

FEATURES

- 6 sided Continuous Shielding
- Synchronization
- 10W/In³ Power Density
- Wide 2:1 Input Voltage Range
- Efficiency to 82%
- -55°C to +85°C Operation
- Meets MIL-STD-810 & MIL-STD-202

DESCRIPTIONS

The 1600XA series 16 watts high performance DC/DC converters are cost effective solution to the high reliability and performance requirements of power distribution systems in applications ranging from high speed data communications equipment to industrial robotic systems. The 1600XA series operates from wide (2:1) input voltage ranges of 9 to 18, 18 to 36 or 36 to 72VDC; providing single, dual and triple output combinations of 5, 12, 15, ±5, ±12, ±15, 5/±12 and 5/±15 VDC. All models are packaged in compact, low profile 2" X 2" X 0.4" metal cases.

OUTPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|------------------------------|-----|-------|---|-------------------------------------|
| Output Voltage Accuracy | | | | |
| Single & Dual Outputs | | ±1.0 | % ¹ | |
| Triple Outputs - Primary | | ±1.0 | % ¹ | |
| - Auxiliaries | | ±6.0 | % ¹ | |
| Output Voltage Trim | | ±5 | % | |
| Voltage Balance: | | | | |
| Dual Outputs | | ±1.0 | %; Equal Output Loads | |
| Triple Outputs (Auxiliaries) | | ±1.0 | %; Equal Output Loads | |
| Minimum Load | | 10% | Full Load | |
| Line Regulation | | | | |
| Single & Dual Outputs | | ±0.5 | % ² | |
| Triple Outputs - Primary | | ±0.2 | % ² | |
| - Auxiliaries | | ±6.0 | % ² | |
| Load Regulation | | | | |
| Single Outputs | | ±0.2 | % ³ | |
| Dual Outputs | | ±1.0 | % ³ ; Equal Loads | |
| Triple Outputs - Primary | | ±0.5 | % ³ | |
| - Auxiliaries | | ±6.0 | % ³ ; Equal Loads | |
| Ripple/Noise | | 2 | % of Vout | |
| Short Circuit Protection | | | | Continuous, Auto- matic Recovery |
| Transient Recovery Time | | 200 | µS to within 1% error band for 50% step load change | |
| Temperature Coefficient | | ±0.01 | % per °C | |
| Over Voltage Protection | | | | See Model Selection Guide |

¹ = Output voltage at nominal line & FL

² = % Output voltage measured from min. input line to maximum

³ = Output voltage measured from FL to 10% Load

INPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|------------------------------------|-----|-----|-----|---------------------|
| Input Voltage Range | | | | |
| 12 VDC Input Models | 9 | 12 | 18 | VDC |
| 24 VDC Input Models | 18 | 24 | 36 | VDC |
| 48 VDC Input Models | 36 | 48 | 72 | VDC |
| Remote On / OFF Control | | | | |
| Supply ON | 3.5 | | | VDC or Open Circuit |
| Supply OFF | 0 | | 0.8 | VDC |
| Logic Referenced to Negative Input | | | | |
| Input Filter | | | | Pi Filter |

GENERAL CHARACTERISTICS

| | Unit/Comments |
|-----------------------|---|
| Efficiency | See Model Selection Guide |
| Isolation Voltage | 1400 VDC Min., 1 minute Meets requirements of MIL-STD-202F, method 301 |
| Isolation Resistance | >10 ⁹ Ohms; Meets requirements of MIL-STD-202F, method 302, test condition B |
| Isolation Capacitance | 140 pF |
| Acceleration | Per MIL-STD-810E, method 513.4, procedure II. Operational test (centrifuge) 12g's (manned aero- space vehicles) |
| Shock | Per MIL-STD-810E, method 516.4, procedure I. Functional shock 40g's. |
| Vibration | Per MIL-STD-810E, method 514.4, procedure I, category 6 (equipment installed in helicopters). |
| Altitude | Per MIL-STD-810E, method 500.3, procedure III Rapid decompression, 40K ft. |
| Switching Frequency | 100 kHz, Min. |

ENVIRONMENTAL SPECIFICATIONS

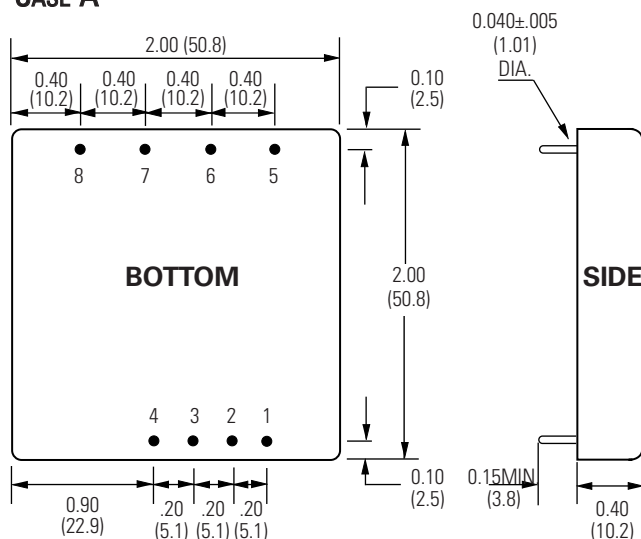
| | Min | Typ | Max | Unit/Comments |
|------------------------------------|---|-----|------|---------------|
| Operating Temp. Range (Industrial) | -55 | | +85 | °C; Ambient |
| Max. Case Temp. | | | +100 | °C; Ambient |
| Storage Temp. Range | -55 | | +125 | °C; Ambient |
| Relative Humidity | Per MIL-STD-801E, method 507.3, procedure I. Natural non-hazardous items, cycle 1,240 Hrs | | | |
| Cooling | Free-Air Convection | | | |
| EMI/RFI | Six-sided Metal Case | | | |

PHYSICAL CHARACTERISTICS

| | Unit/Comments |
|--|---|
| Case Size | 2.0 X 2.0 X 0.4 inches (51.0 X 51.0 X 10.2 mm) |
| Case Material | Coated Copper |
| Weight | 2.8 oz (79 grams) |
| Shielding | 6-sided, Continuous |
| Shielding Connection | |
| 12V and 24V Input Models | Negative Input, Pin 3 |
| 48V Input Models | Positive Input, Pin 4 |
| Reliability Specs: MTBF, Ground Benign, @+25°C | >705,000 Hrs |

OUTLINE DRAWING

CASE A



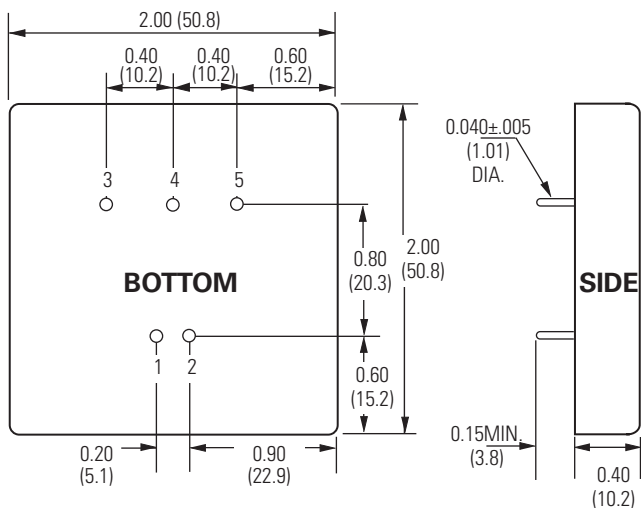
PIN OUT CHART; CASE A

| Pin | Single | Dual | Triple |
|-----|---------------|---------------|---------------|
| 1 | Remote On/Off | Remote On/Off | Remote On/Off |
| 2 | Sync | Sync | Sync |
| 3 | - Vin | - Vin | - Vin |
| 4 | + Vin | + Vin | + Vin |
| 5 | Trim | Trim | - Vout (Aux) |
| 6 | - Vout | - Vout | Common |
| 7 | + Vout | Common | -5V Vout |
| 8 | No Pin | + Vout | +Vout (Aux) |

Ordering Information:

- Case "A" pinning is standard. Models with Case "A" packaging do not require a suffix on the part number.
- Case "A1" is an alternate. Models with Case "A1" packaging must be designated with an "A1" suffix; e.g. 1615D48XA-A1.

CASE A1



PIN OUT CHART; CASE A1

| Pins | Single | Dual |
|------|--------|------------|
| 1 | + Vin | + Vin |
| 2 | - Vin | - Vin |
| 3 | + Vout | + Vout |
| 4 | Trim - | +/- Common |
| 5 | - Vout | - Vout |

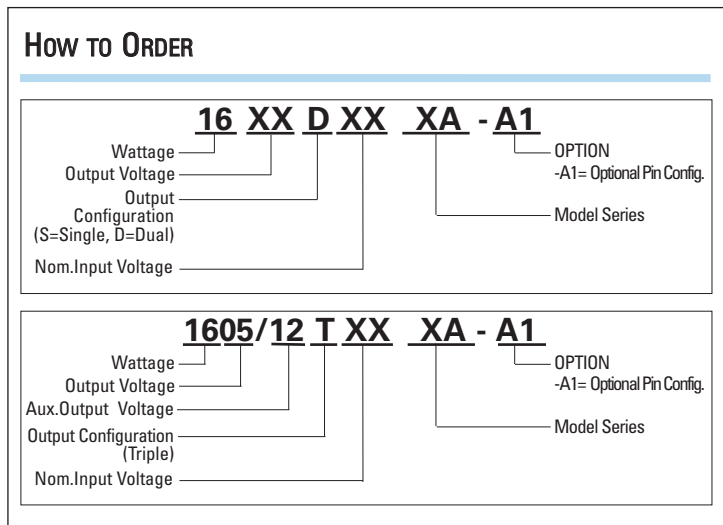
Notes:

1. Unless otherwise specified dimensions are in inches (mm).

| 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 output is recommended for operation.

How To ORDER



MODEL SELECTION CHART

| Model | Nominal Input Voltage (VDC) | Input Voltage Range (VDC) | No Load Input Current (mA) | Full Load Input Current (mA) | Output Voltage (VDC) | Output Current (mA) | Over Voltage (VDC) | Efficiency (%) | Case |
|--------------|-----------------------------|---------------------------|----------------------------|------------------------------|----------------------|---------------------|--------------------|----------------|-------|
| 1605S12XA | 12 | 9 - 18 | 45 | 1667 | 5 | 3200 | 6.8 | 80 | A, A1 |
| 1612S12XA | 12 | 9 - 18 | 45 | 1640 | 12 | 1300 | 15.0 | 81 | A, A1 |
| 1615S12XA | 12 | 9 - 18 | 45 | 1650 | 15 | 1060 | 18.0 | 81 | A, A1 |
| 1605D12XA | 12 | 9 - 18 | 45 | 1667 | ±5 | ±1600 | ±6.8 | 80 | A, A1 |
| 1612D12XA | 12 | 9 - 18 | 45 | 1640 | ±12 | ±665 | ±15.0 | 81 | A, A1 |
| 1615D12XA | 12 | 9 - 18 | 45 | 1650 | ±15 | ±535 | ±18.0 | 81 | A, A1 |
| 1605S24XA | 24 | 18 - 36 | 34 | 833 | 5 | 3200 | 6.8 | 80 | A, A1 |
| 1612S24XA | 24 | 18 - 36 | 34 | 810 | 12 | 1300 | 15.0 | 82 | A, A1 |
| 1615S24XA | 24 | 18 - 36 | 34 | 815 | 15 | 1060 | 18.0 | 82 | A, A1 |
| 1605D24XA | 24 | 18 - 36 | 34 | 833 | ±5 | ±1600 | ±6.8 | 80 | A, A1 |
| 1612D24XA | 24 | 18 - 36 | 34 | 810 | ±12 | ±665 | ±15.0 | 82 | A, A1 |
| 1615D24XA | 24 | 18 - 36 | 34 | 815 | ±15 | ±535 | ±18.0 | 82 | A, A1 |
| 1605S48XA | 48 | 36 - 72 | 32 | 411 | 5 | 3200 | 6.8 | 81 | A, A1 |
| 1612S48XA | 48 | 36 - 72 | 32 | 405 | 12 | 1300 | 15.0 | 82 | A, A1 |
| 1615S48XA | 48 | 36 - 72 | 32 | 408 | 15 | 1060 | 18.0 | 82 | A, A1 |
| 1605D48XA | 48 | 36 - 72 | 32 | 411 | ±5 | ±1600 | ±6.8 | 81 | A, A1 |
| 1612D48XA | 48 | 36 - 72 | 32 | 405 | ±12 | ±665 | ±15.0 | 82 | A, A1 |
| 1615D48XA | 48 | 36 - 72 | 32 | 408 | ±15 | ±535 | ±18.0 | 82 | A, A1 |
| 1605/12T12XA | 12 | 9 - 18 | 50 | 1667 | 5/±12 | 2000/±250 | 6.8, ±15.0 | 75 | A, A1 |
| 1605/15T12XA | 12 | 9 - 18 | 50 | 1667 | 5/±15 | 2000/±200 | 6.8, ±18.0 | 79 | A, A1 |
| 1605/12T24XA | 24 | 18 - 36 | 45 | 832 | 5/±12 | 2000/±250 | 6.8, ±15.0 | 81 | A, A1 |
| 1605/15T24XA | 24 | 18 - 36 | 45 | 832 | 5/±15 | 2000/±200 | 6.8, ±18.0 | 75 | A, A1 |
| 1605/12T48XA | 48 | 36 - 72 | 35 | 406 | 5/±12 | 2000/±250 | 6.8, ±15.0 | 79 | A, A1 |
| 1605/15T48XA | 48 | 36 - 72 | 35 | 401 | 5/±15 | 2000/±200 | 6.8, ±18.0 | 81 | A, A1 |