



# Test Report: NID35-12

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35W 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

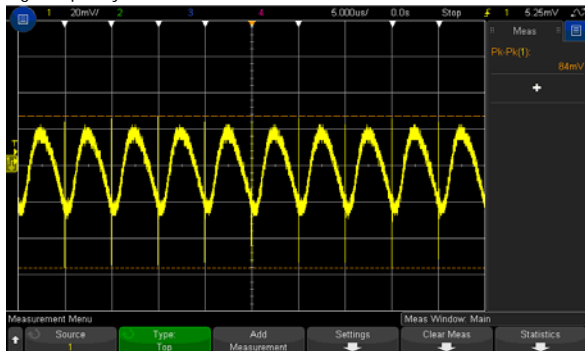
ENVIRONMENT TEST

## DESIGN VERIFY TEST

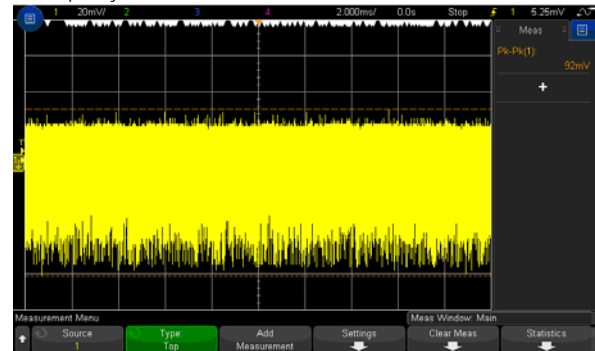
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -2%~2%	I/P: 20 VDC /53VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1:-0.02%-0.02%
2	LINE REGULATION (Max)	V1: -0.5%~0.5%	I/P: 20VDC /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: 24 VDC/48 VDC O/P:FULL -MIN LOAD Ta:25°C	V1: -0.02%~0.02%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 24 VDC/48 VDC O/P:FULL LOAD Ta:25°C	TEST: 2.4%
5	RIPPLE & NOISE (Max)	V1: 120mVp-p	I/P: 24 VDC/48 VDC O/P:FULL LOAD Ta:25°C	V1: 92mVp-p

high frequency :

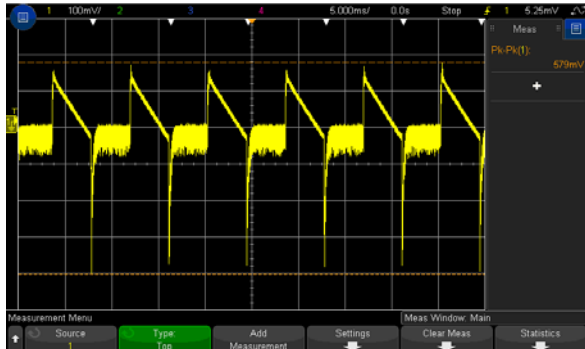


low frequency :

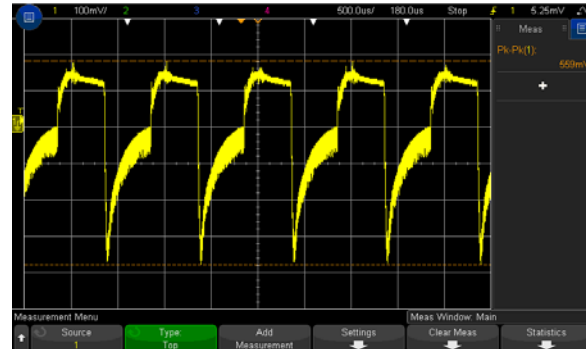


6	DYNAMIC LOAD	V1: 1200mVp-p	I/P: 24 VDC/48 VDC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	579mVp-p 559mVp-p
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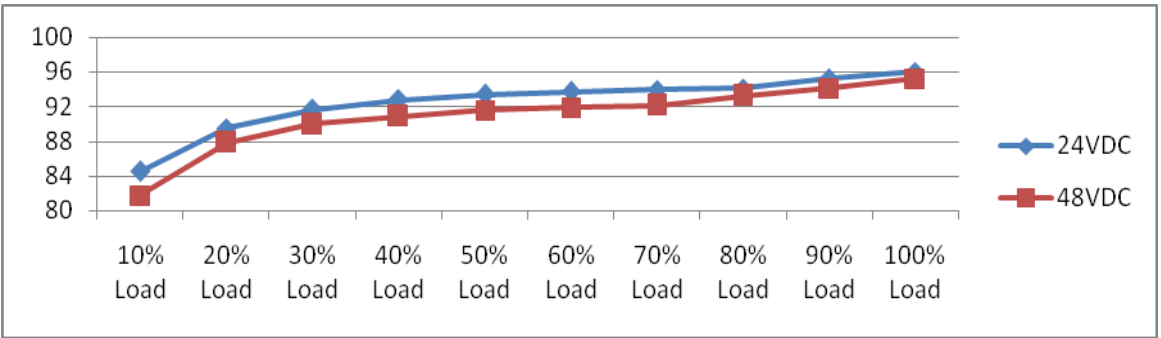
FULL /50% LOAD 50%DUTY / 120HZ



FULL /50% LOAD 50%DUTY / 1KHZ



**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	20VDC-53VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	15.7V~ 56V																																	
			I/P: LOW-LINE-0.2= 19.8V 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: 1580mA NO LOAD: 30mA	I/P: 24 VDC \48 VDC O/P:FULL LOAD O/P:NO LOAD Ta:25°C	FULL LOAD NO LOAD I =1491mA/24VDC I =10.5mA/24VDC I =758mA/48VDC I =13.5mA/48VDC																																	
3	EFFICIENCY(TYP)	95% /24VDC 93%/48VDC	I/P: 24 VDC \48 VDC O/P:FULL LOAD Ta:25°C	96.0% /24VDC 95.2%/48VDC																																	
<p><b>EFFICIENCY vs LOAD</b></p>  <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>Load (%)</th> <th>24VDC Efficiency (%)</th> <th>48VDC Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>84</td><td>82</td></tr> <tr><td>20%</td><td>90</td><td>88</td></tr> <tr><td>30%</td><td>92</td><td>90</td></tr> <tr><td>40%</td><td>93</td><td>91</td></tr> <tr><td>50%</td><td>94</td><td>92</td></tr> <tr><td>60%</td><td>94.5</td><td>92.5</td></tr> <tr><td>70%</td><td>95</td><td>93</td></tr> <tr><td>80%</td><td>95.5</td><td>94</td></tr> <tr><td>90%</td><td>96</td><td>94.5</td></tr> <tr><td>100%</td><td>96</td><td>95</td></tr> </tbody> </table>					Load (%)	24VDC Efficiency (%)	48VDC Efficiency (%)	10%	84	82	20%	90	88	30%	92	90	40%	93	91	50%	94	92	60%	94.5	92.5	70%	95	93	80%	95.5	94	90%	96	94.5	100%	96	95
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**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	120%-250% RATED OUTPUT POWER	I/P: 53 VDC I/P: 48 VDC I/P: 24VDC I/P: 20VDC O/P:TESTING Ta:25°C	143%/53VDC 140%/48VDC 132%/24VDC 130%/20VDC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	CH: 15.6 V~18 V	I/P: NO O/P:MIN LOAD Ta:25°C	17.3V PROTECTION TYPE : Shut off o/p voltage, clamp by TVS diode
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 53VDC 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: 12 VDC 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 : 49 A / 80 V Q2 Rated : 49 A / 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) 57.6V (1) 62.8V (2) 59.2V (2) 64.0V (3) 57.6V (3) 62.8V
2	Input Capacitor Voltage	C22 Rated: : 105 μ / 100 V	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) 57.6V (2) 57.2V (3) 57.6V (4) 57.6V
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) 7.73V (2) 7.73V (3) 7.81V (4) 7.73V

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 : NID-35-5 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 48 VDC O/P : FULL LOAD Ta= 24.6 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 48 VDC O/P : FULL LOAD Ta= 55.4 °C																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 24.6 °C</th> <th>HIGH AMBIENT Ta= 55.4 °C</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>L1</td> <td>65.7°C</td> <td>95.1°C</td> </tr> <tr> <td>2</td> <td>Q1</td> <td>65.0°C</td> <td>94.5°C</td> </tr> <tr> <td>3</td> <td>Q2</td> <td>65.3°C</td> <td>94.5°C</td> </tr> <tr> <td>4</td> <td>ZD1</td> <td>54.2°C</td> <td>83.4°C</td> </tr> <tr> <td>5</td> <td>C31</td> <td>56.5°C</td> <td>85.9°C</td> </tr> <tr> <td>6</td> <td>C23</td> <td>64.9°C</td> <td>94.3°C</td> </tr> <tr> <td>7</td> <td>U1</td> <td>63.1°C</td> <td>91.7°C</td> </tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 24.6 °C	HIGH AMBIENT Ta= 55.4 °C	1	L1	65.7°C	95.1°C	2	Q1	65.0°C	94.5°C	3	Q2	65.3°C	94.5°C	4	ZD1	54.2°C	83.4°C	5	C31	56.5°C	85.9°C	6	C23	64.9°C	94.3°C	7	U1	63.1°C	91.7°C
NO	Position	ROOM AMBIENT Ta= 24.6 °C	HIGH AMBIENT Ta= 55.4 °C																																	
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6	C23	64.9°C	94.3°C																																	
7	U1	63.1°C	91.7°C																																	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 48 VDC O/P : 134% 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 55 °C /95 %R.H NO DAMAGE	I/P : 56 VDC O/P : FULL LOAD Ta= 55 °C HUMIDITY= 95 %R.H	TEST : OK																																
5	TEMPERATURE COEFFICIENT	±0.03%/°C(0-55°C)	I/P : 48VDC O/P : FULL LOAD	±0.0042 %/°C(0-55°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	-30-55°C	1. Thermal shock Temperature : -35°C~ +60°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	Ongoing Reliability Test	I/P : 48VDC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours
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TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		Wangdz

2018.4.30 GP-A50-F010