



# Test Report: DDR-480B-24

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480W DIN Rail Type DC-DC Converter

## ■ 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

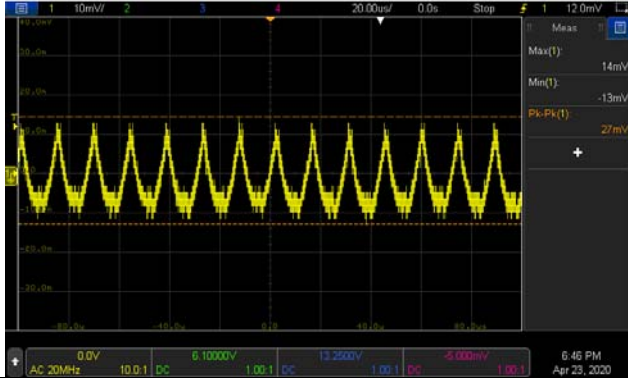
ENVIRONMENT TEST

## DESIGN VERIFY TEST

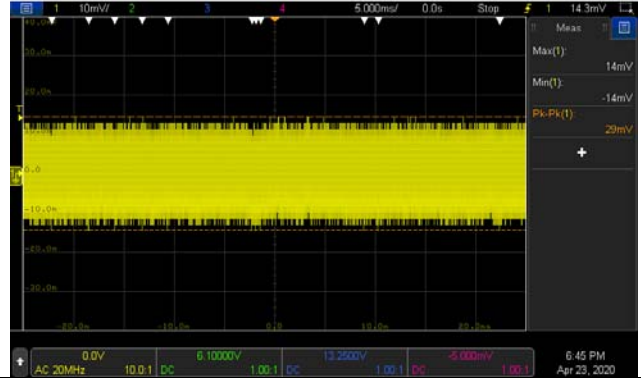
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24V~ 28V	I/P: NORMAL VOLTAGE O/P: MIN LOAD Ta: 25°C	CH1: 22.84V~29.08 V
2	OUTPUT VOLTAGE TOLERANCE(Max)	V1: -1%~1 %	I/P: 16.8 VDC /33.6 VDC O/P: FULL/ MIN. LOAD Ta: 25°C	V1: -0.20%~0.20%
3	LINE REGULATION(Max)	V1: -0.5%~ 0.5%	I/P: 16.8 VDC /33.6 VDC O/P: FULL LOAD Ta: 25°C	V1: 0%~0.08%%
4	LOAD REGULATION(Max)	V1: -1%~1 %	I/P: 24VDC O/P: FULL ~MIN LOAD Ta: 25°C	V1: -0.20%~0.20%
5	OVER/UNDERSHOOT TEST	<±5%	I/P: 24 VDC O/P: FULL LOAD Ta: 25°C	TEST: 2.1%
6	Peaking Loading	720W/5sec.	I/P: 24 VDC O/P: 720W Ta: 25°C	TEST: OK
7	RIPPLE & NOISE (Max)	V1: 120mVp-p	I/P: 24 VDC O/P: FULL LOAD Ta: 25°C	V1: 29mVp-p

high frequency :



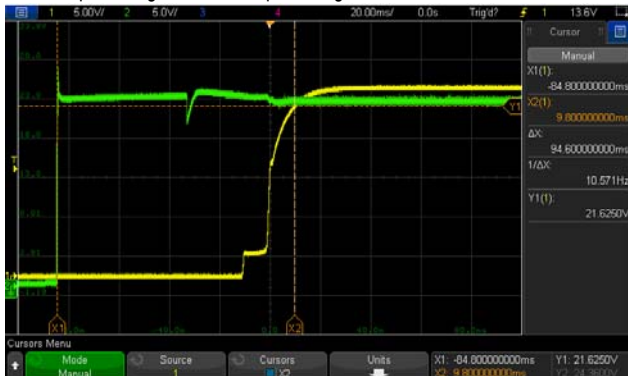
low frequency :




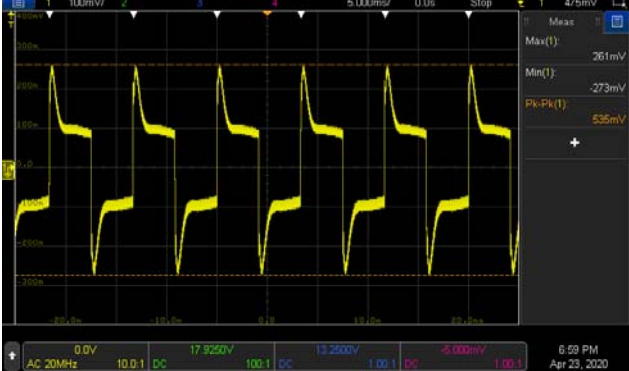
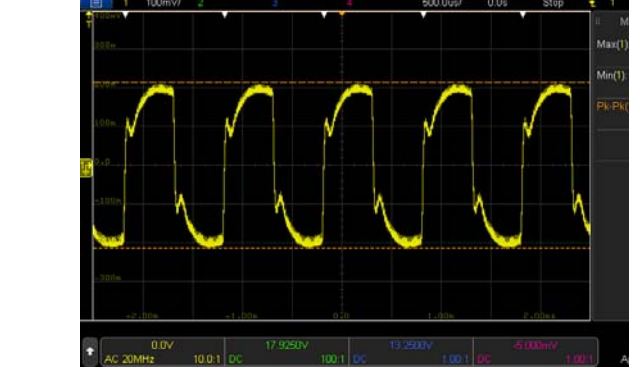


8	SET UP TIME(Max)	24VDC/500ms	I/P: 24 VDC O/P: FULL LOAD Ta: 25°C	94.6ms
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INPUT=24VDC @ FULL LOAD

CH1 : Output Voltage CH2 : DC Input Voltage

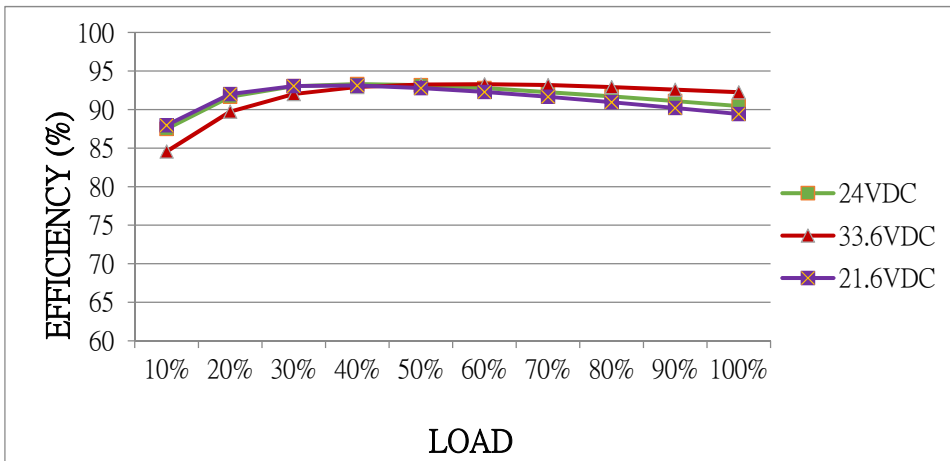


9	RISE TIME (Max)	24VDC/ 60ms	I/P: 24VDC O/P: FULL LOAD Ta: 25°C	20.08ms
<p>INPUT=24VDC @ FULL LOAD CH1 : Output Voltage</p> 				
10	HOLD UP TIME (TYP)	24VDC/ 10 ms 24VDC/ 16 ms@70%LOAD	I/P: 24VDC O/P: FULL LOAD/70%LOAD Ta: 25°C	10.26ms@FULL LOAD 15.6ms@70%LOAD
<p>INPUT=24VDC @ FULL LOAD CH1 : Output Voltage CH2 : DC Input Voltage</p>  <p>INPUT=24VDC @ 70% LOAD CH1 : Output Voltage CH2 : DC Input Voltage</p> 				
11	TRANSIENT RECOVERY TIME	V1: 2400mVp-p	I/P: 24VDC O/P: 40% LOAD CHANGE 50%DUTY/120HZ	430mVp-p
12	DYNAMIC LOAD	V1: 2400mVp-p	I/P: 24VDC O/P: (1) FULL /50% LOAD 50%DUTY/120HZ (2) FULL /50% LOAD 50%DUTY/ 1KHZ Ta: 25°C	535mVp-p 426mVp-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	16.8VDC~33.6 VDC 14.4VDC~16.8 VDC ≥100ms	I/P: TESTING O/P: FULL LOAD Ta: 25°C	(1) 14.87V~33.6 V (2) TEST : OK
			I/P: LOW-LINE-0.2=16.6 V HIGH-LINE+1V= 34.6V 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 CURRENT(TYP)	24VDC/23 A	I/P: 24VDC O/P: FULL LOAD Ta: 25°C	I = 21.67A
3	EFFICIENCY(TYP)	91%	I/P: 24VDC O/P: FULL LOAD Ta: 25°C	91.45%

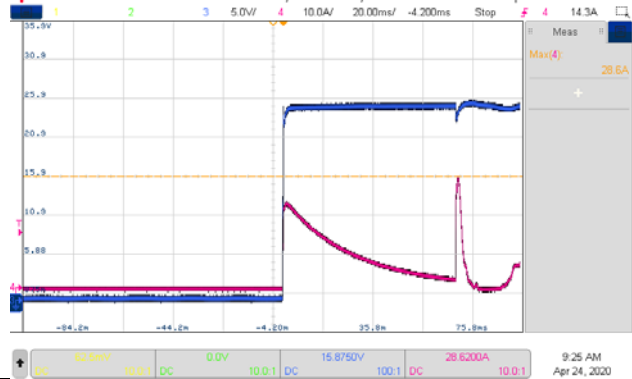
EFFICIENCY vs LOAD



4	INRUSH CURRENT(TYP)	24VDC/30 A COLD START	I/P: 24VDC O/P: FULL LOAD Ta: 25°C	I = 28.6A/24VDC
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INPUT=24VDC @ FULL LOAD

CH4 : Input current



5	INTERRUPTION OF VOLTAGE SUPPLY	COMPLY WITH S2 LEVEL (10ms)	I/P: 24VDC O/P: FULL LOAD Ta: 25°C	11.4ms
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOADPROTECTION	105%~135%RATED OUTPUT POWER	I/P: 21.6VDC I/P: 24VDC I/P: 33.6VDC O/P: TESTING PEAK LOAD ( 5S ) Ta:25°C	120.9%/21.6VDC 120.5%/24VDC 120.45%/33.6VDC PROTECTION TYPE : Normally works within 150% rated output power for more than 5 seconds and thenconstant current protection 105%~135% rated output powerwith auto-recovery.
2	OVER VOLTAGE PROTECTION	CH: 28.8 V~ 35 V	I/P: 16.8VDC I/P: 24VDC I/P: 33.6VDC O/P: MIN LOAD Ta:25°C	31.4V/16.8VDC 31.5V/24VDC 31.4V/33.6VDC PROTECTION TYPE : Shut down O/P voltage,re-power on to recover
3	OVERTEMPERATUREPROTECTION	SPEC: NO DAMAGE	I/P: 33.6/16.8VDC O/P: FULL LOAD Ta:25°C	O.T.P. Active PROTECTION TYPE : Shut down O/P voltage,re-power on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 33.6/16.8VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Constant current limiting with auto-recovery recovers automatically after fault condition is removed
5	INPUT REVERSE	POWER OK	I/P: 33.6/16.8VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE
6	INPUT UNDER VOLTAGE PROTECTION	24 VIN (C-TYPE) : POWER ON >=16.8V POWER OFF<=16.5V	I/P: TESTING O/P: FULL LOAD Ta:25°C	POWER ON >=16.2V POWER OFF<=12.9V

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT						
1	REMOTE ON/OFF CONTROL	I/P: 24VDC O/P:FULL LOAD Ta:25°C Test Result :								
		<table border="1"> <tr> <td>Remote ON-OFF (TB1 PIN2,4)</td> <td>Power Supply Status</td> </tr> <tr> <td>Open or 5.5~10VDC</td> <td>ON 3.81V</td> </tr> <tr> <td>Short or 0~0.8VDC</td> <td>OFF 0.83V</td> </tr> </table>	Remote ON-OFF (TB1 PIN2,4)	Power Supply Status	Open or 5.5~10VDC	ON 3.81V	Short or 0~0.8VDC	OFF 0.83V		
Remote ON-OFF (TB1 PIN2,4)	Power Supply Status									
Open or 5.5~10VDC	ON 3.81V									
Short or 0~0.8VDC	OFF 0.83V									
2	DC OK CONTACT RATINGS	30VDC/1A RESISTIVE LOAD	I/P: 24VDC O/P:FULL LOAD Ta:25°C	TEST : OK						

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E)Peak Voltage	Q 8/Q19 Rated : 100 A/ 100 V Q12/Q17 Rated : 100 A/ 100V	DC ON/OFF I/P:High-Line +1V =34.6V VDS: O/P: (1)Full Load	Q8 Q19 VDS: (1) 54.6V (1) 58.3V (2) 65.8V (2) 61.9V



			<p>(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>(3) 65.0V  (4) 69.0V  (5) 64.2V  (6) 59.4V  (7) 79.5V</p> <p>Q12  VDS:  (1) 55.9V  (2) 60.7V  (3) 59.8V  (4) 62.2V  (5) 59V  (6) 56.2V  (7) 65.5V</p>	<p>(3) 59.5V  (4) 61.9V  (5) 58.7V  (6) 57.9V  (7) 77.1V</p> <p>Q17  VDS:  (1) 57.8V  (2) 69.1V  (3) 63.9V  (4) 65.6V  (5) 59.9V  (6) 57.5V  (7) 66.3V</p>
2	Clamp MOSFET (D to S) or (C to E) Peak Voltage	Q20/Q4 Rated : 73 A/ 100 V	<p>DC ON/OFF  I/P:High-Line +1V =34.6V  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.  Ta:25°C</p>	<p>Q20  VDS:  (1) 46.5V  (2) 50.5V  (3) 60.1V  (4) 60.9V  (5) 56.0V  (6) 56.4V  (7) 70.5V</p>	<p>Q4  VDS:  (1) 46.1V  (2) 50.1V  (3) 69V  (4) 79.4V  (5) 71.4V  (6) 58.5V  (7) 64.9V</p>
3	Diode PeakVoltage	<p>Q101/Q200 Rated :  20 A/ 200 V  Q105/Q203Rated :  65 A/ 200 V</p>	<p>DC ON/OFF  I/P:High-Line +1V =34.6 V  VOmax:  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>VO:  O/P: (1)Full Load  Ta:25°C</p>	<p>Q101:  VOmax:  VDS:  (1) 165V  (2) 103.7V  (3) 171V  (4) 175V  (5) 171V  (6) 169V  (7) 165.5V  (8) 83.8V</p> <p>VO:  (1) 137V</p> <p>Q200:  VOmax:  VDS:  (1) 133.9V  (2) 120V  (3) 166V  (4) 170V  (5) 168V  (6) 164V  (7) 123V  (8) 85.0V</p> <p>VO:  (1) 115.6V</p>	<p>Q105:  VOmax:  VDS:  (1) 149V  (2) 159V  (3) 149V  (4) 153V  (5) 149V  (6) 149V  (7) 163V  (8) 137V</p> <p>VO:  (1) 149V</p> <p>Q203:  VOmax:  VDS:  (1) 161V  (2) 168V  (3) 161V  (4) 161V  (5) 163V  (6) 163V  (7) 168V  (8) 147V</p> <p>VO:  (1) 163V</p>



4	Input Capacitor Voltage	C20/C28 Rated: : 2200 $\mu$ / 35V	I/P: High-Line +1V =34.6V 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°C	C20 (1) 34.3V (2) 33.5V (3) 33.7V (4) 33.7V	C28 (1) 34.5V (2) 33.3V (3) 33.3V (4) 33.3V
5	Control IC Voltage Test	PWM IC U1 Rated 7.5V~ 15 V O/PU204/U102 Rated -0.3V~ 27 V O/PU100 Rated -0.3V~ 32 V	DC ON/OFF I/P: High-Line +1V =34.6 V 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	U102 (1) 10.89V (2) 10.89V (3) 10.97V (4) 10.97V (5) 110.81V  U100 (1) 11.48V (2) 11.56V (3) 11.81V (4) 11.64V (5) 11.4V	U204 (1) 10.92V (2) 11.48V (3) 11.08V (4) 11.0V (5) 10.68V  U1 (1) 13.14V (2) 13.23V (3) 13.31V (4) 13.06 (5) 10.97

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4KVDC/min I/P-FG: 2.5KVDC/min O/P-FG: 0.71KVDC/min	I/P-O/P: 4.4KVDC/min I/P-FG: 3KVDC/min O/P-FG: 0.852KVDC/min Ta:25°C	I/P-O/P: 0.2uA I/P-FG: 0.1uA O/P-FG: 0.3uA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC > 100M $\Omega$ I/P-FG: 500VDC > 100M $\Omega$ O/P-FG: 500VDC > 100M $\Omega$	I/P-O/P: 600 VDC I/P-FG: 600VDC O/P-FG: 600VDC Ta:25°C	I/P-O/P: 9999M $\Omega$ I/P-FG: 9999M $\Omega$ O/P-FG: 9999M $\Omega$ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m $\Omega$	40A / 2min Ta:25°C	3m $\Omega$

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	EN55032 CLASS B	I/P: 24VDC O/P: FULL LOAD Ta:25°C	PASS Test by certified Lab
2	CONDUCTION	EN55032 CLASS A	I/P: 24VDC O/P: FULL LOAD Ta:25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 <input type="checkbox"/> MEDICAL AIR: 15KV / Contact: 8KV <input type="checkbox"/> LIGHT INDUSTRY AIR: 8KV / Contact: 4KV <input checked="" type="checkbox"/> INDUSTRY AIR: 8KV / Contact: 6KV	I/P: 24VDC O/P: FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
4	E.F.T	EN61000-4-4 <input type="checkbox"/> LIGHT INDUSTRY INPUT: 0.5KV <input type="checkbox"/> MEDICAL <input checked="" type="checkbox"/> INDUSTRY INPUT: 2KV	I/P: 24VDC O/P: FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B

5	SURGE	IEC61000-4-5 <input checked="" type="checkbox"/> INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 24VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
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 : DDR-480B-48 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 24 VDC O/P : FULL LOAD Ta= 26.2 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 24 VDC O/P : FULL LOAD Ta= 60.6 °C																																																																																																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENTTa= 26.2 °C</th> <th>HIGH AMBIENT Ta= 60.6 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF3</td><td>74.4°C</td><td>116.4°C</td></tr> <tr><td>2</td><td>C29</td><td>57.9°C</td><td>98.8°C</td></tr> <tr><td>3</td><td>T7</td><td>61.6°C</td><td>103.3°C</td></tr> <tr><td>4</td><td>U1</td><td>53.8°C</td><td>96.5°C</td></tr> <tr><td>5</td><td>T3</td><td>74.1°C</td><td>117.6°C</td></tr> <tr><td>6</td><td>Q4</td><td>62.5°C</td><td>105°C</td></tr> <tr><td>7</td><td>R23</td><td>62.3°C</td><td>104.7°C</td></tr> <tr><td>8</td><td>Q17</td><td>69.2°C</td><td>111.8°C</td></tr> <tr><td>9</td><td>T2</td><td>73.4°C</td><td>117.5°C</td></tr> <tr><td>10</td><td>L200</td><td>81.6°C</td><td>124.1°C</td></tr> <tr><td>11</td><td>Q200</td><td>75.3°C</td><td>115.6°C</td></tr> <tr><td>12</td><td>Q202</td><td>75.3°C</td><td>118.1°C</td></tr> <tr><td>13</td><td>C204</td><td>69.4°C</td><td>109.8°C</td></tr> <tr><td>14</td><td>U101</td><td>66.4°C</td><td>108.1°C</td></tr> <tr><td>15</td><td>U100</td><td>67.3°C</td><td>107.8°C</td></tr> <tr><td>16</td><td>D210</td><td>69.1°C</td><td>110.4°C</td></tr> <tr><td>17</td><td>ZD209</td><td>69°C</td><td>110.3°C</td></tr> <tr><td>18</td><td>R203</td><td>68°C</td><td>108.9°C</td></tr> <tr><td>19</td><td>Q204</td><td>68.5°C</td><td>110.3°C</td></tr> <tr><td>20</td><td>TB1</td><td>59.8°C</td><td>99.3°C</td></tr> <tr><td>21</td><td>ZNR1</td><td>62.8°C</td><td>106.2°C</td></tr> <tr><td>22</td><td>LF1</td><td>67.7°C</td><td>109.2°C</td></tr> <tr><td>23</td><td>LF2</td><td>73.2°C</td><td>115.8°C</td></tr> <tr><td>24</td><td>Q6</td><td>62.2°C</td><td>103°C</td></tr> <tr><td>25</td><td>Q13</td><td>73.1°C</td><td>115.2°C</td></tr> <tr><td>26</td><td>C64</td><td>62.4°C</td><td>101.8°C</td></tr> <tr><td>27</td><td>LF4</td><td>75.7°C</td><td>116.8°C</td></tr> <tr><td>28</td><td>T8</td><td>65.4°C</td><td>106.5°C</td></tr> <tr><td>29</td><td>Q103</td><td>75.2°C</td><td>95.9°C</td></tr> <tr><td>30</td><td>T4</td><td>76.8°C</td><td>118.1°C</td></tr> <tr><td>31</td><td>Q19</td><td>75.1°C</td><td>115.5°C</td></tr> <tr><td>32</td><td>Q8</td><td>69.9°C</td><td>109.7°C</td></tr> <tr><td>33</td><td>Q20</td><td>72.6°C</td><td>113.3°C</td></tr> <tr><td>34</td><td>R91</td><td>66°C</td><td>106°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENTTa= 26.2 °C	HIGH AMBIENT Ta= 60.6 °C	1	LF3	74.4°C	116.4°C	2	C29	57.9°C	98.8°C	3	T7	61.6°C	103.3°C	4	U1	53.8°C	96.5°C	5	T3	74.1°C	117.6°C	6	Q4	62.5°C	105°C	7	R23	62.3°C	104.7°C	8	Q17	69.2°C	111.8°C	9	T2	73.4°C	117.5°C	10	L200	81.6°C	124.1°C	11	Q200	75.3°C	115.6°C	12	Q202	75.3°C	118.1°C	13	C204	69.4°C	109.8°C	14	U101	66.4°C	108.1°C	15	U100	67.3°C	107.8°C	16	D210	69.1°C	110.4°C	17	ZD209	69°C	110.3°C	18	R203	68°C	108.9°C	19	Q204	68.5°C	110.3°C	20	TB1	59.8°C	99.3°C	21	ZNR1	62.8°C	106.2°C	22	LF1	67.7°C	109.2°C	23	LF2	73.2°C	115.8°C	24	Q6	62.2°C	103°C	25	Q13	73.1°C	115.2°C	26	C64	62.4°C	101.8°C	27	LF4	75.7°C	116.8°C	28	T8	65.4°C	106.5°C	29	Q103	75.2°C	95.9°C	30	T4	76.8°C	118.1°C	31	Q19	75.1°C	115.5°C	32	Q8	69.9°C	109.7°C	33	Q20	72.6°C	113.3°C	34	R91	66°C	106°C
NO	Position	ROOM AMBIENTTa= 26.2 °C	HIGH AMBIENT Ta= 60.6 °C																																																																																																																																													
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14	U101	66.4°C	108.1°C																																																																																																																																													
15	U100	67.3°C	107.8°C																																																																																																																																													
16	D210	69.1°C	110.4°C																																																																																																																																													
17	ZD209	69°C	110.3°C																																																																																																																																													
18	R203	68°C	108.9°C																																																																																																																																													
19	Q204	68.5°C	110.3°C																																																																																																																																													
20	TB1	59.8°C	99.3°C																																																																																																																																													
21	ZNR1	62.8°C	106.2°C																																																																																																																																													
22	LF1	67.7°C	109.2°C																																																																																																																																													
23	LF2	73.2°C	115.8°C																																																																																																																																													
24	Q6	62.2°C	103°C																																																																																																																																													
25	Q13	73.1°C	115.2°C																																																																																																																																													
26	C64	62.4°C	101.8°C																																																																																																																																													
27	LF4	75.7°C	116.8°C																																																																																																																																													
28	T8	65.4°C	106.5°C																																																																																																																																													
29	Q103	75.2°C	95.9°C																																																																																																																																													
30	T4	76.8°C	118.1°C																																																																																																																																													
31	Q19	75.1°C	115.5°C																																																																																																																																													
32	Q8	69.9°C	109.7°C																																																																																																																																													
33	Q20	72.6°C	113.3°C																																																																																																																																													
34	R91	66°C	106°C																																																																																																																																													





			35	T1	73.6°C	115.4°C
			36	L101	82.4°C	123.5°C
			37	Q105	77.9°C	107.6°C
			38	C110	68.9°C	108.8°C
			39	C111	67.2°C	106.4°C
			40	ZD109	68.7°C	108.7°C
			41	Q14	69.2°C	109.3°C
			42	D17	75.9°C	116.7°C
			43	D106	68.8°C	108.8°C
			44	TB2	64.2°C	102°C
			45	LF100	69.2°C	108.9°C
			46	RY100	70.6°C	109.1°C
			47	C207	65.5°C	105.1°C
			48	Q22	65.9°C	106.1°C
			49	C65	75.8°C	118.4°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 24 VDC O/P : 144% LOAD Ta : 25°C		TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 21.6VDC /33.6VDC O/P : 100% LOAD Ta= -45°C		TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C /95 %R.H NO DAMAGE	I/P : 35VDC O/P : FULL LOAD Ta= 60°C HUMIDITY= 95 %R.H		TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03%/ (0~55°C)	I/P : 24C O/P : FULL LOAD		± 0.0051%/°C (0~55°C)	
6	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			
7	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: 24 VDC / FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle: 24 VDC / FULL LOAD Burn In Test			
8	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 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 : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C			
9	CAPACITOR LIFE CYCLE	SUPPOSE C111 IS THE MOST CRITICAL COMPONENT (1) I/P : 24VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 24VDC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 24VDC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 24VDC O/P : 50% LOAD Ta= 60 °C LIFE TIME			(1) 364259.9HRS (2) 23084 HRS (3) 63100.7HRS (4) 113321.8HRS	



10	MTBF	Conducted by Parts Stress Analysis Prediction 280.0 K hrs min. Telcordia SR-332 (Bellcore) ; 101.7K hrs min. MIL-HDBK-217F (25°C)
11	Ongoing Reliability Test	I/P : 24VDC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30000hours

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		Wangdz

2018.4.30 GP-A50-F010