Test Report: IRM-30-24

30W AC-DC PCB-Mount Green Power Module

■ 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	VERDICT
1	RIPPLE & NOISE	V1: 240 mVp-p (Max)	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 40.3 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1: 2.5 %~ -2.5 % (Max)	I/P: 85VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1:0 %~0.02 %	P
3	LINE REGULATION	V1: 0.5 %~ -0.5 % (Max)	I/P: 100VAC~ 305VAC O/P:FULL LOAD Ta:25℃	V1:-0.02 %~0 %	P
4	LOAD REGULATION	V1: 0.5%~ -0.5 % (Max)	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1:0%~0%	P
5	SET UP TIME	230VAC/1000ms (Max) 115VAC/1500ms (Max)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25℃	230VAC/94.345ms 115VAC/ 270 ms	P
6	RISE TIME	230VAC/30ms (Max) 115VAC/30ms (Max)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25℃	230VAC/11.767ms 115VAC/ 13.99ms	P
7	HOLD UP TIME	230VAC/40ms (Typ) 115VAC/12ms(Typ)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25℃	230VAC/77.803ms 115VAC/16.972ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	< 5%	P
9	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 230VAC O/P(1)FULL /Min LOAD 90%DUTY/1KHZ (2) (1)FULL /Min LOAD 90%DUTY/3KHZ (3)FULL /Min LOAD 90%DUTY/5KHZ (4)FULL /Min LOAD 50%DUTY/120HZ Ta:25℃	296mVp-p 115mVp-p 84mVp-p 852mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~305VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	64.18VAC~305VAC	P
			I/P: (1)LOW-LINE-3V=82 V HIGH-LINE=305 V O/P:FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230Vac ON: 0.5 Sec OFF: 0.5 Sec 20MIN (3)230Vac ON:3Sec OFF:3Sec 12HOURS (POWER ON/OFF NO DAMAGE)	TEST:OK	
2	INPUT FREQUENCY RANGE	47HZ ~440 HZ NO DAMAGE OSC	I/P:85 VAC ~305 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST:OK	P
3	EFFICIENCY	88.5 % (TYP)	I/P:230 VAC O/P:FULL LOAD Ta:25℃	90.91%	P
4	INPUT CURRENT	230V/ 0.5 A (Typ) 115V/ 0.75A (Typ) 277V/ 0.375A (Typ)	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25℃	I = 0.28A/ 230VAC I = 0.480A/ 115VAC I = 0.227A/ 115VAC	P
5	INRUSH CURRENT	230V/ 40A (Typ) 115V/ 20A (Typ) COLD START	I/P:230VAC/115VAC O/P:FULL LOAD Ta:25℃	I =29.664A/ 230VAC I =12.7A/ 115VAC	P
6	NO LOAD CONSUMPTION	<0.1W	I/P: 240 VAC/115VAC O/P:NO LOAD Ta:25℃	0.033W /240V 0.027W /115V	P
7	LEAKAGE CURRENT	<0.25 mA/ 277VAC	I/P： 277 VAC O/P：Min LOAD Ta：25℃	L-FG: 0.011mA N-FG: 0.011mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105%~160% RATED OUTPUT POWER	I/P: 230VAC I/P: 115VAC O/P:TESTING Ta:25℃	126.46%/ 230VAC 126.15%/115VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH:25.2V~32.4V(Typ)	I/P:230VAC O/P:MIN LOAD Ta:25℃	28.2V Shut off o/p voltage, clamping by zener diode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE Hiccup Mode	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q1 Rated 8A/600V	I/P：High-Line = 305 V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 500V (2) 588V (3) 500V	P
2	Diode Peak **Voltage**	D100 Rated 20A200V	I/P：High-Line = 305 V O/P： (1)Full Load Turn on (2)Output Short (3)Full load continue Ta：25℃	(1)153V (2)129V (3)138V	P
3	**Input Capacitor Voltage**	C5 Rated: ： 56 μ /400 V	I/P：High-Line = 305 V O/P： (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta：25℃	(1)360V (2)360V (3)360V	P
4	**Control IC Voltage Test**	PWM IC U1 Rated: 24V	I/P：High-Line = 305 V O/P： (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta：25℃	(1) 16.9V (2) 16.2V (3) 16.8V	P

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P： 4 KVAC/min	I/P-O/P： 4.4 KVAC/min Ta：25℃	I/P-O/P： 2.28 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P：500VDC>100MΩ	I/P-O/P： 500 VDC Ta：25℃/70%RH	I/P-O/P： 9999 Ω NO DAMAGE	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	BS EN/EN61000-3-2 CLASS A	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	PASS	P
2	CONDUCTION	BS EN/EN55032(CISPR32) CNS13438 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab	P
3	RADIATION	BS EN/EN55032(CISPR32) CNS13438 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab	P
4	E.S.D	BS EN/EN61000-4-2 AIR：8KV / Contact：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
5	E.F.T	BS EN/EN61000-4-4 INPUT： 2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
6	SURGE	BS EN/EN61000-4-5 L-N ：2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL： IRM-30-24 1. ROOM AMBIENT BURN-IN： 1 HRS I/P： 230VAC O/P： FULL LOAD Ta= 29.2℃ 2. HIGH AMBIENT BURN-IN： 1 HRS I/P： 230VAC O/P： FULL LOAD Ta=51.5℃			P

NO	Position	ROOM AMBIENT Ta= 29.2℃	HIGH AMBIENT Ta= 51.5℃
1	D100	67.3℃	85.2℃
2	T1	66.1℃	83.8℃
3	C106	53.7℃	72.0℃
4	C105	61.8℃	79.7℃
5	C40	60.0℃	77.8℃
6	Q1	63.9℃	82.0℃
7	D5	62.3℃	80.3℃
8	D40	58.4℃	76.3℃
9	C5	59.8℃	77.5℃
10	BD1	58.6℃	76.6℃
11	LF2	53.9℃	72.0℃
12	LF1	52.7℃	69.9℃
13	L100	54.8℃	73.2℃
14	D6	61.4℃	79.4℃
15	D42	54.6℃	72.8℃
16	D43	54.8℃	72.9℃
17	CASE	50.6℃	69.1℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230 VAC O/P：114% LOAD Ta：25℃	TEST：OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P： 305VAC/100VAC O/P： 100 % LOAD Ta= -30℃	TEST：OK	P
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL50℃ NO DAMAGE	I/P： 305 VAC O/P：FULL LOAD Ta=50℃ HUMIDITY= 95 %R.H	TEST：OK	P
5	TEMPERATURE COEFFICIENT	±0.03%/℃(0~50℃)	I/P： 230 VAC O/P：FULL LOAD	0%/℃(0~50℃)	P
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：5 CYCLE 5. Input/Output condition： STATIC		OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature： -30℃~ +70℃ 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： 230VAC/Full Load AC ON/OFF TEST turn on 58sec；turn off 2sec		OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：2G（Blank）/5G（ST） (5) Test Time：60min in each axis (X.Y.Z) (6) Ta：25℃		TEST：OK	P
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta=25℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta=50℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=50℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta=50℃ LIFE TIME		(1) 152437HRS (2) 36569HRS (3) 54096HRS (4) 91433HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE：593.3K HRS			P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50℃			P

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SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	FRANK	WANGDZ