



Test Report: DDR-120C-12

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

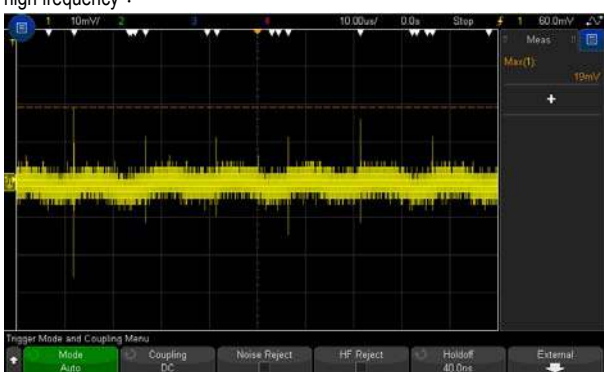
E.M.C. Test

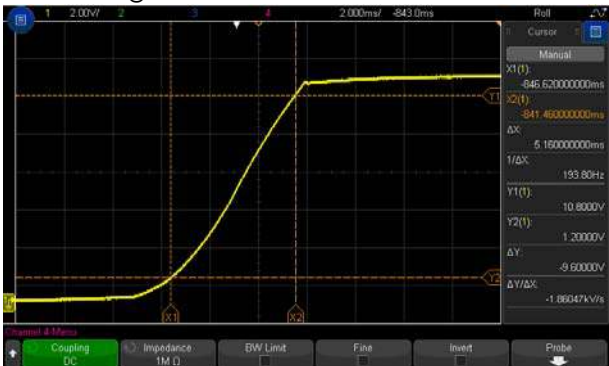
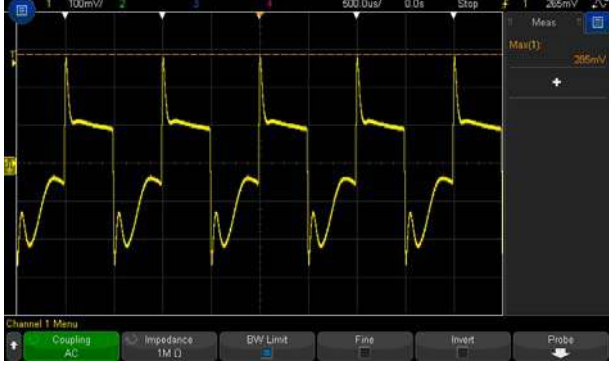
■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

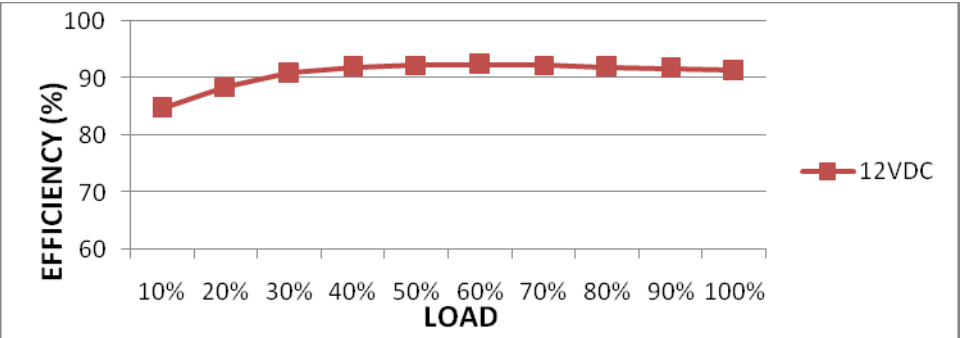
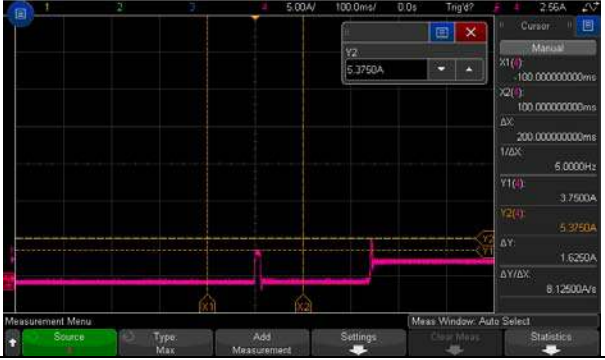
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1:9 V~14 V	I/P : 48 VDC O/P : MIN LOAD Ta : 25°C	8.81V~14.21V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -1 %~1 %	I/P:33.6VDC /67.2VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.38%~ 0.39%
3	LINE REGULATION (Max)	V1: -0.5 %~0.5 %	I/P: 33.6VDC / 67.2 VDC O/P:FULL LOAD Ta:25°C	V1: -0.05%~0.025%
4	LOAD REGULATION (Max)	V1: -1 %~ 1 %	I/P:48VDC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.38%~ 0.39%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 48VDC O/P:FULL LOAD Ta:25°C	TEST: 1.01%
6	RIPPLE & NOISE (Max)	V1: 50mVp-p	I/P: 48VDC O/P:FULL LOAD Ta:25°C	V1: 23 mVp-p
high frequency :  low frequency : 				
7	SET UP TIME (Max)	48VDC/ 500 ms	I/P: 48VDC O/P:FULL LOAD Ta:25°C	48VDC/ 346 ms
INPUT=48VDC @ FULL LOAD CH1 : Output Voltage CH4 : DC Input Voltage 				

8	RISE TIME (Max)	48VDC/ 60 ms	I/P: 48 VDC O/P:FULL LOAD Ta:25°C	48VDC/ 5.16 ms
	INPUT=48VDC @ FULL LOAD 			
9	HOLD UP TIME (TYP)	48VDC/ 6 ms @FULL LOAD 48VDC/ 10ms@60%LOAD	I/P: 48VDC O/P:FULL LOAD Ta:25°C	48VDC/ 7.22ms@FULL LOAD 48VDC/ 10.6ms@60%LOAD
	INPUT=48VDC @ FULL LOAD CH1 : Output Voltage CH4 : DC Input Voltage  INPUT=48VDC @ 60% LOAD CH1 : Output Voltage CH4 : DC Input Voltage 			
10	DYNAMIC LOAD	V1: 1200 mVp-p	I/P: 48VDC O/P: (1)FULL /MIN LOAD 50%DUTY / 120HZ (2)FULL /MIN LOAD 50%DUTY / 1KHZ Ta:25°C	293mVp-p 285mVp-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	33.6VDC~ 67.2VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	28.705V~67.2 V

			I/P: LOW-LINE-0.2= 33.4 V HIGH-LINE+3V= 70.2 V 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)	48VDC/ 2.8 A	I/P: 48VDC O/P:FULL LOAD Ta:25°C	I = 2.702A/ 48VDC
3	EFFICIENCY(TYP)	89.5 %	I/P: 48VDC O/P:FULL LOAD Ta:25°C	91.34 %
EFFICIENCY vs LOAD 				
4	INRUSH CURRENT(TYP)	48VDC/ 5A COLD START	I/P: 48VDC O/P:FULL LOAD Ta:25°C	I = 3.75A/48 VDC
INPUT=48VDC @ FULL LOAD 				

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~135%RATED OUTPUT POWER	I/P: 67.2VDC I/P: 48VDC I/P: 33.6VDC O/P:TESTING Ta:25°C	124.84%/ 67.2VDC 126.11%/48VDC 127.16%/ 33.6VDC 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: 14.4 V~ 16.8 V	I/P: 67.2VDC I/P: 48VDC I/P: 33.6VDC O/P:MIN LOAD Ta:25°C	15.85V/67.2VDC 15.85V/48 VDC 15.85V/ 33.6 VDC PROTECTION TYPE : Shut down O/P voltage,re-power on to recover

3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 67.2 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:67.2 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	Q 5 Rated : 200 V Q 6 Rated : -200V	I/P:High-Line +3V =70.2V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)Full Load Continue Ta:25°C	Q5 VDS: (1) 107.5V (2) 88.2V (3) 105.9V Q6 VDS: (1) -106.7V (2)- 81V (3)- 100.3V
2	Diode Peak Voltage	Q100 Rated : 56 A/ 120V Q101 Rated : 73 A/ 100V	I/P:High-Line +3V =70.2 V DC ON/OFF O/P: (1)Full Load (2)Output Short (3)Full Load Continue Ta:25°C	Q100: VDS: (1) 50.1V (2) 22.8V (3) 21.6V Q101 VDS: (1) 73.9V (2) 82.7V (3) 71.1V
3	Input Capacitor Voltage	C5 Rated: : 330 μ / 80 V °C / Series	I/P:High-Line +3V =70.2 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) 71.3V (2) 72.1V (3) 71.3V (4) 71.3V
4	Control IC Voltage Test	PWM IC U1 Rated :-0.3V~16V U102 Rated : 16V	I/P:High-Line +3V =70.2 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) 14.8 V (2) 15 V (3) 15 V (4) 15V U102: (1) 12.69V (2) 9.79V (3) 11.81V (4) 15.58V

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:2.5 KVDC/min	I/P-O/P: 4.25KVDC/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



120W DC-DC DIN Rail Power Supply

DDR-120C series

3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	10mΩ
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E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	☒ EN55032 ☐ EN55011 ☐ CLASS A ☒ CLASS B	I/P: 48 VDC O/P: FULL LOAD Ta:25°C	☒ PASS ☐ FAIL Test by certified Lab
2	CONDUCTION	☒ EN55032 ☐ EN55011 ☐ CLASS A ☒ CLASS B	I/P: 48 VDC O/P: FULL LOAD Ta:25°C	☒ PASS ☐ FAIL Test by certified Lab
3	E.S.D	EN61000-4-2 ☐ Din rail Model : AIR: 8KV / Contact: 6KV	I/P: 48 VDC O/P: FULL LOAD Ta:25°C	☒ CRITERIA A ☐ CRITERIA B
4	E.F.T	EN61000-4-4 ☐ INDUSTRY INPUT: 2KV	I/P: 48 VDC O/P: FULL LOAD Ta:25°C	☒ CRITERIA A ☐ CRITERIA B
5	SURGE	IEC61000-4-5 ☐ INDUSTRY L-N :1KV L,N-FG:2KV	I/P: 48 VDC O/P: FULL LOAD Ta:25°C	☒ CRITERIA A ☐ CRITERIA B
6	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
2	TEMPERATURE RISE TEST	MODEL : DDR-120C-12 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 48VDC O/P : FULL LOAD Ta= 23.1 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 48VDC O/P : FULL LOAD Ta= 50.8 °C		

			NO	Position	ROOM AMBIENT Ta= 23.1 °C	HIGH AMBIENT Ta= 50.8 °C	
			1	LF1	50.5℃	81.6℃	
			2	LF2	46.6℃	77.3℃	
			3	LF100	60.5℃	90.7℃	
			4	T1	58.2℃	88.4℃	
			5	T2	53.2℃	83.5℃	
			6	Q1	48.1℃	79.3℃	
			7	Q2	48.3℃	79.5℃	
			8	Q5	56.3℃	88.7℃	
			9	Q6	54.6℃	85.3℃	
			10	Q100	61.4℃	94.1℃	
			11	Q101	63.6℃	95.9℃	
			12	L100	64.8℃	96.0℃	
			13	C1	49.7℃	80.7℃	
			14	C5	47.2℃	78.6℃	
			15	C6	48.3℃	78.4℃	
			16	C7	51.6℃	81.6℃	
			17	C101	61.6℃	91.7℃	
			18	C102	61.1℃	91.7℃	
			19	C104	56.3℃	85.8℃	
			20	C106	56.0℃	87.3℃	
			21	ZNR1	44.0℃	74.6℃	
3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 48 VDC O/P : 119 % LOAD Ta : 25℃		TEST : OK		
4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 43.2 VDC/ 67.2 VDC O/P : 100 % LOAD Ta= -45 °C		TEST : OK		
5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 55 °C NO DAMAGE	I/P : 70.2 VDC O/P : FULL LOAD Ta= 55 °C HUMIDITY= 95 %R.H		TEST : OK		
6	TEMPERATURE COEFFICIENT	± 0.03 %(0~55℃)	I/P : 48 VDC O/P : FULL LOAD		± 0.003 %(0~55℃)		
7	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		
8.	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 : 48VDC/Full Load DC ON/OFF TEST turn on 3sec ; turn off 1sec@15cycle\ 48VDC/Full Load DC ON@1cycle			TEST : OK		

9	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														
10	CAPACITOR LIFE CYCLE	SUPPOSE C102 IS THE MOST CRITICAL COMPONENT (1) I/P : 48VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 48VDC O/P : FULL LOAD Ta= 55 °C LIFE TIME (3) I/P : 48VDC O/P : 75% LOAD Ta= 55 °C LIFE TIME (4) I/P : 48VDC O/P : 50% LOAD Ta= 55 °C LIFE TIME	(1) 150348.4 HRS (2) 21758.8 HRS (3) 50933.8 HRS (4) 120805 HRS												
11	MTBF	Conducted by Parts Stress Analysis Prediction 214.6K hrs min. MIL-HDBK-217F (25°C)													
12	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