

**FEATURES :**

- 60W DIL Package
- 4:1 Wide Input Voltage Range
- High Efficiency Up to 92%
- Regulated Output Types
- No Minimum Load Required
- Over Power and Short Circuit Protection
- Over Temperature Protection
- Operating Temperature: -40°C to +76°C
- UL/cUL/IEC/EN 62368-1 approved, CB-Report, CE Marking
- EMC standard of EMI EN55032:2015 approved
- EMC standard of EMS EN55035:2017 approved
- EMC standard of Canadian ICES-003 issue7(2020) approved
- EMC standard of 47CFR FCC Part 15 subpart B approved



DC-DC Converter

**YNB60 SERIES**

60Watt

1600Vdc Isolated

4 : 1 Input Voltage Range

Single Output

2" X 1" Size

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

**Selection Guide**

Part Number	Input Voltage Range	Input Current (typ)		Output Voltage	Output Current	Efficiency	Maximum capacitor Load
		No-Load	Full Load				
	Vdc	mA	mA	Vdc	mA (typ)	% (typ)	μF
YNB60-24S05	9-36	15	2747	5	12000	91	20400
YNB60-24S12	9-36	15	2717	12	5000	92	3600
YNB60-24S15	9-36	15	2717	15	4000	92	2400
YNB60-24S24	9-36	15	2747	24	2500	91	900
YNB60-48S05	18-75	10	1374	5	12000	91	20400
YNB60-48S12	18-75	10	1359	12	5000	92	3600
YNB60-48S15	18-75	10	1359	15	4000	92	2400
YNB60-48S24	18-75	10	1374	24	2500	91	900



**Part Number**

YNB    60    -    24    S    05    HS  
 \_\_\_\_\_  
 A        B        C        D        E        F

- A: Series
- B: Output Power
- C: Input Voltage
- D: Single Output
- E: Output Voltage
- F: Heatsink (Option)



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## Input Specifications

Parameters	Conditions	Min	Typ	Max	Units	
Input Voltage	24V Models	9		36	Vdc	
	48V Models	18		75	Vdc	
Input Surge Voltage (100 ms max.)	24V Models	-0.7		50		
	48V Models	-0.7		100		
Start-up Voltage	24V Models			9	Vdc	
	48V Models			18	Vdc	
Under Voltage Shutdown	24V Models		7.5		Vdc	
	48V Models		16		Vdc	
Start-up Time	Constant Resistive Load, Nominal Vin	Power-up	30		ms	
		Remote ON/OFF	30		ms	
Input Filter	All Models		Internal Pi type			
Remote ON/OFF (Ctrl PIN Refer To -Vin PIN)	Positive Logic	DC/DC ON	Open or 3.5 Vdc – 12 Vdc			
		DC/DC OFF	Short or 0 Vdc – 1.2 Vdc			
	Input Current of Ctrl PIN		-0.5		0.5	mA
	Remote Off Input Current			3		mA

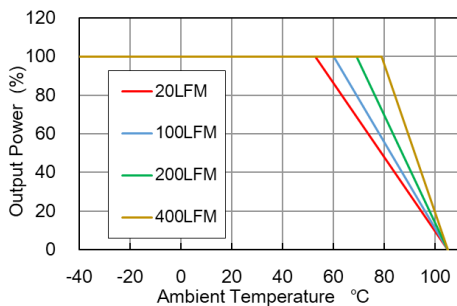
## Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% Load	-2		+2	%
Line Regulation	Vin(min) to Vin(max) @100% Load	-0.2		+0.2	%
Load Regulation	0% Load to 100% Load	-0.5		+0.5	%
Ripple & Noise (BW=20MHz)	With an 1uF MLCC and a 10uF tantalum Capacitor	5Vout		100	mVp-p
		12Vout		150	mVp-p
		15Vout		150	mVp-p
		24Vout		150	mVp-p
Transient Response Setting Time	25% Load Step Change		350	500	us
Transient Response Deviation	25% Load Step Change	-5	±3	+5	%
Temperature Coefficient		-0.02		+0.02	%/°C
Voltage Adjustability	% of Vout	-10		+10	%
Output Power Protection	% of Io, Hiccup mode, Auto-recovery	120	150	180	%
Short Circuit Protection	Continuous [Hiccup Mode], Auto-Recovery				
Over Voltage Protection	5Vout		6.2		Vdc
	12Vout		15		Vdc
	15Vout		18		Vdc
	24Vout		30		Vdc

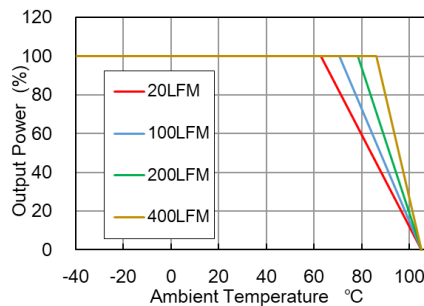
General Specifications

Parameters	Conditions	Min	Typ	Max	Units		
Isolation Voltage	Input To Output (60 sec.)	1600			Vdc		
	Input (Output) To Case (60 sec.)	1000			Vdc		
Isolation Resistance	500Vdc	1000			MΩ		
Isolation Capacitance	100kHz, 1V			2200	pF		
Switching Frequency	Full Load, Nominal Input		280		KHz		
Operating Ambient Temperature (Power Derating See Derating Graph)	Nominal Vin, 100% Load	YNB60-24S05, YNB60-24S24 YNB60-48S05, YNB60-48S24	-40		45.7	°C	
		YNB60-24S12, YNB60-24S15 YNB60-48S12, YNB60-48S15			52.8		
	Nominal Vin, 100% Load (With HS Heatsink)	YNB60-24S05HS, YNB60-24S24HS YNB60-48S05HS, YNB60-48S24HS	-40			56.9	°C
		YNB60-24S12HS, YNB60-24S15HS YNB60-48S12HS, YNB60-48S15HS				62.7	
	Nominal Vin, 100% Load (With HS1 Heatsink)	YNB60-24S05HS1, YNB60-24S24HS1 YNB60-48S05HS1, YNB60-48S24HS1	-40			68.2	°C
		YNB60-24S12HS1, YNB60-24S15HS1 YNB60-48S12HS1, YNB60-48S15HS1				72.7	
Maximum Case Temperature				105	°C		
Over Temperature Protection	Case temperature		115		°C		
Storage Temperature		-55		125	°C		
Humidity	Non-Condensing	5		95	%		
Cooling			Natural Convection				
Case Material			Copper				
Potting Material			Silicone (UL94-V0)				
MTBF	MIL-HDBK-217F@25°C (calculated)		2.59X10 <sup>5</sup>		Hours		
Weight			48		g		
Dimensions			50.8 x 25.4 x 11.6		mm		

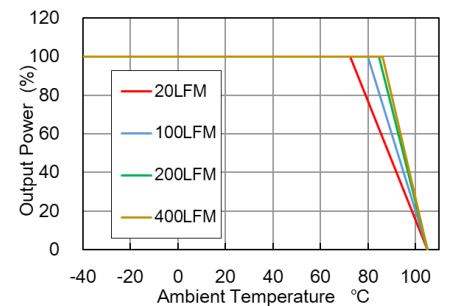
Temperature Derating Graph



YNB60-24S15

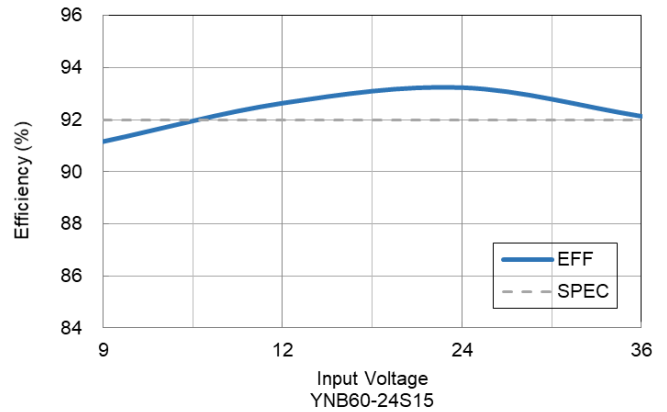
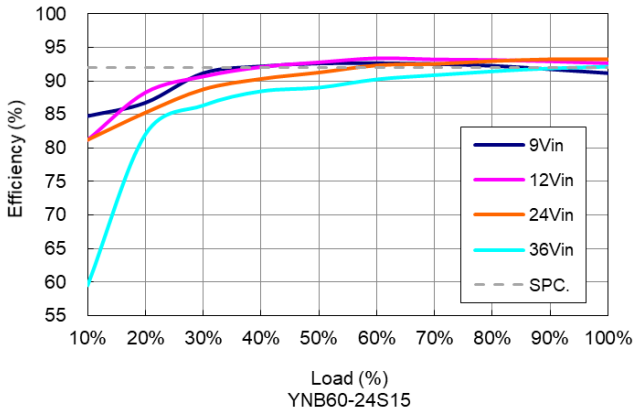


YNB60-24S15HS

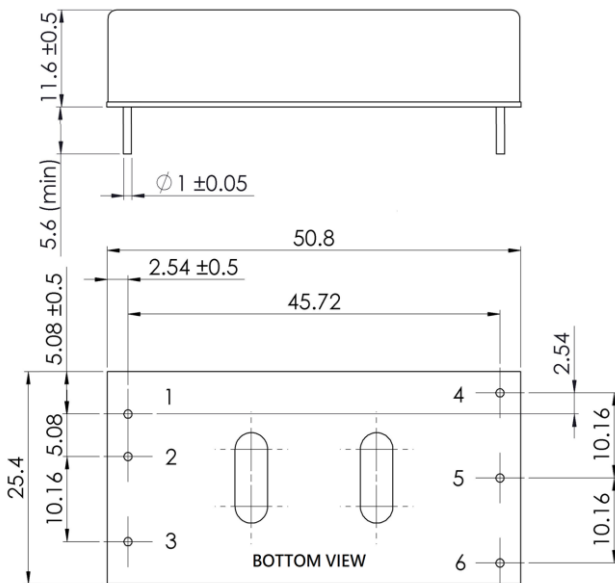


YNB60-24S15HS1

Characteristic Curve

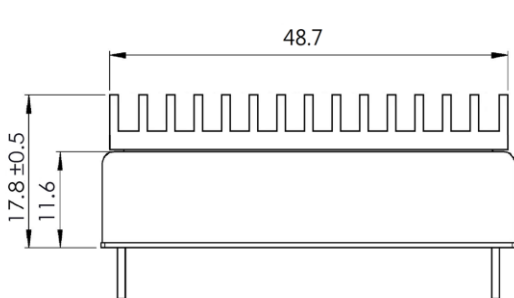


Dimensions

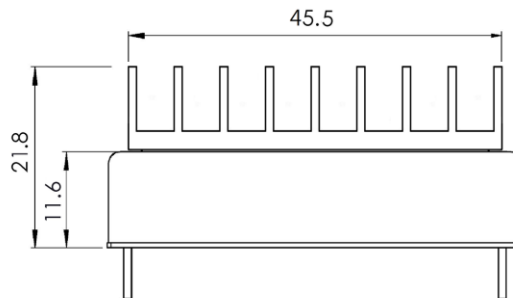


PIN Assignment

Pin	Define	Diameter
1	+Vin	1.0mm[0.04"]
2	-Vin	1.0mm[0.04"]
3	Ctrl	1.0mm[0.04"]
4	+Vout	1.0mm[0.04"]
5	-Vout	1.0mm[0.04"]
6	Trim	1.0mm[0.04"]



YNB60-XXSXXHS

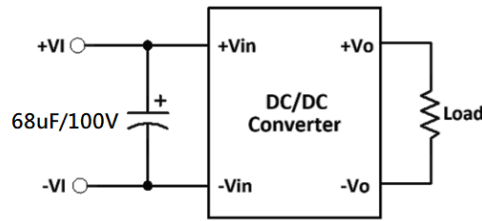


YNB60-XXSXXHS1

Unit: mm Tolerance: XX.X ±0.5; XX.XX ±0.25



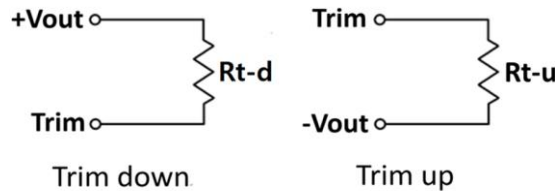
Application Examples



It is necessary to parallel a capacitor across the input pins under normal operation.  
Minimum Capacitance: 68μF/100V.

External Output Trimming

Output can be externally trimmed by using the method, shown as below.



YNB60-□□S05

Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	138.88KΩ	62.41KΩ	36.92KΩ	24.18KΩ	16.53KΩ	11.44KΩ	7.79KΩ	5.06KΩ	2.94KΩ	1.24KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	106.87KΩ	47.76KΩ	28.06KΩ	18.21KΩ	12.30KΩ	8.36KΩ	5.55KΩ	3.44KΩ	1.79KΩ	0.48KΩ

YNB60-□□S12

Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	280.90KΩ	125.65KΩ	73.90KΩ	48.02KΩ	32.50KΩ	22.15KΩ	14.76KΩ	9.21KΩ	4.90KΩ	1.45KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	225.50KΩ	100.75KΩ	59.17KΩ	38.38KΩ	25.90KΩ	17.58KΩ	11.64KΩ	7.19KΩ	3.72KΩ	0.95KΩ

YNB60-□□S15

Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	499.18KΩ	223.09KΩ	131.06KΩ	85.05KΩ	57.44KΩ	39.03KΩ	25.88KΩ	16.02KΩ	8.35KΩ	2.22KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	404.82KΩ	180.91KΩ	106.27KΩ	68.95KΩ	46.56KΩ	31.64KΩ	20.97KΩ	12.98KΩ	6.76KΩ	1.78KΩ

YNB60-□□S24

Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	598.97KΩ	267.93KΩ	157.59KΩ	102.42KΩ	69.31KΩ	47.24KΩ	31.48KΩ	19.66KΩ	10.46KΩ	3.11KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	486.83KΩ	217.87KΩ	128.21KΩ	83.38KΩ	56.49KΩ	38.56KΩ	25.75KΩ	16.14KΩ	8.67KΩ	2.69KΩ

## Recommended Boardpads

The best overall performance is achieved by using the recommended PCB layout, as shown in the figure below.

