

MODEL : MDR-60-5

OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|---|---|--|---------|
| 1 | RIPPLE & NOISE | V1: 80 mVp-p (Max) | I/P: 230VAC O/P:FULL LOAD Ta:25°C | V1: 12 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 5 V~ 6V | I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C | 4.76 V- 6.17 V/ 230 VAC 4.76 V- 6.17 V/ 115 VAC | P |
| 3 | OUTPUT VOLTAGE TOLERANCE | V1: 2 % - -2 % (Max) | I/P: 100VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C | V1: 1 %- -1 % | P |
| 4 | LINE REGULATION | V1: 1 % - -1 % (Max) | I/P: 100VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C | V1: 0 %- 0 % | P |
| 5 | LOAD REGULATION | V1: 1.5 % - -1.5 % (Max) | I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C | V1: 0.82 %- -0.82 % | P |
| 6 | SET UP TIME | 230VAC: 500 ms (Max) 115 VAC: 500 ms (Max) | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | 230VAC/ 254 ms 115VAC/ 236 ms | P |
| 7 | 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/ 3 ms 115VAC/ 3 ms | P |
| 8 | HOLD UP TIME | 230VAC: 50 ms (TYP) 115VAC: 20 ms (TYP) | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | 230VAC/ 106 ms 115VAC/ 22 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: 1000 mVp-p | I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C | 994 mVp-p | P |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------|--|--|---|---------|
| 1 | INPUT VOLTAGE RANGE | 85VAC~264 VAC | I/P:TESTING O/P:FULL LOAD Ta:25°C | 54V~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°C | TEST: OK | P |
| 3 | EFFICIENCY | 78 % (TYP) | I/P: 230 VAC O/P:FULL LOAD Ta:25°C | 77.6% | P |
| 4 | INPUT CURRENT | 230V/ 1 A (TYP) 115V/ 1.8 A (TYP) | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | I = 0.6 A/ 230 VAC I = 1.05 A/ 115 VAC | P |
| 5 | INRUSH CURRENT | 230V/ 60 A (TYP) 115V/ 30 A (TYP) COLD START | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | I = 55 A/ 230 VAC I = 27 A/ 115 VAC | P |
| 6 | LEAKAGE CURRENT | < 1 mA/ 240 VAC | I/P: 254 VAC O/P:Min LOAD Ta:25°C | L-FG: 0.44 mA N-FG: 0.44 mA | P |

PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-------------------------|--|---|---|---------|
| 1 | OVER LOAD PROTECTION | 105 %~ 150 % | I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25°C | 125 %/ 230 VAC 126 %/ 115 VAC Constant Current Limiting | P |
| 2 | OVER VOLTAGE PROTECTION | CH1: 6.25V~ 7.25V | I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C | 6.7 V/ 230 VAC 6.7 V/ 115 VAC Shunt down Re- power ON | P |
| 3 | 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 | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|----------------------------|---------------|--|------------------------------------|---------|
| 1 | NO LOAD POWER CON SUMPTION | <0.75W | I/P: 230 VAC I/P: 115 VAC O/P:NO LOAD Ta:25°C | 230 VAC/ 0.69 W 115 VAC/ 0.61 W | P |
| 2 | DC OK SIGNAL | 30V/ 1A | I/P: 230 VAC O/P: FULL LOAD Ta:25°C | OK | P |

ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|---|--|--|-------------------|---------|
| 1 | TEMPERATURE RISE TEST | MODEL : MDR-60-5 1. ROOM AMBIENT BURN-IN : 1 HRS I/P: 230VAC O/P: FULL LOAD Ta=29.5 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=55.6 °C | | | P |
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| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P: 230 VAC O/P: 120 % LOAD Ta:25°C | TEST : OK | P |
| 3 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | I/P: 230 VAC O/P: 100 % LOAD Ta= -20°C | TEST : OK | P |
| 4 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 60°C NO DAMAGE | I/P: 272 VAC O/P:FULL LOAD Ta= 60°C HUMIDITY= 95 %R.H | TEST : OK | P |
| 5 | TEMPERATURE COEFFICIENT | ± 0.03 %(0-50°C) | I/P: 230 VAC O/P:FULL LOAD | ± 0.025 %(0-50°C) | P |
| 6 | VIBRATION TEST | 1 Carton & 1 Set (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 | 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: 5.95 mA I/P-FG: 4.87 mA O/P-FG: 3.08 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: 15 GΩ I/P-FG: 3 GΩ O/P-FG: 6 GΩ NO DAMAGE | P |
| 3 | GROUNDING CONTINUITY | FG(PE) TO CHASSIS OR TRACE < 100 mΩ | 40 A / 2min Ta:25°C | 14 mΩ | P |
| 4 | APPROVAL | TUV: Certificate NO : R50100751 UL: File NO : E215312 / E183223 | | | P |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | 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 certified Lab & Test Report Prepare | | | | |

M.T.B.F & LIFE CYCLE CALCULATION

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|--|----------------|--------|---------|
| 1 | CAPACITOR LIFE CYCLE | MDR-60-5: SUPPOSE C105 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25°C LIFE TIME=27258 HRS I/P: 230VAC O/P:FULL LOAD Ta= 60°C LIFE TIME=12380 HRS I/P: 230VAC O/P:75% LOAD Ta= 60°C LIFE TIME=37792 HRS | | | P |
| 2 | MTBF | MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 299.2KHRS | | | P |
| 3 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure : Above 30,000 hours @ TA 45°C | | | 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 STP9NK70 : 700V 7.5A | I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Output Short Ta:25°C | (1) 616 V (2) 606 V | P |
| 2 | Diode Peak Voltage | D100 Rated MBR1545CT : 45V 15 A | I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2)Output Short Ta:25°C | (1) 41.4 V (2) 31.4 V | P |
| 3 | Clamp Diode Peak Voltage | D1 Rated EGP20J : 600V 2A | I/P:High-Line +3V = 267 V O/P: (1) Dynamic Load 90%Duty/1KHz Ta:25°C | (1) 564 V | P |
| 4 | Input Capacitor Voltage | C5 Rated :150u / 400V/ 105°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) 378 V (3) 374 V | P |
| 5 | Control IC Voltage Test | U1 Rated 1200D60R2G : 16V | 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) 14.91 V (2) 10.65 V (3) 14.91 V | P |

| DATE | SAMPLE | TEST RESULT | TESTER | APPROVAL |
|------------|----------------------------|-------------|---------------|----------|
| 2006/12/14 | RD SAMPLE | PASS | VINCENT TSENG | MAX LIN |
| 2007/3/6 | PRODUCT SAMPLE W0701B07 | PASS | VINCENT TSENG | MAX LIN |
| 2007/5/9 | PRODUCT SAMPLE W0703A07 | PASS | VINCENT TSENG | MAX LIN |

2003/12/12 A50-F023