# NL50

## 50 Watts Output Power

*SINGLE OUTPUT*


## How to Order:

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

- NL — Series
- 50 — Total Output Power
- S — Single Output
- M — Industrial (I) or Military (M)
- / 5 — Output Voltage: Maximum current as stated in chart
- - A — 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

## FEATURES

- .38 Inch Profile
- Synchronization
- N + 1 Redundancy
- Remote Turn On (TTL)
- Parallelable Operation
- Output Voltage Trim Pin
- Over Temperature Protection
- Output Overvoltage/Overcurrent Protection
- Built-In Test (Output Power Good)
- 100% Environmental Screening (Military Version)

## SELECTION CHART

| Nominal Output Voltage | Output Current (Amps) | Model Number (Industrial) | Model Number (Military) |
|---|---|---|---|
| 2 | 10 | NL50SI/2-A | NL50SM/2-A |
| 3.3 | 10 | NL50SI/3.3-A | NL50SM/3.3-A |
| 5 | 10 | NL50SI/5-A | NL50SM/5-A |
| 5.2 | 9.6 | NL50SI/5.2-A | NL50SM/5.2-A |
| 12 | 4.2 | NL50SI/12-A | NL50SM/12-A |
| 15 | 3.3 | NL50SI/15-A | NL50SM/15-A |

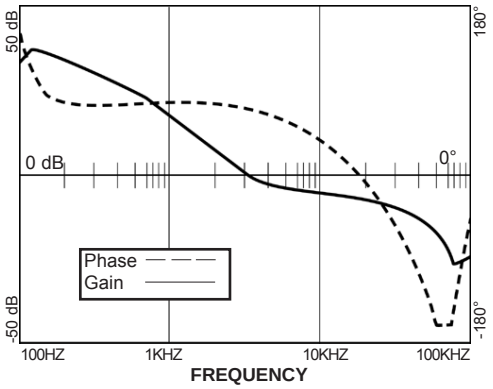
## INPUT CHARACTERISTICS

| | Per Channel Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Input Voltage | 9 | 12 | 18 | Vdc |
| Brown Out (75% of Full Load) [fig. I]* | | 7 | | Vdc |
| No Load Power Dissipation | | 1 | 2 | Watt |
| Inrush Charge [fig. VII]* | | | 3.5 | mc |
| Reflective Ripple Current [fig. VIII]* | | 3 | | % |
| Logic Disable Current (Sink) | | 100 | 150 | µA |
| Logic Disable Power In | | 0.5 | 1 | W |
| Input Ripple Rejection (120 Hz) | | 50 | | dB |
| Input Ripple Rejection (800 Hz) | | 40 | | dB |
| Efficiency (FL) [fig. II & III]* | 72 | 78-85 | | % |
| 3.3 Vdc Output (FL) | 70 | 75 | | % |
| 2 Vdc Output (FL) | 63 | 69 | | % |

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

Input Transient: Units can withstand 24V transients for up to 0.1 second

### STABILITY




## OUTPUT CHARACTERISTICS

| | Per Channel Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Set Point Accuracy | | | 1 † | % $V_{out}$ |
| Load Regulation | | 10 | 30 | mV |
| Line Regulation | | 5 | 25 | mV |
| Ripple P-P (10 MHz) [fig. IV]* | | 50 | 150 | mV |
| Trim Range | 100 | | 110 | % $V_{out}$ |
| Remote Sense Compensation | | 0.5 | | Vdc |
| Overvoltage Protection (2V, 3.3V) | | 140 | | % $V_{out}$ |
| Overvoltage Protection (5V-15V) | | 130 | | % $V_{out}$ |
| Current Sharing | | ±10 | | % $I_{out}$ |
| Transient Response (Vout 1%) Time/Overshoot [fig.V & VI]* | | | | |
| 20-80% Load | | 300/250 | | µS/mV |
| Low Line - High Line | | 250/200 | | µS/mV |
| 50-100% Load | | 250/200 | | µS/mV |
| Temperature Drift | | 0.01 | 0.05 | %/°C |
| Long Term Drift | | 0.01 | 0.02 | %/1KHrs |
| Current Limit | 105 | 125 | 150 | % $I_{out}$ |
| Short Circuit Current | 20 | | 75 | % $I_{out}$ |
| Turn On Time [fig. XI]* | | 3 | | mS |
| Logic Turn On Time [fig. IX]* | | 3 | | mS |

† 1% or 50mV, whichever is greater

* figures on page 10

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*High Density*
*DC to DC Converters*

Industrial & Military Grades

## TEMPERATURE CHARACTERISTICS

| | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Operating | -55 | | +100 | °C |
| Storage (Ambient) | -55 | | +125 | °C |
| Over Temperature Shutdown | | +105 | | °C |
| Thermal Resistance Case - Ambient | | 9 | | °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.

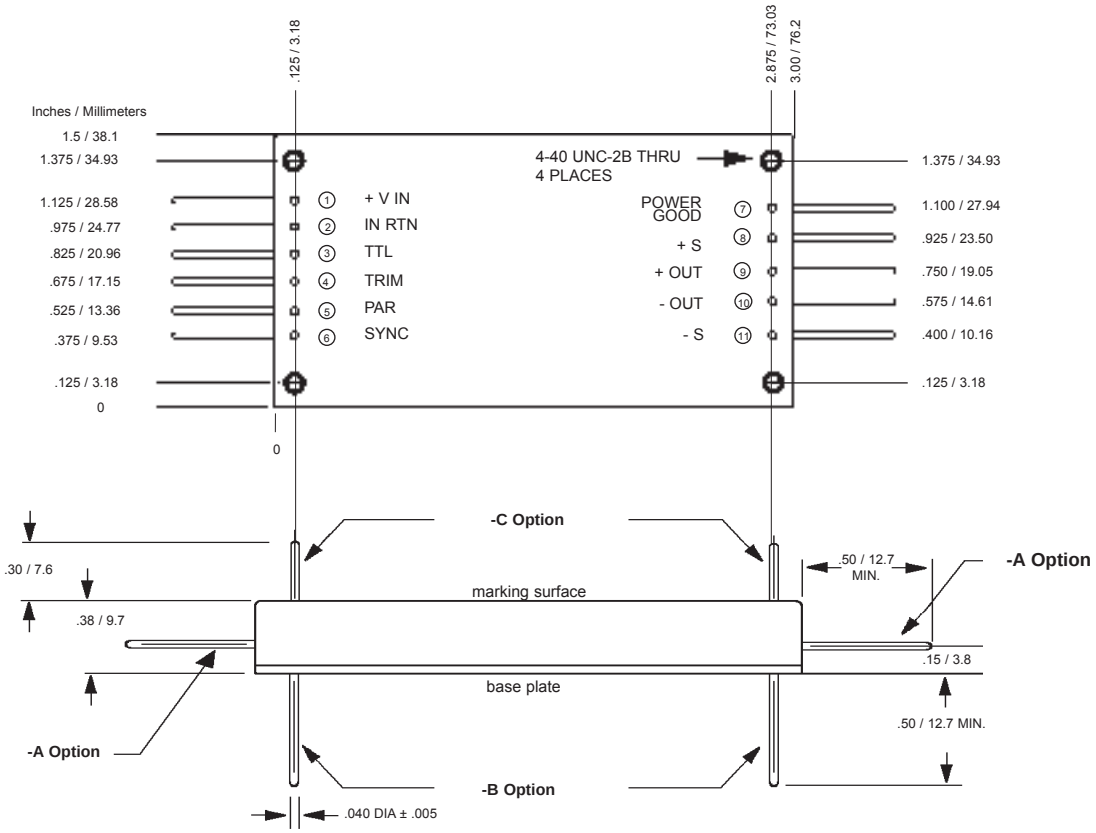
## ISOLATION CHARACTERISTICS

| | Min. | Typ. | Units |
|---|---|---|---|
| Isolation: | | | |
| Input to Output | 250 | | Vdc |
| Output to Base | 100 | | Vdc |
| Input to Base | 100 | | Vdc |
| Input to Output Capacitance | | 0.022 | µf |
| Insulation Resistance (@50 Vdc) | 50 | | MOhm |

## MECHANICAL CHARACTERISTICS

| | | |
|---|---|---|
| Weight | 3.2<br>90 | oz.<br>grams |
| Size | 3.0 x 1.5 x 0.38<br>76.2 x 38.1 x 9.7 | inch<br>mm |
| Volume | 1.71<br>28 | $inch^3$<br>$cm^3$ |
| Material | Pin<br>Baseplate<br>Case | Brass (Solder Plating)<br>Aluminum 5052-H32<br>28 Gauge Steel (cold rolled) |
| Finish | | Nickel Plating |
| Mounting | Standard<br>I Option<br>D Option | 4-40 inserts provided in baseplate<br>M2.5 metric inserts (4 places)<br>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

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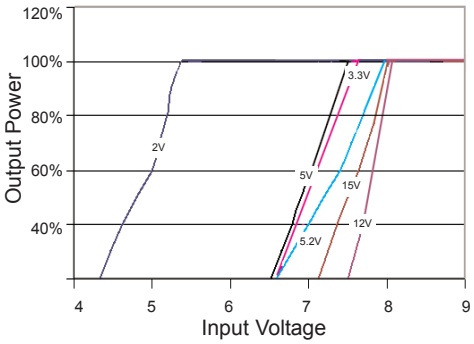
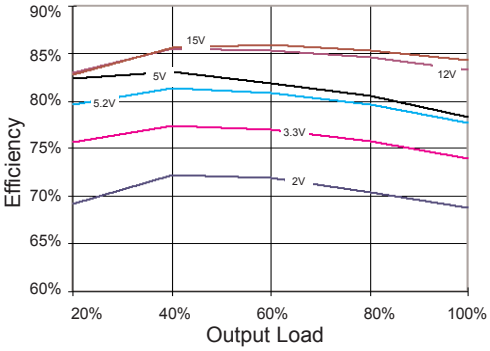
# PERFORMANCE CHARACTERISTICS
## *NL50S NL100 NL150*

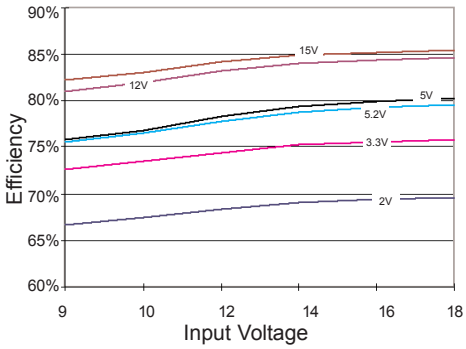
I. Input Voltage vs. Output Power



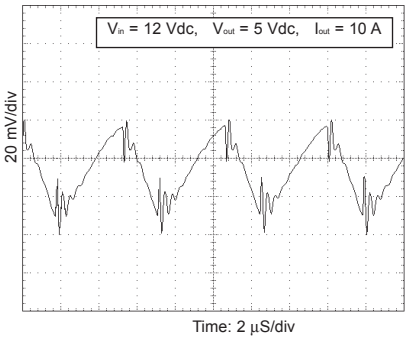

II. Efficiency vs. Output Power



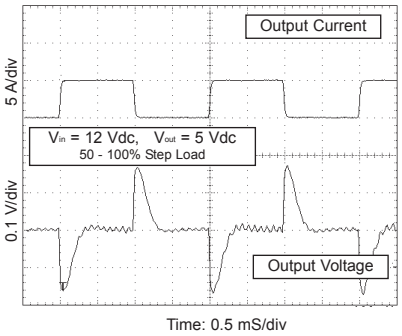

III. Efficiency vs. Input Voltage



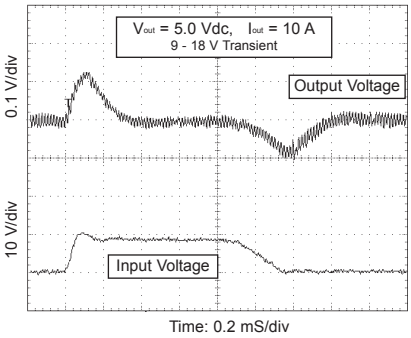

IV. Output Voltage Ripple



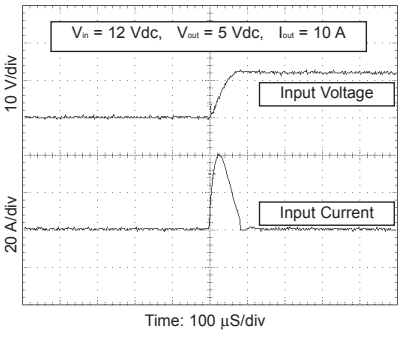

V. Load Transient Response



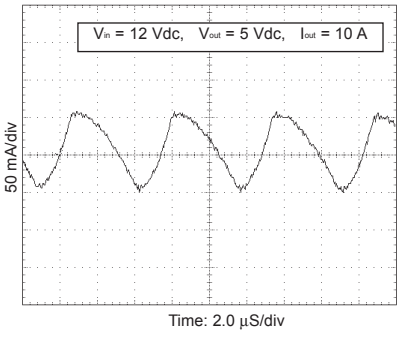

VI. Input Transient Response



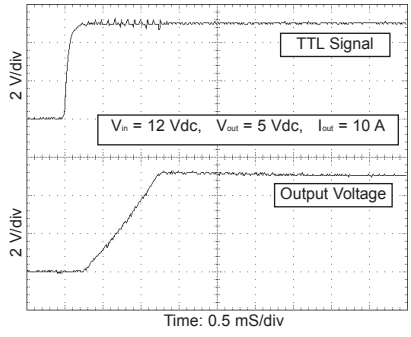

VII. Input Inrush Current



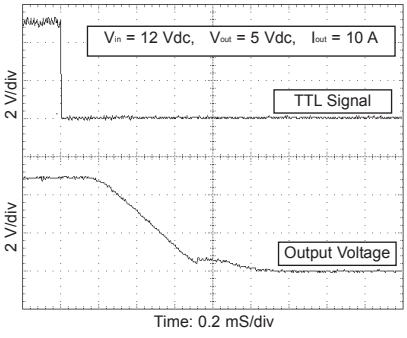

VIII. Input Current Ripple



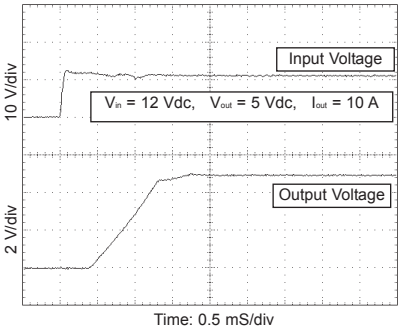

IX. TTL Turn On



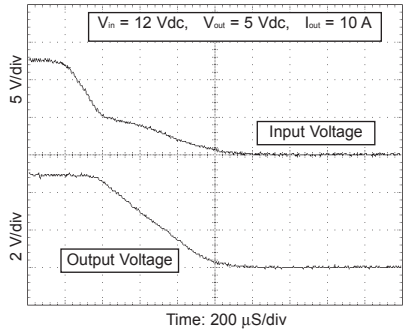

X. TTL Turn-off




XI. Turn-on




XII. Turn-off / Hold-up Time

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# NLF50

## EMI Filter


- **MIL-STD-461D Compliance CE101 and CE102**
- **Less than 1.0 volt drop across the NLF50**
- **Does Not Require External Components**
- **Meets Environmental Requirements of MIL-STD-810E and MIL-STD-901C**
- **For Use With NL50 Series DC/DC Converters**

### *How to Order:*

**NLF 50 - A - D**

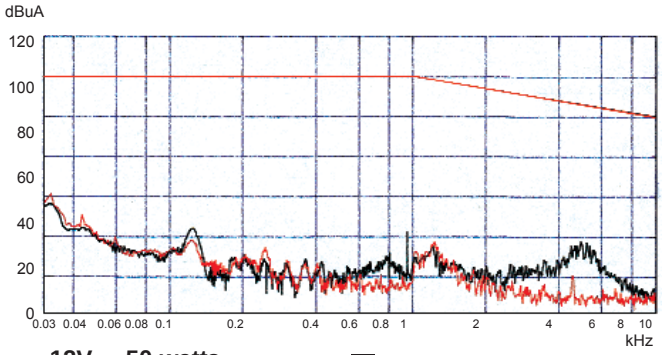
- Series
- Total Output Power

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

### SPECIFICATIONS

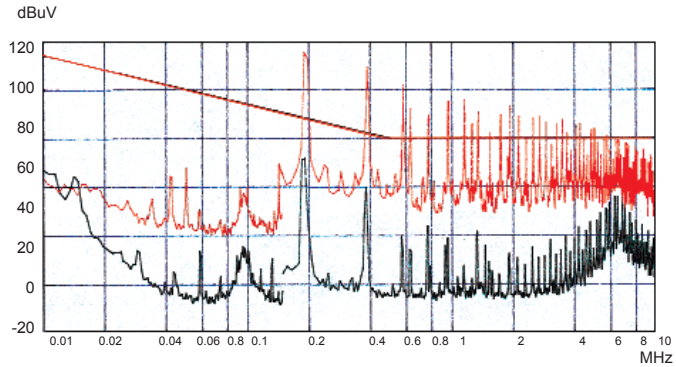
| | | |
|---|---|---|
| Input Voltage (maximum) | 24 | Vdc |
| Rated Output Current | 8 | A |
| Isolation (Input/Output to Case) | 100 | Vdc |
| Operating Temperature | -55 + 100 | ºC |
| Storage Temperature | -55 + 125 | ºC |
| Insulation Resistance (measured at 50Vdc) | 50 | M Ohm |
| Weight | 1.9 | oz. |
| | 54 | grams |
| Size | 1.75 x 1.5 x 0.38 | inch |
| | 44.5 x 38.1 x 9.7 | mm |
| Volume | 1.00 | $inch^3$ |
| | 16.5 | $cm^3$ |
| Material — Pin | Brass (Solder Plating) | |
| Material — Baseplate | Aluminum 5052-H32 | |
| Material — Case | 28 Gauge Steel (cold rolled) | |
| Finish | Nickel Plating | |
| Mounting — Standard | 4-40 inserts provided in baseplate | |
| Mounting — I Option | M2.5 metric inserts (4 places) | |
| Mounting — D Option | 0.115 DIA thru holes (4 places) | |

### EMI COMPARISON GRAPHS




**12Vin - 50 watts**
**MIL-STD-461D, CE101-4**

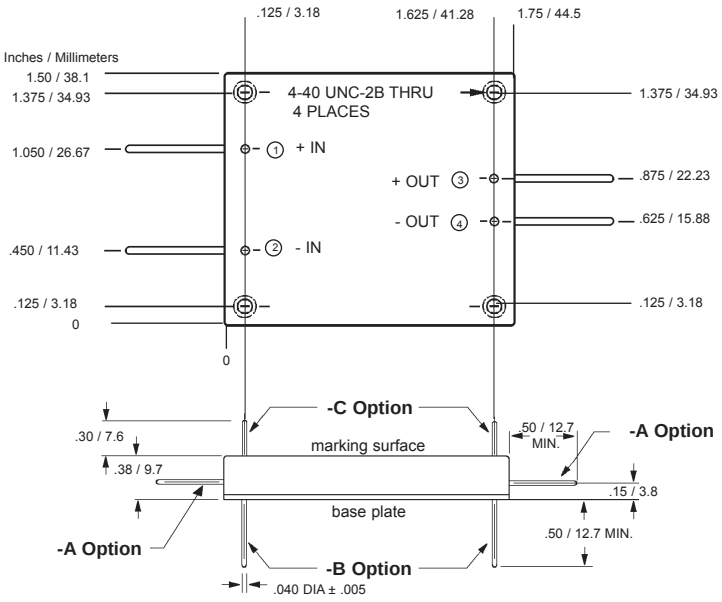
■ With NLF50
■ Without NLF50




**12Vin - 50 watts**
**MIL-STD-461D, CE102**

■ With NLF50
■ Without NLF50

### CASE DRAWING




| Tolerances: | | | |
|---|---|---|---|
| inches | - | x.xx | = ±0.03 |
| | | x.xxx | = ±0.015 |
| mm | - | x.x | = ±0.8 |
| | | x.xx | = ±0.40 |

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