



Test Report: APV-25-12

25W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection 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 : 85 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : 5 %~ -5 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.383 %~ -0.257 %	P
3	LINE REGULATION	V1 : 1 %~ -1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.050 %~ -0.008 %	P
4	LOAD REGULATION	V1 : 2 %~ -2 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.267 %~ -0.257 %	P
5	SET UP TIME	230VAC : 1500 ms (Max) 115VAC : 1500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 278.29 ms 115VAC/ 280.05 ms	P
6	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 4.08 ms 115VAC/ 4.40 ms	P
7	HOLD UP TIME	230VAC : 20 ms (TYP) 115VAC : 12 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 68.41 ms 115VAC/ 13.83 ms	P
8	OVER/UNDERSHOOT TEST	< ± 5 %	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
9	DYNAMIC LOAD	V1 : 1200 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 225 mVp-p (2) 402 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	87 V~ 264 V	P
			(1)I/P: LOW-LINE-3V= 87 V HIGH-LINE+15%= 300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (2) I/P:230VAC ON: 0.5 Sec . OFF: 0.5 Sec 20MIN (AC POWER ON/OFF NO DAMAGE)	TEST: (1) OK (2) OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25℃	TEST : OK	P
3	EFFICIENCY	82 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	82.75 %	P
4	INPUT CURRENT	230V/ 0.4 A (TYP) 115V/ 0.8 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	I = 0.295 A/ 230 VAC I = 0.462 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 45 A (TYP) Twidh =310 us measured at 50% Ipeak COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	I = 37.0 A/ 230 VAC Twidh =249 us	P
6	LEAKAGE CURRENT	< 0.25 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-CASE : 0.003 mA N-CASE : 0.003 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	>105%	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25℃	146.76 %/ 230 VAC 144.67 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 13.8 V ~ 16.2 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25℃	14.9 V/ 230 VAC 14.9 V/ 115 VAC Shut down o/p voltage, re-power on to recover	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25℃	NO DAMAGE Hiccup mode	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : NDF06N60ZG : 600 V/ 6.0 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 510 V (2) 480 V (3) 496 V	P
2	Diode Peak Voltage	D100 Rated : SBR10100CTFP:100V/ 10 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 79.6 V (2) 72.0 V (3) 76.8 V	P
3	Input Capacitor Voltage	C5 Rated : 47u/420V 105°C 18*20 KM	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) 390 V (2) 370 V (3) 370 V	P
4	Control IC Voltage Test	U 1 Rated : NCP1200D100R2G: 16V (MAX)	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) 11.8 V (2) 11.8 V (3) 11.7 V	P

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-O/P : 3.6 KVAC/min Ta : 25°C	I/P-O/P : 0.755 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC Ta : 25°C/70%RH	I/P-O/P : >9999 MΩ NO DAMAGE	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/240VAC/220VAC50HZ O/P:100% LOAD CLASS A Ta:25℃	PASS	P
2	CONDUCTION	EN55022 CLASSB	I/P: 230 VAC (50HZ)/115V[60HZ] O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASSB	I/P: 230 VAC (50HZ)/115V[60HZ] O/P: FULL LOAD Ta:25℃	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℃	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℃	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

RELIABILITY TEST

ENVIRONMENT TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																							
1	TEMPERATURE RISE TEST	MODEL : APV-25-5 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=32.3 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=42.5 °C <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 32.3 °C</th><th>HIGH AMBIENT Ta= 42.5 °C</th></tr><tr><td>1</td><td>LF1</td><td>LF-804</td><td>61.2°C</td><td>69.7°C</td></tr><tr><td>2</td><td>BD1</td><td>KBP208G</td><td>63.1°C</td><td>71.6°C</td></tr><tr><td>3</td><td>C5</td><td>47uF/420V KM</td><td>59.7°C</td><td>67.7°C</td></tr><tr><td>4</td><td>C9</td><td>100uF/25V KY</td><td>69.2°C</td><td>77.6°C</td></tr><tr><td>5</td><td>Q1</td><td>NDF06N60ZG</td><td>83.4°C</td><td>92.3°C</td></tr><tr><td>6</td><td>ZD1</td><td>P6KE180A</td><td>77.0°C</td><td>86.4°C</td></tr><tr><td>7</td><td>D1</td><td>S1M 1A/1KV</td><td>80.1°C</td><td>89.2°C</td></tr><tr><td>8</td><td>U1</td><td>NCP1200D60R2G</td><td>69.4°C</td><td>78.2°C</td></tr><tr><td>9</td><td>T1</td><td>TF-6393</td><td>82.4°C</td><td>90.7°C</td></tr><tr><td>10</td><td>D100</td><td>STPS2045CTC</td><td>94.1°C</td><td>103.3°C</td></tr><tr><td>11</td><td>C106</td><td>1200uF/10V GL</td><td>80.1°C</td><td>88.8°C</td></tr><tr><td>12</td><td>C107</td><td>1000uF/10V GL</td><td>75.8°C</td><td>83.8°C</td></tr><tr><td>13</td><td>LF100</td><td>TR-574</td><td>67.6°C</td><td>75.9°C</td></tr></table>				NO	Position	P/N	ROOM AMBIENT Ta= 32.3 °C	HIGH AMBIENT Ta= 42.5 °C	1	LF1	LF-804	61.2°C	69.7°C	2	BD1	KBP208G	63.1°C	71.6°C	3	C5	47uF/420V KM	59.7°C	67.7°C	4	C9	100uF/25V KY	69.2°C	77.6°C	5	Q1	NDF06N60ZG	83.4°C	92.3°C	6	ZD1	P6KE180A	77.0°C	86.4°C	7	D1	S1M 1A/1KV	80.1°C	89.2°C	8	U1	NCP1200D60R2G	69.4°C	78.2°C	9	T1	TF-6393	82.4°C	90.7°C	10	D100	STPS2045CTC	94.1°C	103.3°C	11	C106	1200uF/10V GL	80.1°C	88.8°C	12	C107	1000uF/10V GL	75.8°C	83.8°C	13	LF100	TR-574	67.6°C	75.9°C	P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 144 % LOAD Ta : 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : FULL LOAD Ta= -30°C	TEST : OK	P
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.021 % (0~50°C)	P
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C ~ +85°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 : -35°C ~ +45°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 : 72min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK		P
9	CAPACITOR LIFE CYCLE	APV-25-5 :SUPPOSE C106 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=40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=40 °C LIFE TIME	(1) 53906.9 HRS (2) 21169.4 HRS (3) 28688.6 HRS		P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 692.8KHRS			P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 20,000 hours @ Tcase 70°C ; 50,000 hours @ Tcase 55°C			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2012/05/30	PRODUCT SAMPLE	PASS	ZOULF	HOWAY

2009/08/04 A50-F023