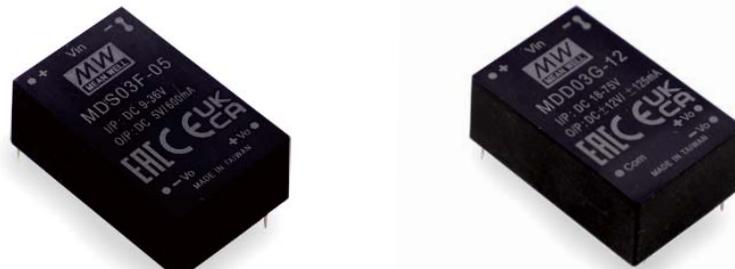




3W DIP Package DC-DC Medical Grade Regulated Converter

**MDS03 & MDD03 series**

## ■ Features

- DIP 24 package with international standard pinout
- 4:1 wide input range
- Low patient leakage current <5µA
- Wide operating temperature range -40 ~ +90°C
- Medical safety approved (2xMOPP) according to IEC60601-1
- Protections: Short circuit (Continuous) / Overload
- 6KVDC or 4.2KVAC high I/O isolation (Reinforced isolation)
- 3 years warranty

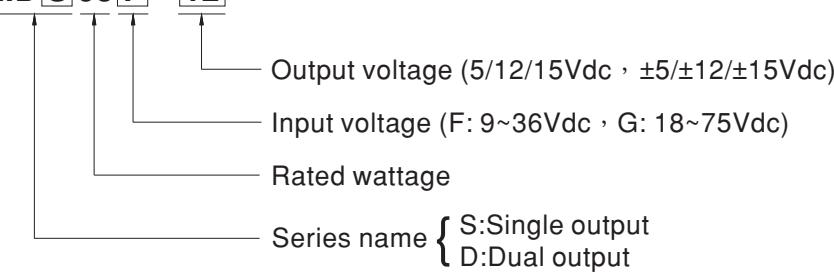
## ■ Applications

- Medical devices
- Medical oxygen monitor
- CT scanning
- Medical carts
- Oral care equipment
- Industrial control system

## ■ Description

MDS03 and MDD03 series are 3W isolated and regulated module type medical grade DC-DC converter with DIP 24 package. It features international standard pins, a high efficiency up to 81%, wide working temperature range -40~+90°C, 6KVDC or 4.2KVAC I/P-O/P high isolation voltage, compliance with IEC60601-1 medical standard, continuous-mode short circuit protection, etc. The models account for different input voltage 9~36V and 18~75V 4:1 wide input range, and various output voltage, 5V/12V/15V for single output and ±5V/±12V/±15V for dual output. Which are suitable for medical systems, ultra low leakage current.

## ■ Model Encoding

MD **S** 03 **F** - **12**



3W DIP Package DC-DC Medical Grade Regulated Converter

**MDS03 & MDD03 series****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						
MDS03F-05	Normal 12V,24V (9 ~ 36V)	20mA	320mA	5V	0 ~ 600mA	80%	330µF		
MDS03F-12		20mA	320mA	12V	0 ~ 250mA	80%	47µF		
MDS03F-15		20mA	320mA	15V	0 ~ 200mA	80%	47µF		
MDD03F-05		20mA	316mA	±5V	±30 ~ 300mA	80%	*220µF		
MDD03F-12		20mA	316mA	±12V	±12.5 ~ 125mA	79%	*47µF		
MDD03F-15		20mA	320mA	±15V	±10 ~ 100mA	79%	*22µF		
MDS03G-05	Normal 24V,48V (18 ~ 75V)	15mA	160mA	5V	0 ~ 600mA	80%	330µF		
MDS03G-12		15mA	160mA	12V	0 ~ 250mA	80%	47µF		
MDS03G-15		15mA	160mA	15V	0 ~ 200mA	81%	47µF		
MDD03G-05		15mA	158mA	±5V	±30 ~ 300mA	80%	*220µF		
MDD03G-12		15mA	158mA	±12V	±12.5 ~ 125mA	80%	*47µF		
MDD03G-15		15mA	158mA	±15V	±10 ~ 100mA	80%	*22µF		

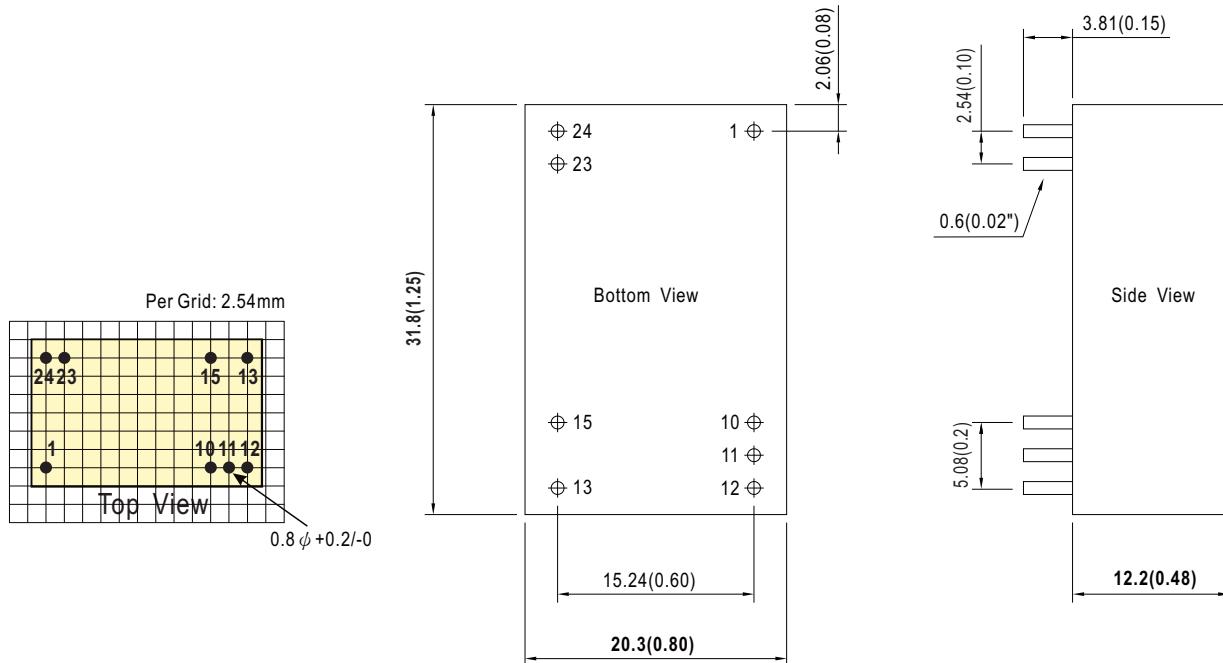
\* For each output

3W DIP Package DC-DC Medical Grade Regulated Converter **MDS03 & MDD03 series**

SPECIFICATION			
INPUT	VOLTAGE RANGE	F: 9 ~ 36Vdc , G: 18 ~ 75Vdc	
	SURGE VOLTAGE (100ms max.)	F models : 50Vdc ; G models : 100Vdc	
	FILTER	Pi type	
	PROTECTION (Typ.)	Fuse recommended. F models: 2A slow-blow Type, G models: 1A slow-blow Type	
OUTPUT	VOLTAGE ACCURACY	±2%	
	RATED POWER	3W	
	RIPPLE & NOISE Note.2	150mVp-p	
	LINE REGULATION Note.3	±0.5%	
	LOAD REGULATION Note.4	±0.5%	
	SWITCHING FREQUENCY (Typ.)	250KHz	
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery	
	OVERLOAD	110 ~ 250% rated output power	
		Protection type : Recovers automatically after fault condition is removed	
ENVIRONMENT	COOLING	Free-air convection	
	WORKING TEMP.	-40 ~ +90°C (Refer to "Derating Curve")	
	CASE TEMPERATURE	+105°C max.	
	WORKING HUMIDITY	20% ~ 90% RH non-condensing	
	STORAGE TEMP., HUMIDITY	-55 ~ +125°C, 10 ~ 95% RH non-condensing	
	TEMP. COEFFICIENT	0.05% / °C (0 ~ 71°C)	
	SOLDERING TEMPERATURE	1.5mm from case of 3 ~ 5sec./265°C max.	
SAFETY & EMC (Note.5)	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes	
	SAFETY STANDARDS	IEC60601-1(LVD) 3 <sup>rd</sup> edition, EAC TP TC 020/2011(EAC TP TC 004 for 48Vin type only) approved	
	WITHSTAND VOLTAGE	I/P-O/P:6KVDC or 4.2KVAC	
	ISOLATION RESISTANCE	I/P-O/P:1000M Ohms / 500VDC / 25°C / 70% RH	
	ISOLATION LEVEL	Primary-secondary: 2xMOPP when system input voltage is with 250VAC, 50/60Hz	
	ISOLATION CAPACITANCE (Typ.)	20pF	
	EMC EMISSION	Parameter	Standard
		Conducted	BS EN/EN55011
	EMC IMMUNITY	Radiated	BS EN/EN55011
		Parameter	Standard
		ESD	BS EN/EN61000-4-2
		Radiated Susceptibility	BS EN/EN61000-4-3
		EFT/Burst	BS EN/EN61000-4-4
		Surge	BS EN/EN61000-4-5
		Conducted	BS EN/EN61000-4-6
		Magnetic Field	BS EN/EN61000-4-8
OTHERS	MTBF	>454Khrs MIL-HDBK-217F(25°C)	
	DIMENSION (L*W*H)	31.8*20.3*12.2mm (1.25*0.8*0.48 inch)	
	CASE MATERIAL	UL94V-0 plastic case	
	PACKING	17g ; 15pcs/per tube, 750pcs/50 tube max./carton	
NOTE	1.All parameters are specified at normal input(F: 12Vdc, G: 24Vdc), rated load, 25°C 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 for MDD03. 5.The final equipment must be re-confirmed that it still meets 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> ) ※ 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

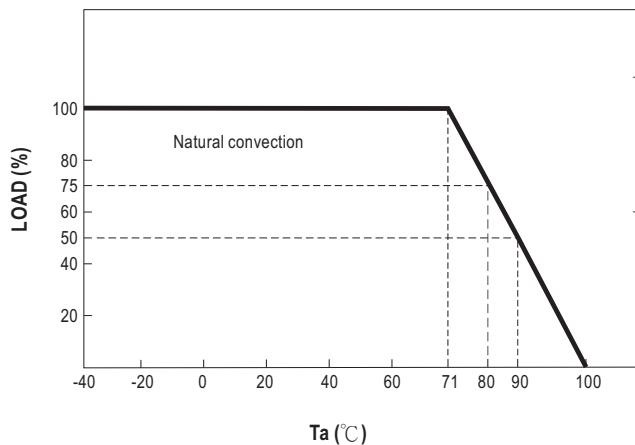
- All dimensions in mm(inch)
- Tolerance:  $x.x$  or  $x.xx \pm 0.5\text{mm}$  ( $x.xx \pm 0.02''$ )
- Pin size is:  $0.6 \pm 0.10\text{mm}$  ( $0.02'' \pm 0.004''$ )



### ■ Plug Assignment

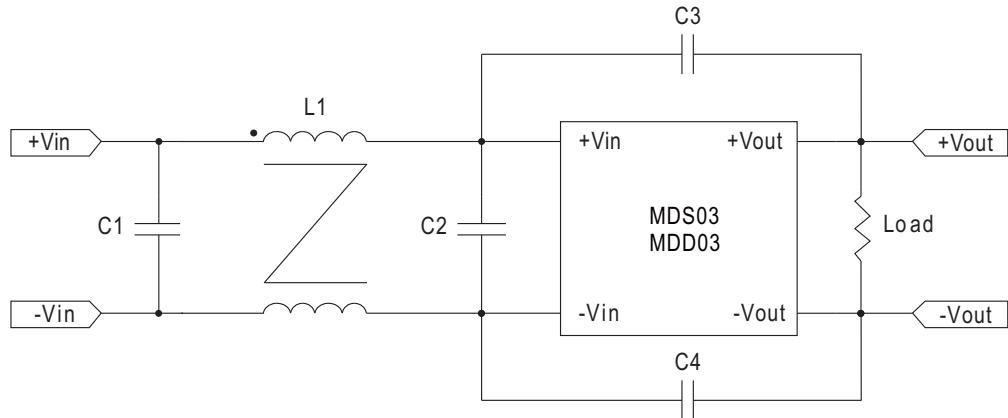
Pin-Out		
Pin No.	MDS03 (Single output)	MDD03 (Dual output)
1	+Vin	+Vin
10	No pin	No pin
11	No pin	Common
12	-Vout	No pin
13	+Vout	-Vout
15	No pin	+Vout
23,24	-Vin	-Vin

### ■ Derating Curve



3W DIP Package DC-DC Medical Grade Regulated Converter **MDS03 & MDD03** series**■ EMC Suggestion Circuit**

※ Required external components to meet BS EN/EN55011 class B emission are as below:



	C1	C2	C3	C4	L1
MDS03F	10μF/50V MLCC	10μF/50V MLCC	X	X	450μH Common Mode Choke
MDS03G	4.7μF/100V MLCC	4.7μF/100V MLCC	X	X	450μH Common Mode Choke

**■ Installation Manual**Please refer to : <http://www.meanwell.com/manual.html>