

# NH50S single-output DC/DC converters 200 – 400Vin, 2 – 28Vout, 50 watts



## How to Order:

**NH 50 S M / 5 - A - D**

Series	Output Voltage: Maximum current as stated in chart	Options: A- pins out side of unit B- pins out bottom of unit C- pins out top of unit D- through hole inserts (STD threaded) I - M2.5 inserts
Total Output Power		
Single Output		
Industrial (I) or Military (M)		

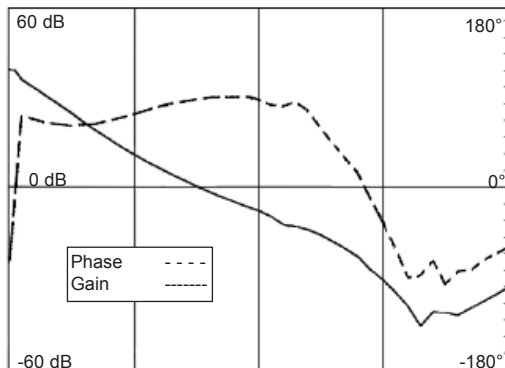
## INPUT CHARACTERISTICS

	PER CHANNEL			Units
	Min.	Typ.	Max.	
Input Voltage	200	270	400	Vdc
Brown Out (75% of Full Load)(fig. I)*	180			Vdc
No Load Power Dissipation		2	3	Watt
Inrush Charge (fig. VII)*		0.12	0.2	mc
Reflective Ripple Current (fig. VIII)*		100		mA
Logic Disable Current (Sink)		5	6	mA
Logic Disable Power In		2	3	W
Input Ripple Rejection (120 Hz)		75		dB
Input Ripple Rejection (800 Hz)		60		dB
Efficiency (FL) (fig. II, III)*	75	80-86		%
3.3 Vdc Output (FL)	70	74		%
2 Vdc Output (FL)	60	65		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient: Units conform to MIL-STD-704D for transients up to 500V for 0.1 second

## STABILITY



All specifications are typical @+25°C with nominal input voltage under full output load conditions, unless otherwise noted. Specifications subject to change without notice.

## FEATURES

- .38 Inch Profile
- Power Good\*\*
- Synchronization\*\*
- Remote Turn On (TTL)\*\*
- Output Voltage Trim Pin\*\*
- Over Temperature Protection
- Output Overvoltage/Overcurrent Protection
- 100% Environmental Screening (Military Version)
- Outputs Isolated Allowing Any Combination of Output Voltages

## SELECTION CHART

Nominal Output Voltage	Output Current (Amps)	Model Number (Industrial)	Model Number (Military)
2	10	NH50SI/2-A	NH50SM/2-A
3.3	10	NH50SI/3.3-A	NH50SM/3.3-A
5	10	NH50SI/5-A	NH50SM/5-A
5.2	9.6	NH50SI/5.2-A	NH50SM/5.2-A
12	4.2	NH50SI/12-A	NH50SM/12-A
15	3.3	NH50SI/15-A	NH50SM/15-A
24	2.1	NH50SI/24-A	NH50SM/24-A
28	1.8	NH50SI/28-A	NH50SM/28-A

## OUTPUT CHARACTERISTICS

	PER CHANNEL			Units
	Min.	Typ.	Max.	
Set Point Accuracy			1 †	% V <sub>out</sub>
Load Regulation		0.15	0.2	% V <sub>out</sub>
Line Regulation		0.15	0.2	% V <sub>out</sub>
Ripple P-P (10 MHz) (fig. IV)*			100	mV
100mV or 1% V <sub>out</sub> , whichever is greater				
Trim Range	90		110	% V <sub>out</sub>
Remote Sense Compensation		0.5		Vdc
Overvoltage Protection		125		% V <sub>out</sub>
Current Sharing		±10		% I <sub>out</sub>
Transient Response (Recovery to 1%V <sub>out</sub> ) Time/Overshoot				
20-80% Load		500/500		µS/mV
Low Line - High Line		500/500		µS/mV
50-100% Load		500/500		µS/mV
Temperature Drift		.01	.05	%/°C
Long Term Drift		.01	.05	%/1KHrs
Current Limit		130		% I <sub>out</sub>
Short Circuit Current (Burp Mode) 25			75	% I <sub>out</sub>
Turn On Time (fig. XI)*		60		mS
Logic Turn On Time (fig. IX)*		1.0		mS

† 1% or 50mV, whichever is greater

\* Figures on page 10

\*\* Features referenced to output ground



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# Industrial & military grade high density DC to DC converters

## TEMPERATURE CHARACTERISTICS

	Min.	Typ.	Max.	Units
Operating	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown		+105		°C
Thermal Resistance Case - Ambient		11		°C/W

## ENVIRONMENTAL SCREENING - M MODEL

Stabilization Bake: +125°C for 24 hours similar to Mil-Std-883, M1008.2, Condition B

Temperature Cycling: 10 cycles at -55°C to +125°C (transition period 36 minutes) similar to Mil-Std-883, M1010, Condition B

Burn-in: 160 hours at +85°C min.

Final Testing

## ENVIRONMENTAL SCREENING - I MODEL

Burn-in: 16 hours at +85°C min.

Final Testing

See "Guide to Operation" for full details.

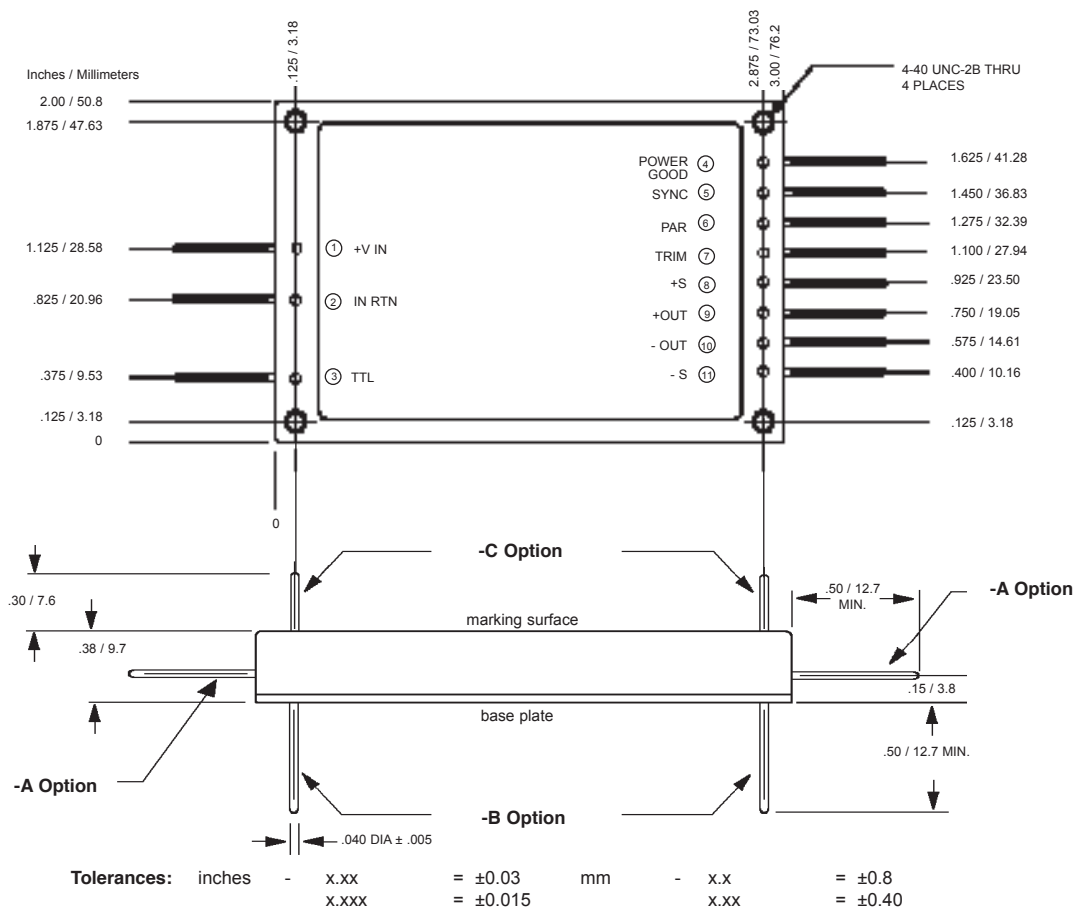
## ISOLATION CHARACTERISTICS

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	1000			Vdc
Output to Base	500			Vdc
Input to Base	1000			Vdc
Input to Output Capacitance		0.022		µf
Insulation Resistance (@50 Vdc) 50				MOhm

## MECHANICAL CHARACTERISTICS

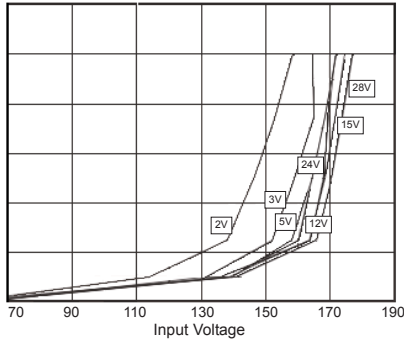
Weight	4.2	oz.
	120	grams
Size	3.0 x 2.0 x 0.38	inch
	76.2 x 50.8 x 9.7	mm
	2.28	inch <sup>3</sup>
Volume	37.5	cm <sup>3</sup>
	Material	Pin
Material	Baseplate	Aluminum 5052-H32
	Case	28 Gauge Steel (cold rolled)
Finish		Nickel Plating
Mounting	Standard	4-40 inserts provided in basplate
	I Option	M2.5 metric inserts (4 places)
	D Option	0.115 DIA thru holes (4 places)

## CASE DRAWINGS

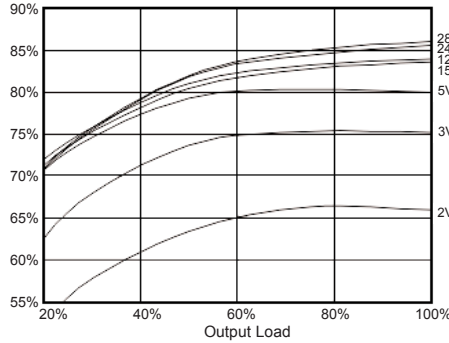


# Performance characteristics

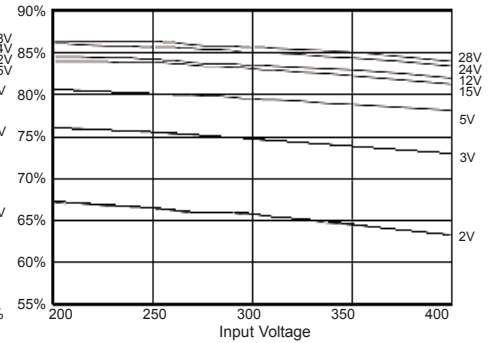
**I. Input Voltage vs. Output Power**



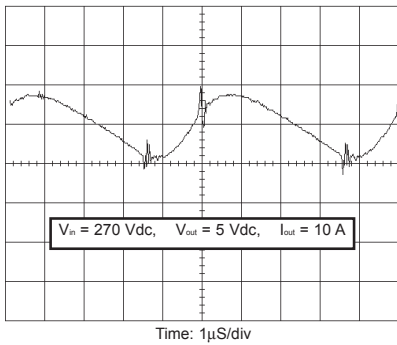
**I. Efficiency vs. Load**



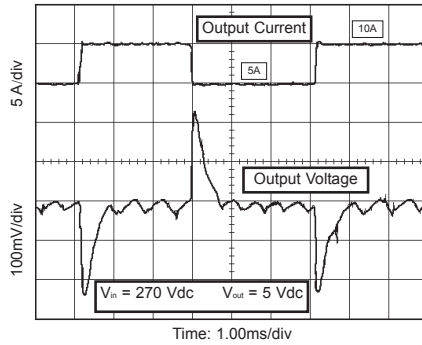
**III. Efficiency vs. Line Voltage**



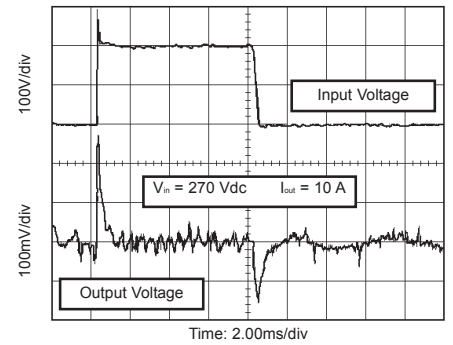
**IV. Output Voltage Ripple**



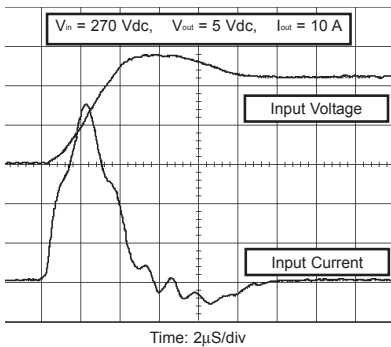
**V. Load Transient Response**



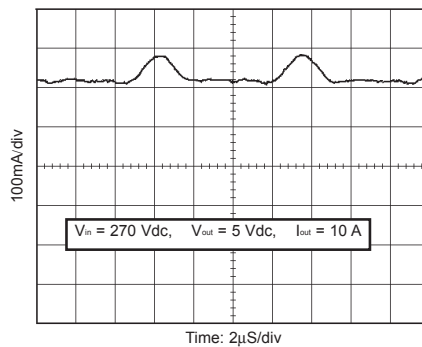
**VI. Input Transient Response**



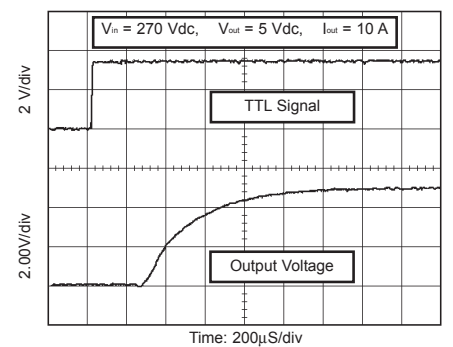
**VII. Input Inrush Current**



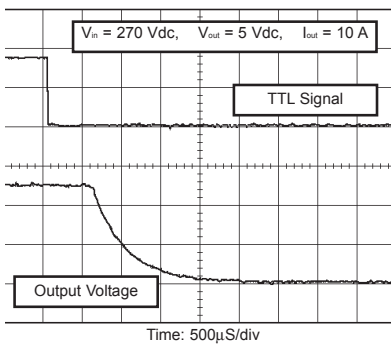
**VIII. Input Current Ripple**



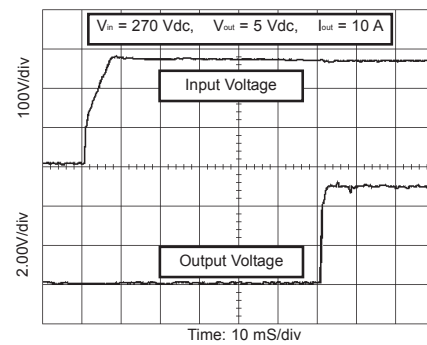
**IX. TTL Turn On**



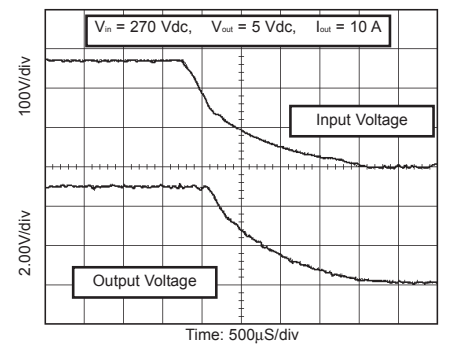
**X. TTL Turn-off**



**XI. Turn On**



**XI. Turn Off / Hold-up Time**



# NHF150 EMI filter



## How to Order:

### NHF 150 - A - D

Series	Options:
Total Output Power	A- pins out side of unit
	B- pins out bottom of unit
	C- pins out top of unit
	D- through hole inserts (STD threaded)
	I - M2.5 inserts

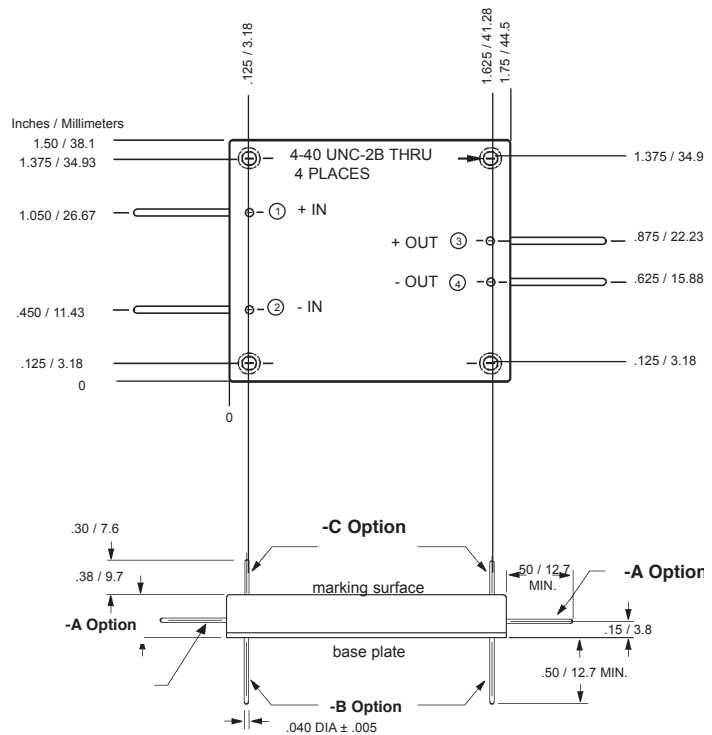
## FEATURES

- MIL-STD-461D Compliance CE101 and CE102
- Thermally Non-dissipative device
- Less than 1.0 Volt Drop Across the NHF150
- Does Not Require External Components
- Meets Environmental Requirements of MIL-STD-810E and MIL-STD-901C
- For Use With NH50, NH100, and NH150 Series DC/DC Converters

## SPECIFICATIONS

Input Voltage (Maximum)	500	Vdc
Rated Output Current	1	A
Isolation (Input/Output to Case)	1000	Vdc
Operating Temperature	100	°C
Storage Temperature	125	°C
Insulation Resistance (measured @ 50Vdc)	50	M Ohm
Weight	1.72	oz.
	48.65	grams
Size	1.75 x 1.5 x 0.38	inch
	44.5 x 38.1 x 9.7	mm
Volume	1.00	inch <sup>3</sup>
	16.5	cm <sup>3</sup>
Material	Pin	Brass (Solder Plating)
	Baseplate	Aluminum 5052-H32
	Case	28 Gauge Steel (cold rolled)
Finish		Nickel Plating
Mounting	Standard:	4-40 inserts provided in basplate
	I Option:	M2.5 metric inserts (4 places)
	D Option:	0.115 DIA thru holes (4 places)

## CASE DRAWINGS

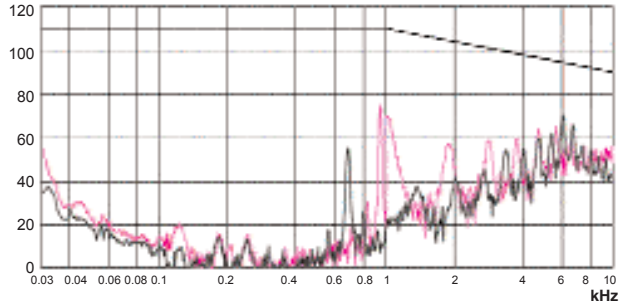


Tolerances:	inches	-	X.XX	= ±0.03
			X.XXX	= ±0.015
	mm	-	X.X	= ±0.8
			X.XX	= ±0.40

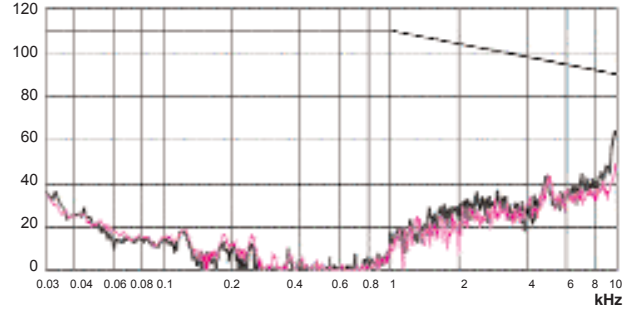
# EMI Compliance graphs

## Mil-STD-461D, CE101

270 V<sub>in</sub> - 150 watts



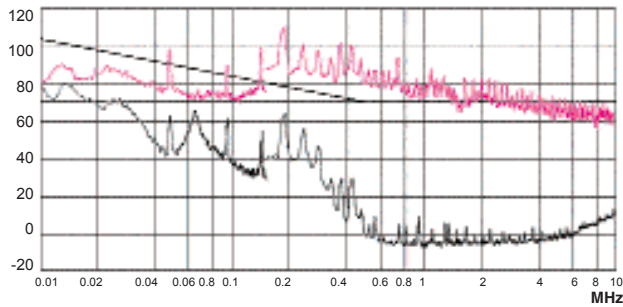
270 V<sub>in</sub> - 50 watts



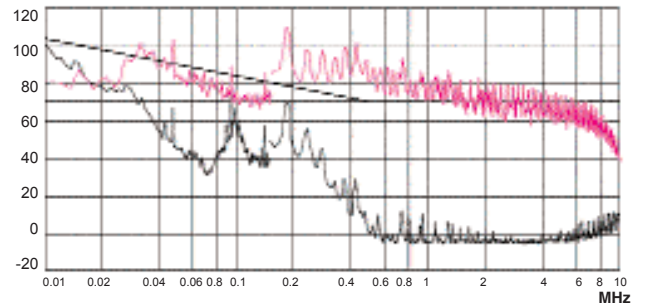
■ Without NHF150  
■ With NHF150

## Mil-STD-461D, CE102

270 V<sub>in</sub> - 150 watts



270 V<sub>in</sub> - 50 watts



■ Without NHF150  
■ With NHF150

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March, 2017

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