

## Quality Engineering Test Report

V1 : 15 V / 5 A

AC-DC

Single Output Switching Power Supply

**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 100 mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 9 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 13.5 V- 16.5 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	12.3V- 17.3V/230 VAC 12.3V- 17.3V/115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: +2%~ -2 % (Max)	I/P: 264 VAC / 90 VAC O/P:FULL/ 0 % LOAD Ta:25°C	V1: +0.1 %~ -0.1 %	P
4	LINE REGULATION	V1: +1 %~ -1 % (Max)	I/P: 264 VAC ~ 90 VAC O/P:FULL LOAD Ta:25°C	V1: +0.05%~ -0.05%	P
5	LOAD REGULATION	V1: +2 %~ -2 % (Max)	I/P: 230 VAC O/P:FULL -MIN LOAD Ta:25°C	V1: +0.1 %~ -0.104%	P
6	SET UP TIME	230 VAC/ 100 ms (Max) 115 VAC/ 100 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 65 ms 115 VAC/ 78 ms	P
7	RISE TIME	230VAC/ 35 ms (Max) 115VAC/ 35 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 6.4 ms 115 VAC/ 8.8 ms	P
8	HOLD UP TIME	230VAC/ 50 ms(TYP) 115VAC/ 12 ms(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 76 ms 115 VAC/ 15.6 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: < 5%	P
10	DYNAMIC LOAD	V1: 1500 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	364 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	264VAC~ 90VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	62.6 V~ 264 V	P
			I/P: LOW-LINE-3V= 87 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	47 HZ ~ 63 HZ NO DAMAGE OSC	I/P: 264 VAC ~ 90 VAC O/P:FULL-MIN LOAD Ta:25°C	TEST: OK	P
3	EFFICIENCY	81 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	83 %	P
4	INPUT CURRENT	230 V/ 1.1 A (TYP) <u>115</u> V/ 1.9 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 0.85 A/ 230VAC I =1.43A/ 115VAC	P
5	INRUSH CURRENT	230 V/ 40 A(TYP) 115 V/ 24 A (TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 33 A/ 230 VAC I = 20 A/ 115 VAC	P
6	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.69 mA N-FG: 0.7 mA	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115 %- 150 %	I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta:25°C	131 %/ 230 VAC 128%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 17.25V - 20.25 V	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta:25°C	19.2 V/ 230 VAC 19.2V/ 115 VAC Hiccup Model	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 267 VAC O/P: 100% LOAD Ta:25°C	NO DAMAGE Hiccup Mode	P

**CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	REMOTE CONTROL	Rc+ / Rc- 0 V - 0.8 V POWER ON 4 V - 10 V POWER OFF	I/P: 230 VAC O/P: FULL LOAD Ta:25°C	0V ~ 2.9 V POWER ON 3.2V ~ 10V POWER OFF	P

## Quality Engineering Test Report

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT																																																																											
1	TEMPERATURE RISE TEST	MODEL : LPS-75-24V 1. ROOM AMBIENT BURN-IN : 2HRS I/P: 230 VAC O/P: 100% LOAD Ta=31.9 °C 2. HIGH AMBIENT BURN-IN : HRS I/P: 230 VAC O/P: 100% LOAD Ta=48.6			P																																																																											
		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th style="width: 5%;">NO</th> <th style="width: 15%;">Position</th> <th style="width: 20%;">P/N</th> <th style="width: 15%;">ROOM AMBIENT Ta=31.9°C</th> <th style="width: 15%;">HIGH AMBIENT Ta= 48.6 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>ET-24</td><td>45.2°C</td><td>57.9°C</td></tr> <tr><td>2</td><td>BD1</td><td>D3SB60 4A/600V</td><td>54.5°C</td><td>68.0°C</td></tr> <tr><td>3</td><td>C5</td><td>CAPXON 150U/400V 85°C</td><td>51.9°C</td><td>65.4°C</td></tr> <tr><td>4</td><td>U1</td><td>NCP1203P60</td><td>61.0°C</td><td>72.2°C</td></tr> <tr><td>5</td><td>Q1</td><td>2SK1507 9A/600V</td><td>70.4°C</td><td>86.5°C</td></tr> <tr><td>6</td><td>D1</td><td>EPG20J 2A/600V</td><td>73.9°C</td><td>91.3°C</td></tr> <tr><td>7</td><td>D2</td><td>FR104 1A/400V</td><td>77.5°C</td><td>85.3°C</td></tr> <tr><td>8</td><td>T1CORE</td><td>TF925</td><td>73.1°C</td><td>87.4°C</td></tr> <tr><td>9</td><td>T1COIL</td><td>TF925</td><td>73.7°C</td><td>85.3°C</td></tr> <tr><td>10</td><td>D51</td><td>E83004 60A/40V</td><td>67.5°C</td><td>80.6°C</td></tr> <tr><td>11</td><td>C54</td><td>2200U/10V GL 105°C</td><td>50.7°C</td><td>65.8°C</td></tr> <tr><td>12</td><td>R52</td><td>33/2W</td><td>63.2°C</td><td>77.2°C</td></tr> <tr><td>13</td><td>C12</td><td>22U/50V 105°C</td><td>81.3°C</td><td>94.3°C</td></tr> <tr><td>14</td><td>R11</td><td>0.24/2W</td><td>64.4°C</td><td>79.0°C</td></tr> </tbody> </table>			NO	Position	P/N	ROOM AMBIENT Ta=31.9°C	HIGH AMBIENT Ta= 48.6 °C	1	LF1	ET-24	45.2°C	57.9°C	2	BD1	D3SB60 4A/600V	54.5°C	68.0°C	3	C5	CAPXON 150U/400V 85°C	51.9°C	65.4°C	4	U1	NCP1203P60	61.0°C	72.2°C	5	Q1	2SK1507 9A/600V	70.4°C	86.5°C	6	D1	EPG20J 2A/600V	73.9°C	91.3°C	7	D2	FR104 1A/400V	77.5°C	85.3°C	8	T1CORE	TF925	73.1°C	87.4°C	9	T1COIL	TF925	73.7°C	85.3°C	10	D51	E83004 60A/40V	67.5°C	80.6°C	11	C54	2200U/10V GL 105°C	50.7°C	65.8°C	12	R52	33/2W	63.2°C	77.2°C	13	C12	22U/50V 105°C	81.3°C	94.3°C	14	R11	0.24/2W	64.4°C	79.0°C	
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230VAC O/P: 131% LOAD Ta:25°C	TEST : OK	P																																																																											
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 O/P: 100% LOAD Ta= -21.4°C	TEST : OK	P																																																																											
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 230VAC O/P: FULL LOAD Ta= 51°C HUMIDITY=95% R.H	TEST : OK	P																																																																											
5	TEMPERATURE COEFFICIENT	± 0.04 % (0-50°C)	I/P: 230 VAC O/P: FULL LOAD	+0.01% (0-50°C)	P																																																																											
6	VIBRATION TEST	1 Carton & 1 Set Operating at I/P: 230VAC NO LOAD (1) Waveform: Sine Wave (2) Frequency: 10-500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 2G (5) Test Time: 1 hour in each axis (X.Y.Z) (6) Ta: 25°C		TEST : OK	P																																																																											

**SAFETY TEST**

NO	TEST ITEM	SPECICATION	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: 4.1 mA I/P-FG: 4.8 mA O/P-FG: 1.9 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	I/P-O/P: 22 G Ω I/P-FG: 10 G Ω O/P-FG: 12G Ω NO DAMAGE	P
4	APPROVAL	TUV: Certificate NO : UL: File NO :			N/A

**E.M.C TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	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 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 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test By Certificate Lab & Test Report Prepare				P

## Quality Engineering Test Report

**M.T.B.F & LIFE CYCLE CALCULATION**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C 54 IS THE MOST CRITICAL COMPONENT I/P:230 VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 380786 HRS I/P: 230 VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 75226 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 335000 HRS			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>	Q Rated K2645: 600V 9A	I/P:High-Line +3V = 267V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 454V (2) 498V (3) 530V	P
2	Diode Peak <b>Voltage</b>	D51 Rated BYQ28X: 200V 10A	I/P:High-Line +3V = 267V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 80.4V (2) 105V (3) 105V	P
3	Clamp Diode Peak <b>Voltage</b>	D1 Rated EGP20J: 600V 2A	I/P:High-Line +3V = 267V O/P: (1)Full Load (2) Dynamic Load 90%Duty/1KHz Ta:25°C	(1) 504V (2) 504V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2003/06/10	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2003/07/23	PRODUCT SAMPLE A306C14A	PASS	VINCENT TSENG	MAX LIN

2003/7/14 A50-F023