MODEL: MP450-CEHM

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max) V2: 150 mVp-p (Max) V3: 150 mVp-p (Max) V4: 80 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25℃	V1: 18 mVp-p (Max) V2: 26 mVp-p (Max) V3: 36 mVp-p (Max) V4: 53 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4 V~ 6 V CH2: 9 V~ 13.2 V CH3: 20 V~ 26.4 V CH4: 4V ~ 6 V	I/P: 230 VAC O/P:MIN LOAD Ta:25℃	3.84 V~ 3.84 V 8.25 V~ 14.19 V 18.11 V~ 29.41 V 3.8 V~ 6.54 V	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 2 %~ -2 % (Max) V2: 1 %~ -1 % (Max) V3: 1 %~ -1 % (Max) V4: 2 %~ -2 % (Max)	I/P: 100 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25℃	V1: 0.12 %~ -0.12 % V2: 0.3 %~ -0.3 % V3: 0.3 %~ -0.3 % V4: 1 %~ -1 %	P
4	LINE REGULATION	V1: 0.5 %~ -0.5 % (Max) V2: 0.3 %~ -0.3 % (Max) V3: 0.2 %~ -0.2 % (Max) V4: 0.5 %~ -0.5 % (Max)	I/P: 100 VAC ~ 264 VAC O/P:FULL LOAD Ta:25℃	V1: 0 %~ 0 % V2: 0 %~ 0 % V3: 0 %~ 0 % V4: 0 %~ 0 %	P
5	LOAD REGULATION	V1: 1 %~ -1 % (Max) V2: 0.5 %~ -0.5 % (Max) V3: 0.5 %~ -0.5 % (Max) V4: 1 %~ -1 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0.12 %~ -0.12 % V2: 0.05 %~ -0.05 % V3: 0.05 %~ -0.05 % V4: 0.24 %~ -0.24 %	P
6	SET UP TIME	230VAC: 1500 ms (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 687 ms	P
7	RISE TIME	230VAC: 50 ms (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 16 ms	P
8	HOLD UP TIME	230VAC: 20 ms (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 23 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TEST: <5 %	P
10	DYNAMIC LOAD	V1: 1000 mVp-p V2: 1200 mVp-p V3: 2400 mVp-p V4: 1000 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25℃	550 mVp-p 647 mVp-p 464 mVp-p 276 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	81V~264V	P
			I/P: LOW-LINE-3V= 82 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: 85 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25℃	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℃	PF= 0.98 / 230 VAC PF= 1 / 115 VAC	P
4	EFFICIENCY	83 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	83.3 %	P
5	INPUT CURRENT	230V/ 3.2 A (TYP) 115V/ 6.3 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃	I = 2.4 A/ 230 VAC I = 5 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A(TYP) 115V/ 25 A (TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃	I = 31 A/ 230 VAC I = 21 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1.5 mA / 240 VAC	I/P: 254 VAC O/P:Min LOAD Ta:25℃	L-FG: 1.05 mA N-FG: 1.05 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	CH1: 121 %~ 150 % CH2: 116 %~ 150 % CH3: 116 %~ 150 % CH4: 116 %~ 150 %	I/P: 230 VAC O/P:TESTING Ta:25℃	CH1: 138 % CH2: 128 % CH3: 141 % CH4: 140 % Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1: 6.1 V~ 7.5 V CH2: 6.1 V~ 7.5 V CH3: 13.3 V~ 18 V CH4: 26.5 V~ 35 V	I/P: 230 VAC O/P:MIN LOAD Ta:25℃	CH1: 6.7V CH2: 16.2 V CH3: 29.1 V CH4: 6.9 V Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: 80 ± 5℃ O.T.P. NO DAMAGE	I/P: 264 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℃	NO DAMAGE Constant Current Limiting	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	FAN SPEED CONTROL	-------	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	Fan Voltage= 12.24 V	P
2	REMOTE CONTROL	Rc+ / Rc- short or 0V~0.8V POWER ON open or 4V~12V POWER OFF	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	short or 0V ~3V POWER ON open or 3.1V ~ 12V POWER OFF	P

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL：MP450-CEHM
1. ROOM AMBIENT BURN-IN：1.5 HRS
I/P: 230VAC O/P: FULL LOAD Ta= 36 ℃
2. HIGH AMBIENT BURN-IN：2 HRS
I/P: 230VAC O/P: FULL LOAD Ta= 53.1 ℃

<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 36℃</th><th>HIGH AMBIENT Ta= 53.1 ℃</th></tr>
<tr><td>1</td><td>Q1</td><td>20N60C3 650V/20A INF</td><td>34.9℃</td><td>47.3℃</td></tr>
<tr><td>2</td><td>C9</td><td>220U/25V NCC 105℃ KY</td><td>36.9℃</td><td>50.5℃</td></tr>
<tr><td>3</td><td>T1 COIL</td><td>TF-1206</td><td>39.1℃</td><td>53.0℃</td></tr>
<tr><td>4</td><td>D8</td><td>BYC5-600 5A/600V PH</td><td>36.0℃</td><td>50.2℃</td></tr>
<tr><td>5</td><td>Q3</td><td>SPA07N60C3 7.3A/600V</td><td>40.1℃</td><td>53.8℃</td></tr>
<tr><td>6</td><td>ZD2</td><td>P6KE200A PAN</td><td>38.2℃</td><td>52.7℃</td></tr>
<tr><td>7</td><td>D7</td><td>BYC8-600 8A/600V PH</td><td>40.7℃</td><td>54.4℃</td></tr>
<tr><td>8</td><td>D9</td><td>BYC5-600 5A/600V PH</td><td>37.9℃</td><td>52.0℃</td></tr>
<tr><td>9</td><td>RG1</td><td>LM317T</td><td>41.9℃</td><td>55.8℃</td></tr>
<tr><td>10</td><td>TSW1</td><td>ST-80℃</td><td>33.9℃</td><td>46.9℃</td></tr>
<tr><td>11</td><td>C15</td><td>470U/450V HP3 85℃</td><td>37.2℃</td><td>51.1℃</td></tr>
<tr><td>12</td><td>LF2</td><td>TR-485</td><td>36.3℃</td><td>48.8℃</td></tr>
<tr><td>13</td><td>BD1</td><td>GBJ2506 25A/600V LT</td><td>48.8℃</td><td>60.6℃</td></tr>
<tr><td>14</td><td>TSW2</td><td>ST-75℃</td><td>38.4℃</td><td>51.1℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P: 230 VAC
O/P: 120% LOAD
Ta:25℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P: 230 VAC
O/P: 100% LOAD
Ta= -20℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P: 272 VAC
O/P:FULL LOAD
Ta= 50 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %(0~50℃)</td><td>I/P: 230 VAC
O/P:FULL LOAD</td><td>± 0.01%(0~50℃)</td><td>P</td></tr>
<tr><td>6</td><td>VIBRATION TEST</td><td colspan="2">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℃</td><td>TEST：OK</td><td>P</td></tr>
</table>

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℃	I/P-O/P: 9.37 mA I/P-FG: 8.04 mA O/P-FG: 8.51 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℃	I/P-O/P: 10 GΩ I/P-FG: 6 GΩ O/P-FG: 7 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃	23 mΩ	P
4	APPROVAL	TUV: Certificate NO ：R50057968 UL: File NO ：E183223			P

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℃	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) 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 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C237 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME= 637228 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 ℃ LIFE TIME= 154985 HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q 1 Rated SPP20N60C3 : 650 V 20 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 498 V (2) 438 V (3) 424 V	P
2	**Input Capacitor Voltage**	C 5 Rated : 470u / 420V/ 105℃	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℃	(1) 400 V (2) 399 V (3) 400 V	P
3	Power Transistor (D to S) or (C to E) **Peak Voltage**	U5 Rated TOP242P : 700V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 660 V (2) 646 V (3) 642 V	P
4	**Control IC Voltage Test**	U5 Rated TOP242P : 9V	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℃	(1) 6.1 V (2) 6.1 V (3) 6.1 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2004/12/29	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2005/3/8	PRODUCT SAMPLE W0501D42	PASS	VINCENT TSENG	MAX LIN
2006/4/11	PRODUCT SAMPLE W0602A45	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023