DC-DC Converters, SV48-26 Series

221W, 36~75Vdc Input

SUPER VERTER™

World's Most Advanced High Density DC-DC Converters.

Size: 60.70mm x 57.91mm x 13.30mm

(2.39in. x 2.28in. x 0.52in.)

MODEL SELECTION

Model Name	Vin(Vdc)	Vout(Vdc)	Io(Amps)	Watts	API P/N
SV48-26-225-2	36-75	26	8.5	221	API0DC07-001

DESCRIPTION

The SuperVerter module is a high density DC-DC converter designed for use in distributed power architectures, workstations, EDP equipment, and telecommunication appliciations. The surface mount construction uses a metal baseplate and planar transformers to produce up to 240W in a half brick package. The SuperVerter module is a suitable replacement for all industry standard half brick modules.

DESCRIPTION

- Choice Of Remote On/off Logic Configuration
- Heat Sink Available For Extended Operation

FEATURES

- High Power Density - Up to 90W/in^3
- Constant Frequency - 370kHz
- -40 to +100^{o}C Operation
- Over Temperature Protection
- High Efficiency: 87% Typical
- Low Output Noise
- Industry-Standard Pinout
- Metal Baseplate
- 2:1 Input Voltage Range
- Output Over Voltage Protection
- Current Limit/Short Circuit Protection
- Adjustable Output Voltage: 60% to 110% of
- $V_{0,set}$
  Remote Sense
- Logic ON/OFF
- Safety Agency Approval

SPECIFICATION

ABSOLUTE MAXIMUM RATINGS:

Exceeding absolute maximum ratings may cause permanent damage and reduce reliability

PARAMETER	MIN	MAX	UNITS	CONDITIONS
Input Voltage		62	Vdc	Continuous
Transient Input Voltage		80	Vdc	100 ms max.
Input/Output Isolation		1500	Vdc	
Operating Case Temperature	-40	100	°C	
Storage Temperature	-40	110	°C	

Electrical Specifications: Unless otherwise indicated specifications apply over all operating input voltage, resistive load, and temperature conditions.

INPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Operation Input Voltage (V_i)	36	48	60	V	
Maximum Input Current ($I_{i,max}$):			10	A	V_i = 0Vdc to 60Vdc I_o = $I_{o,max}$
Inrush Transient			1.0	A^2 s	
Input Reflected-Ripple Current: Peak to Peak		5		mAp-p	5Hz~20MHz, 12 μH Source Impedance
Input Ripple Rejection		60		dB	@ 120Hz

i. Specifications subject to change without notice.
ii. All illustrations are for reference only.

Caution: This power module is not internally fused. An input line fuse must always be used.

OUTPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Output Voltage Set Point ($V_{o,set}$)	25.55	26.00	26.45	V	T_c=25°C, V_i=48V,
Line Regulation		0.01	0.1	%	I_o= $I_{o,max}$
Load Regulation		0.05	0.2	%	V_i=36V to 75V
Temperature Drift		50	300	mV	I_o=0.5 to $I_{o,max}$
Output Ripple and Noise Voltage: Peak to Peak		100	80	mVp-p	With Output External Capacitors 220uF/35V 100 mohm 3EA. Bandwidth 5Hz to 30MHz
Output Current(I_o):	0.15		8.5	A	At Io< 0.5A,The Modules May Exceed Output Ripple Specifications
Output Current limit	9.0	9.8	11.5	A	V_o=90% of $V_{o,set}$
Output Short Circuit Current			170	%$I_{o,max}$	Vo=250mV
Switching Frequency		370		kHz	
Efficiency	85 75	87		% %	Tc=25°C, I_o=$I_{o,max}$ Tc=25°C, I_o=1.9A
Dynamic Response: Peak Deviation Setting Time		3	300	%$V_{o,set}$ μs	10%-100%-10% Load, 1A/μs, 863Hz

CONTROL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Logic On/Off:					
Logic Low: Ion/off			1	mA	Von/off=0V
Von/off			1.2	V	Ion/off<1mA
Logic High:Ion/off (Leakage Current)			50	μA	Von/off=15V
Von/of			15	V	Ion/off=0.0 μA
Turn-On Time		25	50	ms	I_o= 80% of $I_{o,max}$, V_o within +/- 1% $V_{o,set}$, -10°C to +80°C
Output Remote Sense Range			1.0	V	
Output Voltage Trim Range	60		105	%$V_{o,set}$	
Over Voltage Protection	27.5		31.2	V	Auto recovery
Over Temperature Protection	100	105	110	°C	Auto recovery

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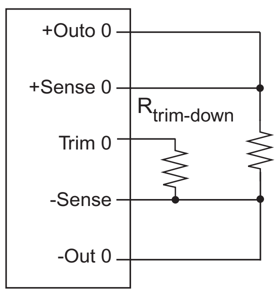
ISOLATION SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input to Output		1500		Vdc	
Input to Case		1500		Vdc	
Output to Case		500		Vdc	
Input to Output Capacity		2000		pF	
Isolation Resistance	10			Mohm	

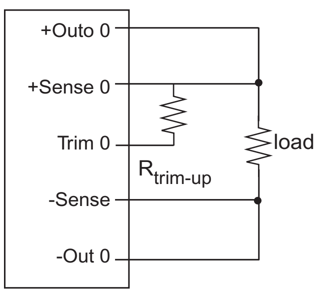
GENERAL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
MTBF		1.3		Mhrs	Tc=40ºC, I_o =80% of $I_{o,max}$
Weight		118		g	
Size		2.39x2.28x0.52		in^3	

TRIM CIRCUIT



Trim-down



Trim-up

Rtrim-down= ((100/Δ%)-2))kohms

$$\text{Rtrim-up}= \left(\frac{Vo(100+\Delta\%)}{1.225\,\Delta\%} - \frac{100+2\,\Delta\%}{\Delta\%}\right)\text{kohms}$$

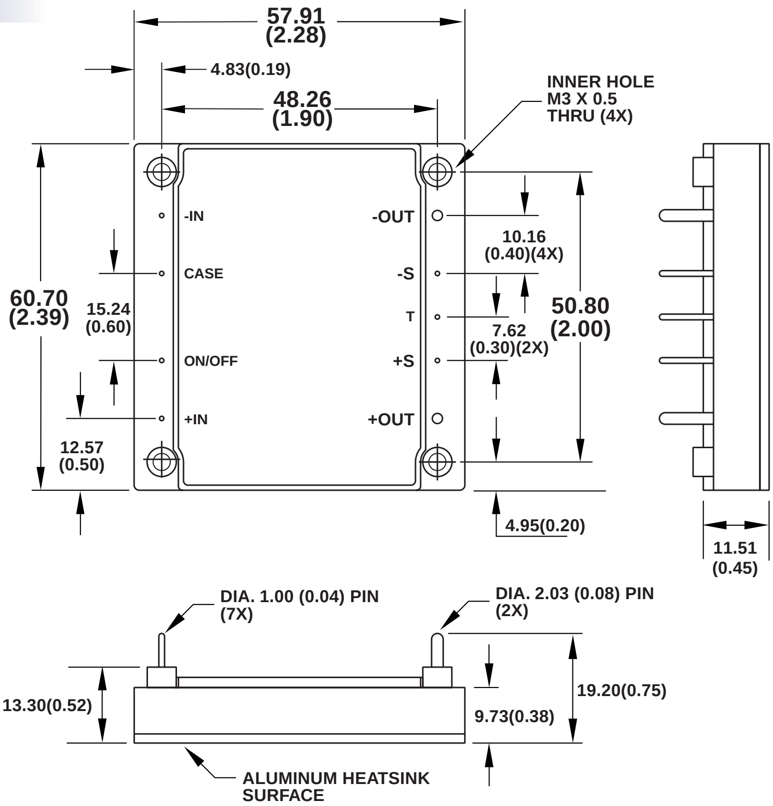
Δ% = Desired Output Voltage Change

Vo = Output Voltage (26V)

Rtrim-up= External Resistor Value to Increase Vo

Rtrim-down= External Resistor Value to Decrease Vo

OUTLINE DRAWING



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SV48-26-225

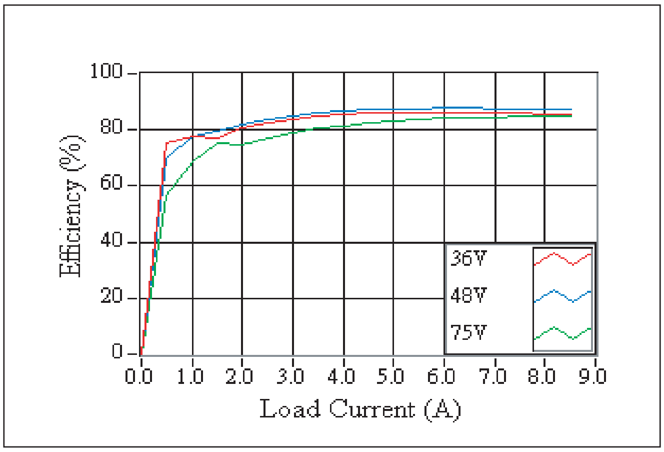

Figure 1. *Efficiency at nominal output voltage vs. load current for 36V, 48V and 75V input voltage at Tc=25°C*

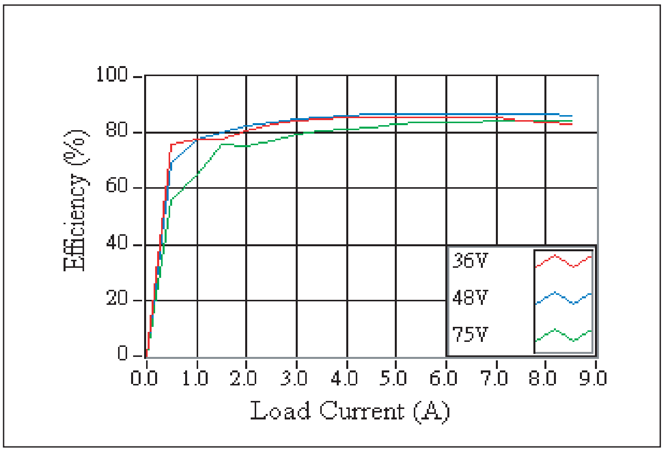

Figure 2. *Efficiency at nominal output voltage vs. load current for 36V, 48V and 75V input voltage at Tc=70°C*

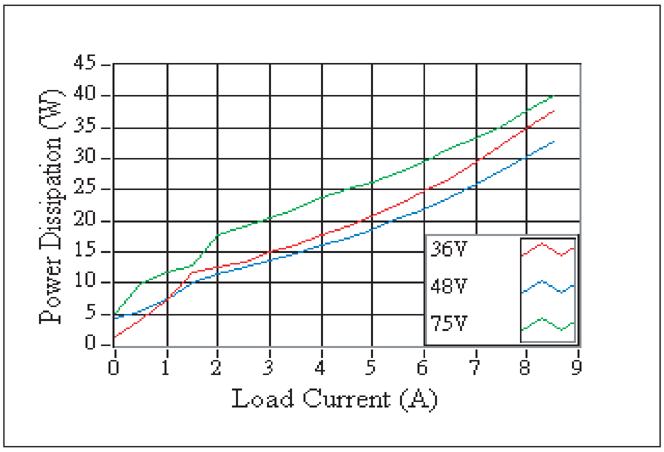

Figure 3. *Power dissipation at nominal output voltage vs. load current for 36V, 48V and 75V input voltage at Tc=25°C*

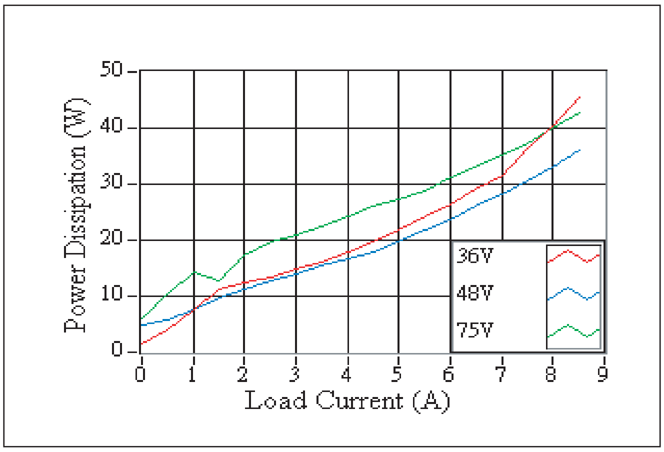

Figure 4. *Power dissipation at nominal output voltage vs. load current for 36V, 48V and 75V input voltage at Tc=70°C*

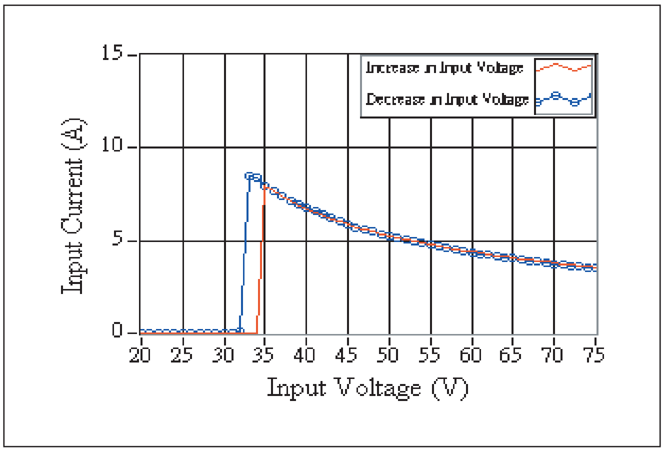

Figure 5. *Input current vs. input voltage for maximum load current*

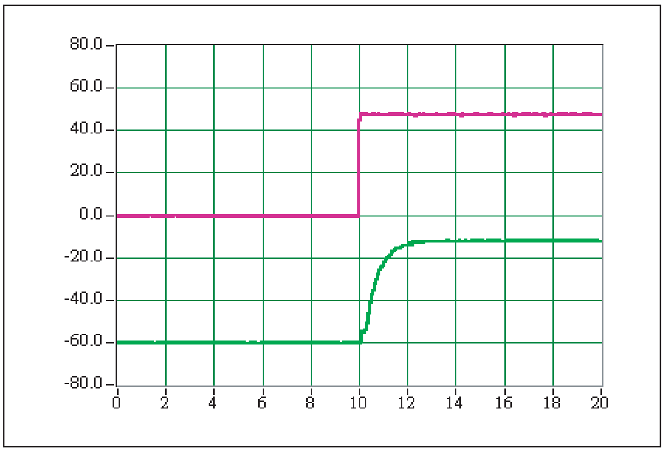

Figure 6. *Typical start-up at 0.8Io,max load current (10ms/div)*
Top Trace: 48V input voltage (20V/div)
Bottom Trace: Output voltage (10V/div)

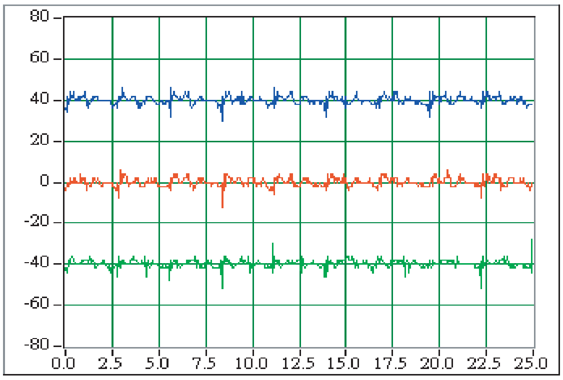

Figure 7. Output voltage ripple at maximum output current and (2.5µs/div)
Top Trace: 36V input voltage (100mV/div)
Middle Trace: 48V input voltage (100mV/div)
Bottom Trace: 75V input voltage (100mV/div)

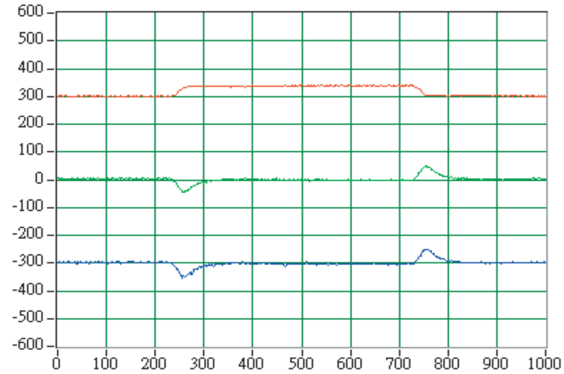

Figure 8. Output voltage response to step-change in load current at 48V input voltage and dI/dt=0.1A/µs (100µs/div)
Top Trace: Step change in 25% of Io,max (1V/div)
Middle Trace: 25%-50%-25% of Io,max (100mV/div)
Bottom Trace: 50%-75%-50% of Io,max (100mV/div)

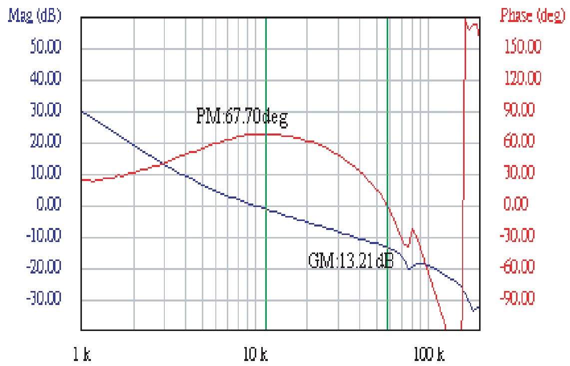

Figure 9. Magnitude and phase of loop gain for 48V input voltage at full rated power and 25°C

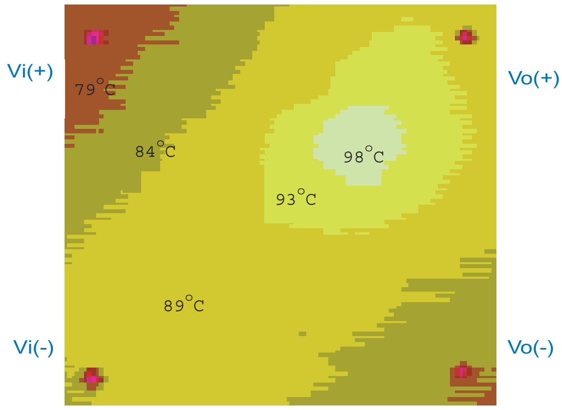

Figure 10. Thermal plot without heat sink at 48V input voltage, maximum load current and room temperature, measured after half an hour

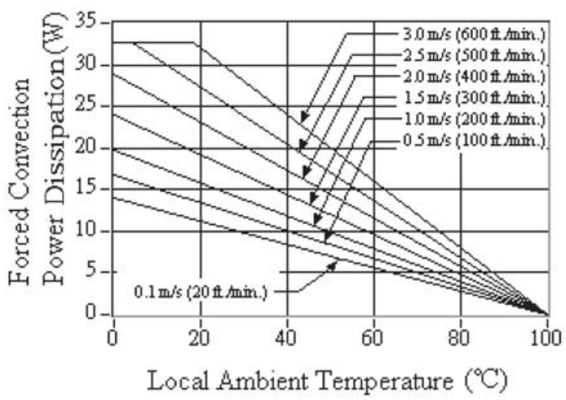

Figure 11. Forced convection power dissipation vs. local ambient temperature with no heat sink for either orientation

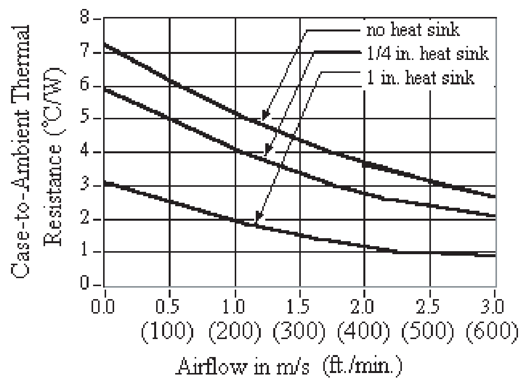

Figure 12. Case-to-ambient thermal resistance vs. airflow for either orientation

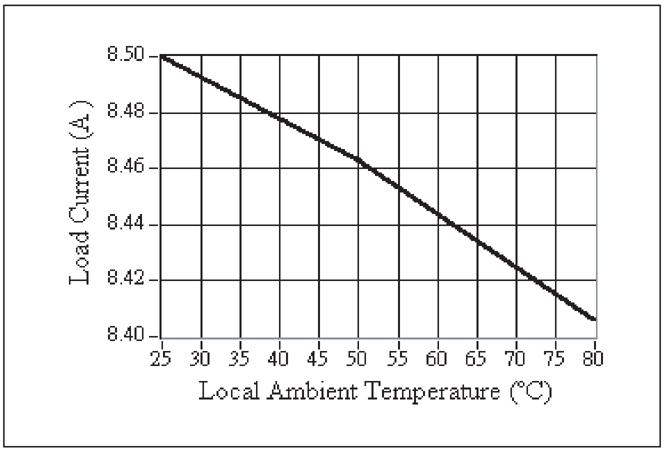

Figure 13. *Load current at maximum power derating vs. local ambient temperature*