



# 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

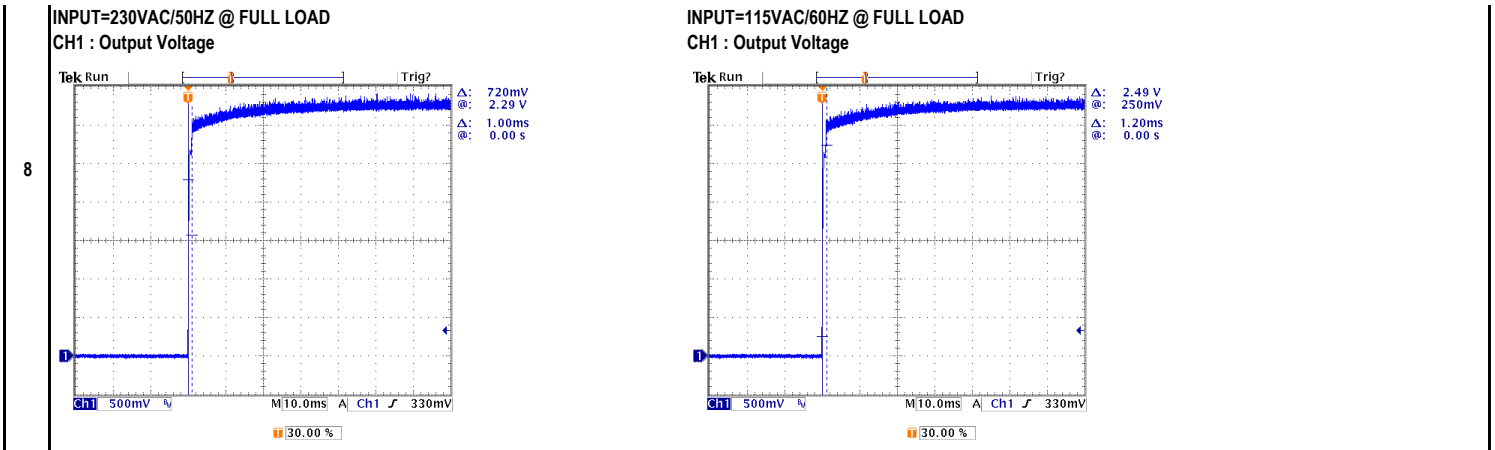
E.M.C. Test

### ■ RELIABILITY TEST

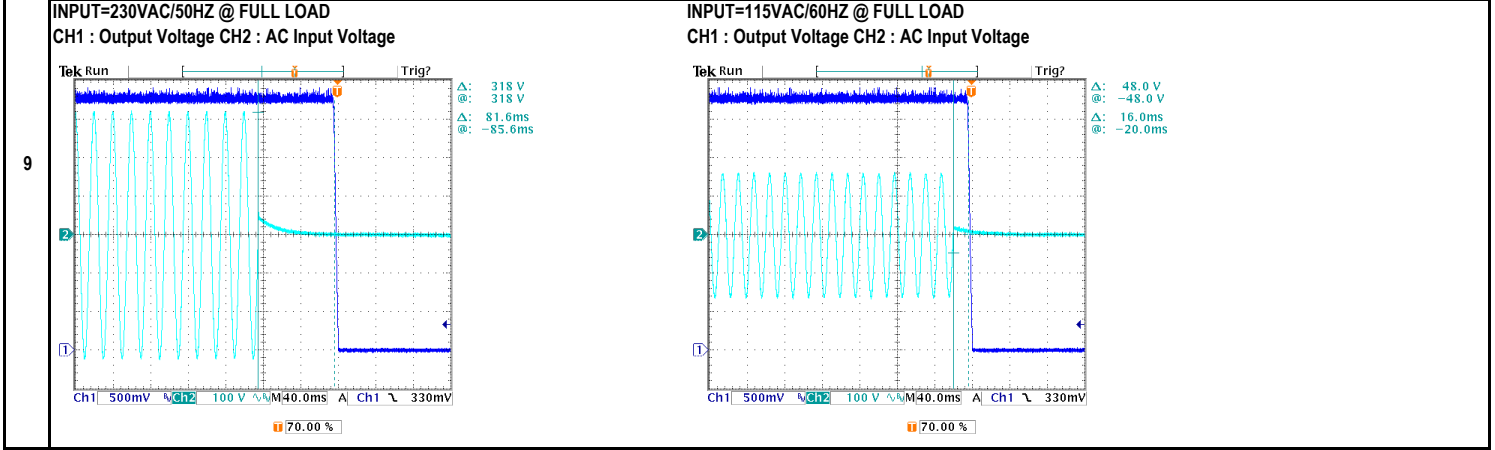
ENVIRONMENT TEST

■ DESIGN VERIFY TEST  
OUTPUT FUNCTION TEST

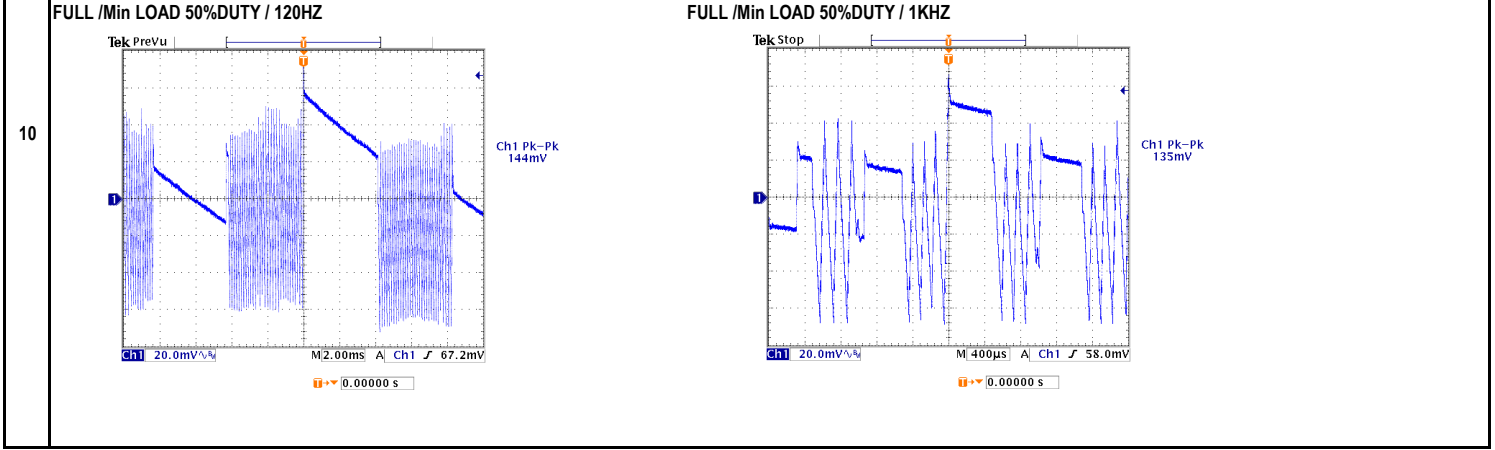
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 3.267V ~ 3.333V	I/P: 230VAC O/P: MIN LOAD TA: 25°C	CH1: 3.30V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1: 2.5% ~ -2.5%	I/P: 100VAC / 305VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.00% ~ -0.61%
3	LINE REGULATION (MAX.)	V1: 0.5% ~ -0.5%	I/P: 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
7	SET UP TIME (MAX.)	230VAC : 600ms 115VAC : 600ms	I/P: 230VAC I/P: 115VAC	230VAC : 6ms 115VAC : 4ms
		<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	
	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



<b>HOLD UP TIME (TYP.)</b>	230VAC : 40ms 115VAC : 12ms	I/P: 230VAC I/P: 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 81.6ms 115VAC : 16.0ms
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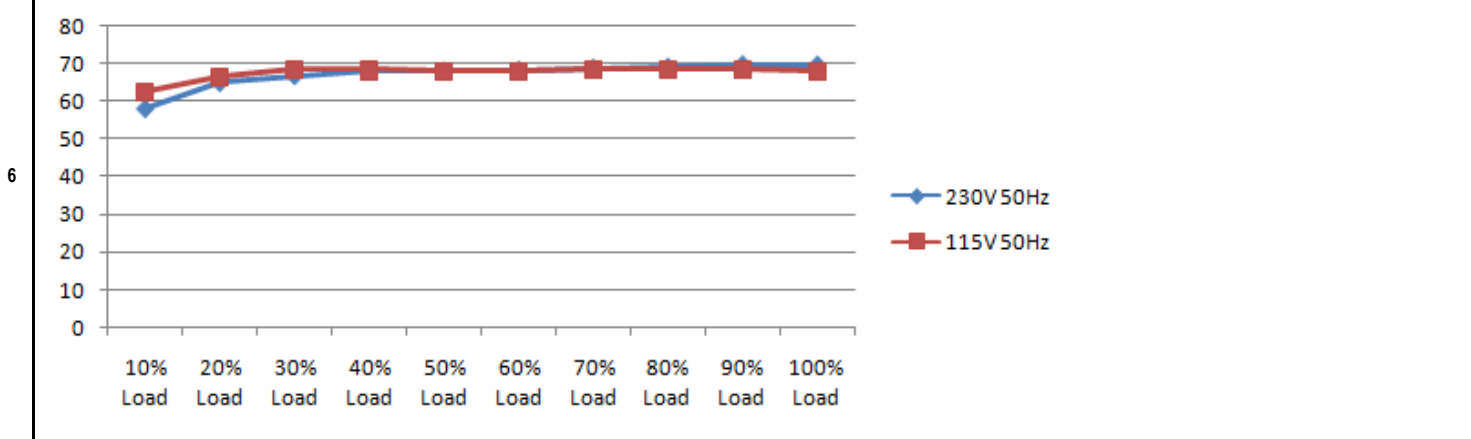
<b>DYNAMIC LOAD</b>	V1: 990 mVp-p	I/P: 230VAC O/P: (1)Full/Min load 50% duty/120HZ (2)Full/Min load 50% duty/1KHZ TA : 25°C	V1: (1). 144.0mv (2). 135.0mv unit:mVp-p
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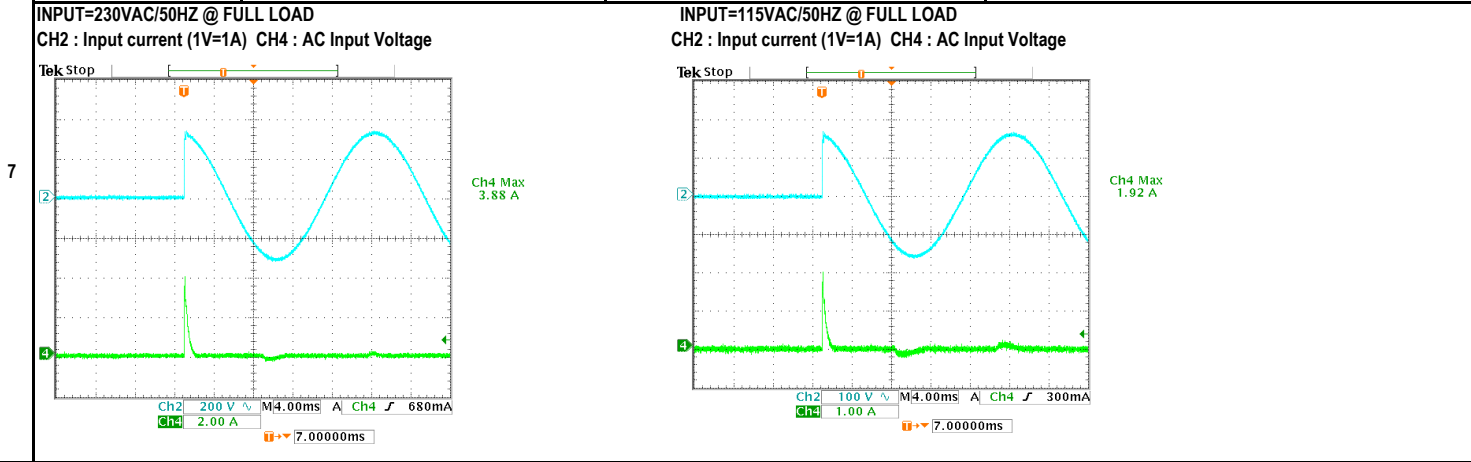


INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC ~ 305VAC 120VDC ~ 430VDC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	59.0VAC ~ 305VAC 85VDC ~ 430VDC
			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 0.025A / 277VAC	I/P: 230VAC I/P: 115VAC O/P: FULL LOAD TA : 25°C	I= 0.02100A / 230VAC I= 0.03448A / 115VAC I= 0.01810A / 277VAC
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 %



7	INRUSH CURRENT (TYP.)	10A / 230VAC 5A / 115VAC twidth= 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
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**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 Change (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	<table border="1"> <thead> <tr> <th>NO.</th> <th>Position</th> <th>ROOM AMBIENT Ta</th> <th>18.9°C</th> <th>HIGH AMBIENT Ta:</th> <th>73.0°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C101</td><td></td><td>40.1°C</td><td></td><td>92.1°C</td></tr> <tr><td>2</td><td>T1</td><td></td><td>41.7°C</td><td></td><td>95.1°C</td></tr> <tr><td>3</td><td>C6</td><td></td><td>35.3°C</td><td></td><td>88.2°C</td></tr> <tr><td>4</td><td>BD1</td><td></td><td>37.1°C</td><td></td><td>90.4°C</td></tr> <tr><td>5</td><td>R2</td><td></td><td>34.4°C</td><td></td><td>87.6°C</td></tr> <tr><td>6</td><td>L1</td><td></td><td>35.9°C</td><td></td><td>88.9°C</td></tr> <tr><td>7</td><td>U1</td><td></td><td>40.1°C</td><td></td><td>94.0°C</td></tr> <tr><td>8</td><td>D100</td><td></td><td>46.3°C</td><td></td><td>100.1°C</td></tr> <tr><td>9</td><td>D1</td><td></td><td>39.6°C</td><td></td><td>93.3°C</td></tr> <tr><td>10</td><td>CASE</td><td></td><td>36.9°C</td><td></td><td>89.7°C</td></tr> </tbody> </table>	NO.	Position	ROOM AMBIENT Ta	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	
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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	13571.4K hrs min. Telcordia SR-332 (Bellcore) ; 1960.2K hrs min. MIL-HDBK-217F (25°C)	
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 75°C O/P: FULL LOAD	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014