



4000 HN series

Triple Output DC/DC Converter



DESCRIPTIONS

The 4000HN, triple output power modules are 40 watt DC/DC converters available in a triple output configuration providing both digital and analog outputs in a compact, industry standard 2" X 2" X 0.5" package. These 400kHz, switching converters are available in 12, 24 and 48 VDC inputs making them one of the most versatile product lines in the market with efficiencies up to 86%. Advanced surface mount construction allows these converters to achieve outstanding thermal performance eliminating the need for thermal potting compounds and thereby enhancing manufacturing efficiency to reduce costs.

OUTPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Output Voltage Set Point				
Main		±1		%; Factory set
Auxiliary		±5		%; Factory set
Total Band Error				
Main	-2		+2	% measured at min. min. line FL and, max. line min. load
Auxiliary	-7		+7	% measured at min. min. line FL and, max. line min. load
Ripple/Noise				
Main		1%		P-P measured at 20 MHz bandwidth
Auxiliary		1%		P-P measured at 20 MHz bandwidth
Output Voltage and Current				Refer to model selection chart
Load Transient Response		2		% deviation of Vout within 500 μS
Short Circuit Protection				Continuous
Overvoltage Protection		135		%; Clamp type

FEATURES

- Up to 86% Efficiency
- Triple Output, 40 watt converter
- Available in 12, 24 and 48 VDC Inputs
- Industry Standard 2" X 2" X 0.5" Package
- Over Voltage, Over Temperature and Short Circuit Protection

INPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Input Voltage				
12 VDC Input Models	9	12	18	VDC
24 VDC Input Models	18	24	36	VDC
48 VDC Input Models	36	48	75	VDC
Under Voltage Shut Down				
12 VDC Input Models		8		VDC
24 VDC Input Models		16		VDC
48 VDC Input Models		30		VDC
Over Voltage Shutdown				
12 VDC Input Models			25	VDC
24 VDC Input Models			45	VDC
48 VDC Input Models			80	VDC
Minimum Input Current				
12 VDC Input Models	660			mA
24 VDC Input Models	330			mA
48 VDC Input Models	185			mA
Full Load Input Current				
12 VDC Input Models			3541	mA
24 VDC Input Models			2008	mA
48 VDC Input Models			992	mA
Input Fuse Requirements				
12 VDC Input Models			10	Amps; Slow blow type
24 VDC Input Models			7	Amps; Slow blow type
48 VDC Input Models			4	Amps; Slow blow type
Efficiency by Model				
4005/12T12HN		80		%; FL Nominal Line
4005/15T12HN		81		%; FL Nominal Line
4005/12T24HN		83		%; FL Nominal Line
4005/15T24HN		84		%; FL Nominal Line
4005/12T48HN		85		%; FL Nominal Line
4005/15T48HN		86		%; FL Nominal Line
Switching Frequency	360	400	440	kHz; Factory set
Remote Shut Down				
Off		0	0.80	VDC;Referenced to input
On		3.5		VDC;Referenced to input
Input - Output Capacitance		2000		pF
Isolation Voltage				
12VDC & 24VDC Input Models				
Input to Output		750		VDC
Input to Baseplate		750		VDC
Output to Baseplate		750		VDC
48 VDC Input Models				
Input to Output		1100		VDC
Input to Baseplate		1100		VDC
Output to Baseplate		750		VDC
Isolation Resistance				MOHms



MODEL SELECTION CHART

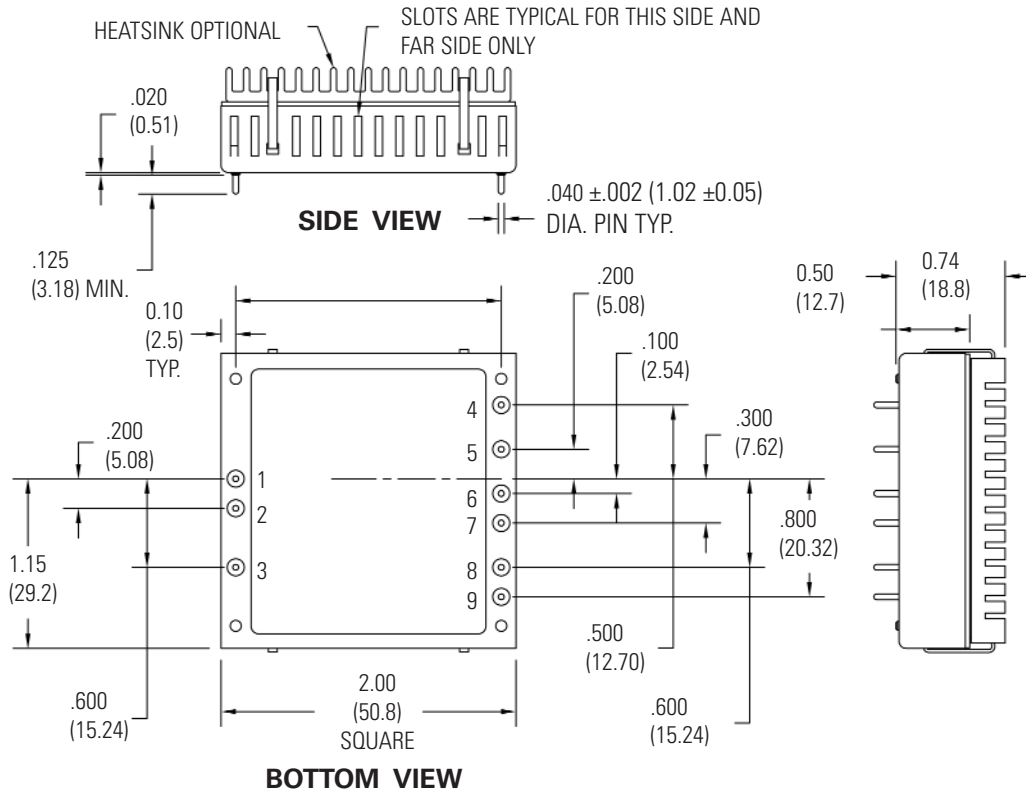
	Input Voltage (VDC)	Output Voltage (VDC)	Min. Output Current (mA)	Nominal Output Current (mA)	Max Output Current (mA)*
4005/12T12HN	12	5	500	5000	5000
		±12	±100	±210	±800
4005/15T12HN	12	5	500	5000	5000
		±15	±100	±170	±650
4005/12T24HN	24	5	600	5000	6000
		±12	±100	±650	±1000
4005/15T24HN	24	5	600	5000	6000
		±15	±100	±500	±800
4005/12T48HN	48	5	600	5000	6000
		±12	±100	±650	±1000
4005/15T48HN	48	5	600	5000	6000
		±15	±100	±500	±800

GENERAL CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Operating Temperature Range	-40		+105	° C
Storage Temperature Range	-55		+125	° C
Over Temperature Shutdown	+105	+115	+125	° C
Baseplate to Ambient Resistance		10		°C / watt
Weight			31	Grams
Size				2" X 2" X 0.5"
Case Material				Black coated aluminum
Agency Approvals				UL/CUL1950

* Total output power may not exceed 40 watts for 24 and 48 VDC input models, 30 watts for 12 VDC input models. All modules are primary side current limited.

OUTLINE DRAWING



PIN OUT CHART

Pins	FUNCTION
1	+ V INPUT
2	- V INPUT
3	CONTROL
4	V2
5	COMMON V2,3
6	V3
7	+V1
8	COMMON V1
9	TRIM

Notes:

1. Unless otherwise specified dimensions are in inches (mm).
2. Controlling dimension in inch.
3. Tolerances

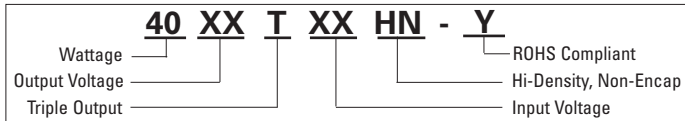
Inches	mm
X.XX = ±0.02	X.X = ±0.5
X.XXX = ±0.010	X.XX = ±0.25

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified. External, low ESR, 10 microfarad (minimum) capacitor across input is recommended for operation.



How To ORDER

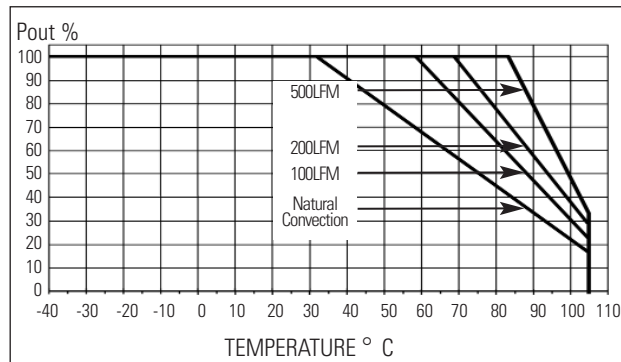
HOW TO ORDER



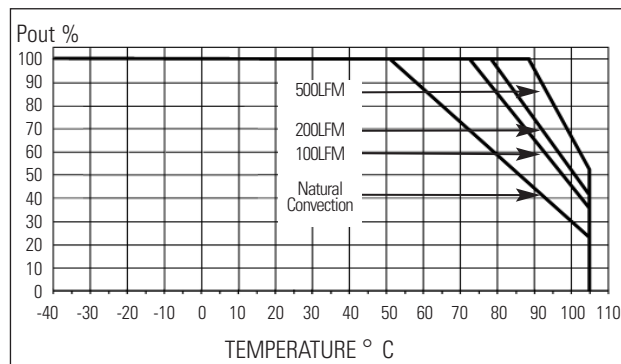
H Options: To add external heatsink mounted on the baseplate of the converter please add a “- H” at the end of the part number. Heatsink is provided to improve thermal performance (see derating curves).

DERATING CURVES

MODEL 4000HN Triple (Without heatsink)



MODEL 4000HN-H Triple (With heatsink)





OUTPUT VOLTAGE ADJUSTMENT (4000HN TRIPLE SERIES)

The converter's output voltage may be trimmed to $\pm 10\%$ of the nominal output voltage.

TRIM UP

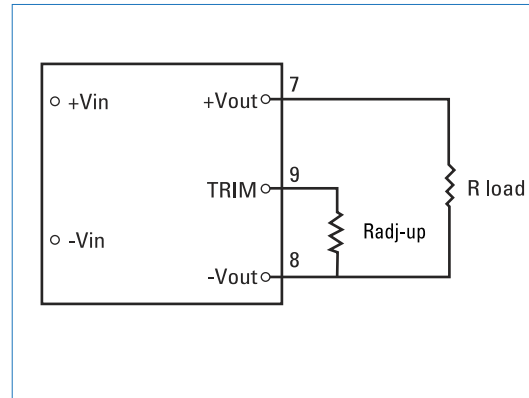
Trim output (all 3) voltage up by connecting an external resistor between Pins 8 and 9. Use the following equation.

$$\text{Radj-up} = \frac{1.245}{\Delta \%} - 10 \text{ (k}\Omega\text{)}$$

Example:

If we want to trim 5% up, $\Delta \% = 0.05$

$$\text{Radj-up} = \frac{1.245}{0.05} - 10 = 14.9 \text{ k}\Omega$$



TRIM DOWN

Trim output (all 3) voltage down by connecting an external resistor between Pins 7 and 9. Use the following equation.

$$\text{Radj-down} = \frac{1.245}{\Delta \%} - 10 \text{ (k}\Omega\text{)}$$

Example:

If we want to trim 3% down, $\Delta \% = 0.03$

$$\text{Radj-down} = \frac{1.245}{0.03} - 10 = 31.5 \text{ k}\Omega$$

