

M40A Series

40W 4:1 Regulated Single & Dual output



Features

- Wide 4:1 Input Range
- Full SMD Technology
- 1600 VDC Isolation
- Efficiency up to 92%
- -40 ~ 85°C Operation Temperature Range
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Over Temperature Protection
- Soft Start



The M40A series is a family of cost effective 40W single & dual output DC-DC converters. These converters combine nickel-coated copper package in a 2"x2" case with high performance features such as Active Clamp Technology, 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, ± 12 , ± 15 Vdc. High performance features include high efficiency operation up to 92% and output voltage accuracy of $\pm 1\%$ maximum.

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

OUTPUT SPECIFICATIONS	
Output Voltage Accuracy	$\pm 1\%$
Output Voltage Adjustability (Trim) (1)	$\pm 10\%$, max
Maximum Output Current	See table
Line Regulation	$\pm 0.5\%$, max
Load Regulation(Single, $I_o=0\%$ to 100%)	$\pm 0.5\%$, max
Load Regulation(Dual, $I_o=1\%$ to 100%)	$\pm 1.0\%$, max
Cross Regulation (Dual Output) (2)	$\pm 5\%$
Ripple&Noise (3)	3.3V&5.0V output: 50mVpk-pk, max Dual output: 150mVpk-pk, max All other output: 75mVpk-pk, max
	3.3V output 3.9V
	5V output 6.2V
Over Voltage Protection	12V output 15V
(Zener diode clamp)	15V output 18V
	± 12 V output ± 15 V
	± 15 V output ± 18 V
Over Load Protection	130% of FL, typ
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$
Capacitive Load (4)	See table
Transient Recovery Time (5)	250us, typ
Transient Response Deviation(5)	$\pm 3\%$, max

INPUT SPECIFICATIONS	
Input Voltage Range	See table
Under Voltage Lockout	
24V Modes	Module ON / OFF 8.6Vdc / 7.9Vdc, typ
48V Modes	Module ON / OFF 17.8Vdc / 16Vdc, typ
Start up Time	25mS, typ
(Nominal Vin and constant resistive load)	
Input Filter	Pi Type
Input Current(No-Load)	See table, typ
Input Current(Full-Load)	See table, max
Input Reflected Ripple Current(6)	20mApk-pk, typ
Remote On/Off (CTRL)(7)	
ON: 3.0 ... 12Vdc or open circuit	
OFF: 0 ... 1.2Vdc or Short circuit pin2 and pin 3	
OFF idle current: 5.0 mA, typ	

GENERAL SPECIFICATIONS	
Efficiency	See table, typ
I/O Isolation Voltage(3 sec)	
Input/Output	1600Vdc
Case/Input & Output	1600Vdc
Isolation Resistance	1000 M Ω , min
Isolation Capacitance	2500 pF, max
Switching frequency	270kHz, typ
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>151 khrs
Safety Standard (design to meet)	IEC/EN 60950-1

EMC CHARACTERISTICS		
Radiated Emissions	EN55022	CLASS A
Conducted Emissions(8)	EN55022	CLASS A
ESD	EN61000-4-2	Perf. Criteria A
RS	EN61000-4-3	Perf. Criteria A
EFT(9)	EN61000-4-4	Perf. Criteria A
Surge (9)	EN61000-4-5	Perf. Criteria A
CS	EN61000-4-6	Perf. Criteria A
PFMF	EN61000-4-8	Perf. Criteria A

ENVIRONMENTAL SPECIFICATIONS	
Operating Ambient Temperature	-40°C ~ +85°C(See Derating Curve) -40°C ~ +55°C(For 100% load)
Maximum Case Temperature	105°C
Storage Temperature	-40°C ~ +125°C
Over Temperature Protection (Case)	110°C, typ
Cooling	Nature Convection

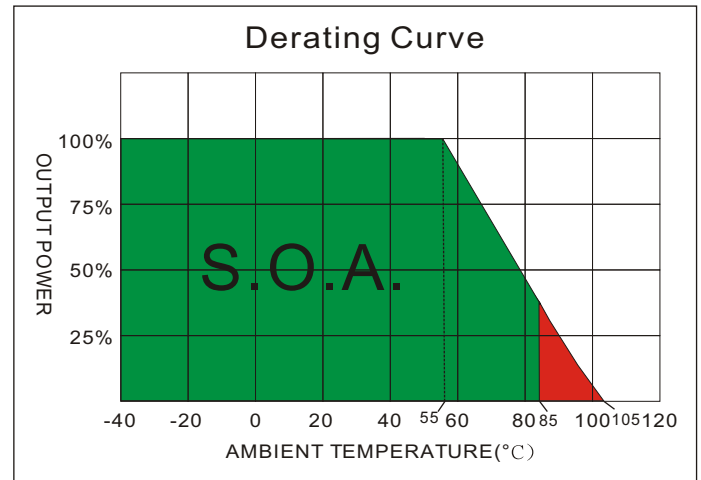
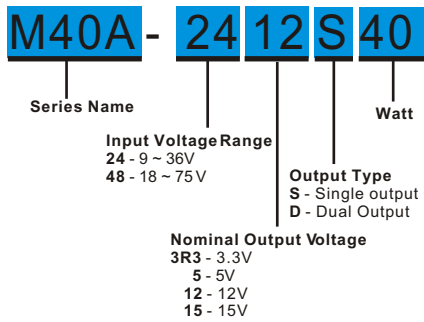
ABSOLUTE SPECIFICATIONS (10)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Voltage(100mS)	
24 Modes	-0.7~50 Vdc
48 Modes	-0.7~100 Vdc
Soldering Temperature	260°C max.
(1.5mm from case 10sec. Max.)	

PHYSICAL SPECIFICATIONS	
Case Material	Nickel-coated Copper
Pin Material	$\varnothing 1.0$ mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	60.0g
Dimensions	2.00"x2.00"x0.40"

The information and specifications contained in this data sheet are believed to be correct at time of publication. However, MOTIEN Technologies accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice. No rights under any patent accompany the sale of any such product(s) or information contained herein.

M40A - 40W 4:1 Regulated Single & Dual output

PART NUMBER STRUCTURE



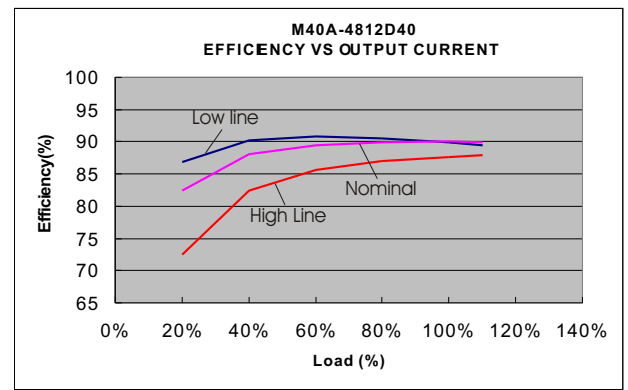
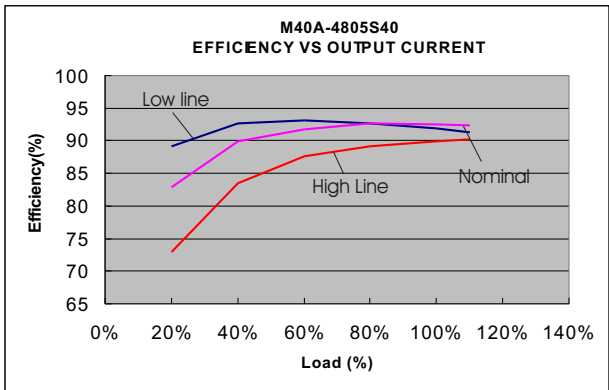
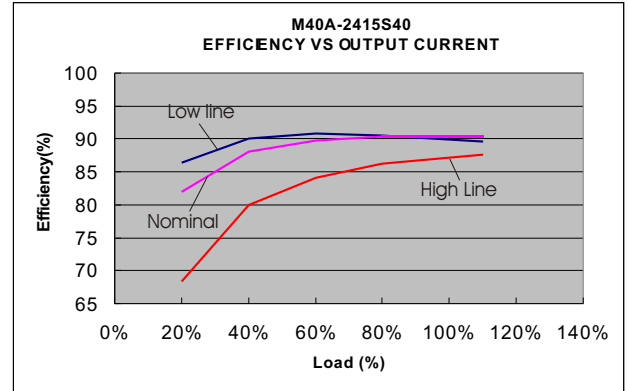
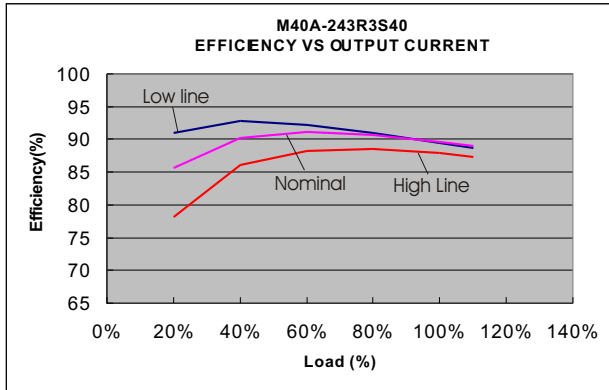
MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Min. load (mA)	Full load (mA)		
M40A-243R3S40	9-36	80	1598	3.3	0	10000	89	25000
M40A-2405S40	9-36	100	1893	5	0	8000	91	13000
M40A-2412S40	9-36	50	1925	12	0	3350	90	2300
M40A-2415S40	9-36	50	1904	15	0	2650	90	1500
M40A-483R3S40	18-75	60	799	3.3	0	10000	89	25000
M40A-4805S40	18-75	60	936	5	0	8000	92	13000
M40A-4812S40	18-75	30	963	12	0	3350	90	2300
M40A-4815S40	18-75	30	941	15	0	2650	91	1500
M40A-2412D40	9-36	60	1919	±12	0	±1650	89	±1200
M40A-2415D40	9-36	60	1962	±15	0	±1350	89	±750
M40A-4812D40	18-75	30	948	±12	0	±1650	90	±1200
M40A-4815D40	18-75	30	970	±15	0	±1350	90	±750

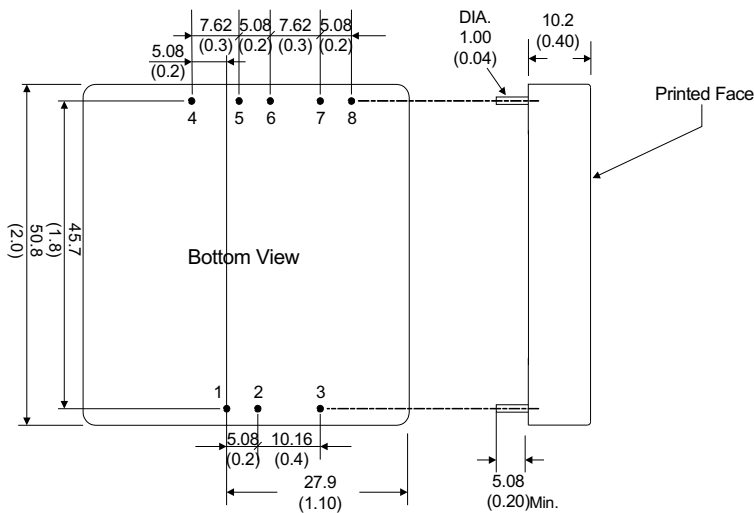
NOTE

- For the Single output: Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding -OUTPUT.
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
- 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 12uH.
- The remote on/off control pin is referenced to -Vin(pin2).
- The M40A-40W series can meet EN55022 Class A With an external filter in parallel with the input pins .
- An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5.
The filter capacitor Motien suggest: Nippon chemi-con KY series, 220uF/100V.
- Exceeding the absolute ratings of the unit could cause damage.
It is not allowed for continuous operating.

M40A - 40W 4:1 Regulated Single & Dual output



MECHANICAL SPECIFICATIONS



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)

PIN CONNECTIONS

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

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. () for dual output trim.

