MD-3W(M) Series

MOTIEN TECHNOLOGY

3W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation, Up to 3000 VDC
- Continuous Short Circuit Protection
- Efficiency up to 81%
- -40°C ~ 85°C Operation Temperature Range
- EMC filter meets EN55022 Class A without adding external components
- Nickel-coated Copper DIL24-pin case

CE

The MD series is a family of cost effective 3W single & dual output DC-DC converters. These converters are consisted with Nickle-coated copper in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3000VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages are 12Vdc, 24Vdc and 48Vdc with output voltages of 3.3,5,12,15,24, ±3.3, ±5, ±12, ±15 and ±24 Vdc. Featuring high efficiency operation up to 81% and output voltage accuracy of ±2% maximum. Also , no additional components adding required to comply with EN55022 Class A.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Output Voltage Accuracy	±2%
Output Voltage Blance(Dual Output)	±2%
Maximum Output Current	See table
Line Regulation	±0.5%, max.
Load Regulation(0% to 100%)	±1.2%, max.
Cross Regulation (Dual Output) **(1)**	±5%
Ripple&Noise (20MHz Bandwidth)**(2)**	80mVpk-pk, max. Dual Output 24V:100mVpk-pk, max.
Over Load Protection	160% of Iout, typ.
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load **(3)**	See table
Transient Recovery Time **(4)**	300us, typ.
Transient Response Deviation **(4)**	±3%, max. Single Output 3.3V:±5%, max.

INPUT SPECIFICATIONS

Input Voltage Range		See table
Under Voltage Lockout		
12V Models	Module ON / OFF	8.5 Vdc / 7.0Vdc, typ.
24V Models	Module ON / OFF	16.5Vdc / 14.5Vdc, typ.
48V Models	Module ON / OFF	34.5Vdc / 30.0Vdc, typ.
Start up Time (Nominal Vin and constant resistive load)		20mS, typ.
Input Filter		Pi Type
Input Current (No-Load)		See table, max.
Input Current (Full-Load)		See table, typ.
Input Reflected Ripple Current **(5)**		20mApk-pk, typ.

EMC SPECIFICATIONS

Radiated Emissions	EN55022	CLASS A
Conducted Emissions	EN55022	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT	IEC 61000-4-4	Perf. Criteria A
Surge**(6)**	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

GENERAL SPECIFICATIONS

Efficiency	See table, typ.
I/O Isolation Voltage(60 sec)	
Input/Output	1500~3000Vdc
Case/Input&Ouput	1000Vdc
I/O Isolation Capacitance	1000 pF, typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Safety Standard : (designed to meet)	IEC/EN 60950-1

PHYSICAL SPECIFICATIONS

Case Material	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	16.5g
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C~85°C(See Derating Curve) -40°C ~ +70°C (For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-55°C~125°C
Cooling	Nature Convection

ABSOLUTE MAXIMUM RATINGS(7)

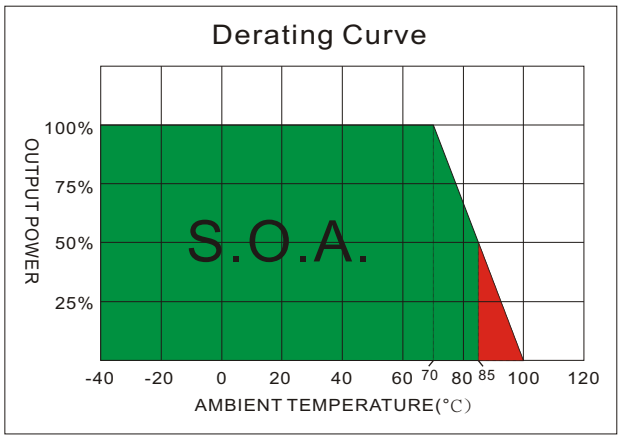
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage(100mS)	
12 Models	25 Vdc, max.
24 Models	50 Vdc, max.
48 Models	100 Vdc, max.
Soldering Temperature (1.5mm from case 10 sec. max.)	260°C, max.

PART NUMBER STRUCTURE

MD - 24 05 S 3 H M

- **Series Name**
- **Input Voltage Range**
  - **12** - 9 ~ 18V
  - **24** - 18 ~ 36V
  - **48** - 36 ~ 75V
- **Output Voltage**
  - **3R3** - 3.3V
  - **05** - 5V
  - **12** - 12V
  - **15** - 15V
  - **24** - 24V
- **Output Type**
  - **S** - Single output
  - **D** - Dual Output
- **3 Watt**
- **3KVdc Isolation.** Optional, if no suffix "H" mean1.5KVdc Isolation
- **Metal Case**



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
MD-123R3S3M	9-18	7	339	3.3	0	900	74	470
MD-1205S3M	9-18	7	325	5	0	600	78	470
MD-1212S3M	9-18	10	313	12	0	250	81	100
MD-1215S3M	9-18	10	313	15	0	200	81	100
MD-1224S3M	9-18	20	316	24	0	125	80	47
MD-123R3D3M	9-18	10	339	±3.3	0	±450	74	±220
MD-1205D3M	9-18	10	325	±5	0	±300	78	±220
MD-1212D3M	9-18	15	313	±12	0	±125	81	±100
MD-1215D3M	9-18	20	313	±15	0	±100	81	±100
MD-1224D3M	9-18	35	319	±24	0	±63	80	±47
MD-243R3S3M	18-36	7	172	3.3	0	900	73	470
MD-2405S3M	18-36	7	164	5	0	600	77	470
MD-2412S3M	18-36	7	156	12	0	250	81	100
MD-2415S3M	18-36	7	156	15	0	200	81	100
MD-2424S3M	18-36	10	156	24	0	125	81	47
MD-243R3D3M	18-36	7	167	±3.3	0	±450	75	±220
MD-2405D3M	18-36	7	160	±5	0	±300	79	±220
MD-2412D3M	18-36	10	156	±12	0	±125	81	±100
MD-2415D3M	18-36	15	156	±15	0	±100	81	±100
MD-2424D3M	18-36	20	158	±24	0	±63	81	±47
MD-483R3S3M	36-75	7	84	3.3	0	900	75	470
MD-4805S3M	36-75	7	80	5	0	600	79	470
MD-4812S3M	36-75	7	78	12	0	250	81	100
MD-4815S3M	36-75	7	78	15	0	200	81	100
MD-4824S3M	36-75	7	78	24	0	125	81	47
MD-483R3D3M	36-75	7	81	±3.3	0	±450	77	±220
MD-4805D3M	36-75	7	78	±5	0	±300	81	±220
MD-4812D3M	36-75	7	78	±12	0	±125	81	±100
MD-4815D3M	36-75	7	78	±15	0	±100	81	±100
MD-4824D3M	36-75	15	81	±24	0	±63	79	±47

Suffix "H" means 3000Vdc isolation

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

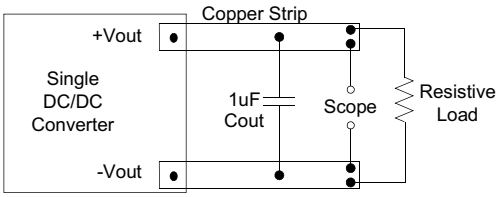
NOTE

1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Ripple/Noise measured with a 1uF ceramic capacitor.
3. Tested by minimal Vin and constant resistive load.
4. Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
5. Measured Input reflected ripple current with a simulated source inductance of 12uH and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz).
6. An external filter capacitor is required if the module has to meet IEC61000-4-5. The filter capacitor Motien suggest: Nippon chemi-con KY series, 220uF/100V.
7. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

TEST CONFIGURATIONS

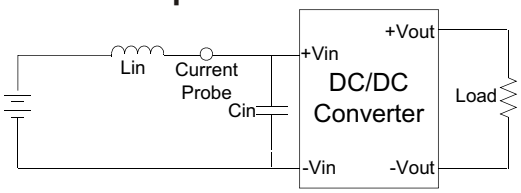
Output Ripple & Noise Measurement Test

Use a capacitor Cout(1.0uF) measurement.
The Scope measurement bandwidth is 0-20MHz.

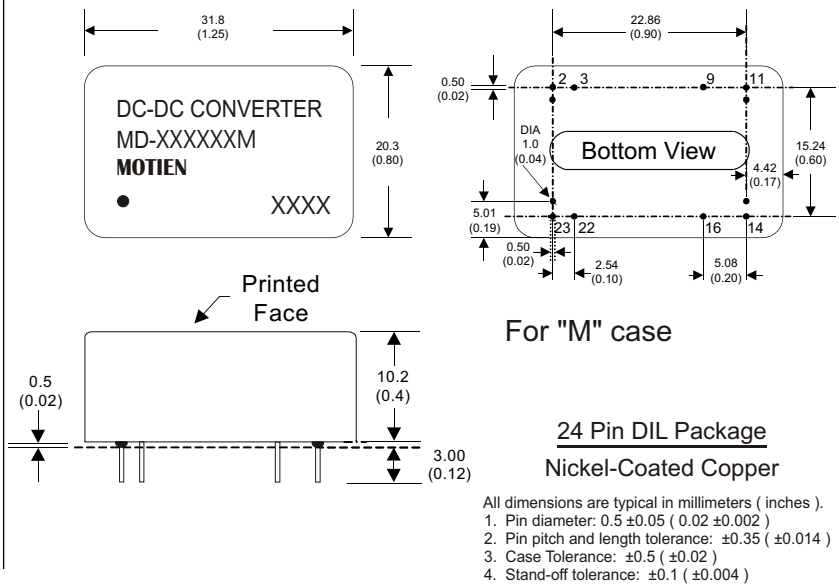


Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



MECCHANICAL SPECIFICATIONS



For "M" case

24 Pin DIL Package
Nickel-Coated Copper

All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)
4. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
2	-V Input	-V Input
3	-V Input	-V Input
9	N.P.	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

(The Pin Connection of high isolation one is the same with normal one.)

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