

A400RU Series

Single & Dual Output, 4W Ultra-Wide Input Range DC/DC Converters



Key Features:

- 4W Output Power
- UL Approved (File E245422)
- 4:1 Input Voltage Range
- 1,500 VDC Isolation
- Meets EN55022 Class "A"
- Compact DIP Case
- Single & Dual Outputs
- 1.0 MH MTBF
- Industry Standard Pin-Out



RoHS Compliant

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Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Start Voltage	24 VDC Input	4.5	6.0	8.5	VDC
	48 VDC Input	8.5	12.0	17.0	
Input Filter	π (Pi) Filter (Complies with EN55022 Class "A")				
Reverse Polarity Input Current				1.0	A
Short Circuit Input Power				2,000	mW

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±0.5	±1.0	%
Output Voltage Balance	Dual Output , Balanced Loads		±0.5	±2.0	%
Line Regulation	Vin = Min to Max		±0.1	±0.3	%
Load Regulation	Iout = 10% to 100%		±0.3	±1.0	%
Ripple & Noise (20 MHz) (Note 1)			50	75	mV P - P
Ripple & Noise (20 MHz)	Over Line, Load & Temp.			100	mV P - P
Ripple & Noise (20 MHz)				15	mV rms
Output Power Protection		120			%
Transient Recovery Time (Note 2)	25% Load Step Change		150	500	μSec
Transient Response Deviation			±2.0		%
Temperature Coefficient			±0.01	±0.02	%/°C
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,500			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V		380	500	pF
Switching Frequency			350		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+71	°C
Operating Temperature Range	Case	-40		+90	°C
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%
RFI	Six-Side Shielded Metal Case				
Conducted EMI	Complies with EN55022 Class "A"				

Physical

Case Size	1.25 x 0.80 x 0.40 Inches (31.8 x 20.3 x 10.2 mm)
Case Material	Metal with Non-Conductive Base
Weight	0.49 Oz (14g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.0			MHours
Safety Standards	UL 1950, EN 60950, IEC 60950				
Safety Approvals	UL, cUL; File No. E245422				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	24 VDC Input	-0.7		50.0	VDC
	48 VDC Input	-0.7		100.0	
Lead Temperature	1.5 mm From Case For 10 Sec.			260	°C
Internal Power Dissipation	All Models			2,500	mW

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

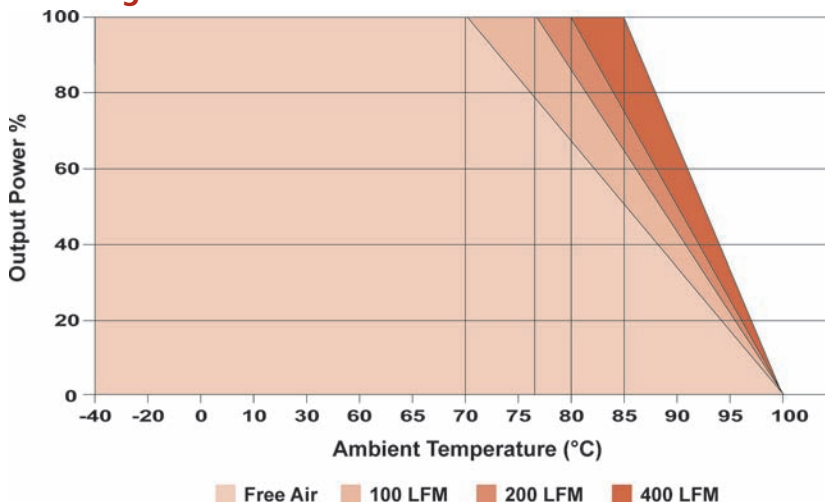
Model Selection Guide

Model Number	Input					Output			Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Reflected Ripple Current (mA, Typ)	Voltage (VDC)	Current (mA, Max)	Current (mA, Min)		
	Nominal	Range	Full-Load	No-Load						
A401RU	24	9.0 -36.0	161	20	5	3.3	900.0	90.0	77	1,000
A402RU	24	9.0 -36.0	170	20	5	5.0	660.0	66.0	81	1,000
A403RU	24	9.0 -36.0	201	20	5	12.0	333.0	33.0	83	1,000
A404RU	24	9.0 -36.0	201	20	5	15.0	267.0	27.0	83	1,000
A405RU	24	9.0 -36.0	156	20	5	±5.0	±300.0	±30.0	80	1,000
A406RU	24	9.0 -36.0	201	20	5	±12.0	±167.0	±17.0	83	1,000
A407RU	24	9.0 -36.0	201	20	5	±15.0	±133.0	±13.0	83	1,000
A411RU	48	18.0 - 75.0	79	10	5	3.3	900.0	90.0	78	500
A412RU	48	18.0 - 75.0	84	10	5	5.0	660.0	66.0	82	500
A413RU	48	18.0 - 75.0	98	10	5	12.0	333.0	33.0	85	500
A414RU	48	18.0 - 75.0	98	10	5	15.0	267.0	27.0	85	500
A415RU	48	18.0 - 75.0	76	10	5	±5.0	±300.0	±30.0	82	500
A416RU	48	18.0 - 75.0	98	10	5	±12.0	±167.0	±17.0	85	500
A417RU	48	18.0 - 75.0	98	10	5	±15.0	±133.0	±13.0	85	500

Notes:

- When measuring output ripple, it is recommended that an external 0.47 μ F ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 μ F capacitors will reduce the output ripple.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- Operation at no-load will not damage these units. However, they may not meet all specifications.
- Dual output units may be connected to provide a 10 VDC, 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
- The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up. In this case, it is recommended that a low ESR (ESR <1.0 Ω at 100 kHz) capacitor be mounted close to the converter. For 24V input units a 4.7 μ F is recommended and for 48V units a 2.2 μ F.
- It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

Derating Curve



Pin Connections

Pin	Single	Dual
2, 3	-Vin	-Vin
9	No Pin	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22, 23	+Vin	+Vin

NC: No Connection

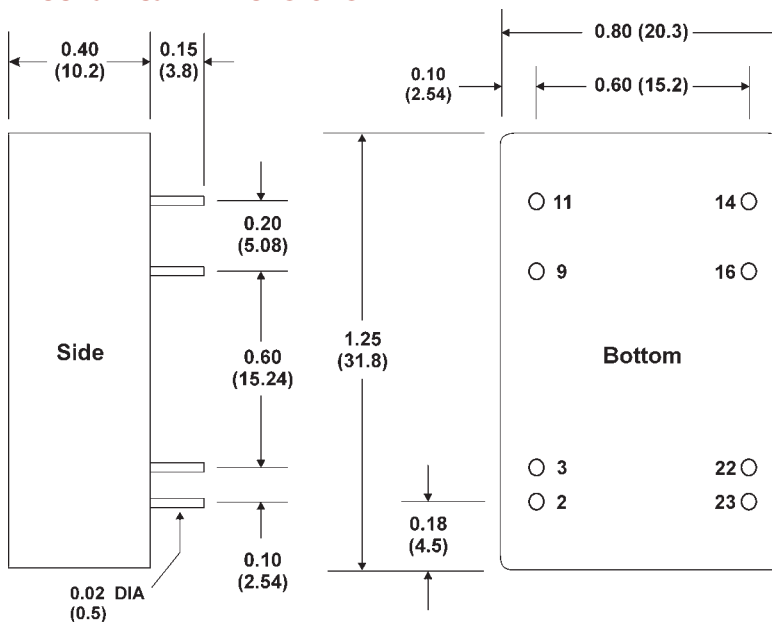
Capacitive Load

Single Output μ F Max	Dual Output μ F Max
3,000	±680

Mechanical Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ± 0.01 (± 0.25)

Mechanical Dimensions



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