



TEST REPORT: TP-K018VB-1

18W QC3.0 Output Switching mode power supply

■ **DESIGN VERIFY TEST**

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ **SAFETY & E.M.C. TEST**

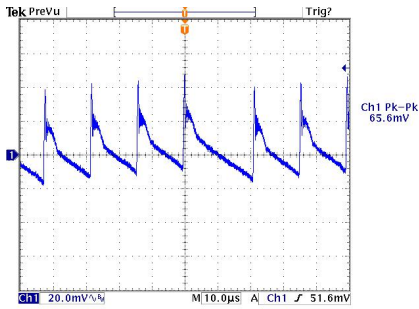
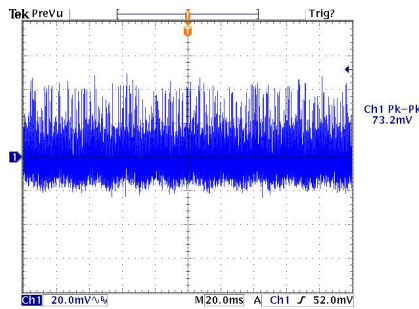
Safety Test

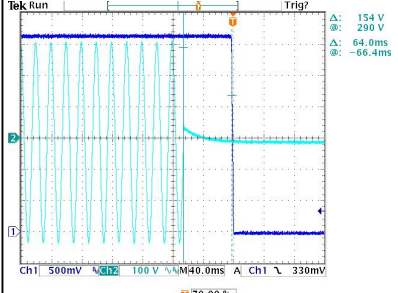
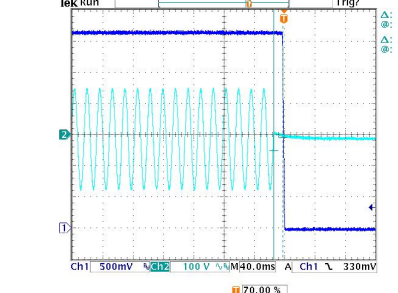
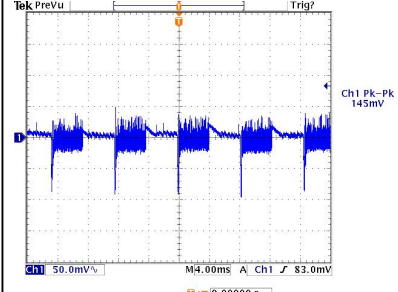
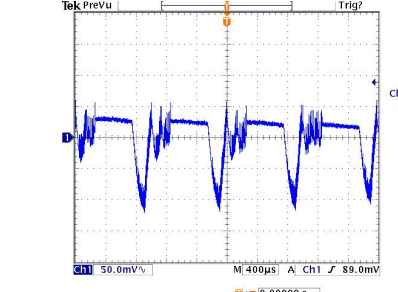
E.M.C. Test

■ **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°C	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°C	V1: 0.30% ~ -0.30%
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 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA: 25°C	V1: 0.30% ~ -0.30%
5	OVER/UNDERSHOOT TEST	< ±15%	I/P : 230VAC O/P: FULL LOAD TA: 25°C	TEST< 3.37 %
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA: 25°C	V1 : 73.2 mVp-p
			high frequency : 	low frequency : 
7	SET UP TIME (MAX.) INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	230VAC : 600ms 115VAC : 600ms	I/P : 230VAC I/P : 115VAC	230VAC : 12ms 115VAC : 12ms
			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 : 0.6ms 115VAC : 0.6ms
			INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage
8	HOLD UP TIME (TYP.)	230VAC : 40ms 115VAC : 8ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	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°C V1: (1). 145.0mv (2). 181.0mv unit:mVp-p
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	90VAC ~264 VAC	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)	64.0VAC ~ 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= 0.03000A / 230VAC I= 0.05400A / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 277VAC O/P : MIN LOAD TA: 25°C	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°C	< 0.038 W
6	EFFICIENCY (TYP.)	80.7.0%	I/P : 230VAC O/P : FULL LOAD TA: 25°C	81.7 %
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= 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°C	201% 305VAC 196% 230VAC 193% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	15V ~ 18V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P: MIN LOAD Ta: 25°C	16.5V 305VAC 16.5V 230VAC 16.5V 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 : 586V 0.4A	I/P : 315VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	VIN: 264VAC VDS: (1). 584.00V (2). 528.00V (3). 584.00V
2	Input Capacitor	C5 Rated : 22uf 400V	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). 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°C	(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)Full load continue Ta : 25°C	(1). 22.50V (2). 24.00V (3). 17.60V
5	Clamp Diode	D1 Rated : 1000V 1.0A	I/P : 315VAC O/P : (1)Full load continue Ta : 25°C	(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°C	I/P-O/P: 0.49mA 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-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	I/P : 230VAC	TEST : OK
		1 HOUR (MIN)	O/P : 134% LOAD	
			Ta : 25℃	
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE	I/P : 305VAC / 100VAC	TEST : OK
		1 HOUR (MIN)	O/P : FULL LOA)	
			Ta : -30.0℃	
		4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS
IN CHAMBER ON	O/P : FULL LOA)			
CONTROL 70℃	Ta : 70℃			
NO DAMAGE	HUMIDITY= 95.0% RH			
5	TEMPERATURE COEFFICIENT			±0.03% /(0℃~50℃)
			O/P : FULL LOA)	
		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				
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		
		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℃				

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