



TEST REPORT: IRM-02-15

2W Single Output Encapsulated Type

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

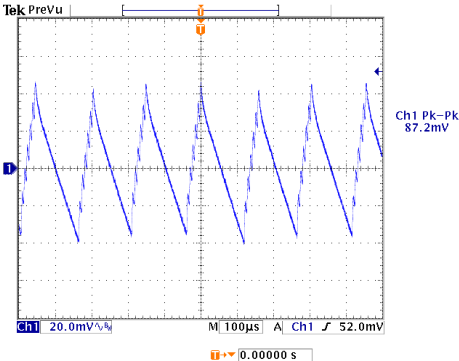
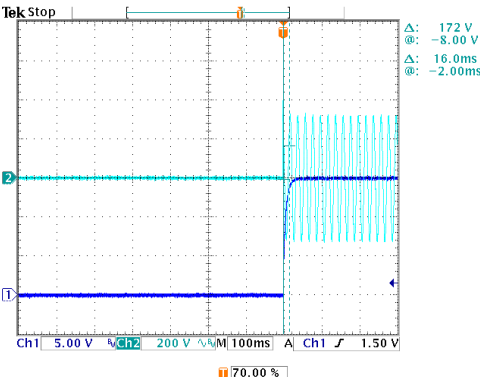
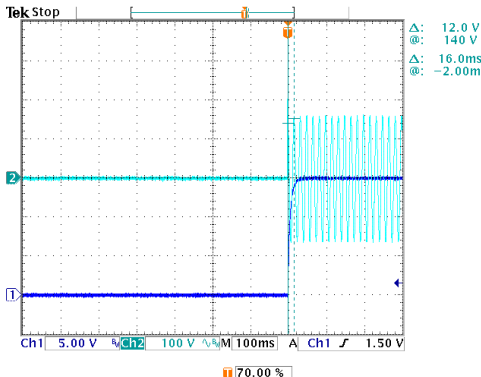
Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST OUTPUT FUNCTION

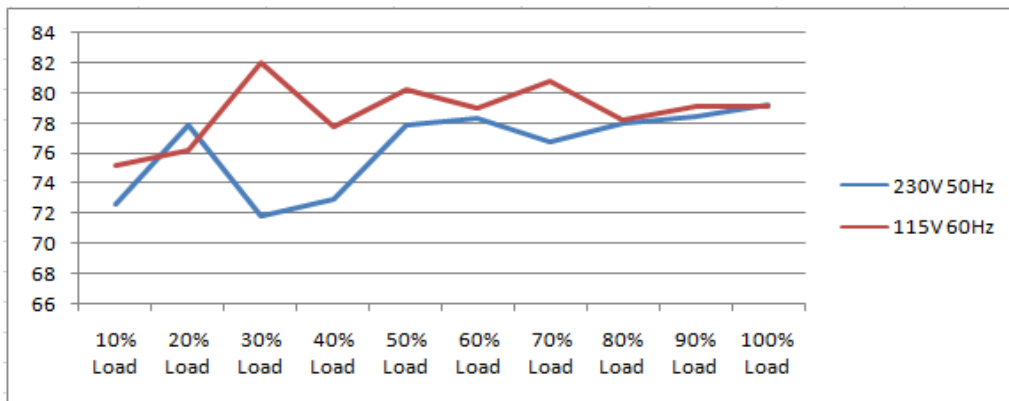
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 14.85V ~ 15.15V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 15.05V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.5% ~ -2.5%	I/P : 100VAC / 305VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.33% ~ 0.27%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 100VAC / 305VAC O/P: FULL LOAD TA : 25°C	V1: 0.07% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.00% ~ -0.07%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 2.67 %
6	RIPPLE & NOISE(Max)	V1 : 200 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 87.2 mVp-p
		high frequency : 		
7	SET UP TIME (MAX.)	230VAC : 600ms 115VAC : 600ms	I/P : 230VAC I/P : 115VAC	230VAC : 16ms 115VAC : 16ms
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		
8	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 12.6ms 115VAC : 12.6ms
		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		

8	<div> <div> INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage </div> <div> </div> </div> <div> <div> INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage </div> <div> </div> </div>
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INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC ~ 305VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	48.0VAC ~ 305VAC
			I/P : LOW-LINE = 97VAC HIGH-LINE = 315VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 100VAC ~ 305VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK
3	INPUT CURRENT (TYP.)	0.030A / 230VAC 0.045A / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	I= 0.01967A / 230VAC I= 0.03005A / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 277VAC O/P: MIN LOAD TA : 25°C	L-FG: 0.0749 mA N-FG: 0.0749 mA
5	NO LOAD POWER CONSUMPTION	< 0.075W	I/P : 230VAC O/P: MIN LOAD TA : 25°C	< 0.0356 W
	EFFICIENCY (TYP.)	75.0%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	79.21 %

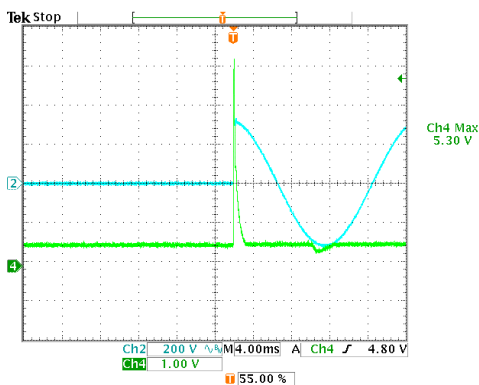
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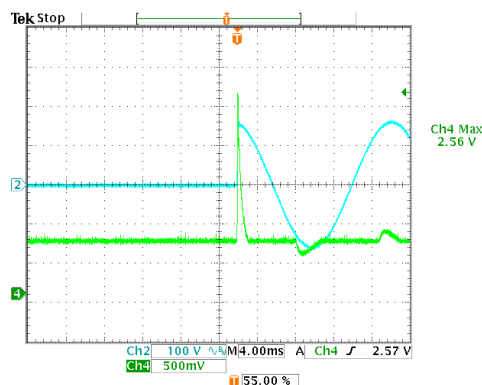
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INRUSH CURRENT (TYP.)	20A / 230VAC 10A / 115VAC twidh= 0 us measured at 50% Ipeak COLD START	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	I= 5.30A / 230VAC I= 2.56A / 115VAC
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INPUT=230VAC/50HZ @ FULL LOAD
CH2 : Input current (1V=1A) CH4 : AC Input Voltage



INPUT=115VAC/50HZ @ FULL LOAD
CH2 : Input current (1V=1A) CH4 : AC Input Voltage



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	> 110%	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P: TESTING Ta: 25°C	379% 305VAC 326% 230VAC 242% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	15.70V ~ 20.30V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P: MIN LOAD Ta: 25°C	17.70V 305VAC 17.70V 230VAC 17.70V 85VAC Shut off o/p voltage, clamping by zener diode
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 85VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q1 Rated : 700V 0.4A	I/P : 315VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	VIN: 315VAC VDS: (1). 638.00V (2). 684.00V (3). 636.00V
2	Input Capacitor	C6 Rated : 5uf 450V	I/P : 315VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1). 446.00V (2). 448.00V (3). 448.00V
3	Control IC	U1 Rated : 9.00V (max) -0.3V (min)	I/P : 315VAC O/P : (1)Full Load (2)Output Short (3)O.L.P (4)Low Line No Load Vo(min) Ta : 25°C	U1 (1). 6.54V (2). 6.28V (3). 6.30V (4). 6.52V
5	O/P Diode	D100 Rated : 100V 2.0A	I/P : 315VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 88.40V (2). 72.80V (3). 88.00V
6	Clamp Diode	D1 Rated : 1000V 1.0A	I/P : 315VAC O/P : (1)Full load continue Ta : 25°C	(1). 612.00V

SAFETY & E.M.C. TEST
SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.000KVAC /min	I/P-O/P: 3.300KVAC /min Ta : 25°C	I/P-O/P: 0.50mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P: 500VDC Ta : 25°C/70%RH	I/P-O/P: 9999MΩ NO DAMAGE

E.M.C. TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS
2	CONDUCTION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N: 1KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A

RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	TEMPERATURE RISE TEST	MODEL : IRM-02-12			
		1. ROOM AMBIENT BURN-IN : 1.0hrs			
		IP: 230VAC O/P: 100% LOAD TA= 18.9℃			
		2. HIGH AMBIENT BURN-IN : 1.0hrs			
		IP: 230VAC O/P: 100% LOAD TA= 73.0℃			
		NO.	Position	ROOM AMBIENT 18.9℃	HIGH AMBIENT Ta: 73.0℃
		1	C101	30.1℃	81.4℃
		2	T1	33.8℃	84.4℃
		3	C6	31.4℃	81.4℃
		4	BD1	32.6℃	82.3℃
		5	R2	31.0℃	80.8℃
		6	L1	31.9℃	81.6℃
2	OVER LOAD BURN-IN TEST	NO DAMAGE		TEST : OK	
		1 HOUR (MIN)			
		I/P : 230VAC			
		O/P : 269.46% LOAD			
		Ta : 25℃			
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 305VAC / 100VAC O/P : FULL LOAD Ta : -30.0℃	TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 75℃ NO DAMAGE	I/P : 315VAC O/P : FULL LOAD Ta : 75℃ HUMIDITY= 95.0% RH	TEST : OK	
5	TEMPERATURE COEFFICIENT	±0.03% /(0℃~75℃)	I/P : 230VAC O/P : FULL LOAD	±0.0000% /(0℃~75℃)	
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40℃ ~ +100℃		TEST : OK	
		2. Temperature change rate : 25℃ / MIN			
7	THERMAL SHOCK TEST	3. Dwell time low and high temperature : 30 MIN/EACH		TEST : OK	
		4. Total test cycle : 5 CYCLE			
		5. Input/Output condition : STATIC			
		1. Thermal shock Temperature : -35℃ ~ +80℃			
		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			



8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (4) Acceleration : 5G (5) Test Time : 60 min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	:SUPPOSE C101 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0°C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 75.0°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 75.0°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 75.0°C LIFE TIME	(1). 158118 HRS (2). 56064 HRS (3). 62984.4 HRS (4). 70605.6 HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 0 KHR	
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 75°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

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