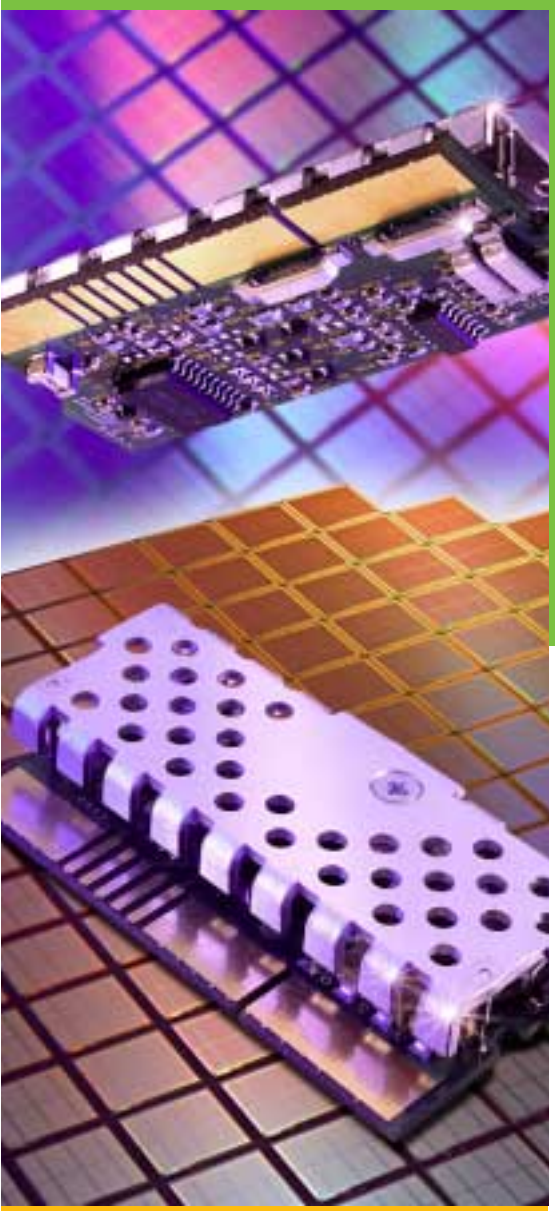
# NXA66 SERIES

## *Single output, selectable*



- Transient response from 0A to rated full load (up to 30A/µs), recovery within 100µsec
- Democratic current sharing, no need for master/slave configuration
- Programmable output voltage
- Remote enable pin
- Power good signal
- True double ended differential remote sense
- True output overvoltage protection with on-board fuse
- Overcurrent foldback, short circuit protection
- Overtemperature protection
- Edge tab mount via gold plated fingers for low interconnect voltage drop
- Small size 1.375 x 2.75 x 0.588 inches
- High power density, small footprint

**Patents pending**

[ 5 YEAR WARRANTY ]

CE (LVD)

The NXA66 non-isolated DC/DC converter is targeted at computing applications that require point of load power conversion. The NXA66 is designed to meet the precise voltage and fast transient requirements of today's high performance applications such as workstations, file servers, desktop computers, telecommunications equipment, adapter cards, DSP and data processing. Employing synchronous rectification and democratic current sharing, the NXA66 can be used in a stand-alone configuration, or paralleled as a building block to achieve higher output currents or redundancy. The current sharing specifications are met during static conditions and transient conditions. The advanced democratic current sharing technique employed by the NXA66 removes the need for cumbersome master/slave combinations.

The NXA66 uses gold plated edge tab fingers for a convenient, low impedance interconnect scheme. This also allows system designers to easily accommodate future expansion in their systems. The NXA66 has been mechanically designed to be compatible with integral latch retention mechanisms for improved shock and vibration performance in the application.

ARTESYN® TECHNOLOGIES

## Absolute Maximum Ratings

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - continuous | Vin (cont) | 0 | | 13.5 | Vdc | Vin(+) - Vin(-) |
| Input voltage - peak/surge or standard/level | Vin (peak) | 0 | | 13.5 | V | Peaks of any duration |
| Operating temperature | Ta | 0 | | +100 | ˚C | Ambient temperature. See derating curves on Page 7 |
| Storage temperature | Tstorage | -40 | | +100 | ˚C | |
| Airflow | V air | 200 | | | LFM | Either direction, along connector axis. See derating curves on Page 7 |

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - operating | Vin (oper) | 10.8 | 12 | 13.2 | Vdc | |
| Input current - no load | Iin | | 100 | | mAdc | |
| Input current - Quiescent | Iin (off) | | | 10 | mAdc | |
| Inrush current ($I^2T$) | Iinrush | | | 0.5 | $A^2s$ | |

## Turn On/Off

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - turn on | Vin (on) | | | 10.4 | Vdc | |
| Input voltage - turn off | Vin (off) | 8.2 | | | Vdc | |
| Hysteresis | | | 2.2 | | Vdc | |
| Turn on delay - enabled, then power applied | Tdelay (power) | | 10 | 15 | msec | With the enable signal asserted, this is the time from when the input voltage reaches the minimum specified operating voltage until the output voltage is within the total regulation band |
| Turn on delay - power applied, then enabled | Tdelay (enable) | | 10 | 15 | msec | With input voltage greater than the turn-on voltage, this is the time from when the enable pin is de-asserted until the output voltage is within the total regulation band |
| Output overshoot at turn on/off | Vovershoot | | 0 | 1 | % | Applies when enable pin is toggled or when input voltage is applied |
| Rise time | Trise | | 10 | | msec | From 10% to 90%; full resistive load, no external capacitance |

## Signal Electrical Interface

| Characteristic - Signal Name | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| **Power good output:** | | | | | | |
| High level output voltage | Voh | | See Note | | V | Output is internally pulled up by a 4.7kΩ resistor to Vo. A high indicates that the main output is within ±10% of nominal value. This signal transitions high within 20ms of the output voltage coming into power good spec. |
| **Output enable - OUTEN:** | | | | | | |
| High level input voltage | Vih | 10.8 | 12 | 13.2 | V | Iih = 0µA; open circuit voltage |
| High level input current | Iih | | | -25 | µA | Allowable leakage current from signal pin into the open collector driver |
| Low level input voltage | Vil | 0 | | 0.8 | V | Converter guaranteed off when OUTEN is less than Vil(max) |
| Low level input current | Iil | | | -1.2 | mA | Vil = 0.8V |
| Low level input current | Iil (max) | | | -1.3 | mA | Vil = 0.0V; maximum source current with output enable pin shorted to ground |
| **Voltage select pin - VSP** | | | | | | |
| High level input voltage | Vih | 10.8 | 12 | 13.2 | V | Iih = 0µA; open circuit voltage, VSP = 1, Vo = 3.3V |
| High level input current | Iih | | | -25 | µA | Allowable leakage current from signal pin into the open collector driver |
| Low level input voltage | Vil | 0 | | 0.8 | V | VSP = 0, Vo = 2.5V when VSP is less than Vil (max) |
| Low level input current | Iil | | | -1.2 | mA | Vil = 0.8V |
| Low level input current | Iil (max) | | | -1.1 | mA | Vil = 0.0V; maximum source current with VSP pin shorted to ground |

## Common Control

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Remote sense compensation | | | | 500 | mV | True +Sense and -Sense differential amplifier |

## Reliability and Service Life

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Mean time between failure calculated | MTBF | 3,500,000 | | | Hours | Bellcore TR-332 |

## Other Specifications

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Switching frequency | Fsw | | 300 | | kHz | Fixed frequency |
| Weight | | | | 42.6 | g | |

## Environmental Requirements

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Max. temperature shock (operating) | | | | 5 | ˚C/10 min. | |
| Temperature shock (operating) | | | | 10 | ˚C/hour | |
| Temperature shock (non-operating) | | | | 20 | ˚C/hour | |
| Humidity (operating) | | | | 85 | %RH | |
| Humidity (storage) | | | | 95 | %RH | |
| Altitude (operating) | | 0 | | 10,000 | ft | |
| Altitude (storage) | | 0 | | 50,000 | ft | |
| Shock (operational) | | 50 | | | G | 11ms half sine wave |
| Vibration (operational) | | 0.01 | | 0.02 | $G^2$/Hz | From 5Hz to 20Hz, maintaining 0.02$G^2$/Hz from 20Hz to 500Hz, all axes |
| Vibration (non-operational) | | 0.01 | | 0.02 | $G^2$/Hz | From 5Hz to 20Hz, maintaining 0.02$G^2$/Hz from 20Hz to 500Hz, all axes |
| Shock (non-operational) | | 50 | | | G | 11ms half sine wave |
| Electrostatic discharge (operating) | ESD | | | 15 | kV | Initilization level; ESD event shall cause no out-of-regulation conditions |
| Electrostatic discharge (non-operating) | ESD | | | 25 | kV | Initialization level |

## Safety Agency Approvals

| Characteristic | |
|---|---|
| UL File Number | Approval pending |
| CSA File Number | Approval pending |
| VDE File Number | Approval pending |
| VDE License Number | Approval pending |

## Standards Compliance List

| Standard | Category |
|---|---|
| EN60950 | Plus A1 and A2 (pending, designed to meet) |
| UL1950 | 3rd edition (pending, designed to meet) |

## Material Ratings

| Characteristic - Signal Name | Symbol | Value | | | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Flammability rating | | | | | | UL94V-0 |
| Material type | | | | | | FR4 PCB |

## Model Numbers

| Model Number | Input Voltage | Nominal Output Voltage | Nominal Output Current | Minimum Efficiency | Maximum Load Reg. |
|---|---|---|---|---|---|
| NXA66-12P3V3C | 12VDC | 3.3/2.5V | 20A | 86/82% | ±1.0% |

### 3.3V/2.5 Model

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input current - operating | Iin | | | 6.8 | Adc | Vin = Vin (nom); Iout = Iout (max.); Vo = 3.3V (measured at converter) |
| Input current - maximum | Iin (max.) | | | 9.5 | Adc | Vin = Vin (off) (min); Iout = Iout (max.); Vo = 3.3V (measured at converter) |
| Reflected ripple current | Iin (ripple) | | | 100 | mA pk-pk | Iout - Iout (max.), measured with recommended external bypass capacitor |
| Input capacitance - internal filter | Cinput | | 25 | | µF | Internal to converter |
| Input capacitance - external bypass | Cbypass | 0 | 100 | No max. | µF | Recommended customer added capacitance. Low ESR type |

### 3.3V/2.5 Model

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Total regulation band | | | | | | |
| VSP = 1 | Vout | 3.15 | 3.30 | 3.45 | Vdc | For all line, static/dynamic load and temperature until end of life. With 2 x 820µF SP Oscons across output |
| VSP = 0 | Vout | 2.39 | 2.50 | 2.61 | Vdc | |
| Output current - continuous | Iout | 0.00 | | 20.0 | Adc | |
| Output current - short circuit | Isc | | | 2.0 | Adc | Continuous, unit auto recovers from short (average o/p current) |
| Output voltage - noise | Vpard | | | 30 | mV pk-pk | Measurement bandwidth: 20MHz. With 2 x 820µF SP Oscons across output |

3.3V/2.5 Model

Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Dynamic regulation - peak | Vdynamic | | | 100 | mV pk | Diout: No load to full load, di/dt = 1A/µsec. External output capacitor is 2 x 820µF SP Oscons |
| Dynamic regulation - recovery time | Trecovery | | 100 | 150 | µsec | |
| External load capacitance | Cext | | | 4000 | µF | Operation with more than the maximum value is possible, but please consult Artesyn before doing so |

3.3V/2.5 Model

Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overvoltage crowbar voltage | Vcrow | | 115 | 120 | % | Output rising above these thresholds fires the on-board SCR and disables the PWM gate drive circuitry. The SCR blows the on-board fuse which protects the output from the input |
| Overcurrent protection inception current | Ioc | | | 26.0 | Adc | Hiccup type protection, impedance of short <90mΩ |
| Current share | Ishare | 0.00 | | 10.0 | % | Single line current share, maximum current imbalance between units at Iomax |

3.3V/2.5 Model

Efficiency

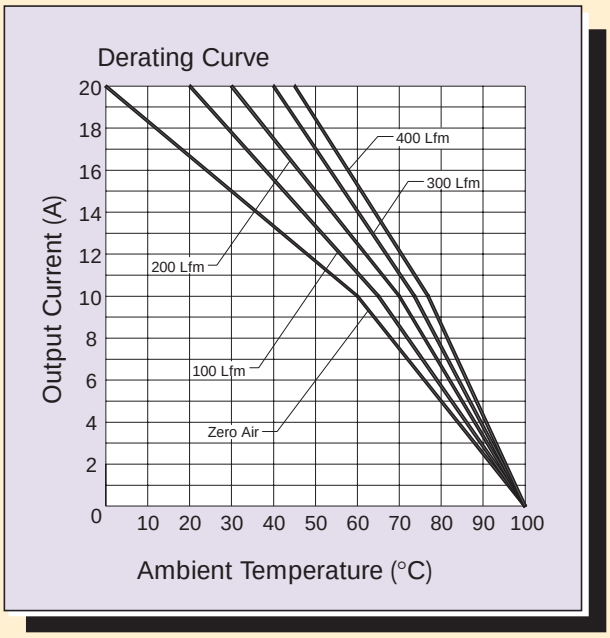
| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Efficiency (light load) | η | 25.0 | | | % | Iout = 0.25A; Vin = 12Vdc |
| Efficiency (full load) | | | | | | |
| VSP = 1 | η | | 86.0 | | % | Vout = 3.3V: Iout = 100% Iout (max); Vin = 12VDC |
| VSP = 0 | η | | 82.0 | | % | Vout = 2.5V: Iout = 100% Iout (max); Vin = 12VDC |

### ***Note 1*** *Mechanical Drawing*

In this view, row A of the edge connector is visible. The leftmost pin is pin 1, and the rightmost pin is pin 25. Row B of the connector is on the opposite side of the unit. Pin 50 is behind pin 1, pin 26 is behind pin 25. See below for pinout.

### ***Note 2*** *Mating Connector*

Recommended mating connector is AMP 145432 or equivalent. Pin 44 is absent and is used for electrical key. AMP keying plug PN 65025-2 may be placed in the mating connector between pins 33 and 34, and between pins 17 and 18. This keying plug serves as a mechanical key.




Pin Connections

| Pin No. | Row A | Row B | Pin No. |
|---|---|---|---|
| 1 | 12V in | RTN | 50 |
| 2 | 12V in | RTN | 49 |
| 3 | 12V in | RTN | 48 |
| 4 | 12V in | RTN | 47 |
| 5 | 12V in | RTN | 46 |
| 6 | Reserved | RTN | 45 |
| 7 | VSP | | |
| 8 | PWRGD | Reserved | 43 |
| 9 | OUTEN | Ishare | 42 |
| 10 | Reserved | Reserved | 41 |
| 11 | Vo-sense | Vo-sense rtn | 40 |
| 12 | Vout | Return | 39 |
| 13 | Vout | RTN | 38 |
| 14 | Vout | RTN | 37 |
| 15 | Vout | RTN | 36 |
| 16 | Vout | RTN | 35 |
| 17 | Vout | RTN | 34 |
| 18 | Vout | RTN | 33 |
| 19 | Vout | RTN | 32 |
| 20 | Vout | RTN | 31 |
| 21 | Vout | RTN | 30 |
| 22 | Vout | RTN | 29 |
| 23 | Vout | RTN | 28 |
| 24 | Vout | RTN | 27 |
| 25 | Vout | RTN | 26 |

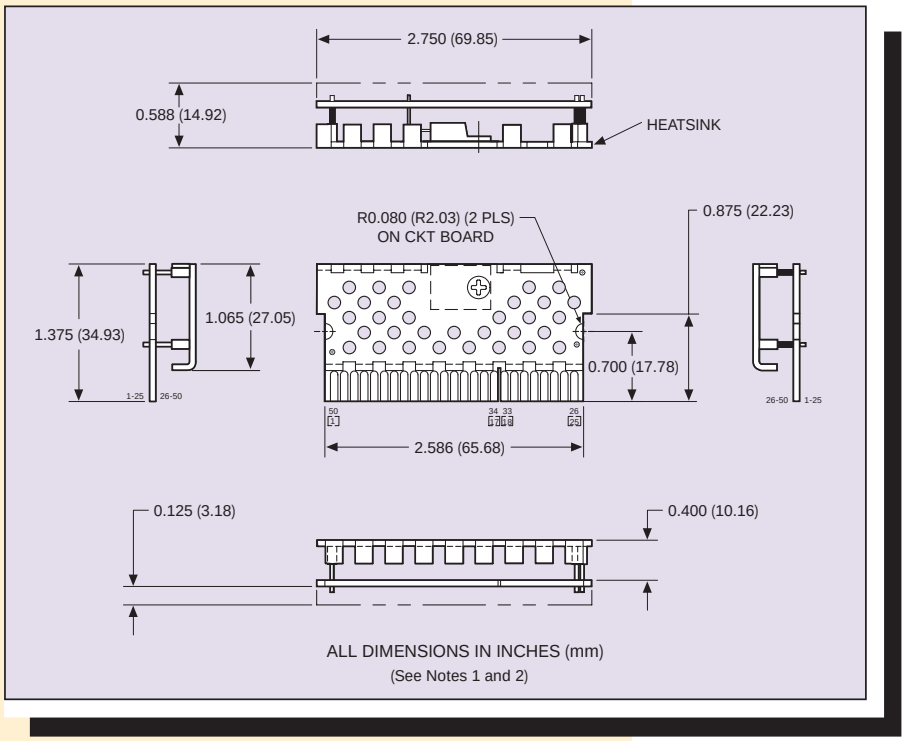



**Figure 1 - Mechanical Drawing**

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