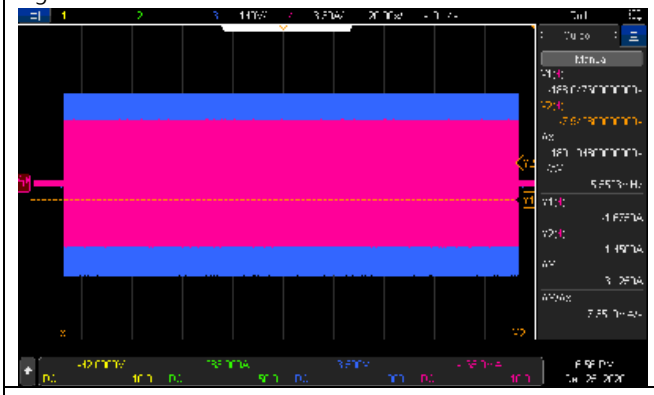
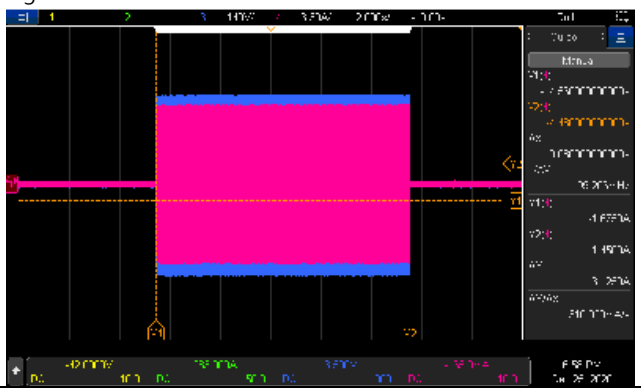
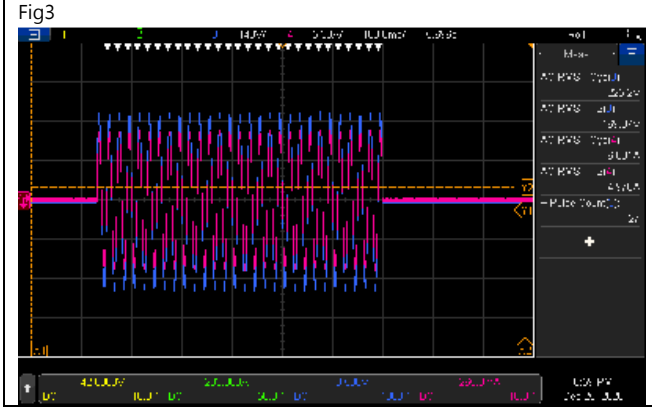
Test Report: NTS-750-212

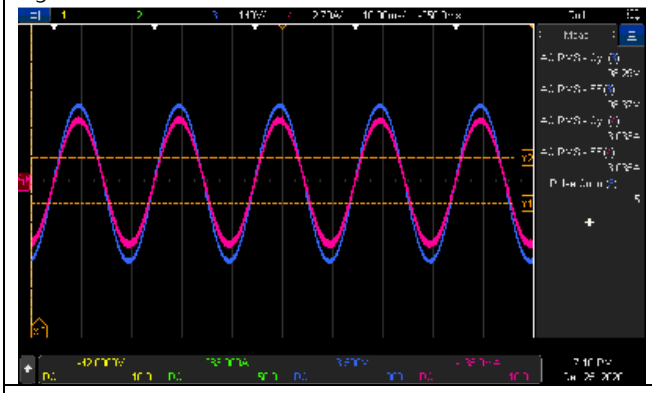
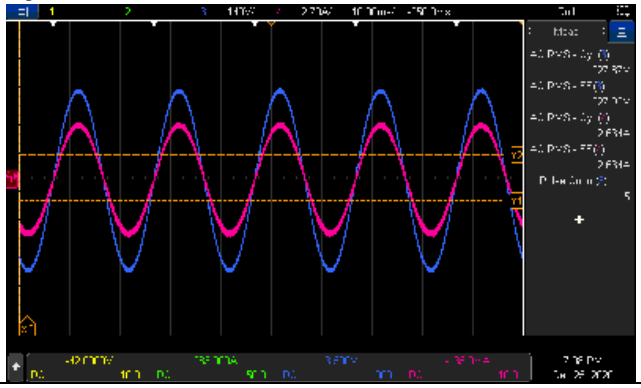
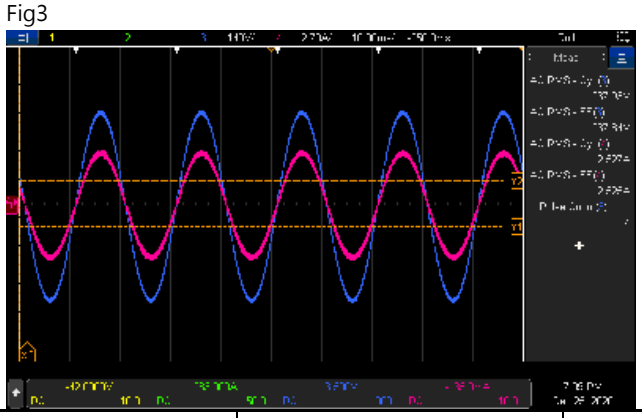
750W High Reliable True Sine Wave DC-AC Power Inverter

- 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	750W	IP: 12VDC Ta:25℃	765 W
2	MAXIMUM OUTPUT POWER (TYP)	(1)862W/180sec. (2)1125w/10sec (3)SURGE POWER 1500W FOR 30CYCLE Vin (30 ± 5 CYCLE)	IP: 12.5VDC OP:TESTING LOAD Ta:25℃	(1) 229.46 V/ 3.77 A/ 180.1Sec (2) 229.12 V/ 4.93 A/ 10.08Sec (3) 226.02 V/ 6.63 A/ 29 Cycle
	CH3:O/P VAC CH4:O/P IAC Fig1  Fig2  Fig3 			
3	AC Voltage	200 / 220 / 230 / 240Vac selectable by DIP S.W	IP: 12VDC OP: FULL LOAD Ta:25℃	DIP S.W 200VAC: 199.78 V DIP S.W 220VAC: 219.75 V DIP S.W 230VAC: 229.72 V DIP S.W 240VAC: 239.9 V
4	FREQUENCY	50/60Hz (±0.1HZ) selectable by DIP S.W	IP: 12VDC OP: FULL LOAD Ta:25℃	DIP S.W 50HZ: 50.042 HZ DIP S.W 60HZ: 59.959 HZ

5	WAVEFORM	True sine wave (THD<3%)	IP: 12.5VDC OP:80% LOAD(600W) (1) Vo(min) (2) Vo(nor) (3) Vo(max) Ta:25℃	(1) 1.524 % / Vo(min) /80% LOAD (2) 1.488% / Vo(nor) /80% LOAD (3) 1.473 % / Vo(max) /80% LOAD
	CH3:O/P VAC CH4:O/P IAC Fig1  Fig2  Fig3 			
6	AC REGULATION	±3%	IP: 12.5VDC OP:80% LOAD(600W) Ta:25℃	-0.239 %
7	Overshoot /Undershoot	<±10%	IP: 12VDC OP: (1) full load turn on (2) no load turn on (3) full /no load change Ta:25℃	(1) -7.48 % (2) -3.91 % (3) -5 %
8	O/P voltage DC offset	Vin(nor)= 12 v · Vo <200mV · no load : 97.2 mV / full load: 92.6 mV		

9	LED STATUS	● Statas test

LED	Statas	RESULT
Green	Inverter OK	OK
Orange	Remote off Saving mode	OK
Red	Abnormal Status (See SPEC)	OK

● Battery test

LED	Battery RANGE	RESULT
Green	12.5~15.5 Vdc±0.3v	12.629Vdc ~ 15.719Vdc
Orange	11~ 12.5Vdc ±0.3v	10.98Vdc ~12.576 Vdc
Red	<11.0 Vdc ±0.3v > 15.5vdc±0.3v	< 10.97 Vdc > 15.708Vdc

● Load test

LED	LOAD RANGE	RESULT
Green	Min. load ~ 40%±5% LOAD	Min. load ~ 44.8%
Orange	40%±5% ~ 80%±5% LOAD	40.93%~ 82.27%
Red	≧ 80%±5% LOAD	≧ 83.4%

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	VOLTAGE RANGE (TYP)	10VDC~16.5VDC	IP: TESTING OP:NO LOAD/FULL LOAD Ta:25℃	10.15 VDC~ 16.54 VDC/NO LOAD 10.21 VDC~ 16.48 VDC/FULL LOAD
			I/P: LOW-LINE=10.5V HIGH-LINE=16.2V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON:30Sec OFF:30Sec 10MIN (POWER ON/OFF NO DAMAGE) I/P: 12V O/P:FULL LOAD ON:30ec OFF:30ec 12Hr (POWER ON/OFF NO DAMAGE)	Test： OK

2	DC CURRENT (TYP)	75A	IP: 12VDC OP:FULL LOAD Ta:25℃	69.42 A
3	NO LOAD DISSPATION (Typ.)	≦ 1.2W @ saving mode ≦ 10W@NON-Saving Mode	IP: 12VDC OP:NO LOAD Ta:25℃	0.72 W 8.34 W LED DISPLAY: OK
4	SAVING MODE TO NORMAL	Po≥25W	IP: 12VDC OP: TESTING LOAD Ta:25℃	20.092 W
5	NORMAL TO SAVING MODE	Po≦ 10W	IP: 12VDC OP: TESTING LOAD Ta:25℃	10.6 W
6	OFF MODE CURRENT DRAW (Typ.)	≦ 1mA	IP: 12VDC OP: Sw off Ta:25℃	0.501 mA
7	EFFICIENCY(TYP)	600W/90%	IP: 12.5VDC OP: Po=600W 230V/50HZ (factory setting)	93.04 %

PROTECTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	BAT LOW ALARM	11V±0.3VDC	IP: TESTING OP:FULL LOAD SW:ON Ta:25℃	11.086 V
2	BAT LOW SHUT DOWN	10V±0.3VDC	IP: TESTING OP: FULL LOAD SW:ON Ta:25℃	10.161 V
3	BAT LOW RESTART	12.5V±0.3VDC	IP: TESTING OP: FULL LOAD SW:ON Ta:25℃	12.589 V
4	BAT HIGH ALARM	15.5V±0.3VDC	IP: TESTING OP:FULL LOAD SW:ON Ta:25℃	15.513 V
5	BAT HIGH SHUT DOWN	16.5V±0.3VDC	IP: TESTING OP: FULL LOAD SW:ON Ta:25℃	16.59 V
6	BAT HIGH RESTART	15V±0.3VDC	IP: TESTING OP: FULL LOAD SW:ON Ta:25℃	15.081 V

7	OVER TEMPERATURE	Shut down o/p voltage: re-power on	IP: HI LINE/LOW-LINE OP: FULL LOAD SW:ON Ta:25℃	Shut down o/p voltage, re-power on to recover LED DISPLAY: OK
8	OUTPUT SHORT	Shut down o/p voltage: re-power on	IP: 12VDC O/P: FULL LOAD SW:ON Ta:25℃	Shut down o/p voltage, re-power on to recover LED DISPLAY: OK (1).TEST: OK
9	OVER LOAD (typ.)	105%~115%LOAD 180sec 115%~150%LOAD 10 sec Shut down o/p voltage, re-power on to recover	IP: 12VDC OP: TESTING SW:ON Ta:25℃	(1). 107%~ 116% 180.1 sec (2). 117%~ 149% 10.08 sec 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: 12VDC OP: FULL LOAD Ta:25℃	Open : Normal work Short : Remote off (1).TEST: OK (2).TEST: OK

APPLICATION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	LAMP	LAMP: 510 W · turn on OK LAMP: 706 W · turn on OK LAMP: 752 W · turn on OK	1. Vin=HIGH LINE 2. O/P= 230V/50Hz TEST: OK	
2	INDUCTION MOTOR	0.35 HP	1. Vin=HIGH LINE 2. O/P= 230V/50Hz TEST: OK	
3		WITH PFC: RSP-1600-48 · O/P= 785 W	1. Vin=HIGH LINE 2. O/P= 230V/50Hz TEST: OK	
		NO PFC: SE-1000-48 · O/P= 278 W	1. Vin=HIGH LINE 2. O/P= 230V/50Hz TEST: OK	

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 : 60V /120 A	I/P: high line O/P:V(max)/Freq 60HZ 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℃	(1) 36.6V (2) 36.2V (3) 38.2V (4) 37.0V (5) 37.0V

2	DC TO DC Diode Peak Voltage	D 108 Rated : 600V/ 20A	I/P: high line O/P:V(max) /Freq 60HZ 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℃	 (1) 517V (2) 529V (3) 529V (4) 497V (5) 505V
3	DC BUS Capacitor Voltage	C118/C119 Rated : 500 u/ 265 V	I/P: high line O/P:V(max) /Freq 60HZ 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℃	C118 (1) 247V (2) 249V (3) 249V (4) 247V (5) 247V C119 (1) 249V (2) 251V (3) 251V (4) 255V (5) 253V
4	DC TO AC Power Transistor (D to S) or (C to E) Peak Voltage	Q 200 Rated : 30A / 650 V	I/P: high line O/P: V(max) /Freq 60HZ 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℃	 (1)491V (2)540V (3)531V (4)491V (5)491V
5	AUX PWM MOS	Q504 Rated : 40 A/ 200 V Q105 Rated : 40 A/ 200 V	I/P: high line O/P:V(max) /Freq 60HZ 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℃	Q504 (1)41.4 V (2) 41.4 V (3) 41.4 V (4) 41.4 V (5) 41.4 V Q105 (1) 41.0V (2) 41.4V (3) 41.4V (4) 41.4V (5) 41.0V
6	Control IC Voltage Test	 MCU IC U303 Rated 2.4 V~ 3.6 V AUX IC U501 Rated 8.2V~30V	I/P: high line O/P:V(max) /Freq 60HZ O/P: (1)Full Load Turn On (2) Output Short (3)O.L.P(200%) Turn On (4) NO LOAD Turn On	U303 (1) 3.34V (2) 3.34V (3) 3.34V (4) 3.34V (5) 3.34V

		CHARGE IC U101 Rated -0.3V~20V Gate Driver IC U200 Rated -0.3V~20V	(5) Saving mode Ta:25℃	U501 (1) 12.62V (2) 12.62V (3) 12.62V (4) 12.62V (5) 12.62V U101 (1) 12.30V (2) 12.22V (3) 12.22V (4) 12.22V (5) 12.30V U200 (1) 5.07V (2) 5.07V (3) 5.07V (4) 5.07V (5) 5.07V

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	BATI/P-ACO/P 3.6 KVAC/min AC O/P-FG:1.8 KVAC/min Ta:25℃	BAT I/P-ACO/P: 2.147 mA AC O/P-FG: 6.36 mA NO DAMAGE
2	GROUNDING CONTINUITY	IEC62368 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃	2mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	▓ EN55032(CISPR32) (expect for Type-UN) CLASS A	I/P:24 VDC O/P: :FULL/50% LOAD Ta:25℃	CLASS A
2	E.S.D	EN61000-4-2 AIR：8KV / Contact：4KV	I/P: 12VDC O/P:FULL LOAD Ta:25℃	■ CRITERIA A □ 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

<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：NTS-750-212
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 12.5VDC O/P： FULL LOAD Ta= 25.0 ℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P： 12.5VDC O/P： FULL LOAD Ta= 40.0 ℃

<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=25.0 ℃</th><th>HIGH AMBIENT Ta= 40.0 ℃</th></tr>
<tr><td>1</td><td>C101</td><td>67.3℃</td><td>75.5℃</td></tr>
<tr><td>2</td><td>Q101</td><td>71.9℃</td><td>78.9℃</td></tr>
<tr><td>3</td><td>Q103</td><td>72.0℃</td><td>78.3℃</td></tr>
<tr><td>4</td><td>C146</td><td>81.4℃</td><td>88.9℃</td></tr>
<tr><td>5</td><td>T101</td><td>80.4℃</td><td>88.6℃</td></tr>
<tr><td>6</td><td>RT300</td><td>61.4℃</td><td>68.8℃</td></tr>
<tr><td>7</td><td>U303</td><td>45.9℃</td><td>57.7℃</td></tr>
<tr><td>8</td><td>T501</td><td>35.7℃</td><td>48.8℃</td></tr>
<tr><td>9</td><td>L100</td><td>45.7℃</td><td>58.0℃</td></tr>
<tr><td>10</td><td>C112</td><td>39.9℃</td><td>52.5℃</td></tr>
<tr><td>11</td><td>D107</td><td>55.0℃</td><td>66.9℃</td></tr>
<tr><td>12</td><td>D105</td><td>53.7℃</td><td>64.7℃</td></tr>
<tr><td>13</td><td>Q200</td><td>59.6℃</td><td>71.2℃</td></tr>
<tr><td>14</td><td>ZR200</td><td>36.9℃</td><td>50.8℃</td></tr>
<tr><td>15</td><td>L201</td><td>38.2℃</td><td>51.4℃</td></tr>
<tr><td>16</td><td>C219</td><td>28.1℃</td><td>43.6℃</td></tr>
<tr><td>17</td><td>L200</td><td>41.3℃</td><td>54.8℃</td></tr>
<tr><td>18</td><td>TSW1</td><td>34.4℃</td><td>48.4℃</td></tr>
<tr><td>19</td><td>C119</td><td>41.8℃</td><td>53.7℃</td></tr>
<tr><td>20</td><td>C118</td><td>39.0℃</td><td>51.3℃</td></tr>
<tr><td>21</td><td>Q202</td><td>57.7℃</td><td>70.6℃</td></tr>
<tr><td>22</td><td>Q105</td><td>35.2℃</td><td>48.8℃</td></tr>
<tr><td>23</td><td>Q501</td><td>52.9℃</td><td>62.9℃</td></tr>
<tr><td>24</td><td>U101</td><td>35.9℃</td><td>49.5℃</td></tr>
<tr><td>25</td><td>U501</td><td>52.3℃</td><td>63.6℃</td></tr>
<tr><td>26</td><td>T100</td><td>33.0℃</td><td>47.0℃</td></tr>
<tr><td>27</td><td>U100</td><td>58.2℃</td><td>66.6℃</td></tr>
<tr><td>28</td><td>U201</td><td>43.4℃</td><td>55.3℃</td></tr>
<tr><td>29</td><td>U500</td><td>42.8℃</td><td>53.7℃</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>LOW TEMPERATURE TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 12.5VDC
O/P： 100%LOAD
Ta= -25 ℃</td><td>TEST：OK</td></tr>
</table>

3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 ℃ NO DAMAGE	I/P：16.2VDC O/P：FULL LOAD Ta= 40 ℃ HUMIDITY= 95 %R.H	TEST：OK
4	STORAGE TEMPERATURE TEST	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：5 CYCLE 5. Input/Output condition： STATIC		TEST：OK
5	THERMAL SHOCK TEST	1. Thermal shock Temperature： -25℃~ +45℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：10 CYCLE 5. Input/Output condition： 12.5VDC/Full Load		TEST：OK
6	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℃		TEST：OK
7	CAPACITOR LIFE CYCLE	SUPPOSE C146 IS THE MOST CRITICAL COMPONENT (1) I/P： 12.5VDC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 12.5VDC O/P：FULL LOAD Ta= 40 ℃ LIFE TIME		 (1) 67864.1HRS (2) 40352.2HRS
8	MTBF	Conducted by Parts Stress Analysis Prediction 238.6K hrs min. Telcordia SR-332 (Bellcore) ; 78K hrs min. MIL-HDBK-217F (25℃)		
9	Ongoing Reliability Test	I/P：12.5VDC O/P：80% LOAD TA=50℃ Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ