

M7W - 15W Series

15W 4:1 Regulated Single & Dual output

Features

- Ultra Wide 4:1 Input Range
- 3000 VDC Isolation
- No Minimum Load Required
- Efficiency up to 90%
- Extended Operating Temperature Range -40 ~ 100°C max.
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Load Protection
- Over Voltage Protection
- Soft Start
- Built-in EMI filter meets EN55032 classA without external components



The M7W series is a family of cost effective 15W single & dual output DC-DC converters. These converters combine copper package in a 1.6"x1" case with high performance features, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 24 and 48 with output voltage of 3.3, 5, 12, 15, ±5, ±12, ±15Vdc. High performance features include high efficiency operation up to 90% and output voltage accuracy of ±1% maximum.

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED.

OUTPUT SPECIFICATIONS	
Output Voltage Accuracy	±1%
Output Voltage Adjustability(Trim)	Single output: ±10%, max.
Maximum Output Current	See table
Line Regulation	±0.5%, max.
Load Regulation(I _o =0% to 100%)	Single: ±0.5%, max. Dual:±1%, max.(balanced load)
Cross Regulation (Dual Output) (1)	±5%
Ripple&Noise	
Measured by 20MHz bandwidth	
With a 10µF/25V X7R MLCC	Single output:75mVpk-pk,max.
With a 10µF/25V X7R MLCC for each output	Dual output:60mVpk-pk,max.
Over Voltage Protection	140% of V _{out} , typ.
Over Load Protection	170% of FL, typ.
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load (2)	See table
Transient Recovery Time (3)	250µs, typ.
Transient Response Deviation(3)	±3%, max. Single Output 3.3V:±5%, max.

INPUT SPECIFICATIONS	
Input Voltage Range	See table
Under Voltage Lockout	
24V Modes	Module ON / OFF 8.8Vdc / 7.6Vdc, typ.
48V Modes	Module ON / OFF 17.5Vdc / 16.5Vdc, typ.
Start up Time	30mS, typ.
(Nominal Vin and constant resistive load)	
Input Filter	Pi Type
Input Current(No-Load)	See table, max.
Input Current(Full-Load)	See table, typ.
Input Reflected Ripple Current(4)	20mA _{p-p} , typ.
Remote On/Off (Positive logic)(5)	
ON:	3.0 ... 12Vdc or open circuit
OFF:	0 ... 1.2Vdc or Short circuit pin2 and pin6
OFF idle current:	2 mA, typ.

ENVIRONMENTAL SPECIFICATIONS	
Operating Ambient Temperature	-40°C ~ +100°C(See Derating Curve) -40°C ~ +77°C(For 100% load)
Maximum Case Temperature	105°C
Thermal Impedance	Without Heat-sink 12°C/W, min. With Heat-sink 11°C/W, min.
Storage Temperature	-55°C ~ +125°C
Cooling(7)	Nature Convection

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	3000Vdc
Case/Input & Output	1600Vdc
Isolation Resistance	1000 MΩ, min.
Isolation Capacitance	2000 pF, typ.
Switching Frequency	3.3 & 05(Single) Vout Models 270kHz, typ. other Models 330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>600 Khrs
Safety Standard	UL/cUL 60950-1, 62368-1 IEC/EN 60950-1, 62368-1
Safety Approvals	UL/cUL 60950-1, 62368-1 IEC/EN 60950-1, 62368-1

EMC CHARACTERISTICS		
Radiated Emissions	EN55032	CLASS A
Conducted Emissions	EN55032	CLASS A
ESD	IEC61000-4-2	Perf. Criteria B
RS	IEC61000-4-3	Perf. Criteria A
EFT(8)	IEC61000-4-4	Perf. Criteria A
Surge(8)	IEC61000-4-5	Perf. Criteria A
CS	IEC61000-4-6	Perf. Criteria A
PFMF	IEC61000-4-8	Perf. Criteria A

PHYSICAL SPECIFICATIONS	
Case Material	Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	29.0g(Without Heat-sink) / 35.5g(With Heat-sink)
Dimensions	1.60"x1.00"x0.41"

ABSOLUTE SPECIFICATIONS (6)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Voltage(100mS)	
24 Models	50 Vdc, max.
48 Models	100 Vdc, max.
Soldering Temperature(1.5mm from case 10sec Max.)	260°C, max.

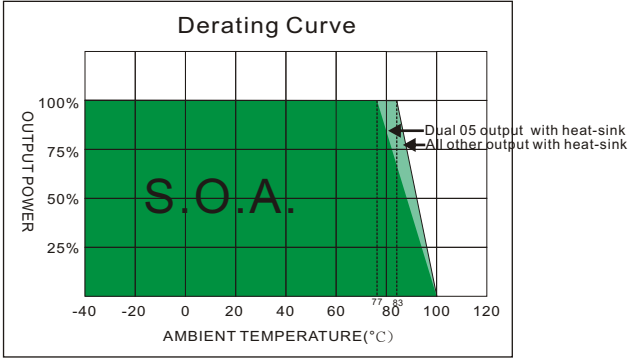
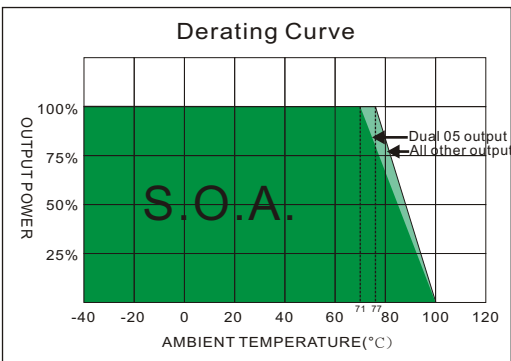
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PART NUMBER STRUCTURE

M7W - 24 12 S 15 SK

- M7W**: Series Name
- 24**: Input Voltage Range (24 - 9 ~ 36V, 48 - 18 ~ 75V)
- 12**: Nominal Output Voltage (3R3 - 3.3V, 05 - 5V, 12 - 12V, 15 - 15V)
- S**: Output Type (S - Single output, D - Dual Output)
- 15**: Watt
- SK**: Heat-sink(optional) (blank - Without Heat-sink, SK - With Heat-sink)



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (% , typ.)	Capacitor Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
M7W-243R3S15	9-36	10	503.05	3.3	0	3000	82	3300
M7W-2405S15	9-36	10	735.29	5	0	3000	85	3300
M7W-2412S15	9-36	10	710.22	12	0	1250	88	680
M7W-2415S15	9-36	10	702.25	15	0	1000	89	470
M7W-2405D15	9-36	10	735.29	±5	0	±1500	85	±2200
M7W-2412D15	9-36	10	710.22	±12	0	±625	88	±470
M7W-2415D15	9-36	15	702.25	±15	0	±500	89	±330
M7W-483R3S15	18-75	10	251.52	3.3	0	3000	82	3300
M7W-4805S15	18-75	10	367.64	5	0	3000	85	3300
M7W-4812S15	18-75	10	359.19	12	0	1250	87	680
M7W-4815S15	18-75	10	355.11	15	0	1000	88	470
M7W-4805D15	18-75	8	355.11	±5	0	±1500	88	±2200
M7W-4812D15	18-75	8	347.22	±12	0	±625	90	±470
M7W-4815D15	18-75	10	355.11	±15	0	±500	88	±330

NOTE

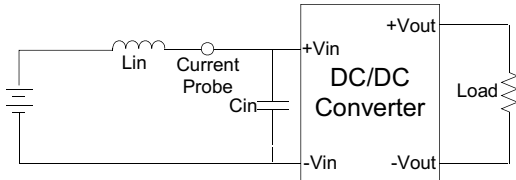
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
- The remote on/off control pin is referenced to -Vin(pin2).
- Exceeding the absolute ratings of the unit could cause damage.
It is not allowed for continuous operating.
- "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
- An external filter is required if the module has to meet IEC61000-4-4, IEC61000-4-5.
The M7W-24XXXX15 recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330μF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
The M7W-48XXXX15 recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330μF/100V) and A TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.
Which application refer to the EFT/Surge Filter of design & feature configuration.

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

TEST CONFIGURATIONS

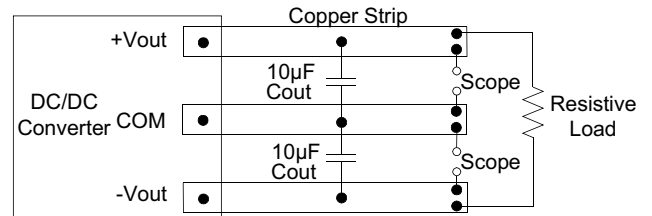
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100KHz$) at nominal input and full load.



Output Ripple & Noise Measurement Test

To reduce ripple and noise, it is recommended to use a $10\mu F$ ceramic disk capacitor to at the output.



DESIGN & FEATURE CONFIGURATIONS

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup).

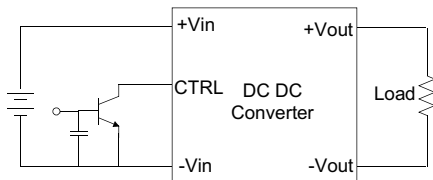
The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

CTRL Module ON / OFF

Positive logic turns on the module during high logic and off during low logic.

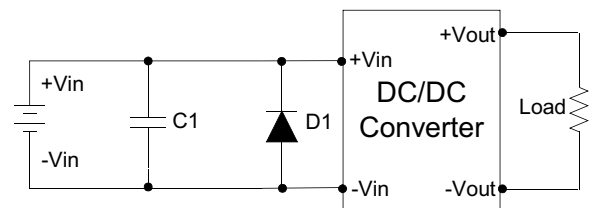
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain

For positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



EFT/ Surge Filter

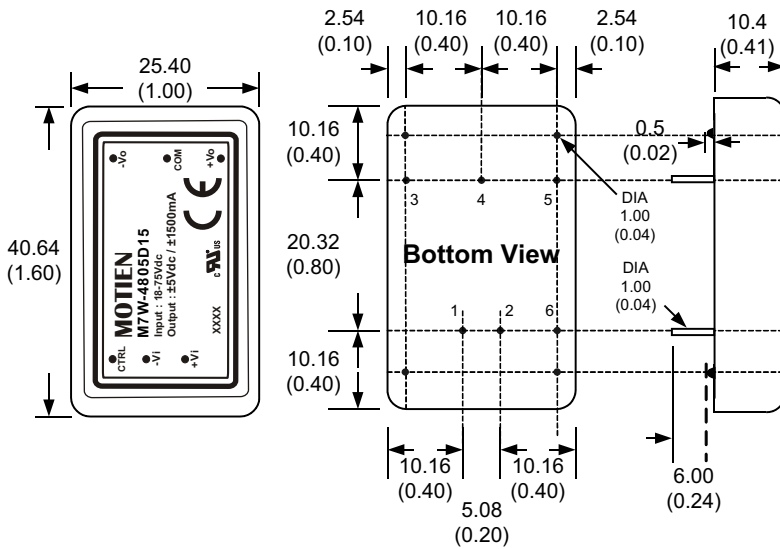
Input filter components (C1, D1) are used to help meet EN61000-4-4 and EN61000-4-5 .



	C1	D1
M7W-24XXXXX	330µF, 100V	TVS, 58V, 3kW
M7W-48XXXXX	330µF, 100V	TVS, 120V, 3kW

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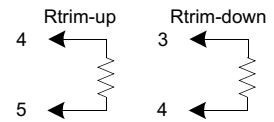
MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Com
5	-Vout	-Vout
6	CTRL	CTRL

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. (single output models only)

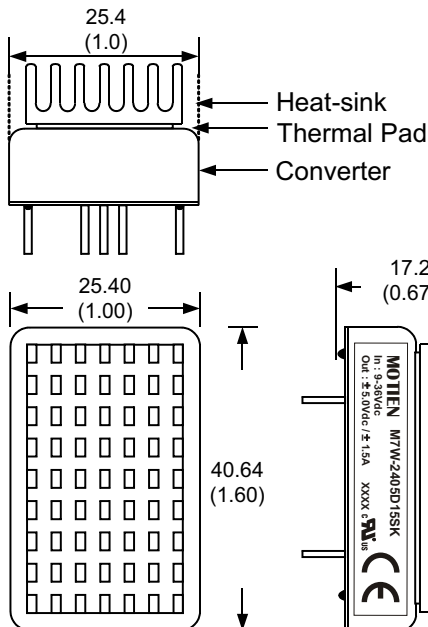


All dimensions are typical in millimeters (inches).

1. Pin diameter: 1.0 ± 0.05 (0.04 ± 0.002)
2. Pin pitch tolerance: ± 0.35 (± 0.014)
3. Case Tolerance: ± 0.5 (± 0.02)
4. Stand-off tolerance: ± 0.1 (± 0.004)

MECHANICAL SPECIFICATIONS

With Heat-sink



Order code: M7W-XXXXS15SK(contain: heat-sink, thermal pad)
 Material: Aluminum
 Finish: Anodic treatment (black)
 Weight: 6.5 g (0.23oz) (without converter)

Note:

1. Converters will be supplied with heat-sinks already mounted. Please contact factory for quotation.