

V6-3W Series

3W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- 1500VDC Isolation, Up to 3500VDC
- Continuous Short Circuit Protection
- Efficiency up to 85%
- Operating Temperature Range -40 ~ 95°C max.



PART NUMBER STRUCTURE

V6 - **24** **05** **S** **3** **H**
(1) (2) (3) (4) (5) (6)

(1) Series

(2) Input Voltage Range

12 - 9-18 V
24 - 18-36 V
48 - 36-72 V

(3) Output Voltage

3R3 - 3.3 V
05 - 5.0 V
09 - 9.0 V
12 - 12 V
15 - 15 V
24 - 24 V

(4) Output Type

S - Single Output
D - Dual Output

(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)		
V6-123R3S3	9-18	18	321	3.3	0	900	75	1000
V6-1205S3	9-18	16	317	5	0	600	79	100
V6-1209S3	9-18	15	305	9	0	333	82	220
V6-1212S3	9-18	20	309	12	0	250	81	100
V6-1215S3	9-18	22	298	15	0	200	84	22
V6-1224S3	9-18	20	305	24	0	125	82	10
V6-123R3D3	9-18	18	329	±3.3	0	±450	76	±68
V6-1205D3	9-18	18	317	±5	0	±300	79	±220
V6-1209D3	9-18	18	305	±9	0	±167	82	±47
V6-1212D3	9-18	25	305	±12	0	±125	82	±47
V6-1215D3	9-18	25	313	±15	0	±100	80	±10
V6-1224D3	9-18	30	313	±24	0	±63	80	±10
V6-243R3S3	18-36	12	161	3.3	0	900	77	1000
V6-2405S3	18-36	18	157	5	0	600	80	100
V6-2409S3	18-36	12	149	9	0	333	84	330
V6-2412S3	18-36	10	149	12	0	250	84	100
V6-2415S3	18-36	15	149	15	0	200	84	1000
V6-2424S3	18-36	15	149	24	0	125	84	100
V6-243R3D3	18-36	12	159	±3.3	0	±450	79	±470
V6-2405D3	18-36	15	157	±5	0	±300	80	±330
V6-2409D3	18-36	15	149	±9	0	±167	84	±22
V6-2412D3	18-36	15	151	±12	0	±125	83	±47
V6-2415D3	18-36	18	153	±15	0	±100	82	±10
V6-2424D3	18-36	24	155	±24	0	±63	81	±22
V6-483R3S3	36-72	10	81	3.3	0	900	77	1000
V6-4805S3	36-72	12	78	5	0	600	81	470
V6-4809S3	36-72	8	75	9	0	333	84	100
V6-4812S3	36-72	10	75	12	0	250	84	100
V6-4815S3	36-72	8	75	15	0	200	84	100
V6-4824S3	36-72	15	75	24	0	125	84	22
V6-483R3D3	36-72	8	81	±3.3	0	±450	78	±68
V6-4805D3	36-72	10	78	±5	0	±300	81	±330
V6-4809D3	36-72	8	77	±9	0	±167	82	±100
V6-4812D3	36-72	12	77	±12	0	±125	82	±100
V6-4815D3	36-72	10	77	±15	0	±100	82	±47
V6-4824D3	36-72	8	77	±24	0	±63	82	±22

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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)		
V6-123R3S3H	9-18	15	326	3.3	0	900	76	470
V6-1205S3H	9-18	20	313	5	0	600	80	470
V6-1209S3H	9-18	18	305	9	0	333	82	220
V6-1212S3H	9-18	18	302	12	0	250	83	220
V6-1215S3H	9-18	22	302	15	0	200	83	22
V6-1224S3H	9-18	22	305	24	0	125	82	22
V6-123R3D3H	9-18	18	338	±3.3	0	±450	74	±1000
V6-1205D3H	9-18	18	313	±5	0	±300	80	±220
V6-1209D3H	9-18	20	302	±9	0	±167	83	±100
V6-1212D3H	9-18	25	313	±12	0	±125	80	±47
V6-1215D3H	9-18	25	313	±15	0	±100	80	±10
V6-1224D3H	9-18	30	305	±24	0	±63	82	±10
V6-243R3S3H	18-36	12	159	3.3	0	900	78	1000
V6-2405S3H	18-36	12	151	5	0	600	83	220
V6-2409S3H	18-36	15	151	9	0	333	83	220
V6-2412S3H	18-36	15	148	12	0	250	85	100
V6-2415S3H	18-36	15	149	15	0	200	84	1000
V6-2424S3H	18-36	15	148	24	0	125	85	220
V6-243R3D3H	18-36	12	159	±3.3	0	±450	79	±330
V6-2405D3H	18-36	15	155	±5	0	±300	81	±1000
V6-2409D3H	18-36	15	153	±9	0	±167	82	±220
V6-2412D3H	18-36	18	153	±12	0	±125	82	±100
V6-2415D3H	18-36	18	153	±15	0	±100	82	±10
V6-2424D3H	18-36	20	155	±24	0	±63	81	±22
V6-483R3S3H	36-72	10	80	3.3	0	900	78	1000
V6-4805S3H	36-72	8	78	5	0	600	81	680
V6-4809S3H	36-72	10	75	9	0	333	84	330
V6-4812S3H	36-72	10	75	12	0	250	84	220
V6-4815S3H	36-72	10	76	15	0	200	83	100
V6-4824S3H	36-72	15	75	24	0	125	84	47
V6-483R3D3H	36-72	10	82	±3.3	0	±450	77	±680
V6-4805D3H	36-72	10	77	±5	0	±300	82	±330
V6-4809D3H	36-72	12	77	±9	0	±167	82	±100
V6-4812D3H	36-72	12	76	±12	0	±125	83	±22
V6-4815D3H	36-72	12	77	±15	0	±100	82	±22
V6-4824D3H	36-72	12	79	±24	0	±63	80	±10

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INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	12V Input	9	12	18	VDC
	24V Input	18	24	36	
	48V Input	36	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)	12V Input	0.63			A
	24V Input	0.315			
	48V Input	0.16			
Note :					
1. Measured with a simulated source inductance of 12 μ H and a source capacitor Cin (47 μ F, ESR<1.0 Ω 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	%/ $^{\circ}$ C
Maximum Capacitive Load	Nominal Vin and constant resistive load	See Table			
Note :					
1. Measured with a 1.0 μ F MLCC.					

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			24	VDC
	24V Input			40	
	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			MΩ
Isolation Capacitance	Input-output			500		pF
Switching Frequency				266		kHz
MTBF	MIL-HDBK-217 F @ 25°C		1121			k hours
Safety Standard	IEC / EN / UL 62368-1		Designed to meet			
Environmental compliance			RoHS			

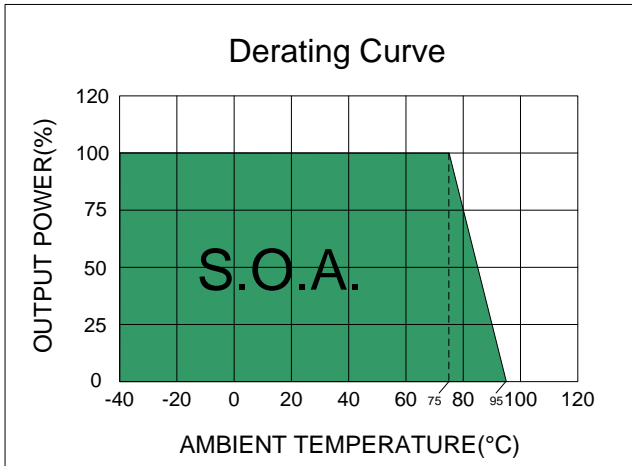
ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		95	°C
Maximum Case Temperature				100	°C
Thermal Impedance		25			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	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 with external components	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

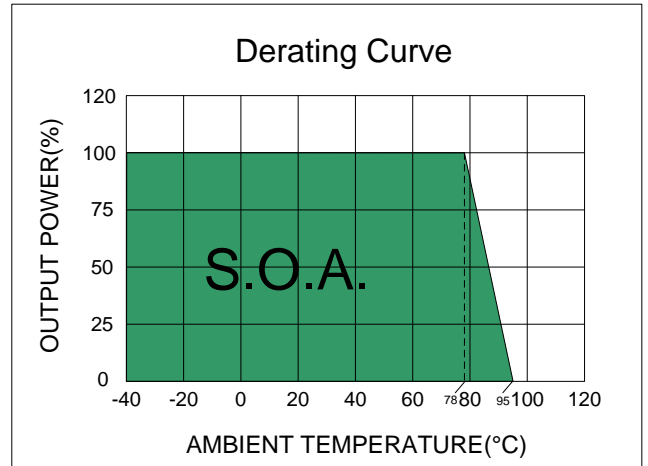
PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Aluminum
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	13.0 g, typ.
Dimensions	1.25" x 0.8" x 0.4"

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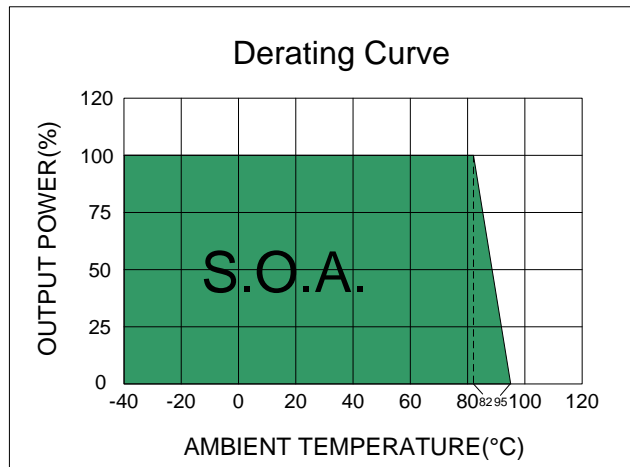
ELECTRICAL CHARACTERISTIC CURVES



Efficiency 74% ~ 79% Models



Efficiency 80% ~ 82% Models

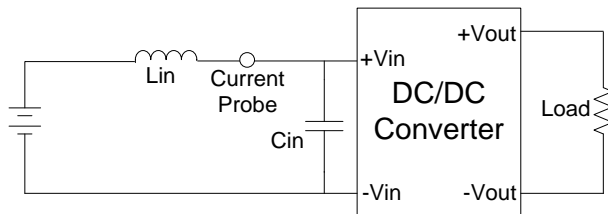


Efficiency 83% ~ 85% Models

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

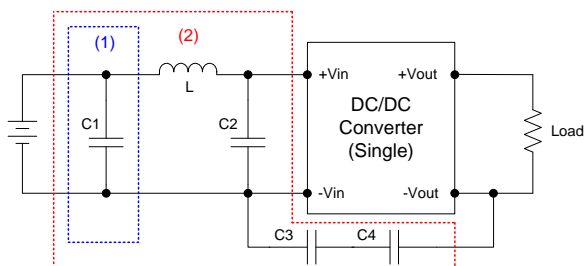
Input reflected ripple current is measured with a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



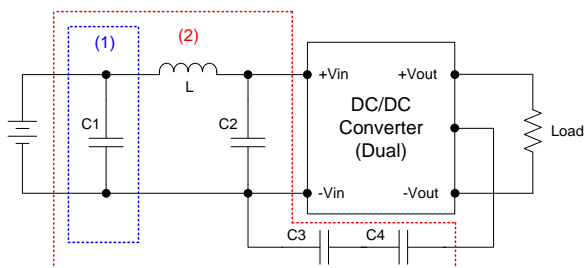
DESIGN & FEATURE CONFIGURATIONS

EMC Filter

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



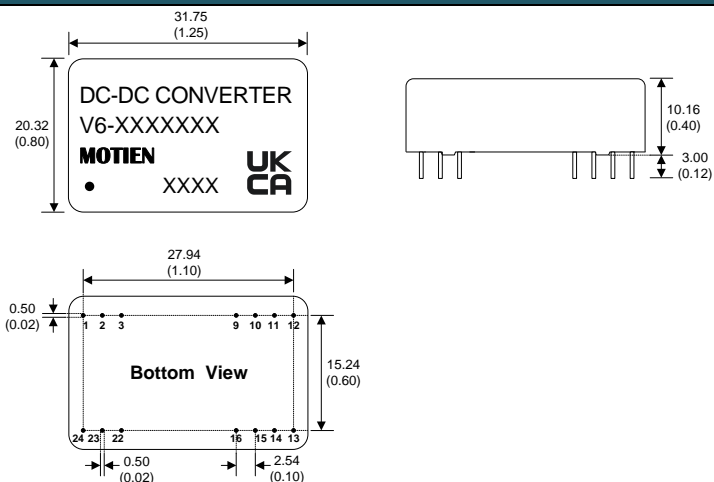
	C1	L	C2	C3	C4
V6-12XXS3	NIPPON Chemi-con KY series 220 μ F, 100V	15 μ H	Nichicon PW series 10 μ F, 100V	MLCC 1000pF, 2kV	
V6-24XXS3					
V6-48XXS3					
V6-12XXS3H				MLCC 2200pF, 2kV	MLCC 2200pF, 2kV
V6-24XXS3H					
V6-48XXS3H					



	C1	L	C2	C3	C4
V6-12XXD3	NIPPON Chemi-con KY series 220 μ F, 100V	15 μ H	Nichicon PW series 10 μ F, 100V	MLCC 1000pF, 2kV	
V6-24XXD3					
V6-48XXD3					
V6-12XXD3H				MLCC 2200pF, 2kV	MLCC 2200pF, 2kV
V6-24XXD3H					
V6-48XXD3H					

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MECHANICAL SPECIFICATIONS

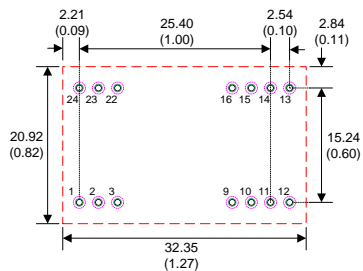


- Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
 3. Case Tolerance: ± 0.5 (± 0.02)
 4. Stand-off tolerance: ± 0.1 (± 0.004)

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: $\varnothing 0.80$ (0.031)
 - Top view pad (green) 1 ~ 24: $\varnothing 1.00$ (0.039)
 - Bottom view pad (pink) 1 ~ 24: $\varnothing 1.60$ (0.063)