Test Report: BIC-5K-380

AC⇔DC 5KW Bidirectional Power Supply with Energy Recycle

■ DESIGN VERIFY TEST

Output Function Test (AC to DC)
Input Function Test (AC to DC)
Input Function Test (DC to AC)
Output Function Test (DC to AC)
Protection Function Test
Control Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

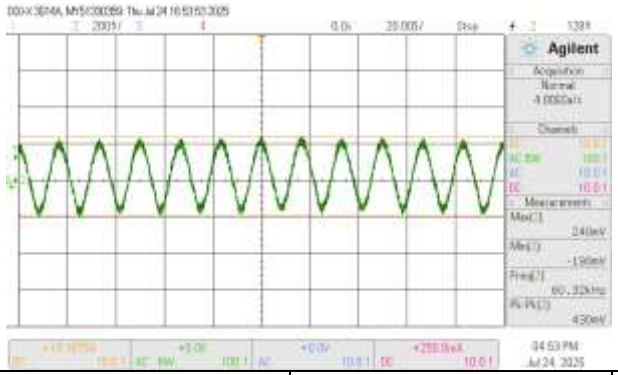
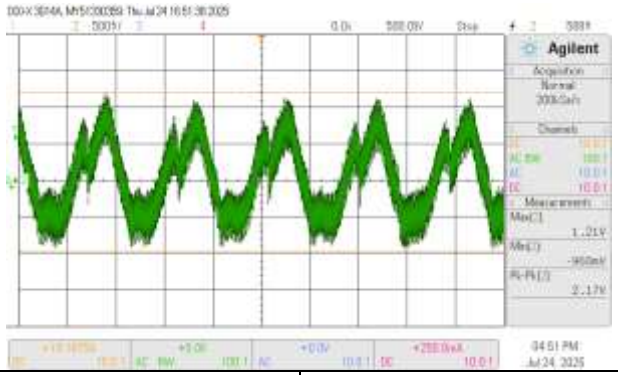
Safety Test
E.M.C. Test

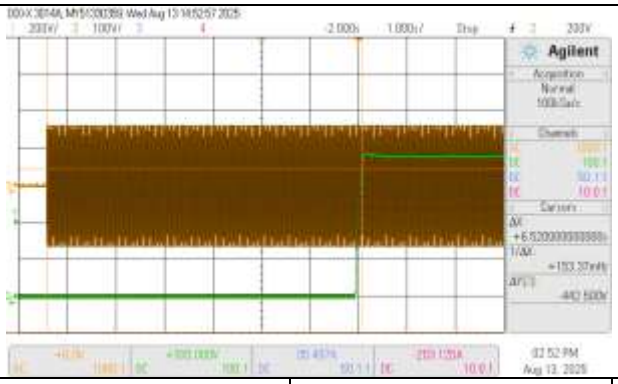
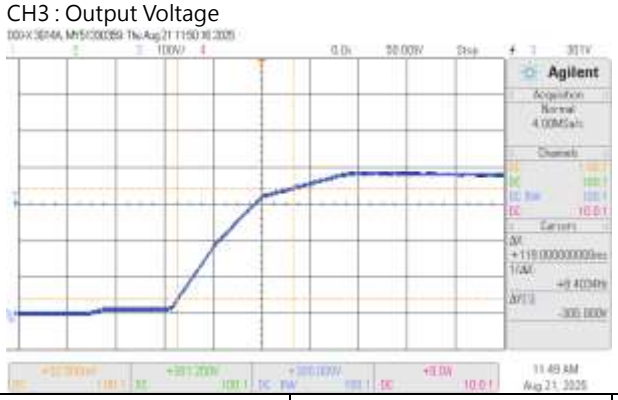
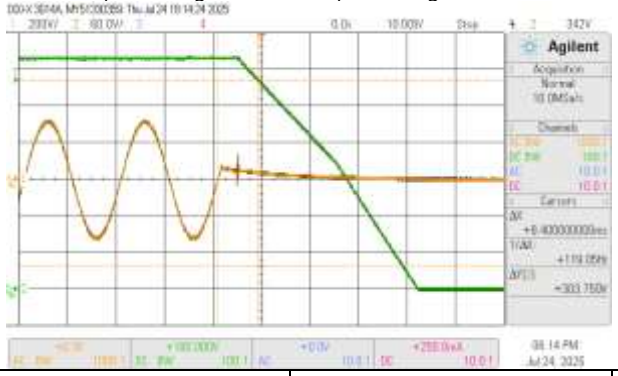
■ RELIABILITY TEST

ENVIRONMENT TEST

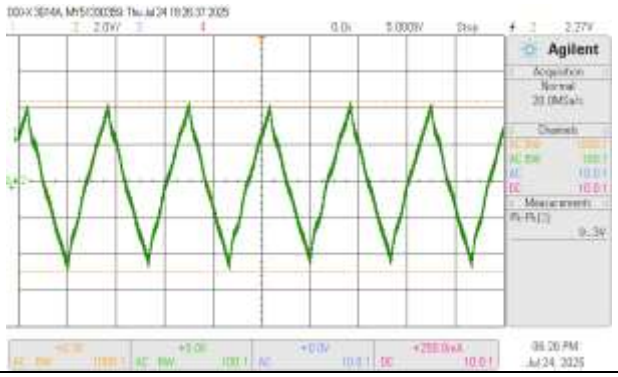
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST (AC to DC)

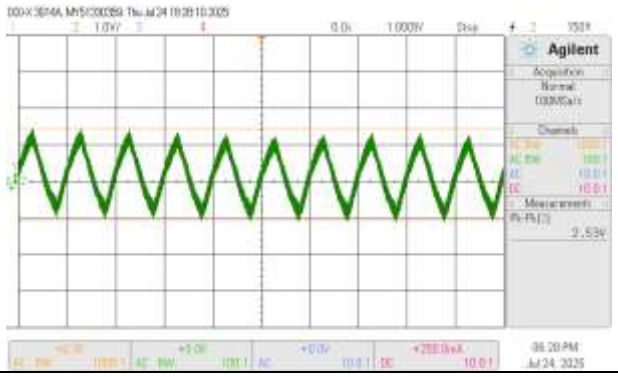
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 280 V~ 430V	I/P： 230 VAC I/P： 180 VAC O/P：MIN LOAD Ta：25℃	280.1V~429.2V / 230VAC 280.2V~429.2V / 180VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: 2% ~ 2%	I/P: 180VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1: 0% ~0%
3	LINE REGULATION	V1: 1%~ -1%	I/P: 200VAC~ 305VAC O/P:FULL LOAD Ta:25℃	V1: 0% ~ 0%
4	LOAD REGULATION	V1: 1%~ -1%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0%~ 0%
5	OVER/UNDERSHOOT TEST	<± 5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	3.4 % / 4.1%
6	RIPPLE & NOISE (Max)	V1: 2.8Vp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 2.17Vp-p
	high frequency：  		low frequency：  	
7	SET UP TIME(Max)	230VAC/8sec	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 6.52sec
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : Output Voltage CH1 : AC Input Voltage			

				
8	RISE TIME (Max)	230VAC/150ms	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	230VAC / 119ms
	INPUT=230VAC/50HZ @ FULL LOAD CH3 : Output Voltage 			
9	HOLD UP TIME (Typ.)	230VAC/--	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 8.4ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 			
10	DYNAMIC LOAD	V1: 38Vp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	 9.3 Vp-p 2.53Vp-p

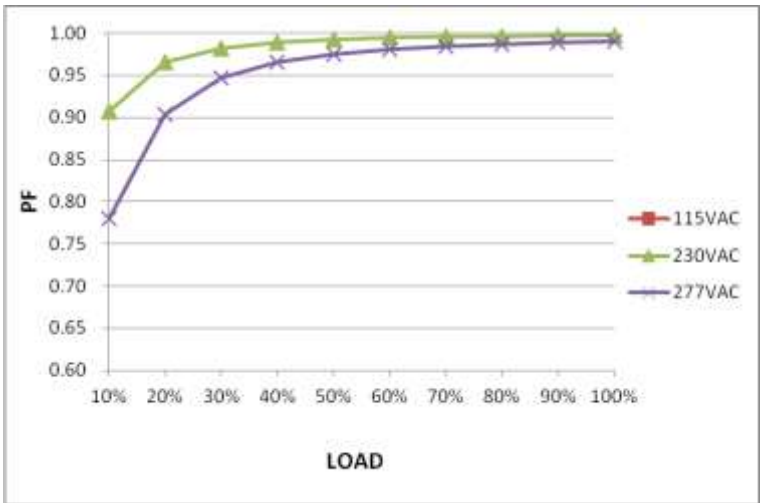
FULL /50% LOAD 50%DUTY / 120HZ

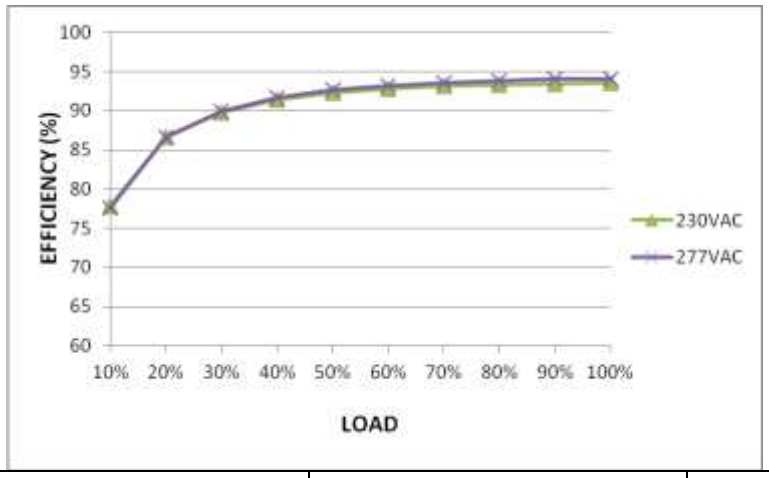
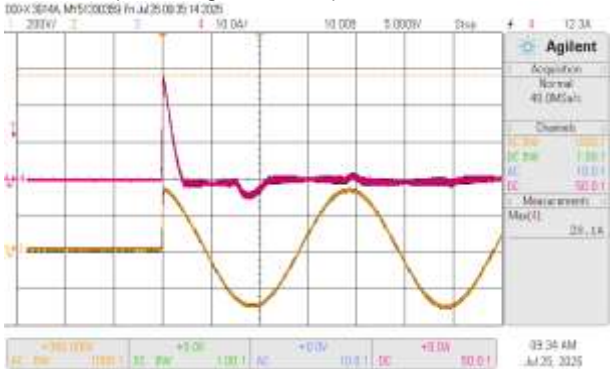
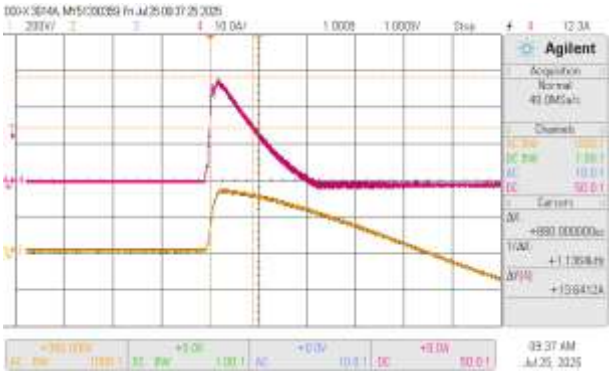


FULL /50% LOAD 50%DUTY / 1KHZ



INPUT FUNCTION TEST(AC to DC)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~305VAC	I/P : TESTING O/P : FULL LOAD Ta:25℃	166.9V~308V
			I/P : LOW-LINE-3V=177 V HIGH-LINE+10V=315V O/P : FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:PASS
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 180 VAC ~305 VAC O/P : FULL~MIN LOAD Ta:25℃	TEST: PASS
3	POWER FACTOR (Typ.)	0.99/ 230VAC	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	PF=0.9959
	P.F vs LOAD			
4	EFFICIENCY(Typ.)	93% @ 75% Load	I/P : 230 VAC O/P : 75% Load	93.4%

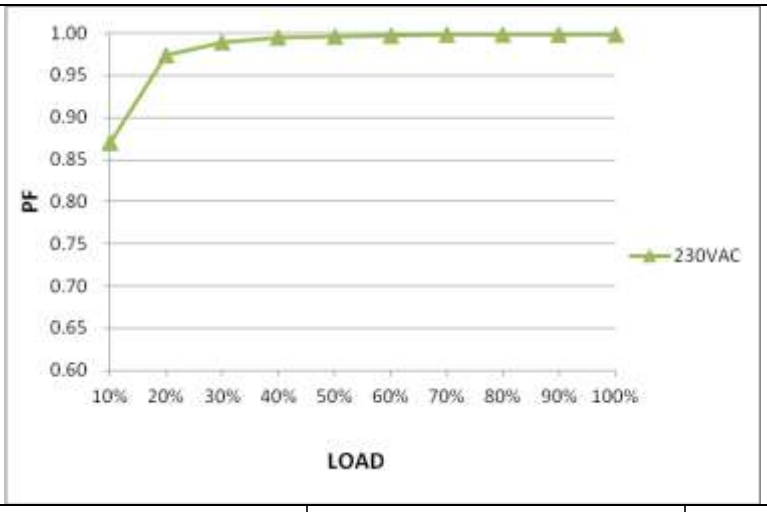
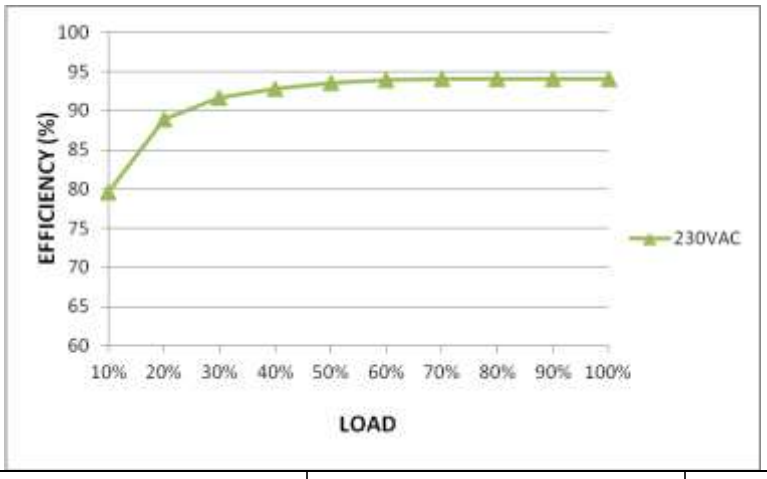
			Ta:25℃	
	EFFICIENCY vs LOAD 			
5	AC CURRENT (Typ.)	27A / 230V	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =23.38A
6	INRUSH CURRENT(Typ.)	120A/230V COLD START	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =28.1A T50=880us
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : AC Input Voltage CH4 : Input current  			
7	LEAKAGE CURRENT	< 7.07mA (Peak)/ 305VAC	I/P： 305 VAC / 60Hz O/P：Min LOAD Ta：25℃	L-FG： 6.62mA(Peak) N-FG： 6.62mA(Peak)
8	TOTAL HARMONIC DISTORTION	<3%(@load=100%/230VAC)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	THDi =2.117% @ Full Load

INPUT FUNCTION TEST(DC to AC)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED INPUT POWER	5500W	I/P： 380VDC O/P：FULL LOAD Ta：25℃	5387W
2	FULL POWER VOLTAGE RANGE	335VDC ~430VDC	I/P： Test O/P：FULL LOAD Ta：25℃	TEST：PASS 332VDC~430VDC
3	DC VOLTAGE RANGE	280VDC ~430VDC	I/P： Test O/P：FULL LOAD Ta：25℃	TEST： 281~430V
4	INPUT CURRENT (MAX.)	16.4A	I/P： 380VDC O/P：FULL LOAD Ta：25℃	14.90A

OUTPUT FUNCTION TEST(DC to AC)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED OUTPUT POWER	5000W	I/P : 380VDC O/P : TESTING Ta:25℃	5387W
2	VOLTAGE RANGE	180VAC~305VAC	I/P : 380VDC O/P : TESTING Ta:25℃	TEST：PASS 164.5VAC~308VAC
3	FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 380VDC O/P : FULL~MIN LOAD Ta:25℃	TEST：PASS
4	AC CURRENT (Typ.)	22.5A/ 230VAC	I/P：380VDC O/P：FULL LOAD Ta：25℃	22A
5	POWER FACTOR (Typ.)	0.99/ 230VAC	I/P：380VDC O/P：FULL LOAD Ta：25℃	PF=0.9985
	P.F vs LOAD			

				
6	EFFICIENCY(Typ.)	93.5%	I/P: 380VDC O/P: 75% LOAD Ta:25℃	93.9%
	EFFICIENCY vs LOAD			
7	TOTAL HARMONIC DISTORTION	<3% (@load=100%/230VAC)	I/P: 380VDC O/P:FULL LOAD Ta：25℃	THDi =2.32% @ Full Load

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 115% Constant current limiting, shut down DC O/P voltage 5 sec. after DC O/P voltage is down low, re-power on to recover	I/P: 305VAC I/P: 230VAC I/P: 200VAC I/P: 180VAC O/P:TESTING Ta:25℃	**AC to DC (BIC mode)** 111.0%/ 305VAC 111.0% / 230VAC 109.6% / 200VAC 89.10%/ 180VAC PROTECTION TYPE： Shut down O/P current, re-power on to recover

2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 180VAC O/P: FULL LOAD Ta:25℃	**AC to DC (BIC mode)** NO DAMAGE PROTECTION TYPE : Shut down O/P current, re-power on to recover **DC to AC(BIC mode) (AC short)** NO DAMAGE PROTECTION TYPE : Shut down O/P current, re-power on to recover **DC to AC(GRID mode) (AC short)** NO DAMAGE PROTECTION TYPE : Shut down O/P current, re-power on to recover
3	OVER VOLTAGE PROTECTION	435V~450V Protection type : Shut down O/P voltage, re-power on to recover	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:MIN LOAD Ta:25℃	**AC to DC(BIC mode)** 439.1V/ 305VAC 439.1.V/ 230VAC 439.1V/ 180VAC PROTECTION TYPE : Shut down O/P voltage, re-power on to recover
4	OVER TEMPERATURE PROTECTION	Protection type : Shut down O/P voltage, recovers automatically after temperature goes down	I/P: 305VAC I/P: 180VAC O/P:FULL LOAD	**AC to DC(BIC mode)** O.T.P. Active Protection type : Shut down O/P voltage, recovers automatically after temperature goes down **DC to AC(BIC mode)** O.T.P. Active Protection type : Shut down O/P voltage, recovers automatically after temperature goes down
5	ISLANDING PROTECTION	Shut down AC O/P voltage, re-power on to recover	(1)I/P: 430VDC O/P: FULL LOAD/ 230VAC (2)I/P: 335VDC O/P: 50% LOAD/ 230VAC (3)I/P: 282VDC O/P: 10% LOAD/ 230VAC Ta:25℃	**DC to AC(BIC mode) (AC open)** NO DAMAGE *Check VAC Out PROTECTION TYPE : Shut down O/P current, re-power on to recover **DC to AC (GRID mode)(AC open)** NO DAMAGE *Check VAC Out PROTECTION TYPE : Shut down O/P current, re-power on to recover

CONTROL FUNCTION TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>BIDIRECTION SWITCH TIME(Typ.)</td><td colspan="3">I/P: 230 VAC /380VDC
O/P:FULL LOAD
Ta:25℃
DC-Source(SHP-30K-380+bat)

<table>
<tr><th>MODE</th><th>BIDIRECTION SWITCH TIME</th><th>Result</th></tr>
<tr><td>AC to DC (BIC)</td><td>1ms</td><td>0.029ms</td></tr>
<tr><td>DC to AC (BIC)</td><td>1ms</td><td>0.34ms</td></tr>
</table></td></tr>
<tr><td>2</td><td>REMOTE ON/OFF CONTROL</td><td colspan="3">By electrical signal or dry contact Short: Power ON Open: Power OFF Please refer to the Function Manual infollowing

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃
Test Result：
<table>
<tr><th>MODE</th><th>Between ON/OFF and +5V-AUX</th><th>Power Supply Status</th></tr>
<tr><td rowspan="2">AC to DC (BIC)</td><td>SW SHORT</td><td>ON</td></tr>
<tr><td>SW OPEN</td><td>OFF</td></tr>
<tr><td rowspan="2">DC to AC (BIC)</td><td>SW SHORT</td><td>ON</td></tr>
<tr><td>SW OPEN</td><td>OFF</td></tr>
<tr><td rowspan="2">AC to DC (CHG)</td><td>SW SHORT</td><td>ON</td></tr>
<tr><td>SW OPEN</td><td>OFF</td></tr>
<tr><td rowspan="2">DC to AC (GRID)</td><td>SW SHORT</td><td>ON</td></tr>
<tr><td>SW OPEN</td><td>OFF</td></tr>
</table></td></tr>
<tr><td>3</td><td>ALARM SIGNAL</td><td colspan="3">1. DC OK SIGNAL
High (4.5 ~ 5.5V) : When the Vout ≦ 80%±5%.
Low (-0.5 ~ 0.5V) : When Vout ≧ 80%±5%.
The maximum sourcing current is 4mA and only for output.
I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃
Test Result
<table>
<tr><th>Spec.</th><th>Transition point</th><th>Spec.</th><th>DC OK SIGNAL</th></tr>
<tr><td>Vout ≦ 75%~85%</td><td>77.1%</td><td>High (4.5 ~ 5.5V)</td><td>5.122V</td></tr>
<tr><td>Vout ≧ 75%~85%</td><td>79.7%</td><td>Low (-0.5 ~ 0.5V)</td><td>0V</td></tr>
</table>
2. T-ALARM
High (4.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when Fan fails.
Low (-0.1 ~ 0.5V) : When the internal temperature is normal, and when Fan works normally.
The maximum sourcing current is 4mA and only for output

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃
Test Result：</td></tr>
</table>

P.SU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST
NORMAL	100%±2%	-0.5 ~0.5V	0V
OTP	0V	4.5~5.5V	5.118V
FAN LOCK	0V	4.5~5.5V	5.118V

3. Fault

High (4.5 ~ 5.5V) : When the Vac≦165Vrms,OLP, SCP,OTP,OVP,AC Fail,fan lock,islanding protection.
Low (-0.5 ~ 0.5V) : When Vac≧175Vrms and when power supply work normally.
The maximum sourcing current is 4mA and only for output. (Note.1)

Ta:25℃

Test Result：

Spec.	Spec.	Fault Signal
VAC ≦165Vrms	High (4.5 ~ 5.5V)	5.123V
OLP		5.121V
SCP		5.121V
OTP		5.121V
OVP		5.121V
AC Fail		5.123V
Fan lock		5.121V
Islanding protection		5.121V
Work normal	-0.5 ~0.5V	0V

4	CURRENT SHARING	CURRENT SHARING TOLERANCE < ±10%	I/P： 230 VAC O/P：95%/50% LOAD Ta：25℃	O/P：95% PSU1： 12.97A PSU2： 13.26A PSU3： 12.70A PSU4： 13.44A PSU5： 13.31A PSU6： 12.91A O/P：50% PSU1： 6.77A PSU2： 7.06A PSU3： 6.81A PSU4： 7.07A PSU5： 6.95A PSU6： 6.82A
5	FAN SPEED CONTROL	10% load 43dB 70% load 44dB with Ta=25℃	I/P: 230VAC O/P:TESTING Load Ta:25℃	42.72dB @10%Load 42.72dB@70%Load
6	C/D Control	High (4.5 ~5.5V) : Battery Charging mode Low (0 ~0.5V) : Battery Discharging mode I/P: 230 VAC O/P:FULL LOAD/ 382V Ta:25℃ Test Result：		

MODE	Between ON/OFF and +5V-AUX	Status
AC to DC (Battery mode)	SW SHORT	Charging
	SW OPEN	Discharging

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	DC TO DC Power Transistor (D to S) or (C to E) **Peak Voltage**	Q914 Rated : 650V 103 A@TC=25℃ 75 A@TC=100℃ VGS :+ 23V/-7V	**AC to DC** I/P:High-Line +3V =308V / 63Hz AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. **DC to AC** I/P : High line (430Vdc) O/P : 308VAC / 63HZ VDS: (1) Full Load (2) +100%Io/1S~-100%Io/1S (3)-100%Io AC Off I/P : Low line (335Vdc) O/P : 197VAC / 47HZ VDS: (1) Full Load (2) +100%Io/1S~-100%Io/1S (3)-100%Io AC Off Ta:25℃	 (1)438V/23.3A (2)441V/62.5A (3)441V/23.7A (4)437V/23.3A (5)437V/24.1A (6)441V/23.3A (7)513V/60.3A (1)481V/21.7A (2)445V/29.0A (3)481V/14.5A (1)380V/16.1A (2)384V/26.6A (3)380V/16.5A
2	P.F.C Transistor (D to S) or (C to E) **Peak Voltage**	Q3 : Rated: 650 V 80A@TC=25℃ 80A@TC=100℃ VGE :±20V	**AC to DC** I/P:High-Line +3V =308V / 63Hz AC ON/OFF VCE: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/	 (1)513V/31.7A (2)577V/37.7A (3)509V/31.7A (4)509V/30.1A (5)509V/29.2A (6)497V/30.9A

			Min. Load 50%Duty/120Hz (7)0%→400% Load. **DC to AC** I/P : High line (430Vdc) O/P : 308VAC / 63HZ VCE: (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off I/P : Low line (335Vdc) O/P : 197VAC / 47HZ VCE: (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off Ta:25℃	(7)545V/41.7A (1)573V/41.7A (2)593V/50.2A (3)589V/61.8A (1)561V/38.5A (2)549V/38.1A (3)589V/44.9A	
3	BUCK MOS	Q 901、Q905 Rated：650V 80 A@TC=25℃ 56 A@TC=100℃ VGE :±20V	**AC to DC** I/P:High-Line +3V =308V / 63Hz AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. **DC to AC** I/P : High line (430Vdc) O/P : 308VAC / 63HZ (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off I/P : Low line (335Vdc) O/P : 197VAC / 47HZ (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off Ta:25℃	Q901 (1)606V/14.4A (2)606V/14.2A (3)610V/14.0A (4)602V/14.2A (5)610V/14.2A (6)618V/14.2A (7)602V/14.2A (1)525V/10.0A (2)565V/12.1A (3)521V/8.0A (1)501V/10.4A (2)585V/14.5A (3)521V/10.2A	Q905 (1)501V/37.3A (2)589V/40.9A (3)489V/41.7A (4)497V/41.3A (5)497V/40.5A (6)493V/40.1A (7)569V/28.8A (1)557V/23.5A (2)593V/32.1A (3)553V/22.9A (1)569V/26.5A (2)513V/42.6A (3)597V/24.9A
4	SR MOS	Q120 : Rated：650V 103A(TC=25℃) 75A(TC=100℃)	**AC to DC** I/P : 308V / 63Hz VO: SPEC MAX AC ON/OFF		

		VGS :+ 23V/-7V	O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD VO: standard O/P: (1)Full Load **DC to AC** I/P : High line (430Vdc) O/P : 308VAC / 63HZ VDS: (1)Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off I/P : Low line (335Vdc) O/P : 197VAC / 47HZ VDS: (1)Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off Ta:25℃	(1)437V (2)437V (3)437V (4)437V (5)437V (6)445V (7)437V (8)437V (1)388V (1)437V (2)388V (3)437V (1)348V (2)348V (3)344V
5	**DC BUS Capacitor Voltage**	C5 : Rated：470u / 550V Surge voltage：600 V	**AC to DC** I/P:High-Line +3V =308V / 63Hz O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue **DC to AC** I/P : High line (430Vdc) O/P : 308VAC / 63HZ (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off I/P : Low line (335Vdc) O/P : 197VAC / 47HZ (1) Full Load (2) +100%Io/1S~-100%Io/1S (3) -100%Io AC Off Ta:25℃	 (1)497V (2)489V (3)517V (4)497V (1)525V (2)533V (3)529V (1)509V (2)513V (3)529V

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 6 K VDC/min I/P-FG : 4 K VDC/min O/P-FG: 4 KVDC/min	I/P-O/P: 6.6 KVDC/min I/P-FG: 4.4 KVDC/min O/P-FG: 4.4 KVDC/min Ta:25℃	I/P-O/P: 0.002 mA I/P-FG: 0.002 mA O/P-FG: 0.002 m A
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>100MΩ O/P-FG: 500 VDC>100MΩ I/P-FG: 500 VDC >100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-O/P: 7.53 GΩ I/P-FG: 4.93 GΩ O/P-FG: 10.24 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	50A / 2min Ta:25℃	16 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-12 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS
2	CONDUCTION	EN55032 CLASS A	I/P： 230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P： 230 VAC (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： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT： 2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
6	SURGE	IEC61000-6-2 INDUSTRY L-N ：2KV L,N-PE：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL： BIC-5K-380 **AC to DC Direction:** 1. ROOM AMBIENT BURN-IN：2 HRS I/P： 230VAC O/P： FULL LOAD Ta= 25 ℃ 2. HIGH AMBIENT BURN-IN： 22.5HRS I/P： 230VAC O/P： FULL LOAD Ta= 40 ℃ **DC to AC Direction:** 1. ROOM AMBIENT BURN-IN：2 HRS I/P： 24VDC O/P： FULL LOAD Ta= 25 ℃ 2. HIGH AMBIENT BURN-IN： 2 HRS I/P： 24VDC O/P： FULL LOAD Ta= 40 ℃		

			NO	Position	AC to DC Direction:		DC to AC Direction:	
					ROOM AMBIENT Ta= 25℃	HIGH AMBIENT Ta= 40 ℃	ROOM AMBIENT Ta= 25℃	HIGH AMBIENT Ta= 40 ℃
			1	L901	53.1℃	60.4℃	58.4℃	61.2℃
			2	L902	48.2℃	57.4℃	51.8℃	57.3℃
			3	L11	59.0℃	64.3℃	57.4℃	60.5℃
			4	C6	49.5℃	57.7℃	52.2℃	57.2℃
			5	Q902	95.0℃	97.4℃	105.1℃	100.3℃
			6	Q905	92.6℃	95.1℃	102.8℃	97.9℃
			7	Q3	85.7℃	87.0℃	86.1℃	82.0℃
			8	Q7	88.6℃	90.6℃	87.0℃	83.4℃
			9	Q2	81.2℃	83.6℃	81.3℃	78.0℃
			10	Q6	88.6℃	90.5℃	86.5℃	83.0℃
			11	Q917	38.9℃	45.8℃	39.6℃	49.1℃
			12	Q918	38.9℃	50.1℃	39.7℃	49.1℃
			13	Q701	48.9℃	57.2℃	52.4℃	57.6℃
			14	T701	51.6℃	59.0℃	53.0℃	57.1℃
			15	T1-Wire	63.3℃	72.5℃	63.9℃	69.2℃
			16	T1-core	57.4℃	64.9℃	58.4℃	62.8℃
			17	Q122	47.1℃	54.7℃	47.0℃	51.6℃
			18	Q123	47.9℃	55.6℃	47.8℃	52.5℃
			19	Q130	47.5℃	54.9℃	47.3℃	51.8℃
			20	Q131	47.6℃	55.1℃	47.0℃	51.8℃
			21	C103	47.4℃	55.0℃	46.5℃	51.2℃
			22	C105	44.6℃	53.2℃	44.7℃	50.6℃
			23	C107	46.2℃	54.4℃	46.4℃	51.6℃
			24	LF1	63.2℃	71.3℃	60.6℃	67.1℃
			25	D311	46.5℃	54.9℃	47.7℃	53.8℃
			26	RG74	58.5℃	68.1℃	61.3℃	69.1℃
			27	C711	50.7℃	57.5℃	50.0℃	53.8℃
			28	RTH1(Q905)	80.0℃	83.1℃	92.8℃	88.6℃
			29	RTH2(IGBT)	79.1℃	81.5℃	77.8℃	75.1℃
			30	RTH3(T1)	49.8℃	58.7℃	45.3℃	53.6℃
			31	RTH4(DD)	45.8℃	53.5℃	45.8℃	50.5℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230 VAC O/P： 110% LOAD Ta：25℃	TEST：OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P： 305VAC/180VAC O/P： 100 %/80%LOAD Ta= -32℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 ℃/95 %R.H NO DAMAGE	I/P： 315 VAC O/P：FULL LOAD Ta= 40 ℃ HUMIDITY= 95 %R.H	TEST：OK

5	TEMPERATURE COEFFICIENT	± 0.03%/℃(0~40℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.008%/℃(0~40℃)
6	STORAGE TEMPERATURE TEST	-40℃~85℃	1. Thermal shock Temperature： -45℃~ +90℃ 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： STATIC	
7	THERMAL SHOCK TEST	-30℃~40℃	1. Thermal shock Temperature： -32℃~ +45℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：16 CYCLE 5. Input/Output condition： 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	
8	VIBRATION TEST	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：10min/sweep cycle (4) Acceleration：4G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃	
9	CAPACITOR LIFE CYCLE	SUPPOSE C103 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta= 40 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 40℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta= 40 ℃ LIFE TIME		(1) 802741HRS (2) 474016HRS (3) 498207HRS (4) 502122HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 209.4K hrs min. Telcordia SR-332 (Bellcore) ; 17.8K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=40℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	ERIS WU

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