V9 Series

20W 4:1 Regulated Single & Dual output

MOTIEN TECHNOLOGY

Features

- Ultra Wide 4:1 Input Range
- Full SMD Technology
- 1600 VDC Isolation
- No Minimum Load Required
- Efficiency up to 91%
- Extended Operating Temperature Range -40 ~ 85°C max.
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Soft Start

CE CB

The V9 series is a family of cost effective 20W single & dual output DC-DC converters. These converters combine nickle-coated copper package in a 2"x1" 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, ±5, ±12, ±15Vdc. High performance features include high efficiency operation up to 91% 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(Io=0% to 100%)		Single: ±0.5%, max. Dual:±1%, max(balanced load)
Cross Regulation (Dual Output) (1)		±5%
Ripple&Noise (2)		75mVp-p, max.
Over Voltage Protection (Zener diode clamp)	3.3V output	3.9V
	5V output	6.2V
	12V output	15V
	15V output	18V
	±5V output	±6.2V
	±12V output	±15V
	±15V output	±18V
Over Current Protection		120% of FL, typ.
Short Circuit Protection		Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient		±0.02%/°C
Capacitive Load (3)		See table
Transient Recovery Time (4)		250us, typ.
Transient Response Deviation(4)		±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 (Nominal Vin and constant resistive load)		20mS, typ.
Input Filter		Pi Type
Input Current(No-Load)		See table, typ.
Input Current(Full-Load)		See table, max.
Input Reflected Ripple Current(5)		20mAp-p, typ.
Remote On/Off (CTRL)(6)		
ON:	3.0 ... 12Vdc or open circuit	
OFF:	0 ... 1.2Vdc or Short circuit pin2 and pin 6	
OFF idle current:	5 mA, typ	

ENVIRONMENTAL SPECIFICATIONS

Operating Ambient Temperature	-40°C ~ +85°C(See Derating Curve) -40°C ~ +66°C(For 100% load)
Maximum Case Temperature	105°C
Storage Temperature	-40°C ~ +125°C
Cooling	Nature Convection

GENERAL SPECIFICATIONS

Efficiency	See table, typ.
I/O Isolation Voltage(3 sec)	
Input/Output	1600Vdc
Case/Input & Output	1600Vdc
Isolation Resistance	1000 MΩ, min.
Isolation Capacitance	1200 pF, typ.
Switching frequency	330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>560 khrs
Safety Standard	IEC/EN 60950-1
Safety Approvals	CB

EMC CHARACTERISTICS

Radiated Emissions	EN55022	CLASS A
Conducted Emissions(7)	EN55022	CLASS A
ESD	IEC61000-4-2	Perf. Criteria A
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

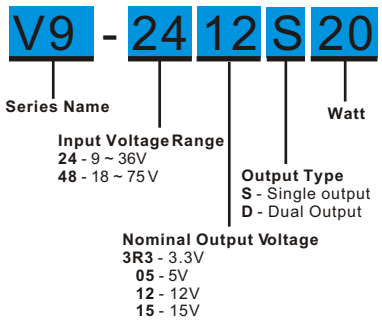
Case Material	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Ø1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	30.0g
Dimensions	2.00"x1.00"x0.40"

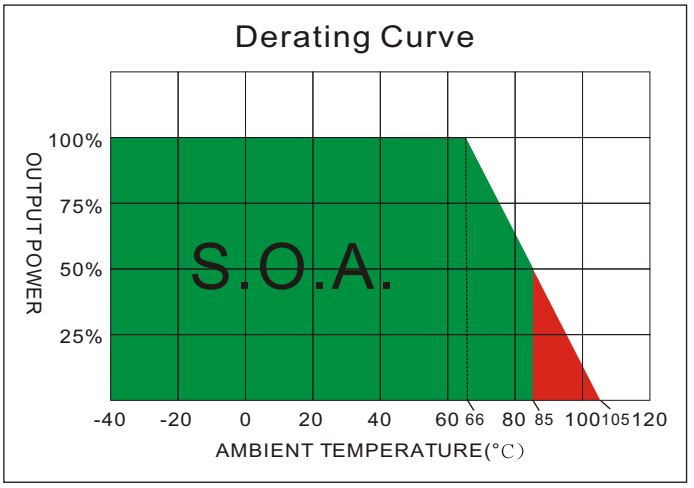
ABSOLUTE SPECIFICATIONS (9)

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

Input Surge Voltage(100mS)	
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





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)
V9-243R3S20	9-36	50	879	3.3	0	5500	89	10000
V9-2405S20	9-36	50	957	5	0	4000	91	6800
V9-2412S20	9-36	22	980	12	0	1670	89	1000
V9-2415S20	9-36	22	968	15	0	1330	89	680
V9-483R3S20	18-75	30	440	3.3	0	5500	89	10000
V9-4805S20	18-75	30	473	5	0	4000	91	6800
V9-4812S20	18-75	15	484	12	0	1670	89	1000
V9-4815S20	18-75	15	484	15	0	1330	89	680
V9-2405D20	9-36	65	969	±5	0	±2000	89	±2200
V9-2412D20	9-36	25	980	±12	0	±835	88	±470
V9-2415D20	9-36	25	980	±15	0	±665	89	±330
V9-4805D20	18-75	40	484	±5	0	±2000	89	±2200
V9-4812D20	18-75	15	490	±12	0	±835	88	±470
V9-4815D20	18-75	15	490	±15	0	±665	89	±330

NOTE

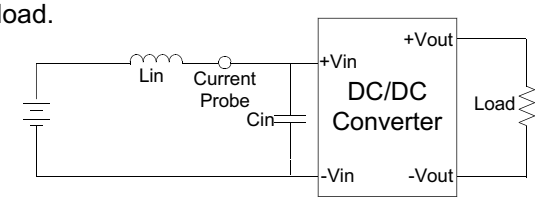
1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
3. Tested by minimal Vin and constant resistive load.
4. Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
5. Measured Input reflected ripple current with a simulated source inductance of 12uH.
6. The remote on/off control pin is referenced to -Vin(pin2).
7. Input filter components (C1, C2, 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.
8. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
   The filter capacitor Motien suggest: Nippon chemi-con KY series, 220uF/100V.
9. Exceeding the absolute ratings of the unit could cause damage.

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

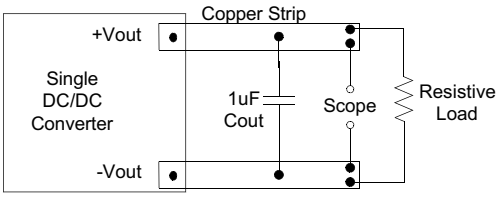
Input Reflected Ripple Current Test Step

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



Output Ripple & Noise Measurement Test

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



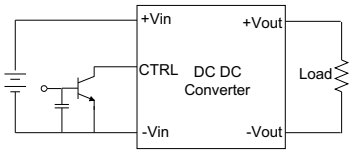
DESIGN&FEATURE CONFIGURATIONS

CTRL Module ON / OFF

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

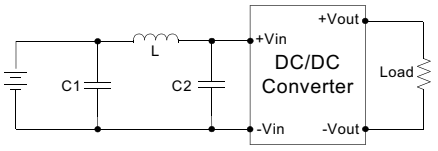
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain

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



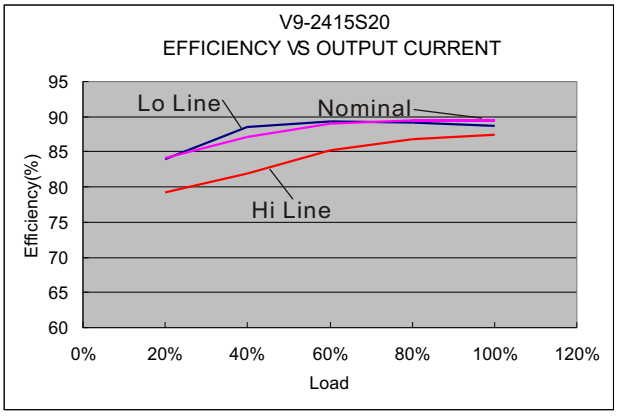
EMI Filter

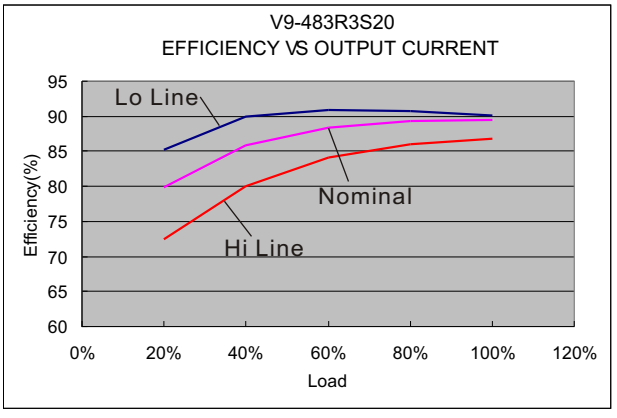
Input filter components (C1, C2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

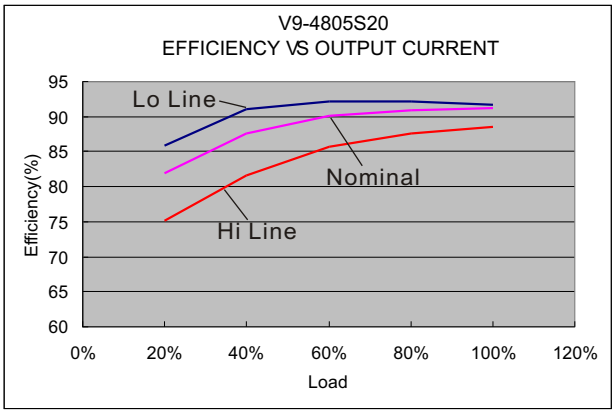


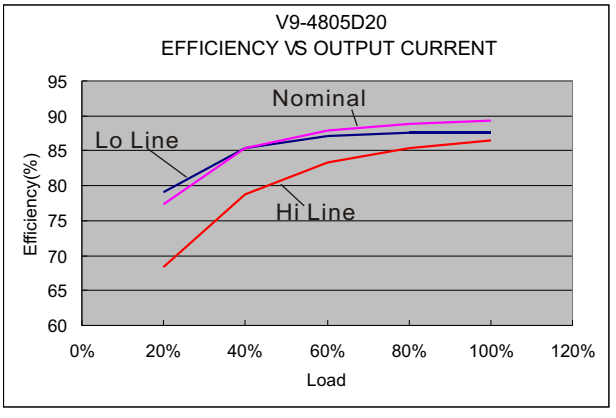
	C1	L	C2
V9-24XXXXX	1210, 2.2uF/100V	12uH	1210, 2.2uF/100V
V9-48XXXXX	1210, 2.2uF/100V	12uH	1210, 2.2uF/100V

ELECTRICAL CHARACTERISTIC CURVES









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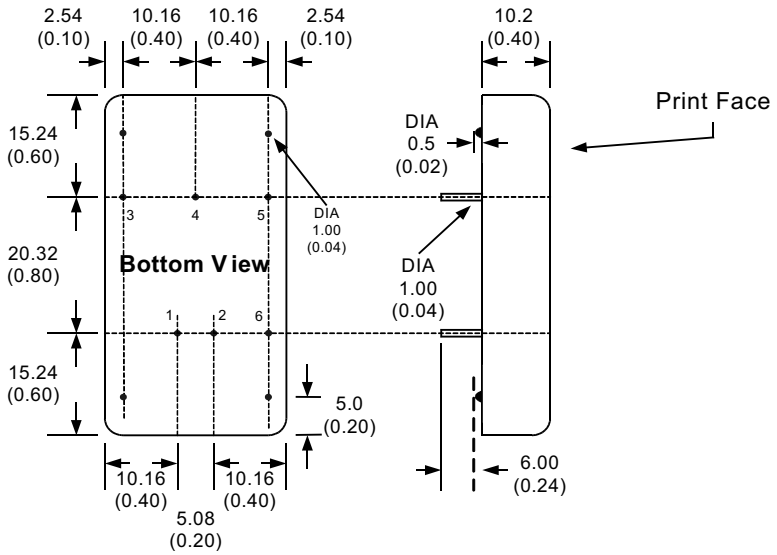
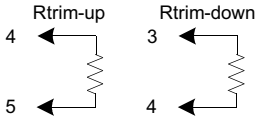
MECHANICAL SPECIFICATIONS



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 and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)
4. Stand-off tolerance: ±0.1 (±0.004)