



Test Report: DDR-120B-24

120W DC-DC DIN Rail Power Supply

■ 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

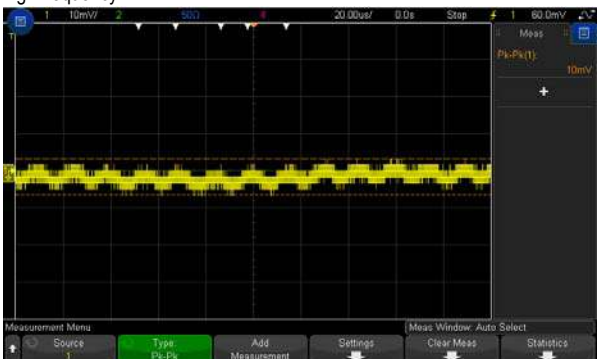
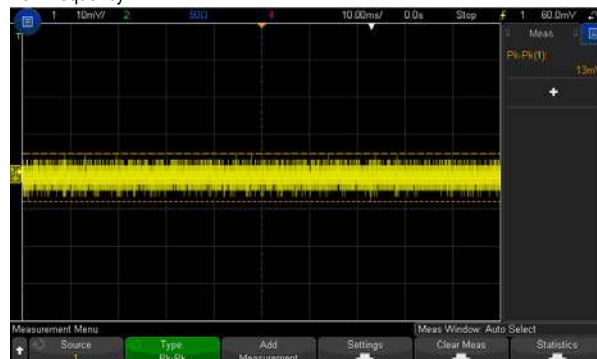
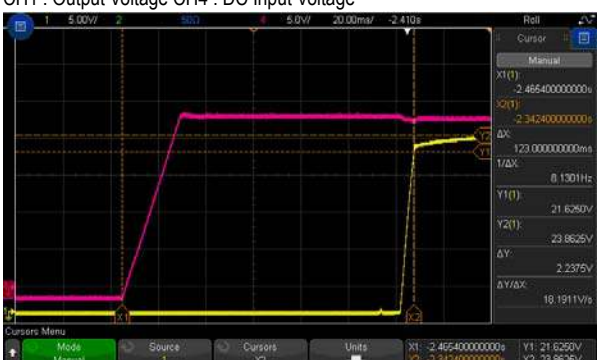
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

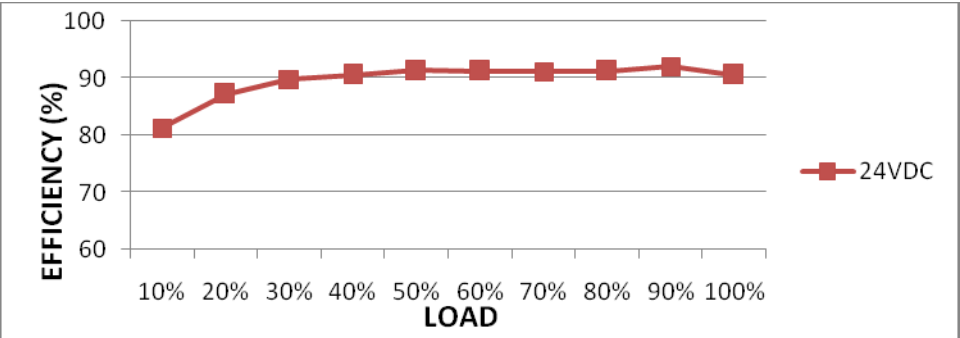
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1:24 V~28 V	I/P : 24 VDC O/P : MIN LOAD Ta : 25°C	23.43V~28.62V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -1 %~1 %	I/P:16.8VDC /33.6VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.121%~ 0.125 %
3	LINE REGULATION (Max)	V1: -0.5 %~0.5 %	I/P: 16.8VDC / 33.6VDC O/P:FULL LOAD Ta:25°C	V1: -0.008 %~ 0.004%
4	LOAD REGULATION (Max)	V1: -1 %~ 1 %	I/P:24VDC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.121%~ 0.125 %
5	OVER/UNDERSHOOT TEST	< $\pm 5\%$	I/P: 24VDC O/P:FULL LOAD Ta:25°C	TEST: 2.1 %
6	RIPPLE & NOISE (Max)	V1: 50 mVp-p	I/P: 24VDC O/P:FULL LOAD Ta:25°C	V1: 13 mVp-p
high frequency :  low frequency : 				
7	SET UP TIME (Max)	24VDC/ 500 ms	I/P: 24VDC O/P:FULL LOAD Ta:25°C	24VDC/ 123 ms
INPUT=24VDC @ FULL LOAD CH1 : Output Voltage CH4 : DC Input Voltage 				

8	RISE TIME (Max)	24VDC/ 60 ms	I/P: 24VDC O/P:FULL LOAD Ta:25°C	24VDC/ 5.04 ms
	INPUT=24VDC @ FULL LOAD 			
9	HOLD UP TIME (TYP)	24VDC/ 6 ms @FULL LOAD 24VDC/ 10 ms @70% LOAD	I/P: 24VDC O/P:FULL LOAD Ta:25°C	24VDC/6.9 ms@full load 24VDC/ 10.3 ms @70%LOAD
	INPUT=24VDC @ FULL LOAD CH1 : Output Voltage CH4 :DC Input Voltage 			
10				
	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 24VDC O/P: (1)FULL /MIN LOAD 50%DUTY / 120HZ (2)FULL /MIN LOAD 50%DUTY / 1KHZ Ta:25°C	750mVp-p 1520mVp-p
	FULL /MIN LOAD 50%DUTY / 120HZ 			
	FULL /MIN LOAD 50%DUTY / 1KHZ 			

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	16.8VDC~ 33.6VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	16.4V~ 33.6V

			I/P: LOW-LINE-0.2= 16.6 V HIGH-LINE+3V= 36.6V 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/5.6 A	I/P:24VDC O/P:FULL LOAD Ta:25°C	I = 5.544/ 24VDC
3	EFFICIENCY(TYP)	89.5 %	I/P: 24VDC O/P:FULL LOAD Ta:25°C	90.66%
EFFICIENCY vs LOAD 				
4	INRUSH CURRENT(TYP)	24VDC/5 A COLD START	I/P: 24VDC O/P:FULL LOAD Ta:25°C	I = 3.68 A/24 VDC
INPUT=24VDC @ FULL LOAD 				

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~135%RATED OUTPUT POWER	I/P: 33.6VDC I/P: 24VDC I/P: 16.8VDC O/P:TESTING Ta:25°C	125.21%/ 33.6VDC 126.75%/24VDC 127.91%/ 16.8VDC PROTECTION TYPE : Normally works within 105~150% rated output power for more than 3 seconds and then constant current protection with auto-recovery >150% rated power ,constant current limiting with auto-recovery
2	OVER VOLTAGE PROTECTION	CH: 28.8V~ 33.6V	I/P: 33.6VDC I/P:24VDC I/P: 16.8VDC O/P:MIN LOAD Ta:25°C	31.5V/33.6VDC 31.5V/24 VDC 31.1V/ 16.8VDC PROTECTION TYPE : Shut down O/P voltage,re-power on to recover

3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 33.6 VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Normally works within 105~150% rated output power for more than 3 seconds and then constant current protection with auto-recovery >150% rated power ,constant current limiting with auto-recovery
4	INPUT REVERSE	POWER OK	I/P:33.6 VDC O/P: NO LOAD Ta:25°C	NO DAMAGE

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated : 100 V Q6 Rated : -100 V	I/P:High-Line +3V =36.6V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	Q5 VDS: (1) 81.3V (2)54.7V (3) 70.8V Q6 VDS: (1) -66 V (2) -45.9 V (3) -58 V
4	Diode Peak Voltage	Q100 Rated : 200V Q101 Rated : 150V	I/P:High-Line +3V =36.6V DC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load continue Ta:25°C	Q100: VDS: (1) 123.6 V (2) 36.2 V (3) 42.7 V Q101 VDS: (1)134.1 V (2) 133.3 V (3) 130 V
5	Input Capacitor Voltage	C5 Rated: : 1200 μ / 35 V	I/P:High-Line +3V =33.6 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	C5: (1) 34.5 V (2) 34.1 V (3) 34.5 V (4) 33.7 V
6	Control IC Voltage Test	PWM IC U1 Rated -0.3V~16V	I/P:High-Line +3V =36.6 V DC ON/OFF O/P:(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta:25°C	U1: (1) 14.69 V (2) 14.37 V (3) 14.77 V (4) 14.53 V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P:4KVDC/min I/P-FG:2.5 KVDC/min O/P-FG:2.5KVDC/min	I/P-O/P: 4.4KVDC/min I/P-FG: 3 KVDC/min O/P-FG:3KVDC/min Ta:25°C	I/P-O/P: 0 mA I/P-FG: 0 mA O/P-FG: 0 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100M Ω I/P-FG: 500VDC>100M Ω O/P-FG:500VDC>100M Ω	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 9999M Ω I/P-FG: 9999 M Ω O/P-FG:9999 M Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	40A / 2min Ta:25°C	10m Ω



E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	☒ EN55032 ☐ EN55011 ☐ CLASS A ☒ CLASS B	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☒ PASS ☐ FAIL Test by certified Lab
2	CONDUCTION	☒ EN55032 ☐ EN55011 ☐ CLASS A ☒ CLASS B	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☒ PASS ☐ FAIL Test by certified Lab
3	E.S.D	EN61000-4-2 ☐ Din rail Model; AIR: 8KV / Contact: 6KV	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☒ CRITERIA A ☐ CRITERIA B
4	E.F.T	EN61000-4-4 ☐ INDUSTRY INPUT: 2KV	I/P: 24VDC O/P:FULL LOAD Ta:25℃	☒ CRITERIA A ☐ CRITERIA B
5	SURGE	IEC61000-4-5 ☐ INDUSTRY L-N :1KV L,N-FG:2KV	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☒ CRITERIA A ☐ CRITERIA B
6	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : DDR-120B-24 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 24VDC O/P : FULL LOAD Ta= 24.0 ℃ 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 24VDC O/P : FULL LOAD Ta= 51.2 ℃		

			NO	Position	ROOM AMBIENT Ta= 24.0 °C	HIGH AMBIENT Ta= 51.2 °C
			1	C104	50.5℃	79.4℃
			2	C106	62.3℃	92.8℃
			3	ZNR1	51.7℃	82.9℃
			4	LF1	63.6℃	94.8℃
			5	LF2	64.1℃	96.1℃
			6	T1	67.7℃	96.9℃
			7	T2	63.9℃	94.0℃
			8	Q1	57.3℃	88.8℃
			9	Q2	57.5℃	89.0℃
			10	Q5	62.1℃	91.7℃
			11	Q6	65.9℃	96.2℃
			12	Q100	65.4℃	94.1℃
			13	Q101	67.5℃	95.8℃
			14	L100	79.5℃	108.8℃
			15	C1	58.2℃	88.7℃
			16	C5	58.0℃	89.4℃
			17	C6	50.7℃	81.1℃
			18	C7	55.1℃	85.1℃
			19	C8	67.3℃	96.6℃
			20	C101	58.1℃	86.8℃
			21	C102	58.3℃	87.3℃
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 24 VDC O/P : 120 % LOAD Ta : 25℃		TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 16.8 VDC/ 33.6 VDC 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 55 °C NO DAMAGE	I/P : 36.6 VDC O/P : FULL LOAD Ta= 55 °C HUMIDITY= 95 %R.H		TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~55℃)	I/P : 24 VDC O/P : FULL LOAD		± 0.0046 %(0~55℃)	
6	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 : 10 CYCLE 5. Input/Output condition : STATIC			TEST : OK	
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -45℃~ +60℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 24VDC/Full Load DC ON/OFF TEST turn on 3sec ; turn off 1sec@15cycle\ 24VDC/Full Load DC ON@1cycle			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 : 5G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C 2 Din Rail <table><tr><td></td><td>Displacement</td><td>Acceleration</td></tr><tr><td>2 (+3/-0) Hz up to 15Hz</td><td>± 2.5mm</td><td>-----</td></tr><tr><td>15Hz up to 50Hz</td><td>-----</td><td>2.3g</td></tr><tr><td>Sweep rate</td><td colspan="2">Max 1 Octave/minute</td></tr></table>		Displacement	Acceleration	2 (+3/-0) Hz up to 15Hz	± 2.5mm	-----	15Hz up to 50Hz	-----	2.3g	Sweep rate	Max 1 Octave/minute		TEST : OK
	Displacement	Acceleration													
2 (+3/-0) Hz up to 15Hz	± 2.5mm	-----													
15Hz up to 50Hz	-----	2.3g													
Sweep rate	Max 1 Octave/minute														
9	CAPACITOR LIFE CYCLE	SUPPOSE C102 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= 55 °C LIFE TIME (3) I/P : 24VDC O/P : 75% LOAD Ta= 55 °C LIFE TIME (4) I/P : 24VDC O/P : 50% LOAD Ta= 55 °C LIFE TIME	(1) 189691.3 HRS (2) 29631.8 HRS (3) 70144.5 HRS (4) 117739.2 HRS												
10	MTBF	Conducted by Parts Stress Analysis Prediction 214.6K hrs min. MIL-HDBK-217F (25°C)													
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 55°C													

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

12.10.30 A50-F031