

V9 Series

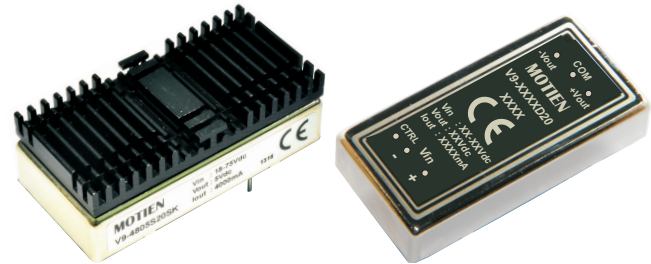
20W 4:1 Regulated Single & Dual output



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
- Optional Heat-sink

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 , ± 15 Vdc. High performance features include high efficiency operation up to 91% and output voltage accuracy of $\pm 1\%$ maximum.

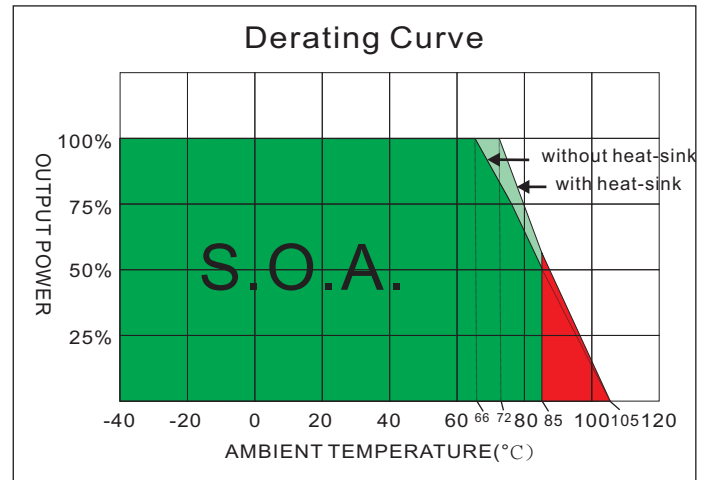
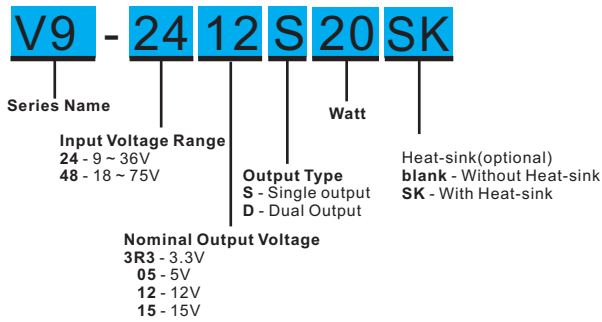
ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED.

OUTPUT SPECIFICATIONS		GENERAL SPECIFICATIONS	
Output Voltage Accuracy	$\pm 1\%$, max.	Efficiency	See table, typ.
Output Voltage Adjustability(Trim)	Single output: $\pm 10\%$, max.	I/O Isolation Voltage(60sec)	
Maximum Output Current	See table, max.	Input/Output	1600Vdc
Line Regulation	$\pm 0.5\%$, max.	Case/Input & Output	1600Vdc
Load Regulation(I _o =0% to 100%)	Single: $\pm 0.5\%$, max. Dual: $\pm 1\%$, max(balanced load)	Isolation Resistance	1000 M Ω , min.
Cross Regulation (Dual Output) (1)	$\pm 5\%$	Isolation Capacitance	1200 pF, typ.
Ripple&Noise (2)	75mVp-p, max.	Switching frequency	330kHz, typ.
		Humidity	95% rel H
Over Voltage Protection (Zener diode clamp)	3.3V output 3.9V 5V output 6.2V 12V output 15V 15V output 18V ± 5 V output ± 6.2 V ± 12 V output ± 15 V ± 15 V output ± 18 V	Reliability Calculated MTBF(MIL-HDBK-217 F)	>560 khrs
Over Current Protection	120% of FL, typ.	Safety Standard	IEC/EN 60950-1
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)	Safety Approvals	CB
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$	EMC CHARACTERISTICS	
Capacitive Load (3)	See table, max.	Radiated Emissions	EN55032 CLASS A
Transient Recovery Time (4)	250us, typ.	Conducted Emissions(7)	EN55032 CLASS A
Transient Response Deviation(4)	$\pm 3\%$, max.	ESD	IEC61000-4-2 Perf. Criteria A
INPUT SPECIFICATIONS		RS	IEC61000-4-3 Perf. Criteria A
Input Voltage Range	See table	EFT(8)	IEC61000-4-4 Perf. Criteria A
Under Voltage Lockout		Surge (8)	IEC61000-4-5 Perf. Criteria A
24V Models Module ON / OFF	8.6Vdc / 7.9Vdc, typ.	CS	IEC61000-4-6 Perf. Criteria A
48V Models Module ON / OFF	17.8Vdc / 16Vdc, typ.	PfMF	IEC61000-4-8 Perf. Criteria A
Start up Time (Nominal Vin and constant resistive load)	20mS, typ.	ENVIRONMENTAL SPECIFICATIONS	
Input Filter	Pi Type	Operating Ambient Temperature	-40°C ~ +85°C(See Derating Curve) -40°C ~ +66°C(For 100% load)
Input Current(No-Load)	See table, max.	Maximum Case Temperature	105°C
Input Current(Full-Load)	See table, typ.	Thermal Impedance (Nature Convection)	Without Heat-sink 12°C/W With Heat-sink 10°C/W
Input Reflected Ripple Current(5)	20mA _{p-p} , typ.	Storage Temperature	-55°C ~ +125°C.
Remote On/Off (CTRL)(6)		Cooling	Nature Convection
ON: 3.0 ... 12Vdc or open circuit		ABSOLUTE SPECIFICATIONS (9)	
OFF: 0 ... 1.2Vdc or Short circuit pin2 and pin 6		These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
OFF idle current: 5mA, typ.		Input Surge Voltage(100mS)	
		24 Models	50 Vdc, max.
		48 Models	100 Vdc, max.
		Soldering Temperature (1.5mm from case 10sec Max.)	260°C, max.
PHYSICAL SPECIFICATIONS			
Case Material	Nickel-coated Copper		
Base Material	Non-conductive Black Plastic(UL94V-0 rated)		
Pin Material	$\Phi 1.0$ mm Brass Solder-coated		
Potting Material	Epoxy (UL94V-0 rated)		
Weight	31.0g		
Dimensions	2.00"x1.00"x0.40"		

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V9 - 20W 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 (% , typ.)	Capacitor Load @FL (µF , max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
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

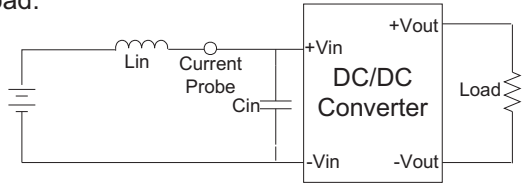
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12uH.
- The remote on/off control pin is referenced to -Vin(pin2).
- 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.
- 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.
- 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

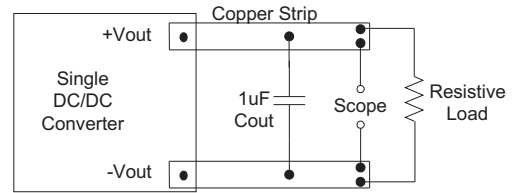
Input Reflected Ripple Current Test Step

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



Output Ripple & Noise Measurement Test

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



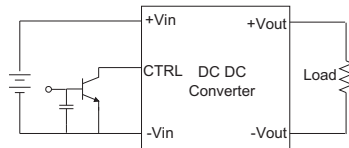
DESIGN&FEATURE CONFIGURATIONS

CTRL Module ON / OFF

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

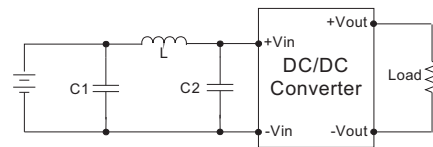
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain.

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



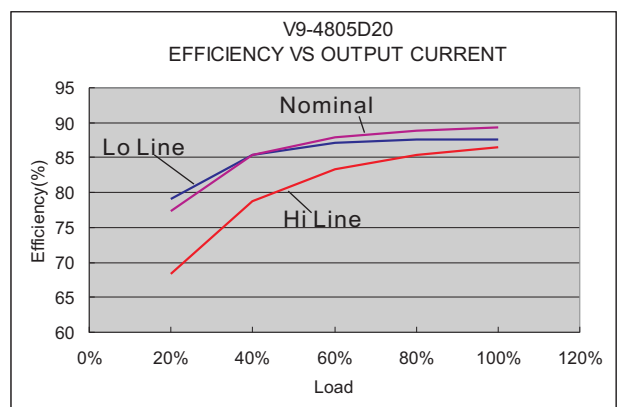
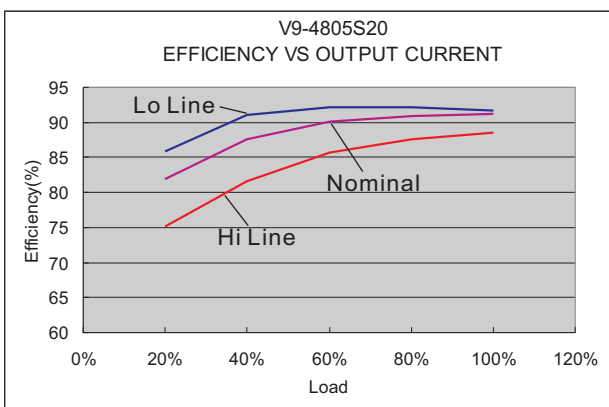
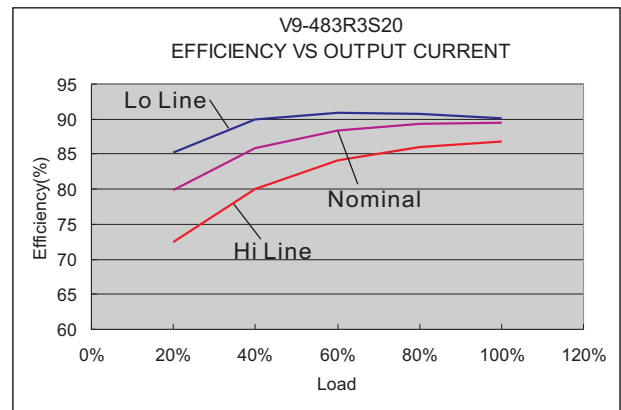
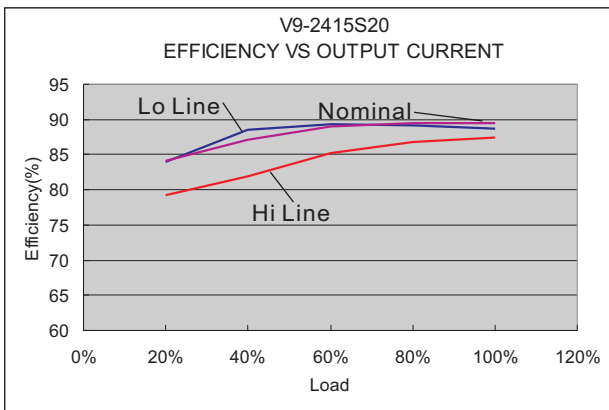
EMI Filter

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.



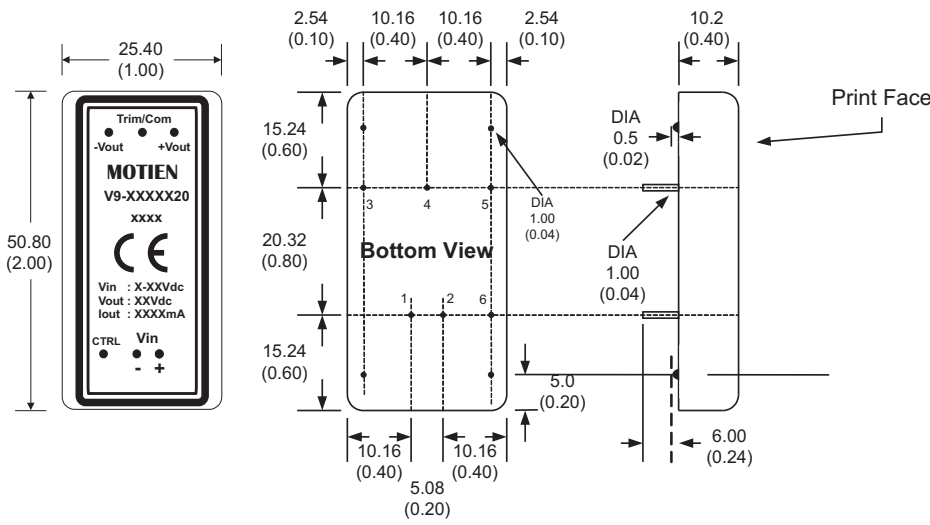
	C1	L	C2
V9-24XXXXX	1210, 2.2uF/100V	12uH	1210, 2.2uF/100V
V9-48XXXXX	1210, 2.2uF/100V	12uH	1210, 2.2uF/100V

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)

Rtrim-up

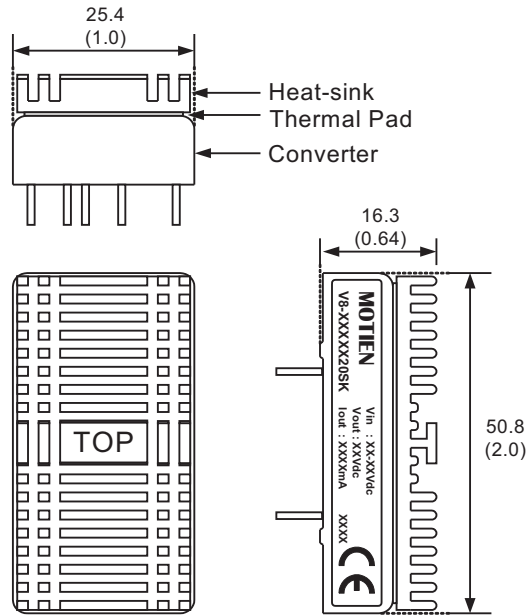
Rtrim-down

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)

MECHANICAL SPECIFICATIONS

With Heat-sink



Order code: V9-XXXXS20SK(contain: heat-sink, thermal pad)
 Material: Aluminum
 Finish: Anodic treatment (black)
 Weight: 11.2 g (0.39oz) (without converter)

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