V6-2W Series

2W 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 2 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)		
V6-123R3S2	9-18	30	220	3.3	0	600	75	1000
V6-1205S2	9-18	18	214	5	0	400	78	470
V6-1209S2	9-18	30	220	9	0	222	76	330
V6-1212S2	9-18	30	204	12	0	167	82	10
V6-1215S2	9-18	30	220	15	0	133	76	100
V6-1224S2	9-18	30	206	24	0	83	81	22
V6-123R3D2	9-18	30	232	±3.3	0	±300	75	±330
V6-1205D2	9-18	18	211	±5	0	±200	79	±100
V6-1209D2	9-18	30	220	±9	0	±111	76	±100
V6-1212D2	9-18	30	211	±12	0	±83	79	±68
V6-1215D2	9-18	30	220	±15	0	±67	76	±33
V6-1224D2	9-18	30	220	±24	0	±42	76	±100
V6-243R3S2	18-36	15	110	3.3	0	600	75	680
V6-2405S2	18-36	10	105	5	0	400	80	1000
V6-2409S2	18-36	20	107	9	0	222	78	330
V6-2412S2	18-36	12	102	12	0	167	82	100
V6-2415S2	18-36	18	105	15	0	133	80	100
V6-2424S2	18-36	20	99	24	0	83	85	100
V6-243R3D2	18-36	20	113	±3.3	0	±300	75	±330
V6-2405D2	18-36	20	106	±5	0	±200	79	±100
V6-2409D2	18-36	20	107	±9	0	±111	78	±100
V6-2412D2	18-36	20	102	±12	0	±83	82	±680
V6-2415D2	18-36	18	106	±15	0	±67	79	±33
V6-2424D2	18-36	20	107	±24	0	±42	78	±22
V6-483R3S2	36-72	12	55	3.3	0	600	76	680
V6-4805S2	36-72	12	53	5	0	400	79	470
V6-4809S2	36-72	12	56	9	0	222	75	330
V6-4812S2	36-72	12	53	12	0	167	80	220
V6-4815S2	36-72	12	51	15	0	133	82	100
V6-4824S2	36-72	12	56	24	0	83	75	33
V6-483R3D2	36-72	12	57	±3.3	0	±300	75	±330
V6-4805D2	36-72	10	56	±5	0	±200	75	±330
V6-4809D2	36-72	12	56	±9	0	±111	75	±100
V6-4812D2	36-72	12	56	±12	0	±83	75	±47
V6-4815D2	36-72	12	56	±15	0	±67	75	±33
V6-4824D2	36-72	12	56	±24	0	±42	75	±22

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)		
V6-123R3S2H	9-18	30	223	3.3	0	600	75	680
V6-1205S2H	9-18	30	211	5	0	400	79	100
V6-1209S2H	9-18	30	220	9	0	222	76	330
V6-1212S2H	9-18	30	220	12	0	167	76	220
V6-1215S2H	9-18	30	220	15	0	133	76	100
V6-1224S2H	9-18	30	220	24	0	83	76	33
V6-123R3D2H	9-18	30	232	±3.3	0	±300	75	±330
V6-1205D2H	9-18	30	214	±5	0	±200	78	±220
V6-1209D2H	9-18	30	220	±9	0	±111	76	±100
V6-1212D2H	9-18	30	220	±12	0	±83	76	±47
V6-1215D2H	9-18	30	220	±15	0	±67	76	±33
V6-1224D2H	9-18	30	220	±24	0	±42	76	±22
V6-243R3S2H	18-36	20	108	3.3	0	600	77	680
V6-2405S2H	18-36	20	107	5	0	400	78	100
V6-2409S2H	18-36	20	107	9	0	222	78	330
V6-2412S2H	18-36	20	101	12	0	167	83	100
V6-2415S2H	18-36	20	103	15	0	133	81	100
V6-2424S2H	18-36	20	107	24	0	83	78	33
V6-243R3D2H	18-36	20	113	±3.3	0	±300	75	±330
V6-2405D2H	18-36	20	110	±5	0	±200	76	±330
V6-2409D2H	18-36	20	107	±9	0	±111	78	±100
V6-2412D2H	18-36	20	107	±12	0	±83	78	±47
V6-2415D2H	18-36	20	106	±15	0	±67	79	±33
V6-2424D2H	18-36	20	107	±24	0	±42	78	±22
V6-483R3S2H	36-72	12	56	3.3	0	600	75	680
V6-4805S2H	36-72	12	56	5	0	400	75	680
V6-4809S2H	36-72	12	56	9	0	222	75	330
V6-4812S2H	36-72	12	56	12	0	167	75	220
V6-4815S2H	36-72	12	56	15	0	133	75	100
V6-4824S2H	36-72	12	56	24	0	83	75	33
V6-483R3D2H	36-72	12	57	±3.3	0	±300	75	±330
V6-4805D2H	36-72	12	55	±5	0	±200	77	±220
V6-4809D2H	36-72	12	56	±9	0	±111	75	±100
V6-4812D2H	36-72	12	56	±12	0	±83	75	±47
V6-4815D2H	36-72	12	56	±15	0	±67	75	±33
V6-4824D2H	36-72	12	56	±24	0	±42	75	±22

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	0.4			A
	24V Input	0.2			
	48V Input	0.1			
Note： 1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (47μF, 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)	12V Input			24	VDC
	24V Input			40	
	48V Input			80	
Soldering Temperature	1.5mm from case 10sec max.			260	°C
Note：These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

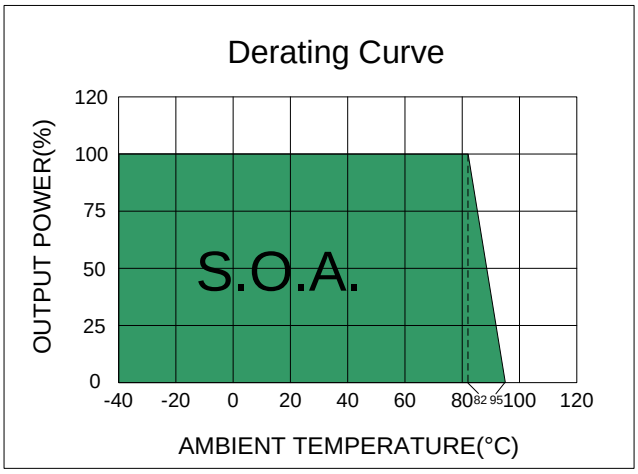
GENERAL SPECIFICATIONS						
Parameter	**Conditions**		**Min.**	**Typ.**	**Max.**	**Unit**
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1500			VDC
		Suffix “H”	3500			
	Case-I/O, and rated for 60sec		1000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			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		26			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

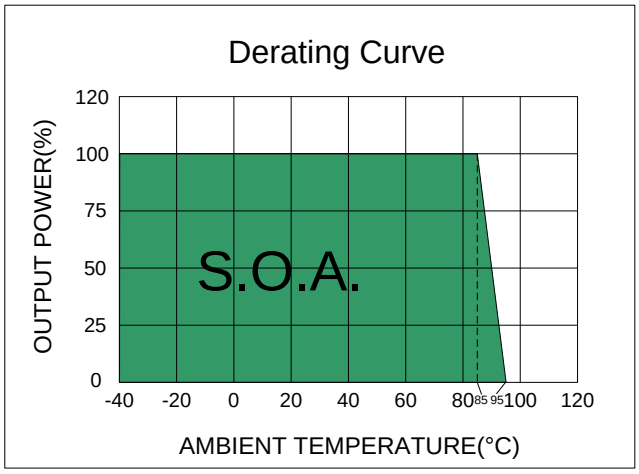
EMC SPECIFICATIONS			
Parameter	**Standard**	**Condition**	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Air: ±8kV / Contact: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge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

ELECTRICAL CHARACTERISTIC CURVES



Efficiency 75% ~ 77% Models

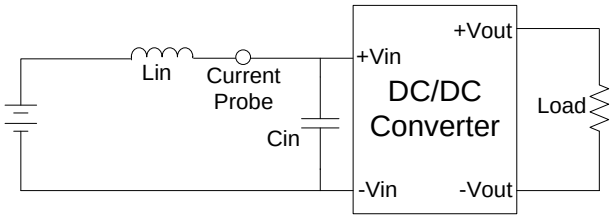


Efficiency 78% ~ 85% Models

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

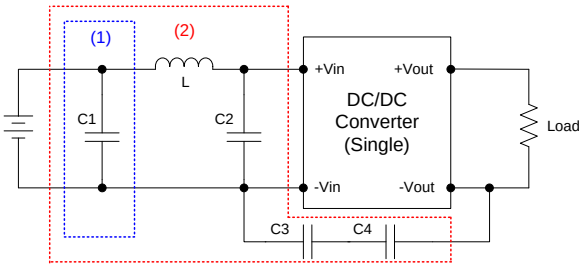
Input reflected ripple current is measured with a source inductor Lin (12μH) and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz) at nominal input and full load.



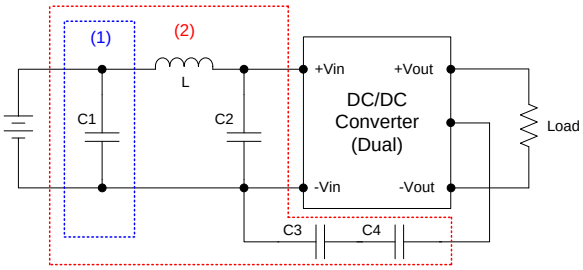
DESIGN & FEATURE CONFIGURATIONS

EMC Filter

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

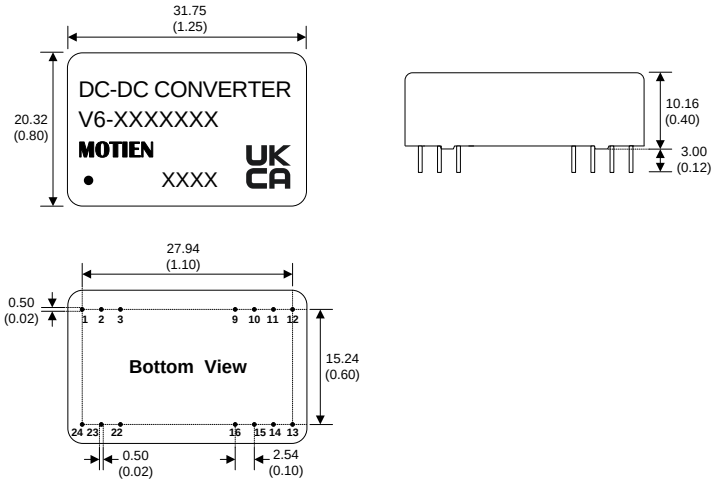


	C1	L	C2	C3	C4
V6-12XXS2	NIPPON Chemi-con KY series 220µF, 100V	15µH	Nichicon PW series 10µF, 100V	MLCC 1000pF, 2kV	
V6-24XXS2					
V6-48XXS2					
V6-12XXS2H				MLCC 2200pF, 2kV	MLCC 2200pF, 2kV
V6-24XXS2H					
V6-48XXS2H					



	C1	L	C2	C3	C4
V6-12XXD2	NIPPON Chemi-con KY series 220µF, 100V	15µH	Nichicon PW series 10µF, 100V	MLCC 1000pF, 2kV	
V6-24XXD2					
V6-48XXD2					
V6-12XXD2H				MLCC 2200pF, 2kV	MLCC 2200pF, 2kV
V6-24XXD2H					
V6-48XXD2H					

MECHANICAL SPECIFICATIONS



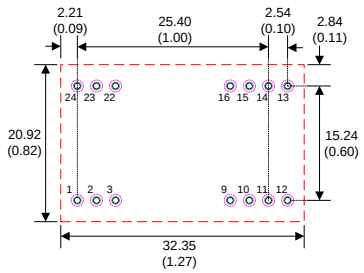
Notes : All dimensions are typical in millimeters (inches).

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)

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