

NA3W Series

3W 4:1 Regulated Single & Dual output



Features

- Highest Power Density In 8 Pin DIL Package
- Wide 4:1 Input Range
- Full SMD Technology
- 1600 VDC Isolation
- Continuous Short Circuit Protection
- Under Voltage Lock-Out Circuit
- Remote on/off Control
- Efficiency up to 84%
- -40 ~ 80°C Operation Temperature Range



The NA3W series is a family of cost effective and high performed 3W single & dual output DC-DC converters. These converters are built in non-conductive black plastic package in a 8-pin DIL miniature compact case with high performance features wide range devices operate over 4:1 input voltage range providing stable output voltage. Devices are encapsulated using flame retardant resin. Input voltages of 12, 24, 48 Vdc with output voltage of 3.3, 5, 12, 15, ± 5 , ± 12 , ± 15 Vdc. High performance features include high efficiency operation up to 84% and output voltage accuracy of $\pm 1\%$ maximum.

All specifications typical at $T_a=25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS		PHYSICAL SPECIFICATIONS	
Voltage Accuracy	$\pm 1\%$	Case Material	Non conductive black plastic(UL94V-0 rated)
Maximum Output Current	See table	Base Material	Non conductive black plastic(UL94V-0 rated)
Line Regulation	$\pm 0.2\%$, max.	Potting Material	Silicon (UL94V-0 rated)
Load Regulation (From 0% to 100% Load)	$\pm 1.0\%$, max.	Pin Material	$\phi 0.5\text{mm}$ Brass Solder-coated
Cross Regulation (Dual Output) (1)	$\pm 5\%$	Weight	3.6g
Ripple & Noise (20 MHz bandwidth)(2)	Single 150mVpp, max. Dual 100mVpp, max.	Dimensions	0.55"x0.55"x0.32"
Short Circuit Protection	Indefinite (Automatic Recovery)	ENVIRONMENT SPECIFICATIONS	
Temperature Coefficient	$\pm 0.02\%/^\circ\text{C}$	Operating Temperature	$-40^\circ\text{C} \sim 80^\circ\text{C}$ (See Derating Curve)
Capacitive Load(3)	See table	Maximum Case Temperature	100°C
Transient Recovery Time (4)	500us, typ.	Storage Temperature	$-55^\circ\text{C} \sim 125^\circ\text{C}$
Transient Response Deviation(4)	$\pm 3\%$, max. Single Output 3.3V, 5V: $\pm 5\%$, max.	Cooling(6)	Nature Convection
INPUT SPECIFICATIONS		ABSOLUTE MAXIMUM RATINGS(7)	
Voltage Range	See table	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Start up Time(Nominal Vin and constant resistive load)	30mS, typ.	Input Surge Voltage(100ms max)	
Input Current	See table	12 Models	25Vdc, max.
No-Load Input Current	See table	24 Models	50Vdc, max.
Input Filter	Capacitor	48 Models	100Vdc, max.
Input Reflected Ripple Current(5)	20mA pk-pk	Soldering Temperature (1.5mm from case 10 sec. max.)	260°C max.
Remote on/off		EMC CHARACTERISTICS	
ON:	open or high impedance	Radiated Emissions	EN55032 CLASS A
OFF:	2-4mA input current (via 1K)	Conducted Emissions(8)	EN55032 CLASS A
Off stand by input current(Nominal Vin)	2.5mA, max.	ESD	IEC61000-4-2 Perf. Criteria A
Under Voltage Lockout		RS	IEC61000-4-3 Perf. Criteria A
12V Modes	Module ON / OFF 4.2Vdc / 3.5Vdc, typ.	EFT(9)	IEC61000-4-4 Perf. Criteria A
24V Modes	Module ON / OFF 8.5Vdc / 7.0Vdc, typ.	Surge(9)	IEC61000-4-5 Perf. Criteria A
48V Modes	Module ON / OFF 17.5Vdc / 15.5Vdc, typ.	CS	IEC61000-4-6 Perf. Criteria A
GENERAL SPECIFICATIONS		PFMF	IEC61000-4-8 Perf. Criteria A
Efficiency	See table, typ.		
I/O Isolation Voltage (60 sec)	1600Vdc		
I/O Isolation Capacity	2000 pF, typ.		
I/O Isolation Resistance	1000M Ohm, min.		
Switching Frequency	100kHz, min.		
Humidity	95%reH		
Reliability Calculated MTBF (MIL-HDBK-217 F)	>820Khrs@25°C		
Safety Standard (designed to meet)	IEC/UL/EN 60950-1 IEC/UL/EN 62368-1		

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PART NUMBER STRUCTURE

NA3W - 2405 S

Series Name

Input Voltage Range

12 - 4.5 ~ 18V

24 - 9 ~ 36V

48 - 18 ~ 75V

Case Type

S - Single Output

D - Dual Output

Nominal Output Voltage

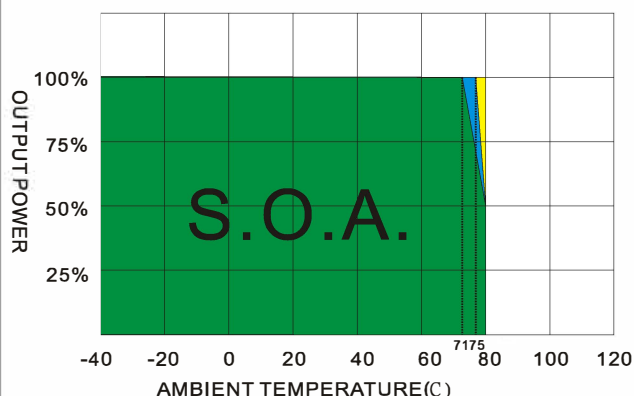
3R3 - 3.3V

5 - 5V

12 - 12V

15 - 15V

Derating Curve



Green Zone : Efficiency under 80% models

Blue Zone : Others

Yellow Zone : Efficiency over 83% models

MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (% ,typ)	Capacitor Load @FL (uF,max)
		No-Load (mA,max)	Full Load (mA,typ.)		Min. load (mA)	Full load (mA)		
NA3W-123R3S	12 (4.5-18)	30	257	3.3	0	700	75	3300
NA3W-1205S	12 (4.5-18)	45	309	5	0	600	81	1680
NA3W-1212S	12 (4.5-18)	55	301	12	0	250	83	470
NA3W-1215S	12 (4.5-18)	60	301	15	0	200	83	330
NA3W-1205D	12 (4.5-18)	30	313	±5	0	±300	80	±1000
NA3W-1212D	12 (4.5-18)	55	305	±12	0	±125	82	±220
NA3W-1215D	12 (4.5-18)	60	301	±15	0	±100	83	±220
NA3W-243R3S	24 (9-36)	25	127	3.3	0	700	76	3300
NA3W-2405S	24 (9-36)	20	152	5	0	600	82	1680
NA3W-2412S	24 (9-36)	30	149	12	0	250	84	470
NA3W-2415S	24 (9-36)	35	149	15	0	200	84	330
NA3W-2405D	24 (9-36)	25	154	±5	0	±300	81	±1000
NA3W-2412D	24 (9-36)	30	151	±12	0	±125	83	±220
NA3W-2415D	24 (9-36)	35	149	±15	0	±100	84	±220
NA3W-483R3S	48 (18-75)	10	65	3.3	0	700	74	3300
NA3W-4805S	48 (18-75)	10	77	5	0	600	81	1680
NA3W-4812S	48 (18-75)	15	77	12	0	250	81	470
NA3W-4815S	48 (18-75)	15	76	15	0	200	82	330
NA3W-4805D	48 (18-75)	20	79	±5	0	±300	79	±1000
NA3W-4812D	48 (18-75)	20	78	±12	0	±125	80	±220
NA3W-4815D	48 (18-75)	25	78	±15	0	±100	80	±220

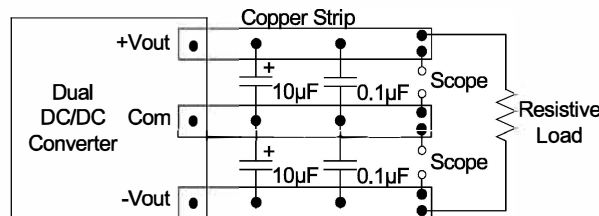
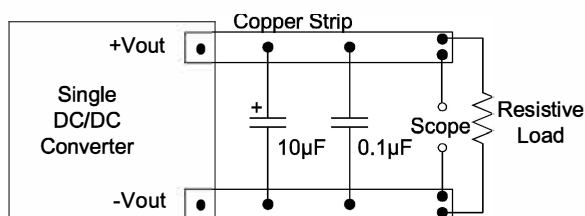
NOTE

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- RippleNoise measured with a 10μF electrolytic capacitor and 0.1μF ceramic capacitor.
- Test by minimal Vin and constant resistive load.
- Test by normal Vin and 100%-25% load,25% load step change.
- Measured Input reflected ripple current with a simulated source inductance of 27μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
- "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
- Exceeding the absolute ratings of the unit could cause damage. It's not allowed for continuous operating ratings.
- Input filter components are required to help meet conducted emission class A, Which application refer to the EMI Filter(Conducted Emissions).
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. The filter capacitor suggest: Nippon - chemi - con KY series, 220μF/100V.

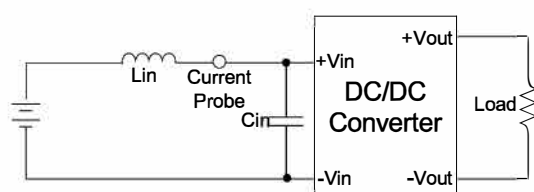
TEST CONFIGURATIONS

Output Ripple & Noise Measurement Test

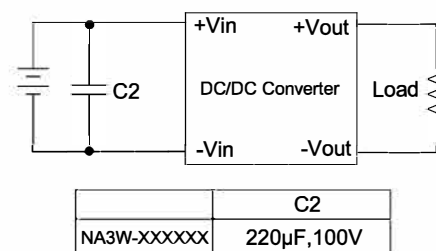
Use a 10 μ F electrolytic capacitor and 0.1 μ F ceramic capacitor.
The Scope measurement bandwidth is 20MHz.


Input Reflected Ripple Current Test Step

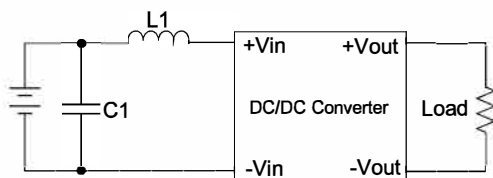
Input reflected ripple current is measured through a source inductor L_{in} (27 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ω at 100KHz) at nominal input and full load.


EFT/Surge Filter

Input filter components (C2) is used to help meet IEC61000-4-4 and IEC61000-4-5 .


EMI Filter(Conducted Emissions)

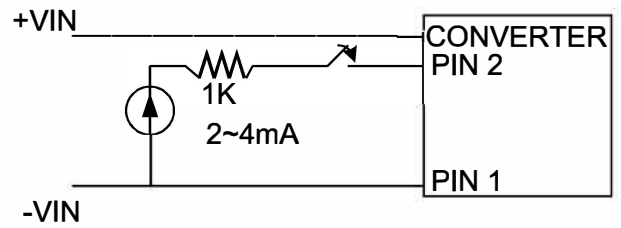
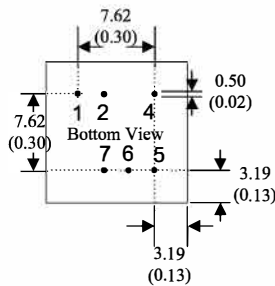
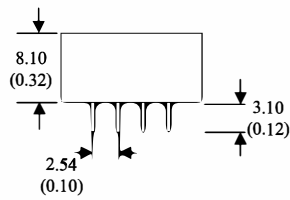
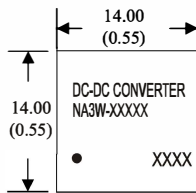
Input filter components (C1,L1) are used to meet EMI test criterial A.
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L1
NA3W-12XXXX	1210, 10 μ F, 35V	2.2 μ H
NA3W-24XXXX	1210, 2.2 μ F, 100V	
NA3W-48XXXX	1210, 4.7 μ F, 100V	

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TEST CONFIGURATIONS
Remote ON / OFF Test Step

Input current(2~4mA) via 1KΩ to Pin2 , converter OFF.
open or high impedance , converter ON.


MECHANICAL SPECIFICATION

8 Pin DIL Package

- 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. Pin to case tolerance: ± 0.5 (± 0.02)
 4. Case Tolerance: ± 0.5 (± 0.02)

PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL
1	-V Input	-V Input
2	Remote On/Off	Remote On/Off
4	+V Input	+V Input
5	+V Output	+V Output
6	N.P.	Common
7	-V Output	-V Output

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DRAWING:

APPROVED:

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