



Test Report: SD-25A-12

25W Single Output DC-DC Converter

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function 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 |
|----|-------------------------------|-----------------|---|-------------------|
| 1 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 11V~ 16V | I/P : 12 VDC O/P : MIN LOAD Ta : 25°C | 9.70V~16.45V |
| 2 | OUTPUT VOLTAGE(Max) TOLERANCE | V1: -1.0%~1.0% | I/P:9.2VDC ~18VDC O/P:FULL/ MIN. LOAD Ta:25°C | V1 : -0.05%~0.05% |
| 3 | LINE REGULATION (Max) | V1: -0.3%~ 0.3% | I/P: 9.2VDC ~18VDC O/P:FULL LOAD Ta:25°C | V1 : -0.00%~0.00% |
| 4 | LOAD REGULATION(Max) | V1: -0.3%~0.3% | I/P:12 VDC O/P:FULL ~MIN LOAD Ta:25°C | V1 : -0.05%~0.05% |
| 5 | RIPPLE & NOISE(Max) | V1: 120mVp-p | I/P: 12 VDC O/P:FULL LOAD Ta:25°C | V1: 12mVp-p |
| 6 | SET UP TIME(Max) | 12VDC/2500ms | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | 244.13ms |
| 7 | RISE TIME (Max) | 12VDC/50ms | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | 7.573ms |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|---------------|--|------------------|
| 1 | INPUT VOLTAGE RANGE | 9.2VDC ~18VDC | I/P:TESTING O/P:FULL LOAD Ta:25°C | 8.4VDC~18VDC |
| 2 | INPUT CURRENT (Typ.) | 12V/ 3.2A | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | I =2.77A/ 12VDC |
| 3 | EFFICIENCY(Typ.) | 72% | I/P: 12 VDC O/P:FULL LOAD Ta:25°C | 73.6% |
| 4 | INRUSH CURRENT(Typ.) | NONE | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | I =31.8 A/ 12VDC |

PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-------------------------|------------------------------|---------------------------------------|--|
| 1 | OVER LOAD PROTECTION | 105%~150% rated output power | I/P: 12VDC O/P:TESTING Ta:25°C | 133.5%/ 12VDC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |
| 2 | OVER VOLTAGE PROTECTION | 16.8V~20V | I/P: 12VDC O/P:10% LOAD Ta:25°C | 18.32V/ 12VDC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |

| | | | | |
|---|------------------|--|---|---|
| 3 | SHORT PROTECTION | SHORT EVERY OUTPUT 1 HOUR NO DAMAGE | I/P: 12VDC O/P: FULL LOAD Ta:25°C | NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |
|---|------------------|--|---|---|

SAFETY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|--|---|-------------------|
| 1 | WITHSTAND VOLTAGE | I/P-O/P: 1.5KVAC/min I/P-FG:2 KVAC/min O/P-FG: 0.5KVAC/min | I/P-O/P: 1.5 KVAC/min I/P- FG: 2.0 KVAC/min O/P - FG: 0.5 KVAC/min Ta:25°C | PASS NO DAMAGE |
| 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 Ta:25°C | PASS NO DAMAGE |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--|--|--|-------------------------------|
| 1 | CONDUCTION | EN55032 CLASS B | I/P : 12 VDC O/P : FULL/50% LOAD Ta : 25°C | PASS Test by certified Lab |
| 2 | RADIATION | EN55032 CLASS B | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | PASS Test by certified Lab |
| 3 | E.S.D | EN61000-4-2 AIR: 8KV / Contact: 4KV | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 4 | E.F.T | EN61000-4-4 INPUT : 1KV | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 5 | SURGE | IEC61000-4-5 L-N : 1KV | I/P : 12 VDC O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 6 | Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report. | | | |

■ RELIABILITY TEST

ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-----------------------|--|----------------|--------|
| 1 | TEMPERATURE RISE TEST | MODEL : SD-25A-5 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 12VDC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 12VDC O/P : FULL LOAD Ta= 40.5 °C | | |



25W Single Output DC-DC Converter

RD-25 series

| | | NO | Position | ROOM AMBIENT Ta= 25 °C | HIGH AMBIENT Ta= 40.5 °C |
|----|---|---|----------|---|--|
| | | | | | |
| | | 1 | LF1 | 57.6°C | 74.2°C |
| | | 2 | T1 | 67.5°C | 83.3°C |
| | | 3 | Q1 | 83.8°C | 97.4°C |
| | | 4 | C5 | 73.2°C | 86.9°C |
| | | 5 | U1 | 64.4°C | 79.5°C |
| | | 6 | C33 | 51.4°C | 67.6°C |
| | | 7 | D11 | 85.1°C | 99.6°C |
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | | I/P : 12 VDC O/P : 127% LOAD Ta : 25°C | TEST : OK |
| 3 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | | I/P : 9.2VDC/18VDC O/P : 100 % LOAD Ta= -10 °C | TEST : OK |
| 4 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 40°C / 95 %R.H NO DAMAGE | | I/P : 18 VDC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H | TEST : OK |
| 5 | TEMPERATURE COEFFICIENT | ± 0.03%/°C (0~50°C) | | I/P : 12 VDC O/P : FULL LOAD | ± 0.0023 %/°C (0~50°C) |
| 6 | STORAGE TEMPERATURE TEST | 1. Thermal shock Temperature : -25°C~ +90°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 : STATIC | | | TEST : OK |
| 7 | THERMAL SHOCK TEST | 1. Thermal shock Temperature : -25°C~ +45°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:12V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:12V/ FULL LOAD Burn In Test | | | TEST : OK |
| 8 | 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 : 180min in each axis (X.Y.Z) (6) Ta : 25°C | | | TEST : OK |
| 9 | CAPACITOR LIFE CYCLE | SUPPOSE C33 IS THE MOST CRITICAL COMPONENT (1) I/P : 12VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 12VDC O/P : FULL LOAD Ta= 40 °C LIFE TIME (3) I/P : 12VDC O/P : 75% LOAD Ta= 40 °C LIFE TIME (4) I/P : 12VDC O/P : 50% LOAD Ta= 40 °C LIFE TIME | | | (1) 205348 HRS (2) 69163 HRS (3) 85742 HRS (4) 105561 HRS |
| 10 | MTBF | 3682.6K hrs min. Telcordia SR-332 (Bellcore) ; 528.8K hrs min. MIL-HDBK-217F (25°C) | | | |
| 11 | Ongoing Reliability Test | I/P : 12 VDC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours | | | |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS | LIUTT | | WANGDZ |

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