



# Test Report: IRM-30-15

---

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: 200 mVp-p (Max)	I/P: 230VAC O/P: FULL LOAD Ta: 25 °C	V1: 37.2 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 °C	V1: 0.04 % ~ -0.04 %	P
3	LINE REGULATION	V1: 0.5 % ~ -0.5 % (Max)	I/P: 100VAC ~ 305VAC O/P: FULL LOAD Ta: 25 °C	V1: 0 % ~ 0%	P
4	LOAD REGULATION	V1: 0.5 % ~ -0.5 % (Max)	I/P: 230VAC O/P: FULL ~ MIN LOAD Ta: 25 °C	V1: 0.04 % ~ -0.04%	P
5	SET UP TIME	230VAC/1000ms (Max) 115VAC/1500ms (Max)	I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25 °C	230VAC/117.79ms 115VAC/256 ms	P
6	RISE TIME	230VAC/30ms (Max) 115VAC/30ms (Max)	I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25 °C	230VAC/11.236ms 115VAC/ 11.954ms	P
7	HOLD UP TIME	230VAC/40ms (Typ) 115VAC/12ms (Typ)	I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25 °C	230VAC/77.339ms 115VAC/16.541ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P: FULL LOAD Ta: 25 °C	< 5%	P
9	DYNAMIC LOAD	V1: 1500 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 °C	426mVp-p 242mVp-p 121mVp-p 424mVp-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 ~	60.12 VAC~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 % (TYP)	I/P:230 VAC O/P:FULL LOAD Ta:25 ~	90.03 %	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 = 0.246A/ 230VAC I = 0.506A/ 115VAC I = 0.206A/ 277VAC	P
5	INRUSH CURRENT	230V/ 40A (Typ) 115V/ 20A (Typ) COLD START	I/P:230VAC/115VAC O/P:FULL LOAD Ta:25 ~	I =30.257A/ 230VAC I =12.5A/ 115VAC	P
6	NO LOAD CONSUMPTION	<0.1W	I/P: 240 VAC/115VAC O/P:NO LOAD Ta:25 ~	0.029W /240V 0.022W /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 ~	132.0%/ 230VAC 138.5%/115VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH:15.75V~20.25V(Typ)	I I/P:230VAC O/P:MIN LOAD Ta:25 ~	18.68V 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) <b>Peak Voltage</b>	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) 512V (2) 570V (3) 506V	P
2	Diode <b>Peak Voltage</b>	D100 Rated 30A120V	I/P High-Line = 305 V O/P (1)Full Load Turn on (2)Output Short (3)Full load continue Ta 25 ~	(1)98.4V (2)78.4V (3)85.6V	P
3	<b>Input Capacitor Voltage</b>	C5 Rated: : 56 /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)356V (2)358V (3)360V	P
4	<b>Control IC Voltage Test</b>	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)16.7V (2) 15.8V (3) 16.7V	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 2.17 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 MΩ 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°C 2. HIGH AMBIENT BURN-IN 1 HRS I/P 230VAC O/P FULL LOAD Ta=51.5°C			P

			NO	Position	ROOM AMBIENT Ta= 29.2 ~	HIGH AMBIENT Ta= 51.5 ~																																																													
			1	D100	67.3°C	85.2°C			2	T1	66.1°C	83.8°C	3	C106	53.7°C	72.0°C	4	C105	61.8°C	79.7°C	5	C40	60.0°C	77.8°C	6	Q1	63.9°C	82.0°C	7	D5	62.3°C	80.3°C	8	D40	58.4°C	76.3°C	9	C5	59.8°C	77.5°C	10	BD1	58.6°C	76.6°C	11	LF2	53.9°C	72.0°C	12	LF1	52.7°C	69.9°C	13	L100	54.8°C	73.2°C	14	D6	61.4°C	79.4°C	15	D42	54.6°C	72.8°C	16	D43	54.8°C
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°C~ +90°C 2. Temperature change rate : 25°C / 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°C~ +70°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 : 230VAC/Fu11 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

2007/3/20 A50-S014

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	FRANK	WANGDZ