



Test Report: BIC-2200-12

AC<->DC Bidirectional Power Supply with Energy Recycle Function

■ DESIGN VERIFY TEST

Output Function Test (AC to DC Direction)

Input Function Test(AC to DC Direction)

Output Function Test (DC to AC Direction)

Input Function Test(DC to AC Direction)

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

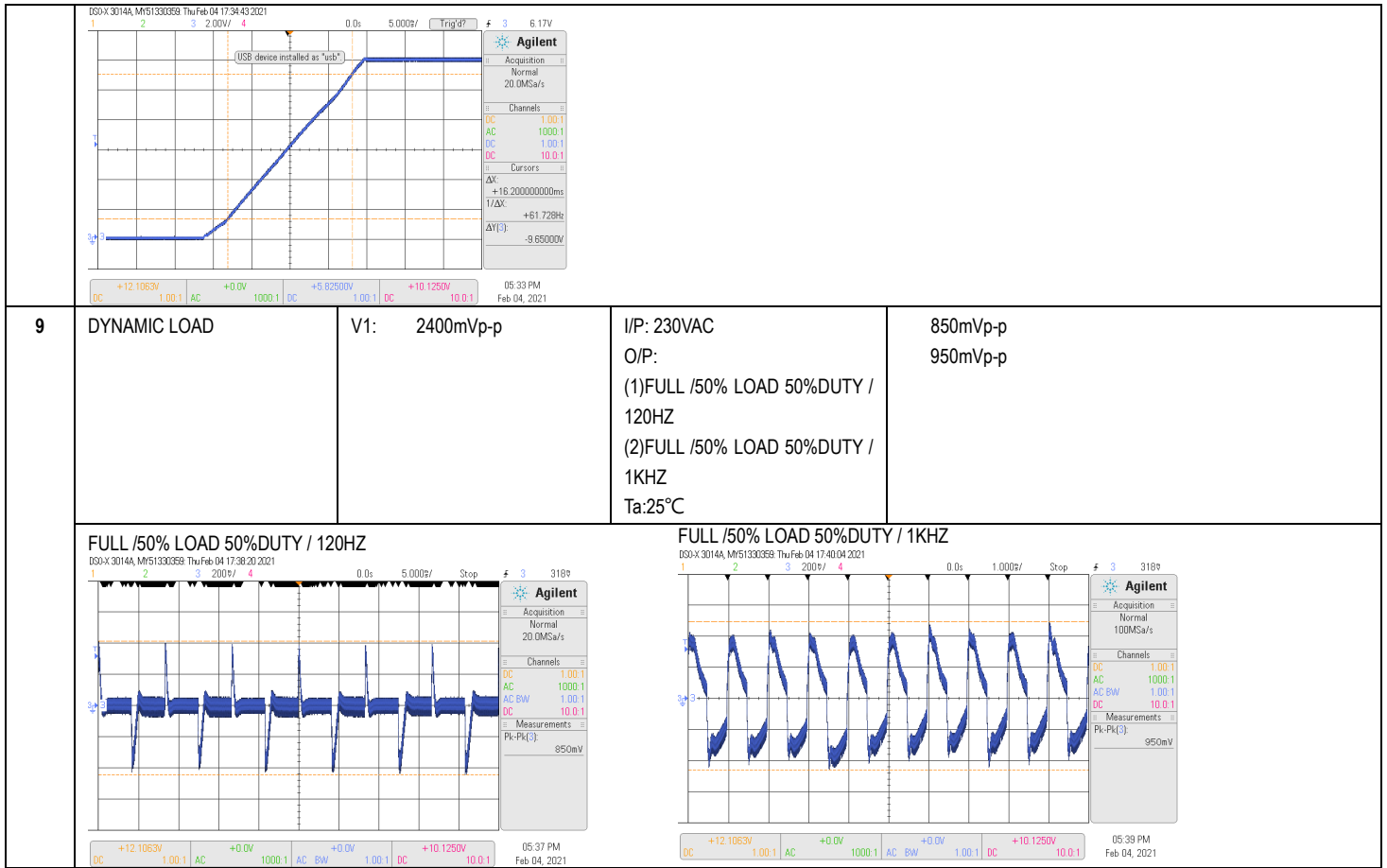
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 10 V~ 15 V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	9.735V~15.583V/230VAC
2	VOLTAGE TOLERANCE (Max)	1%~ -1 %	I/P: 180VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	0.58%~ -0.43 %
3	LINE REGULATION (Max)	0.5 %~ -0.5 %	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	0.33%~ - 0.33%
4	LOAD REGULATION(Max)	0.5%~ -0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	0.06%~ - 0.066%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<10%
6	RIPPLE & NOISE(Max)	160mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	141mVp-p
<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>high frequency :</p> </div> <div style="width: 45%;"> <p>low frequency :</p> </div> </div>				
7	SET UP TIME(Max)	230VAC/1800ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 916ms
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>				
8	RISE TIME (Max)	230VAC/60ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 16.2ms
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>				



9	DYNAMIC LOAD	V1: 2400mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	850mVp-p 950mVp-p
	<p>FULL /50% LOAD 50%DUTY / 120HZ</p> <p>FULL /50% LOAD 50%DUTY / 1KHZ</p>			

INPUT FUNCTION TEST(AC to DC Direction)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264VAC	I/P: TESTING O/P: FULL LOAD Ta:25°C	(1) 162V~272V
			I/P: LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P: FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 180VAC ~264 VAC O/P: FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 11A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =10.9A/ 230VAC
4	LEAKAGE CURRENT	< 2mA / 230 VAC	I/P : 230 VAC O/P : Min LOAD Ta : 25°C	L-FG : 1.2 mA N-FG : 1.2 mA
5	POWER FACTOR (Typ.)	0.98/ 230VAC	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF=0.9938/230VAC

	<p>P.F vs LOAD</p> <table border="1"> <caption>PF vs LOAD Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>180VAC PF</th> <th>230VAC PF</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.88</td><td>0.82</td></tr> <tr><td>20%</td><td>0.96</td><td>0.93</td></tr> <tr><td>30%</td><td>0.98</td><td>0.96</td></tr> <tr><td>40%</td><td>0.99</td><td>0.97</td></tr> <tr><td>50%</td><td>0.995</td><td>0.98</td></tr> <tr><td>60%</td><td>0.998</td><td>0.985</td></tr> <tr><td>70%</td><td>0.999</td><td>0.99</td></tr> <tr><td>80%</td><td>1.00</td><td>0.995</td></tr> <tr><td>90%</td><td>1.00</td><td>0.998</td></tr> <tr><td>100%</td><td>1.00</td><td>1.00</td></tr> </tbody> </table>			LOAD (%)	180VAC PF	230VAC PF	10%	0.88	0.82	20%	0.96	0.93	30%	0.98	0.96	40%	0.99	0.97	50%	0.995	0.98	60%	0.998	0.985	70%	0.999	0.99	80%	1.00	0.995	90%	1.00	0.998	100%	1.00	1.00	
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6	<p>EFFICIENCY(Typ.)</p>	<p>90%</p>	<p>I/P:230 VAC O/P:75% LOAD Ta:25°C</p>	<p>90.95%</p>																																	
	<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs LOAD Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>180VAC Efficiency (%)</th> <th>230VAC Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>84</td><td>85</td></tr> <tr><td>20%</td><td>90</td><td>91</td></tr> <tr><td>30%</td><td>92</td><td>93</td></tr> <tr><td>40%</td><td>92.5</td><td>93.5</td></tr> <tr><td>50%</td><td>92</td><td>93</td></tr> <tr><td>60%</td><td>91.5</td><td>92.5</td></tr> <tr><td>70%</td><td>91</td><td>92</td></tr> <tr><td>80%</td><td>90.5</td><td>91.5</td></tr> <tr><td>90%</td><td>89.5</td><td>90.5</td></tr> <tr><td>100%</td><td>88.5</td><td>89.5</td></tr> </tbody> </table>				LOAD (%)	180VAC Efficiency (%)	230VAC Efficiency (%)	10%	84	85	20%	90	91	30%	92	93	40%	92.5	93.5	50%	92	93	60%	91.5	92.5	70%	91	92	80%	90.5	91.5	90%	89.5	90.5	100%	88.5	89.5
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7	<p>INRUSH CURRENT(Typ.)</p>	<p>230V/35A COLD START</p>	<p>I/P : 230 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>I=29.7A/ 230VAC T50= 1800us/230V</p>																																	
	<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current</p>																																				
8	<p>TOTAL HARMONIC DISTORTION</p>	<p><3%</p>	<p>I/P : 230 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>THD = 1.8%</p>																																	

OUTPUT FUNCTION TEST(DC to AC Direction)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT POWER (Typ.) (@240V/60HZ)	1685W	I/P:12VDC O/P: FULL LOAD Ta:25°C	1633W
2	VOLTAGE RANGE	180VAC~264VAC	I/P:12VDC O/P: TESTING Ta:25°C	158VAC~270VAC
3	FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:12VDC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
4	AC CURRENT (Typ.)	230VAC/ 7.5A	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	I =6.67A/ 230VAC
5	POWER FACTOR (Typ.)	0.99/ 230VAC	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	PF=0.9949/230VAC
6	EFFICIENCY(Typ.)	90.5%	I/P: 12VDC O/P:75%LOAD Ta:25°C	91.83%
7	TOTAL HARMONIC DISTORTION	<3%	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	THD = 2.7%/

INPUT FUNCTION TEST(DC to AC Direction)

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED INPUT POWER	1800W	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	1833W
2	DC VOLTAGE RANGE	10VDC ~15VDC	I/P : TESTING VDC O/P : FULL LOAD AUTO DERATING Ta : 25°C	10VDC/151.8A 12VDC/151.8A 15VDC/121.56A/ AUTO DERATING
3	MAX INPUT CURRENT	150A	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	V1: 151.8A

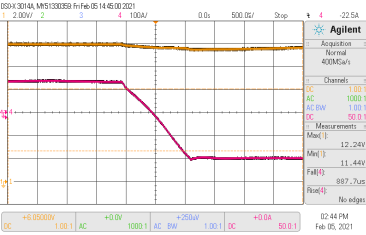
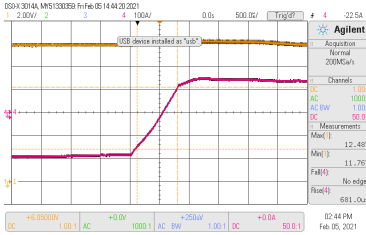
PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 115 % AC to DC Direction: Constant current limiting, shut down DC O/P voltage 5 sec. after DC O/P voltage is down low, re-power on to recover DC to AC Direction: Not accurate with constant power design	AC to DC Direction I/P: 264VAC I/P: 230VAC I/P: 180VAC DC to AC Direction I/P: 10VDC I/P: 12VDC I/P: 15VDC O/P:FULL LOAD Ta:25°C	AC to DC Direction 110.9%/ 264VAC 110.9%/ 230VAC 110.9%/180VAC PROTECTION TYPE : Constant current limiting, shut down DC O/P voltage 5 sec. after DC O/P voltage is down low, re-power on to recover

				DC to AC Direction: 10VDC/151.8A 12VDC/151.8A 15VDC/121.56A/ AUTO DERATING PROTECTION TYPE : Not accurate with constant power design
2	OVER VOLTAGE PROTECTION	17.6V~20.8V Protection type : Shut down o/p voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 180VAC O/P:MIN LOAD Ta:25°C	18.1V/ 264VAC 18.1V/ 230VAC 18.1V/ 180VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down o/p voltage, recovers automatically after temperature goes down	AC to DC Direction I/P: 264VAC I/P: 180VAC DC to AC Direction I/P: 10VDC I/P: 15VDC O/P:FULL LOAD Ta:25°C	AC to DC Direction O.T.P. Active Protection type : Shut down o/p voltage, recovers automatically after temperature goes down DC to AC Direction O.T.P. Active Protection type : Shut down o/p voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	AC to DC Direction I/P: 264VAC I/P: 180VAC DC to AC Direction I/P: 10VDC I/P: 15VDC O/P:FULL LOAD Ta:25°C	AC to DC Direction NO DAMAGE PROTECTION TYPE : Shut down o/p voltage, re-power on to recover DC to AC Direction NO DAMAGE PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
5	ISLANDING PROTECTION	NO DAMAGE PROTECTION TYPE : Shut down o/p voltage, re-power on to recover	IEC62116 I/P: 14.5VDC O/P: FULL LOAD I/P: 12.5VDC O/P: 50% LOAD I/P: 10.5VDC O/P: 10% LOAD Ta:25°C	DC to AC Direction NO DAMAGE PROTECTION TYPE : Shut down o/p voltage, re-power on to recover

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
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1	AUXILIARY POWER (AUX)	<p>Auxiliary voltage output, 11.4~12.6V, referenced to GND-AUX (pin 2,4). The maximum output current is 0.5A. This output is not controlled by the Remote ON/OFF control.</p> <p>I/P: 230 VAC /12VDC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="507 479 1129 645"> <thead> <tr> <th></th> <th>TOLERANCE</th> <th>RIPPLE</th> </tr> </thead> <tbody> <tr> <td>SPEC</td> <td>11.4~12.6 V</td> <td>150mVp-p</td> </tr> <tr> <td>TEST RESULT</td> <td>11.7V</td> <td>35mV</td> </tr> </tbody> </table>		TOLERANCE	RIPPLE	SPEC	11.4~12.6 V	150mVp-p	TEST RESULT	11.7V	35mV				
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SPEC	11.4~12.6 V	150mVp-p													
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2	REMOTE ON/OFF CONTROL	<p>I/P: 230 VAC /12VDC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="507 788 1327 1016"> <thead> <tr> <th>MODE</th> <th>electrical signal or dry contact between Remote ON/OFF and +12V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td rowspan="2">AC to DC Direction</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 Direction</td> <td>SW SHORT</td> <td>ON</td> </tr> <tr> <td>SW OPEN</td> <td>OFF</td> </tr> </tbody> </table>	MODE	electrical signal or dry contact between Remote ON/OFF and +12V-AUX	Power Supply Status	AC to DC Direction	SW SHORT	ON	SW OPEN	OFF	DC to AC Direction	SW SHORT	ON	SW OPEN	OFF
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AC to DC Direction	SW SHORT	ON													
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3	BIDIRECTION SWITCH TIME(DEFAULT)	<p>I/P: 230 VAC /12VDC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="507 1178 1327 1285"> <thead> <tr> <th>MODE</th> <th>BIDIRECTION SWITCH TIME</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>AC to DC Direction</td> <td>1ms</td> <td><u>888 us</u></td> </tr> <tr> <td>DC to AC Direction</td> <td>1ms</td> <td><u>681 us</u></td> </tr> </tbody> </table> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>	MODE	BIDIRECTION SWITCH TIME	Result	AC to DC Direction	1ms	<u>888 us</u>	DC to AC Direction	1ms	<u>681 us</u>				
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4	ALARM SIGNAL	<p>1. DC OK SIGNAL</p> <p>High (4.5 ~ 5.5V) : When the $V_{out} \leq 80\% \pm 5\%$.</p> <p>Low (-0.5 ~ 0.5V) : When the $V_{out} \geq 80\% \pm 5\%$.</p> <p>The maximum sourcing current is 4mA and only for output.</p> <p>I/P: 230 VAC/12VDC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="625 1796 1340 1883"> <thead> <tr> <th>MODE</th> <th>Vout</th> <th>DC OK SIGNAL</th> </tr> </thead> <tbody> <tr> <td rowspan="2">AC to DC Direction</td> <td>$V_{out} \leq 75\%$</td> <td>5.006V</td> </tr> <tr> <td>$V_{out} \geq 85\%$</td> <td>-0.004V</td> </tr> </tbody> </table>	MODE	Vout	DC OK SIGNAL	AC to DC Direction	$V_{out} \leq 75\%$	5.006V	$V_{out} \geq 85\%$	-0.004V					
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AC to DC Direction	$V_{out} \leq 75\%$	5.006V													
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		<p>2. T-ALARM High (4.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when fan fails. Low (-0.5 ~ 0.5V) : When the internal temperature is normal, and when fan works normally. The maximum sourcing current is 4mA and only for output.</p> <p>I/P: 230 VAC/12VDC O/P:FULL LOAD Ta:25°C Test Result :</p> <table border="1" data-bbox="560 521 1513 633"> <thead> <tr> <th>MODE</th> <th>P.SU STATUS</th> <th>Vo</th> <th>T-ALARM SPEC</th> <th>T-ALARM TEST</th> </tr> </thead> <tbody> <tr> <td rowspan="3">AC to DC Direction</td> <td>NORMAL</td> <td>100%±2%</td> <td>-0.5~0.5V</td> <td>-0.004V</td> </tr> <tr> <td>OTP</td> <td>0V</td> <td>4.5~5.5V</td> <td>4.95V</td> </tr> <tr> <td>FAN LOCK</td> <td>0V</td> <td>4.5~5.5V</td> <td>4.95V</td> </tr> </tbody> </table>	MODE	P.SU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST	AC to DC Direction	NORMAL	100%±2%	-0.5~0.5V	-0.004V	OTP	0V	4.5~5.5V	4.95V	FAN LOCK	0V	4.5~5.5V	4.95V		
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	FAN LOCK	0V	4.5~5.5V	4.95V																		
5	CURRENT SHARING	CURRENT SHARING TOLERANCE $\pm 10\%$	I/P : 230 VAC O/P : 90/50% LOAD Ta : 25°C	AC to DC Direction O/P : 90% PSU1 : 163.78A PSU2 : 163.51A PSU3 : 160 A PSU4 : 163.69A PSU5 : 160.88A O/P : 50% PSU1 : 90.81 A PSU2 : 90.96A PSU3 : 88.45A PSU4 : 91.14 A PSU5 : 89.78 A	DC to AC Direction O/P : 100% PSU1 : 151.6A PSU2 : 148.4A PSU3 : 149.8A PSU4 : 148.4A PSU5 : 147.6A O/P : 50% PSU1 : 76.6 A PSU2 : 75A PSU3 : 74.2A PSU4 : 76.8 A PSU5 : 74 A																	
6	BATTERY MODE RATED CURRENT(CAN BUS model only)	AC to DC Direction:160A DC to AC Direction:120A Can be adjusted by communication	AC to DC Direction I/P: 230VAC DC to AC Direction I/P: 12VDC O/P:FULL LOAD Ta:25°C	AC to DC Direction: 160.72A/230VAC DC to AC Direction 119.25A/12VDC																		

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	AC to DC Direction & DC to AC Direction Q903 Rated: 36A/ 600V VGS :± 20V	AC ON/OFF AC to DC Direction I/P:High-Line +3V =267V VDS: O/P: (1)Full Load (2)Output Short (3)0%→400% Load. I/P:Low-Line -3V = 177V O/P: (1)Full Load (2)Output Short (3)0%→400% Load.	AC to DC Direction I/P:High-Line +3V =267V Q903 VDS: (1) 419V/20.38A (2) 408V/ 15.21A (3) 403V/16.05 A I/P:Low-Line -3V = 177V Q903 VDS: (1) 406V/ 19.98A (2) 398V/ 14.85A (3) 402V/ 16.03A

			<p>DC to AC Direction I/P: 15VDC VDS: O/P: (1)Full Load (2)+100%Io/1S~-100%Io/1S (3)-100%Io AC Off</p> <p>I/P: 10VDC O/P: (1)Full Load (2)+100%Io~-100%Io (3)-100%Io AC Off Ta:25°C</p>	<p>DC to AC Direction I/P: 15VDC Q903 VDS: (1) 423 V/5.32A (2) 431 V/6.91A (3) 510 V/6.29A</p> <p>I/P: 10VDC Q903 VDS: (1) 424V/ 5.34A (2) 435V/6.57A (3) 510V/6.37A</p>	
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	<p>AC to DC Direction Q2 Rated: 53A/ 650V VGS :± 25V</p> <p>Q4 Rated: 52A/ 600V VGS :± 25V</p>	<p>I/P:High-Line +3V =267 V AC ON/OFF (1)Full Load (2)Output Short (3)0%→400% Load.</p> <p>I/P:Low-Line -3V = 177V AC ON/OFF O/P:(1)Full Load (2)Output Short (3)0%→400% Load.</p> <p>Ta:25°C</p>	<p>I/P:High-Line +3V =267V Q2 VDS: (1) 469V/21.8A (2) 423V/10.9A (3) 418V/9.56A</p> <p>Q4 VDS: (1) 411V/18.5A (2) 412V/10.29A (3) 412V/11.28A</p> <p>I/P:Low-Line -3V = 177V Q2 VDS: (1) 429V/13.61A (2) 413V/9.5A (3) 417V/15.58A</p> <p>Q4 VDS: (1) 441V/15.65A (2) 441V/13.98A (3) 417V/13.81A</p>	
3	Diode Peak Voltage	<p>AC to DC Direction & DC to AC Direction</p> <p>Q950 Rated : 225A/60V VGS :±20V</p> <p>Q951 Rated : 225A/60V VGS :±20V</p> <p>Q958 Rated : 225A/ 60V VGS :±20V</p> <p>Q959 Rated : 225A/60V VGS :±20V</p> <p>AC to DC Direction only</p> <p>Q74 Rated :225A/60V VGS :±20V</p>	<p>AC to DC Direction AC ON/OFF I/P:High-Line +3V =267 V <u>VO=SPEC VR MAX</u> O/P: (1)Full Load (2)Output Short (3)0%→400% Load.</p> <p><u>VO=RATED VOLTAGE</u> O/P: (1)Full Load</p> <p>DC to AC Direction I/P:15VDC <u>VO=SPEC VR MAX</u> O/P: (1)Full Load (2)+100%Io/1S~-100%Io/1S (3)-100%Io AC Off</p> <p><u>VO=RATED VOLTAGE</u> O/P: (1)Full Load</p> <p>Ta:25°C</p>	<p>AC to DC Direction Q950: <u>VO=SPEC VR MAX</u> VDS: (1) 23.3V (2) 22.67V (3) 22.71V</p> <p><u>VO=RATED VOLTAGE</u> (1) 22.85V</p> <p>Q951: <u>VO=SPEC VR MAX</u> VDS: (1) 23.86V (2) 23.47V (3) 23.49V</p> <p><u>VO=RATED VOLTAGE</u> (1) 24.07V</p> <p>Q958: <u>VO=SPEC VR MAX</u> VDS: (1) 22.88V (2) 22.3V</p>	<p>DC to AC Direction Q950: <u>VO=SPEC VR MAX</u> VDS: (1) 32.04V (2) 33.42V (3) 36.4V</p> <p><u>VO=RATED VOLTAGE</u> (1) 33.6V</p> <p>Q951: <u>VO=SPEC VR MAX</u> VDS: (1) 24.52V (2) 28.06V (3) 28.85V</p> <p><u>VO=RATED VOLTAGE</u> (1) 24.9V</p> <p>Q958: <u>VO=SPEC VR MAX</u> VDS: (1) 32.83V (2) 34.39V</p>

				<p>(3) 22.68V <u>VO=RATED VOLTAGE</u> (1) 22.68V</p> <p>Q959: <u>VO=SPEC VR MAX</u> VDS: (1) 24.1V (2) 23.69V (3) 23.62V <u>VO=RATED VOLTAGE</u> (1) 24.28V</p> <p>Q74 <u>VO=SPEC VR MAX</u> VDS: (1) 32.61V (2) 30.06V (3) 30.45V <u>VO=RATED VOLTAGE</u> (1) 33.43V</p>	<p>(3) 34.4V <u>VO=RATED VOLTAGE</u> (1) 35.59V</p> <p>Q959: <u>VO=SPEC VR MAX</u> VDS: (1) 24.95V (2) 26.28V (3) 25.12V <u>VO=RATED VOLTAGE</u> (1)25.15 V</p>
4	Input Capacitor Voltage	C6 Rated: 470μ/ 450V	<p>I/P:High-Line +3V =267V</p> <p>AC to DC Direction O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue</p> <p>DC to AC Direction (1)+100%Io~100%Io (2)-100%Io AC Off Ta:25°C</p>	<p>AC to DC Direction (1) 414.3V (2) 410.1V (3) 429.9V (4) 412.1V</p> <p>DC to AC Direction (1)429.84V (2)430V</p>	
5	Control IC Voltage Test	<p>PWM IC U57 Rated -0.3V~ 20V</p> <p>PFC IC U551 Rated -0.3V~ 20V</p> <p>O/P IC U308 Rated -0.3V~ 20V</p> <p>MCU IC U201 Rated 1.71V~3.6V</p> <p>AUX IC U701 Rated -0.3V~35V</p>	<p>AC ON/OFF</p> <p>AC to DC Direction I/P:High-Line +3V =267 V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(Low LINE) Ta:25°C</p>	<p>U57: (1) 11.39V (2) 11.39V (3) 11.39V (4) 11.4V (5) 11.4V</p> <p>U551: (1) 11.95V (2) 11.95V (3) 11.94V (4) 11.95V (5) 11.95V</p> <p>U308: (1) 12.46V (2) 12.45V (3) 12.46V (4) 12.44V (5) 12.43V</p> <p>U201: (1) 3.304V (2) 3.302V (3) 3.301V (4) 3.302V (5) 3.303V</p> <p>U701: (1) 13.69V (2) 13.76V (3) 13.57V (4) 13.76V (5) 13.96V</p>	
6	STAND BY POWER	Q700 Rated : 4.5A/ 800V	<p>AC ON/OFF</p> <p>AC to DC Direction I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Remote On/Off</p>	<p>I/P:High-Line +3V =267 V (1) 557V/1.976 A (2) 561V/ 2.052A</p>	

			I/P:Low-Line -3V =177V O/P: (1)Full Load (2)Remote On/Off Ta:25°C	I/P:Low-Line -3V =177V (1) 557V/ 1.846A (2) 565V/1.862 A
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■ **SAFETY& E.M.C. TEST**

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG :2KVAC/min O/P-FG:0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:0.6KVAC/min Ta:25°C	I/P-O/P:17.29mA I/P-FG:16.5mA O/P-FG:11.3m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 12.6GΩ I/P-FG: 13.2GΩ O/P-FG: 7.62GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	13 mΩ

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	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	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-2200-12 AC to DC Direction: 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 40 °C DC to AC Direction: 1. ROOM AMBIENT BURN-IN : 0.5 HRS I/P : 12VDC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 12VDC O/P : FULL LOAD Ta= 40 °C																																																																																																																																																													
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			25	Q2	66.8°C	85.1°C	49.5°C	68.0°C
			26	T550	33.9°C	51.4°C	31.2°C	47.5°C
			27	L900	63.0°C	82.7°C	44.9°C	61.0°C
			28	T3	40.4°C	60.4°C	34.7°C	51.1°C
			29	RT51	47.0°C	66.8°C	39.4°C	56.5°C
			30	RT52	35.7°C	55.1°C	29.9°C	50.1°C
			31	L1	40.6°C	56.5°C	31.9°C	51.1°C
			32	BD1	28.3°C	43.0°C	23.0°C	42.8°C
			33	RY1	28.3°C	42.0°C	24.3°C	43.0°C
			34	Q902	57.0°C	77.4°C	38.4°C	55.4°C
			35	LF3	31.6°C	50.6°C	26.9°C	44.8°C
			36	C2	24.2°C	42.4°C	23.0°C	40.9°C
			37	C962	29.4°C	46.0°C	26.8°C	44.3°C
			38	C958	29.9°C	46.7°C	25.5°C	44.7°C
			39	L950	56.7°C	71.2°C	39.9°C	59.2°C
			40	RG61	37.4°C	56.2°C	30.9°C	50.5°C
			41	T92	49.4°C	68.5°C	38.0°C	56.1°C
			42	U405	36.0°C	55.1°C	34.0°C	50.2°C
			43	U51	33.6°C	55.6°C	31.5°C	47.3°C
			44	R143	44.6°C	68.5°C	41.1°C	57.4°C
			45	D906	38.3°C	60.6°C	37.9°C	55.7°C
			46	D905	38.6°C	59.5°C	38.3°C	57.3°C
			47	U120	42.6°C	60.8°C	35.1°C	52.9°C
			48	Q74	50.3°C	68.1°C	39.4°C	58.0°C
			49	RG50	30.9°C	47.2°C	27.9°C	45.7°C
			50	R938	38.2°C	50.4°C	29.8°C	49.4°C
			51	C6	48.2°C	67.1°C	39.3°C	56.1°C
			52	Q903	61.5°C	84.4°C	42.9°C	59.5°C
			53	Q952	80.1°C	101.0°C	58.0°C	77.0°C
			54	D982	72.8°C	92.5°C	53.5°C	74.4°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 110% LOAD Ta : 25°C		TEST : OK			
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 %LOAD Ta= -35 °C		TEST : OK			
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C/95 %R.H NO DAMAGE	I/P : 268 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H		TEST : OK			
5	TEMPERATURE COEFFICIENT	± 0.03%/°C(0~45°C)	I/P : 230 VAC O/P : FULL LOAD		± 0.01%/°C(0~45°C)			
6	STORAGE TEMPERATURE TEST	-40~85°C	1. Thermal shock Temperature : -45°C~ +90°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 : STATIC					

7	THERMAL SHOCK TEST	-30~45°C	1. Thermal shock Temperature : -35°C~ +50°C 2. Temperature change rate : 25°C / 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, 2G 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 : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C
9	CAPACITOR LIFE CYCLE	SUPPOSE C962 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40 °C LIFE TIME	(1) 519622HRS (2) 164428HRS (3) 481868HRS (4) 784370HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 462.9K hrs min. Telcordia SR-332 (Bellcore) ; 46K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=40°C Demonstration Mean Time Between Failure : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

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