



# Test Report: SPV-300-12

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300W Single Output With PFC Function

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

**DESIGN VERIFY TEST**
**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:150 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 35 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 10.8V- 13.2V Adjustment by VR	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	13.831 V- 10.317 V/ 230 VAC 13.831 V- 10.317 V/ 115 VAC	P
3	OUTPUT VOLTAGE ADJUST RANGE	CH1: 2.4V-13.2V Adjustment by 1V-5.5VDC external control	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	2.401 V- 13.243 V/ 230 VAC 2.401 V- 13.245 V/ 115 VAC	P
4	OUTPUT VOLTAGE TOLERANCE	V1: 1%- -1% (Max)	I/P: 135VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: 0.4 %-0.308 %	P
5	LINE REGULATION	V1: 0.3 %- -0.3 % (Max)	I/P: 135VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: -0.049 %-0.049 %	P
6	LOAD REGULATION	V1: 0.5 %- -0.5 % (Max)	I/P: 230 VAC O/P:FULL -MIN LOAD Ta:25°C	V1: -0.999 %-0.099 %	P
7	SET UP TIME	230VAC: 800 ms (Max) 115 VAC: 2500 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 483.512 ms 115VAC/ 453.656 ms	P
8	RISE TIME	230VAC: 50 ms (Max) 115VAC: 50 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 18.694 ms 115VAC/ 18.712 ms	P
9	HOLD UP TIME	230VAC: 16 ms (TYP) 115VAC: 16 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 19.429 ms 115VAC/ 19.313 ms	P
10	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: <5 %	P
11	DYNAMIC LOAD	V1: 1200 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	725 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	88VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	75.087 V-264V	P
			I/P: LOW-LINE-3V= 85 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST: OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 88VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.981 / 230 VAC PF= 1 / 115 VAC	P
4	EFFICIENCY	84 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	85 %	P
5	INPUT CURRENT	230V/ 2.5 A (TYP) 115V/ 5 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 1.575 A/ 230 VAC I = 3.243 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A (TYP) 115V/ 20 A(TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 30.266 A/ 230 VAC I = 23.554 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.86 mA N-FG: 0.9 mA	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 135%	I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25°C	119 %/ 230 VAC 119 %/ 115 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1: 13.8V- 16.2V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	15.16V/ 230 VAC 15.16V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1: 80 ± 5°C O.T.P. NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	O.T.P. Active Shut down o/p voltage + recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P:FULL LOAD Ta:25°C	NO DAMAGE Constant Current Limiting	P

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	REMOTE CONTROL	RC/-V: 0 ~ 0.8VDC : POWER ON 4 ~ 10VDC : POWER OFF	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	POWER ON: 1.6 V-0 V POWER OFF: 1.6 V- 6 V	P
2	PROGRAMMING SETTING	PV/-V:1V-5V for output 2.4V-12V PV/-V :1V±0.5%for output=2.4V±5% PV/-V:2.5V±0.5%for output=6V±2.5% PV/-V :5V±0.5%for output=12V±2.5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	PV/-V :1 V for output = 2.412 V PV/-V : 2.5V for output =6.022 V PV/-V :5 V for output =12.037 V	p

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q1 Rated IRFP460A : 500V/20A  Q2 Rated 2SK3878 : 900V 9 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Output Short Ta:25°C	(1) 448 V (2) 410 V  (1) V (2) V	
2	Diode Peak <b>Voltage</b>	D19 Rated SBL3060PT :30A/60V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2)Output Short Ta:25°C	(1) 44.8 V (2) 46 V	
3	Clamp Diode Peak <b>Voltage</b>	D4 Rated BYV26EGP: 1A/1KV	I/P:High-Line +3V = 267 V O/P: (1) Dynamic Load 90%Duty/1KHz Ta:25°C	(1) 780 V	
4	<b>Input Capacitor Voltage</b>	C5 Rated : 150 u /400V/85°C	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 374 V (2) 386 V (3) 378 V	
5	<b>Control IC Voltage Test</b>	U1 Rated ML4800 CP: 16 V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 12.573 V (2) 13.171 V (3) 13.215 V	

**■ SAFETY & E.M.C. TEST**
**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 5.67 mA I/P-FG: 4.44 mA O/P-FG: 7.61 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C / 70%RH	I/P-O/P: 7.77 GΩ I/P-FG: 8.66 GΩ O/P-FG: 10.33 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C / 70%RH	7 mΩ	p

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

**RELIABILITY TEST**
**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																																																								
1	TEMPERATURE RISE TEST	MODEL : SPV-300-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 29.3 °C 2. HIGH AMBIENT BURN-IN : 14 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50.6 °C			<b>P</b>																																																																																																																								
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>PART NUMBER</th> <th>ROOM AMBIENT Ta= 29.3 °C</th> <th>HIGH AMBIENT Ta= 50.6 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>D10XB60</td><td>43.4°C</td><td>63.8°C</td></tr> <tr><td>2</td><td>Q1</td><td>IRFP-460A</td><td>39.2°C</td><td>60.5°C</td></tr> <tr><td>3</td><td>D3</td><td>BYC10-600</td><td>39.8°C</td><td>60.0°C</td></tr> <tr><td>4</td><td>Q2</td><td>2SK3878</td><td>44.2°C</td><td>65.8°C</td></tr> <tr><td>5</td><td>TSW1</td><td>ST-22W-R3 80°C</td><td>40.0°C</td><td>61.4°C</td></tr> <tr><td>6</td><td>L1</td><td>TR-337</td><td>39.8°C</td><td>60.5°C</td></tr> <tr><td>7</td><td>T1 COIL</td><td>TF-884</td><td>64.2°C</td><td>86.5°C</td></tr> <tr><td>8</td><td>L2</td><td>TR-336</td><td>53.2°C</td><td>76.1°C</td></tr> <tr><td>9</td><td>D19</td><td>ESAD92-02R 20A/200V</td><td>46.9°C</td><td>67.4°C</td></tr> <tr><td>10</td><td>C52</td><td>1500u/35V</td><td>38.2°C</td><td>60.7°C</td></tr> <tr><td>11</td><td>C53</td><td>1500u/35V</td><td>35.8°C</td><td>58.8°C</td></tr> <tr><td>12</td><td>C1</td><td>684/250VAC</td><td>29.8°C</td><td>46.4°C</td></tr> <tr><td>13</td><td>LF2</td><td>TF-360</td><td>36.3°C</td><td>55.1°C</td></tr> <tr><td>14</td><td>U1</td><td>4800</td><td>37.2°C</td><td>58.0°C</td></tr> <tr><td>15</td><td>D4</td><td>BYV26EGP</td><td>42.8°C</td><td>62.3°C</td></tr> <tr><td>16</td><td>RTH2</td><td>5K</td><td>38.0°C</td><td>59.5°C</td></tr> <tr><td>17</td><td>C32</td><td>4.7u/50V</td><td>39.2°C</td><td>60.3°C</td></tr> <tr><td>18</td><td>C33</td><td>10u/50V</td><td>39.8°C</td><td>60.7°C</td></tr> <tr><td>19</td><td>C34</td><td>100u/35V</td><td>31.1°C</td><td>55.1°C</td></tr> <tr><td>20</td><td>C39</td><td>47u/25V</td><td>36.9°C</td><td>57.5°C</td></tr> <tr><td>21</td><td>C29</td><td>100u/25V</td><td>36.5°C</td><td>56.2°C</td></tr> <tr><td>22</td><td>C60</td><td>47u/50V</td><td>35.5°C</td><td>56.0°C</td></tr> <tr><td>23</td><td>D10</td><td>HER102</td><td>43.5°C</td><td>64.2°C</td></tr> </tbody> </table>	NO	Position		PART NUMBER	ROOM AMBIENT Ta= 29.3 °C	HIGH AMBIENT Ta= 50.6 °C	1	BD1	D10XB60	43.4°C	63.8°C	2	Q1	IRFP-460A	39.2°C	60.5°C	3	D3	BYC10-600	39.8°C	60.0°C	4	Q2	2SK3878	44.2°C	65.8°C	5	TSW1	ST-22W-R3 80°C	40.0°C	61.4°C	6	L1	TR-337	39.8°C	60.5°C	7	T1 COIL	TF-884	64.2°C	86.5°C	8	L2	TR-336	53.2°C	76.1°C	9	D19	ESAD92-02R 20A/200V	46.9°C	67.4°C	10	C52	1500u/35V	38.2°C	60.7°C	11	C53	1500u/35V	35.8°C	58.8°C	12	C1	684/250VAC	29.8°C	46.4°C	13	LF2	TF-360	36.3°C	55.1°C	14	U1	4800	37.2°C	58.0°C	15	D4	BYV26EGP	42.8°C	62.3°C	16	RTH2	5K	38.0°C	59.5°C	17	C32	4.7u/50V	39.2°C	60.3°C	18	C33	10u/50V	39.8°C	60.7°C	19	C34	100u/35V	31.1°C	55.1°C	20	C39	47u/25V	36.9°C	57.5°C	21	C29	100u/25V	36.5°C	56.2°C	22	C60	47u/50V	35.5°C	56.0°C	23	D10	HER102	43.5°C	64.2°C		
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 125% LOAD Ta : 25°C	TEST : OK	<b>P</b>																																																																																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230VAC/100VAC O/P : 100 % LOAD Ta= -25 °C	TEST : OK	<b>P</b>																																																																																																																								
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	<b>P</b>																																																																																																																								
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.008 %/°C (0-50°C)	<b>P</b>																																																																																																																								

6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC	OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -25°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec	OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK	P
9	CAPACITOR LIFE CYCLE	SUPPOSE C52 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 1683926HRS (2) 270909HRS (3) 289512HRS (4) 358995HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 207 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/7/10	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023