
Engineering Specification

Model No : DC8010-AQ0G

Customer: Zyxel

Part No: SPEC-DC8010-AQ0G

Revision: 3

Engineer: Bruce_Huang

High Output Power, High Efficiency Half Brick, SV48-13.5-100

**Module: 36Vdc to 75Vdc Input,
13.5Vdc Output, Output Power Up to 100W**

**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 100W 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:

- Miniature Size: 61.0mm x 57.9mm x 14.2mm (2.40in. x 2.28in. x 0.56in.) (Typical)
- High Power Density: Up to 32.6W/in.³
- High Efficiency: 89% Typical
- Low Output Noise
- Industry-Standard Size
- Thermal Protection
- Under Voltage Protection
- Over Voltage Protection
- Current Limit/Short Circuit Protection
- Adjustable Output Voltage: 60% to 105% of V_o
- Remote Sense
- Remote ON/OFF Control: Short-OFF, Open-ON
- Safety: TBD
- RoHS Compliant

SPECIFICATIONS:
ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage (+In to -In)	-0.3		100	V	<100ms
	-0.3		75	V	Continuous
Storage Temperature	-40		125	°C	
Storage Humidity	10		95	%	
Operating Temperature	-40		85	°C	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	75	V	
Maximum Input Current (Ii,max)			2.5	A	Vi=48V, Io =Io,max
Inrush Transient			2	A ² s	
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°C
Input Ripple Rejection		60		dB	@ 120Hz
Input Under Voltage Protection: Turn-on Threshold	31	32	33	V	Vo=13.5V, Io=0.5A.
Turn-off Threshold	27	28	29	V	

OUTPUT SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Output Set Point (Vo,set)	13.45	13.5	13.55	V	Initial Adjusted @Tb=25°C, Vi=48V, Io=Io,max
Output Voltage Accuracy	13.365		13.635	V	Io=Io,max
Output Voltage Tolerance Band	-3		+3	%	All Operating Condition
Line Regulation			0.2	%	Vi=36V to 75V
Load Regulation			0.2	%	Io= Io,min to Io,max.
Temperature Drift			0.02	%/ °C	Tb= -40 to 85°C
Output Ripple and Noise Voltage Peak to Peak		50	150	mVp-p	Bandwidth 5Hz to 20MHz and with 0.1uF MLCC. Output Capacitor:880uF Tb = 25°C
Output Current (Io,max)	0.5		7.5	A	
Output Current Limit		8.6	9.8	A	Current limit inception point Vo=90% of Vo,set
Output Short Circuit Current			170	%Io,max	Auto. Recovery
Output Over Voltage Protection	14.5		17.5	V	Auto. Recovery
External Capacitance		880		uF	
Output Power			100	W	

OUTPUT SPECIFICATIONS (CONTINUED):

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Efficiency	86	89		%	$V_i=48V$, $V_o=13.5V$, $I_o=80\%$ of $I_{o,max}$ @ $T_b=25^\circ C$.
Dynamic Response: Peak Deviation Settling Time		2	500	% $V_{o,set}$ us	25%-50%-75% of $I_{o,max}$, Slew rate $0.1A/\mu s$, with load cap. $880\mu F$. $T_b=25^\circ C$, $V_i=48V$ $\pm 1\%$ Error Band

CONTROL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Logic ON/OFF Remote Logic Low = module Off Logic High = module On					
Logic Low: Ion/off Von/off			1 0.7	mA V	Von/off=0V Ion/off<1mA
Logic High: Ion/off Von/off	2.1		50	uA V	Von/off=15V Ion/off=0.0uA
Turn-On Delay & Rise Times Tdelay		40		ms	Tdelay = Time until $V_o = 10\%$ of V_o , set from either application of V_i with Remote On/Off set to On or operation of Remote On/Off from Off to On with V_i already applied for at least one second.
Trise		50		ms	Trise = time for V_o to rise from 10% to 90% of $V_{o,set}$.
Output Voltage Adjustment Output Voltage Trim Range	60		105	% V_o	With Cap. $220\mu F*4/50V$, @ $T_b=25^\circ C$, Refer Trim Circuit.
Over Temperature Protection		100		$^\circ C$	Auto. Recovery, Baseplate Temperature

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	

STRUCTURAL DYNAMICS:

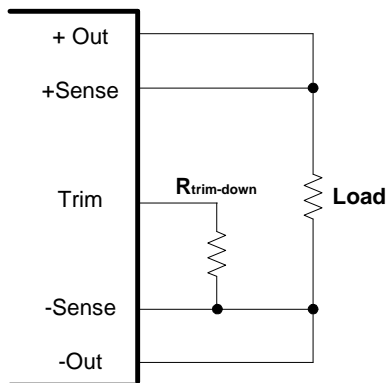
PARAMETER	CONDITIONS
Vibration	Sine Wave, 10-55Hz (Sweep for 1 min.), Amplitude 0.825mm Constant (Maximum 5g) X,Y,Z 1 Hour each, At No Operating,
Shock	20g, 166 in/sec, Square Wave

GENERAL SPECIFICATIONS:

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
MTBF		2		Mhrs	Tb=40°C, Vi=48V, Io=80% of Io,max
Weight		85		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:

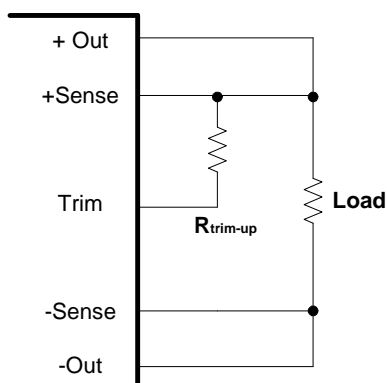


$$R_{trim-down} = \left(\frac{100\%}{\Delta\%} - 2 \right) (k\Omega)$$

$\Delta\%$: 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



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

V_o : 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

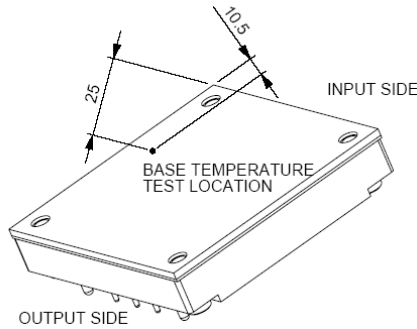
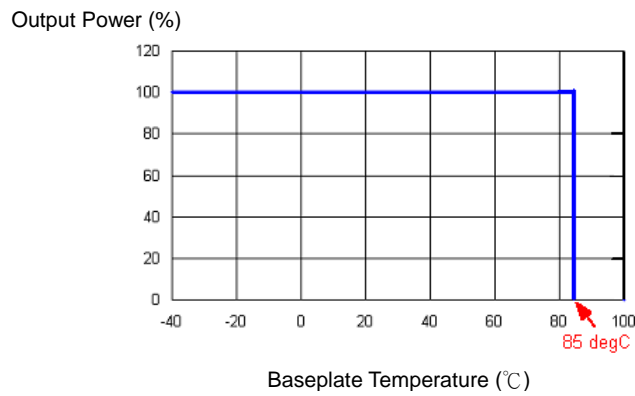


Fig. 3 Baseplate Temperature Measure Point.

DERATING CURVE:



OUTLINE DRAWING:

- NOTES:
 1. UNIT : mm [INCH]
 2. TOLERANCE: X.X[.XX] +/- 0.5 [0.02]
 X.XX[.XXX] +/- 0.25 [0.10]

