



Test Report: LDH-65-1400

DC-DC Step-Up Constant Current LED driver

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

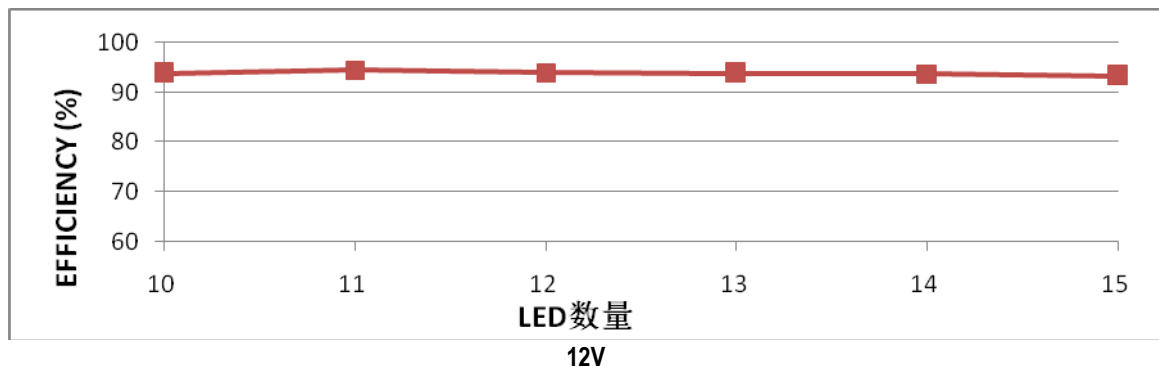
OUTPUT FUNCTION TEST

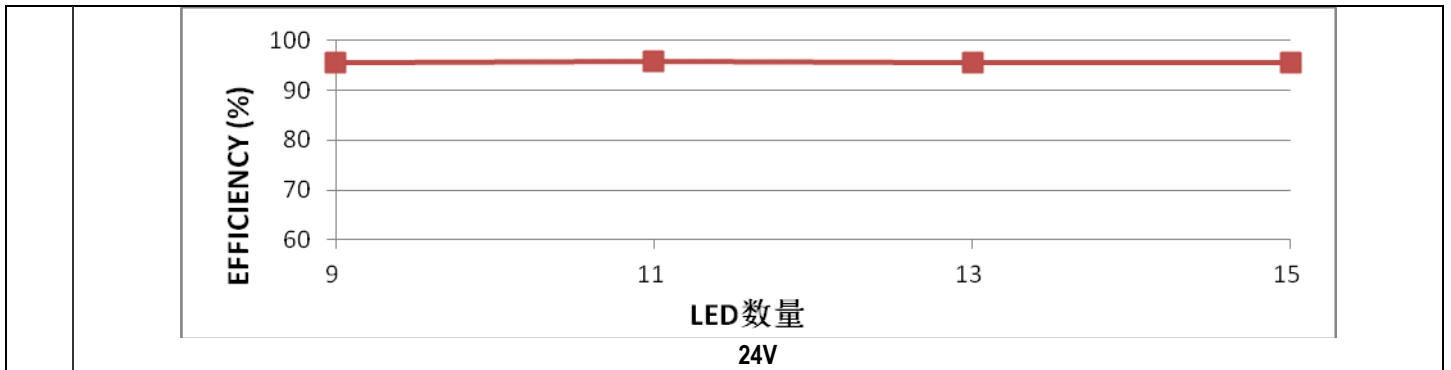
| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|------------------|--------------------|---|--|
| 1 | CURRENT ACCURACY | ± 5% | I/P: 12VDC/24VDC O/P: LED min/LED max Ta:25°C | -1.84%~ -1.19%/12VDC -1.62%~ -1.06%/24VDC |
| 2 | CURRENT RIPPLE | 5%(@rated current) | I/P: 12VDC / 24VDC O/P: LED min~LED max Ta:25°C | 2.13%/12VDC 1.75%/24VDC |
| 3 | SUGRE CURRENT | < ±110 % | I/P: 12VDC / 24VDC O/P:-min/LED max Ta:25°C | 108%/12VDC 104.8%/24VDC |
| 4 | VOLTAGE RANGE | 12.5V~46V | I/P: 12VDC/24VDC O/P:FULL LOAD Ta:25°C | 15V~54.6V/12VDC 27V~54.9V/24VDC |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---------------------|-----------------------------|---|---|
| 1 | INPUT VOLTAGE RANGE | 9.5VDC~ 32VDC | I/P:TESTING O/P:FULL LOAD Ta:25°C | 9.2V~ 38V |
| | | | I/P: LOW-LINE-0.2= 9.3 V HIGH-LINE+3V= 35 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec . OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE) | TEST(1) <u> OK </u> (2) <u> OK </u> (3) <u> OK </u> |
| 2 | INPUT CURRENT(TYP) | 12VDC/ 6.2A 24VDC/ 3.1A | I/P: 12VDC/24VDC O/P:FULL LOAD Ta:25°C | I=5.72A/12VDC I=2.773A/24VDC |
| 3 | DIMMING OFF | INPUT CURRENT <7mA Vo=Vi | I/P:12VDC O/P:FULL LOAD Ta:25°C | <u> 1.39 </u> mA Vo= <u> 12 </u> Vi |
| 4 | EFFICIENCY(TYP) | 92% /12VDC 95% /24VDC | I/P: 12VDC/24VDC O/P:FULL LOAD Ta:25°C | 93.2%/12VDC 95.38%/24VDC |

EFFICIENCY vs LOAD





PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--------------------------|---------------|--|--|
| 1 | OVER VOLTAGE PROTECTION | CH: 47V~80V | I/P: 9.3VDC I/P: 35VDC O/P:MIN LOAD Ta:25°C | 54.42V/9.3VDC 55.22V/35VDC PROTECTION TYPE : Output voltage rise to OVP, and drop equal to input voltage, re-power to recovery |
| 2 | SHORT CIRCUIT PROTECTION | NO DAMAGE | I/P: 12VDC O/P: FULL LOAD Ta:25°C | PROTECTION TYPE : Output short circuit, the power supply will be damaged |
| 3 | NO LOAD PROTECTION | NO LOAD | I/P: 12VDC/24VDC O/P: NO LOAD Ta:25°C | PROTECTION TYPE : Output voltage rise to OVP, and drop equal to input voltage, re-power to recovery |

COMPONENT STRESS TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--|-------------------------|--|---|
| 1 | PWM Transistor (D to S) or (C to E) Peak Voltage | Q1 Rated : 70A/100 V | DC ON/OFF I/P:High-Line +3V = 35V O/P: (1)CVmax (2) CVmax continue (3) CVmin (4) No Load (5) DIMMING off I/P:Low-Line -0.2V = 9.3V O/P: (1)CVmax (2) CVmax continue (3) CVmin (4) No Load (5) DIMMING off Ta:25°C | VDS: (1) 54.2V (2) 53.6V (3) 45.8V (4) 62.2V (5) 2.4V VDS: (1) 65.4V (2) 62.2V (3) 18.2V (4) 79.2V (5) 12V |
| 2 | Diode Peak Voltage | D5 Rated : 10A/100V | DC ON/OFF I/P:High-Line +3V = 35V VO: 設定 SPEC 輸出電壓上限 O/P: (1)CVmax | VDS: VO: 設定 SPEC 輸出電壓上限 (1) 50.2V |

| | | | | | |
|---|-------------------------|--|--|---|---|
| | | | (2) CVmax continue (3) CVmin (4) No Load (5) DIMMING off VO: 設定出貨輸出電壓 O/P: (1)CVmax (2) CVmax continue (3) CVmin (4) No Load (5) DIMMING off Ta:25°C | (2) 50.4V (3) 42.8V (4) 60V (5) 1V VO: 設定出貨輸出電壓 (1) 50V (2) 50V (3) 18.8V (4) 58.4V (5) 0.8V | |
| 3 | Input Capacitor Voltage | C5 Rated: 100 μ / 50V | I/P:High-Line +3V =35V O/P: (1)Full Load input on/off (2)Full load continue Ta:25°C | (1)36V (2)36V | |
| 4 | Control IC Voltage Test | U1 Rated -0.3V~ 43V U500 Rated -0.3V~ 65V | DC ON/OFF I/P:High-Line +3V = 35V O/P: (1)CVmax (2) CVmax continue (3) CVmin (4) No Load (5) DIMMING off (6)OVP Ta:25°C | U1: (1) 35.6V (2) 36V (3) 35.8V (4) 36V (5) 36V (6) 35.8V | U500: (1) 5.36V (2) 5.38V (3) 5.38V (4) 5.34V (5) 5.36V (6) 5.34V |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---|--|--|-----------------------------------|
| 1 | RADIATION | EN55015 CLASS B | I/P: 12VDC O/P:FULL LOAD Ta:25°C | PASS Test by certified Lab |
| 2 | CONDUCTION | EN55015 CLASS B | I/P: 12VDC O/P:FULL LOAD Ta:25°C | PASS Test by certified Lab |
| 3 | E.S.D | EN61000-4-2 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV | I/P: 12VDC O/P:FULL LOAD Ta:25°C | CRITERIA A |
| 4 | E.F.T | EN61000-4-4 LIGHT INDUSTRY INPUT: 0.5KV | I/P: 12VDC O/P:FULL LOAD Ta:25°C | CRITERIA A |
| 5 | 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 : LDH-65-1400 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 12VDC O/P : FULL LOAD Ta=30.4 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 12VDC O/P : FULL LOAD Ta=51.8 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=30.4 °C</th> <th>HIGH AMBIENT Ta=51.8 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>Q3</td><td>58.6°C</td><td>82.2°C</td></tr> <tr><td>2</td><td>L1</td><td>71.6°C</td><td>95.5°C</td></tr> <tr><td>3</td><td>C5</td><td>60.7°C</td><td>84.1°C</td></tr> <tr><td>4</td><td>U1</td><td>68.0°C</td><td>91.2°C</td></tr> <tr><td>5</td><td>Q1</td><td>81.4°C</td><td>105.5°C</td></tr> <tr><td>6</td><td>D5</td><td>81.5°C</td><td>104.4°C</td></tr> <tr><td>7</td><td>D6</td><td>79.7°C</td><td>102.6°C</td></tr> <tr><td>8</td><td>C13</td><td>72.2°C</td><td>95.1°C</td></tr> <tr><td>9</td><td>C14</td><td>70.4°C</td><td>93.2°C</td></tr> <tr><td>10</td><td>R22</td><td>76.5°C</td><td>100.3°C</td></tr> <tr><td>11</td><td>U2</td><td>60.8°C</td><td>83.9°C</td></tr> <tr><td>12</td><td>LF20</td><td>55.7°C</td><td>78.6°C</td></tr> <tr><td>13</td><td>BC1</td><td>81.8°C</td><td>105.1°C</td></tr> <tr><td>14</td><td>TC</td><td>65.3°C</td><td>85.9°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta=30.4 °C | HIGH AMBIENT Ta=51.8 °C | 1 | Q3 | 58.6°C | 82.2°C | 2 | L1 | 71.6°C | 95.5°C | 3 | C5 | 60.7°C | 84.1°C | 4 | U1 | 68.0°C | 91.2°C | 5 | Q1 | 81.4°C | 105.5°C | 6 | D5 | 81.5°C | 104.4°C | 7 | D6 | 79.7°C | 102.6°C | 8 | C13 | 72.2°C | 95.1°C | 9 | C14 | 70.4°C | 93.2°C | 10 | R22 | 76.5°C | 100.3°C | 11 | U2 | 60.8°C | 83.9°C | 12 | LF20 | 55.7°C | 78.6°C | 13 | BC1 | 81.8°C | 105.1°C | 14 | TC | 65.3°C | 85.9°C |
| NO | Position | ROOM AMBIENT Ta=30.4 °C | HIGH AMBIENT Ta=51.8 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Q3 | 58.6°C | 82.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | L1 | 71.6°C | 95.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | C5 | 60.7°C | 84.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | U1 | 68.0°C | 91.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Q1 | 81.4°C | 105.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | D5 | 81.5°C | 104.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | D6 | 79.7°C | 102.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | C13 | 72.2°C | 95.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | C14 | 70.4°C | 93.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | R22 | 76.5°C | 100.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | U2 | 60.8°C | 83.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | LF20 | 55.7°C | 78.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | BC1 | 81.8°C | 105.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | TC | 65.3°C | 85.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | I/P : 12VDC / 32VDC O/P : 100 % LOAD Ta= -45°C | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C /95 %R.H NO DAMAGE | I/P : 12VDC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | TEMPERATURE COEFFICIENT | ±0.03 %/°C(0~50°C) | I/P : 12VDC O/P : FULL LOAD | ±0.001 %/°C(0~50°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | STORAGE TEMPERATURE TEST | -40~85°C | 1. Thermal shock Temperature : -45°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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | THERMAL SHOCK TEST | -40~60°C | 1. Thermal shock Temperature : -45°C~+65°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: 24VDC / FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle: 24VDC / FULL LOAD Burn In Test | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| | | | |
|----|--------------------------|--|---|
| 7 | VIBRATION TEST | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes | 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C |
| 8 | CAPACITOR LIFE CYCLE | SUPPOSE C13 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=50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=50 °C LIFE TIME | (1) 186040HRS (2) 30053HRS (3) 69075HRS (4) 118649HRS |
| 9 | MTBF | Conducted by Parts Stress Analysis Prediction 9118.4K hrs min. Telcordia SR-332 (Bellcore) ; 874.9K hrs min. MIL-HDBK-217F (25°C) | |
| 10 | Ongoing Reliability Test | I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30000 hours | |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------------|--------|----------|
| PASS | WUWQ/HUANGMK | WENF | LIUWY |

2018.4.30 GP-A50-F010