

### FEATURES

- 6 sided Continuous Shielding
- Synchronization
- 10W/In<sup>3</sup> 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	% <sup>1</sup>	
Triple Outputs - Primary		±1.0	% <sup>1</sup>	
- Auxiliaries		±6.0	% <sup>1</sup>	
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	% <sup>2</sup>	
Triple Outputs - Primary		±0.2	% <sup>2</sup>	
- Auxiliaries		±6.0	% <sup>2</sup>	
Load Regulation				
Single Outputs		±0.2	% <sup>3</sup>	
Dual Outputs		±1.0	% <sup>3</sup> ; Equal Loads	
Triple Outputs - Primary		±0.5	% <sup>3</sup>	
- Auxiliaries		±6.0	% <sup>3</sup> ; 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

<sup>1</sup> = Output voltage at nominal line & FL

<sup>2</sup> = % Output voltage measured from min. input line to maximum

<sup>3</sup> = 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 <sup>9</sup> 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 aerospace 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**

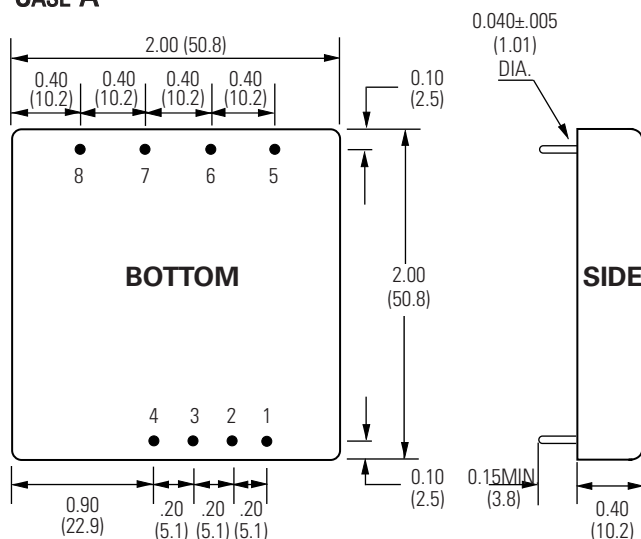
	Min	Typ	Max	Unit/Comments
Operating Temp. Range (Industrial)	-55		+85	°C; Ambient
Max. Case Temp.			+100	°C; Ambient
Storage Temp. Range	-55		+125	°C; Ambient
Relative Humidity	Per MIL-STD-801E, method 507.3, procedure I. Natural non-hazardous items, cycle 1,240 Hrs			
Cooling	Free-Air Convection			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



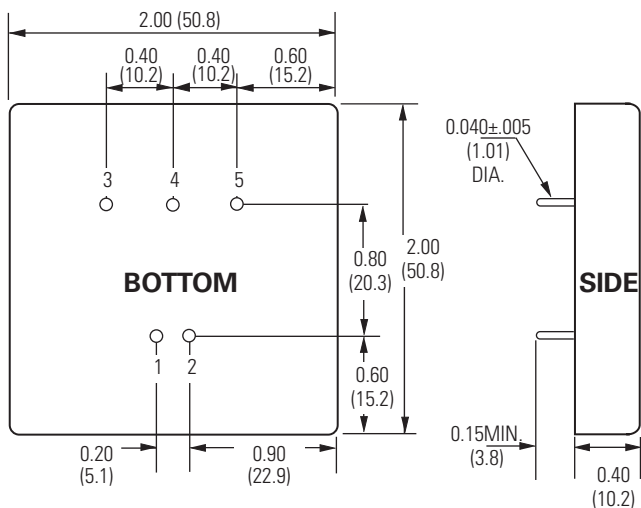
**PIN OUT CHART; CASE A**

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

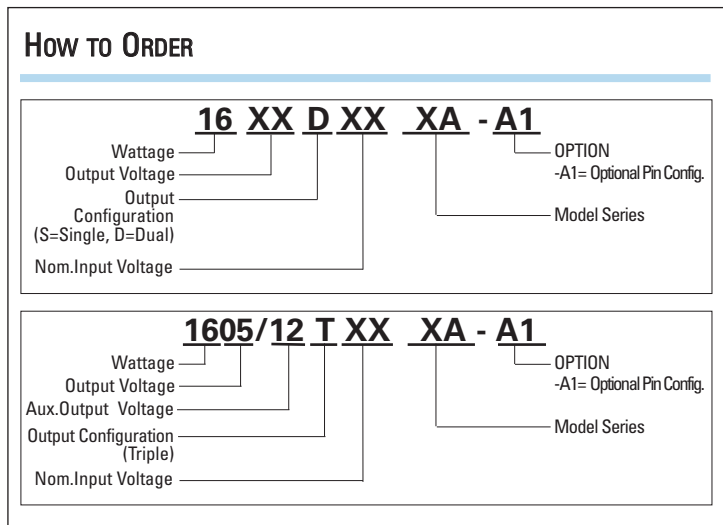
**Notes:**

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