



# Test Report: BIC-2200-48

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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

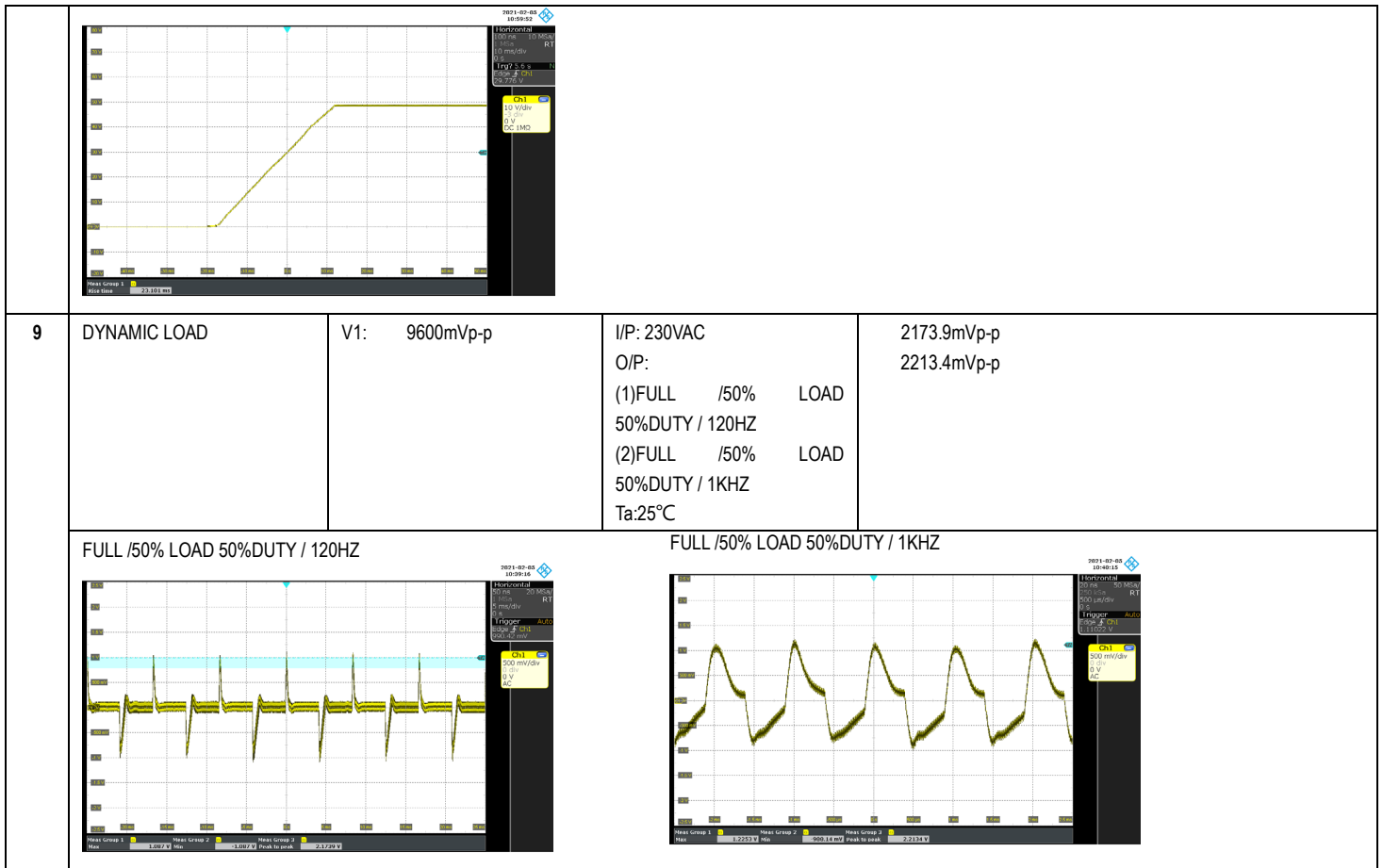
E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

■ **DESIGN VERIFY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 38V~65 V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	36.646V~66.93V
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~ -1 %	I/P: 180VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.66%~ -0.59 %
3	LINE REGULATION (Max)	V1: 0.5 %~ -0.5 %	I/P: 180VAC~264VAC O/P:FULL LOAD Ta:25°C	V1: 0.06 %~ -0.06 %
4	LOAD REGULATION(Max)	V1: 0.5%~ -0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.05 %~ 0.03 %
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<10%
6	RIPPLE & NOISE(Max )	V1: 300mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 233.99mVp-p
		high frequency :	low frequency :	
7	SET UP TIME(Max)	230VAC/1800ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 996ms
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		
8	RISE TIME (Max)	230VAC/60ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/23.101ms
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 		



**INPUT FUNCTION TEST(AC to DC Direction)**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264VAC	(1) I/P:TESTING O/P:FULL LOAD Ta:25°C	(1) 166V~264V
			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=10.28A/ 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=0.9958/230VAC

	<p>P.F vs LOAD</p>			
6	EFFICIENCY(Typ.)	93%	I/P:230 VAC O/P:75% LOAD Ta:25°C	93.34 %
	<p>EFFICIENCY vs LOAD</p>			
7	INRUSH CURRENT(Typ.)	230V/35A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I=30.83A/ 230VAC T50=1900us/230V
	<p>INPUT=230VAC/50HZ @ FULL LOAD CH4 : AC Input Voltage CH3 : Input current</p>			
8	TOTAL HARMONIC DISTORTION	<3%	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	THD = 1.81%

**OUTPUT FUNCTION TEST(DC to AC Direction)**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT POWER (Typ.) (@240V/60HZ)	1720W	I/P:48VDC O/P: FULL LOAD Ta:25°C	1707W
2	VOLTAGE RANGE	180VAC~264VAC	I/P:48VDC O/P: TESTING Ta:25°C	175 VAC~280VAC
3	FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:48VDC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
4	AC CURRENT (Typ.)	230VAC/ 7.5 A	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	I =7.44A/ 230VAC
5	POWER FACTOR (Typ.)	0.99/ 230VAC	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	PF=0.9963/230VAC
6	EFFICIENCY(Typ.)	93%	I/P: 48VDC O/P:75% LOAD Ta:25°C	93.6%
7	TOTAL HARMONIC DISTORTION	<3%	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	THD = 2.75%

**INPUT FUNCTION TEST(DC to AC Direction)**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED INPUT POWER	1800W	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	1832W
2	DC VOLTAGE RANGE	38VDC ~65VDC	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	38VDC/38.46A 48VDC/38.1A 65VDC/28A/ AUTO DERATING
3	MAX INPUT CURRENT	37.5A	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	38.1A

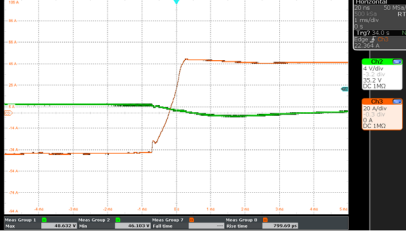
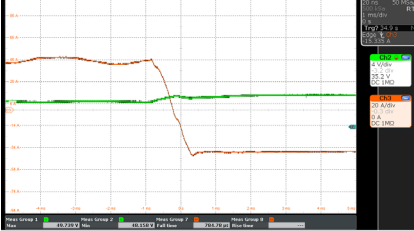
**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 115 % <b>AC to DC Direction:</b> Constant current limiting, shut down DC O/P voltage 5 sec. after DC O/P voltage is down low, re-power on to recover  <b>DC to AC Direction:</b> Not accurable with constant power design	<b>AC to DC Direction</b> I/P: 264VAC I/P: 230VAC I/P: 180VAC  <b>DC to AC Direction</b> I/P: 38VDC I/P: 48VDC I/P: 65VDC O/P:FULL LOAD Ta:25°C	<b>AC to DC Direction</b> 110.2%/ 264VAC 110.2%/ 230VAC 110.2%/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  <b>DC to AC Direction:</b> 38VDC/38.46A 48VDC/38.1A

				65VDC/28A/ AUTO DERATING PROTECTION TYPE : Not accurable with constant power design
2	OVER VOLTAGE PROTECTION	72.6V~86V 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	<b>AC to DC Direction</b> 77.945V/ 264VAC 77.945V/ 230VAC 77.945V/ 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	<b>AC to DC Direction</b> I/P: 264VAC I/P: 180VAC  <b>DC to AC Direction</b> I/P: 38VDC I/P: 65VDC O/P:FULL LOAD	<b>AC to DC Direction</b> O.T.P. Active Protection type : voltage, recovers automatically after temperature goes down <b>DC to AC Direction</b> O.T.P. Active Protection type : voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	<b>AC to DC Direction</b> I/P: 264VAC I/P: 180VAC  <b>DC to AC Direction</b> I/P: 38VDC I/P: 65VDC O/P: FULL LOAD Ta:25°C	<b>AC to DC Direction</b> NO DAMAGE PROTECTION TYPE : Shut down o/p current, re-power on to recover <b>DC to AC Direction</b> NO DAMAGE PROTECTION TYPE : Shut down o/p current, 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: 62.3VDC O/P: FULL LOAD  I/P: 51.5VDC O/P: 50% LOAD  I/P: 40.7VDC O/P: 10% LOAD  Ta:25°C	<b>DC to AC Direction</b> 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>1. Auxiliary voltage output, 11.4~12.6V, referenced to GND-AUX (pin 2,4). The maximum load current is 0.5A. This output has the built-in "Oring diodes" and 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="507 465 1129 633"> <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>11.88V</td> <td>48mV</td> </tr> </tbody> </table>		TOLERANCE	RIPPLE	SPEC	11.4~12.6 V	150mVp-p	TEST RESULT	11.88V	48mV				
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SPEC	11.4~12.6 V	150mVp-p													
TEST RESULT	11.88V	48mV													
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="507 779 1329 1014"> <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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3	BIDIRECTION SWITCH TIME(DEFAULT)	<p>I/P: 230 VAC /48VDC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="507 1160 1329 1272"> <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>799 us</u></td> </tr> <tr> <td>DC to AC Direction</td> <td>1ms</td> <td><u>784 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>799 us</u>	DC to AC Direction	1ms	<u>784 us</u>				
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4	ALARM SIGNAL	<p>1. DC OK SIGNAL High (4.5 ~ 5.5V) : When the Vout <math>\geq</math> 80%±5%. Low (-0.5 ~ 0.5V) : When the Vout <math>\geq</math> 80%±5%. 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="627 1787 1342 1877"> <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>Vout <math>\leq</math> 75%</td> <td>4.994V</td> </tr> <tr> <td>Vout <math>\geq</math> 85%</td> <td>-0.038V</td> </tr> </tbody> </table>	MODE	Vout	DC OK SIGNAL	AC to DC Direction	Vout $\leq$ 75%	4.994V	Vout $\geq$ 85%	-0.038V					
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	Vout $\geq$ 85%	-0.038V													

		<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</p> <p>Test Result :</p> <table border="1" data-bbox="560 488 1517 600"> <thead> <tr> <th>MODE</th> <th>PSU 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>0V</td> </tr> <tr> <td>OTP</td> <td>0V</td> <td>4.5~5.5V</td> <td>5.16V</td> </tr> <tr> <td>FAN LOCK</td> <td>0V</td> <td>4.5~5.5V</td> <td>5.16V</td> </tr> </tbody> </table>	MODE	PSU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST	AC to DC Direction	NORMAL	100%±2%	-0.5 ~0.5V	0V	OTP	0V	4.5~5.5V	5.16V	FAN LOCK	0V	4.5~5.5V	5.16V		
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	OTP	0V	4.5~5.5V	5.16V																		
	FAN LOCK	0V	4.5~5.5V	5.16V																		
5	CURRENT SHARING	CURRENT SHARING TOLERANCE < ±10%	I/P : 230 VAC O/P : 95/50% LOAD Ta : 25°C	<b>AC to DC Direction</b> O/P : 95% PSU1 : 42.8A PSU2 : 42.6A PSU3 : 42 A PSU4 : 42.2A PSU5 : 41.8A O/P : 50% PSU1 : 22.64 A PSU2 : 22.6A PSU3 : 21.4A PSU4 : 22.6A PSU5 : 22.8A	<b>DC to AC Direction</b> O/P : 100% PSU1 : 37.83A PSU2 : 37.92A PSU3 : 37.34A PSU4 : 37.14A PSU5 : 37.2A O/P : 50% PSU1 : 18.56 A PSU2 : 18.74A PSU3 : 18.71A PSU4 : 18.46 A PSU5 : 18.7A																	
6	BATTERY MODE RATED CURRENT( CAN BUS model only)	AC to DC Direction:40A DC to AC Direction:32A Can be adjusted by communication	<b>AC to DC Direction</b> I/P: 230VAC <b>DC to AC Direction</b> I/P: 48VDC O/P:FULL LOAD Ta:25°C	<b>AC to DC Direction:</b> 40.08A/230VAC  <b>DC to AC Direction</b> 32.2A/48VDC																		

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E) Peak Voltage	<b>AC to DC Direction &amp; DC to AC Direction</b>  Q903 Rated: 36A/ 600V VGS :± 20V	AC ON/OFF <b>AC to DC Direction</b> 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.	<b>AC to DC Direction</b> I/P:High-Line +3V =267V VDS: (1) 419V/20.38A (2) 408V/ 15.21A (3) 403V/16.05 A  I/P:Low-Line -3V = 177V VDS: (1) 406V/ 19.98A



			<p><b>DC to AC Direction</b>  I/P: 65VDC  VDS:  O/P: (1)Full Load  (2)+100%Io/1S~-100%Io/1S  (3)-100%Io AC Off  I/P: 38VDC  O/P: (1)Full Load  (2)+100%Io~-100%Io  (3)-100%Io AC Off  Ta:25°C</p>	<p>(2) 398V/ 14.85A  (3) 402V/ 16.03A  <b>DC to AC Direction</b>  I/P: 65VDC  VDS:  (1) 423 V/5.32A  (2) 431 V/6.91A  (3) 510 V/6.29A  I/P: 38VDC  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><b>AC to DC Direction</b>  Q2 Rated: 53A/ 650V  VGS :-8~19V    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.    VGS:  (1)OLP  (2)Output Short  (3)NO LOAD    I/P:Low-Line -3V = 177V  AC ON/OFF  O/P:(1)Full Load  (2)Output Short  (3)0%→400% Load.    Ta:25°C</p>	<p>I/P:High-Line +3V =267  Q2 VDS:  (1) 469V/21.8A  (2) 423V/10.9A  (3) 418V/9.56A    Q4 VDS:  (1) 411V/18.5A  (2) 412V/10.29A  (3) 412V/11.28A    I/P:Low-Line -3V = 177V  Q2 VDS:  (1) 429V/13.61A  (2) 413V/9.5A  (3) 417V/15.58A    Q4 VDS:  (1) 441V/15.65A  (2) 441V/13.98A  (3) 417V/13.81A</p>						
3	Diode Peak Voltage	<p><b>AC to DC Direction &amp; DC to AC Direction</b>    Q950 Rated: 24A/250V  VGS :±20V    Q951 Rated: 24A/250V  VGS :±20V    Q958 Rated: 225A/ 60V  VGS :±20V    Q959 Rated: 24A/250V  VGS :±20V    <b>AC to DC Direction only</b>  Q74 Rated:24A/250V  VGS :±20V</p>	<p><b>AC to DC Direction</b>  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.    <u>VO=RATED VOLTAGE</u>  O/P: (1)Full Load    <b>DC to AC Direction</b>  I/P:65VDC  <u>VO=SPEC VR MAX</u>  O/P: (1)Full Load  (2)+100%Io/1S~-100%Io/1S  (3)-100%Io AC Off    <u>VO=RATED VOLTAGE</u></p>	<table border="0"> <tr> <td><b>AC to DC Direction</b>  Q950:  <u>VO=SPEC VR MAX</u>  VDS:  (1) 182.77V  (2) 175.2V  (3) 176.67V  <u>VO=RATED VOLTAGE</u>  (1) 182.77V</td> <td><b>DC to AC Direction</b>  Q950:  <u>VO=SPEC VR MAX</u>  VDS:  (1) 184.8V  (2) 190.67V  (3) 230.8V  <u>VO=RATED VOLTAGE</u>  (1) 184.87V</td> </tr> <tr> <td>Q951:  <u>VO=SPEC VR MAX</u>  VDS:  (1) 184.24V  (2) 162.21V  (3) 167.18V  <u>VO=RATED VOLTAGE</u>  (1) 185.93V</td> <td>Q951:  <u>VO=SPEC VR MAX</u>  VDS:  (1) 184.77V  (2) 191.67V  (3) 227.45V  <u>VO=RATED VOLTAGE</u>  (1) 185.43V</td> </tr> <tr> <td>Q958:</td> <td>Q958:</td> </tr> </table>	<b>AC to DC Direction</b> Q950: <u>VO=SPEC VR MAX</u> VDS: (1) 182.77V (2) 175.2V (3) 176.67V <u>VO=RATED VOLTAGE</u> (1) 182.77V	<b>DC to AC Direction</b> Q950: <u>VO=SPEC VR MAX</u> VDS: (1) 184.8V (2) 190.67V (3) 230.8V <u>VO=RATED VOLTAGE</u> (1) 184.87V	Q951: <u>VO=SPEC VR MAX</u> VDS: (1) 184.24V (2) 162.21V (3) 167.18V <u>VO=RATED VOLTAGE</u> (1) 185.93V	Q951: <u>VO=SPEC VR MAX</u> VDS: (1) 184.77V (2) 191.67V (3) 227.45V <u>VO=RATED VOLTAGE</u> (1) 185.43V	Q958:	Q958:
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Q958:	Q958:									

			<p>O/P: (1)Full Load Ta:25°C</p>	<p><u>VO=SPEC VR MAX</u> VDS: (1) 184.8V (2) 121.45V (3) 143.39V <u>VO=RATED VOLTAGE</u> (1) 186.03V</p> <p>Q959: <u>VO=SPEC VR MAX</u> VDS: (1) 184.88V (2) 146.93V (3) 153.01V <u>VO=RATED VOLTAGE</u> (1) 187.93V</p> <p>Q74 <u>VO=SPEC VR MAX</u> VDS: (1) 94.783V (2) 105.85V (3) 106.64V <u>VO=RATED VOLTAGE</u> (1) 93.202V</p>	<p><u>VO=SPEC VR MAX</u> VDS: (1) 185.27V (2) 191.54V (3) 230.99V <u>VO=RATED VOLTAGE</u> (1) 185.3V</p> <p>Q959: <u>VO=SPEC VR MAX</u> VDS: (1) 185.35V (2) 191.67V (3) 231.02V <u>VO=RATED VOLTAGE</u> 185.25 V</p>
4	Input Capacitor Voltage	C6 Rated:: 470μ/ 450V	<p>I/P:High-Line +3V =267V <b>AC to DC Direction</b> 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><b>DC to AC Direction</b> (1)+100%Io~100%Io (2)-100%Io AC Off Ta:25°C</p>	<p><b>AC to DC Direction</b> (1) 414.3V (2) 410.1V (3) 429.9V (4) 412.1V</p> <p><b>DC to AC Direction</b> (1)429.84V (2)432V</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 <b>AC to DC Direction</b> 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 <b>AC to DC Direction</b> I/P:High-Line +3V =267 V</p>	<p>(1) 557V/1.976 A</p>	

			O/P: (1)Full Load (2)Remote On/Off  I/P:Low-Line -3V =177V O/P: (1)Full Load (2)Remote On/Off  Ta:25°C	(2) 561V/ 2.052A  (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: 3.6KVAC/min I/P-FG: 2.4KVAC/min O/P-FG:0.6KVAC/min Ta:25°C	I/P-O/P: 12.4 mA I/P-FG: 10.9mA O/P-FG: 11.6mA 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: 30GΩ I/P-FG: 28.8GΩ O/P-FG:21.7 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	13mΩ

**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-2200-96 <b>AC to DC Direction:</b> 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= 45 °C  <b>DC to AC Direction:</b> 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 96VDC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 96VDC O/P : FULL LOAD Ta= 45 °C																																																																																																																																																													
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			25	Q2	60.0°C	77.8°C	52.3°C	67.6°C
			26	T550	33.1°C	48.7°C	32.7°C	52.0°C
			27	L900	60.3°C	74.8°C	43.7°C	61.8°C
			28	T3	30.1°C	47.1°C	32.0°C	51.0°C
			29	RT51	48.0°C	62.3°C	44.6°C	61.0°C
			30	RT52	36.7°C	52.8°C	34.1°C	52.8°C
			31	L1	41.1°C	57.2°C	35.6°C	54.2°C
			32	BD1	29.4°C	45.8°C	26.7°C	46.6°C
			33	RY1	34.1°C	49.4°C	32.0°C	50.9°C
			34	Q902	50.5°C	75.7°C	36.6°C	56.2°C
			35	LF3	35.0°C	52.3°C	32.8°C	52.6°C
			36	C2	27.4°C	44.5°C	27.7°C	47.8°C
			37	C963	25.5°C	48.1°C	26.7°C	46.6°C
			38	C958	25.7°C	48.2°C	26.2°C	46.1°C
			39	L950	40.7°C	60.4°C	38.5°C	57.4°C
			40	RG61	33.4°C	51.5°C	32.8°C	52.2°C
			41	T92	28.9°C	48.0°C	30.2°C	49.5°C
			42	U405	29.7°C	48.8°C	32.2°C	51.8°C
			43	U51	28.9°C	48.3°C	32.0°C	51.3°C
			44	R143	35.0°C	58.8°C	36.8°C	60.6°C
			45	D906	37.7°C	56.3°C	41.5°C	58.9°C
			46	D905	37.5°C	55.3°C	40.3°C	57.9°C
			47	U120	29.2°C	47.8°C	29.9°C	49.6°C
			48	Q74	31.7°C	49.8°C	33.5°C	52.8°C
			49	RG50	31.2°C	48.9°C	31.5°C	51.6°C
			50	C6	37.0°C	52.6°C	35.8°C	54.1°C
			51	Q903	49.9°C	68.6°C	39.5°C	58.0°C
			52	Q952	37.8°C	55.2°C	41.0°C	60.5°C
			53	D982	37.0°C	53.8°C	38.0°C	57.0°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 45 °C/95 %R.H NO DAMAGE	I/P : 268 VAC O/P : FULL LOAD Ta= 45 °C HUMIDITY= 95 %R.H		TEST : OK			
5	TEMPERATURE COEFFICIENT	± 0.03%/°C(0~45°C)	I/P : 230 VAC O/P : FULL LOAD		± 0.001%/°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 C963 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= 45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 45°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 °C LIFE TIME	(1) 288572HRS (2) 60245HRS (3) 287977HRS (4) 612859HRS
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=45°C Demonstration Mean Time Between Failure : 50,000 hours	

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

2020.10.1 TAG-QA-009