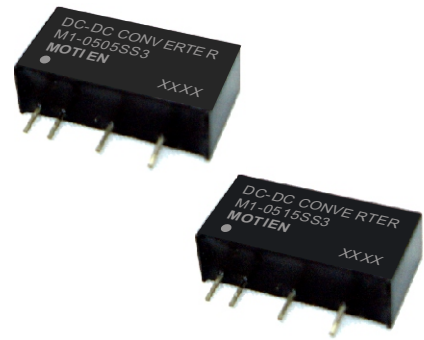


M1 Series

3W Semi-regulated Single & Dual output

Features

- 7 Pin SIL Package
- Semi-regulated output
- 1000 VDC Isolation
- Up to 3000 VDC Isolation
- Low Ripple and Noise
- Efficiency up to 90%
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case



The M1 series is a family of cost effective 3W single & dual output DC-DC converters. These converters achieve low cost, high efficiency, semi-regulated and ultra-miniature SIP 7 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 5, 12Vdc with output voltage of 5, 9, 12, 15, ± 5 , ± 9 , ± 12 , ± 15 Vdc. High efficiency operation and output voltage accuracy of $\pm 2\%$ ~ $\pm 4\%$ maximum. Standard features include an input range of $\pm 10\%$ tolerance and low output noise and ripple.

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

OUTPUT SPECIFICATIONS	
Voltage accuracy	$\pm 2\sim 4\%$
Line regulation	$\pm 1.2\%$ / Per 1% Vin Change
Load regulation(From 10% to 100% Load)	See table
Ripple & noise (20 MHz bandwidth)(1)	50mV pk-pk
Temperature coefficient	$\pm 0.02\%/^{\circ}\text{C}$
Capacitor load(2)	See table

INPUT SPECIFICATIONS	
Voltage Range	$\pm 10\%$
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitors
Input Reflected Ripple Current	5V 25mA pk-pk 12V 25mA pk-pk

GENERAL SPECIFICATIONS	
Efficiency	See table
I/O Isolation Voltage(60 sec)	
Input/Output	10000~3000Vdc
I/O Isolation Capacitance	60 pF typ.
I/O Isolation Resistance	1G Ohm
Switching Frequency	Variable 70kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.8 Mhrs
Safety Standard : (designed to meet)	IEC 60950-1

EMC SPECIFICATIONS		
Radiated Emissions	EN55032	CLASS B
Conducted Emissions (3)	EN55032	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT(4)	IEC 61000-4-4	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

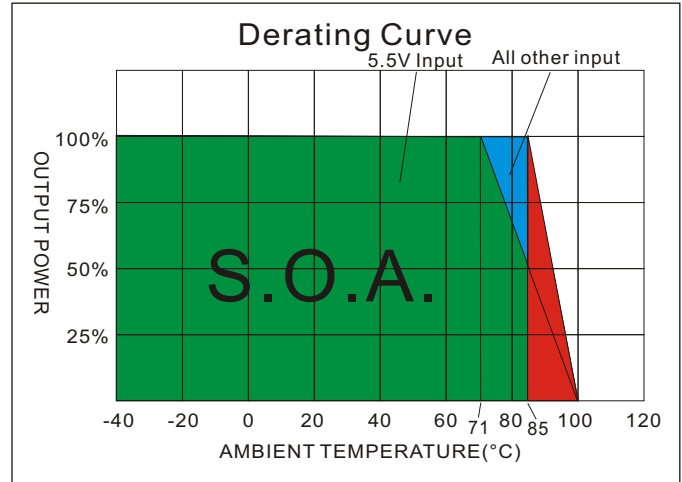
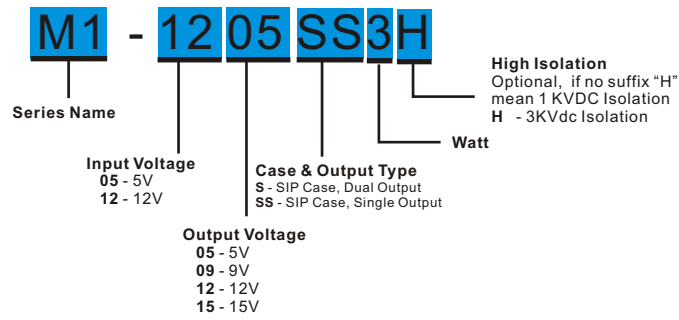
PHYSICAL SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	C5191R-H Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	2.8g, typ.
Dimensions	SIP Case 0.76"x0.28"x0.39"

ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-40°C~85°C(See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

ABSOLUTE MAXIMUM RATINGS(5)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Surge Voltage(100mS)	
5 Models	9 Vdc, max.
12 Models	18 Vdc, max.
Soldering Temperature (1.5mm from case 10 sec.max.)	260°C

M1 - 3W Semi-regulated Single & Dual output

PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	LOAD Regulation %	EFFICIENCY @FL (% , typ.)	Capacitor Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, max.)					
M1-0505S3	5	80	741	±5	±300	7	81	±100
M1-0509S3	5	70	706	±9	±166.67	6	85	±100
M1-0512S3	5	70	706	±12	±125	6	85	±47
M1-0515S3	5	80	714	±15	±100	5	84	±47
M1-1205S3	12	25	294	±5	±300	5	85	±100
M1-1209S3	12	25	284	±9	±166.67	4	88	±100
M1-1212S3	12	25	281	±12	±125	3	89	±47
M1-1215S3	12	20	278	±15	±100	3	90	±47
M1-0505SS3	5	80	769	5	600	8	78	220
M1-0509SS3	5	70	714	9	333.33	7	84	220
M1-0512SS3	5	80	714	12	250	6	84	100
M1-0515SS3	5	80	714	15	200	6	84	100
M1-1205SS3	12	25	298	5	600	6	84	220
M1-1209SS3	12	25	287	9	333.33	4	87	220
M1-1212SS3	12	25	284	12	250	4	88	100
M1-1215SS3	12	20	278	15	200	3	90	100

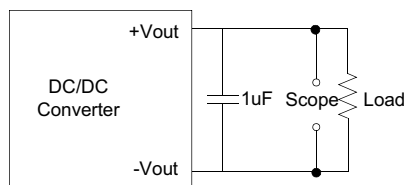
NOTE

1. Ripple/Noise measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
2. Tested by minimal Vin and constant resistive full load.
3. Input filter components (C1, L) are used to help meet conducted emissions requirement for the module.
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.
4. An external filter capacitor is required if the module has to meet IEC61000-4-4
The filter capacitor Motien suggest: Nippon chemi-con KY series, 220uF/100V.
5. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
6. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

TEST CONFIGURATIONS

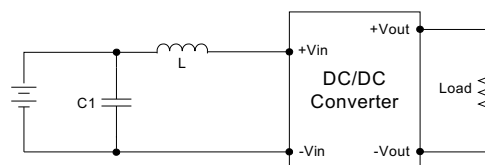
Output Ripple & Noise Measurement Test

Use a capacitor $C_{out}(1.0\mu F)$ measurement.
The Scope measurement bandwidth is 0-20MHz.



EMI Filter

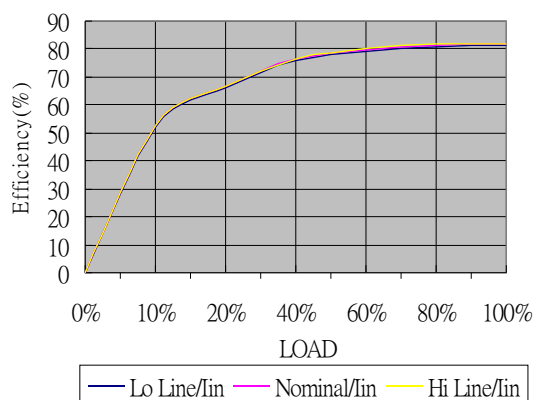
Input filter components ($C1$, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L
M1-05XXXXX	1210, 2.2uF/100V	18uH
M1-12XXXXX	1210, 2.2uF/100V	18uH

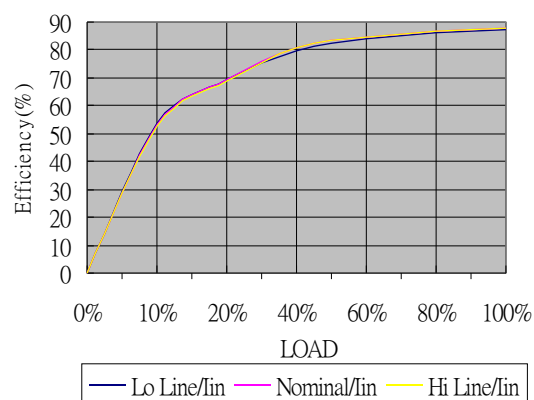
ELECTRICAL CHARACTERISTIC CURVES

EFFICIENCY VS OUTPUT CURRENT



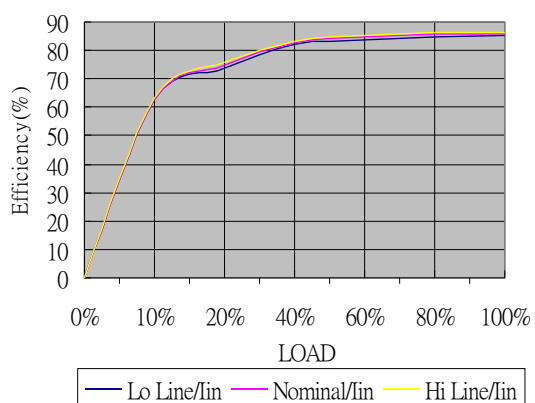
M1-0505SS3

EFFICIENCY VS OUTPUT CURRENT



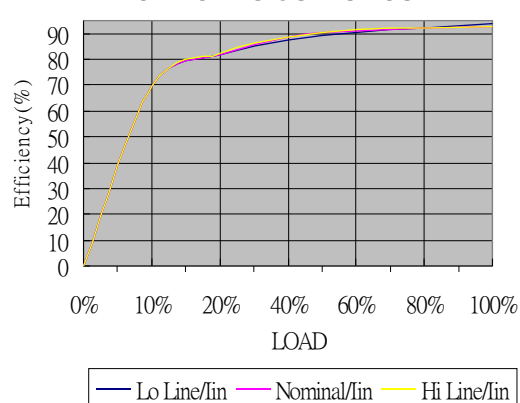
M1-0515S3

EFFICIENCY VS OUTPUT CURRENT



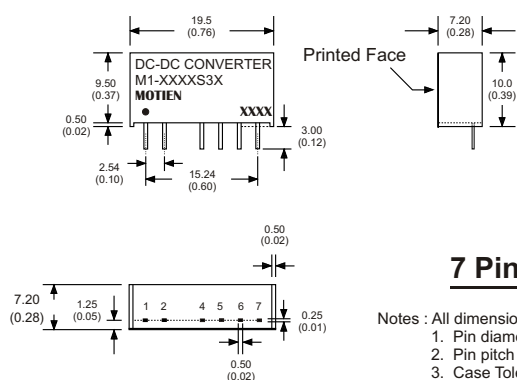
M1-1205SS3

EFFICIENCY VS OUTPUT CURRENT



M1-1215S3

MECHANICAL SPECIFICATIONS



7 Pin SIL Package

Notes : 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)

PIN CONNECTIONS

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