Efficiency >91% | 121W/in³ | INPUT 2:1/4:1 | Remote ON OFF | Full Metal Package

Molded Package | Open Frame Package | OVP | OTP | OCP

6.4Mhrs MTBF

Pb | RoHS 2002/95/EC

The N16 series power module provides 50W maximum outputs with industry standard sixteenth brick pin assignment. The efficient SR stage is combined with patented "Coupled-inductor SR" topology that would reduce power loss to achieve 90W/in³ power density. The multi-layer single side circuit board design plus the fully metal-enclosed package would enhance the thermal performance and improve its reliability. The module is designed for Telecom, Servers, Networking equipments and other industry applications that use a 24V or 48V input bus.

PART NUMBER SYSTEM (Total height = standoff height + module thickness)

Preliminary Data Sheet

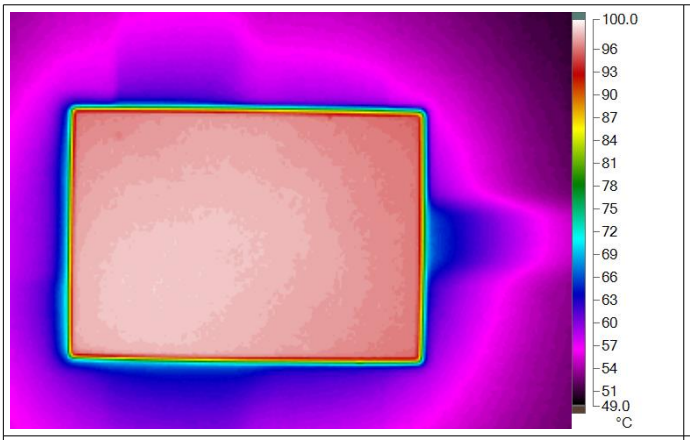
N16	48	120	a	b	c	d	-	XX	XX	X
Series Name	Rated Input	Rated Output	Enable Logic	Pin Length	Standoff Height	Base-Plate / module thickness		Setting	Suffix	Version
N16	**18**=9V~36V **24**=18V~36V **36**=18V~75V **48**=36V~75V	**Unit:** 0.1V Increments 120= 12V 033= 3.3V	**P:** Positive **N:** Negative	**-:** SMD **0:** 0.12" **1:** 0.16" **2:** 0.20" **3:** 0.24"	**-:** SMD **0:** 0.02" **1:** 0.08" **2:** 0.16"	**N:** Open Frame / 0.36" **E:** Metal Enclosed / 0.40" **M:** Molding / 0.40"	-	For customer function only	For marketing purpose only	

MODEL LIST (Contact to factory for 4X input models or special specifications)

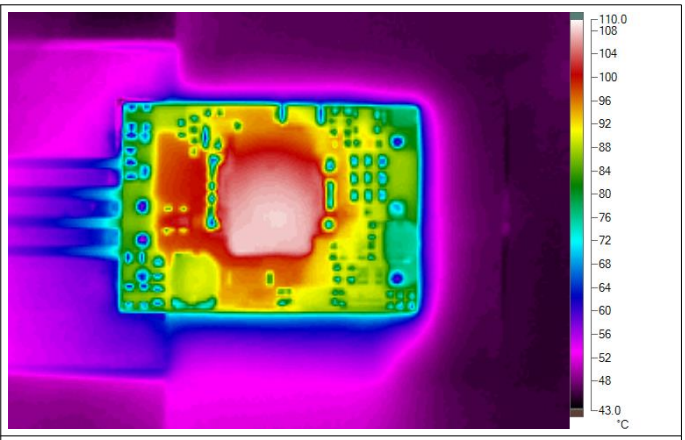
Part Number *	Maximum Input		Maximum Output		Efficiency
N1624120abcd-XXXXX	18V~36V	57W	12.0V/4.2A	50W	90%
N1624050abcd-XXXXX	18V~36V	59W	5.0V/10A	50W	89%
N1624033abcd-XXXXX	18V~36V	47W	3.3V/12A	40W	87%
N1624025abcd-XXXXX	18V~36V	37W	2.5V/12A	30W	85%

Part Number *	Maximum Input		Maximum Output		Efficiency
N1648120abcd-XXXXX	36V~75V	57W	12.0V/4.2A	50W	91%
N1648050abcd-XXXXX	36V~75V	59W	5.0V/10A	50W	90%
N1648033abcd-XXXXX	36V~75V	47W	3.3V/12A	40W	88%
N1648025abcd-XXXXX	36V~75V	37W	2.5V/12A	30W	86%

REFERENCED THERMAL IMAGES



N1648120P20E-04 (Io= 4A@50˚C/20LFM)



N1636120N10N-04 (Io= 3.1A@50˚C/100LFM)

SPECIFICATIONS

Absolute Maximum Ratings

Temperature	Operation Storage	-40°C to +110°C -55°C to +125°C
Input Voltage Range	Operation: 18V/24V Models 36V/48V Models Transient (100mS): 18V/24V Models 36V/48V Models	 -0.5V to +40Vdc -0.5V to +80Vdc 50V Maximum 100V Maximum
Isolation Voltage	Input to Output Input to Case Output to Case	2.0KV Minimum 1.0KV Minimum 1.0KV Minimum
Remote Control		-0.5V to +12Vdc

General Parameters

Conversion Efficiency	Typical	See table
Switching Frequency	Typical	450KHz
MTBF	Bellcore TR-332 issue 6	6.40×10^6 hrs @GB/25°C (N1648050abcd-10XXX)
OTP	T_{AVG} or T_C	110°C ±5°C for standard setting
Weight	Packaging related	8~26g

Control Functions

Remote Control	Logic High Logic Low	+3.0V to +6.5V 0V to +1.0V
Input Current of Remote Control Pin		-0.5mA ~ +1.5mA

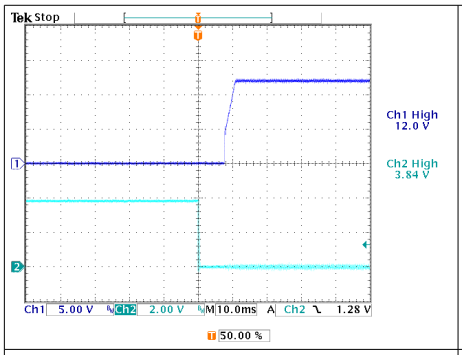
Input

Operation Voltage Range	18V(24V) Models 36V(48V) Models	+9V(+18V) to +36Vdc +18V(+36V) to +75Vdc
Reflected Ripple Current	L_{EXT} = 10uH	20mA rms/60mAp-p
Power ON Voltage Ranges	18V Models 24V/36V Models 48V Models	+8.5V to + 9.0Vdc +17.0V to +18.0Vdc +34.0V to +36.0Vdc
Power OFF Voltage Ranges	18V Models 24V/36V Models 48V Models	+7.8V to 8.3Vdc +15.6V to +16.6Vdc +31.2V to +33.2Vdc
Off State Input Current	V_{NOM}	6mA Max
Latch-State Input Current	V_{NOM}	8mA Max
Input Capacitance	18V/24V Models 36V/48V Models	20.0uF Max 14.0uF Max

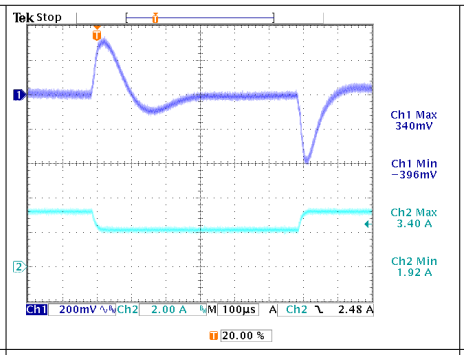
Output

Voltage Accuracy	Typical	±1.0%
Line Regulation	Full Input Range	±0.2%
Load Regulation	0%~100%	±0.2%
Temperature Drift	-40°C ~100°C	±0.03%/°C
Output Tolerance Band	All Conditions	±4%
Ripple & Noise (20MHz)	Peak-Peak (RMS)	3% (1%) V_O
Over Voltage Protection	V_{NOM}, 10% Load	115~130 %V_O
Output Current Limits	V_{NOM}	108%~125%
Voltage Trim	V_{NOM}, 10% Load	±10%
Input Ripple Rejection (<1KHz)	V_{NOM}, Full Load	-50dB
Step Load (2.5A/μS)	50%~75% Load	±6%Vo/500μS
Start-Up Delay Time	V_{NOM}, Full Load	20mS/250mS

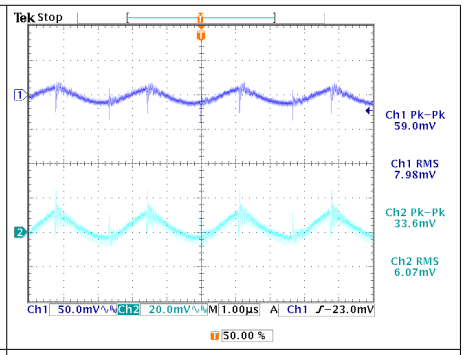
TYPICAL WAVES AND CURVES



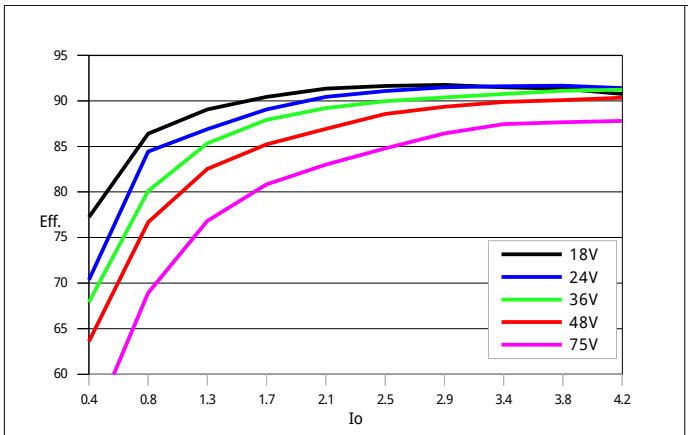
Start-up waveform of N1636120abcd-04
(V_{IN}: 36V, C_{OUT}= 0uF, Load: 4.2A)



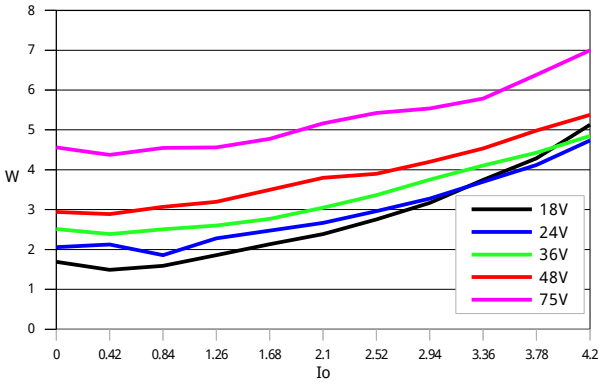
Transient response of N1636120abcd-04
(V_{IN}: 36V, C_{OUT}= 0uF, Load: 3.15A/2.1A@2.5A/µS)



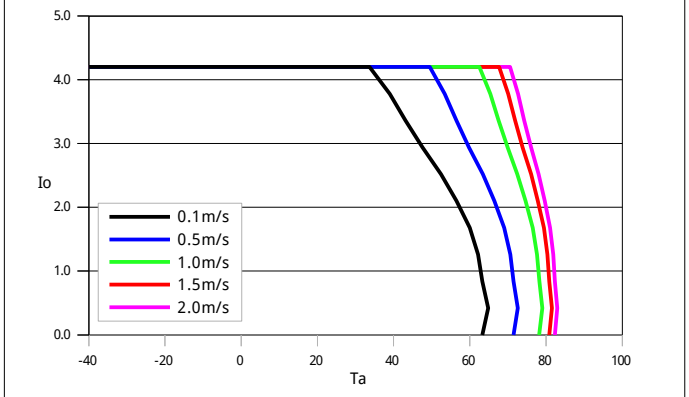
Input/Output ripples of N1636120abcd-04
(V_{IN}: 36V, C_{OUT}= 0uF, Load: 4.2A, L_{IN}=10uH)



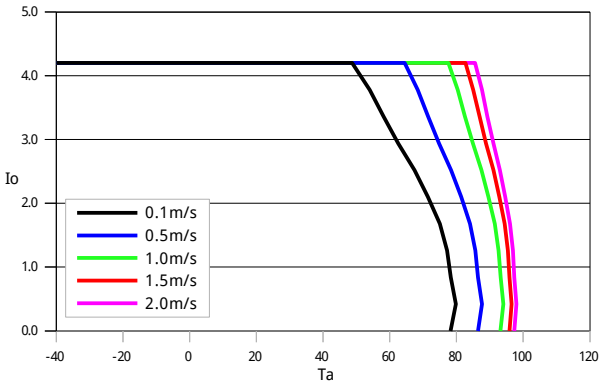
Efficiency plot of N1636120N10N-04



Power loss curves of N1636120N10N-04

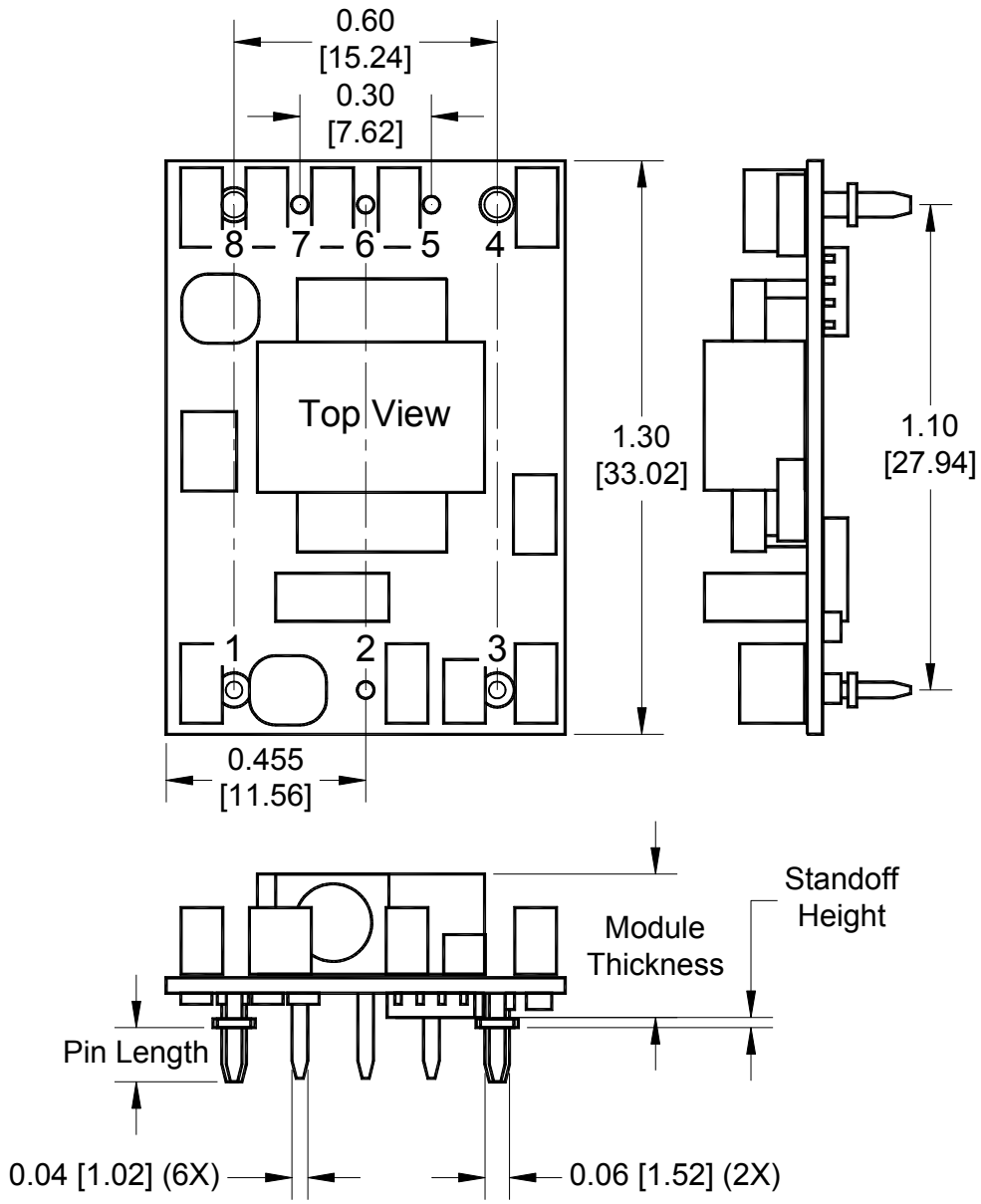


Calculated derating of N1636120N10N-04 (T_{OTP}= 90°C)



Calculated derating of N1636120N10N-04 (T_{OTP}= 110°C)

OPEN FRAME



Dimensions and Pin Connections

Designation	Function Description	Pin #
+IN	Positive input	**1**
PC	Remote control. To turn-on and turn-off output.	**2**
-IN	Negative input	**3**
-Vo	Negative output	**4**
-S	Negative remote sense	**5**
TRIM	Output voltage adjust	**6**
+S	Positive remote sense	**7**
+Vo	Positive output	**8**

Dimensions: inches (mm)

Tolerances: .xx±0.02 (.x±0.5)
.xxx±0.01 (.x±0.25)

Weight: 8g / Sixteenth Brick

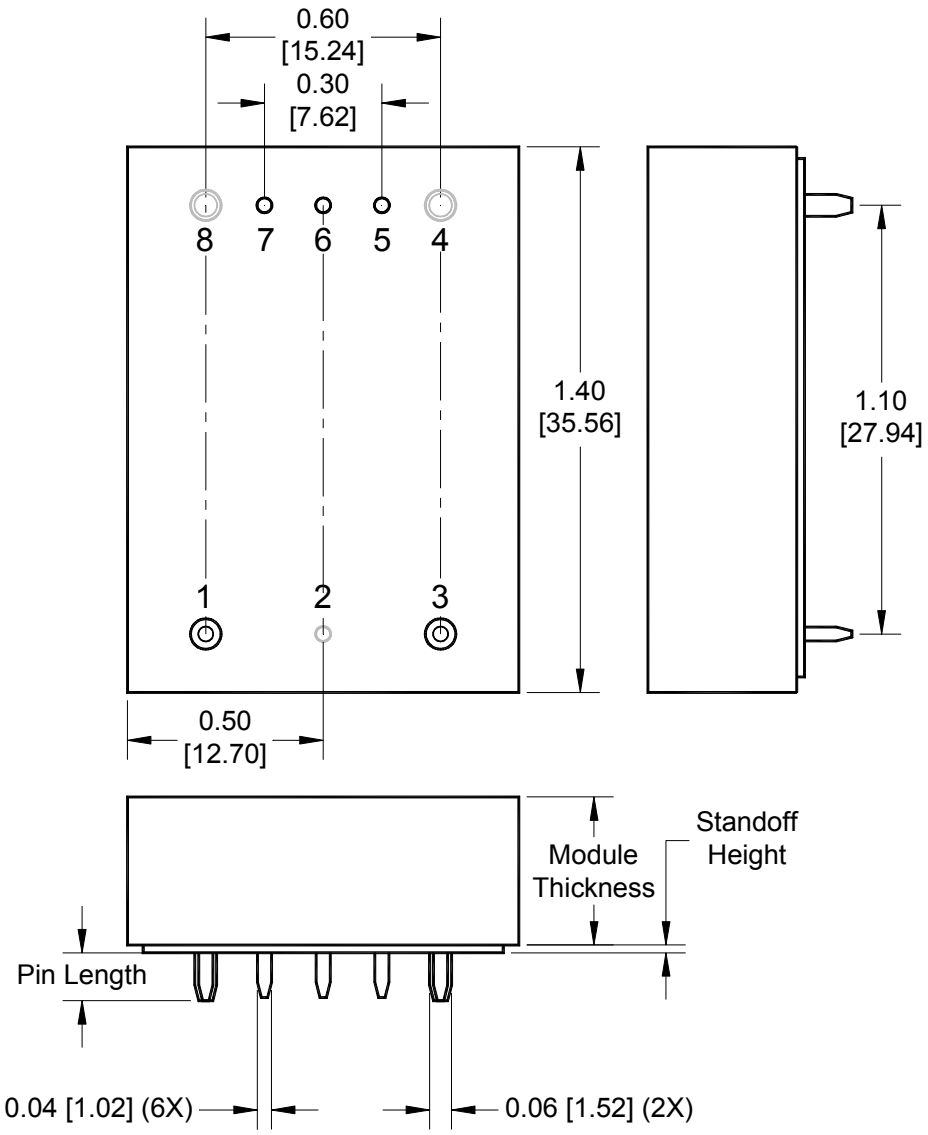
Base-plate: None

Maximum torque: NA

Pin material: Copper alloy or Brass

Pin plating: Golden over Nickel

METAL ENCLOSED



Dimensions and Pin Connections

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-IN	Negative input	**3**
-Vo	Negative output	**4**
-S	Negative remote sense	**5**
TRIM	Output voltage adjust	**6**
+S	Positive remote sense	**7**
+Vo	Positive output	**8**

Dimensions: inches (mm)

Tolerances: .xx±0.02 (.x±0.5)
.xxx±0.01 (.x±0.25)

Weight: 26g

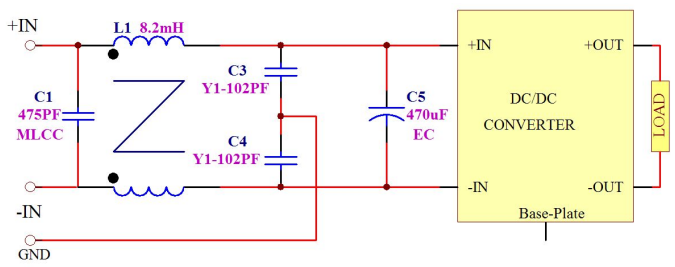
Base plate: None-conductive

Mounting inserts: None
Maximum torque: NA

Pin material: Copper alloy or Brass

Pin plating: Gold over Nickel

REFERENCED EMC CIRCUIT



Referenced input filter circuit

Referenced Input Filter Circuit

The circuit shown in left-hand side can be used as a design reference for customer system. The EMC performance of customer's system depends on the whole system design. It should be noted that modifications on the circuit parameters and fine adjustment of the final layout affect the final EMC performance. Since no components are ideal for infinite frequency range. The bandwidth of EMC components should be taking into consideration when designing an EMC filter circuit.

EXTERNAL OUTPUT CAPACITANCE

For reducing the ripple/noise voltage on the load or the peak voltage deviation caused by a step load, additional capacitor is required for decoupling the unwanted voltage components from the load. Since the step load performance is mainly dominated by the feedback loop performance, which also affected by the additional output capacitance. To put some low-bandwidth high capacitance Electrolytic capacitors very close to the power module help nothing and even introduces unwanted effects on the feedback performance, sinking or sourcing surge current damaging the power module. Glary suggest to put a low ESR capacitor with simply sufficient capacitance to handle the short duration high frequency component of ripple/noise or voltage peak deviation, and the capacitor needs to be as close as possible to the load. Do not add capacitor for no reason.

NOTE:

1. **It is recommended that the input should be protected by fuses or other protection devices.**
2. All specifications are typical at nominal input, full load and 25°C unless otherwise noted.
3. Specifications are subject to change without notice.
4. Printed or downloaded datasheets are not subject to Glary document control.
5. Product labels shown, including safety agency certificates, may vary based on the date of manufacture.
6. Information provided in this documentation is for ordering purposes only.
7. This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems or other such applications, which necessitate specific safety and regulatory standards other than the ones listed in this datasheet.

IMPORTANT

※ General specifications and the performances are related to standard series only, no special customer specification display here except requested items.

※ In order to secure effective usage of converter and the validity of Glary's service and warranty coverage, please refer to the application notes for general usage. For needs of usage beyond the application notes, please contact to Glary headquarter or our regional sales representative office for help.