

Engineering Specification

Model No : DC7013-000G

Customer: Huawei

Part No: SPEC- DC7013-000G

Revision: D

Engineer: 張華錡

High Output Power, High Efficiency Full Brick, MV48-28-700L

**Module: 36Vdc to 76Vdc Input, 28Vdc Output,
Output Power UP to 700W, Independent Auxiliary Power.**

**World's Most Advanced Ultra High Power
Density DC-DC Converters.**



DESCRIPTION:

MegaVerter MV48-28 modules are high power density and high efficiency DC-DC converters designed for uses in telecom and other centralized modular and distributed power applications. All use metal baseplates, planar transformers, and surface mount construction to produce up to 700W maximum.

FEATURES:

- Miniature Size: 116.8mm x 61mm x 12.7mm (4.59in. x 2.40in. x 0.50in.)
- High Power Density: Up to 127W/in.³
- High Efficiency: 92% Typical
- Low Output Noise
- Industry-Standard Size
- Metal Baseplate
- Thermal Protection
- Over Voltage Protection
- Current Limit/Short Circuit Protection
- Adjustable Output Voltage: 60% to 115% of $V_{o,set}$
- Remote Sense
- Independent Auxiliary Power: 7-10V, $I_o \leq 20mA$
- I.O.G (DC Good): Open Collector Output
- Remote ON/OFF Control: Short-ON, Open-OFF

SPECIFICATIONS:

ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage (+In to -In)	-0.3		80	V	<100ms
	-0.3		76	V	Continuous
Storage Temperature	-55		+125	°C	
Storage Humidity	10		95	%	
Operating Temperature	-40		+100	°C	Temperature measure shall be taken from the baseplate (Tb). Refer to Fig.5 for location definition
Operating Humidity	30		95	%	

INPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Operation Input Voltage (Vi)	36	48	76	V	
Maximum Input Current (Ii,max) MV48-28-700L			16.4	A	Vi=48V, Io =Io,max @Tb=25°C
Inrush Transient			2	A ² s	
Input Ripple Rejection		60		dB	@ 120Hz

OUTPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Output Set Point (Vo,set)	27.95	28.0	28.05	V	Initial Adjusted @Tb=25°C, Vi=48V, Io=Io,max
Output Voltage Accuracy (28V)	27.72	28.0	28.28	V	Vi=48V, Io=Io,max
Line Regulation		0.01	0.2	%	Vi=36V to 76V
Load Regulation		0.05	0.2	%	Io= Io,min to Io,max.
Temperature Drift		0.002	0.02	%/°C	Tb= -40 to 100°C
Output Ripple and Noise Voltage Peak to Peak			280	mVp-p	Bandwidth 5Hz to 100MHz and with filter 0.1uF MLCC series 100 ohm Min. Output Capacitor: 220uF *2, Tc>= -20°C 220uF *4, Tc<= -20°C
Output Current (Io,max) MV48-28-700L	0		25.0	A	At Vo<=28V, if Vo>28V, Output Power (Po) should be less than its rating power.
Output Current limit	105		140	%Io,max	Current limit inception point Vo=90% of Vo,set @Tb=25°C
Output Short Circuit Current			310	%Io,max	Current limit inception point Vo=250mV
Output Over Voltage Protection	115		140	%Vo,set	Io=0.5A
Auxiliary Voltage	7	8	10	V	Io <= 20mA

*Note 1: The suggest aluminum capacitor is Chemi-Con LXZ series or equivalent. Using lower dissipation factor (tan δ) at low temperature will be better.

OUTPUT SPECIFICATIONS (CONTINUED):

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Efficiency		92		%	$V_i=48V$, $V_o=28V$, $I_o=80\%I_{o,max}$ @ $T_b=25^\circ C$
Dynamic Response: Peak Deviation Settling Time		3	300	% $V_{o,set}$ us	25% - 50% -75% load, 0.1A/us; With Cap. 220uF/35V $T_b=25^\circ C$, $V_i=48V$

CONTROL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Turn-On Time			200	ms	$I_o=80\%$ of $I_{o,max}$ V_o with $\pm 1\% V_{o,set}$
Output Voltage Adjustment Output Voltage Trim Range	60		115	% $V_{o,set}$	With Cap. 220uF/35V, @ $T_b=25^\circ C$, Refer Trim Function below * Note 1
Over Temperature Protection Shutdown Recovery	100 90	105	110	$^\circ C$ $^\circ C$	Auto. Recovery
Under Voltage Turn On	22.8	23.8	24.8	V	$I_o = 0.5 A$
Under Voltage Turn Off	20	21	22	V	$I_o = 0.5 A$
Hysteresis	2	2.8		V	

*Note 1: Output Voltage Trim-up Range can extend to 115% while the input voltage is above 42V.

ISOLATION SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input to Output		1500		Vdc	60 seconds
Input to Case		1500		Vdc	60 seconds
Output to Case		500		Vdc	60 seconds
Input to Output Capacitance		2000		pF	
Isolation Resistance	100			Mohm	at $T_b=25^\circ C$ and 70%RH, Output to Baseplate - 500VDC

STRUCTURAL DYNAMICS:

PARAMETER	CONDITIONS
Vibration	Sine Wave, 10-55Hz (Sweep for 1 min.), Amplitude 0.825mm Constant (Maximum 0.5g) X,Y,Z 1 Hour each, At No Operating,
Shock	20g, 166 in/sec, Square Wave

GENERAL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
MTBF		1.2		Mhrs	$T_b=40^\circ C$, $I_o=80\% I_{o,max}$, $V_i=48V$
Weight		225		g	
Size (WxHxD)		4.59x2.4x0.5		in.^3	

OUTPUT VOLTAGE ADJUSTMENT RANGE:

The output voltage can be programmed by applying an external voltage or external resistor at the TRIM pin. The possible range of values is defined in figure 1. Take note that increasing the output voltage decreases the input voltage range. The OVP will be triggered if the output voltage range exceeds the range defined below. Also, to limit the output power of the module to within specifications, increasing the output voltage needs a corresponding de-rating of the output current.

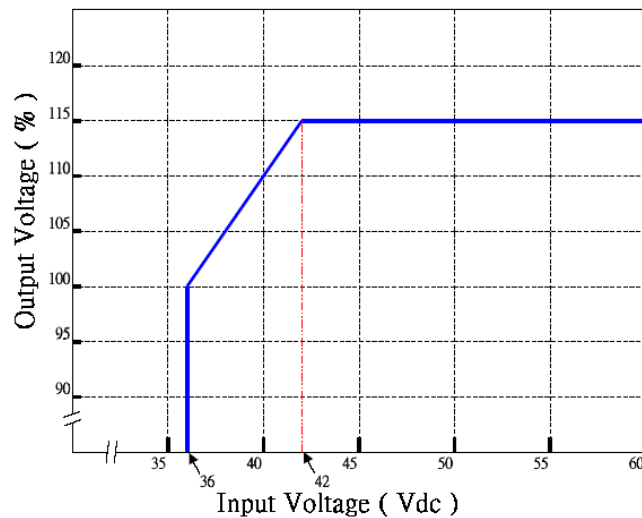
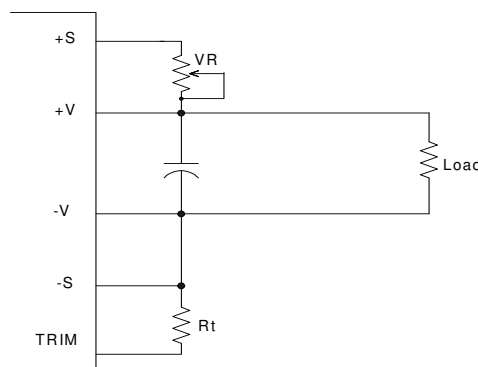


Fig. 1 Limit of Input Voltage.

A. Output Voltage Adjusted by using external resistor and/or variable resistor:



The output voltage can be determined by below equations:

$$V_f = \frac{1.225 * (R_t // 32.4)}{7.32 + (R_t // 32.4)} \quad (V)$$

$$V_{out} = (28 + VR) * V_f \quad (V)$$

Rt: +/-5% tolerance

VR: +/-20% tolerance

Unit: K ohm

Rt:43K ohm and VR:10K ohm for output +/-10% Variable.

Fig. 2 The schematic of output voltage adjusted by using external resistor and/or variable resistor.

B. Output Voltage Adjustment by Applying External DC Voltage:

The output voltage can be adjusted either by applying an external voltage or external resistor at the trim terminal. The relationship between the trim voltage and output voltage is shown in figure 3.

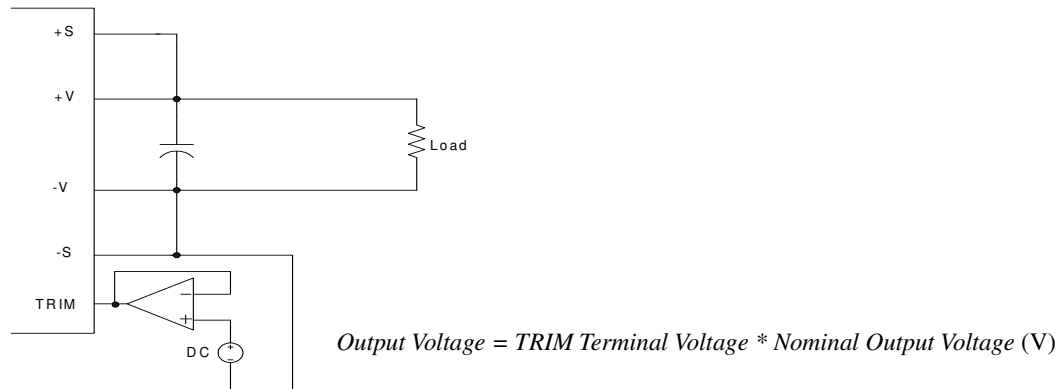


Fig. 3 The schematic of output voltage adjusted by using external DC voltage.

For all other applications not defined above, the trim circuit of figure 4 may be used.

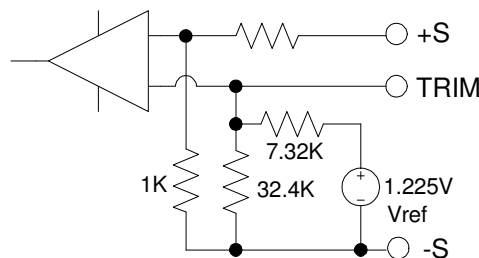
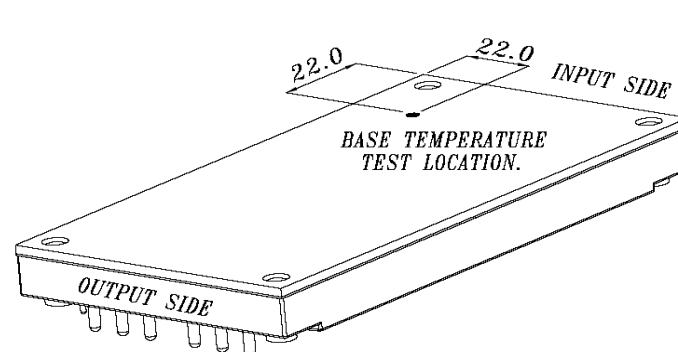


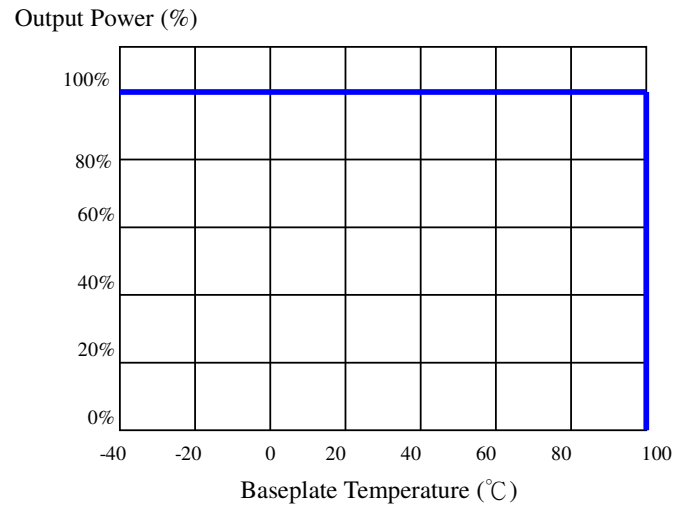
Fig. 4 Trim Circuit (for the reference)

BASEPLATE MEASURE POINT:



UNIT: mm

Fig. 5 Baseplate Temperature Measure Point.

DERATING CURVE (for MV48-28-700 only):

OUTLINE DRAWING:

