Test Report: SLD-150-24

150W Constant Voltage + Constant Current LED Driver

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

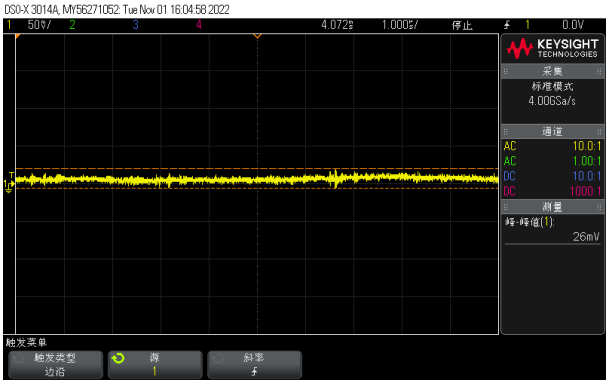
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

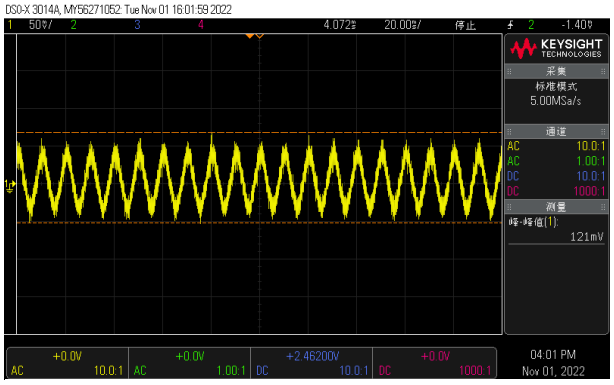
OUTPUT FUNCTION TEST

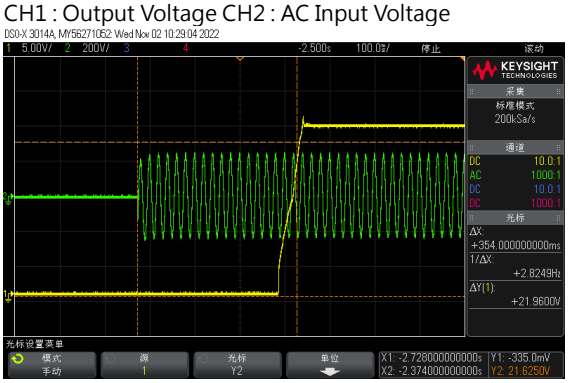
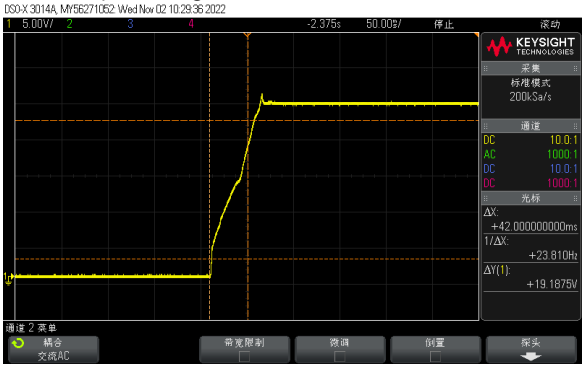
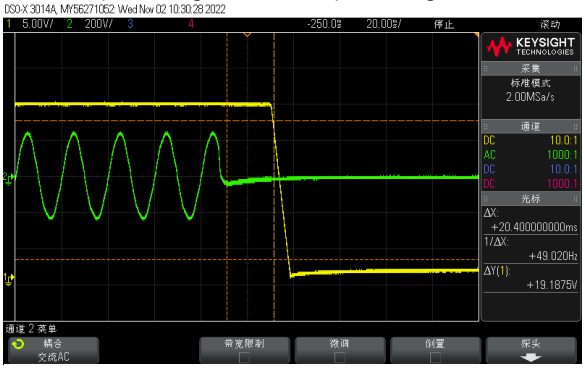
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT ACCURACY	±5%	I/P: 230 VAC I/P:115VAC O/P:FULL LOAD Ta:25℃ **CV MODE TEST**	6.416A /230VAC@CV MAX-1V 6.429A /230VAC@CV MIN 6.392A/115VAC@CV MAX-1V 6.388A/115VAC@CV MIN 1.83%
2	CONSTANT CURRENT REGION	CH1: 16.8V~ 24 V	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CV MODE TEST**	11.2V~23.5V /230VAC
3	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -3% ~ +3%	I/P:110VAC /305AC O/P:FULL/ MIN LOAD Ta:25℃	V1: 0.23%~ 0.76%
4	LINE REGULATION (Max)	V1: -0.5 % ~ 0.5 %	I/P: 110VAC~305AC O/P:FULL LOAD Ta:25℃	V1: -0.04%~ 0%
5	LOAD REGULATION (Max)	V1: -1% ~ +1 %	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.2%~ 0.37%
6	RIPPLE & NOISE (Max)	V1: 240mVp-p	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	V1: 121mVp-p

high frequency :



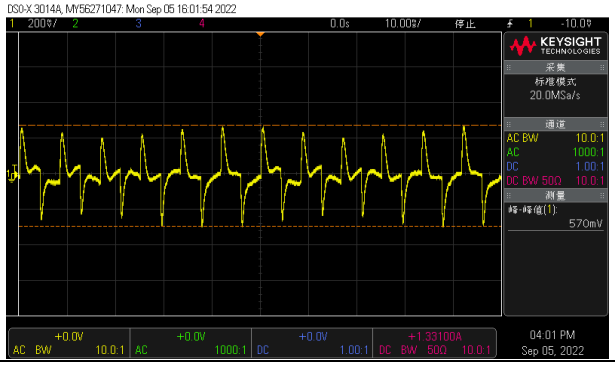
low frequency :



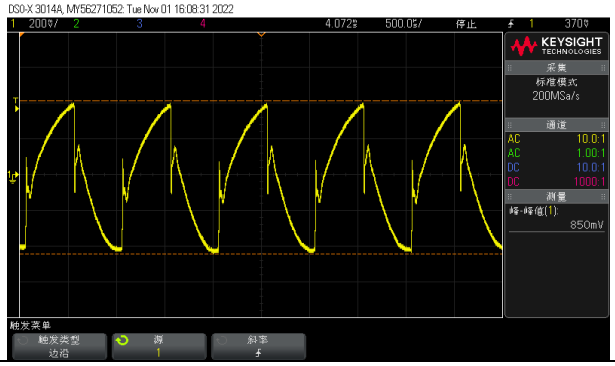
7	SET UP TIME (Max)	230VAC/ 500ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	230VAC/ 354ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 			
8	RISE TIME (Max)	230VAC/ 80ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	230VAC/ 42ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 			
9	HOLD UP TIME (Typ.)	230VAC/ 10ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	230VAC/ 20.4 ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 			

10	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	 570mVp-p 850mVp-p

FULL /50% LOAD 50%DUTY / 120HZ

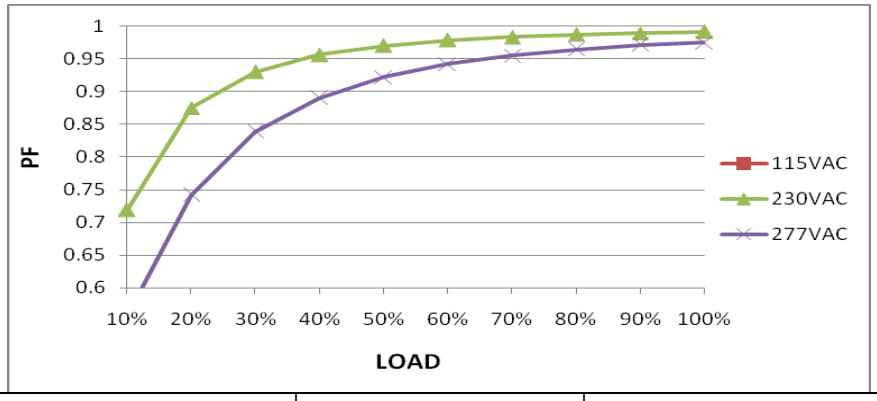
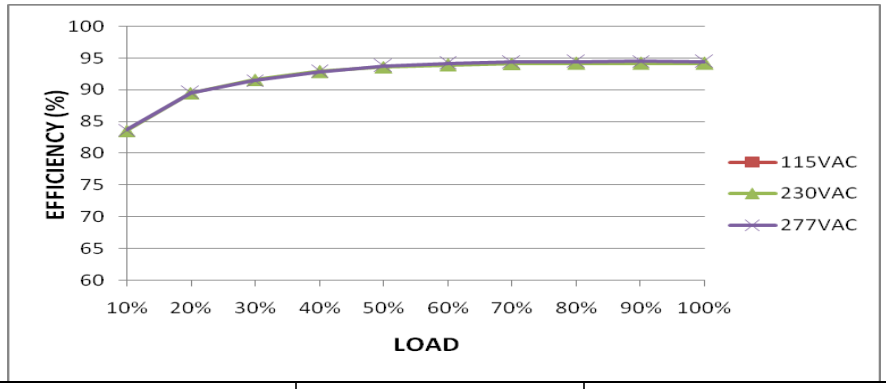
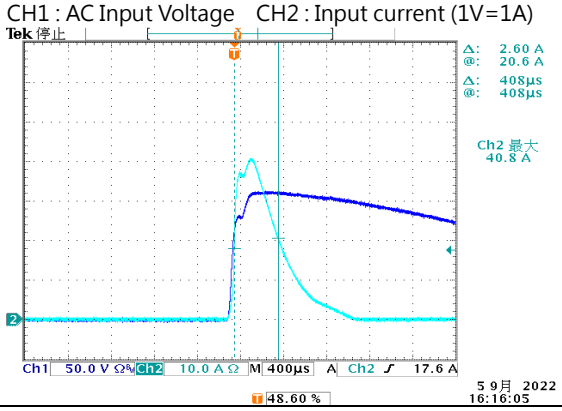


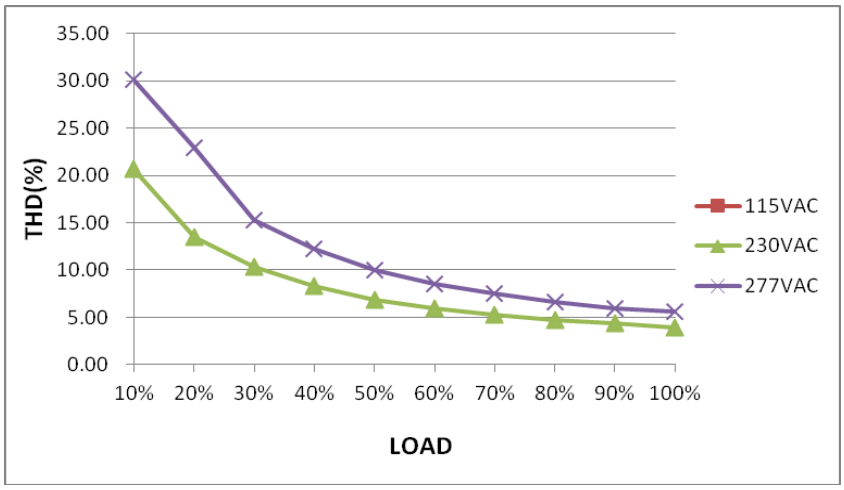
FULL /50% LOAD 50%DUTY / 1KHZ



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	120VAC~305 VAC 170VDC~431VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD (PLEASE CHECK DERATING CURVE) Ta:25℃	(1) 100V~305V (2)152Vdc~431Vdc/FULL LOAD (3) 152Vdc~431Vdc/FULL LOAD
			I/P: LOW-LINE-3V=117 V HIGH-LINE+10V=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) 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: 120VAC ~305VAC O/P:FULL~MIN LOAD Ta:25℃	OK
3	INPUT CURRENT (TYP)	277VAC/ 0.8A 230 VAC/1.0A	I/P: 277VAC/230 VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	I= 0.70 A/277VAC I = 0.61A/ 230VAC
4	NO LOAD POWER CONSUMPTION	< 0.5 W	I/P：230VAC O/P：NO LOAD Ta：25℃	< 0.296 W

5	POWER FACTOR(TYP)	0.95/230 VAC FULL LOAD 0.92/277 VAC FULL LOAD	I/P: 230 VAC/277VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	PF= 0.983/230V/100%LOAD PF= 0.956/277V/100%LOAD
	P.F vs LOAD			
6	EFFICIENCY (TYP)	93%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	94.12%
	EFFICIENCY vs LOAD			
7	INRUSH CURRENT (TYP)	230 V/65A COLD START (twidth=500us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	I = 40.8 A/ 230VAC T50=408 us
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : AC Input Voltage CH2 : Input current (1V=1A)			

8	TOTAL HARMONIC DISTORTION	THD< 10% (@ load≧ 60% at 230VAC, @load≧ 75% at 277VAC	I/P : 230VAC/277VAC O/P : 60% LOAD 75%LOAD Ta : 25℃	THD : 6.89%230V /60% THD : 7.28%277V /75%
	THD&LOAD 			
9	LEAKAGE CURRENT	IEC/EN60335-1: < 0.35mA peak/ 294VAC, 60Hz	I/P: 295VAC O/P:Min LOAD Ta:25℃	L-FG: 0.023mA N-FG: 0.021mA

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 108%	I/P: 305VAC I/P: 230VAC I/P: 120VAC O/P:TESTING Ta:25℃	106.66%/ 295VAC 106.67%/ 230VAC 105.69%/120VAC PROTECTION TYPE : Constant current limiting · continous increase of load will be hiccup protection, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 28V~34V	I/P: 308VAC I/P: 230VAC I/P: 120VAC O/P:MIN LOAD Ta:25℃	32.1 V/ 295VAC 31.5V/ 230VAC 31.9V/ 120VAC PROTECTION TYPE : Shut down output voltage, repower on to recovery
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305 VAC I/P: 200VAC O/P:FULL LOAD	O.T.P Active PROTECTION TYPE : Shut down output voltage, repower on to recovery

4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 308VAC I/P: 200 VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) **Peak Voltage**	Q3 Rated: 11A/ 600V	AC ON/OFF I/P:High-Line +3V =308V VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD I/P:Low-Line -3V = 117V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD Ta:25℃	 VDS: (1) 461V (2) 446V (3) 451V (4) 447V (5) 447V (6) 445V (7) 451V (8) 441V VDS: (1) 462V (2) 441V (3) 441V (4) 452V (5) 455V (6) 452 (7) 454V (8) 445V

2	P.F.C Transistor (D to S) or (C to E) **Peak Voltage**	Q1 Rated: 15A/ 650V	AC ON/OFF I/P:High-Line +3V =308 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD I/P:Low-Line -3V = 117V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD Ta:25℃	 VDS: (1) 532V (2) 496V (3) 524V (4) 527V (5) 519V (6) 528V (7) 524V (8) 506V VDS: (1) 572V (2) 525V (3) 562V (4) 558V (5) 558V (6) 554V (7) 510V (8) 490V
3	P.F.C DIODE	D5 Rated: 600V/9A	AC ON/OFF I/P:High-Line +3V =308 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 117V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25℃	 308VAC (1)461V (2)458V (3)454V (4)456V 117VAC (1)446V (2)443V (3)451V (4)446V

4	Diode Peak **Voltage**	Q101 Rated: 85V/80A	AC ON/OFF I/P:High-Line +3V =308 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD Ta:25℃	Q101: VDS: (1) 56.1V (2) 6.72V (3) 59.1V (4) 58.7V (5) 58.1V (6) 58.5V (7) 57.5V (8) 56.3V
5	**Input Capacitor Voltage**	C5 Rated: 33μ / 450 V Surge voltage: 500V	I/P:High-Line +3V =308V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25℃	(1)441V (2)445V (3)441V (4)436 V
6	**Control IC Voltage Test**	PFC/PWM IC U1 Rated -0.3V~19V O/P IC U101 Rated -0.3V~26V	AC ON/OFF I/P:High-Line +3V =308 V FOR C.V MODE TYPE O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin.LOW LINE FOR C.C MODE TYPE O/P(6)LEDmax (7)LEDmin Ta:25℃	U1: (1) 17.3V (2) 17.3V (3) 17.3V (4) 17.3V (5) 12.1V (6) 17.3V (7) 17.3V U101: (1) 11.1V (2) 0.6V (3) 0.57V (4) 11.1V (5) 11.2V (6) 11.1V (7) 9.78V

■ SAFETY & EMC TEST REPORT

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC/EN61347-1: I/P-O/P: 3.86KVAC/min	I/P-O/P: 4.246 KVAC/min Ta:25℃	I/P-O/P: 1.526 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25℃	I/P-O/P:9999MΩ NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS FAIL
2	CONDUCTION	EN55015/ EN55014 CLASS B	I/P: 230 VAC /50HZ O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN55015/ EN55014 CLASS B	I/P: 230 VAC /50HZ O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab
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
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
7	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

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： SLD-150-24
1. ROOM AMBIENT BURN-IN： HRS
I/P： 230VAC O/P： FULL LOAD Ta=30.9 ℃
2. HIGH AMBIENT BURN-IN： HRS
I/P： 230VAC O/P： FULL LOAD Ta=41.9 ℃

<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=30.9℃</th><th>HIGH AMBIENT Ta=41.9 ℃</th></tr>
<tr><td>1</td><td>RTH1</td><td>61.7℃</td><td>88.4℃</td></tr>
<tr><td>2</td><td>BD1</td><td>80.2℃</td><td>89.9℃</td></tr>
<tr><td>3</td><td>C8</td><td>72.4℃</td><td>81.9℃</td></tr>
<tr><td>4</td><td>L2</td><td>71.9℃</td><td>81.5℃</td></tr>
<tr><td>5</td><td>D5</td><td>75.5℃</td><td>80.3℃</td></tr>
<tr><td>6</td><td>Q1</td><td>78.6℃</td><td>87.8℃</td></tr>
<tr><td>7</td><td>C6</td><td>65.7℃</td><td>76.7℃</td></tr>
<tr><td>8</td><td>Q2</td><td>79.4℃</td><td>90.1℃</td></tr>
<tr><td>9</td><td>Q3</td><td>77.9℃</td><td>88.6℃</td></tr>
<tr><td>10</td><td>Q4</td><td>80.5℃</td><td>90.1℃</td></tr>
<tr><td>11</td><td>U1</td><td>71.3℃</td><td>81.3℃</td></tr>
<tr><td>12</td><td>C13</td><td>72.3℃</td><td>82.3℃</td></tr>
<tr><td>13</td><td>C51</td><td>68.7℃</td><td>78.9℃</td></tr>
<tr><td>14</td><td>L3</td><td>72.4℃</td><td>82.6℃</td></tr>
<tr><td>15</td><td>T1</td><td>75.2℃</td><td>83.8℃</td></tr>
<tr><td>16</td><td>T1core</td><td>75.8℃</td><td>86.2℃</td></tr>
<tr><td>17</td><td>Q100</td><td>67.3℃</td><td>77.8℃</td></tr>
<tr><td>18</td><td>Q101</td><td>67.8℃</td><td>78.3℃</td></tr>
<tr><td>19</td><td>U101</td><td>71.1℃</td><td>81.5℃</td></tr>
<tr><td>20</td><td>C105</td><td>61.6℃</td><td>71.5℃</td></tr>
<tr><td>21</td><td>Q300</td><td>66.6℃</td><td>77.2℃</td></tr>
<tr><td>22</td><td>RTH2</td><td>64.5℃</td><td>74.5℃</td></tr>
<tr><td>23</td><td>TC</td><td>61.3℃</td><td>72.4℃</td></tr>
</table>
</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： 107 % LOAD
Ta：25℃</td><td>TEST：OK</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2
HOUR</td><td>I/P： 305VAC/120VAC
O/P： 100 % LOAD
Ta= -30 ℃</td><td>TEST：OK</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 40℃
NO DAMAGE</td><td>I/P： 315 VAC
O/P：FULL LOAD
Ta=40 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
</table>

5	TEMPERATURE COEFFICIENT	± 0.06 %(0℃~60℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.004 %(0~60℃)
6	STORAGE TEMPERATURE TEST	-40~85℃	1. Thermal shock Temperature： -45℃~ +90℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：10CYCLE 5. Input/Output condition：AC OFF STATIC TEST：OK	
7	THERMAL SHOCK TEST	-25~40℃	1. Thermal shock Temperature： -30℃~ +45℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：16 CYCLE 5. Input/Output condition： 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	
8	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℃	
9	CAPACITOR LIFE CYCLE	SLD-150-24 SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Tc=75 ℃ LIFE TIME (2) I/P： 230VAC O/P：75% LOAD Tc=75 ℃ LIFE TIME (3) I/P： 230VAC O/P：50% LOAD Tc=75 ℃ LIFE TIME		(1) 113756HRS (2) 123486HRS (3) 142588HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 2883.5K hrs min. Telcordia SR-332 (Bellcore) ; 298.8K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=40℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX

2020.10.1 TAG-QA-009