



Test Report: XLC-25-12

25W Constant Voltage 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

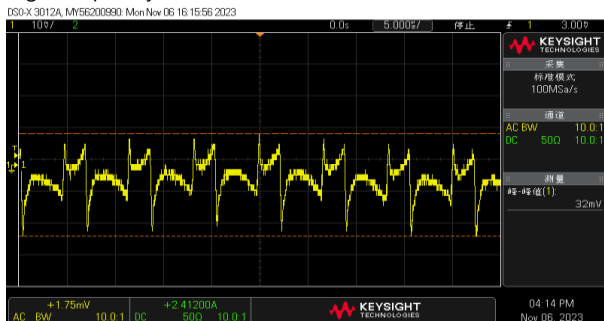
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

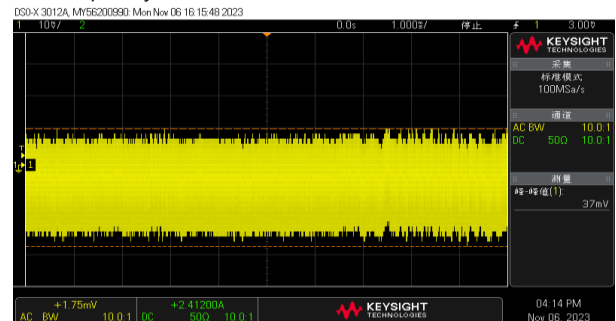
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE	V1: -4% ~4%	I/P:100VAC /305AC O/P:FULL/ MIN LOAD Ta:25°C	V1: -0.75%~0.08%
2	LINE REGULATION	V1: -0.5% ~ 0.5%	I/P:100VAC~305AC O/P:FULL LOAD Ta:25°C	V1: 0%~0%
3	LOAD REGULATION	V1: -2% ~ 2%	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.41%~ 0.33 %
4	OVER/UNDERSHOOT TEST	< ± 5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	TEST: 0.83%
5	RIPPLE & NOISE (Max)	V1: 120 mVp-p	I/P: 230 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	V1: 37mVp-p

high frequency :

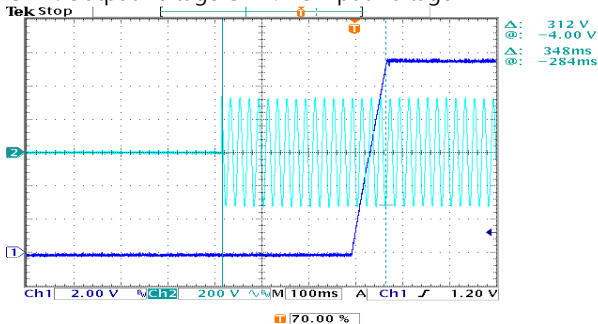


low frequency :

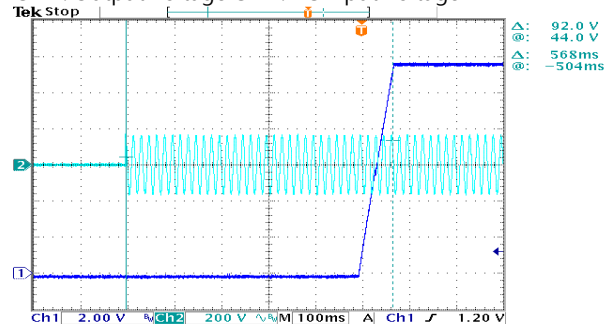


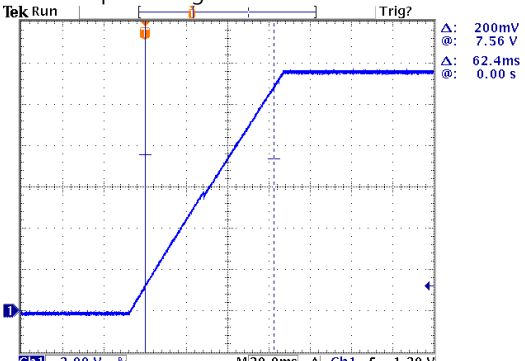
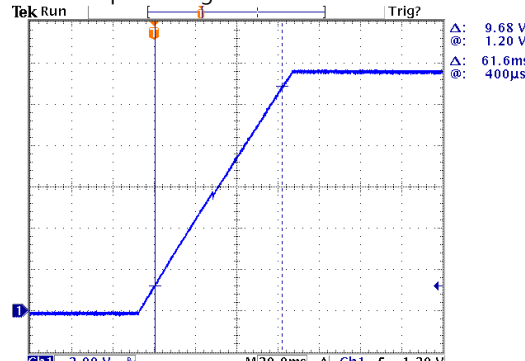
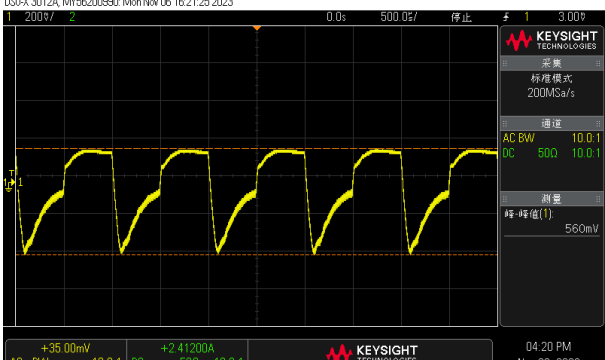
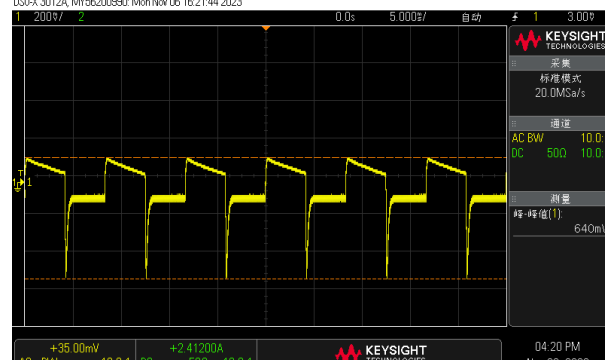
6	SET UP TIME (Max)	230VAC/ 500ms 115VAC/ 1000ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	230VAC/ 348 ms 115 VAC/ 568ms
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INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage

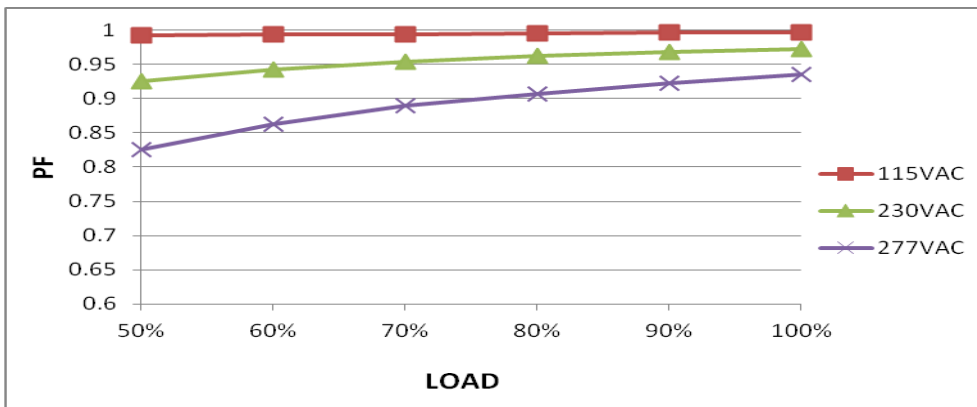


7	RISE TIME (Max)	230VAC/ 100ms 115VAC/100ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	230VAC/ 62.4ms 115 VAC/ 61.6ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> 		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> 		
8	DYNAMIC LOAD	V1: 1200mVp-p	I/P: 230VAC O/P: (1) FULL /50% LOAD 50%DUTY / 120HZ (2) FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	560mVp-p 640mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p> 		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p> 		

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC 141VDC~400VDC	(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 Ta:25°C	(1) 97V~305V (2) 141Vdc~431Vdc/FULL LOAD 141Vdc~431Vdc/50% LOAD (3) 141Vdc~431Vdc/FULL LOAD 141Vdc~431Vdc/50% LOAD
			I/P: LOW-LINE-3V=97 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: 100 VAC ~305VAC O/P:FULL~MIN LOAD Ta:25°C	OK
3	INPUT CURRENT (TYP)	277VAC/0.15A 230 VAC/0.18A 115 VAC/0.35A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	I= 0.11A/277VAC I =0.13A/ 230VAC I = 0.25A/ 115VAC
4	LEAKAGE CURRENT	<0.75mA / 277 VAC	I/P : 277VAC O/P : Min LOAD Ta : 25°C	L-FG:0.023mA N-FG:0.018mA
5	POWER FACTOR(TYP)	0.95 /230 VAC FULL LOAD 0.97 /115 VAC FULL LOAD 0.92/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	PF=0.972/230V/100%LOAD PF=0.996/115V/100%LOAD PF= 0.935/277V/100%LOAD

P.F vs LOAD



6	EFFICIENCY (TYP)	86%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C CCH MODE TEST	86.27%																																												
<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>Load (%)</th> <th>115VAC (%)</th> <th>230VAC (%)</th> <th>277VAC (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>70</td><td>65</td><td>65</td></tr> <tr><td>20%</td><td>78</td><td>72</td><td>72</td></tr> <tr><td>30%</td><td>82</td><td>78</td><td>78</td></tr> <tr><td>40%</td><td>84</td><td>81</td><td>81</td></tr> <tr><td>50%</td><td>85</td><td>83</td><td>83</td></tr> <tr><td>60%</td><td>85.5</td><td>84</td><td>84</td></tr> <tr><td>70%</td><td>86</td><td>85</td><td>85</td></tr> <tr><td>80%</td><td>86.2</td><td>86</td><td>86</td></tr> <tr><td>90%</td><td>86.3</td><td>86.1</td><td>86.1</td></tr> <tr><td>100%</td><td>86.27</td><td>86.2</td><td>86.2</td></tr> </tbody> </table>					Load (%)	115VAC (%)	230VAC (%)	277VAC (%)	10%	70	65	65	20%	78	72	72	30%	82	78	78	40%	84	81	81	50%	85	83	83	60%	85.5	84	84	70%	86	85	85	80%	86.2	86	86	90%	86.3	86.1	86.1	100%	86.27	86.2	86.2
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7	INRUSH CURRENT (TYP)	230 V/10A COLD START (twidh=100 us measured at 50% Ipeak) COLD START	I/P: 230 VAC 115VAC O/P: FULL LOAD Ta: 25°C CCH MODE TEST	I = 3.48A/ 230VAC T50= 34.56 us																																												
<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A)</p> <table border="1"> <caption>Inrush Current Measurement Data</caption> <thead> <tr> <th>Point</th> <th>Time (us)</th> <th>Current (A)</th> </tr> </thead> <tbody> <tr><td>a</td><td>28.48</td><td>1.520</td></tr> <tr><td>b</td><td>-6.080</td><td>1.720</td></tr> <tr><td>Δ</td><td>34.56</td><td>200.0</td></tr> </tbody> </table>					Point	Time (us)	Current (A)	a	28.48	1.520	b	-6.080	1.720	Δ	34.56	200.0																																
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8	TOTAL HARMONIC DISTORTION	THD < 10%(@load ≥ 50%/230VAC; @load ≥ 75%/277VAC); THD < 15% @load 50%/115VAC	I/P : 115VAC/230VAC/277VAC O/P : 50% /75% LOAD Ta : 25°C	THD : 6.51% 230VAC 50% THD : 7.34% 277VAC 75% THD : 5.20% 115VAC 50%																																												
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 220%	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25°C	167%%/ 305VAC 167.1%/ 230VAC 167%%/100VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 13 V~ 16 V	I/P: 308VAC I/P: 230VAC I/P: 100VAC O/P:MIN LOAD Ta:25°C	15.12V/ 308VAC 15.10V/ 230VAC 15.03V/ 90VAC PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305 VAC I/P: 100VAC O/P:FULL LOAD	O.T.P Active PROTECTION TYPE : Shut down output voltage, recovers automatically after fault condition is removed
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 308VAC I/P: 100VAC O/P: FULL LOAD Ta:25°C	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	Q1 Rated 800V/7A	<p>AC ON/OFF</p> <p>I/P: High-Line +3V =308V</p> <p>VDS:</p> <p>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.</p> <p>I/P: Low-Line -3V = 97V</p> <p>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.</p> <p>Ta:25°C</p>	<p>VDS:</p> <p>(1) 738V (2) 553V (3) 568V (4) 718V (5) 716V (6) 739V (7) 548V</p> <p>VDS:</p> <p>(1) 292V (2) 264V (3) 288V (4) 284V (5) 292V (6) 278V (7) 254V</p>
2	Diode Peak Voltage	D101 Rated 10A/ 400V	<p>AC ON/OFF</p> <p>I/P: High-Line +3V =308 V</p> <p>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</p> <p>Ta:25°C</p>	<p>D101:</p> <p>VDS:</p> <p>(1) 228V (2) 228V (3) 226V (4) 222V (5) 220V (6) 224V (7) 234V (8) 230V</p>

3	Control IC Voltage Test	<p>U1 Rated 7V~18V</p> <p>U100 Rated 6V~75V</p>	<p>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 Ta:25°C</p>	<table border="0"> <tr> <td>U1</td> <td>U100</td> </tr> <tr> <td>(1) 14.6V</td> <td>(1)36V</td> </tr> <tr> <td>(2) 14.6V</td> <td>(1) 36V</td> </tr> <tr> <td>(3) 14.5V</td> <td>(2) 36.4V</td> </tr> <tr> <td>(4) 14.6V</td> <td>(3) 36V</td> </tr> <tr> <td>(5) 10.2V</td> <td>(4) 36V</td> </tr> </table>	U1	U100	(1) 14.6V	(1)36V	(2) 14.6V	(1) 36V	(3) 14.5V	(2) 36.4V	(4) 14.6V	(3) 36V	(5) 10.2V	(4) 36V
U1	U100															
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(5) 10.2V	(4) 36V															
4	Clamp Diode Peak Voltage	D10 Rated : 1000V1A	<p>AC ON/OFF I/P : High-Line +3V = 308 V O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C</p>	<table border="0"> <tr> <td>(1) 567V</td> </tr> <tr> <td>(2) 542V</td> </tr> </table>	(1) 567V	(2) 542V										
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5	Buck Diode Peak Voltage MOS	Q110 Rated : 100V /35A	<p>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. Ta : 25°C</p>	<p>VDS:</p> <table border="0"> <tr> <td>(1) 44.1V</td> </tr> <tr> <td>(2) 46.1V</td> </tr> <tr> <td>(3) 45.7V</td> </tr> <tr> <td>(4) 43.7V</td> </tr> <tr> <td>(5) 44.9V</td> </tr> <tr> <td>(6) 44.1V</td> </tr> <tr> <td>(7) 38.4V</td> </tr> </table>	(1) 44.1V	(2) 46.1V	(3) 45.7V	(4) 43.7V	(5) 44.9V	(6) 44.1V	(7) 38.4V					
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SAFETY & EMC TEST REPORT

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.125 KVAC/min Ta:25°C	I/P-O/P: 2.381mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	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°C	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 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 INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 L-N :1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	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

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																
1	TEMPERATURE RISE TEST	MODEL : XLC-25-12 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=23.4 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=52 °C																																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=23.4°C</th> <th>HIGH AMBIENT Ta=52 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>ZNR2</td><td>56.5°C</td><td>82.1°C</td></tr> <tr><td>2</td><td>BD1</td><td>63.8°C</td><td>88.7°C</td></tr> <tr><td>3</td><td>C4</td><td>63.5°C</td><td>88.8°C</td></tr> <tr><td>4</td><td>C20</td><td>55.3°C</td><td>81.4°C</td></tr> <tr><td>5</td><td>Q1</td><td>73.8°C</td><td>99.1°C</td></tr> <tr><td>6</td><td>U1</td><td>66.0°C</td><td>91.5°C</td></tr> <tr><td>7</td><td>D10</td><td>74.1°C</td><td>99.5°C</td></tr> <tr><td>8</td><td>R37</td><td>71.0°C</td><td>96.1°C</td></tr> <tr><td>9</td><td>T1</td><td>65.8°C</td><td>90.7°C</td></tr> <tr><td>10</td><td>D101</td><td>71.9°C</td><td>97.0°C</td></tr> <tr><td>11</td><td>Q110</td><td>67.6°C</td><td>93.6°C</td></tr> <tr><td>12</td><td>Q111</td><td>70.1°C</td><td>96.0°C</td></tr> <tr><td>13</td><td>Q120</td><td>68.6°C</td><td>93.7°C</td></tr> <tr><td>14</td><td>L100</td><td>79.4°C</td><td>105.0°C</td></tr> <tr><td>15</td><td>C101</td><td>67.0°C</td><td>92.2°C</td></tr> <tr><td>16</td><td>C201</td><td>56.2°C</td><td>82.5°C</td></tr> <tr><td>17</td><td>C143</td><td>65.3°C</td><td>91.2°C</td></tr> <tr><td>18</td><td>RTH3</td><td>60.1°C</td><td>86.6°C</td></tr> <tr><td>19</td><td>TC</td><td>56.8°C</td><td>81.6°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=23.4°C	HIGH AMBIENT Ta=52 °C	1	ZNR2	56.5°C	82.1°C	2	BD1	63.8°C	88.7°C	3	C4	63.5°C	88.8°C	4	C20	55.3°C	81.4°C	5	Q1	73.8°C	99.1°C	6	U1	66.0°C	91.5°C	7	D10	74.1°C	99.5°C	8	R37	71.0°C	96.1°C	9	T1	65.8°C	90.7°C	10	D101	71.9°C	97.0°C	11	Q110	67.6°C	93.6°C	12	Q111	70.1°C	96.0°C	13	Q120	68.6°C	93.7°C	14	L100	79.4°C	105.0°C	15	C101	67.0°C	92.2°C	16	C201	56.2°C	82.5°C	17	C143	65.3°C	91.2°C	18	RTH3	60.1°C	86.6°C	19	TC	56.8°C	81.6°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 153.53 % LOAD Ta : 25°C	TEST : OK																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/110VAC O/P : 100 % LOAD Ta=-30 °C	TEST : OK																																																																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 315 VAC O/P : FULL LOAD Ta=50 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																
5	TEMPERATURE COEFFICIENT	± 0.03 %(0°C~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.003 %(0~50°C)																																																																																

6	STORAGE TEMPERATURE TEST	-40~80°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 : 10CYCLE 5. Input/output condition : STATIC TEST : OK
7	THERMAL SHOCK TEST	-25~50°C	1. Thermal shock Temperature : -30°C~ +55°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: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, period for 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C
9	CAPACITOR LIFE CYCLE	SUPPOSE C101 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Tc=70 °C LIFE TIME (2) I/P : 230VAC O/P : 75% LOAD Tc=70 °C LIFE TIME (3) I/P : 230VAC O/P : 50% LOAD Tc=70 °C LIFE TIME	(1) 74151HRS (2) 92797HRS (3) 114045HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 3949.8K hrs min. Telcordia SR-332 (Bellcore) ; 338.5K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX

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