



Test Report: HLG-600H-12

600W Single Output Switching Power Supply

■ 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 | RIPPLE & NOISE | V1 : 150 mVp-p (Max) | I/P : 230VAC O/P : FULL LOAD Ta : 25°C | V1 : 70.4 mVp-p (Max) |
| 2 | CONSTANT CURRENT REGION | O/P : 6~12V | I/P : 230VAC O/P : CV MODE Ta : 25°C | CV= 6V : 40.575A CV= 11V : 40.275A |
| 3 | OUTPUT VOLTAGE ADJUST RANGE | CH1 : 10.2V ~ 12.6 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 12.94 V ~ 9.794 V / 230 VAC 12.94 V ~ 9.794 V / 115 VAC |
| 4 | OUTPUT VOLTAGE TOLERANCE | V1 : -3 % ~ 3 % (Max) | I/P : 100 VAC / 305 VAC O/P : FULL / MIN LOAD Ta : 25°C | V1 : 0.05 % ~ -1.56 % |
| 5 | LINE REGULATION | V1 : -0.5 % ~ 0.5 % (Max) | I/P : 100VAC ~ 305 VAC O/P : FULL LOAD Ta : 25°C | V1 : 0.152 % ~ -0.05 % |
| 6 | LOAD REGULATION | V1 : -2 % ~ 2 % (Max) | I/P : 230 VAC O/P : FULL ~ MIN LOAD Ta : 25°C | V1 : -0.68 % ~ 0.73 % |
| 7 | SET UP TIME | 230VAC : 500 ms (Max) 115VAC : 500 ms(Max) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 100.8 ms 115VAC/ 105.6 ms |
| 8 | RISE TIME | 230VAC : 80 ms (Max) 115VAC : 80 ms (Max) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 15.2 ms 115VAC/ 17.2 ms |
| 9 | HOLD UP TIME | 230VAC : 15 ms (TYP) 115VAC : 15 ms (TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 22.8 ms 115VAC/ 24 ms |
| 10 | OVER/UNDERSHOOT TEST | < ±5% | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | TEST : 0.833 % |
| 11 | OUTPUT CURRENT ADJ RANGE | CH1 : 20 A ~ 40 A | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 11.96A ~ 45.46 A/230VAC 11.71A ~ 45.46 A/115VAC |



600W Single Output Switching Power Supply

HLG-600H series

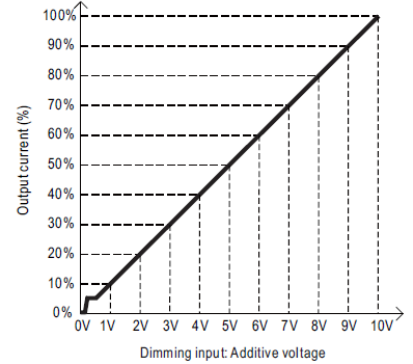
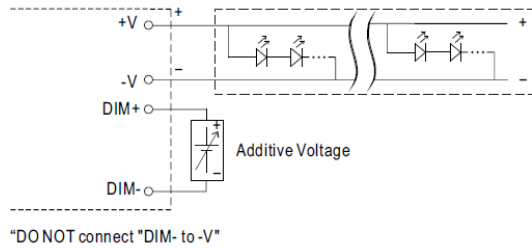
| | | | | |
|----|--------------|-----------------|---|--|
| 12 | DYNAMIC LOAD | V1 : 2040 mVp-p | I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C | (1)1610 mVp-p (2)1530 mVp-p (3)1320 mVp-p (4)1540 mVp-p |
|----|--------------|-----------------|---|--|

13 DIMMING OPERATION

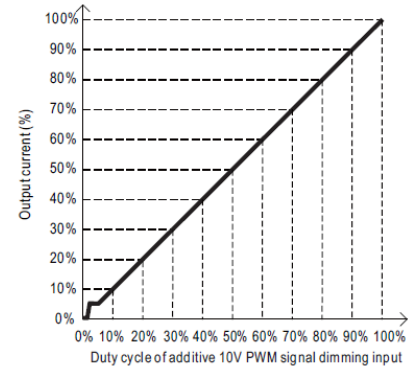
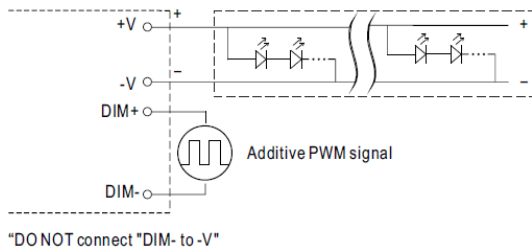
※ 3 in 1 dimming function (for B-Type)

- Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.
- Dimming source current from power supply: 100 μ A (typ.)

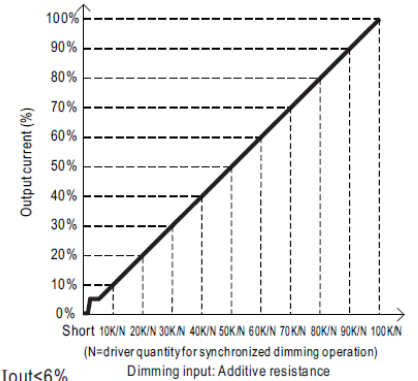
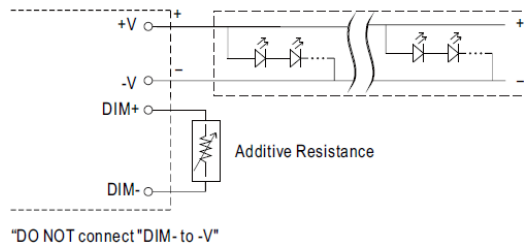
◎ Applying additive 0 ~ 10VDC



◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



◎ Applying additive resistance:



Note : 1. Min. dimming level is about 6% and the output current is not defined when 0% < Iout < 6%.

2. The output current could drop down to 0% when dimming input is about 0k Ω or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P : 230VAC

O/P : DIMMING TEST

TA : 25 $^{\circ}$ C

| | | | | | | | | | | | | |
|-------------|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| R | SHORT | 10K | 20K | 30K | 40K | 50K | 60K | 70K | 80K | 90K | 100K | OPEN |
| O/P CURRENT | 0 | 4.120A | 7.880A | 11.400A | 15.100A | 19.600A | 23.900A | 27.800A | 32.000A | 36.800A | 40.000A | 40.000A |
| % | 0.00% | 10.30% | 19.70% | 28.50% | 37.75% | 49.00% | 59.75% | 69.50% | 80.00% | 92.00% | 100.00% | 100.00% |
| V | SHORT | 1V | 2V | 3V | 4V | 5V | 6V | 7V | 8V | 9V | 10V | OPEN |
| O/P CURRENT | 0 | 4.320A | 8.000A | 11.400A | 15.100A | 19.300A | 23.400A | 27.550A | 31.700A | 36.800A | 40.200A | 40.200A |
| % | 0.00% | 10.80% | 20.00% | 28.50% | 37.75% | 48.25% | 58.50% | 68.88% | 79.25% | 92.00% | 100.50% | 100.50% |
| PWM (100HZ) | SHORT | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | OPEN |
| O/P CURRENT | 0 | 4.040A | 8.200A | 11.900A | 16.200A | 20.300A | 24.100A | 28.200A | 32.000A | 36.400A | 40.200A | 40.200A |
| % | 0.00% | 10.10% | 20.50% | 29.75% | 40.50% | 50.75% | 60.25% | 70.50% | 80.00% | 91.00% | 100.50% | 100.50% |

TEST RESULT : OK

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---------------------------|--|---|-----------------------|
| 1 | INPUT VOLTAGE RANGE | 90VAC~305 VAC | I/P : TESTING O/P : FULL LOAD Ta : 25°C | 69.6 V~305V |
| | | | I/P : LOW-LINE-3V=87 V (PLEASE CHECK DERATING CURVE) HIGH-LINE+10V=315 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN (POWER ON/OFF NO DAMAGE) | TEST : OK |
| 2 | INPUT FREQUENCY RANGE | 47HZ ~63 HZ NO DAMAGE | I/P : 100 VAC ~ 305 VAC O/P : FULL-MIN LOAD Ta : 25°C | TEST : OK |
| 3 | POWER FACTOR | 0.95 / 230 VAC(TYP) | I/P : 230 VAC | PF= 0.963 / 230 VAC |
| | | 0.98 / 115 VAC(TYP) | I/P : 115 VAC | PF= 0.992 / 115 VAC |
| | | 0.93 / 277 VAC(TYP) | I/P : 277 VAC | PF= 0.946 / 277 VAC |
| | | | O/P : FULL LOAD Ta : 25°C | |
| 4 | EFFICIENCY | 92% (TYP) | I/P : 230 VAC | 92.39 % |
| | | 92.5%(TYP) | I/P : 277 VAC O/P : FULL LOAD Ta : 25°C | 92.78 % |
| 5 | INPUT CURRENT | 277V/ 2.9 A (TYP) | I/P : 277 VAC | I = 1.9432 A/ 277 VAC |
| | | 230V/ 3.3 A (TYP) | I/P : 230 VAC | I = 2.2997 A/ 230 VAC |
| | | 115V/ 7 A (TYP) | I/P : 115 VAC | I = 4.5351 A/ 115 VAC |
| | | | O/P : FULL LOAD Ta : 25°C | |
| 6 | INRUSH CURRENT | 230V/ 70 A (TYP) | I/P : 230 VAC | I = 54.4 A/ 230 VAC |
| | | (twidth=1000us measured at 50% Ipeak) COLD START | O/P : FULL LOAD Ta : 25°C | T50= 990 us |
| 7 | LEAKAGE CURRENT | < 0.75 mA / 277 VAC | I/P : 277 VAC | L-FG : 0.32 mA |
| | | | O/P : Min LOAD Ta : 25°C | N-FG : 0.31 mA |
| 8 | NO LOAD CONSUMPTION | < 0.5 W | I/P : 115VAC | < 0.08 W |
| | | | I/P : 230VAC O/P : NO LOAD AT REMOTE OFF Ta : 25°C | < 0.35 W |
| 9 | TOTAL HARMONIC DISTORTION | THD< 20% when output loading \geq 50% at 115VAC/230VAC input and output loading \geq 75% at 277VAC input | I/P : 115VAC | THD : 8.8 |
| | | | I/P : 230VAC | THD : 10.4 |
| | | | O/P : 50% LOAD Ta : 25°C | |
| | | | I/P : 277VAC O/P : 75% LOAD Ta : 25°C | THD : 12.63 |

PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-----------------------------|--|---|--|
| 1 | OVER LOAD PROTECTION | 95% ~108 % | I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C | 106%/ 230 VAC 106%/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 13 V ~ 16V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 13.96-V/ 230 VAC 13.96 V/ 115 VAC Shut down o/p voltage, re-power on to recover |
| 3 | OVER TEMPERATURE PROTECTION | NO DAMAGE | I/P : 230 VAC O/P : FULL LOAD | O.T.P. Active Shut down o/p voltage, re-power on to recover |
| 4 | SHORT PROTECTION | SHORT EVERY OUTPUT 1 HOUR NO DAMAGE | I/P : 305 VAC O/P : FULL LOAD Ta : 25°C | NO DAMAGE Constant current limiting, recovers automatically after fault condition is removed |

CONTROL FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------|---|--|--|
| 1 | REMOTE CONTROL | Power on : "Hi" (Open circuit) or ">2 ~ 5V" Power off : "Low" (Short circuit) or "<0 ~ 0.5V" | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | 1.45 V~5 V POWER ON 0 V~1.3 V POWER OFF |
| 2 | 5V STANDBY | 5V@0.5A TOLERANCE ± 5% RIPPLE 100mVp-p | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 4.958V 26mVp-p/230 VAC 4.958V 26mVp-p/115 VAC |

COMPONENT STRESS TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--|--|--|--|
| 1 | Power Transistor (D to S) or (C to E) Peak Voltage | Q 12 Rated 600 V/ 20 A | I/P : High-Line +3V = 308 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C | (1) 450 V (2) 450 V (3) 450 V |
| 2 | Diode Peak Voltage | Q100 Rated 40 V /120 A | I/P : High-Line +3V = 308 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C | (1) 29.5 V (2) 22.1 V (3) 28.7 V |
| 3 | Input Capacitor Voltage | C5 Rated 220 u / 450V SURGE VOLTAGE 495V | I/P : High-Line +3V = 308 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) 444 V (2) 442 V (3) 452 V |
| 4 | Control IC Voltage Test | U 2 Rated MAX 16 V MIN 8.85V | I/P : High-Line +3V = 308 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) 13.8 V (2) 14 V (3) 14 V |

| | | | | | | |
|---|---|----------------------------|---|-----|-----|---|
| 5 | Power Transistor (D to S) or (C to E) Peak Voltage | Q 1 Rated 600 V/ 20.2 A | I/P : High-Line +3V = 308 V O/P : (1) Full Load Turn on (2) Output Short (3) Full load continue Ta : 25°C | (1) | 468 | V |
| | | | | (2) | 454 | V |
| | | | | (3) | 470 | V |

■ SAFETY & E.M.C. TEST

SAFETY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|--|--|--|
| 1 | WITHSTAND VOLTAGE | I/P-O/P : 3.75KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min | I/P-O/P : 4KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C | I/P-O/P : 3.33 mA I/P-FG : 2.67 mA O/P-FG : 3.54 mA 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 O/P-FG : 500 VDC Ta : 25°C/70%RH | I/P-O/P : 30 GΩ I/P-FG : 25.4 GΩ O/P-FG : 30 GΩ NO DAMAGE |
| 3 | GROUNDING CONTINUITY | FG(PE) TO CHASSIS OR TRACE < 100 mΩ | 40 A / 2min Ta : 25°C / 70%RH | 21 mΩ |

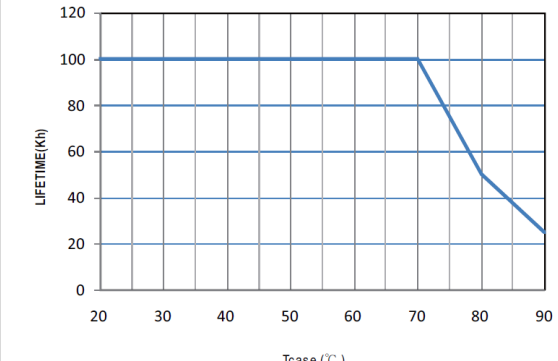
E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|------------|---|--|-------------------------------|
| 1 | HARMONIC | EN61000-3-2 CLASS A CLASS C | I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C | PASS |
| 2 | CONDUCTION | EN55015 CLASS B | I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C | PASS Test by certified Lab |
| 3 | RADIATION | EN55015 CLASS B | I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C | PASS Test by certified Lab |
| 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 |
| 5 | E.F.T | EN61000-4-4 INDUSTRY INPUT : 2KV | I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 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 |

■ RELIABILITY TEST

ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|---|---|--|-----------------------|----------|---------------------------|-----------------------------|---|-----|--------|--------|---|-----|--------|--------|---|------|--------|--------|---|----|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|---------|----|----|--------|---------|----|----|--------|--------|----|------|--------|--------|----|----|--------|--------|----|-----|--------|--------|----|------|--------|--------|----|------|--------|---------|----|------|--------|--------|----|-------|--------|---------|----|----|--------|--------|----|----|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|--|
| 1 | TEMPERATURE RISE TEST | MODEL : HLG-600H-12 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 29 °C 2. HIGH AMBIENT BURN-IN : 14.5HRS I/P : 230VAC O/P : FULL LOAD Ta= 61.7 °C | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 29 °C</th> <th>HIGH AMBIENT Ta= 61.7 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>66.5°C</td><td>95.0°C</td></tr> <tr><td>2</td><td>C10</td><td>64.3°C</td><td>93.0°C</td></tr> <tr><td>3</td><td>ZNR3</td><td>63.5°C</td><td>92.2°C</td></tr> <tr><td>4</td><td>C2</td><td>60.3°C</td><td>88.8°C</td></tr> <tr><td>5</td><td>LF3</td><td>61.9°C</td><td>90.3°C</td></tr> <tr><td>6</td><td>Q1</td><td>63.9°C</td><td>92.7°C</td></tr> <tr><td>7</td><td>L2</td><td>65.8°C</td><td>94.6°C</td></tr> <tr><td>8</td><td>L3</td><td>66.1°C</td><td>95.1°C</td></tr> <tr><td>9</td><td>T1</td><td>71.4°C</td><td>100.3°C</td></tr> <tr><td>10</td><td>T2</td><td>75.0°C</td><td>104.6°C</td></tr> <tr><td>11</td><td>C5</td><td>61.6°C</td><td>90.2°C</td></tr> <tr><td>12</td><td>RTH2</td><td>63.2°C</td><td>92.1°C</td></tr> <tr><td>13</td><td>D9</td><td>66.3°C</td><td>95.5°C</td></tr> <tr><td>14</td><td>Q13</td><td>65.8°C</td><td>95.3°C</td></tr> <tr><td>15</td><td>C115</td><td>69.7°C</td><td>98.7°C</td></tr> <tr><td>16</td><td>C124</td><td>72.0°C</td><td>102.0°C</td></tr> <tr><td>17</td><td>C140</td><td>66.3°C</td><td>95.6°C</td></tr> <tr><td>18</td><td>LF100</td><td>71.8°C</td><td>102.2°C</td></tr> <tr><td>19</td><td>U1</td><td>60.7°C</td><td>89.1°C</td></tr> <tr><td>20</td><td>U2</td><td>61.4°C</td><td>89.9°C</td></tr> <tr><td>21</td><td>C560</td><td>64.3°C</td><td>93.0°C</td></tr> <tr><td>22</td><td>C562</td><td>66.2°C</td><td>94.9°C</td></tr> <tr><td>23</td><td>C510</td><td>63.5°C</td><td>91.8°C</td></tr> <tr><td>24</td><td>C523</td><td>64.0°C</td><td>92.2°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 29 °C | HIGH AMBIENT Ta= 61.7 °C | 1 | BD1 | 66.5°C | 95.0°C | 2 | C10 | 64.3°C | 93.0°C | 3 | ZNR3 | 63.5°C | 92.2°C | 4 | C2 | 60.3°C | 88.8°C | 5 | LF3 | 61.9°C | 90.3°C | 6 | Q1 | 63.9°C | 92.7°C | 7 | L2 | 65.8°C | 94.6°C | 8 | L3 | 66.1°C | 95.1°C | 9 | T1 | 71.4°C | 100.3°C | 10 | T2 | 75.0°C | 104.6°C | 11 | C5 | 61.6°C | 90.2°C | 12 | RTH2 | 63.2°C | 92.1°C | 13 | D9 | 66.3°C | 95.5°C | 14 | Q13 | 65.8°C | 95.3°C | 15 | C115 | 69.7°C | 98.7°C | 16 | C124 | 72.0°C | 102.0°C | 17 | C140 | 66.3°C | 95.6°C | 18 | LF100 | 71.8°C | 102.2°C | 19 | U1 | 60.7°C | 89.1°C | 20 | U2 | 61.4°C | 89.9°C | 21 | C560 | 64.3°C | 93.0°C | 22 | C562 | 66.2°C | 94.9°C | 23 | C510 | 63.5°C | 91.8°C | 24 | C523 | 64.0°C | 92.2°C | |
| NO | Position | ROOM AMBIENT Ta= 29 °C | HIGH AMBIENT Ta= 61.7 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | BD1 | 66.5°C | 95.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | C10 | 64.3°C | 93.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | ZNR3 | 63.5°C | 92.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | C2 | 60.3°C | 88.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | LF3 | 61.9°C | 90.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Q1 | 63.9°C | 92.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | L2 | 65.8°C | 94.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | L3 | 66.1°C | 95.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | T1 | 71.4°C | 100.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | T2 | 75.0°C | 104.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | C5 | 61.6°C | 90.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | RTH2 | 63.2°C | 92.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | D9 | 66.3°C | 95.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Q13 | 65.8°C | 95.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | C115 | 69.7°C | 98.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | C124 | 72.0°C | 102.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | C140 | 66.3°C | 95.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | LF100 | 71.8°C | 102.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | U1 | 60.7°C | 89.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | U2 | 61.4°C | 89.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | C560 | 64.3°C | 93.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | C562 | 66.2°C | 94.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | C510 | 63.5°C | 91.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | C523 | 64.0°C | 92.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | I/P : 230VAC/115VAC O/P : 95 % LOAD Ta= -45°C | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 55 °C NO DAMAGE | I/P : 305 VAC O/P : FULL LOAD Ta= 55 °C HUMIDITY= 95 %R.H | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | TEMPERATURE COEFFICIENT | ± 0.03 %/°C (0~55°C) | I/P : 230 VAC O/P : FULL LOAD | ± 0.003 %/°C (0~55°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | STORAGE TEMPERATURE TEST | 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 : 5 CYCLE 5. Input/Output condition : STATIC | | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

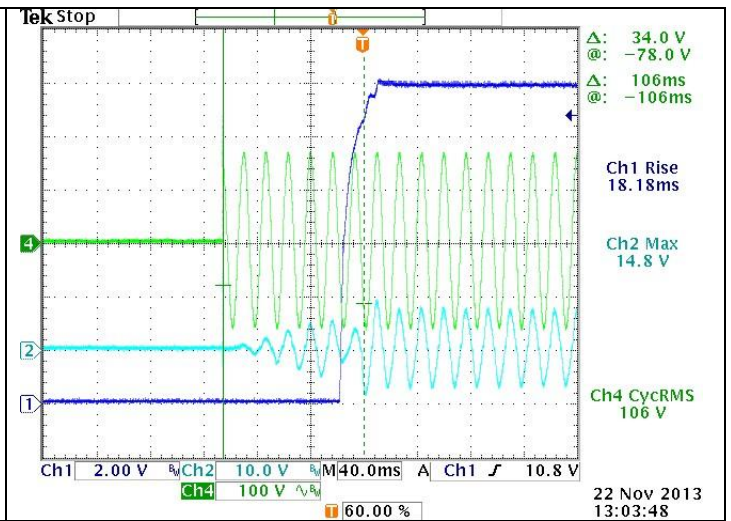
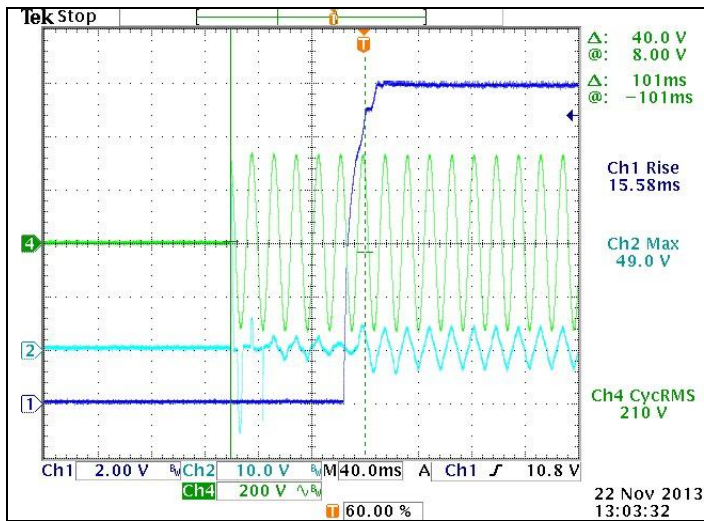
| | | | |
|----|-----------------------------|---|--|
| 6 | THERMAL SHOCK TEST | 1. Thermal shock Temperature : -45°C~ +60°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec | OK |
| 7 | VIBRATION TEST | 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C | TEST : OK |
| 8 | CAPACITOR LIFE CYCLE | HLG-600H-12 : SUPPOSE C115 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= 55 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 55°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 55°C LIFE TIME | (1) 174517 HRS (2) 28645HRS (3) 65534HRS (4) 74494HRS |
| 9 | MTBF | Conducted by Parts Stress Analysis Prediction 76.9K hrs min. MIL-HDBK-217F (25°C) | |
| 10 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure(Expected Life) : 62,000 hours @ Tcase75°C  | |



Auto Test System Data

Model Name : HLG-600H-12

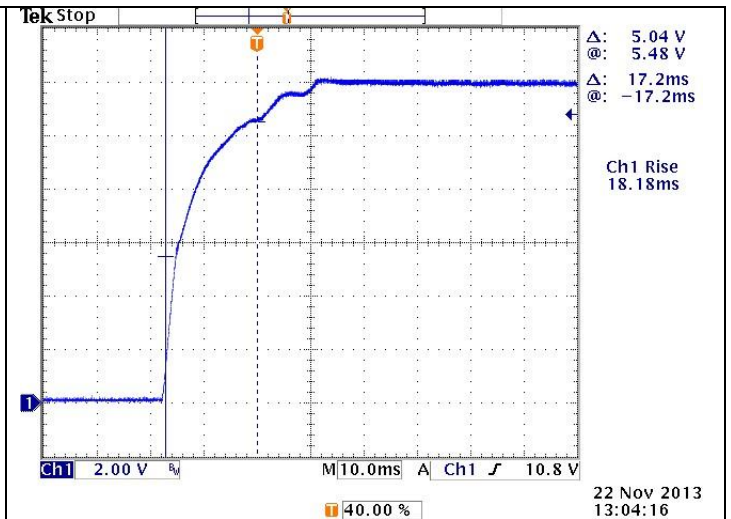
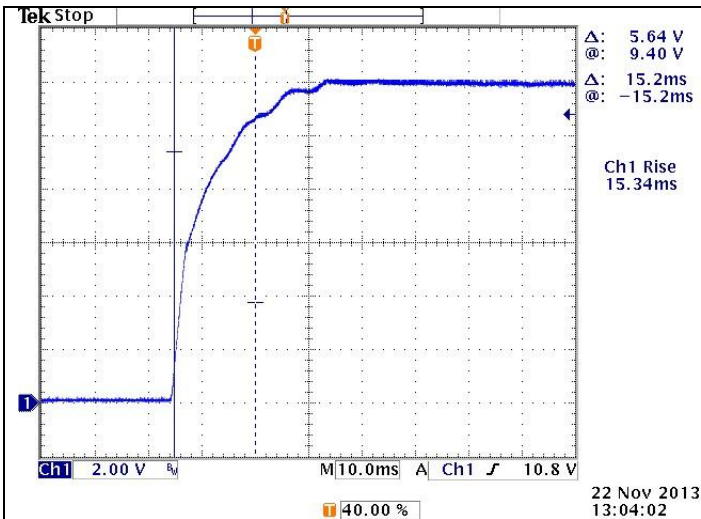
| SETUP TIME | | SPEC : | 230Vac: | 500 | Unit:(ms) |
|----------------|---------|-------------|---------|---------|-----------|
| Test Condition | | | 115Vac: | 500 | |
| Vin(Vac) | Fin(HZ) | TEST RESULT | | VERDICT | |
| 230 | 60 | 100.80 | | PASS | |
| 115 | 60 | 105.60 | | PASS | |



Extended Name = Normal-H Vac/60Hz @ Full LOAD
 SET UP TIME & Inrush Current TEST
 INPUT=230VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage
 CH2 : Inrush Current
 CH4 : AC Input Voltage

Extended Name = Normal-L Vac/60Hz @ Full LOAD
 SET UP TIME & Inrush Current TEST
 INPUT=115VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage
 CH2 : Inrush Current
 CH4 : AC Input Voltage

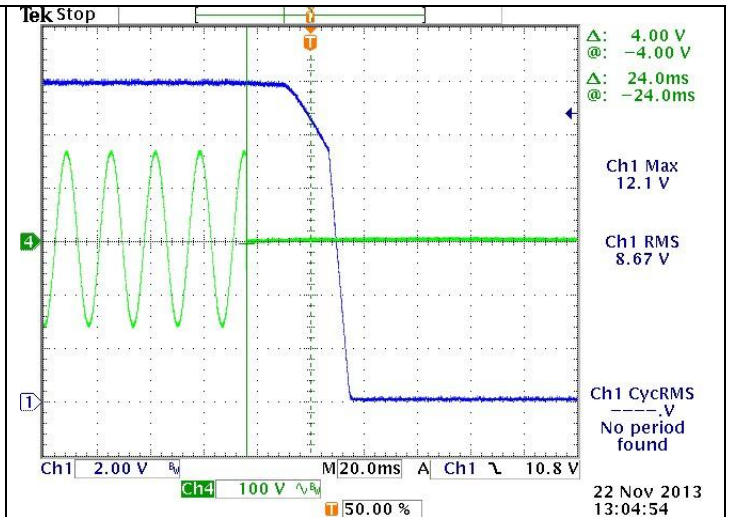
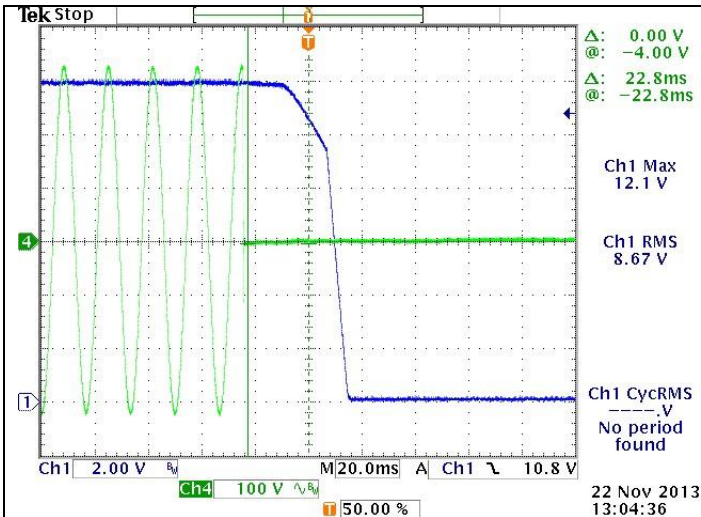
| RISE TIME | | SPEC : | 230Vac: | 80 | Unit:(ms) |
|----------------|---------|-------------|---------|---------|-----------|
| Test Condition | | | 115Vac: | 80 | |
| Vin(Vac) | Fin(HZ) | TEST RESULT | | VERDICT | |
| 230 | 60 | 15.20 | | PASS | |
| 115 | 60 | 17.20 | | PASS | |



Extended Name = Normal-H Vac/60Hz @ Full LOAD
 LOAD CH1:Vout
 Rise Time Test
 INPUT=230VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage

Extended Name = Normal-L Vac/60Hz @ Full LOAD
 LOAD CH1:Vout
 Rise Time Test
 INPUT=115VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage

| HOLD UP TIME | | SPEC : | 230Vac: | 15 | Unit:(ms) |
|----------------|---------|-------------|---------|---------|-----------|
| Test Condition | | | 115Vac: | 15 | |
| Vin(Vac) | Fin(HZ) | TEST RESULT | | VERDICT | |
| 230 | 60 | 22.80 | | PASS | |
| 115 | 60 | 24.00 | | PASS | |



Extended Name = Normal-H Vac/60Hz @ Full LOAD
 Hold up Time Test
 INPUT=230VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage
 CH4 : AC Input Voltage

Extended Name = Normal-L Vac/60Hz @ Full LOAD
 Hold up Time Test
 INPUT=115VAC/60HZ @ FULL LOAD
 CH1 : Output Voltage
 CH4 : AC Input Voltage

| Efficiency Test | | SPEC: | 230VAC: | 92 | Unit:(%) |
|-----------------|-------------|-------|---------|----|----------|
| Test Condition | TEST RESULT | | | | |



600W Single Output Switching Power Supply

HLG-600H series

| Vin(Vac) | Fin(HZ) | MIN Load | 10% Load | 20% Load | 30% Load | 40% Load | 50% Load | 60% Load | 70% Load | 80% Load | 90% Load | 100% Load |
|----------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| 230 | 50 | 0.00 | 85.62 | 89.71 | 91.58 | 92.82 | 93.09 | 92.98 | 92.81 | 92.54 | 92.23 | 92.38 |
| 230 | 60 | 0.00 | 85.70 | 89.73 | 91.58 | 92.95 | 93.10 | 92.99 | 92.83 | 92.55 | 92.23 | 92.39 |
| 115 | 50 | 0.00 | 84.78 | 88.71 | 90.48 | 91.87 | 91.99 | 91.81 | 91.63 | 91.26 | 90.94 | 90.51 |
| 115 | 60 | 0.00 | 84.76 | 88.71 | 90.48 | 91.87 | 91.99 | 91.83 | 91.64 | 91.28 | 90.93 | 90.54 |
| 277 | 50 | 0.00 | 85.36 | 90.28 | 92.05 | 93.07 | 93.36 | 93.28 | 93.12 | 92.87 | 92.60 | 92.68 |
| 277 | 60 | 0.00 | 85.26 | 90.19 | 92.02 | 93.05 | 93.35 | 93.28 | 93.11 | 92.86 | 92.58 | 92.78 |

| PF Test | | | | | | | | | | SPEC: | 230VAC: 0.95 | Unit:() |
|---------------|---------|-------------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|-----------|
| | | | | | | | | | | | 115VAC: 0.98 | |
| | | | | | | | | | | | 277VAC: 0.93 | |
| Test Conditon | | TEST RESULT | | | | | | | | | | |
| Vin(Vac) | Fin(HZ) | MIN Load | 10% Load | 20% Load | 30% Load | 40% Load | 50% Load | 60% Load | 70% Load | 80% Load | 90% Load | 100% Load |
| 230 | 50 | 0.145 | 0.655 | 0.818 | 0.883 | 0.915 | 0.936 | 0.949 | 0.957 | 0.961 | 0.964 | 0.965 |
| 230 | 60 | 0.120 | 0.603 | 0.779 | 0.858 | 0.897 | 0.924 | 0.940 | 0.950 | 0.956 | 0.961 | 0.963 |
| 115 | 50 | 0.396 | 0.920 | 0.962 | 0.975 | 0.977 | 0.983 | 0.981 | 0.982 | 0.988 | 0.988 | 0.992 |
| 115 | 60 | 0.666 | 0.907 | 0.958 | 0.974 | 0.978 | 0.984 | 0.980 | 0.982 | 0.988 | 0.990 | 0.992 |
| 277 | 50 | 0.094 | 0.559 | 0.729 | 0.817 | 0.868 | 0.897 | 0.917 | 0.931 | 0.938 | 0.946 | 0.952 |
| 277 | 60 | 0.155 | 0.508 | 0.682 | 0.778 | 0.838 | 0.873 | 0.901 | 0.918 | 0.928 | 0.938 | 0.946 |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|------------|------------|---------------|
| PASS | DANIEL GAO | SANFORD SU | VINCENT TSENG |

12.10.30 A50-F031