



TEST REPORT: IRM-02-3.3

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

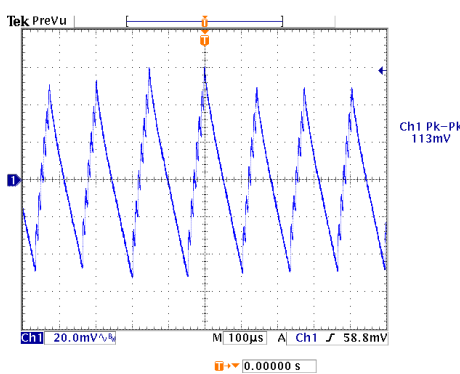
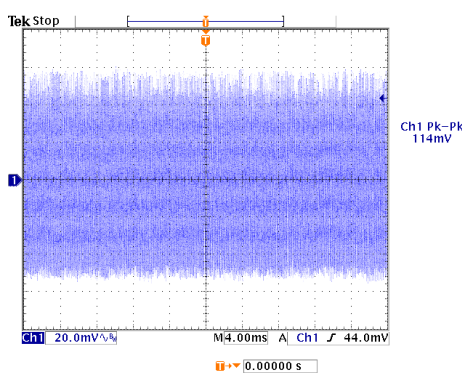
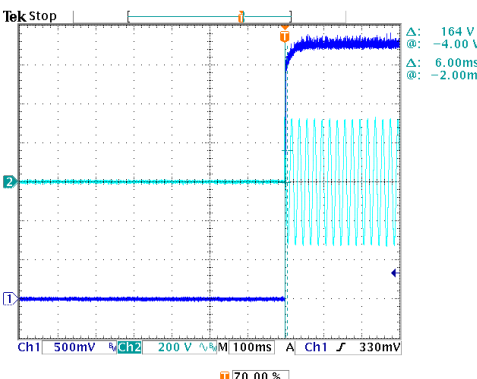
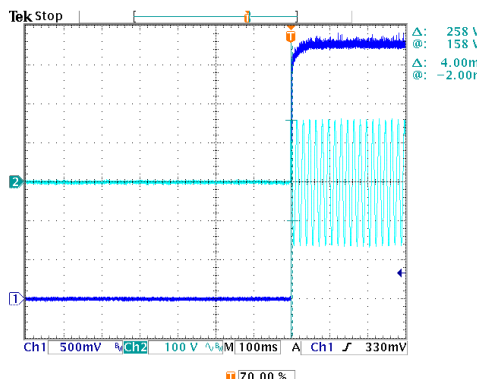
Safety Test

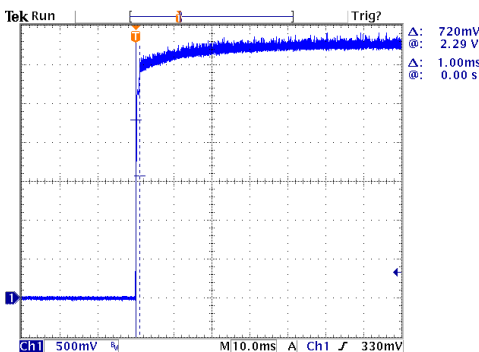
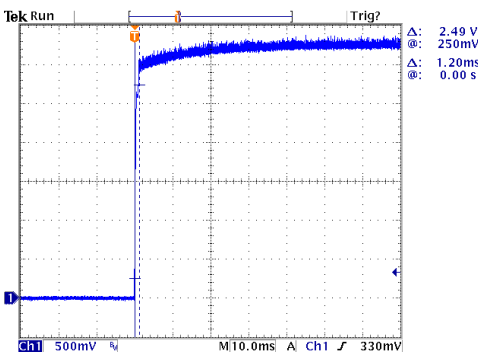
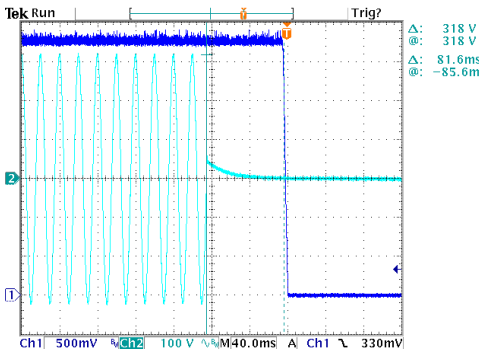
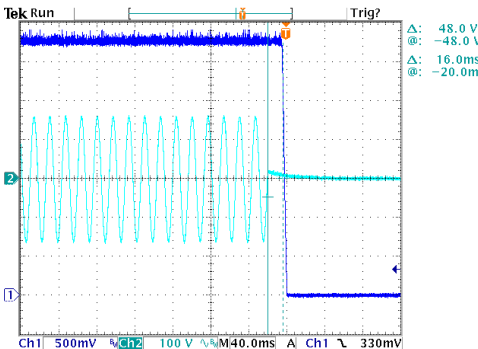
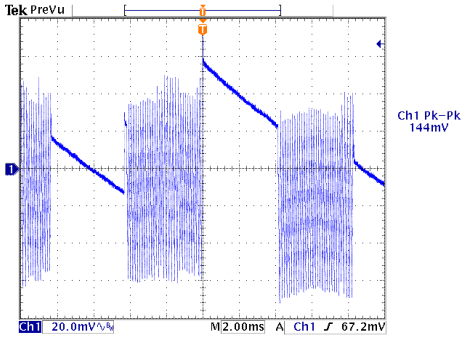
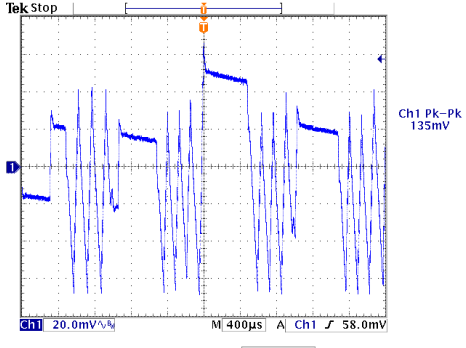
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST OUTPUT FUNCTION

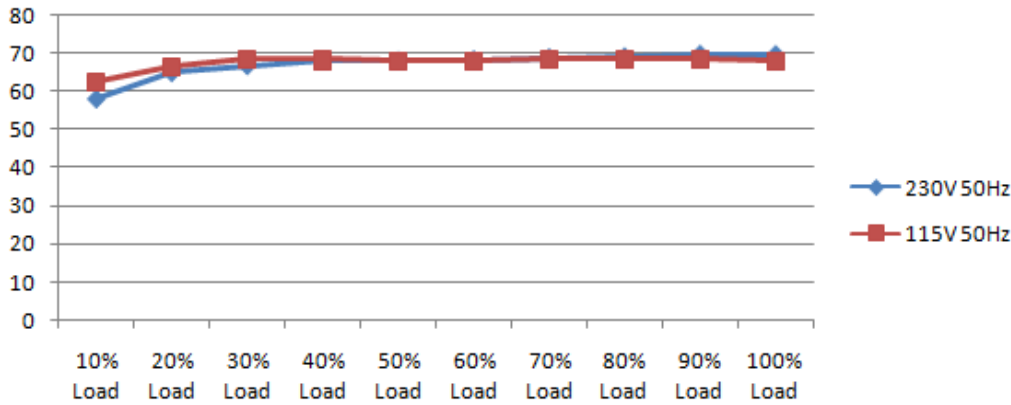
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 3.267V ~ 3.333V	I/P : 230VAC O/P: MIN LOAD TA: 25°C	CH1: 3.30V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.5% ~ -2.5%	I/P : 100VAC / 305VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.00% ~ -0.61%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 100VAC / 305VAC O/P: FULL LOAD TA: 25°C	V1: 0.00% ~ -0.30%
4	LOAD REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA: 25°C	V1: 0.00% ~ -0.30%
5	OVER/UNDERSHOOT TEST	< ±15%	I/P : 230VAC O/P: FULL LOAD TA: 25°C	TEST< 3.70 %
6	RIPPLE & NOISE(Max)	V1 : 150 mVp-p	I/P : 230VAC O/P: FULL LOAD TA: 25°C	V1 : 114.00 mVp-p
	<div>high frequency : </div> <div>low frequency : </div>			
7	SET UP TIME (MAX.)	230VAC : 600ms 115VAC : 600ms	I/P : 230VAC I/P : 115VAC	230VAC : 6ms 115VAC : 4ms
	<div>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage </div> <div>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage </div>			
	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	230VAC : 1.0ms 115VAC : 1.2ms

8	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage	
				
HOLD UP TIME (TYP.)		230VAC : 40ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 81.6ms 115VAC : 16.0ms
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°C	(1). (2). unit:mVp-p V1: 144.0mv 135.0mv
10	FULL /Min LOAD 50%DUTY / 120HZ		FULL /Min LOAD 50%DUTY / 1KHZ	
				

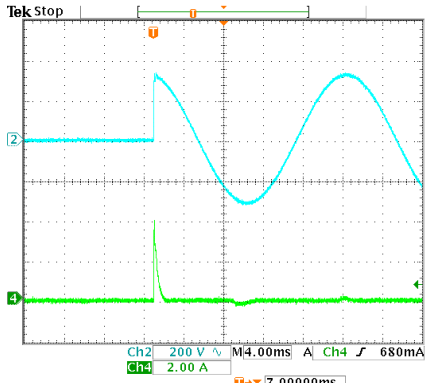
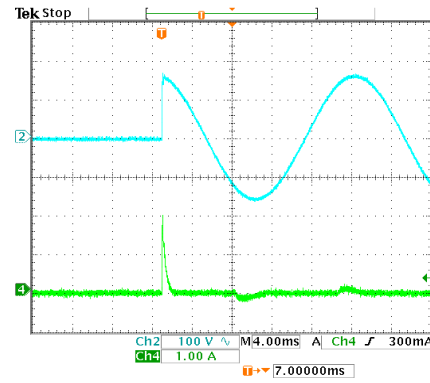
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC ~ 305VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	59.0VAC ~ 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= 0.02100A / 230VAC I= 0.03448A / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 277VAC O/P: MIN LOAD TA : 25°C	L-O/P: 0.0114 mA N-O/P: 0.0112 mA
5	NO LOAD POWER CONSUMPTION	< 0.075W	I/P : 230VAC O/P: MIN LOAD TA : 25°C	< 0.0347 W
	EFFICIENCY (TYP.)	66.0%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	69.83 %

6



7

7	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= 3.88A / 230VAC I= 1.92A / 115VAC
	<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>  <p>Ch4 Max 3.88 A</p> </div> <div style="width: 45%;"> <p>INPUT=115VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>  <p>Ch4 Max 1.92 A</p> </div> </div>			

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	343% 305VAC 291% 230VAC 221% 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°C	4.40V 305VAC 4.40V 230VAC 4.40V 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). 642.00V (2). 650.00V (3). 638.00V
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). 6.28V (2). 6.26V (3). 6.26V (4). 6.28V
5	O/P Diode	D100 Rated : 45V 5.0A	I/P : 315VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 28.20V (2). 32.10V (3). 18.50V
6	Clamp Diode	D1 Rated : 1000V 1.0A	I/P : 315VAC O/P : (1)Full load continue Ta : 25°C	(1). 608.00V

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: 0.05mA 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-02-3.3 1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 18.9°C 2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 73.0°C	NO. Position ROOM AMBIENT 18.9°C HIGH AMBIENT Ta: 73.0°C 1 C101 40.1°C 92.1°C 2 T1 41.7°C 95.1°C 3 C6 35.3°C 88.2°C 4 BD1 37.1°C 90.4°C 5 R2 34.4°C 87.6°C 6 L1 35.9°C 88.9°C 7 U1 40.1°C 94.0°C 8 D100 46.3°C 100.1°C 9 D1 39.6°C 93.3°C 10 CASE 36.9°C 89.7°C	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 275.00% LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 305VAC / 100VAC O/P : FULL LOAD Ta : -30.0°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 75°C NO DAMAGE	I/P : 315VAC O/P : FULL LOAD Ta : 75°C HUMIDITY= 95.0% RH	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03% /(0°C~75°C)	I/P : 230VAC O/P : FULL LOAD	±0.0000% /(0°C~75°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C ~ +100°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		TEST : OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +80°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 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°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). 17782.8 HRS (3). 28119.6 HRS (4). 70605.6 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction T159K hrs min. Telcordia SR-332 (Bellcore) ; 46.3K hrs min. MIL-HDBK-217F (25°C)	
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

2007/3/20 A50-S014