



TEST REPORT: IRM-03-9

3W Single Output Encapsulated Type

■ DESIGN VERIFY TEST

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

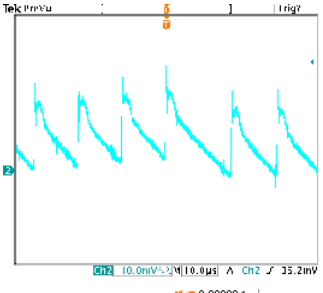
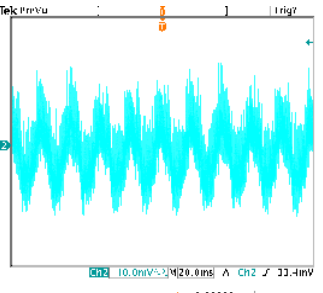
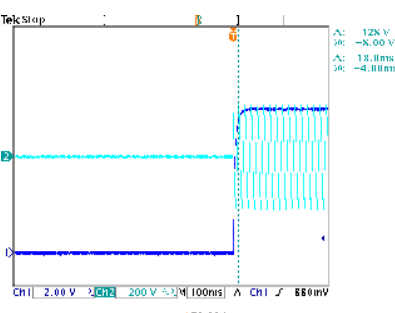
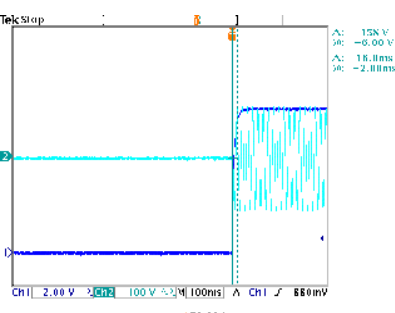
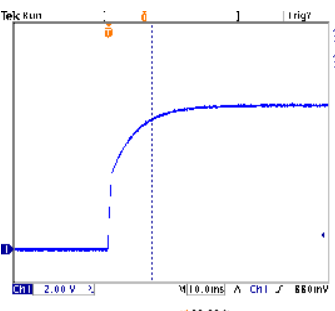
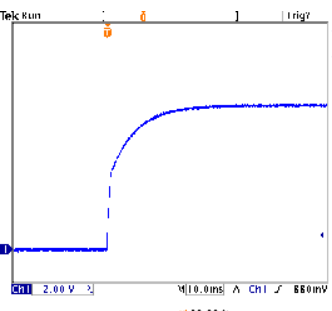
■ SAFETY & E.M.C. TEST

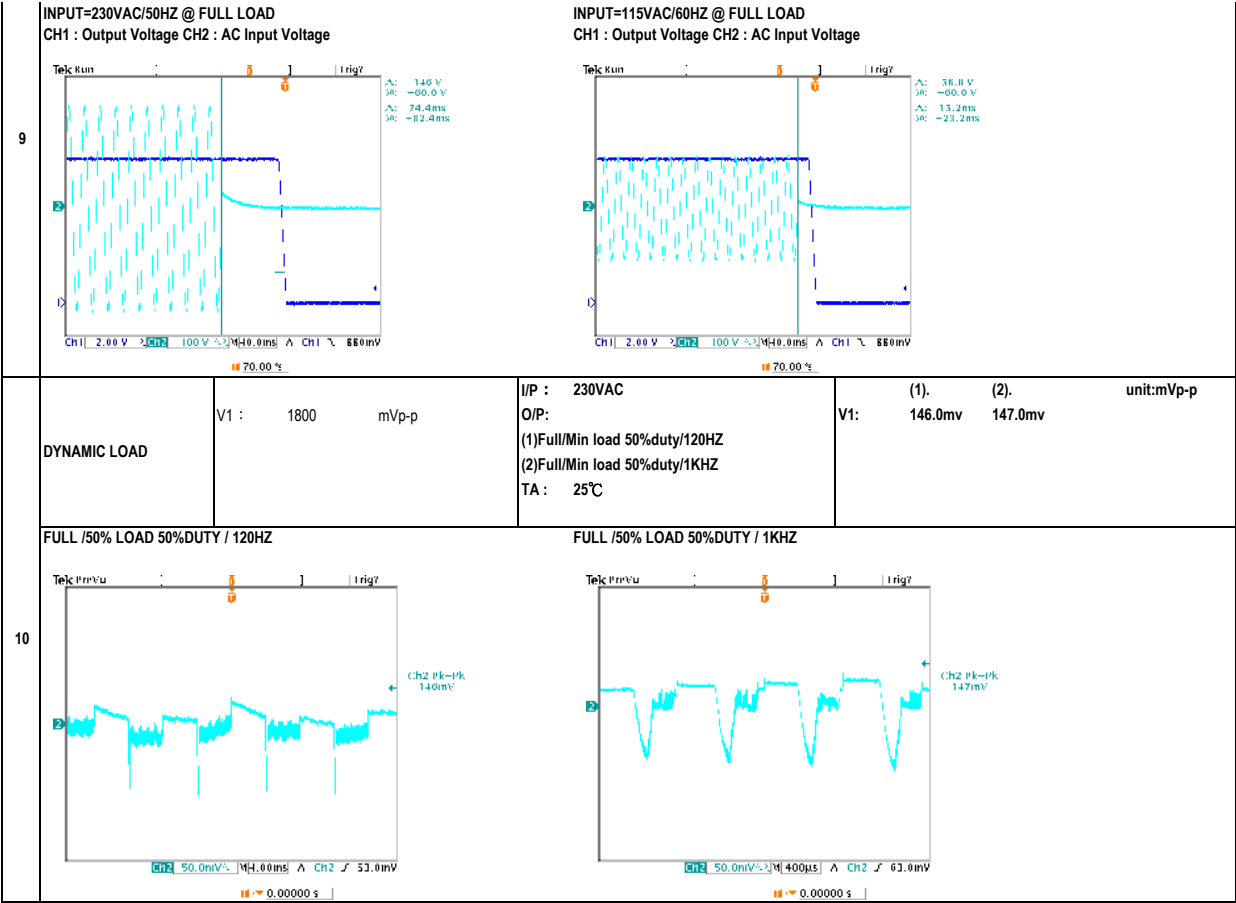
Safety Test
E.M.C. Test

■ RELIABILITY TEST

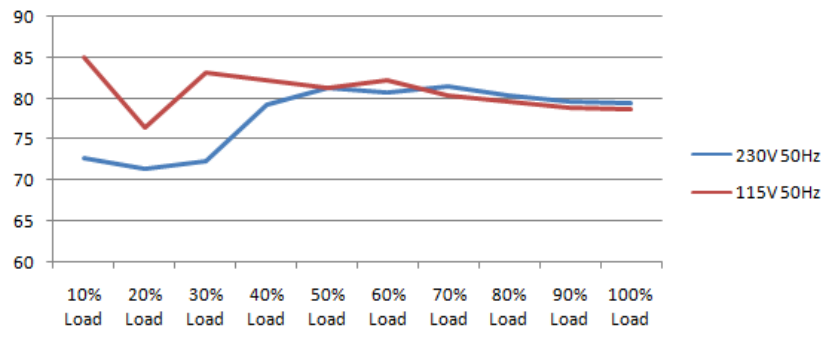
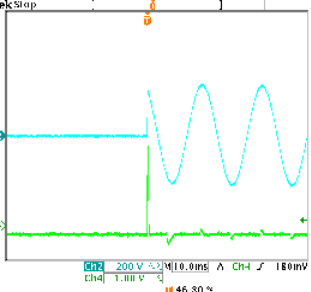
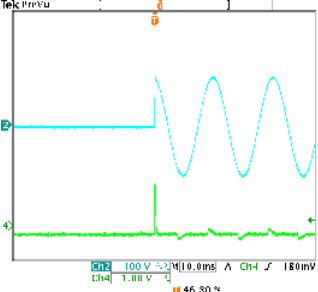
ENVIRONMENT TEST

DESIGN VERIFY TEST OUTPUT FUNCTION

OUTPUT FUNCTION		TEST CONDITION		RESULT	
1	OUTPUT VOLTAGE RANGE	CH1: 8.820V ~ 9.180V	I/P : 230VAC O/P: MIN LOAD TA: 25°C	CH1: 9.03V ~ 9.03V	
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 100VAC / 305VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.33% ~ 0.22%	
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 100VAC / 305VAC O/P: FULL LOAD TA: 25°C	V1: 0.00% ~ 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% ~ 0.00%	
5	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230VAC O/P: FULL LOAD TA: 25°C	TEST< 1.327 %	
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA: 25°C	V1 : 51.4 mVp-p	
	high frequency :		low frequency :		
					
7	SET UP TIME (MAX.)	230VAC : 600ms 115VAC : 600ms	I/P : 230VAC I/P : 115VAC	230VAC : 18ms 115VAC : 16ms	
	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°C	230VAC : 13.8ms 115VAC : 14.0ms	
	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°C	230VAC : 74.4ms 115VAC : 15.2ms	



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 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)	54.0VAC ~ 305VAC 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.)	0.04 / 230VAC 0.07 / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	I= 0.02600A / 230VAC I= 0.04300A / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 277VAC O/P: MIN LOAD TA : 25°C	L-FG: 0.066 mA N-FG: 0.0658 mA
5	NO LOAD POWER CONSUMPTION	< 0.075W	I/P : 230VAC O/P: MIN LOAD TA : 25°C	< 0.039 W
6	EFFICIENCY (TYP.)	77.0%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	79.8 %
				
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°C	I= 5.28A / 230VAC I= 2.68A / 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°C	212.0% 305VAC 212.0% 230VAC 200.0% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	10.30V ~ 12.20V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P: MIN LOAD Ta: 25°C	10.90V 305VAC 10.90V 230VAC 10.90V 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 : 725V 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). 642.00V (2). 552.00V (3). 642.00V
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°C	(1). 424.00V (2). 424.00V (3). 424.00V
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°C	(1). 6.56V (2). 6.08V (3). 6.52V (4). 6.52V
4	O/P Diode	D100 Rated : 60V 3.0A	I/P : 315VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 44.60V (2). 34.20V (3). 44.20V
5	Clamp Diode	D1 Rated : 1000V 1.0A	I/P : 315VAC O/P : (1)Full load continue Ta : 25°C	(1). 602.00V

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: 0.48mA 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℃	
		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℃
2	OVER LOAD BURN-IN TEST	NO DAMAGE	I/P : 230VAC	TEST : OK	
		1 HOUR (MIN)	O/P : 134% 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 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℃		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℃ ~ +75℃			
		2. Temperature change rate : 25℃ / MIN			
8	VIBRATION TEST	3. Dwell time low and high temperature : 30 MIN/EACH		TEST : OK	
		4. Total test cycle : 10 CYCLE			
		5. Input/Output condition : 230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec			
		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℃					



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