



EMC CE



## ■ Features

- DIP 2"x1" package with international standard pinout
- 2:1 wide input range
- Low patient leakage current <math><5\mu\text{A}</math>
- Wide operating temperature range  $-40 \sim +90^{\circ}\text{C}$
- Medical safety approved (2xMOPP) according to IEC60601-1
- No minimum load required
- Protections: Short circuit (Continuous) / Overload / Input under voltage
- 4000VAC high I/O isolation (Reinforced isolation)
- 3 years warranty

## ■ Applications

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

## ■ Description

MDS15 series is 15W isolated and regulated module type medical grade DC-DC converter with 2"x1" package. It features international standard pins, a high efficiency up to 88%, wide working temperature range  $-40 \sim +90^{\circ}\text{C}$ , 4KVAC 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 9~18V, 18~36V and 36~75V 2:1 wide input range, and various output voltage 5V/12V/15V/24V, which are suitable for medical systems, ultra low leakage current.

## ■ Model Encoding

MDS15 **A** - **12**

- Output voltage (5/12/15/24Vdc)
- Input voltage (A: 9~18Vdc · B: 18~36Vdc · C: 36~75Vdc)
- Rated wattage
- Series name

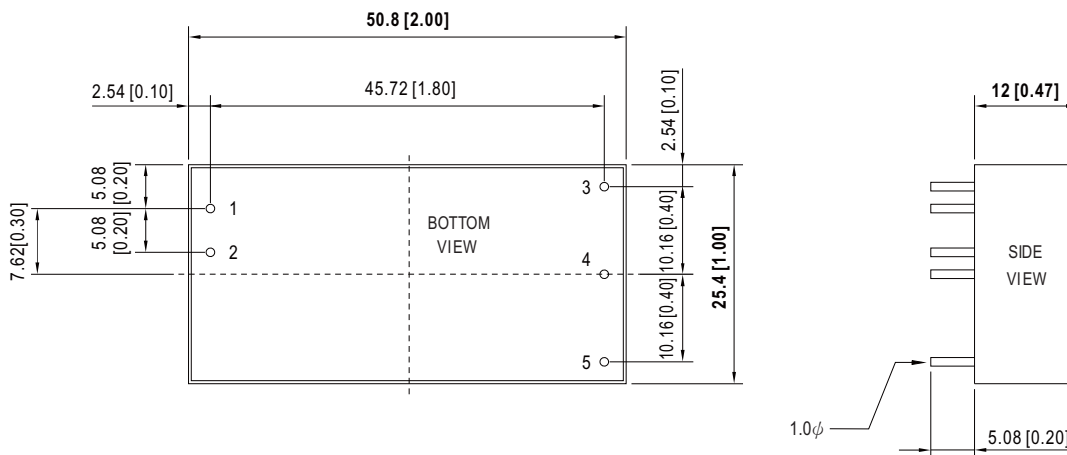
MODEL SELECTION TABLE							
ORDER NO.	INPUT			OUTPUT		EFFICIENCY (Typ.)	CAPACITOR LOAD (MAX.)
	INPUT VOLTAGE (RANGE)	INPUT CURRENT		OUTPUT VOLTAGE	OUTPUT CURRENT		
		NO LOAD	FULL LOAD				
MDS15A-05	Normal 12V (9 ~ 18V)	10mA	1500mA	5V	3000mA	85%	5600μF
MDS15A-12		10mA	1450mA	12V	1250mA	88%	1000μF
MDS15A-15		10mA	1450mA	15V	1000mA	87%	720μF
MDS15A-24		10mA	1450mA	24V	625mA	85%	220μF
MDS15B-05	Normal 24V (18 ~ 36V)	7mA	750mA	5V	3000mA	87%	5600μF
MDS15B-12		7mA	700mA	12V	1250mA	87%	1000μF
MDS15B-15		7mA	700mA	15V	1000mA	86%	720μF
MDS15B-24		7mA	720mA	24V	625mA	87%	220μF
MDS15C-05	Normal 48V (36 ~ 75V)	5mA	390mA	5V	3000mA	86%	5600μF
MDS15C-12		5mA	350mA	12V	1250mA	87%	1000μF
MDS15C-15		5mA	360mA	15V	1000mA	87%	720μF
MDS15C-24		5mA	360mA	24V	625mA	88%	220μF

SPECIFICATION				
INPUT	VOLTAGE RANGE	A: 9~18Vdc B: 18~36Vdc C: 36~75Vdc		
	SURGE VOLTAGE (100ms max.)	12Vin models : 25Vdc, 24Vin models : 50Vdc, 48Vin models : 100Vdc		
	FILTER	Pi type		
	PROTECTION	Fuse recommended. 12Vin models: 4A delay time Type, 24Vin models: 2A delay time Type, 48Vin models: 1A delay time Type		
OUTPUT	VOLTAGE ACCURACY	±1%		
	RATED POWER	15W		
	RIPPLE & NOISE Note.2	60mVp-p		
	LINE REGULATION Note.3	±0.5%		
	LOAD REGULATION Note.4	±0.5%		
	SWITCHING FREQUENCY (Typ.)	12Vin/24Vin:250KHz, 48Vin:300KHz		
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery		
	OVERLOAD	110 ~ 185% rated output power Protection type : Recovers automatically after fault condition is removed		
	UNDER VOLTAGE LOCKOUT	12Vin: 7.5Vdc, 24Vin: 15Vdc, 48Vin: 33Vdc		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +90°C (Refer to "Derating Curve")		
	CASE TEMPERATURE	+110°C max.		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.03% / °C (0 ~ 70°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 (Note.6)	SAFETY STANDARDS	IEC60601-1(LVD) 3 <sup>rd</sup> edition, EAC TP TC 004 approved		
	WITHSTAND VOLTAGE	I/P-O/P 4KVAC		
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH		
	ISOLATION CAPACITANCE (Typ.)	100pF		
	EMC EMISSION	Parameter	Standard	Test Level / Note
		Conducted	EN55011	Class A without external components
		Radiated	EN55011	N/A
	EMC IMMUNITY	Parameter	Standard	Test Level / Note
		ESD	EN61000-4-2	Level 1, ±15KV air, ±8KV contact
		Radiated Susceptibility	EN61000-4-3	Level 1, 10V/m
		EFT/Burest	EN61000-4-4	Level 1, ±2KV
		Surge	EN61000-4-5	Level 1, ±1KV Line-Line, ±2KV Line-GND
		Conducted	EN61000-4-6	Level 1, 10Vrms(e.m.f.)
Magnetic Field	EN61000-4-8	Level 2, 10A/m		
OTHERS	MTBF	1060Khrs MIL-HDBK-217F(25°C)		
	DIMENSION (L*W*H)	50.8*25.4*12mm (2*1*0.47 inch)		
	CASE MATERIAL	UL94V-0 plastic case		
	PACKING	30g; 18pcs/per tube, 432pcs/24 tube max./carton		
NOTE	<p>1.All parameters are specified at normal input(A:12Vdc, B:24Vdc, C:48Vdc), rated load, 25°C 70% RH ambient.  2.Ripple &amp; noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf &amp; 47µf capacitor.  3.Line regulation is measured from low line to high line at rated load.  4.Load regulation is measured from 0% to 100% rated load.  5.2xMOPP base on a working voltage of 250Vac between Primary to Secondary.  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."</p>			

**Mechanical Specification**

- All dimensions in mm (inch)
- Tolerance:  $x.x \pm 0.5\text{mm}$  ( $x.xxx \pm 0.125"$ )
- Pin size is  $1 \pm 0.1\text{mm}$  ( $0.04 \pm 0.004"$ )

Unit:mm (inch)



**Pin Configuration**

Pin No.	Pin-Out
1	+Vin
2	-Vin
3	+Vout
4	No Pin
5	-Vout

**Derating Curve**

