TEST REPORT: IRM-03-3.3

3W Single Output Encapsulated Type

■ DESIGN VERIFY TEST

- Output Function Test
- Input Function Test
- Protection Function Test
- Component Stress Test

■ SAFETY & E.M.C. TEST

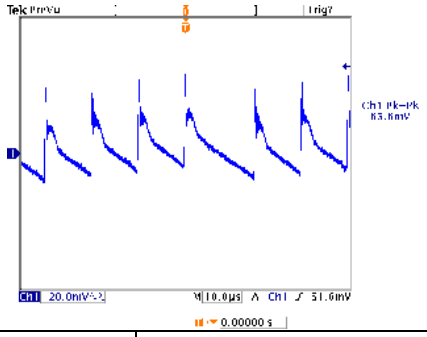
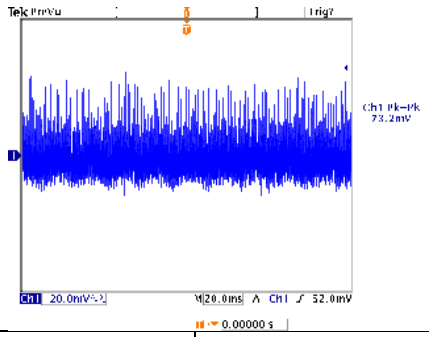
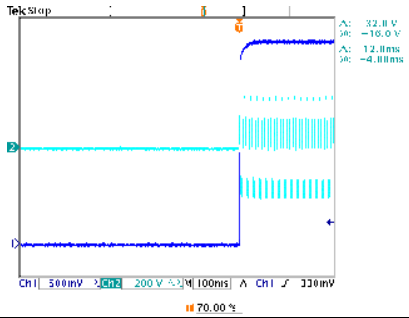
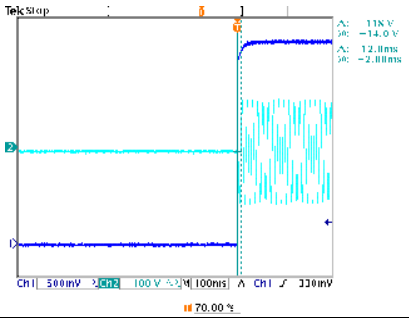
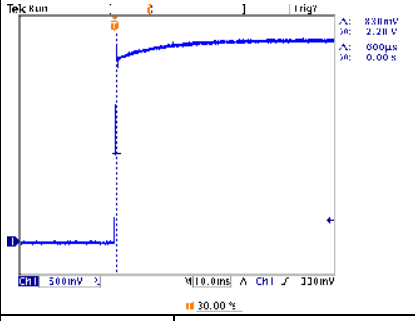
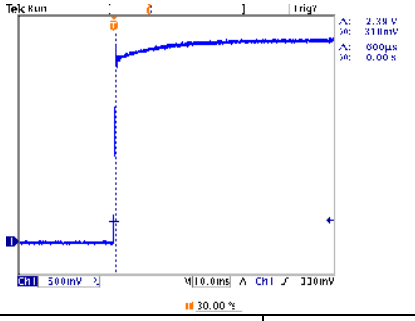
- Safety Test
- E.M.C. Test

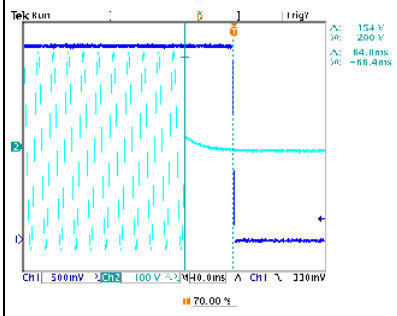
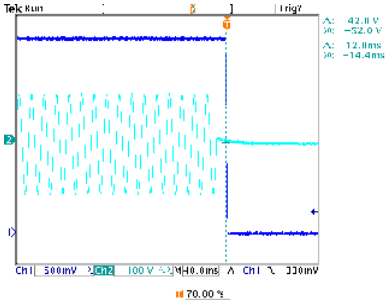
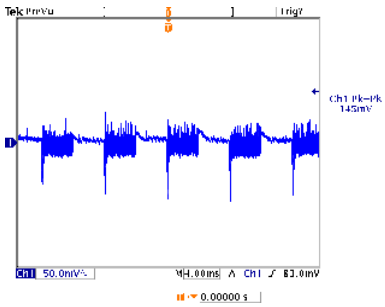
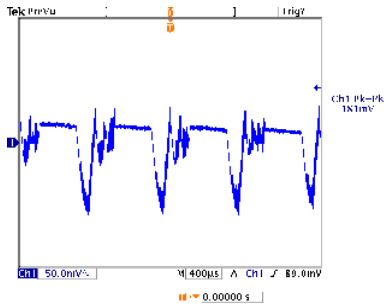
■ RELIABILITY TEST

- ENVIRONMENT TEST

■ DESIGN VERIFY TEST

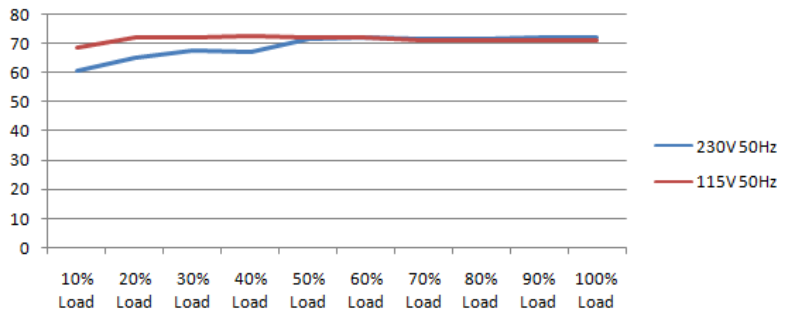
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 3.234V ~ 3.366V	I/P : 230VAC O/P: MIN LOAD TA : 25℃	CH1: 3.30V ~ 3.31V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 100VAC / 305VAC O/P: FULL / MINLOAD TA= 25℃	V1: 0.30% ~ -0.30%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 100VAC / 305VAC O/P: FULL LOAD TA : 25℃	V1: 0.00% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25℃	V1: 0.30% ~ -0.30%
5	OVER/UNDERSHOOT TEST	< ±15%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	TEST< 3.37 %
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25℃	V1 : 73.2 mVp-p
	high frequency :  low frequency : 			
7	SET UP TIME (MAX.)	230VAC : 600ms 115VAC : 600ms	I/P : 230VAC I/P : 115VAC	230VAC : 12ms 115VAC : 12ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		INPUT=115VAC/60HZ @ 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℃	230VAC : 0.6ms 115VAC : 0.6ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage 	
	HOLD UP TIME (TYP.)	230VAC : 40ms 115VAC : 8ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 64.0ms 115VAC : 12.0ms

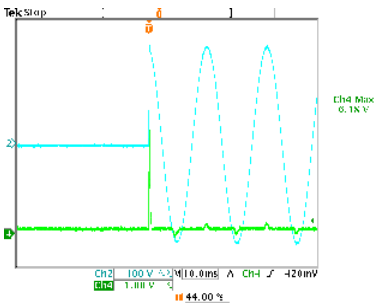
9	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		
	DYNAMIC LOAD	V1 : 990 mVp-p	I/P : 230VAC O/P: (1)Full/Min load 50%duty/120HZ (2)Full/Min load 50%duty/1KHZ TA : 25℃	(1). (2). unit:mVp-p V1: 145.0mv 181.0mv	
10	FULL /50% LOAD 50%DUTY / 120HZ 		FULL /50% LOAD 50%DUTY / 1KHZ 		

INPUT FUNCTION TEST

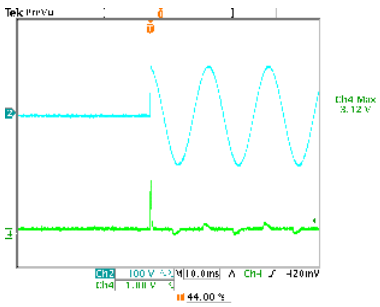
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC ~ 305VAC	I/P : TESTING O/P : FULL LOAD Ta : 25℃	64.0VAC ~ 305VAC
			I/P : LOW-LINE = 97VAC HIGH-LINE = 315VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 100VAC ~ 305VAC O/P : FULL~MIN LOAD Ta : 25℃	TEST : OK
3	INPUT CURRENT (TYP.)	0.04 / 230VAC 0.07 / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 0.03000A / 230VAC I= 0.05400A / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 277VAC O/P: MIN LOAD TA : 25℃	L-FG: 0.069 mA N-FG: 0.069 mA
5	NO LOAD POWER CONSUMPTION	< 0.075W	I/P : 230VAC O/P: MIN LOAD TA : 25℃	< 0.038 W
6	EFFICIENCY (TYP.)	68.0%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	72.21 %
7	INRUSH CURRENT (TYP.)	20A / 230VAC 10A / 115VAC twidth= 0 us measured at 50% Ipeak COLD START	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 6.18A / 230VAC I= 3.12A / 115VAC



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	105% ~ 260%	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P: TESTING TA : 25℃	201% 305VAC 196% 230VAC 193% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	3.80V ~ 4.90V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P: MIN LOAD TA : 25℃	4.60V 305VAC 4.60V 230VAC 4.60V 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℃	NO DAMAGE Hiccup Mode

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q1 Rated： 725V 0.4A	I/P： 315VAC VDS： O/P： (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta： 25℃	VIN: 315VAC VDS: (1). 684.00V (2). 628.00V (3). 684.00V
2	Input Capacitor	C5 Rated： 2uf 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℃	(1). 436.00V (2). 438.00V (3). 436.00V
3	Control IC	U1 Rated： 6.85V (max) 6.0V (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℃	(1). 6.60V (2). 6.56V (3). 6.60V (4). 6.60V
4	O/P Diode	D100 Rated： 30V 5.0A	I/P： 315VAC O/P： (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta： 25℃	(1). 22.50V (2). 24.00V (3). 17.60V
5	Clamp Diode	D1 Rated： 1000V 1.0A	I/P： 315VAC O/P： (1)Fulll load continue Ta： 25℃	(1). 648.00V

■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℃	I/P-O/P: 0.49mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P： 500VDC>100MΩ	I/P-O/P: 500VDC Ta： 25℃/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℃	PASS
2	CONDUCTION	EN55022 CLASS B	I/P： 230VAC /50HZ O/P： FULL LOAD / 50% LOAD Ta： 25℃	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS B	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	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℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT： 2KV	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N：1KV	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	CRITERIA A

■RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL： IRM-03-3.3 1. ROOM AMBIENT BURN-IN： 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 21.9℃ 2. HIGH AMBIENT BURN-IN： 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 68.2℃		
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230VAC O/P： 134% LOAD Ta： 25℃	TEST：OK
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 70℃ NO DAMAGE	I/P： 315VAC O/P： FULL LOAD Ta： 70℃ HUMIDITY= 95.0% RH	TEST：OK
5	TEMPERATURE COEFFICIENT	±0.03% /(0℃~50℃)	I/P： 230VAC O/P： FULL LOAD	±0.0000% /(0℃~50℃)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature： -40℃ ~ +100℃ 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		TEST：OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature： -35℃ ~ +75℃ 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		TEST：OK
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℃		TEST：OK

NO.	Position	ROOM AMBIENT 21.9℃	HIGH AMBIENT Ta： 68.2℃
1	C6	43.6℃	89.3℃
2	R5	41.7℃	87.6℃
3	R2	41.5℃	87.4℃
4	T1	48.7℃	94.4℃
5	C101	47.5℃	92.4℃
6	D100	52.8℃	97.1℃
7	U1	46.7℃	93.1℃
8	D1	45.7℃	91.5℃
9	BD1	43.4℃	89.1℃
10	CASE	43.4℃	88.4℃

9	CAPACITOR LIFE CYCLE	:SUPPOSE C101 IS THE MOST CRITICAL COMPONENT								
		(1) I/P :	230VAC	O/P : FULL LOAD	Ta=	25.0℃	LIFE TIME	(1).	158118	HRS
		(2) I/P :	230VAC	O/P : FULL LOAD	Ta=	70.0℃	LIFE TIME	(2).	17782.8	HRS
		(3) I/P :	230VAC	O/P : 75% LOAD	Ta=	70.0℃	LIFE TIME	(3).	35390.4	HRS
		(4) I/P :	230VAC	O/P : 50% LOAD	Ta=	70.0℃	LIFE TIME	(4).	62984.4	HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 2137.6 KHRS								
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 70℃								

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014