Test Report: DDR-30L-5

30W DIN Rail Type DC-DC Converter

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Control Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

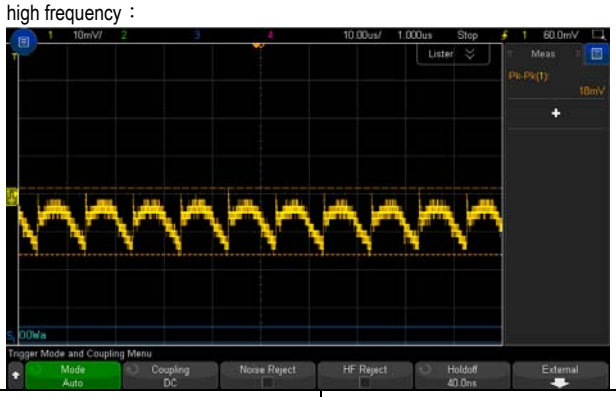
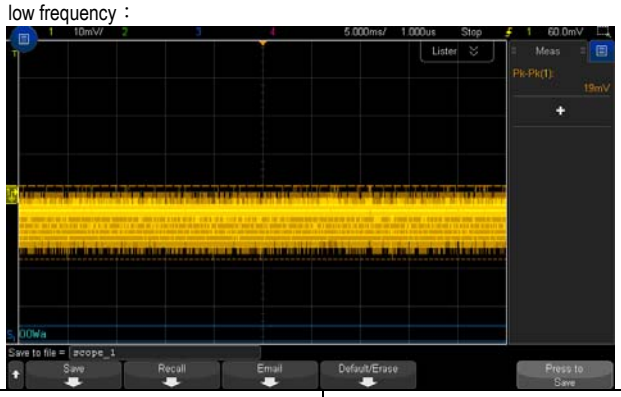
Safety Test
E.M.C. Test

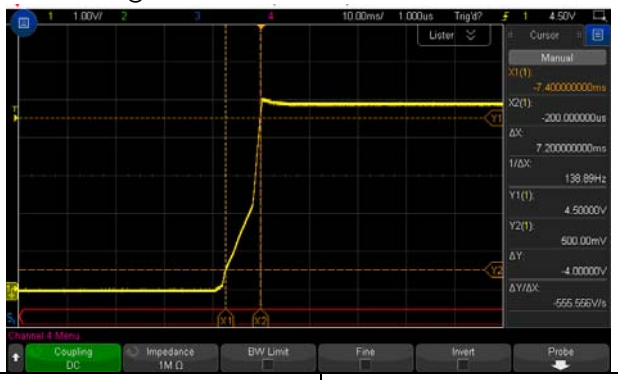
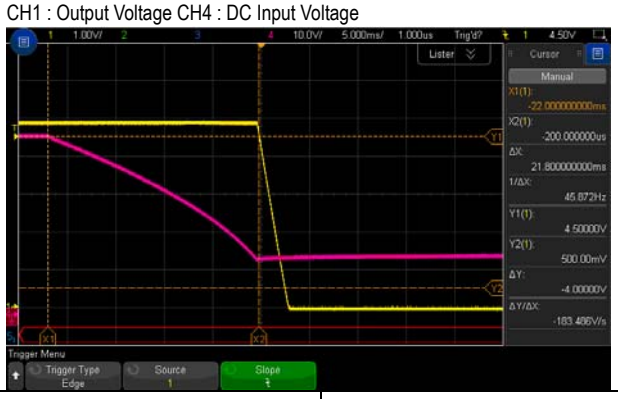
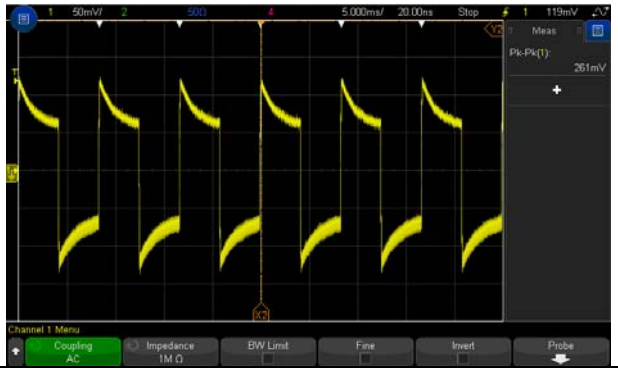
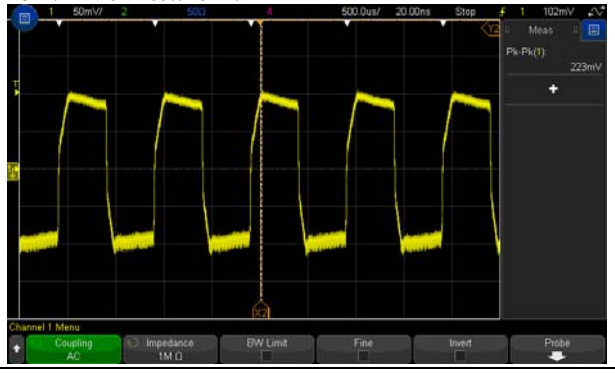
■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

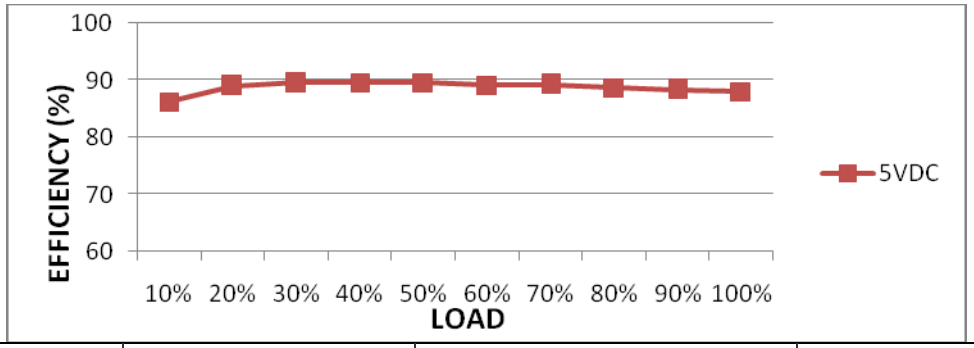
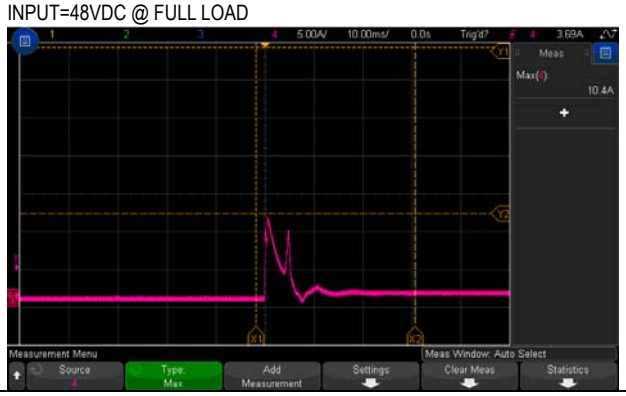
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1:4.5 V~5.5 V	I/P： 48 VDC O/P：MIN LOAD Ta：25℃	4.41V~5.73V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -2%~ 2%	I/P:18 VDC / 75VDC O/P:FULL/ MIN. LOAD Ta:25℃	V1: -1.35 %~ 1.35%
3	LINE REGULATION (Max)	V1:-0.5%~ 0.5%	I/P: 18 VDC / 75VDC O/P:FULL LOAD Ta:25℃	V1: -0 %~ 0.259 %
4	LOAD REGULATION (Max)	V1: -1.5%~ 1.5%	I/P: 48VDC O/P:FULL ~MIN LOAD Ta:25℃	V1: -1.35 %~ 1.35%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P:48VDC O/P:FULL LOAD Ta:25℃	TEST:3.7%
6	RIPPLE & NOISE (Max)	V1: 60 mVp-p	I/P: 48VDC O/P:FULL LOAD Ta:25℃	V1: 19 mVp-p
	high frequency：  low frequency： 			
7	SET UP TIME (Max)	48VDC/120 ms	I/P:48 VDC O/P:FULL LOAD Ta:25℃	48VDC/ 27.2 ms
	INPUT=48VDC @ FULL LOAD CH1 : Output Voltage CH4 :DC Input Voltage 			

8	RISE TIME (Max)	48VDC/ 85 ms	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	48VDC/ 7.2 ms
	INPUT=48VDC@ FULL LOAD 			
9	HOLD UP TIME (TYP)	48VDC/18ms	I/P: 48VDC O/P:F ULL LOAD Ta:25℃	48VDC/ 21.8 ms
	INPUT=48VDC @ FULL LOAD CH1 : Output Voltage CH4 : DC Input Voltage 			
10	DYNAMIC LOAD	V1: 1000 mVp-p	I/P: 48VDC O/P: (1)FULL /MIN LOAD 50%DUTY / 120HZ (2)FULL /MIN LOAD 50%DUTY / 1KHZ Ta:25℃	261mVp-p 223mVp-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	18VDC~ 75 VDC	I/P:TESTING O/P:FULL LOAD Ta:25℃	17.365V~ 75V

			I/P: LOW-LINE-0.2=17.8V HIGH-LINE+3V=78V 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/0.8 A	I/P: 48VDC O/P:FULL LOAD Ta:25℃	I =0.6918A/48VDC
3	EFFICIENCY(TYP)	86 %	I/P: 48VDC O/P:FULL LOAD Ta:25℃	88.05 %
	EFFICIENCY vs LOAD 			
4	INRUSH CURRENT(TYP)	48VDC/ 15 A COLD START	I/P: 48VDC O/P:FULL LOAD Ta:25℃	I =10.4A/ 48VDC
	INPUT=48VDC @ FULL LOAD 			

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	110%~150%RATED OUTPUT POWER	I/P: 75VDC I/P: 48 VDC I/P: 18 VDC O/P:TESTING Ta:25℃	127.5%/ 75VDC 127.5%/ 48VDC 127.5%/ 18VDC PROTECTION TYPE： Constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	CH: 5.75 V~7 V	I/P: 75VDC I/P: 48 VDC I/P: 18 VDC O/P:MIN LOAD Ta:25℃	6.76V/75VDC 6.76V/ 48VDC 6.76V/ 18VDC PROTECTION TYPE： Shut down O/P voltage,re-power on to recover

3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 75 VDC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE： Constant current limiting, recovers automatically after fault condition is removed
4	INPUT REVERSE	POWER OK	I/P:75VDC O/P: NO LOAD Ta:25℃	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 3 Rated ： 150 V	I/P:High-Line +3V =78V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) full load continue Ta：25℃	VDS: (1)132.8V (2)99V (3)132.8V
2	Diode Peak Voltage	Q100 Rated : 60V	I/P:High-Line +3V =78 V DC ON/OFF O/P: (1)Full Load (2)Output Short (3)full load continue Ta：25℃	VDS: (1)27.7V (2)20.4V (3)27.3V
3	Input Capacitor Voltage	C5 Rated: ： 680 μ / 80V	I/P:High-Line +3V =78 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℃	C5: (1)79.8V (2)79.6V (3)79.8V (4)79.8V
4	Control IC Voltage Test	PWM IC U1 Rated -0.3V~30V U100 Rated -0.3V~38V	I/P:High-Line +3V =78 V DC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta：25℃	U1: (1) 20.9V (2) 8.29V (3) 20.3V (4) 15.3V U100: (1)20.3V (2)15.3 (3)20.3V (4)18.5V
5	Clamp Diode Peak Voltage	D7 Rated： 200V D8 Rated： 200V	I/P：High-Line +3V = 78 V DC ON/OFF O/P： (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta：25℃	D7: (1)109.4V (2)107V D8: (1)111V (2)111V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	EN 60950-1 I/P-O/P:4KVDC/min	I/P-O/P: 4.4KVDC/min Ta:25℃	I/P-O/P: 0 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25℃	I/P-O/P: 9999MΩ NO DAMAGE

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℃	☑PASS ☐FAIL Test by certified Lab
2	CONDUCTION	☑EN55032 ☐EN55011 ☐CLASS A ☑CLASS B	I/P: 48 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:48VDC O/P:FULL LOAD Ta:25℃	☑CRITERIA A ☐CRITERIA B
4	E.F.T	EN61000-4-4 ☐INDUSTRY INPUT: 2KV	I/P:48 VDC O/P:FULL LOAD Ta:25℃	☑CRITERIA A ☐CRITERIA B
5	SURGE	IEC61000-4-5 ☐INDUSTRY line-line :1KV	I/P:48 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-30L-5 1. ROOM AMBIENT BURN-IN：1 HRS I/P： 48VDC O/P： FULL LOAD Ta= 22.2 ℃ 2. HIGH AMBIENT BURN-IN：1 HRS I/P： 48VDC O/P： FULL LOAD Ta= 59.4 ℃		

NO	Position	ROOM AMBIENT Ta= 22.2 ℃	HIGH AMBIENT Ta= 59.4 ℃
1	LF1	36.9℃	77.2℃
2	T1	59.6℃	99.9℃
3	T2	54.4℃	93.8℃
4	L100	58.6℃	105.7℃
5	L1	69.5℃	107.7℃
6	Q2	31.0℃	69.8℃
7	Q3	59.6℃	99.7℃
8	Q100	75.0℃	118.5℃
9	U1	50.8℃	90.2℃
10	D7	70.6℃	109.7℃
11	D8	61.4℃	111.6℃
12	C18	60.2℃	95.0℃
13	C5	39.1℃	78.0℃
14	C105	63.5℃	108.3℃
15	C106	57.8℃	104.5℃
16	C40	50.4℃	87.1℃
17	C110	51.6℃	93.1℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P：48 VDC O/P：125 % LOAD Ta：25℃	TEST：OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P： 24 VDC/ 75 VDC O/P： 100 % LOAD Ta= -45 ℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 ℃ NO DAMAGE	I/P：78 VDC O/P：FULL LOAD Ta= 60 ℃ HUMIDITY= 95 %R.H	TEST：OK
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~60℃)	I/P： 48 VDC O/P：FULL LOAD	± 0.0107 %(0~60℃)
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℃~ +65℃ 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
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：10min/sweep cycle (4) Acceleration：3G (5) Test Time：60min in each axis (X.Y.Z) (6) Ta：25℃ 2 Din Rail		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 C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 48VDC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 48VDC O/P：FULL LOAD Ta= 60 ℃ LIFE TIME (3) I/P： 48VDC O/P：75% LOAD Ta= 60 ℃ LIFE TIME (4) I/P： 48VDC O/P：50% LOAD Ta= 60 ℃ LIFE TIME	(1) 632472.0 HRS (2) 35565.6 HRS (3) 44763.6 HRS (4) 141561.6 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 483.3K hrs min. MIL-HDBK-217F (25℃)	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 60℃	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

12.10.30 A50-F031