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uV300-5-164 MICROVERTER® -164 DC-DC Converter

300 VDC Input
275 Watts
3/4 Brick

The MICROVERTER® 164 Series is a second generation product which combines high efficiency electrical power design and proprietary advanced thermal management techniques including insulated metal substrate technology, specialty dielectrics and formulated thermally conductive potting to produce small, ruggedized DC/DC converters with reduced temperature rise and increased reliability. This series is ideal for use in rugged, thermally challenged applications requiring baseplate cooled operation such as military systems, RF/power amplifiers, commercial avionics and industrial control. All RO products are normally manufactured using a tin-lead soldering process. The MICROVERTER® 164 Series is also available in both full RoHS compliant (utilizing lead free solder) and full tin-lead (no pure tin) configurations. All models are designed to meet international safety standards.



OPERATIONAL FEATURES

- Encapsulated & Environmentally Rugged Package
- Extremely Low Thermal Resistance
- -40 ~ 100°C Baseplate Operation – Standard
-55 ~ 125°C Baseplate Operation – Optional
- Constant Frequency Operation for Reduced Noise
- Remote On/Off, Parallel and Remote Sense Functions
- Auto-Recovery from OTP / OCP / OVP Circuits
- Trimable Output
- Synchronizable from 330-400KHz (Optional)
- 2 Year Warranty

ORDERING INFORMATION

Model Number	Input Voltage Range	Output Voltage	Output Current
uV300-5-164	220-400 VDC	5 (4.0-5.5VDC)	50A

uV300-5-XXX-164YY
XXX ← → YY

S= Synchronization 330-400KHz

T= -55°C to 100°C Operating Temperature

C= Conformal Coating

E= -55°C to 125°C (Consult the factory for output power rating) standard tin-lead finish

RL= No Pure Tin

LF= RoHS Compliant

no suffix is required for

Part Number Example: uV300-5-STC-164RL

Synchronization, -55°C to 100°C, Conformal Coating, No Pure Tin

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ABSOLUTE MAXIMUM RATINGS Exceeding absolute maximum ratings may cause permanent damage or reduce reliability

Parameter	Option	Minimum	Maximum	Units	Conditions
Input Voltage (+ In to -In)		-0.3	400	VDC	Continuous
Transient Input Voltage (+In to -In)		-0.3	450	VDC	100 msec. Max.
Input/Output Isolation			4500	VDC	
Input/Case Isolation			2500	VDC	
Output/Case Isolation			500	VDC	
Storage Temperature	Standard	-40	+110	°C	
	T	-55	+110	°C	
	E	-55	+130	°C	
Operating Temperature	Standard	-40	+110	°C	Baseplate
	T	-55	+100	°C	Baseplate
	E	-55	+125	°C	Baseplate
Soldering Temperature (Wave Solder)			260	°C	< 5 sec.

ELECTRICAL SPECIFICATIONS Electrical specifications apply for Vin=300VDC, Vout=5VDC, Full Load, Tc=25°C unless specified otherwise

Input	Minimum	Typical	Maximum	Units	Conditions
Input Voltage	220	300	400	VDC	
Maximum Input Current		1.4		ADC	Vin= 220V, Tc= 25°C
			1.5	ADC	Vin=220V, Tc=100°C
Input Ripple Rejection		70		dB	f= 120Hz, Vin ripple= 15V p-p
Output	Minimum	Typical	Maximum	Units	Conditions
Voltage Set Point	4.95	5.00	5.05	VDC	
Load Regulation		0.05	0.2	%	0 to Full Load
Line Regulation		0.05	0.2	%	Vin min to Vin max
Voltage Drift w/Temperature			0.02	% / °C	Tc min to Tc max
Ripple (PARD)		60	100	mV p-p	Vin= 300V, Tc= 25°C
			150	mV p-p	220V<Vin<400V, -40°C<Tc<+100°C
Rated Current			50	A	
Overcurrent Inception Point	105	115	130	% Rated	Vout=95% Vout nominal
Short Circuit Current			170	% Rated	220V< Vin< 400V, Rshort= 15 mohm
Transient Response Deviation		100		mV	20-80% Rated Current, 0.5A/μs
Transient Response Settling Time		100		μs	20-80% Rated Current, 0.5A/μs, ± 1%Vo
Efficiency		82		%	Vin= 300V, Iout= 75% Rated
Isolation	Minimum	Typical	Maximum	Units	Conditions
Input-to-Output	4500			VDC	Special Test Method Required
Input-to-Case	2500			VDC	
Output-to-Case	500			VDC	
Input-to-Output Capacitance		5600		pF	
Input-to-Output Resistance	10			M Ohm	500V

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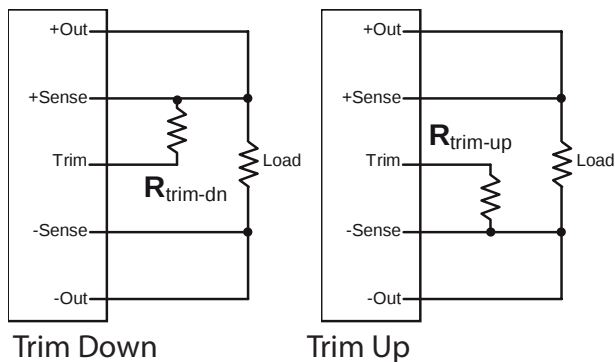


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ELECTRICAL SPECIFICATIONS Continued

Control	Option	Minimum	Typical	Maximum	Units	Conditions
Over Temperature Shutdown Temp (Tc)	Standard & T		105		°C	
	E		130		°C	
Over Temperature Restart Temp (Tc)	Standard & T		85		°C	
	E		105		°C	
Start-up Voltage			175	200	VDC	
Input Under Voltage Lock Out			130		VDC	
Turn-on Time			18	30	msec	220 < Vin < 400V, Tc = 25°C
				40	msec	220 < Vin < 400V, -40°C < Tc < +100°C
Logic On/Off Enable Signal			Open		VDC	Positive Logic, open collector enables. Do not pull up.
Logic On/Off Disable Signal				0.6	VDC	I On/Off = 1mA
Logic On/Off Turn-on Time			5	10	msec	
Trim Range		4		5.5	VDC	See Trim Formula and Diagrams
OVP Trip Point		5.9	6.2	6.6	VDC	Non-shutdown, Auto Recovery, Iout = 50% Rated
Remote Sense Compensation				0.5	VDC	May be OVP limited
Current Sharing (Parallel Operation)			5		%	Using Parallel Pin Connection or PDM
Switching Frequency			370		KHz	Standard Model
			300		KHz	-S Sync Option Model
Switching Frequency Range		330		440	KHz	Using Optional Sync Pin and External Sync Signal
Thermal / Mechanical Parameters	Option	Minimum	Typical	Maximum	Units	Conditions
Thermal Resistance, Case to Ambient			4.2		°C/W	Free Air, No Heatsink, Tc = 100°C
Size, HxWxL			0.5 x 2.4 x 3.6 (12.7 x 61.0 x 91.4)		in (mm)	3/4 Brick, See Outline Drawing
Weight			5.7 (161)		oz. (g)	

TRIM



$$R_{\text{trim-up}} = \frac{8.516K \Omega}{\Delta V}$$

$$R_{\text{trim-down}} = \frac{19.87 - 5.677 \Delta V}{\Delta V} K \Omega$$

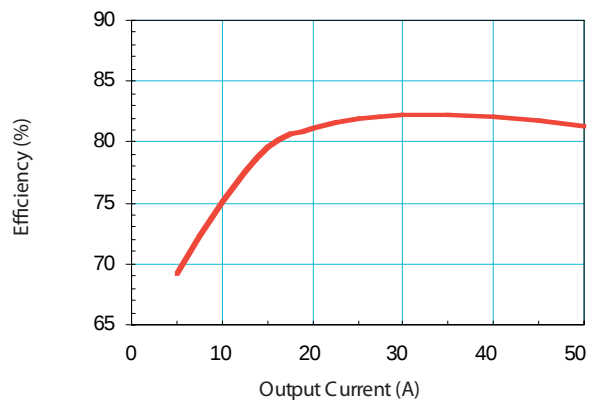
$\Delta V = | \text{Desired Output Voltage Change (Volts)} |$
 $R_{\text{trim-up}} = \text{External Resistor Value to Increase}_{\text{out}} V$
 $R_{\text{trim-down}} = \text{External Resistor Value to Decrease}_{\text{out}} V$

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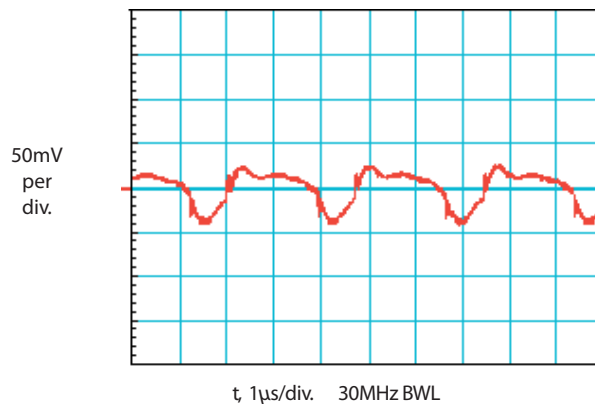
300 VDC Input / 275 Watts / 3/4 Brick



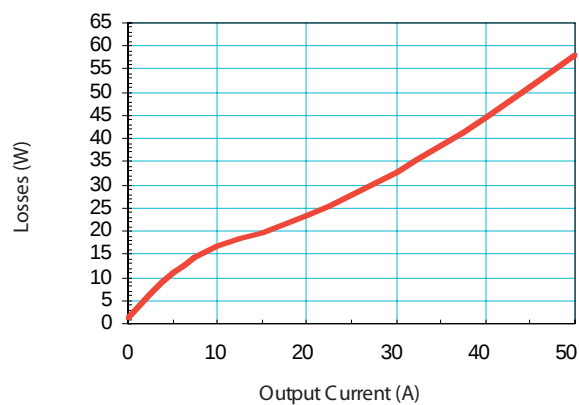
EFFICIENCY VS. LOAD, $V_{in}=300V$, $T_C=25^{\circ}C$



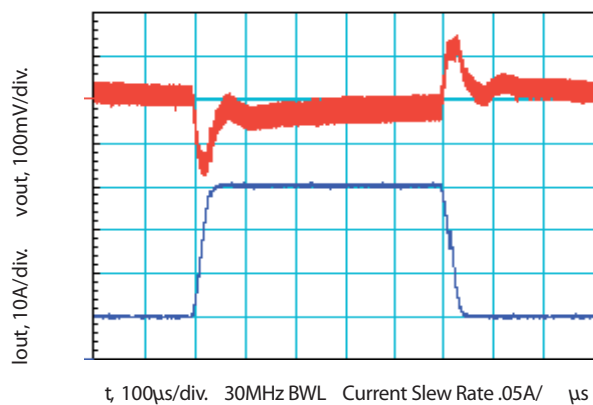
OUTPUT RIPPLE, $V_{in}=300V$, $I_{out}=50A$, $T_C=25^{\circ}C$



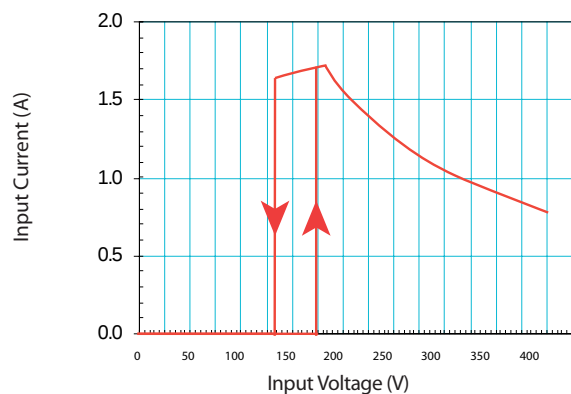
LOSSES VS. LOAD, $V_{in}=300V$, $T_C=25^{\circ}C$



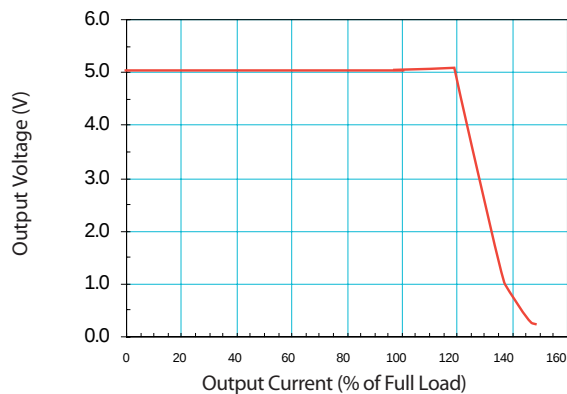
TRANSIENT RESPONSE, $V_{in}=300V$, $I_{out}=10A-40A-10A$, $T_C=25^{\circ}C$



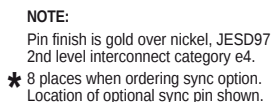
INPUT CHARACTERISTIC, $V_{in}=300V$, $T_C=25^{\circ}C$



OUTPUT CHARACTERISTIC, $V_{in}=300V$, $T_C=25^{\circ}C$



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