

I2000RU Series

Ultra-Miniature 20W Wide 4:1 Input Range DC/DC Converters



Key Features:

- 20W Output Power
- 4:1 Input Range
- Ultra- Miniature Case
- Remote On/Off Control
- 1,500 VDC Isolation
- >346 kHour MTBF
- Standard Pin-Out



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 Voltage Range	24 VDC Input	9.0	24.0	36.0	VDC
	48 VDC Input	18.0	48.0	75.0	
Start-Up Voltage	24 VDC Input			9.0	VDC
	48 VDC Input			18.0	
Under Voltage Shutdown	24 VDC Input			8.5	VDC
	48 VDC Input			17.0	
Input Filter	LC Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
Output Voltage Balance	Dual Output , Balanced Loads			±2.0	%
Line Regulation, $V_{IN} = \text{Min to Max}$	Single Output			±0.2	%
	Dual Output			±0.5	
Load Regulation, $I_{OUT} = 15\% \text{ to } 100\%$	Single Output (3.3V and 5V)			±0.5	%
	Single Output (12V and 15V)			±0.2	
	Dual Output			±1.0	
Ripple & Noise (20 MHz), See Note 1	Single Output (3.3V and 5V)		75		mV P - P
	Single Output (12V and 15V)		100		
	Dual Output		100		
Transient Recovery Time, See Note 2			300		µSec
Transient Response Deviation	25% Load Step Change		±3.0		%
Output Power Protection			150		%
Temperature Coefficient				±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		1,500		pF
Switching Frequency			330		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Operating Temperature Range	Case			+105	°C
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Derating	See Curve				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	1.00 x 1.00 x 0.40 Inches (25.4 x 25.4 x 10.16 mm)				
Case Material	Six-Sided Shielded Aluminum With Non-Conductive Base (UL94-V0)				
Weight	0.52 Oz (15g)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	346			kHours

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

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

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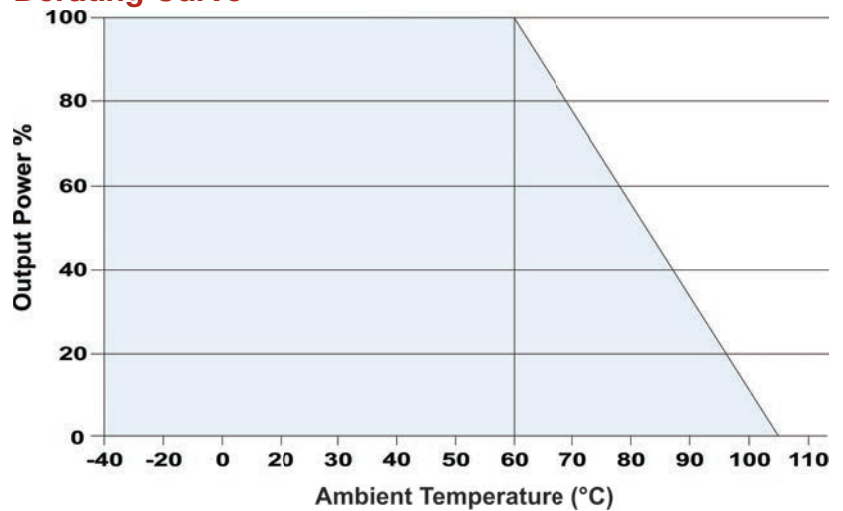
Model Number	Input				Output			Efficiency (% Typ)	Capacitive Load (μ F Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
I2001RU	24	9.0 - 36.0	1,390	80	3.3	4,500	0	87	10,300	4,000
I2002RU	24	9.0 - 36.0	1,852	90	5.0	4,000	0	89	6,800	4,000
I2003RU	24	9.0 - 36.0	1,877	40	12.0	1,670	0	89	1,200	4,000
I2004RU	24	9.0 - 36.0	1,882	40	15.0	1,340	0	89	750	4,000
I2005RU	24	9.0 - 36.0	1,877	40	\pm 12.0	\pm 835	\pm 60	89	\pm 680	4,000
I2006RU	24	9.0 - 36.0	1,882	40	\pm 15.0	\pm 670	\pm 50	89	\pm 380	4,000
I2011RU	48	18.0 - 75.0	695	40	3.3	4,500	0	88	10,300	2,000
I2012RU	48	18.0 - 75.0	926	45	5.0	4,000	0	89	6,800	2,000
I2013RU	48	18.0 - 75.0	938	25	12.0	1,670	0	89	1,200	2,000
I2014RU	48	18.0 - 75.0	930	25	15.0	1,340	0	89	750	2,000
I2015RU	48	18.0 - 75.0	938	25	\pm 12.0	\pm 835	\pm 60	89	\pm 680	2,000
I2016RU	48	18.0 - 75.0	941	25	\pm 15.0	\pm 670	\pm 50	89	\pm 380	2,000

Notes:

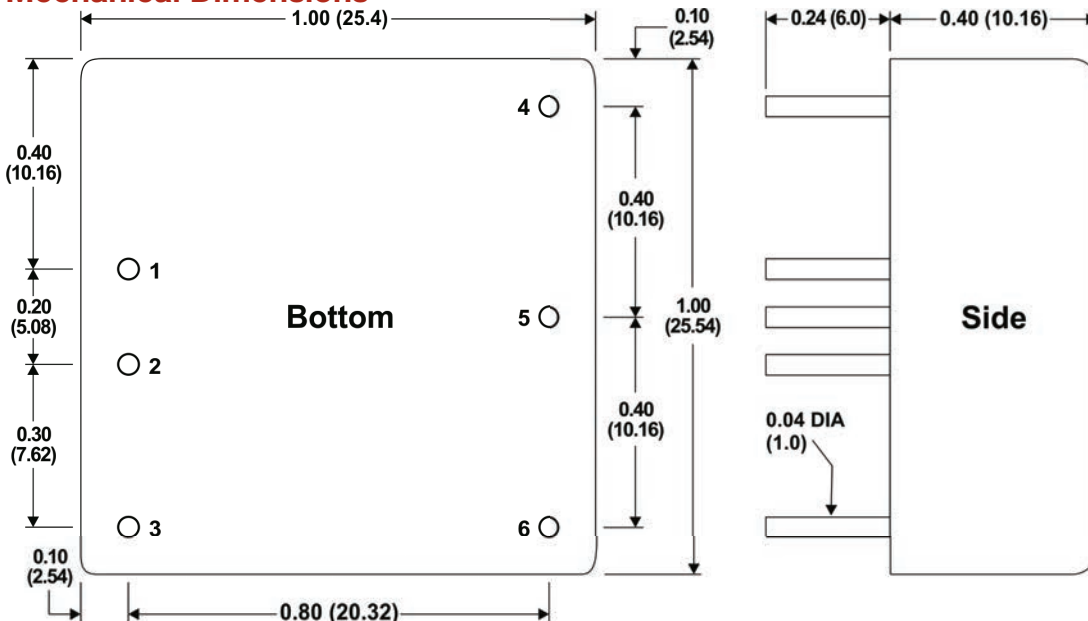
- Output ripple is measured with a 1.0 μ F ceramic and a 10 μ F tantalum capacitor connected across the outputs.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- Operation at no-load will not damage the unit, but they may not meet all specifications.
- The On/Off Control input (Pin 3) is referenced to -Vin (Pin 2). If it is not used, the control pin should be left open. If the pin is shorted to -Vin, the unit will turn off.

	Min	Max
On	3.5 VDC	12 VDC
Off	0.0 VDC	1.2 VDC
In. Current (on)		0.5 mA
In. Current (off)		-0.5 mA
- An external resistor may be used to adjust the converter output by \pm 10%. To adjust the output UP, connect a 5%, 3W resistor between the minus output pin and the Vout trim pin. To adjust the output DOWN, connect a 5%, 3W resistor between the plus output pin and the V_{out} trim pin. For continuous UP/Down trimming capability, connect a 10 kW potentiometer between the plus and minus outputs with the wiper arm connected to the V_{out} trim pin. The trim pin may be left floating if it is not used. Contact the factory for more information.
- It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

Derating Curve



Mechanical Dimensions



Pin Connections

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote ON/OFF	
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout



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Notes:

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