



Test Report: NID100-05

100W DC-DC Non-isolated Regulated 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

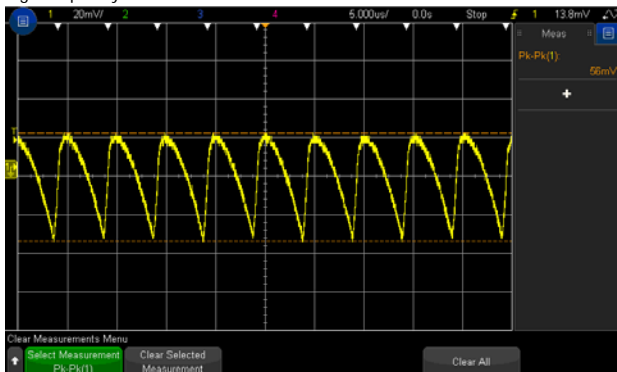
ENVIRONMENT TEST

DESIGN VERIFY TEST

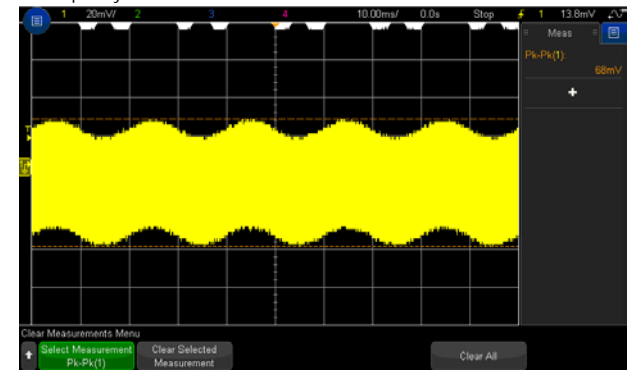
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -2%~ 2%	I/P: 10.5 VDC /53VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.02%~ 0.05%
2	LINE REGULATION (Max)	V1: -0.5%~ 0.5%	I/P: 10.5 VDC /53 VDC O/P:FULL LOAD Ta:25°C	V1: -0.01%~ 0.01%
3	LOAD REGULATION (Max)	V1: -0.5%~0.5%	I/P: 12VDC/24 VDC/48 VDC O/P:FULL ~MIN LOAD Ta:25°C	V1:-0.02%~ 0.05%
4	OVER/UNDERSHOOT TEST	< ±10%	I/P: 12VDC/24 VDC/48 VDC O/P:FULL LOAD Ta:25°C	TEST: 4.0%
5	RIPPLE & NOISE (Max)	V1: 100mVp-p	I/P: 12VDC/24 VDC/48 VDC O/P:FULL LOAD Ta:25°C	V1:68 mVp-p

high frequency :

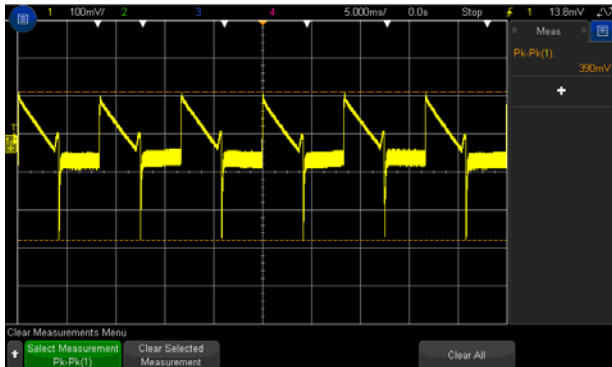


low frequency :

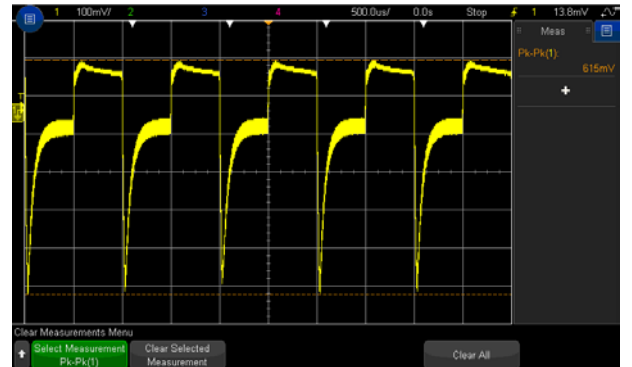


6	DYNAMIC LOAD	V1: 1000mVp-p	I/P: 12VDC/24 VDC/48 VDC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	390 mVp-p 615 mVp-p
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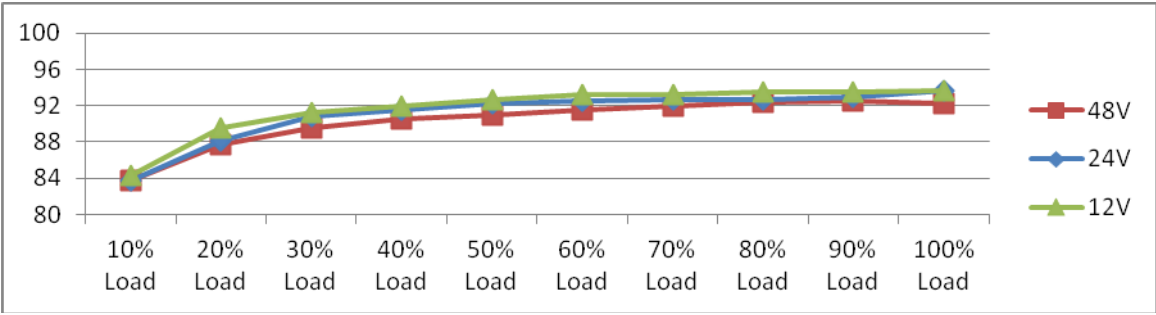
FULL /50% LOAD 50%DUTY / 120HZ



FULL /50% LOAD 50%DUTY / 1KHZ



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																												
1	INPUT VOLTAGE RANGE	10.5VDC-53VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	9.0V- 56V																																												
			I/P: LOW-LINE-0.2= 10.3V HIGH-LINE+3V= 56V 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)	FULL LOAD: 5400mA NO LOAD: 20mA	I/P: 12VDC \24 VDC \48 VDC O/P:FULL LOAD O/P:NO LOAD Ta:25°C	FULL LOAD NO LOAD I =4897mA/12VDC I =15.0mA/12VDC I =2450mA/24VDC I =2.47A/24VDC I =1245mA/48VDC I =2.48A/48VDC																																												
3	EFFICIENCY(TYP)	93% /12VDC 93% /24VDC 92%/48VDC	I/P: 12VDC \24 VDC \48 VDC O/P:FULL LOAD Ta:25°C	93.7% /12VDC 93.6% /24VDC 92.3%/48VDC																																												
<p>EFFICIENCY vs LOAD</p>  <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>Load (%)</th> <th>12V Efficiency (%)</th> <th>24V Efficiency (%)</th> <th>48V Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>84.5</td><td>84.0</td><td>83.5</td></tr> <tr><td>20%</td><td>90.0</td><td>89.0</td><td>88.0</td></tr> <tr><td>30%</td><td>91.5</td><td>90.5</td><td>89.5</td></tr> <tr><td>40%</td><td>92.0</td><td>91.0</td><td>90.0</td></tr> <tr><td>50%</td><td>92.5</td><td>91.5</td><td>90.5</td></tr> <tr><td>60%</td><td>93.0</td><td>92.0</td><td>91.0</td></tr> <tr><td>70%</td><td>93.5</td><td>92.5</td><td>91.5</td></tr> <tr><td>80%</td><td>93.8</td><td>92.8</td><td>91.8</td></tr> <tr><td>90%</td><td>94.0</td><td>93.0</td><td>92.0</td></tr> <tr><td>100%</td><td>94.2</td><td>93.2</td><td>92.2</td></tr> </tbody> </table>					Load (%)	12V Efficiency (%)	24V Efficiency (%)	48V Efficiency (%)	10%	84.5	84.0	83.5	20%	90.0	89.0	88.0	30%	91.5	90.5	89.5	40%	92.0	91.0	90.0	50%	92.5	91.5	90.5	60%	93.0	92.0	91.0	70%	93.5	92.5	91.5	80%	93.8	92.8	91.8	90%	94.0	93.0	92.0	100%	94.2	93.2	92.2
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	120%-300% RATED OUTPUT POWER	I/P: 53 VDC I/P: 48 VDC I/P: 24VDC I/P: 12VDC I/P: 10.5VDC O/P:TESTING Ta:25°C	180%/53VDC 175%/48VDC 161%/24VDC 149%/12VDC 154%/10.5VDC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	CH: 6.4 V- 7.5 V	I/P: NO O/P:MIN LOAD Ta:25°C	7.0V PROTECTION TYPE : Shut off o/p voltage, clamp by TVS diode
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P:53 VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

Control Function Test

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	REMOTE CONTROL	Power on: 1.2VDC < R.C-com < 12VDC Power off: R.C-com < 0.4VDC	I/P: 48 VDC I/P: 24 VDC I/P: 12VDC 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	Q1 Rated : 80 V Q2 Rated : 80 V	I/P: High-Line +3V =56V DC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Full Load Continue Ta: 25°C	Q1 Q2 VDS: VDS: (1) 66.9V (1) 73.5V (2) 71.1V (2) 74.3V (3) 66.7V (3) 67.9V
2	Input Capacitor Voltage	C25 Rated: : 105/100V	I/P: High-Line +3V =56 V 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	(1) 62.3V (2) 57.4V (3) 62.3V (4) 62.3V
3	Control IC Voltage Test	PWM IC U1 Rated 7.5V-14V	I/P: High-Line +3V =56V DC ON/OFF O/P: (1) FULL LOAD (2) Output Short (3) O.L.P (4) NO LOAD VR 下限.LOW LINE Ta: 25°C	(1) 8.03V (2) 8.03V (3) 8.03V (4) 7.63V

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	<input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011 <input type="checkbox"/> CLASS A <input checked="" type="checkbox"/> CLASS B	I/P: 48 VDC O/P: FULL LOAD Ta: 25°C	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL Test by certified Lab
2	CONDUCTION	<input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011 <input type="checkbox"/> CLASS A <input checked="" type="checkbox"/> CLASS B	I/P: 48 VDC O/P: FULL LOAD Ta: 25°C	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL Test by certified Lab
3	E.F.T	EN61000-4-4 <input type="checkbox"/> LIGHT INDUSTRY INPUT: 0.5KV <input type="checkbox"/> MEDICAL <input checked="" type="checkbox"/> INDUSTRY INPUT: 1KV	I/P: 48 VDC O/P: FULL LOAD Ta: 25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
4	SURGE	IEC61000-4-5 <input type="checkbox"/> MEDICAL <input type="checkbox"/> LIGHT INDUSTRY L-N :0.5KV L,N-PE:0.5KV <input checked="" type="checkbox"/> INDUSTRY L-N :1KV L,N-PE:1KV	I/P: 48VDC O/P: FULL LOAD Ta: 25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
5	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 : NID100-05 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 48 VDC O/P : FULL LOAD Ta= 23.9 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 48 VDC O/P : FULL LOAD Ta= 50.0 °C																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 23.9 °C</th> <th>HIGH AMBIENT Ta= 50.0 °C</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>L1</td> <td>95.9°C</td> <td>120.2°C</td> </tr> <tr> <td>2</td> <td>Q1</td> <td>97.5°C</td> <td>122.3°C</td> </tr> <tr> <td>3</td> <td>Q2</td> <td>95.7°C</td> <td>120.6°C</td> </tr> <tr> <td>4</td> <td>C21</td> <td>83.0°C</td> <td>108.6°C</td> </tr> <tr> <td>5</td> <td>C31</td> <td>78.3°C</td> <td>102.4°C</td> </tr> <tr> <td>6</td> <td>ZD1</td> <td>83.9°C</td> <td>107.4°C</td> </tr> <tr> <td>7</td> <td>U1</td> <td>89.3°C</td> <td>114.1°C</td> </tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 23.9 °C	HIGH AMBIENT Ta= 50.0 °C	1	L1	95.9°C	120.2°C	2	Q1	97.5°C	122.3°C	3	Q2	95.7°C	120.6°C	4	C21	83.0°C	108.6°C	5	C31	78.3°C	102.4°C	6	ZD1	83.9°C	107.4°C	7	U1	89.3°C	114.1°C
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6	ZD1	83.9°C	107.4°C																																	
7	U1	89.3°C	114.1°C																																	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 48 VDC O/P : 140% LOAD Ta : 25°C	TEST : OK																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 20 VDC / 53 VDC O/P : 100 % LOAD Ta= -35°C	TEST : OK																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C /95 %R.H NO DAMAGE	I/P : 56 VDC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK																																
5	TEMPERATURE COEFFICIENT	±0.03%/°C(0-50°C)	I/P : 48VDC O/P : FULL LOAD	±0.0005 %/°C(0-50°C)																																
6	STORAGE TEMPERATURE TEST	-30-105°C	1. Thermal shock Temperature : -45°C~ +110°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	-30-50°C	1. Thermal shock Temperature : -35°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: 48 VDC / FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle: 48 VDC / 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 : 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 C31 IS THE MOST CRITICAL COMPONENT (1) I/P : 48VDC O/P : FULL LOAD Ta= 50 °C LIFE TIME (2) I/P : 48VDC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 48VDC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 48VDC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 5775075 HRS (2) 948714 HRS (3) 973158 HRS (4) 1007605 HRS
10	Ongoing Reliability Test	I/P : 48VDC O/P : FULL 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