

M4-1W Series

1W Regulated Single output

Features

- 7 Pin SIL / 14 Pin DIL Package
- 1000 ~ 3000VDC Isolation
- Continue Short Current Protection
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case



The M4 series is a family of cost effective 1W single output DC-DC converters. These converters achieve low cost and ultra-miniature SIP 7 pin or DIP 14 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 5, 12, 24 Vdc with output voltage of 3.3, 5, 7.2, 9, 12, 15Vdc. Featuring high efficiency up to 68% (input voltage range $\pm 10\%$) and output short circuit protection.

All specifications typical at $T_a=25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified

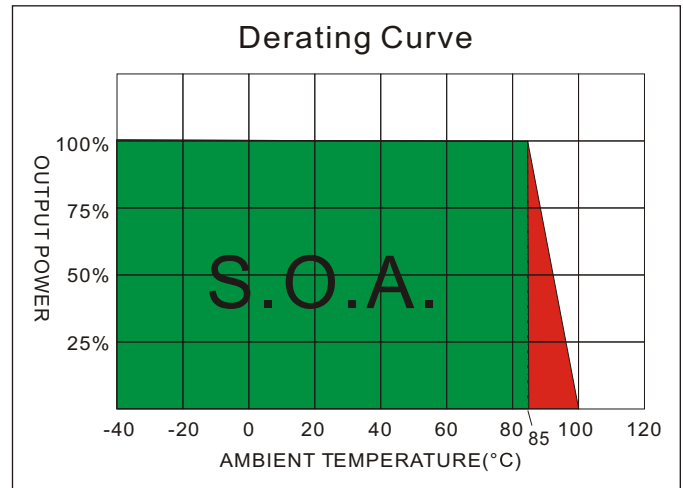
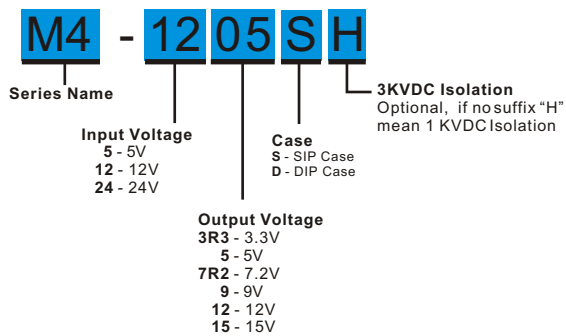
OUTPUT SPECIFICATIONS		PHYSICAL SPECIFICATIONS	
Voltage accuracy	$\pm 2\%$	Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Line regulation	$\pm 0.5\%$	Pin Material	0.5mm Alloy42 Solder-coated
Load regulation	(From 0% to 100% Load) $\pm 0.5\%$ (Output 3.3V Model) $\pm 1.0\%$	Potting Material	Epoxy (UL94V-0 rated)
Ripple & noise(20 MHz bandwidth)(1)	50mV pk-pk	Weight	(SIP/2.7g) (DIP/2.9g)
Temperature coefficient	$\pm 0.02\%/^\circ\text{C}$	Dimensions	SIP Case 0.76"x0.28"x0.39" DIP Case 0.80"x0.40"x0.27"
Short Circuit Protection	Continuous	ENVIRONMENT SPECIFICATIONS	
Capacitor load(2)	See table	Operating Temperature	-40°C~85°C(See Derating Curve)
INPUT SPECIFICATIONS		Maximum Case Temperature	100°C
Voltage Range	$\pm 10\%$	Storage Temperature	-40°C~125°C
Max. Input Current	See table	Cooling	Nature Convection
No-Load Input Current	See table	ABSOLUTE MAXIMUM RATINGS(4)	
Input Filter	Capacitors	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Reflected Ripple Current(3)	20mA pk-pk	Input Voltage(100mS)	
GENERAL SPECIFICATIONS		5 Modes	0~7 Vdc
Efficiency	See table	12 Modes	0~15 Vdc
I/O Isolation Voltage(3 sec)		24 Modes	0~28 Vdc
Input/Output	1000~3000Vdc	Soldering Temperature	260°C
I/O Isolation Capacitance	60 pF Typ.	(1.5mm from case 10sec.)	
I/O Isolation Resistance	1000M Ohm		
Switching Frequency	Variable 50kHz		
Humidity	95% rel H		
Reliability Calculated MTBF(MIL-HDBK-217 F)	>3.5 Mhrs		
Safety Standard : (designed to meet)	IEC 60950-1		

NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal V_{in} and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

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PARTNUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Full load (mA)			
M4-053R3S	5	30	363	3.3	333	55	220	
M4-0505S	5	30	312	5	200	64	220	
M4-057R2S	5	30	312	7.2	138.9	64	220	
M4-0509S	5	35	307	9	111.1	65	220	
M4-0512S	5	35	303	12	83.3	66	220	
M4-0515S	5	35	303	15	66.7	66	220	
M4-123R3S	12	20	148	3.3	333	56	220	
M4-1205S	12	20	130	5	200	64	220	
M4-127R2S	12	20	128	7.2	138.9	65	220	
M4-1209S	12	20	126	9	111.1	66	220	
M4-1212S	12	20	126	12	83.3	66	220	
M4-1215S	12	20	122	15	66.7	68	220	
M4-243R3S	24	10	74	3.3	333	56	220	
M4-2405S	24	10	66	5	200	63	220	
M4-247R2S	24	10	64	7.2	138.9	65	220	
M4-2409S	24	10	63	9	111.1	66	220	
M4-2412S	24	10	62	12	83.3	67	220	
M4-2415S	24	10	62	15	66.7	67	220	
M4-053R3D	5	30	363	3.3	333	55	220	
M4-0505D	5	30	312	5	200	64	220	
M4-057R2D	5	30	312	7.2	138.9	64	220	
M4-0509D	5	35	307	9	111.1	65	220	
M4-0512D	5	35	303	12	83.3	66	220	
M4-0515D	5	35	303	15	66.7	66	220	
M4-123R3D	12	20	148	3.3	333	56	220	
M4-1205D	12	20	130	5	200	64	220	
M4-127R2D	12	20	128	7.2	138.9	65	220	
M4-1209D	12	20	126	9	111.1	66	220	
M4-1212D	12	20	126	12	83.3	66	220	
M4-1215D	12	20	122	15	66.7	68	220	
M4-243R3D	24	10	74	3.3	333	56	220	
M4-2405D	24	10	66	5	200	63	220	

Suffix "H" means 3 KVdcisolation

Suffix "H2" means 2 KVdcisolation

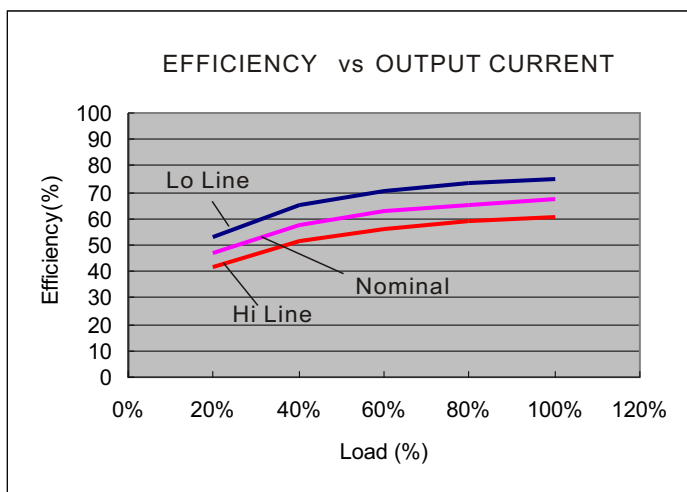
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MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Full load (mA)			
M4-247R2D	24	10	64	7.2	138.9	65	220	
M4-2409D	24	10	63	9	111.1	66	220	
M4-2412D	24	10	62	12	83.3	67	220	
M4-2415D	24	10	62	15	66.7	67	220	

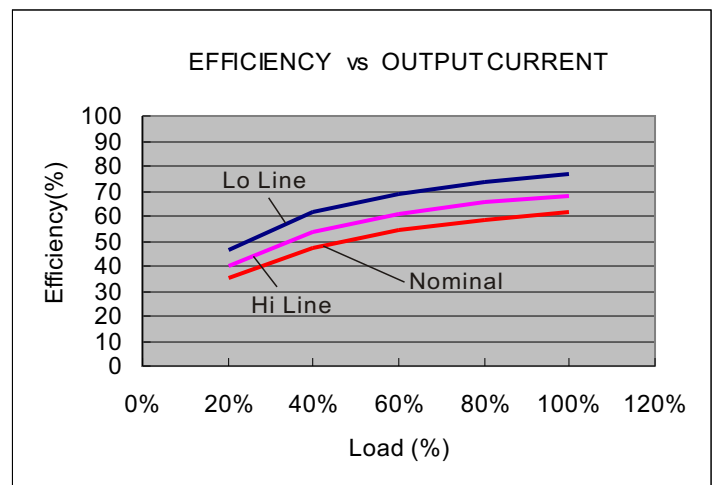
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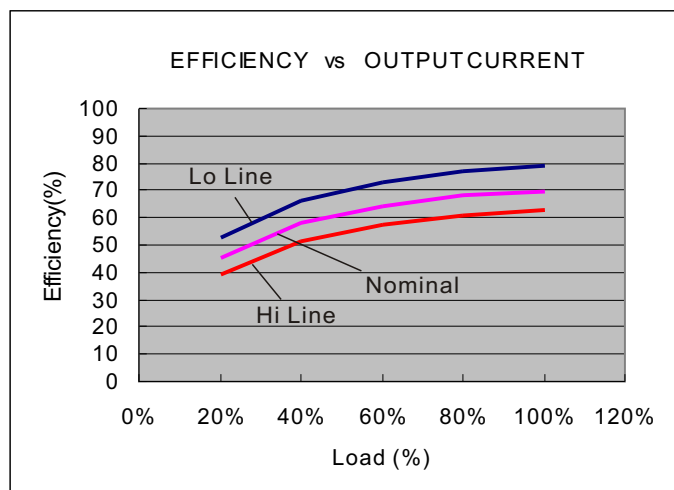
NOTE



5V Mode

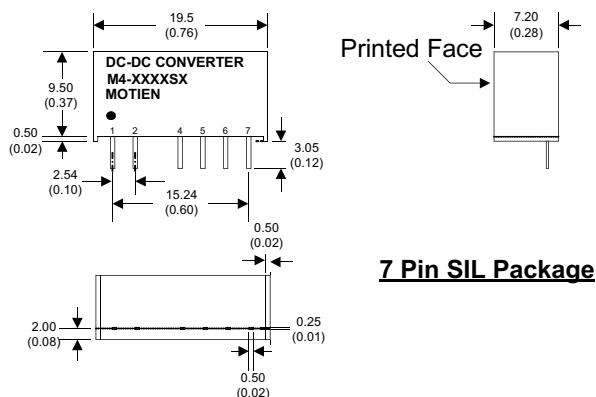


12V Mode

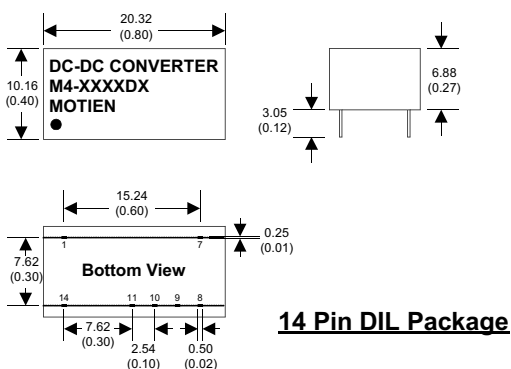


24V Mode

MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	SINGLE-H
1	+V Input	+V Input
2	-V Input	-V Input
4	-V Output	N.P.
5	N.P.	-V Output
6	+V Output	N.P.
7	N.P.	+V Output



PIN CONNECTIONS		
PIN NUMBER	SINGLE	SINGLE-H
1	-V Input	-V Input
7	N.C.	N.C.
8	N.P.	+V Output
9	+V Output	N.P.
10	N.P.	-V Output
11	-V Output	N.P.
14	+V Input	+V Input

Notes : All dimensions are typical in millimeters (inches).

1. Pin diameter: 0.5±0.05 (0.02±0.002)
2. Pin pitch tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)