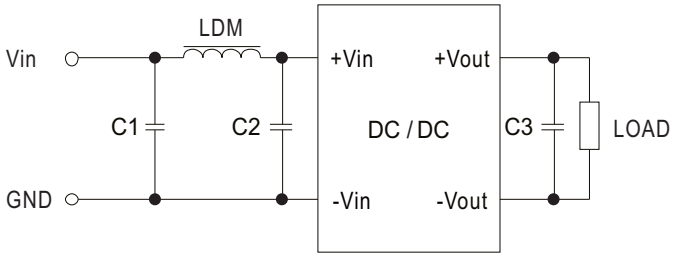


■ Plug Assignment

Pin-Out		
Pin No.	MDS02 (Single output)	MDD02 (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 B)



Recommended typical circuit parameters:

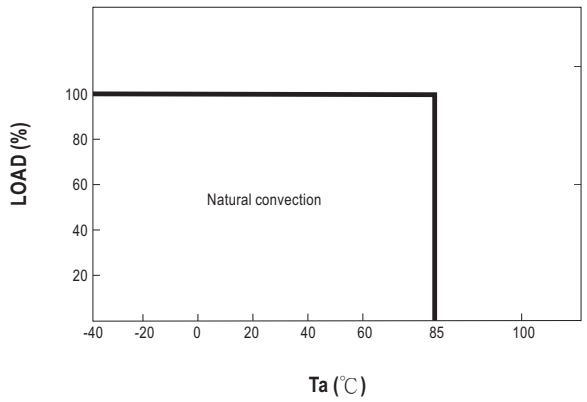
Input voltage (V)		3.3/5/12/15/24
EMI	C1,C2	4.7μF/50V
	C3	See table 2
	LDM	6.8μH

Table 1

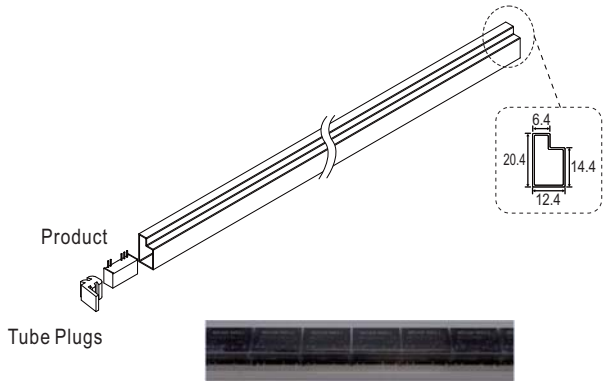
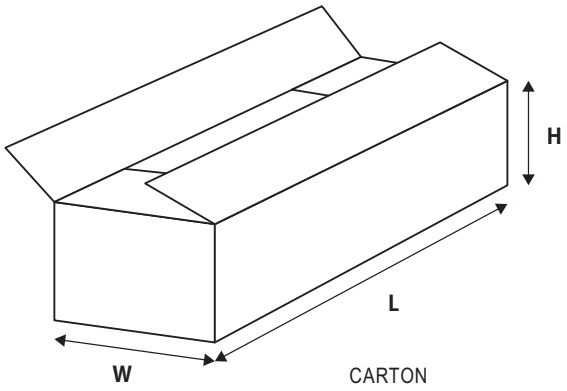
Single Vout	C3(μF)	Dual Vout	C3(μF)
3.3/5V	10μF	±5V	4.7μF
12V	2.2μF	±9V	2.2μF
15V	1μF	±12V/15V	1μF

Table 2

■ Derating Curve



■ Packing

Standard Tube Packing	MPQ Per Tube (PCS)	One Tube G.W.	Max. Q'TY/ Carton(PCS)	One Carton G.W.
Unit : mm  Tube pattern  CARTON L600 x W285 x H225	25	136g	3000	18.5Kg

■ Installation Manual

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