



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

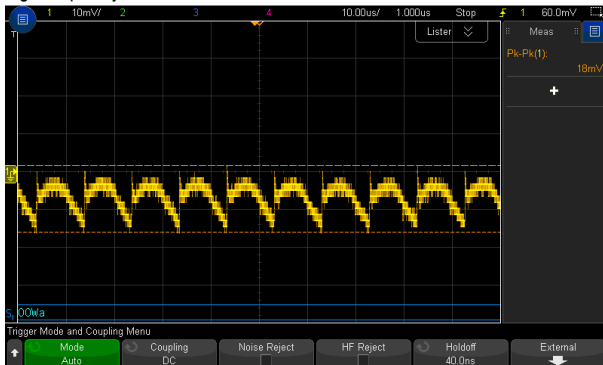
ENVIRONMENT TEST

DESIGN VERIFY TEST

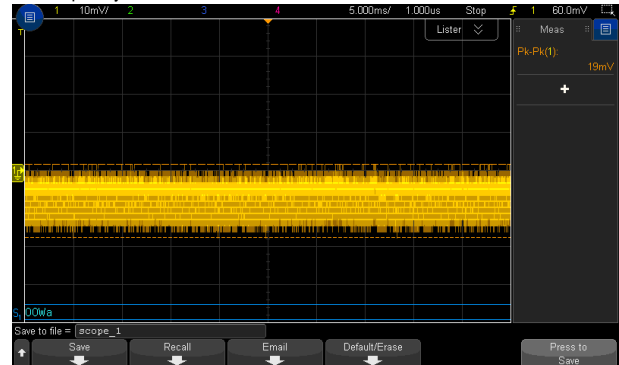
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -2%~ 2%	I/P:18 VDC / 75VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -1.35 %~ 1.35%
2	LINE REGULATION (Max)	V1:-0.5%~ 0.5%	I/P: 18 VDC / 75VDC O/P:FULL LOAD Ta:25°C	V1: -0 %~ 0.259 %
3	LOAD REGULATION (Max)	V1: -1.5%~ 1.5%	I/P: 48VDC O/P:FULL ~MIN LOAD Ta:25°C	V1: -1.35 %~ 1.35%
4	OVER/UNDERSHOOT TEST	< ±10%	I/P:48VDC O/P:FULL LOAD Ta:25°C	TEST:3.7%
5	RIPPLE & NOISE (Max)	V1: 60 mVp-p	I/P: 48VDC O/P:FULL LOAD Ta:25°C	V1: 19 mVp-p

high frequency :



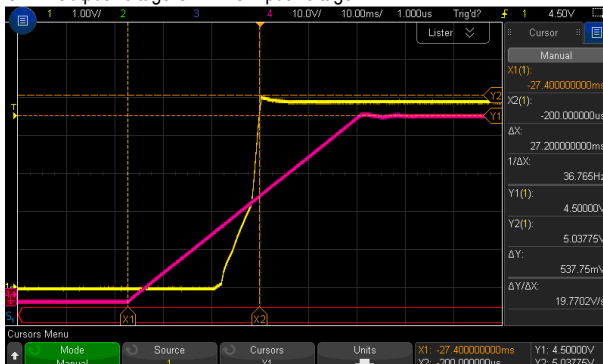
low frequency :



6	SET UP TIME (Max)	48VDC/120 ms	I/P:48 VDC O/P:FULL LOAD Ta:25°C	48VDC/ 27.2 ms
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INPUT=48VDC @ FULL LOAD

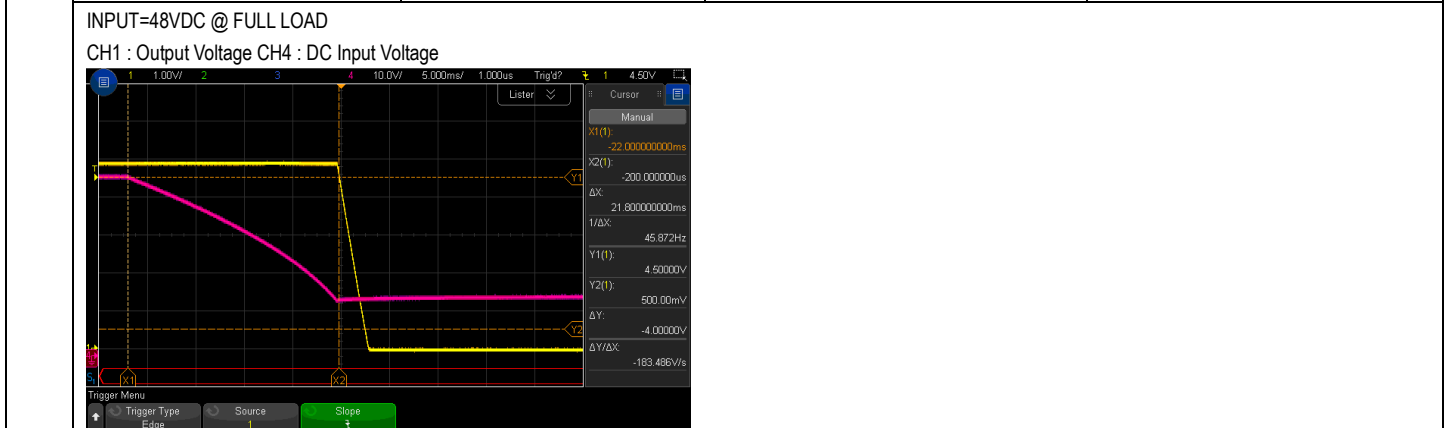
CH1 : Output Voltage CH4 :DC Input Voltage



7	RISE TIME (Max)	48VDC/ 85 ms	I/P: 48 VDC O/P:FULL LOAD Ta:25°C	48VDC/ 7.2 ms
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8	HOLD UP TIME (TYP)	48VDC/18ms	I/P: 48VDC O/P: FULL LOAD Ta:25°C	48VDC/ 21.8 ms
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9	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°C	261mVp-p 223mVp-p
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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°C	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°C	I=0.6918A/48VDC																						
3	EFFICIENCY(TYP)	86 %	I/P: 48VDC O/P:FULL LOAD Ta:25°C	88.05 %																						
EFFICIENCY vs LOAD <table border="1"> <caption>Efficiency vs Load Data (Approximate)</caption> <thead> <tr> <th>LOAD (%)</th> <th>EFFICIENCY (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>86.0</td></tr> <tr><td>20%</td><td>88.5</td></tr> <tr><td>30%</td><td>89.5</td></tr> <tr><td>40%</td><td>89.5</td></tr> <tr><td>50%</td><td>89.5</td></tr> <tr><td>60%</td><td>89.0</td></tr> <tr><td>70%</td><td>89.5</td></tr> <tr><td>80%</td><td>88.5</td></tr> <tr><td>90%</td><td>88.5</td></tr> <tr><td>100%</td><td>88.0</td></tr> </tbody> </table>					LOAD (%)	EFFICIENCY (%)	10%	86.0	20%	88.5	30%	89.5	40%	89.5	50%	89.5	60%	89.0	70%	89.5	80%	88.5	90%	88.5	100%	88.0
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80%	88.5																									
90%	88.5																									
100%	88.0																									
4	INRUSH CURRENT(TYP)	48VDC/ 15 A COLD START	I/P: 48VDC O/P:FULL LOAD Ta:25°C	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°C	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°C	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°C	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°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 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°C	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°C	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°C	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°C	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°C	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°C	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°C	I/P-O/P: 9999MΩ NO DAMAGE

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.S.D	EN61000-4-2 <input type="checkbox"/> Din rail Model : AIR: 8KV / Contact: 6KV	I/P:48VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
4	E.F.T	EN61000-4-4 <input type="checkbox"/> INDUSTRY INPUT: 2KV	I/P:48 VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
5	SURGE	IEC61000-4-5 <input type="checkbox"/> INDUSTRY line-line :1KV	I/P:48 VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> 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 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 48VDC O/P : FULL LOAD Ta= 59.4 °C		



		NO	Position	ROOM AMBIENT Ta= 22.2 °C	HIGH AMBIENT Ta= 59.4 °C
		1	LF1	36.9°C	77.2°C
		2	T1	59.6°C	99.9°C
		3	T2	54.4°C	93.8°C
		4	L100	58.6°C	105.7°C
		5	L1	69.5°C	107.7°C
		6	Q2	31.0°C	69.8°C
		7	Q3	59.6°C	99.7°C
		8	Q100	75.0°C	118.5°C
		9	U1	50.8°C	90.2°C
		10	D7	70.6°C	109.7°C
		11	D8	61.4°C	111.6°C
		12	C18	60.2°C	95.0°C
		13	C5	39.1°C	78.0°C
		14	C105	63.5°C	108.3°C
		15	C106	57.8°C	104.5°C
		16	C40	50.4°C	87.1°C
		17	C110	51.6°C	93.1°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 48 VDC O/P : 125 % LOAD Ta : 25°C	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 °C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C NO DAMAGE		I/P : 78 VDC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~60°C)		I/P : 48 VDC O/P : FULL LOAD	± 0.0107 %(0~60°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°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			TEST : OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -45°C~ +65°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 : 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°C 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 °C LIFE TIME (2) I/P : 48VDC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 48VDC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 48VDC O/P : 50% LOAD Ta= 60 °C 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 2780.3K hrs min. Telcordia SR-332 (Bellcore) ; 483.8K hrs min. MIL-HDBK-217F (25°C)	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 60°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

12.10.30 A50-F031