ACBEL POLYTECH INC.

Engineering Specification

Model No : DC8027-090G Customer: Huawei

Part No: SPEC-DC8027-090G

Revision: 1

Engineer: Bruce_Huang

AcBel Product Specification

Acbel Part No.	DC8027-090G
Model Name	SV48-28-350A
Description	DC-DC Converter 48Vdc Input, 28Vdc Output, 350W Output Power, Negative ON/OFF control
Specification Version	Rev.1
Date Issued	08/27/2009

High Output Power, High Efficiency Half Brick,

DC8027-090G SV48-28-350A

Module: 36Vdc to 76Vdc Input,

28Vdc Output, Output Power Up to 350W.

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

DESCRIPTION:

The SUPERVERTER™ module is a high density DC-DC converter designed for use in distributed power architectures, workstation, EDP equipment, and telecommunication applications. The surface-mount construction uses a metal baseplate and planar transformer to produce up to 350W in a half brick package. The SUPERVERTER™ module is a suitable replacement for all industry.

OPTIONS

- Remote On/Off Logic Configuration
- Heat Sink Available for Extended Operation

FEATURES:

- Industry Standard Half brick: 61.0mm x 57.9mm x 12.7mm (2.40in. x 2.28in. x 0.50in.) (Typical)
- High Power Density: Up to 128W/in.^3
- High Efficiency: 92% Typical
- Low Output Noise
- Metal Baseplate
- Thermal Protection
- Input Under Voltage Protection
- Output Over Voltage Protection
- Current Limit Protection: Step down mode
- Short Circuit Protection
- Adjustable Output Voltage: 60% to 120% of Vo, set
- Remote Sense
- Remote ON/OFF Control: Negative Logic
- Safety UL 60950-1/CE
- RoHS Compliant

SPECIFICATIONS:

ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage (+In to –In)	-0.3		100	V	<100ms, no damage
	-0.3		76	V	Continuous
Logic ON/OFF Voltage (ON/OFF to –In)	-0.3		15	V	
Storage Temperature	-40		125	℃	
Storage Humidity	10		95	%	
Operating Temperature	-40		100	℃	Temperature measure shall be taken from the baseplate (Tb).
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)			11	A	Vi=36V, Io =Io,max
Inrush Transient			2	A^2s	
Input Reflected-Ripple Current: Peak-Peak		40	60	mAp-p	5HZ to 20MHZ, Vin=48V, Io= Io,max, 12uH source Impedance, Cin=690uF, Ta=25℃
Input Ripple Rejection		60		dB	@ 120Hz
Input Under Voltage Protection: Turn-on Threshold Turn-off Threshold Hysteresis	26	 31 27 4	32	 V V V	Vo=28V, Io=0.5A.

OUTPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Output Set Point (Vo,set)	27.95	28	28.05	V	Initial Adjusted @Tb=25℃,Vi=48V, Io=Io,max
Output Voltage Tolerance Band	-3		+3	%	All Operating Condition
Line Regulation			0.2	%	Vi=36V to 76V
Load Regulation			0.2	%	Io= Io,min to Io,max.
Temperature Drift			0.02	%/ ℃	Tb= -40 to 100℃
Output Ripple and Noise Voltage Peak to Peak			350	mVp-p	Bandwidth 5Hz to 20MHz and with 0.1uF MLCC. Output Capacitor:880uF @Tb=25℃
Output Current (Io,max)	0		12.5	A	
Output Current Limit	105		145	%Io,max	Current limit inception point Vo=90% of Vo,set
Output Short Circuit Current			170	%Io,max	Hiccup Mode
Output Over Voltage Protection	125		150	%Vo	Io=0.5A
External Capacitance	880		5000	uF	Low ESR Capacitor
Output Power			350	W	

OUTPUT SPECIFICATIONS (CONTINUED):

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Efficiency		92		%	Vi=48V, Vo=28V, Io=80 % of Io,max @Tb=25 ℃.
Dynamic Response: Peak Deviation Settling Time		2 500		%Vo,set us	25%-50%-75% of Io,max, Slew rate 0.1A/μs, with load cap. 880uF. Tb=25℃, Vi=48V ±1% Error Band

CONTROL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Logic ON/OFF Remote Logic Low = module On Logic High = module Off Logic Low: Ion/off Von/off Logic High: Ion/off Von/off	 2	 	 1 0.7 50 	 mA V uA V	 Von/off=0V Ion/off<1mA Von/off=15V Ion/off=0.0μA
Turn-On Delay & Rise Times Tdelay Trise		 10 10	 50 50	 ms ms	 Tdelay = Time until Vo = 10% of Vo, set from either application of Vi with Remote On/Off set to On or operation of Remote On/Off from Off to On with Vi already applied for at least one second. Trise = time for Vo to rise from 10% to 90% of Vo,set.
Output Voltage Trim Range	60		120	%Vo	Refer Trim Circuit.
Over Temperature Protection	100	105	115	℃	Auto. Recovery, full load, Baseplate Temperature
Switching Frequency		240		KHz	

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 Tb=25℃ and 70%RH, Output to Baseplate - 500VDC

STRUCTURAL DYNAMICS:

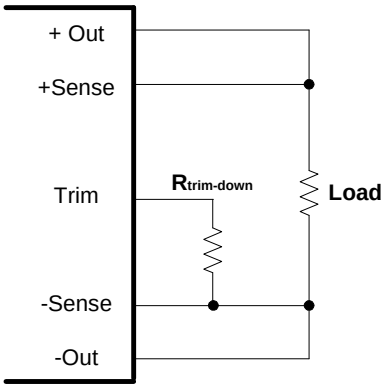
PARAMETER	CONDITIONS
Vibration	Sine Wave, 10-55Hz (Sweep for 1 min.), Amplitude 0.825mm Constant (Maximum 5g) X,Y,Z 1 Hour each, At No Operating,
Shock	20g, 166 in/sec, Square Wave

GENERAL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
MTBF		2		Mhrs	Tb=40℃, Vi=48V, Io=80% of Io,max
Weight		100		g	
Size (WxHxD)		2.40x2.28x0.5		in.^3	

TRIM CIRCUIT:

A. Trim down: The resistor for output voltage trim-down function could be calculated with the following formula:

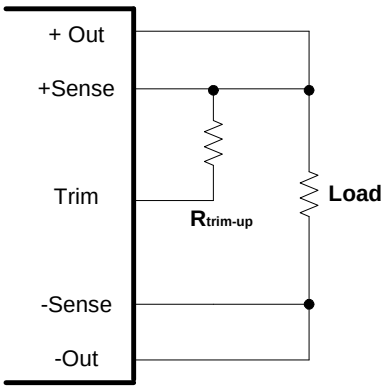


$$R_{trim-down} = \left(\frac{100\%}{\Delta\%} - 2\right)(k\Omega)$$

$\Delta\%$: Output voltage change rate against nominal output voltage.

Fig. 1 The schematic for output voltage trim down.

B. Trim up: The resistor for output voltage trim-up function could be calculated with the following formula



$$R_{trim-up} = \left[\frac{Vo(100\% + \Delta\%)}{1.225\Delta\%} - \frac{(100\% + 2\Delta\%)}{\Delta\%}\right](k\Omega)$$

Vo: The nominal output voltage.

$\Delta\%$: Output voltage change rate against nominal output voltage.

Fig. 2 The schematic for output voltage trim up.

BASEPLATE MEASURE POINT:

UNIT: mm

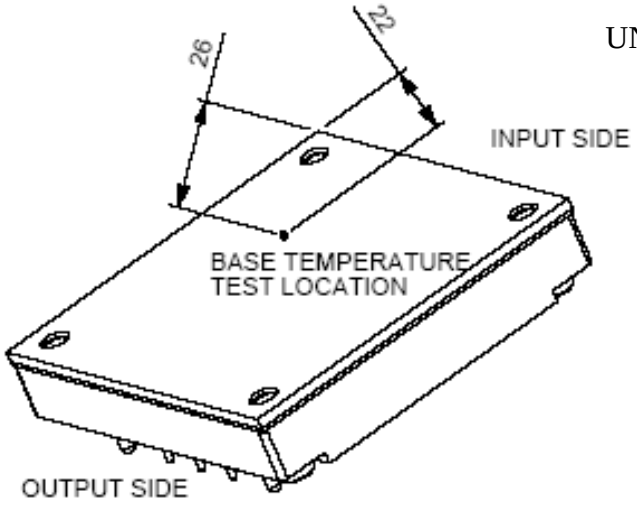
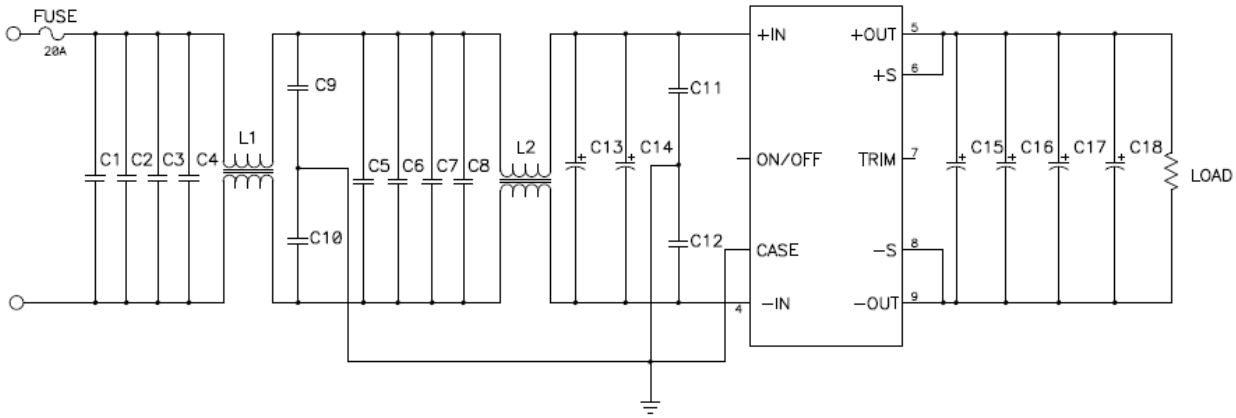


Fig. 3 Base plate Temperature Measure Point.

TYPICAL APPLICATION CIRCUIT:

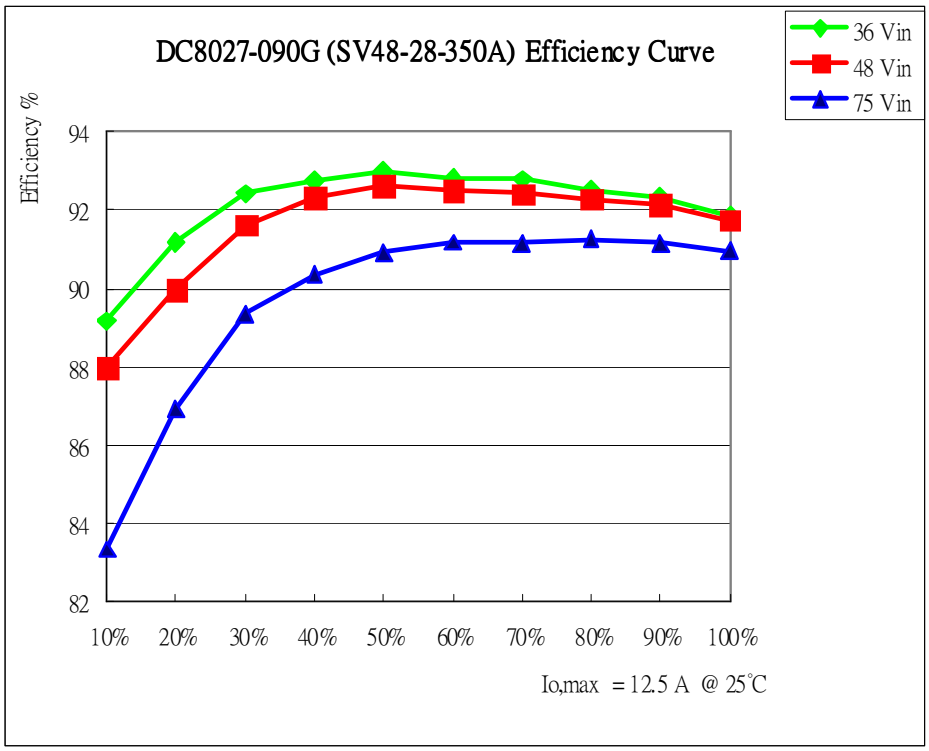
Conducted EMI was tested by placing the module in the application circuit of figure 4. The fundamental switching frequency is 240kHz. Careful layout must me considered to ensure that the EMI filter components will be effective in suppressing noise.



C1~C8	:	2.2uF Ceramic Capacitor
C9~C12	:	0.1uF Ceramic Capacitor
C13~C14	:	220uF Electrolytic Capacitor
C15~C18	:	220uF Electrolytic Capacitor
L1, L2	:	810uH

Fig. 4 The CISPR 22 class B application circuit

EFFICIENCY CURVE:



OUTLINE DRAWING: