



Test Report: NTS-400P-248

400W High Reliable Built-in Type True Sine Wave DC-AC Power Inverter

- **DESIGN VERIFY TEST**
 - Output Function Test
 - Input Function Test
 - Protection Function Test
 - Control Function Test
 - APPLICATION 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 | RATED POWER | 400W | IP: 48VDC Ta:25°C | <u>408 W</u> |
| 2 | MAXIMUM OUTPUT POWER (TYP) | (1)460W/180sec. (2)600w/10sec (3)SURGE POWER 800W FOR 30CYCLE Vin (30±5 CYCLE) | IP: 50VDC OP:TESTING LOAD Ta:25°C | (1) 228.4 V/ 1.99 A/ 180.0 Sec (2) 228.00 V/ 2.59 A/ 10.07 Sec (3) 227.7 V/ 3.48A/ 27 Cycle |

CH3:O/P VAC CH4:O/P IAC

Fig1

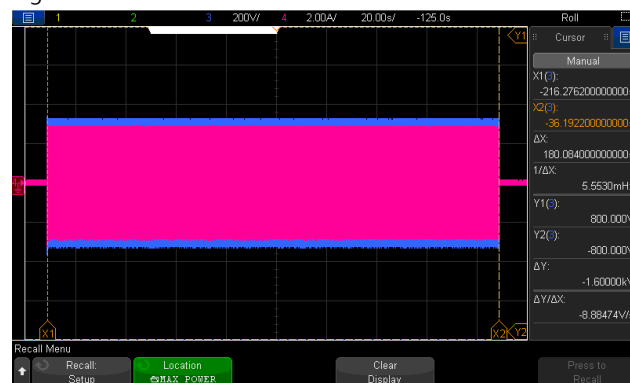


Fig2

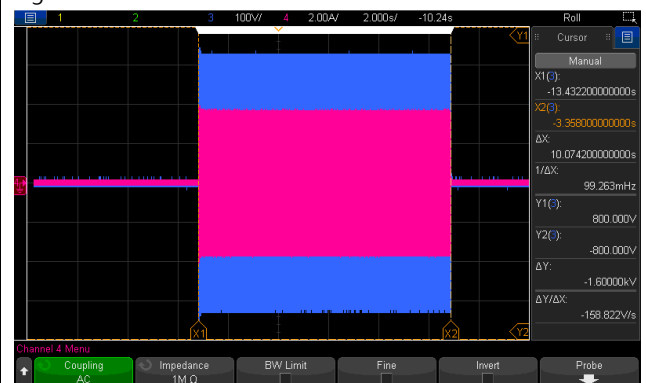


Fig3



Fig4



| | | | | |
|---|------------|--|--|--|
| 3 | AC Voltage | 200 / 220 / 230 / 240Vac selectable by DIP S.W | IP: 48VDC OP: FULL LOAD Ta:25°C | DIP S.W 200VAC: <u>198.5 V</u> DIP S.W 220VAC: <u>218.7 V</u> DIP S.W 230VAC: <u>228.7 V</u> DIP S.W 240VAC: <u>238.7 V</u> |
| 4 | FREQUENCY | 50/60Hz (±0.1HZ) selectable by DIP S.W | IP: 48VDC OP: FULL LOAD Ta:25°C | DIP S.W 50HZ: <u>50.042 HZ</u> DIP S.W 60HZ: <u>59.958 HZ</u> |
| 5 | WAVEFORM | True sine wave (THD<3%) | IP: 50VDC OP: FULL LOAD (1) Vo(min) (2) Vo(nor) (3) Vo(max) Ta:25°C | (1) 0.949% / Vo(min) /FULL LOAD (2) 1.01% / Vo(nor) /FULL LOAD (3) 0.965% / Vo(max) /FULL LOAD |

| CH3:O/P VAC CH4:O/P IAC | | | | |
|-------------------------|--------------------------|---|---|--|
| | | | | |
| | | | | |
| 6 | AC REGULATION | ±3% | IP: 50VDC OP: FULL LOAD/NO LOAD Ta:25°C | <u> -0.70 </u> % |
| 7 | Overshoot /Undershoot | <±10% | IP: 48VDC OP: (1) full load turn on (2) no load turn on (3) full /no load change Ta:25°C | (1) <u> -8.13 </u> % (2) <u> -6.30 </u> % (3) <u> -2.30 </u> % |
| 8 | O/P voltage DC offset | Vin(nor)= <u> 48 </u> v · Vo<200mv · no load : <u> 81.6 mv </u> / full load: <u> -77.8mv </u> | | |

| 9 | LED STATUS | <ul style="list-style-type: none"> Status test <table border="1"> <thead> <tr> <th>LED</th> <th>Status</th> <th>RESULT</th> </tr> </thead> <tbody> <tr> <td>Green</td> <td> Inverter OK</td> <td>OK</td> </tr> <tr> <td>Orange</td> <td> Remote off Saving mode</td> <td>OK</td> </tr> <tr> <td>Red</td> <td> Abnormal Status (See SPEC)</td> <td>OK</td> </tr> </tbody> </table> Battery test <table border="1"> <thead> <tr> <th>LED</th> <th>Battery RANGE</th> <th>RESULT</th> </tr> </thead> <tbody> <tr> <td> Green</td> <td>50.0~62.0 Vdc±1v</td> <td>50.103~ 62.23vdc</td> </tr> <tr> <td> Orange</td> <td>44.0~50.0Vdc ±1v</td> <td>44.073 ~ 50.043 vdc</td> </tr> <tr> <td> Red</td> <td><44.0 Vdc ±1v > 62.0vdc±1v</td> <td>< 44.063vdc > 62.24vdc</td> </tr> </tbody> </table> Load test <table border="1"> <thead> <tr> <th>LED</th> <th>LOAD RANGE</th> <th>RESULT</th> </tr> </thead> <tbody> <tr> <td> Green</td> <td>Min. load ~ 40%±5% LOAD</td> <td>Min. load ~ 42%</td> </tr> <tr> <td> Orange</td> <td>40%±5% ~ 80%±5% LOAD</td> <td>42.25%~81.75 %</td> </tr> <tr> <td> Red</td> <td>≥ 80%±5% LOAD</td> <td>≥ 82 %</td> </tr> </tbody> </table> | LED | Status | RESULT | Green | Inverter OK | OK | Orange | Remote off Saving mode | OK | Red | Abnormal Status (See SPEC) | OK | LED | Battery RANGE | RESULT | Green | 50.0~62.0 Vdc±1v | 50.103~ 62.23vdc | Orange | 44.0~50.0Vdc ±1v | 44.073 ~ 50.043 vdc | Red | <44.0 Vdc ±1v > 62.0vdc±1v | < 44.063vdc > 62.24vdc | LED | LOAD RANGE | RESULT | Green | Min. load ~ 40%±5% LOAD | Min. load ~ 42% | Orange | 40%±5% ~ 80%±5% LOAD | 42.25%~81.75 % | Red | ≥ 80%±5% LOAD | ≥ 82 % |
|--------|-------------------------|--|-------------------------------|---------------------------|--------|-------|-------------|----|--------|---------------------------|----|-----|-------------------------------|----|-----|---------------|--------|-------|------------------|------------------|--------|------------------|---------------------|-----|-------------------------------|---------------------------|-----|------------|--------|-------|-------------------------|-----------------|--------|----------------------|----------------|-----|---------------|--------|
| | | LED | Status | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Green | Inverter OK | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Orange | Remote off Saving mode | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Red | Abnormal Status (See SPEC) | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | LED | Battery RANGE | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Green | 50.0~62.0 Vdc±1v | 50.103~ 62.23vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Orange | 44.0~50.0Vdc ±1v | 44.073 ~ 50.043 vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Red | <44.0 Vdc ±1v > 62.0vdc±1v | < 44.063vdc > 62.24vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | LED | LOAD RANGE | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Green | Min. load ~ 40%±5% LOAD | Min. load ~ 42% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orange | 40%±5% ~ 80%±5% LOAD | 42.25%~81.75 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Red | ≥ 80%±5% LOAD | ≥ 82 % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---------------------|---------------|---|---|
| 1 | VOLTAGE RANGE (TYP) | 40VDC~66VDC | IP: TESTING OP:NO LOAD/FULL LOAD Ta:25°C I/P: LOW-LINE=42V HIGH-LINE=65V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON:30Sec OFF:30Sec 10MIN (POWER ON/OFF NO DAMAGE) I/P: 48V O/P:FULL LOAD ON:30ec OFF:30ec 12Hr (POWER ON/OFF NO DAMAGE) | 40.189 VDC~ 66.03 VDC/NO LOAD 40.199 VDC~ 66.04 VDC/FULL LOAD Test: <u>OK</u> |

| | | | | |
|---|--------------------------------------|---|---|----------------------------------|
| 2 | DC CURRENT (TYP) | 10A | IP: 48VDC OP:FULL LOAD Ta:25°C | <u>8.92</u> A |
| 3 | Power Saving Mode NON-Saving Mode | $\leq 1.5W$ @ saving mode $<12W$ @ non-saving mode | IP: 48VDC OP:NO LOAD Ta:25°C | <u>1.14</u> W <u>7.94</u> W |
| 4 | SAVING MODE TO NORMAL | $P_o \geq 25W$ | IP: 48VDC OP: TESTING LOAD Ta:25°C | <u>≥ 20.94</u> W |
| 5 | NORMAL TO SAVING MODE | $P_o \leq 10W$ | IP: 48VDC OP: TESTING LOAD Ta:25°C | <u>≤ 15.44</u> W |
| 6 | OFF MODE CURRENT DRAW (Typ.) | $\leq 1mA$ | IP: 48VDC OP: Sw off Ta:25°C | 0mA |
| 7 | EFFICIENCY(TYP) | 400W/93% | IP: 50VDC OP: $P_o=400W$ 230V/50HZ (factory setting) Ta:25°C | 93.89% |

PROTECTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-----------------------|----------------|--|-----------------|
| 1 | BAT LOW ALARM | 44V \pm 1VDC | IP: TESTING OP:FULL LOAD SW:ON Ta:25°C | <u>44.075</u> V |
| 2 | BAT LOW SHUT DOWN | 40V \pm 1VDC | IP: TESTING OP: FULL LOAD SW:ON Ta:25°C | <u>40.189</u> V |
| 3 | BAT LOW RESTART | 50V \pm 1VDC | IP: TESTING OP: FULL LOAD SW:ON Ta:25°C | <u>50.155</u> V |
| 4 | BAT HIGH ALARM | 62V \pm 1VDC | IP: TESTING OP:FULL LOAD SW:ON Ta:25°C | <u>61.8</u> V |
| 5 | BAT HIGH SHUT DOWN | 66V \pm 1VDC | IP: TESTING OP: FULL LOAD SW:ON Ta:25°C | <u>65.8</u> V |
| 6 | BAT HIGH RESTART | 60V \pm 1VDC | IP: TESTING OP: FULL LOAD SW:ON Ta:25°C | <u>59.8</u> V |

| | | | | |
|---|------------------|--|---|--|
| 7 | OVER TEMPERATURE | Shut down o/p voltage: re-power on | IP: HI LINE/LOW-LINE OP: FULL LOAD SW:ON Ta:25°C | Shut down o/p voltage, re-power on to recover LED DISPLAY: <u>OK</u> |
| 8 | OUTPUT SHORT | Shut down o/p voltage: re-power on | IP: 48VDC O/P: FULL LOAD SW:ON Ta:25°C | Shut down o/p voltage, re-power on to recover LED DISPLAY: <u>OK</u> (1).TEST: <u>OK</u> |
| 9 | OVER LOAD (typ.) | 105%~115%LOAD 180sec 115%~150%LOAD 10 sec Shut down o/p voltage, re-power on to recover | IP: 48VDC OP: TESTING SW:ON Ta:25°C | (1). <u>105.5~113.75 % 180.17 sec</u> (2). <u>115~ 147.5 % 10.21 sec</u> Shut down o/p voltage, re-power on to recover |

CONTROL FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------|---|---------------------------------------|---|
| 1 | REMOTE CONTROL | Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work Short : Remote off | IP: 48VDC OP: FULL LOAD Ta:25°C | Open : Normal work Short : Remote off TEST: <u>OK</u> |

APPLICATION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|------------------------|--|---|--------|
| 1 | LAMP | LAMP: <u>312.14</u> W · turn on <u>OK</u> LAMP: <u>412.55</u> W · turn on <u>OK</u> LAMP: <u>517.9</u> W · turn on <u>OK</u> | 1. Vin=HIGH LINE 2. O/P = 230V/50Hz TEST: <u>OK</u> | |
| 2 | INDUCTION MOTOR | <u>0.15</u> HP | 1. Vin=HIGH LINE 2. O/P = 230V/50Hz TEST: <u>OK</u> | |
| 3 | SWITCHING POWER SUPPLY | WITH PFC: <u>EPP-500-48</u> · O/P= <u>402.78W</u> | 1. Vin=HIGH LINE 2. O/P = 230V/50Hz TEST: <u>OK</u> | |
| | | NO PFC: <u>LRS-350-36</u> · O/P= <u>314.96</u> W | 1. Vin=HIGH LINE 2. O/P = 230V/50Hz TEST: <u>OK</u> | |

COMPONENT WEAFORM TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--|------------------------|--|--|
| 1 | DC TO DC Power Transistor (D to S) or (C to E) Peak Voltage | Q102 Rated :200V /75 A | I/P: high line O/P:V(max)/Freq 50HZ VDS: O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | (1)159 V (2) 159V (3) 159V (4) 155V (5) 153V |

| | | | | |
|---|--|--|---|--|
| 2 | DC TO DC Diode Peak Voltage | D 105 Rated : 600V/ 10A | I/P: high line O/P:V(max) /Freq 50HZ O/P: (1)Full Load Turn On (2) Output Short (5)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | (1)532V (2)560V (3)560V (4)548V (5)540V |
| 3 | DC BUS Capacitor Voltage | C118 Rated : 270 u/ 265 V | I/P: high line O/P:V(max) /Freq 50HZ O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | C118 (1) 248V (2) 244V (3) 250V (4) 248V (5) 246V |
| 4 | DC TO AC Power Transistor (D to S) or (C to E) Peak Voltage | Q 200 Rated : 15A / 650 V | I/P: high line O/P: (1)Full Load Turn On VDS: O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | (1) 519V (2) 551V (3) 563V (4) 527V (5) 527V |
| 5 | AUX PWM MOS | Q504 Rated : 18 A/ 200 V Q105 Rated : 40 A/ 200 V | I/P: high line O/P:V(max) /Freq 50HZ O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | Q504 (1) 129.5V (2) 129.5V (3) 129.5V (4) 129.5V (5) 129.5V Q105 (1) 143V (2) 141V (3) 139V (4) 137V (5) 137V |
| 6 | Control IC Voltage Test | MCU IC U303 Rated 2.4 V~ 3.6 V AUX IC U501 Rated 8.2V~30V CHARGE IC U101 Rated -0.3V~20V Gate Driver IC U200 Rated | I/P: high line O/P:V(max) /Freq 50HZ O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On (5) Saving mode Ta:25°C | U303 (1) 3.46V (2) 3.42V (3) 3.42V (4) 3.42V (5) 3.42V U501 (1) 11.59V (2) 11.59V |

| | | | | |
|--|--|-----------|--|---|
| | | -0.3V~20V | | (3) 11.59V (4) 11.59V (5) 11.59V U101 (1) 12.63V (2) 12.55V (3) 12.55V (4) 12.55V (5) 12.63V U200 (1) 5.27V (2) 5.27V (3) 5.19V (4) 5.19V (5) 5.19V |
|--|--|-----------|--|---|

SAFETY & EMC TEST

SAFETY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|--|---|--|
| 1 | WITHSTAND VOLTAGE | BAT I/P-ACO/P: 3 KVAC/min AC O/P-FG: 1.5 KVAC/min | BAT I/P-ACO/P 3.6 KVAC/min AC O/P-FG:1.8 KVAC/min Ta:25°C | BAT I/P-ACO/P: 2.863mA AC O/P-FG: 6.22mA NO DAMAGE |
| 2 | GROUNDING CONTINUITY | IEC62368 FG(PE) TO CHASSIS OR TRACE < 100 mΩ | 40 A / 2min Ta:25°C | 5mΩ |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---|---|--|---|
| 1 | RADIATION | EN55032 CLASS A | I/P:24 VDC O/P: :FULL/50% LOAD Ta:25°C | CLASS A |
| 2 | E.S.D | EN61000-4-2 AIR : 15KV / Contact : 8KV | I/P: 12VDC O/P:FULL LOAD Ta:25°C | <input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B |
| 3 | Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report | | | |

Reliability Test

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|---|--|--|---|----|----------|-------------------------|--------------------------|---|------|--------|--------|---|------|--------|--------|---|------|--------|--------|---|-----|--------|--------|---|------|--------|--------|---|------|--------|--------|---|-------|--------|--------|---|------|--------|--------|---|------|--------|--------|----|-------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|------|--------|--------|
| 1 | TEMPERATURE RISE TEST | MODEL : NTS-400P-248 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 50VDC O/P : FULL LOAD Ta= 31.1 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 50VDC O/P : FULL LOAD Ta= 41.1 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=31.1 °C</th> <th>HIGH AMBIENT Ta= 41.1 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>Q103</td><td>50.9°C</td><td>59.8°C</td></tr> <tr><td>2</td><td>Q101</td><td>48.1°C</td><td>56.9°C</td></tr> <tr><td>3</td><td>C100</td><td>41.4°C</td><td>49.6°C</td></tr> <tr><td>4</td><td>TB1</td><td>32.3°C</td><td>42.5°C</td></tr> <tr><td>5</td><td>C101</td><td>44.9°C</td><td>53.0°C</td></tr> <tr><td>6</td><td>T101</td><td>62.7°C</td><td>70.4°C</td></tr> <tr><td>7</td><td>RT300</td><td>45.6°C</td><td>54.1°C</td></tr> <tr><td>8</td><td>L100</td><td>34.2°C</td><td>43.3°C</td></tr> <tr><td>9</td><td>L201</td><td>54.5°C</td><td>60.7°C</td></tr> <tr><td>10</td><td>ZR200</td><td>47.7°C</td><td>54.5°C</td></tr> <tr><td>11</td><td>C219</td><td>45.4°C</td><td>51.6°C</td></tr> <tr><td>12</td><td>Q203</td><td>55.0°C</td><td>61.7°C</td></tr> <tr><td>13</td><td>L200</td><td>49.1°C</td><td>56.0°C</td></tr> <tr><td>14</td><td>C112</td><td>38.2°C</td><td>46.3°C</td></tr> <tr><td>15</td><td>D107</td><td>44.2°C</td><td>51.6°C</td></tr> <tr><td>16</td><td>D105</td><td>47.2°C</td><td>54.3°C</td></tr> <tr><td>17</td><td>C119</td><td>44.3°C</td><td>50.8°C</td></tr> <tr><td>18</td><td>Q200</td><td>54.3°C</td><td>61.2°C</td></tr> <tr><td>19</td><td>C118</td><td>43.9°C</td><td>50.4°C</td></tr> <tr><td>20</td><td>U201</td><td>50.8°C</td><td>56.5°C</td></tr> <tr><td>21</td><td>U500</td><td>60.1°C</td><td>66.3°C</td></tr> <tr><td>22</td><td>TSW1</td><td>50.2°C</td><td>56.9°C</td></tr> <tr><td>23</td><td>U303</td><td>51.1°C</td><td>59.2°C</td></tr> <tr><td>24</td><td>Q105</td><td>44.3°C</td><td>52.2°C</td></tr> <tr><td>25</td><td>U100</td><td>51.2°C</td><td>59.4°C</td></tr> <tr><td>26</td><td>T100</td><td>48.6°C</td><td>55.5°C</td></tr> <tr><td>27</td><td>U501</td><td>63.4°C</td><td>70.2°C</td></tr> <tr><td>28</td><td>Q501</td><td>56.6°C</td><td>63.8°C</td></tr> <tr><td>29</td><td>Q504</td><td>57.2°C</td><td>64.0°C</td></tr> <tr><td>30</td><td>T501</td><td>50.6°C</td><td>57.3°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta=31.1 °C | HIGH AMBIENT Ta= 41.1 °C | 1 | Q103 | 50.9°C | 59.8°C | 2 | Q101 | 48.1°C | 56.9°C | 3 | C100 | 41.4°C | 49.6°C | 4 | TB1 | 32.3°C | 42.5°C | 5 | C101 | 44.9°C | 53.0°C | 6 | T101 | 62.7°C | 70.4°C | 7 | RT300 | 45.6°C | 54.1°C | 8 | L100 | 34.2°C | 43.3°C | 9 | L201 | 54.5°C | 60.7°C | 10 | ZR200 | 47.7°C | 54.5°C | 11 | C219 | 45.4°C | 51.6°C | 12 | Q203 | 55.0°C | 61.7°C | 13 | L200 | 49.1°C | 56.0°C | 14 | C112 | 38.2°C | 46.3°C | 15 | D107 | 44.2°C | 51.6°C | 16 | D105 | 47.2°C | 54.3°C | 17 | C119 | 44.3°C | 50.8°C | 18 | Q200 | 54.3°C | 61.2°C | 19 | C118 | 43.9°C | 50.4°C | 20 | U201 | 50.8°C | 56.5°C | 21 | U500 | 60.1°C | 66.3°C | 22 | TSW1 | 50.2°C | 56.9°C | 23 | U303 | 51.1°C | 59.2°C | 24 | Q105 | 44.3°C | 52.2°C | 25 | U100 | 51.2°C | 59.4°C | 26 | T100 | 48.6°C | 55.5°C | 27 | U501 | 63.4°C | 70.2°C | 28 | Q501 | 56.6°C | 63.8°C | 29 | Q504 | 57.2°C | 64.0°C | 30 | T501 | 50.6°C | 57.3°C |
| NO | Position | ROOM AMBIENT Ta=31.1 °C | HIGH AMBIENT Ta= 41.1 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Q103 | 50.9°C | 59.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Q101 | 48.1°C | 56.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | C100 | 41.4°C | 49.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | TB1 | 32.3°C | 42.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | C101 | 44.9°C | 53.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | T101 | 62.7°C | 70.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | RT300 | 45.6°C | 54.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | L100 | 34.2°C | 43.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | L201 | 54.5°C | 60.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | ZR200 | 47.7°C | 54.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | C219 | 45.4°C | 51.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Q203 | 55.0°C | 61.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | L200 | 49.1°C | 56.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | C112 | 38.2°C | 46.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | D107 | 44.2°C | 51.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | D105 | 47.2°C | 54.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | C119 | 44.3°C | 50.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Q200 | 54.3°C | 61.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | C118 | 43.9°C | 50.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | U201 | 50.8°C | 56.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | U500 | 60.1°C | 66.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | TSW1 | 50.2°C | 56.9°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | U303 | 51.1°C | 59.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Q105 | 44.3°C | 52.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | U100 | 51.2°C | 59.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | T100 | 48.6°C | 55.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | U501 | 63.4°C | 70.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Q501 | 56.6°C | 63.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Q504 | 57.2°C | 64.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | T501 | 50.6°C | 57.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | I/P : 50VDC O/P : 100%LOAD Ta= -25 °C | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE | I/P : 65VDC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 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 | TEST : OK |
| 7 | THERMAL SHOCK TEST | 1. Thermal shock Temperature : -25°C~ +45°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 : 48VDC/Full Load | TEST : OK |
| 8 | VIBRATION TEST | 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 4G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C | TEST : OK |
| 9 | CAPACITOR LIFE CYCLE | SUPPOSE C101 IS THE MOST CRITICAL COMPONENT (1) I/P : 50VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 50VDC O/P : FULL LOAD Ta= 40 °C LIFE TIME | (1) 1424805.8HRS (2) 574653.9HRS |
| 10 | MTBF | Conducted by Parts Stress Analysis Prediction 836.2K hrs min. Telcordia SR-332 (Bellcore) ; 84.0K hrs min. MIL-HDBK-217F (25°C) | |
| 11 | Ongoing Reliability Test | I/P : 50VDC O/P : 80% LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours | |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS | LIUTT | | WANGDZ |

2018.4.30 GP-A50-F010