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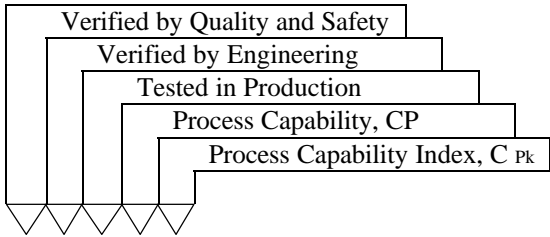
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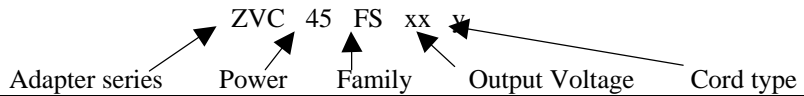
	APPROVALS	DATE	TITLE	
	Eng:		ENGINEERING SPECIFICATION ZVC45FSsxy/ 40FSsxy/36FSsxy /30FSsxy/25FSsxy/20FSsxy	
CAMARILLO, CALIFORNIA 1-805-484-9998	Qual:		DWG NO.	
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1. SCOPE

This is the engineering specification of EOS “Micro-Z” series 45W/40W/36W/25W/20Watt power switching power supply, with auto select 90V-132V/170V-264V AC input, single DC output, packaged into a fully enclosed plastic case with integrated output cable and connector. Power and Output Voltages covered : ZVC45FS24y /ZVC45FS19y/ZVC40FS15y ZVC36FS24y/ZVC36FS19y/ZVC36FS15y/ZVC36FS12y/ZVC36FS09y ZVC30FS24y/ZVC30FS19y/ZVC30FS15y/ZVC30FS12y/ZVC25FS09y ZVC20FS05y.

Model Description:



2. CONNECTIONS

The following specifies the input and output connection requirement of the power supply.

2.1	INPUT CONNECTOR Two wire, C8, IEC 320 connector.
2.2	OUTPUT CABLE/CONNECTOR A two-wire cable with an o/p connector is used. The available length of the cables offered vary between 36 inch to 72 inch. Different cable specifications with different length and o/p connector are attached as applicable.
2.3	PIN ASSIGNMENTS

INPUT (J1)	OUTPUT (CS1)
Pin 1: Line	Outside: GND
Pin 2: Neutral	Inside : +Vout(1)

3. ELECTRICAL REQUIREMENTS

(Unless specified otherwise , all specifications are at nominal input voltage, full load, 25 deg C , PSU at warmed up condition.)

	3.1	INPUT The operating conditions with respect to the AC input voltage are described in this section.
	3.1.1	INPUT VOLTAGE The operating voltage range is: 90 to 135 VAC and 170 to 264 VAC, single phase. (Auto Select)
	3.1.2	INPUT CURRENT When the input voltage is 90VAC at 45W, then the max input current shall be less than 1.1A.
	3.1.3	INPUT FREQUENCY Input frequency range shall be 47 – 63 Hz.
	3.1.4	INRUSH CURRENT Maximum inrush shall be less than 40A at 264VAC.
	3.1.5	EFFICIENCY The efficiency of the power supply is 90% nominal. Measured at Full Load and nominal AC input voltage of 230 VAC, 25°C with the PSU warmed up, at 24V output. O/P Cable drop of 0.25V typical is removed for this calculation. The lowest efficiency is 82% for +5V output model.
	3.1.6	POWER FACTOR Input AC voltage connects to internal diode bridge rectifier and Filter . Typically the PF at 110VAC, 45W output load is >0.6 .
	3.2	OUTPUT The operating conditions for the regulated DC output are described in this section.
	3.2.1	OUTPUT POWER Max. rated power for a specific model ZVCxxFSyyE is “XX”Watt. For example: ZVC45FS24Y model has maximum rated output power of 45 watts.



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3.2.2 OUTPUT VOLTAGE

Initial set point voltage is measured at Min. Load / Half Load / Max. load , at nominal input AC voltage. The nominal output voltage of a specific model ZVCxxFSyyE is “YY” volt. This voltage change is indicative of change due to process variation and change due to load variation. The set point tolerance is measured with reference to the respective nominal Voltage and expressed as percentage of the nominal output voltage.

Model	OUTPUT	NOMINAL VOLTAGE	SET POINT TOLERANCE	User Adjust.
ZVCxxFS05y	+Vout(1)	+5VDC	<5%	NA
ZVCxxFS09y	+Vout(1)	+9VDC	<5%	NA
ZVCxxFS12y	+Vout(1)	+12VDC	<5%	NA
ZVCxxFS15y	+Vout(1)	+15VDC	<5%	NA
ZVCxxFS19y	+Vout(1)	+19VDC	<5%	NA
ZVCxxFS24y	+Vout(1)	+24VDC	<5%	NA

3.2.3 OUTPUT CURRENT

The maximum load capacitance shall be less than 470uF for any nominal output voltage below 15v and 330uF for any nominal o/p volt above 15V. Any load capacitance shall be discharged below 1V before the PSU is turned on. The max. continuous rated output current for the specific models is listed below. Under overload, max permissible power is 68w and for each model overload protection (Over Current Protection) shall not be activated below the Min. OCP limit shown.

Model	Output	MIN. Load Current	MAX. Load Current	MIN. OCP Current Limit.
ZVC20FS05y	+Vout(1)= 5V	0.50A	4.00A	5.00A
ZVC25FS09y	+Vout(1)= 9V	0.2A	2.77A	3.5A
ZVC30FS12y	+Vout(1)=12V	0A	2.5 A	2.75A
ZVC30FS15y	+Vout(1)=15V	0A	2.00A	2.20A
ZVC30FS19y	+Vout(1)=19V	0A	1.57A	1.73A
ZVC30FS24y	+Vout(1)=24V	0A	1.25A	1.37A
ZVC36FS09y	+Vout(1)= 9V	0A	4.00A	4.33A
ZVC36FS12y	+Vout(1)=12V	0A	3.00 A	3.35A
ZVC36FS15y	+Vout(1)=15V	0A	2.40A	2.60A
ZVC36FS19y	+Vout(1)=19V	0A	1.90A	2.05A
ZVC36FS24y	+Vout(1)=24V	0A	1.50A	1.62A
ZVC40FS15y	+Vout(1)=15V	0A	2.66 A	2.86A
ZVC45FS19y	+Vout(1)=19V	0A	2.36 A	2.52A
ZVC45FS24y	+Vout(1)=24V	0A	1.87 A	2.00A

3.2.4. LINE REGULATION

Regulation is measured by varying the line voltage from 90 - 132VAC/175 - 264VAC, at full load.

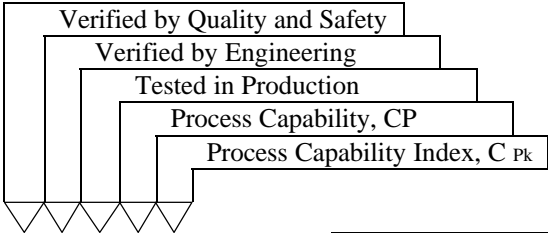
Model	OUTPUT	TOLERANCE
All	+Vout(1)	<0.5%

3.2.5 LOAD REGULATION

Measured by varying the load current from respective MIN. load to 100% of the MAX rated load, at nominal AC input voltage. The measured output voltage will be within the voltage tolerance band indicated below. Tolerance is expressed as percentage of the respective nominal voltages. Voltage is measured at the o/p power cord end.

Model	OUTPUT	TOLERANCE
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All	+Vout(1)	<5%
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3.2.6	CROSS REGULATION Measured at 50% load on the output while any other output load changed by 50%.
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All Models	Not Applicable.
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3.2.7	OUTPUT RIPPLE AND NOISE VOLTAGE (PARD) Measured at full load, 20MHz bandwidth, with a 0.1uF Ceramic Cap and a 10 uF Tant. Cap /E-Cap . connected at the measurement point. The maximum PARD PK-PK ripple and noise is indicated below.
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Model	Output	Max pk-pk
ZVCxxFS05y	+Vout(1)=5V	<60mV
ZVCxxFS09y	+Vout(1)=9V	<90mV
ZVCxxFS12y	+Vout(1)=12V	<120mV
ZVCxxFS15y	+Vout(1)=15V	<150mV
ZVCxxFS19y	+Vout(1)=19V	<190mV
ZVCxxFS24y	+Vout(1)=24V	<240mV

3.2.8	OUTPUT TRANSIENT RESPONSE The load current of the measured output is kept at its (Max+Min)/2 load and then changed by (Max-Min)/4 load, at 0.1A/uSec slew rate, at 100/120 Hz, 50% duty cycle. This reflects a 25% load change while operating at the mid level. The overshoot/undershoot excursion, and recovery time is measured from the point where the output has recovered to within 1% it's steady state value.
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Model	Load capacitance	RECOVERY TIME	MAX. EXCURSION
ZVC20FS05E	10uF	<3 ms	<3%
ZVC25FS09E	10uF	<3 ms	<3%
All other Models	10uF	<1 ms	<3%

3.2.9	OUTPUT VOLTAGE DRIFT Long-term output voltage drift over 1000 hours of operation, at Vout(1) is typically less than 0.5%.
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3.2.10	OUTPUT OVERSHOOT The overshoot voltage as a percentage of nominal output voltage at initial power up of the PSU, at 45w full load condition is indicated below. Measured with ref. to the o/p regulation band.
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Model	OUTPUT	OVERSHOOT
ZVC20FS05E	+Vout(1)	<10%
All other model	+Vout(1)	< 5%

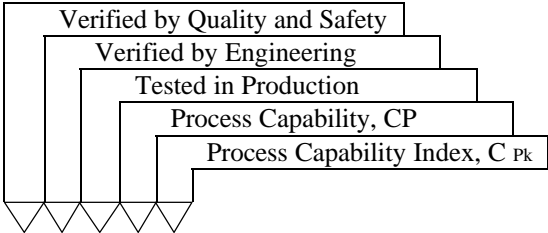
3.2.11	OUTPUT PROTECTION The power supply /load shall be protected against a fault condition described below.
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3.2.11.1	OVER VOLTAGE Redundant Feedback type. The load is protected against any output over voltage under any fault condition, the trip voltage depends on the nominal output voltage of the models.
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3.2.11.2	OUTPUT SHORT CIRCUIT /OVERLOAD PROTECTION The PSU shall be protected against overload as per section 3.2.3. The power supply will be protected against output short circuit. Short circuit current shall be less than 0.5A rms under all conditions. Output voltage of less than 0.5V constitutes a short. The PSU will self-recover within a max. of 3 sec. after removal of the fault.
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3.2.12	OUTPUT RISE TIME The time taken by the output to rise from 10% to 90% of the final steady state value, should be as below.
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Model	OUTPUT	MAX RISE TIME
All	+Vout(1)	<10 ms

					3.2.13	TURN-ON DELAY The turn-on delay time, from the time AC power is applied to the PSU until the o/p voltage is within the regulation band, shall be less than 3.5 seconds at 120 VAC, cold start.
					3.2.14	OUTPUT HOLD-UP TIME The power supply shall maintain the output within its voltage/current specifications for more than 10 ms. after any loss of AC input voltage. Measured at nominal input voltage of 115VAC/230VAC and at point when output is crossing regulation band.
					3.2.15	REMOTE SENSE N/A
					3.2.16	POWER FAIL/POWER GOOD SIGNAL. N/A
					3.2.17	TEMPERATURE COEFFICIENT Temperature coefficient over the entire operating temperature range of 0°C to 40°C after one-hour warm-up will be as follows:

Model	OUTPUT	TEMP. COEFF.
All	+Vout(1)	<2.4 mV/°C

4. ENVIRONMENTAL REQUIREMENTS

					4.1	TEMPERATURE Operating temperature range is 0°C to 40°C at the respective rated output power, with free air convection. Non-operating temperature range: -40°C to +85°C.
					4.2	ALTITUDE Maximum operating altitude: 10,000 feet. Maximum Non-operating altitude: 40,000 feet.
					4.3	HUMIDITY Non-condensing relative humidity range: 5% to 95%.
					4.4	VIBRATION The power supply shall meet operating and non operating vibration, 5-9 Hz, 2G PK., 0.5Oct/min, and 2 cycles, 9-500Hz, 2G pk. 0.5 oct/min, 2 cycles.
					4.5	INPUT TRANSIENT SUSCEPTIBILITY The unit shall comply with requirements of IEC, 1000-4-2, IEC 1000-4-4 and IEC 1000-4-5. Will withstand ESD of 20K AIR DISCHARGE, 10 strides, both +ve and -ve, as per IEC 1000-4-2.
					4.6	THERMAL SHUTDOWN N/A

5. SAFETY REQUIREMENTS

					5.1	DIELECTRIC WITHSTAND VOLTAGE Minimum dielectric withstand voltage: Between Input to output : 4250VDC rms/1 minute.
					5.2	LEAKAGE CURRENT Leakage current from primary to secondary shall be 250uA maximum.
					5.3	SAFETY SPACINGS 6.4mm minimum between primary and secondary.
					5.4	SAFETY STANDARDS The power supply will meet Class II, SELV of the following safety agency requirements: UL1950 (Listed), Canadian Approval through UL: C-UL, IEC 950(AM4), EN60950 with the following approvals: VDE, SEMKO, NEMKO, DEMKO, FIMKO, QAS, MITI, GOST, EZU.
					5.5	RELIABILITY
					5.5.1	MTBF @ 25°C shall be 100,000 hours min.

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6. EMI REQUIREMENTS

The power supply shall comply to the limits CISPR 55022 and CISPR 55014, Level B (at 230 VAC and 115 VAC). FCC 47 CFR Part 15, Level B (115 VAC)

7. APPLICABLE TEST PROGRAM

Audit Test Program
 Production 1 Test Program
 Production 2 Test Program
 QC Test Program

8. MECHANICAL

8.1	WEIGHT
8.1.1	0.36Lb. (0.163 Kg.) approx. with EOS standard o/p cable, without any AC input cable.
8.2	DIMENSIONS
8.2.1	OUTLINE : See diagram below.

