



Test report:M3DN20-12

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Output function test

NO.	Test item	Specication	Test condition	Result	Verdict
1	Rated current	0-20A continuous	I/P:12VDC O/P:Full load Ta:25°C	OK	P
2	Peak current	30A 5 Sec No damage	I/P:12VDC O/P:30A Ta:25°C	OK	P
3	Capacitance	320uF	I/P:12VDC O/P:320uF Ta:25°C	OK	P
4	Standby power losses(Typ.)	1.5W	I/P:12VDC O/P:No load Ta:25°C	0.46W	P

Input function test

NO.	Test item	Specication	Test condition	Result	Verdict
1	Input voltage range	9-14VDC	I/P:Testing O/P:Full load Ta:25°C	8.56~14.78VDC	P
2	Rated current	0~10Ax2 input, 0~20Ax1 input Continuous	I/P:12VDC O/P:0-10Ax2 input.0-20Ax1 Ta:25°C	ok	P
3	Voltage drop(Vin-Vout)(max.)	0.25V	I/P:12VDC O/P:Full load Ta:25°C	0.19V	P
4	Peak current	0-15Ax2 input,0-30Ax1 5 Sec No damage	I/P:12VDC O/P:30A Ta:25°C	OK	P
5	Input reverse current(max.)	1mA	I/P:12VDC O/P:Full load Ta:25°C	2.17uA	P
6	Input reverse voltage(max.)	40VDC No damage	I/P:40VDC O/P:Full load Ta:25°C	OK	P
7	Efficiency	98%	I/P:12VDC O/P:Full load Ta:25°C	98.89%	P

Protection function test

NO.	Test item	Specication	Test condition	Result	Verdict
1	Over load protection	<30A No damage 5 Sec (max.)	I/P:12VDC O/P:Testing Ta:25°C	No damage	P
3	Short protection	<30A No damage 5 Sec (max.)	I/P:14VDC O/P:Full load Ta:25°C	No damage	P

Environment test

NO.	Test item	Specication	Test condition	Result	Verdict	
1	Temperature rise test	Model:M3DN20-12			P	
		1.Room ambient burn-in: 2HS				
		I/P:12VDC O/P:Full load Ta=26.2°C				
		2.High ambient burn-in: 2HS				
		I/P:12VDC O/P:Full load Ta=59.6°C				
				Room ambient		High ambient
				Ta=26.2°C		Ta=59.6°C
		1	ZNR2	48.8		86.2
		2	Q1	51.5		89.8
		3	Q3	71.5		116.8
		4	C17	57.6		95.6
		5	ZNR2	53.6		90.2
		6	C15	49.2		86.5
		7	C16	52.2		90.8
		8	RY1	44.6		81.5
		9	RY2	52.6		91.2
10	PCB	67.9	109.5			
11	U4	46.9	84.6			
12	D3	45.9	83.6			
13	R54	44.6	81.6			
14	R56	47.5	83.5			
15	C4	53.6	91.6			
2	Over load burn-in test	NO damage 1 Hours(min)	I/P:12VDC O/P:115% load Ta:25°C	OK	P	
3	Low temperature turn on test	Turn-in after 2 hour	I/P:9VDC/14VDC O/P:100% load Ta:-45°C	OK		
4	Vibration test	(1) Waveform: Sine wave (2) Frequency:10~500Hz (3) Sweep time:10min/sweep cycle (4) Acceleration:2G (5) Test time:1 hour in each axis (X.Y.Z) Ta:25°C		OK	P	

Safety test

NO.	Test item	Specication	Test condition	Result	Verdict
1	Withstand voltage	I/PO/P-FG:0.5KVAC/min I/P/FG-RELAY:0.5KVAC/min FG-RELAY:0.5KVAC/min	I/PO/P-FG:0.6KVAC/min I/P/FG-RELAY:0.6KVAC/min O/P-FG:0.6KVAC/min Ta:25°C	I/P/O/P-FG:7.42mA I/P/FG-RELAY:0.28mA FG-RELAY:0.27mA NO damage	P
2	Isolation resistance	I/P/O/P-FG:500VDC>100M Ω I/P/FG-RELAY:500VDC>100M Ω FG-RELAY:500VDC>100M Ω	I/P/O/P-FG:500VDC I/P/FG-RELAY:500VDC FG-RELAY:500VDC Ta:25°C	I/P/O/P-FG:9999M Ω I/P/FG-RELAY:9999M Ω FG-RELAY:9999M Ω NO damage	P

Componment stress tset

NO.	Test item	Specication	Test condition	Result	Verdict
1	Transistor peak voltage	Q1 VGS Rated:±20V Q3 VGS Rated:±20V	I/P:14VDC DC ON/OFF O/P:Full load Ta:25°C	Q1 VGS:12V Q3 VGS:12.6V	P

E.M.C test

NO.	Test item	Specication	Test condition	Result	Verdict
1	HARMONIC	EN IEC 61000-3-2	I/P: 12VDC O/P:Full/50% load Ta:25°C	/	P
2	CONDUCTION	EN 55032 CLASS B	I/P: 12VDC O/P:Full/50% load Ta:25°C	PASS	P
3	RADIATION	EN 55032 CLASS B	I/P: 12VDC O/P:Full load Ta:25°C	PASS	P
4	E.S.D	EN61000-4-2 AIR: 15KV / Contact: 8KV	I/P: 12VDC O/P:Full load Ta:25°C	Criteria A	P
5	E.F.T	EN 61000-4-4 Input:2KV	I/P: 12VDC O/P:Full load Ta:25°C	Criteria A	P
6	SURGE	EN 61000-4-5 INDUSTRY L-N:1KV L,N-FG :2KV	I/P: 12VDC O/P:Full load Ta:25°C	Criteria A	P

Date	TEST	Check	Approver	Result
2023-9-6	JH HUANG	GL YAO	YX CHEN	PASS