

VQ-4W Series



4W 4:1 Regulated Single & Dual output

Features

- Wide 4:1 Input Range
- 1500VDC Isolation, Up to 3500VDC
- Continuous Short Circuit Protection
- Efficiency up to 86%
- Operating Temperature Range -40 ~ 95°C max.



PART NUMBER STRUCTURE

VQ - **24** **05** **S** **4** **H**
(1) (2) (3) (4) (5) (6)

(1) Series

(2) Input Voltage Range

24 - 9-36 V
48 - 18-72 V

(4) Output Type

S - Single Output
D - Dual Output

(3) Output Voltage

3R3 - 3.3 V
05 - 5.0 V
7R2 - 7.2 V
09 - 9.0 V
12 - 12 V
15 - 15 V
18 - 18 V
24 - 24 V

(5) Watt

(6) Isolation Voltage

Blank - 1500 VDC
H - 3500 VDC

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

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VQ-243R3S4	9-36	10	215	3.3	0	1200	77	1000
VQ-2405S4	9-36	15	206	5	0	800	81	680
VQ-247R2S4	9-36	18	209	7.2	0	555	80	100
VQ-2409S4	9-36	18	209	9	0	444	80	100
VQ-2412S4	9-36	15	199	12	0	333	84	47
VQ-2415S4	9-36	15	199	15	0	266	84	220
VQ-2418S4	9-36	18	201	18	0	222	83	120
VQ-2424S4	9-36	18	201	24	0	166	83	100
VQ-243R3D4	9-36	15	214	±3.3	0	±606	78	±680
VQ-2405D4	9-36	15	206	±5	0	±400	81	±330
VQ-247R2D4	9-36	20	201	±7.2	0	±277	83	±220
VQ-2409D4	9-36	16	201	±9	0	±222	83	±47
VQ-2412D4	9-36	20	199	±12	0	±166	84	±100
VQ-2415D4	9-36	18	201	±15	0	±133	83	±22
VQ-2418D4	9-36	22	201	±18	0	±111	83	±22
VQ-2424D4	9-36	25	209	±24	0	±83	80	±10
VQ-483R3S4	18-72	10	108	3.3	0	1200	77	1000
VQ-4805S4	18-72	10	102	5	0	800	82	1000
VQ-487R2S4	18-72	10	100	7.2	0	555	84	680
VQ-4809S4	18-72	15	105	9	0	444	80	220
VQ-4812S4	18-72	12	100	12	0	333	84	220
VQ-4815S4	18-72	10	100	15	0	266	84	100
VQ-4818S4	18-72	15	105	18	0	222	80	47
VQ-4824S4	18-72	15	97	24	0	166	86	100
VQ-483R3D4	18-72	10	106	±3.3	0	±606	79	±680
VQ-4805D4	18-72	15	106	±5	0	±400	79	±330
VQ-487R2D4	18-72	15	101	±7.2	0	±277	83	±100
VQ-4809D4	18-72	15	105	±9	0	±222	80	±47
VQ-4812D4	18-72	12	100	±12	0	±166	84	±47
VQ-4815D4	18-72	15	102	±15	0	±133	82	±33
VQ-4818D4	18-72	10	103	±18	0	±111	81	±100
VQ-4824D4	18-72	15	105	±24	0	±83	80	±22

The information and specifications contained in this data sheet are believed to be correct at time of publication. However, **MOTIEN Technology** 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.

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VQ-243R3S4H	9-36	12	215	3.3	0	1200	77	1000
VQ-2405S4H	9-36	15	206	5	0	800	81	1000
VQ-247R2S4H	9-36	15	199	7.2	0	555	84	680
VQ-2409S4H	9-36	15	197	9	0	444	85	220
VQ-2412S4H	9-36	15	199	12	0	333	84	100
VQ-2415S4H	9-36	15	199	15	0	266	84	220
VQ-2418S4H	9-36	15	199	18	0	222	84	10
VQ-2424S4H	9-36	18	201	24	0	166	83	100
VQ-243R3D4H	9-36	12	217	±3.3	0	±606	77	±470
VQ-2405D4H	9-36	15	206	±5	0	±400	81	±100
VQ-247R2D4H	9-36	15	201	±7.2	0	±277	83	±220
VQ-2409D4H	9-36	18	209	±9	0	±222	80	±47
VQ-2412D4H	9-36	15	199	±12	0	±166	84	±47
VQ-2415D4H	9-36	20	204	±15	0	±133	82	±10
VQ-2418D4H	9-36	25	201	±18	0	±111	83	±100
VQ-2424D4H	9-36	25	209	±24	0	±83	80	±22
VQ-483R3S4H	18-72	10	108	3.3	0	1200	77	1000
VQ-4805S4H	18-72	8	102	5	0	800	82	220
VQ-487R2S4H	18-72	10	102	7.2	0	555	82	470
VQ-4809S4H	18-72	10	99	9	0	444	85	330
VQ-4812S4H	18-72	12	101	12	0	333	83	1000
VQ-4815S4H	18-72	10	99	15	0	266	85	47
VQ-4818S4H	18-72	10	97	18	0	222	86	10
VQ-4824S4H	18-72	15	100	24	0	166	84	33
VQ-483R3D4H	18-72	10	105	±3.3	0	±606	80	±680
VQ-4805D4H	18-72	8	103	±5	0	±400	81	±330
VQ-487R2D4H	18-72	15	106	±7.2	0	±277	79	±47
VQ-4809D4H	18-72	15	105	±9	0	±222	80	±47
VQ-4812D4H	18-72	12	100	±12	0	±166	84	±100
VQ-4815D4H	18-72	15	101	±15	0	±133	83	±100
VQ-4818D4H	18-72	15	105	±18	0	±111	80	±22
VQ-4824D4H	18-72	15	102	±24	0	±83	82	±10

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INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	24V Input	9	24	36	VDC
	48V Input	18	48	72	
Input Filter		Pi Type			
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		500		ms
Recommended input fuse (slow blow)	24V Input	0.8			A
	48V Input	0.4			
Note :					
1. Measured with a simulated source inductance of 12uH and a source capacitor Cin (47uF, ESR<1.0Ω at 100kHz).					

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V Output		-2.0		+2.0	%
	Other Output		-1.0		+1.0	
Line Regulation			-0.5		+0.5	%
Load Regulation	From 0% to 100% Load	3.3V Output	-1.5		+1.5	%
		Other Output	-0.5		+0.5	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth	24V Output			150	mVpk-pk
		Other Output			60	
Short Circuit Protection			Indefinite (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Nominal Vin and constant resistive load		See Table			
Note :						
1. Measured with a 1.0μF MLCC.						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	24V Input			40	VDC
	48V Input			80	
Soldering Temperature	1.5mm from case 10sec max.			260	$^{\circ}$ C
Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

GENERAL SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1500		VDC
		Suffix "H"	3500		
	Case-I/O, and rated for 60sec	1000			
Isolation Resistance	Input-output	1000			M Ω
Isolation Capacitance	Input-output		500		pF
Switching Frequency			266		kHz
MTBF	MIL-HDBK-217 F @ 25 $^{\circ}$ C	1121			k hours
Safety Standard	IEC / EN / UL 62368-1	Designed to meet			
Environmental compliance		RoHS			

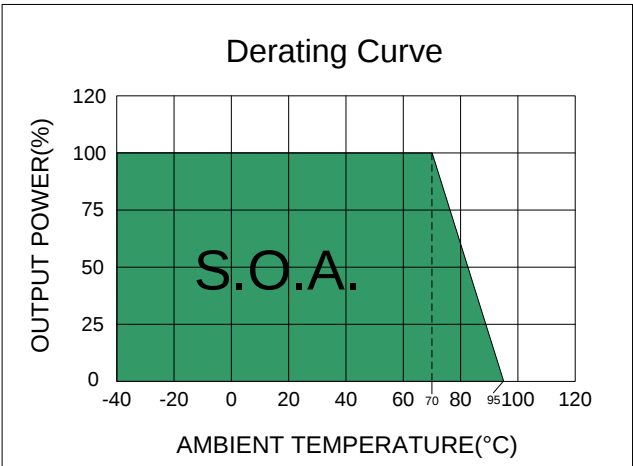
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ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		95	°C
Maximum Case Temperature				100	°C
Thermal Impedance		25			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

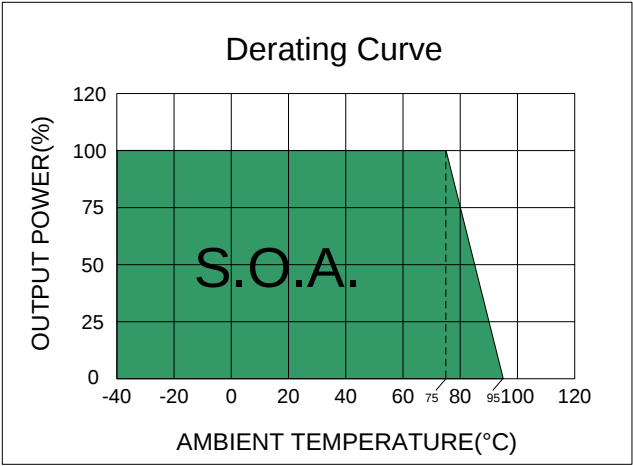
EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ±8kV / Contact: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Aluminum
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	13.0 g, typ.
Dimensions	1.25" x 0.8" x 0.4"

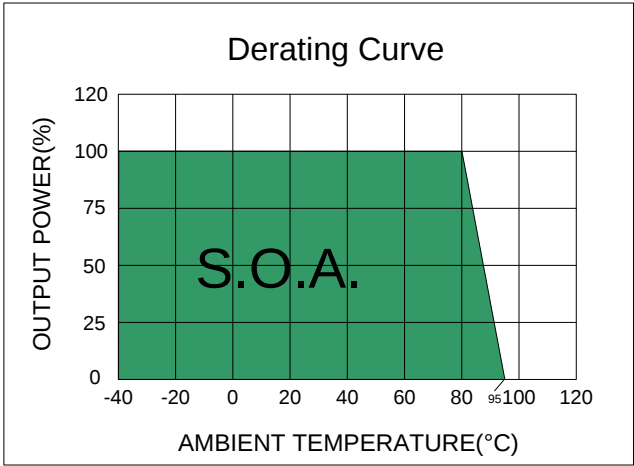
ELECTRICAL CHARACTERISTIC CURVES



Efficiency 77% ~ 80% Models



Efficiency 81% ~ 83% Models



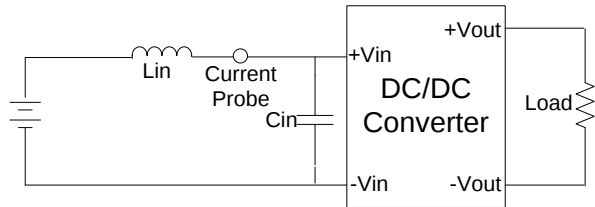
Efficiency 84% ~ 86% Models

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TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

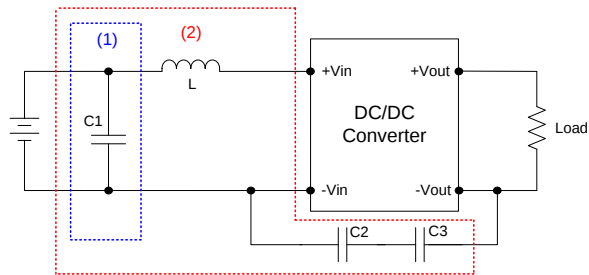
Input reflected ripple current is measured with a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

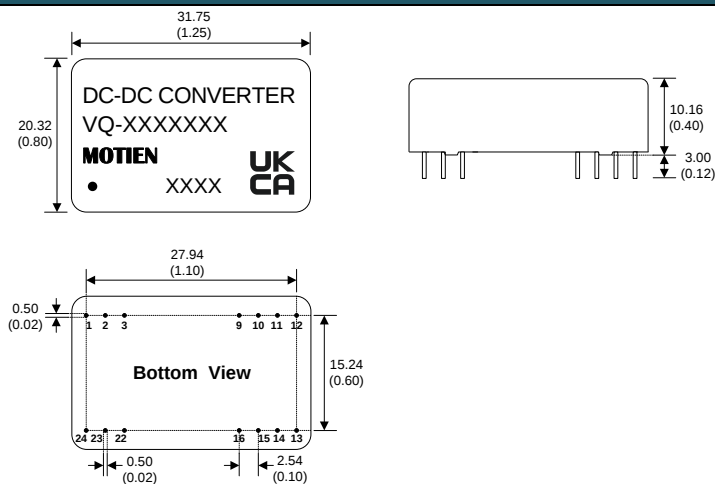
EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



	C1	L	C2	C3
VQ-24XXX4	NIPPON Chemi-con KY series 220μF, 100V	12μH	MLCC 1000pF, 2kV	
VQ-48XXX4				
VQ-24XXX4(H)			MLCC 2200pF, 2kV	MLCC 2200pF, 2kV
VQ-48XXX4(H)				

MECHANICAL SPECIFICATIONS

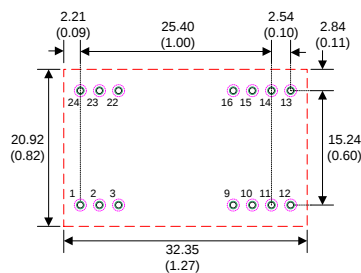


- Notes : All dimensions are typical in millimeters (inches).
- 1. Pin diameter: 0.5±0.05 (0.02±0.002)
 - 2. Pin pitch and length tolerance: ±0.35 (±0.014)
 - 3. Case Tolerance: ±0.5 (±0.02)
 - 4. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+Vin	+Vin	N.P.	N.P.
2	N.C.	-Vout	-Vin	-Vin
3	N.C.	COM	-Vin	-Vin
9	N.P.	N.P.	N.P.	COM
10	-Vout	COM	N.P.	N.P.
11	+Vout	+Vout	N.C.	-Vout
12	-Vin	-Vin	N.P.	N.P.
13	-Vin	-Vin	N.P.	N.P.
14	+Vout	+Vout	+Vout	+Vout
15	-Vout	COM	N.P.	N.P.
16	N.P.	N.P.	-Vout	COM
22	N.C.	COM	+Vin	+Vin
23	N.C.	-Vout	+Vin	+Vin
24	+Vin	+Vin	N.P.	N.P.

*N.P. : No PIN
*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS



- Notes : 1. All dimensions are typical in millimeters (inches).
- Through hole (black) 1 ~ 24: Ø0.80 (0.031)
 - Top view pad (green) 1 ~ 24: Ø1.00 (0.039)
 - Bottom view pad (pink) 1 ~ 24: Ø1.60 (0.063)