



TEST DATA OF PBW50F-5

Regulated DC Power Supply
Sep 29, 2005

Approved by : Kuniaki Nagahara
Kuniaki Nagahara Design Manager

Prepared by : Atsushi Yoshiyama
Atsushi Yoshiyama Design Engineer

COSEL CO.,LTD.

CONTENTS

1. Input Current (by Load Current)	1
2. Input Power (by Load Current)	2
3. Efficiency (by Input Voltage)	3
4. Efficiency (by Load Current)	4
5. Power Factor (by Input Voltage)	5
6. Power Factor (by Load Current)	6
7. Inrush Current	7
8. Leakage Current	8
9. Line Regulation	9
10. Load Regulation	10
11. Dynamic Load Response	11
12. Ripple Voltage (by Load Current)	13
13. Ripple-Noise	15
14. Ripple Voltage (by Ambient Temperature)	17
15. Ambient Temperature Drift	18
16. Output Voltage Accuracy	19
17. Time Lapse Drift	20
18. Rise and Fall Time	21
19. Hold-Up Time	23
20. Instantaneous Interruption Compensation	25
21. Minimum Input Voltage for Regulated Output Voltage	27
22. Overcurrent Protection	28
23. Overvoltage Protection	29
24. Figure of Testing Circuitry	30

(Final Page 30)

COSEL

Model	PBW50F-5	Temperature Testing Circuitry	25°C Figure A																																																		
Item	Input Current (by Load Current)																																																				
Object	_____																																																				
1.Graph		—△— Input Volt. 100V - -□--- Input Volt. 200V - -○--- Input Volt. 230V																																																			
			2.Values																																																		
<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.053</td><td>0.049</td><td>0.051</td></tr> <tr><td>20</td><td>0.126</td><td>0.101</td><td>0.095</td></tr> <tr><td>40</td><td>0.193</td><td>0.129</td><td>0.129</td></tr> <tr><td>60</td><td>0.263</td><td>0.161</td><td>0.154</td></tr> <tr><td>80</td><td>0.335</td><td>0.195</td><td>0.181</td></tr> <tr><td>100</td><td>0.408</td><td>0.228</td><td>0.211</td></tr> <tr><td>110</td><td>0.446</td><td>0.246</td><td>0.225</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Ration [%]	Input Current [A]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	0.053	0.049	0.051	20	0.126	0.101	0.095	40	0.193	0.129	0.129	60	0.263	0.161	0.154	80	0.335	0.195	0.181	100	0.408	0.228	0.211	110	0.446	0.246	0.225	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Input Current [A]																																																				
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																		
0	0.053	0.049	0.051																																																		
20	0.126	0.101	0.095																																																		
40	0.193	0.129	0.129																																																		
60	0.263	0.161	0.154																																																		
80	0.335	0.195	0.181																																																		
100	0.408	0.228	0.211																																																		
110	0.446	0.246	0.225																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		

COSEL

Model	PBW50F-5	Temperature 25°C Testing Circuitry Figure A																																																					
Item	Input Power (by Load Current)																																																						
Object	_____																																																						
1.Graph	<p>—△— Input Volt. 100V - -□--- Input Volt. 200V - -○--- Input Volt. 230V</p> <table border="1"> <caption>Data points estimated from Figure A</caption> <thead> <tr> <th>Load Ration [%]</th> <th>Input Power [W] (100V)</th> <th>Input Power [W] (200V)</th> <th>Input Power [W] (230V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>3.73</td><td>4.00</td><td>4.00</td></tr> <tr><td>20</td><td>11.55</td><td>13.00</td><td>13.00</td></tr> <tr><td>40</td><td>18.47</td><td>19.00</td><td>20.00</td></tr> <tr><td>60</td><td>25.60</td><td>26.00</td><td>26.00</td></tr> <tr><td>80</td><td>32.86</td><td>33.00</td><td>33.00</td></tr> <tr><td>100</td><td>40.26</td><td>40.00</td><td>40.00</td></tr> <tr><td>110</td><td>44.03</td><td>44.00</td><td>44.00</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Load Ration [%]	Input Power [W] (100V)	Input Power [W] (200V)	Input Power [W] (230V)	0	3.73	4.00	4.00	20	11.55	13.00	13.00	40	18.47	19.00	20.00	60	25.60	26.00	26.00	80	32.86	33.00	33.00	100	40.26	40.00	40.00	110	44.03	44.00	44.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Load Ration [%]	Input Power [W] (100V)	Input Power [W] (200V)	Input Power [W] (230V)																																																				
0	3.73	4.00	4.00																																																				
20	11.55	13.00	13.00																																																				
40	18.47	19.00	20.00																																																				
60	25.60	26.00	26.00																																																				
80	32.86	33.00	33.00																																																				
100	40.26	40.00	40.00																																																				
110	44.03	44.00	44.00																																																				
-	-	-	-																																																				
-	-	-	-																																																				
-	-	-	-																																																				
-	-	-	-																																																				
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Input Power [W]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>3.73</td><td>4.00</td><td>4.00</td></tr> <tr><td>20</td><td>11.55</td><td>13.00</td><td>13.00</td></tr> <tr><td>40</td><td>18.47</td><td>19.00</td><td>20.00</td></tr> <tr><td>60</td><td>25.60</td><td>26.00</td><td>26.00</td></tr> <tr><td>80</td><td>32.86</td><td>33.00</td><td>33.00</td></tr> <tr><td>100</td><td>40.26</td><td>40.00</td><td>40.00</td></tr> <tr><td>110</td><td>44.03</td><td>44.00</td><td>44.00</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Load Ration [%]	Input Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	3.73	4.00	4.00	20	11.55	13.00	13.00	40	18.47	19.00	20.00	60	25.60	26.00	26.00	80	32.86	33.00	33.00	100	40.26	40.00	40.00	110	44.03	44.00	44.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Load Ration [%]	Input Power [W]																																																						
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																				
0	3.73	4.00	4.00																																																				
20	11.55	13.00	13.00																																																				
40	18.47	19.00	20.00																																																				
60	25.60	26.00	26.00																																																				
80	32.86	33.00	33.00																																																				
100	40.26	40.00	40.00																																																				
110	44.03	44.00	44.00																																																				
-	-	-	-																																																				
-	-	-	-																																																				
-	-	-	-																																																				
-	-	-	-																																																				

COSEL

Model	PBW50F-5	Temperature Testing Circuitry	25°C Figure A																																
Item	Efficiency (by Input Voltage)																																		
Object	_____																																		
1.Graph			2.Values																																
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: Load 50% (dashed line with squares), Load 100% (solid line with triangles)</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td> <td>68.9</td> <td>74.0</td> </tr> <tr> <td>85</td> <td>69.3</td> <td>75.0</td> </tr> <tr> <td>100</td> <td>69.5</td> <td>76.0</td> </tr> <tr> <td>120</td> <td>69.5</td> <td>76.6</td> </tr> <tr> <td>200</td> <td>68.4</td> <td>76.5</td> </tr> <tr> <td>230</td> <td>67.5</td> <td>76.3</td> </tr> <tr> <td>264</td> <td>66.9</td> <td>76.1</td> </tr> <tr> <td>280</td> <td>66.8</td> <td>76.0</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	75	68.9	74.0	85	69.3	75.0	100	69.5	76.0	120	69.5	76.6	200	68.4	76.5	230	67.5	76.3	264	66.9	76.1	280	66.8	76.0	-	-	-
Input Voltage [V]	Efficiency [%]																																		
	Load 50%	Load 100%																																	
75	68.9	74.0																																	
85	69.3	75.0																																	
100	69.5	76.0																																	
120	69.5	76.6																																	
200	68.4	76.5																																	
230	67.5	76.3																																	
264	66.9	76.1																																	
280	66.8	76.0																																	
-	-	-																																	

Note: Slanted line shows the range of the rated input voltage.

COSEL

Model	PBW50F-5
Item	Efficiency (by Load Current)
Object	

1.Graph

Load Ration [%]	Input Volt. 100V [%]	Input Volt. 200V [%]	Input Volt. 230V [%]
20	53.5	47.5	47.5
40	66.6	64.8	61.5
60	72.0	70.9	70.9
80	74.8	74.4	74.4
100	76.2	76.7	76.7
110	76.7	76.7	76.7

Temperature 25°C
Testing Circuitry Figure A

2.Values

Load Ration [%]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
20	53.5	47.5	47.5
40	66.6	64.8	61.5
60	72.0	70.9	70.9
80	74.8	74.4	74.4
100	76.2	76.7	76.7
110	76.7	76.7	76.7
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PBW50F-5	Temperature	25°C																																
Item	Power Factor (by Input Voltage)	Testing Circuitry	Figure A																																
Object	—	—	—																																
1. Graph																																			
			2. Values																																
<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Power Factor</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td><td>0.992</td><td>0.998</td></tr> <tr> <td>85</td><td>0.984</td><td>0.998</td></tr> <tr> <td>100</td><td>0.970</td><td>0.990</td></tr> <tr> <td>120</td><td>0.943</td><td>0.978</td></tr> <tr> <td>200</td><td>0.784</td><td>0.883</td></tr> <tr> <td>230</td><td>0.708</td><td>0.839</td></tr> <tr> <td>264</td><td>0.622</td><td>0.744</td></tr> <tr> <td>280</td><td>0.561</td><td>0.678</td></tr> <tr> <td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Input Voltage [V]	Power Factor		Load 50%	Load 100%	75	0.992	0.998	85	0.984	0.998	100	0.970	0.990	120	0.943	0.978	200	0.784	0.883	230	0.708	0.839	264	0.622	0.744	280	0.561	0.678	—	—	—
Input Voltage [V]	Power Factor																																		
	Load 50%	Load 100%																																	
75	0.992	0.998																																	
85	0.984	0.998																																	
100	0.970	0.990																																	
120	0.943	0.978																																	
200	0.784	0.883																																	
230	0.708	0.839																																	
264	0.622	0.744																																	
280	0.561	0.678																																	
—	—	—																																	
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

COSEL

Model	PBW50F-5
Item	Power Factor (by Load Current)
Object	

1. Graph

—△— Input Volt. 100V
 - - -□- - Input Volt. 200V
 - - ○- - Input Volt. 230V

Load Ration [%]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.708	0.400	0.333
20	0.915	0.650	0.591
40	0.956	0.731	0.667
60	0.973	0.813	0.722
80	0.981	0.846	0.786
100	0.986	0.870	0.816
110	0.989	0.898	0.846
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Temperature 25°C
Testing Circuitry Figure A

2. Values

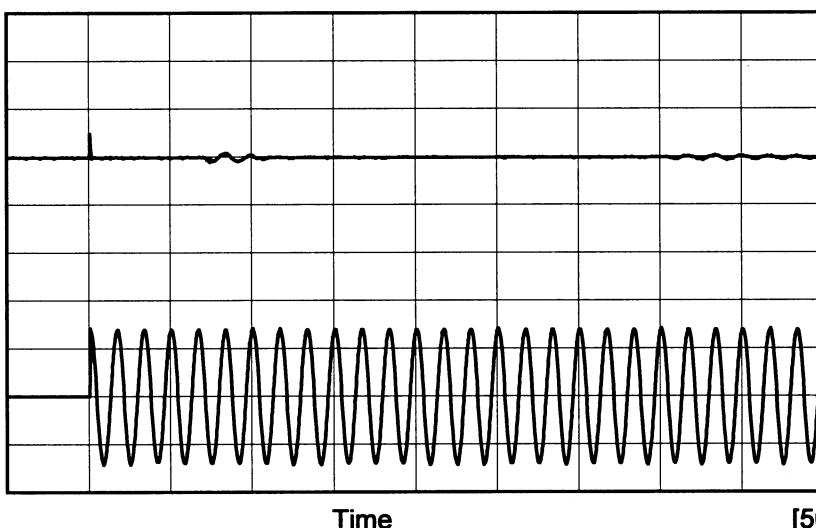
Load Ration [%]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.708	0.400	0.333
20	0.915	0.650	0.591
40	0.956	0.731	0.667
60	0.973	0.813	0.722
80	0.981	0.846	0.786
100	0.986	0.870	0.816
110	0.989	0.898	0.846
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model PBW50F-5

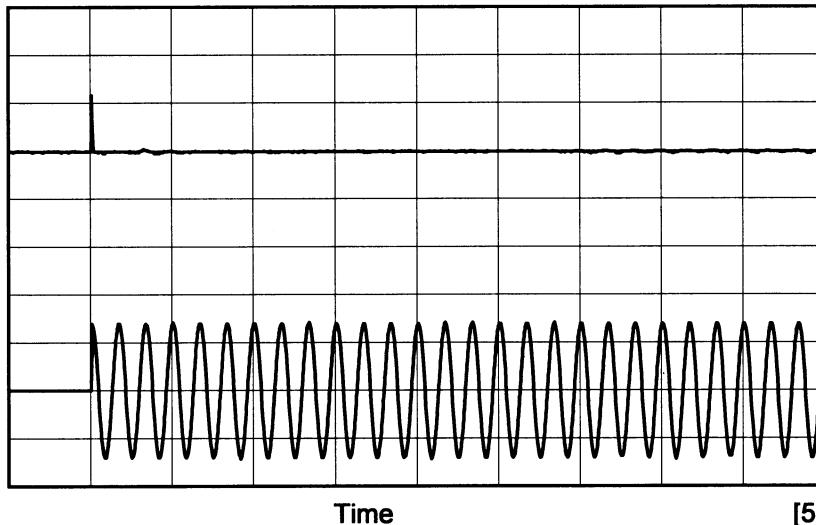
Item Inrush Current

Object _____

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]

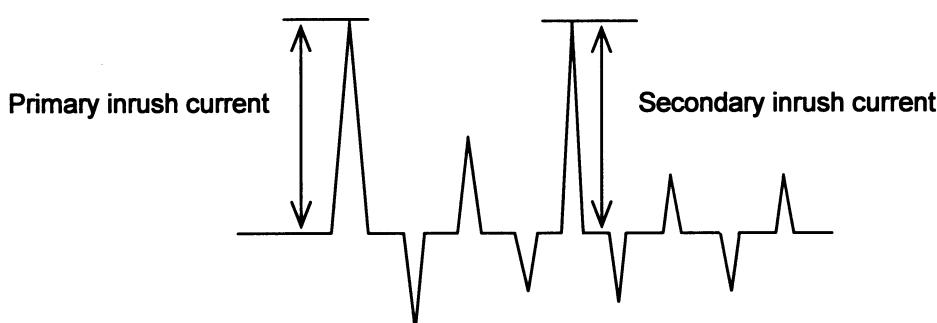
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current : 9.9 A
Secondary inrush current : 0.0 A

Input
Voltage
[100V/div]Input
Current
[20A/div]

Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current : 23.5 A
Secondary inrush current : 0.0 A

Input
Voltage
[200V/div]



Model	PBW50F-5	Temperature Testing Circuitry	25°C Figure B
Item	Leakage Current		
Object	_____		

1. Results

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.18	0.40	0.54	Operation
	One of phase	0.27	0.54	0.63	stand by
IEC60950	Both phases	0.18	0.40	0.54	Operation
	One of phase	0.27	0.54	0.63	stand by

The value for "One of phase" is the reference value only.

2. Condition

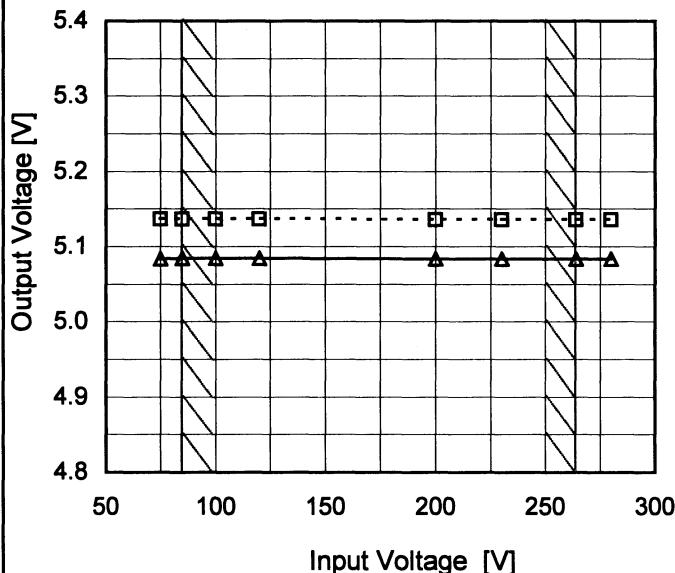
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

COSEL

Model	PBW50F-5
Item	Line Regulation
Object	+5V3A

1.Graph

---□--- Load 50%
—△— Load 100%



Temperature 25°C
Testing Circuitry Figure A

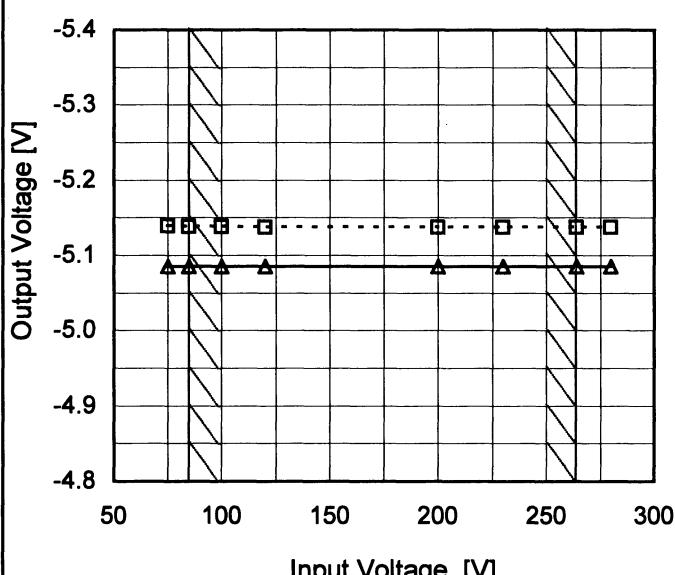
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	5.137	5.084
85	5.137	5.084
100	5.137	5.084
120	5.136	5.084
200	5.136	5.084
230	5.136	5.084
264	5.136	5.084
280	5.136	5.084
--	-	-

Object	-5V3A
--------	-------

1.Graph

---□--- Load 50%
—△— Load 100%

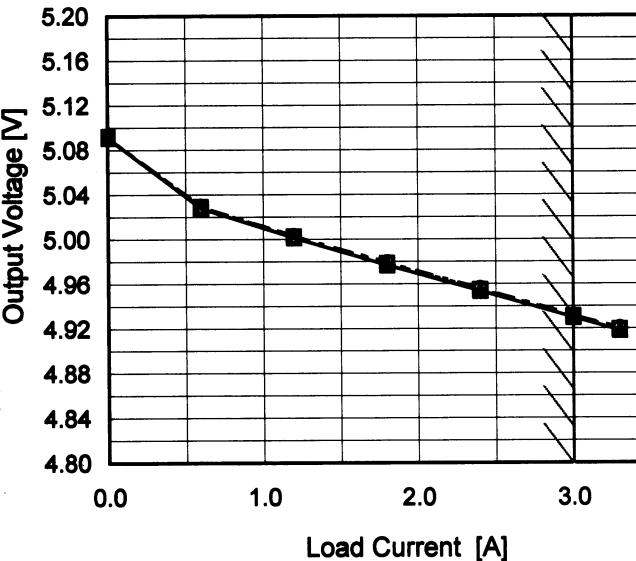
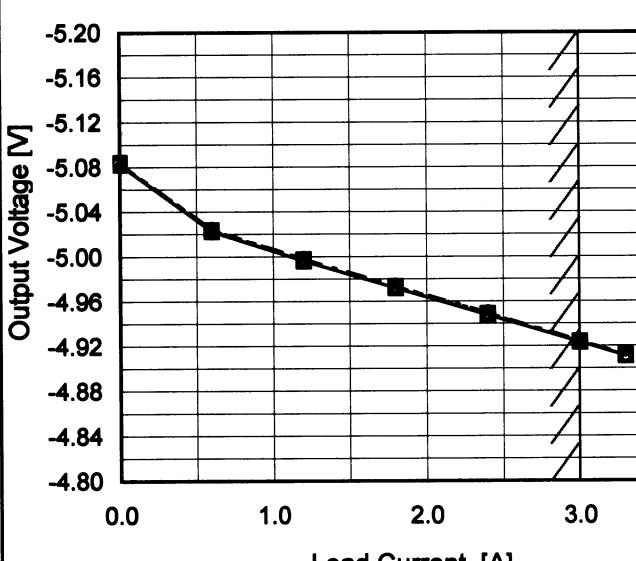


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	-5.139	-5.085
85	-5.138	-5.085
100	-5.138	-5.086
120	-5.138	-5.086
200	-5.138	-5.086
230	-5.138	-5.086
264	-5.138	-5.086
280	-5.138	-5.086
--	-	-

Note: Slanted line shows the range of the rated input voltage.

COSEL

Model	PBW50F-5
Item	Load Regulation
Object	+5V3A
1.Graph	<p style="text-align: center;"> —△— Input Volt. 100V ---□--- Input Volt. 200V ---○--- Input Volt. 230V </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Load Current [A]</p>
Object	-5V3A
1.Graph	<p style="text-align: center;"> —△— Input Volt. 100V ---□--- Input Volt. 200V ---○--- Input Volt. 230V </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Load Current [A]</p>
<p>Note: Slanted line shows the range of the rated load current.</p>	

Temperature 25°C
 Testing Circuitry Figure A

2.Values

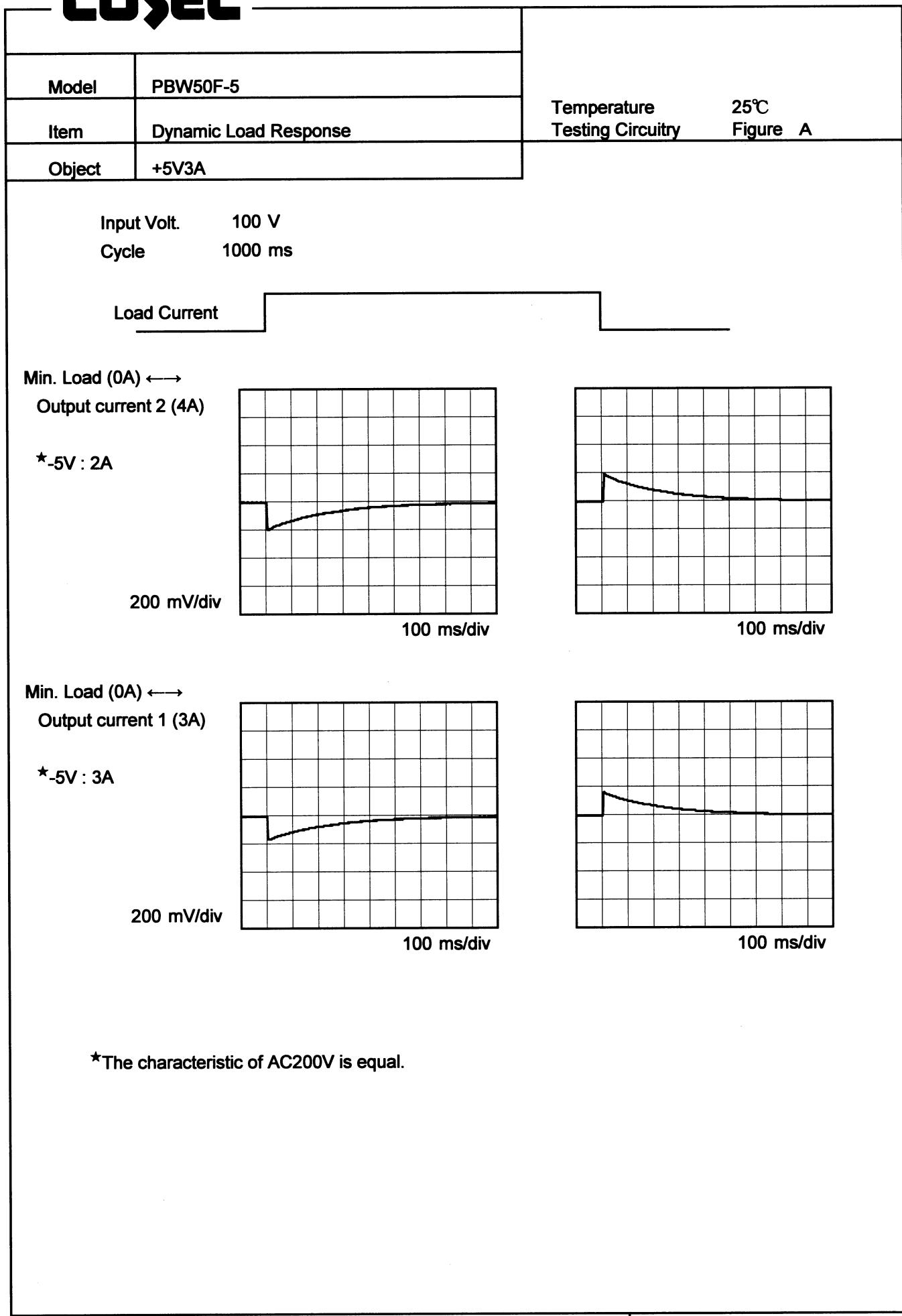
Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	5.091	5.092	5.092
0.6	5.028	5.029	5.030
1.2	5.001	5.003	5.003
1.8	4.977	4.979	4.979
2.4	4.954	4.955	4.956
3.0	4.930	4.931	4.932
3.3	4.918	4.919	4.920
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

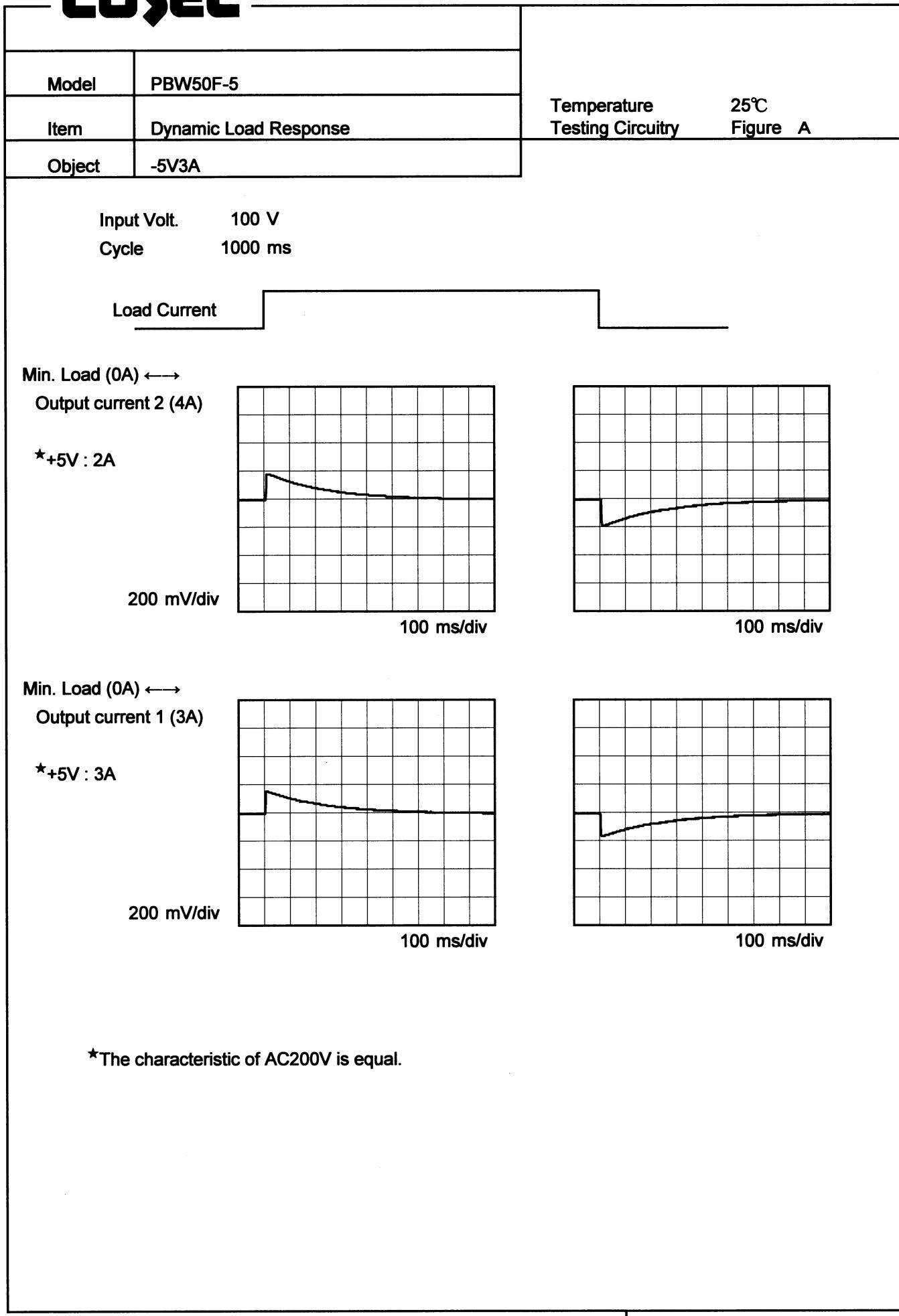
-5V : Rated output current 1

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-5.082	-5.084	-5.084
0.6	-5.023	-5.024	-5.024
1.2	-4.996	-4.998	-4.998
1.8	-4.972	-4.973	-4.974
2.4	-4.948	-4.949	-4.949
3.0	-4.923	-4.924	-4.924
3.3	-4.911	-4.912	-4.912
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+5V : Rated output current 1

COSEL

COSEL

COSEL

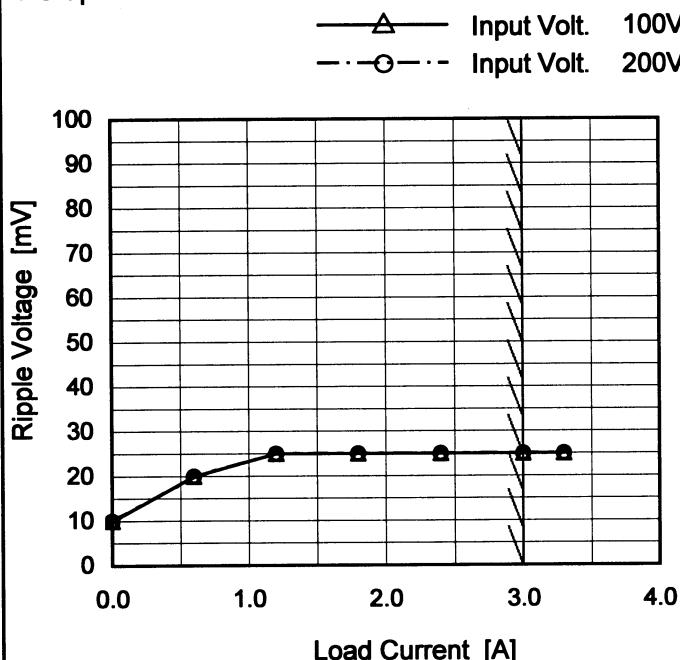
Model	PBW50F-5	Temperature Testing Circuitry	25°C Figure A																																						
Item	Ripple Voltage (by Load Current)																																								
Object	+5V3A																																								
1.Graph			2.Values																																						
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 100 mV, and the X-axis ranges from 0.0 to 4.0 A. Two curves are plotted: Input Volt. 100V (solid line with open circles) and Input Volt. 200V (dashed line with open circles). Both curves show a slight increase in ripple voltage as load current increases from 0.0 to 3.0 A, after which it remains constant at approximately 25 mV. A slanted line indicates the rated load current range.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 100 [V]</th> <th>Input Volt. 200 [V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>10</td> <td>10</td> </tr> <tr> <td>0.6</td> <td>20</td> <td>20</td> </tr> <tr> <td>1.2</td> <td>25</td> <td>25</td> </tr> <tr> <td>1.8</td> <td>25</td> <td>25</td> </tr> <tr> <td>2.4</td> <td>25</td> <td>25</td> </tr> <tr> <td>3.0</td> <td>25</td> <td>25</td> </tr> <tr> <td>3.3</td> <td>25</td> <td>25</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>-5V : Rated output current 1</p>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	10	10	0.6	20	20	1.2	25	25	1.8	25	25	2.4	25	25	3.0	25	25	3.3	25	25	-	-	-	-	-	-	-	-	-	-	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 100 [V]	Input Volt. 200 [V]																																							
0.0	10	10																																							
0.6	20	20																																							
1.2	25	25																																							
1.8	25	25																																							
2.4	25	25																																							
3.0	25	25																																							
3.3	25	25																																							
-	-	-																																							
-	-	-																																							
-	-	-																																							
-	-	-																																							
<p>Measured by 20 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>																																									
<p>Diagram illustrating a Complex Ripple Wave Form. The Y-axis is labeled "Ripple [mVp-p]". Two vertical double-headed arrows indicate time intervals: T1 spans the entire width of the waveform, while T2 is a smaller interval within T1, specifically highlighting the switching component of the ripple.</p>																																									
<p>Fig. Complex Ripple Wave Form</p>																																									

COSEL

Model	PBW50F-5
Item	Ripple Voltage (by Load Current)
Object	-5V3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



Measured by 20 MHz Oscilloscope.

Ripple Voltage is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	10	10
0.6	20	20
1.2	25	25
1.8	25	25
2.4	25	25
3.0	25	25
3.3	25	25
-	-	-
-	-	-
-	-	-
-	-	-

+5V : Rated output current 1

T1: Due to AC Input Line
T2: Due to Switching

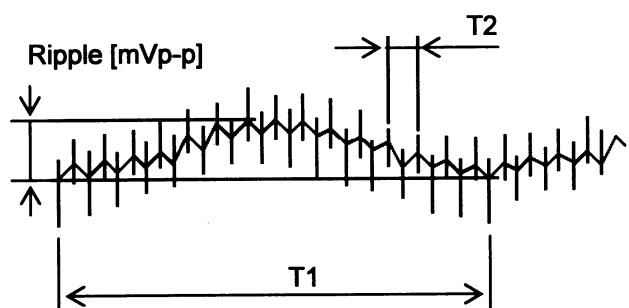


Fig. Complex Ripple Wave Form

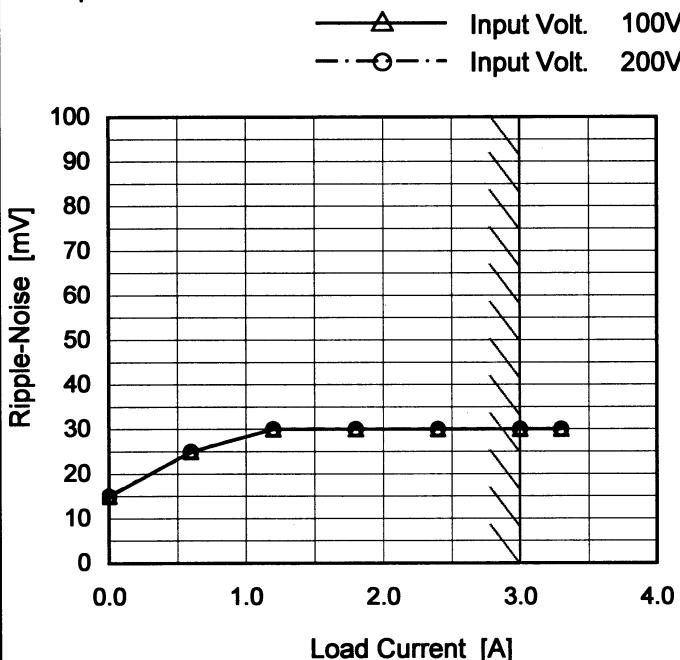
COSEL

Model PBW50F-5

Item Ripple-Noise

Object +5V3A

1. Graph



Measured by 20 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	15	15
0.6	25	25
1.2	30	30
1.8	30	30
2.4	30	30
3.0	30	30
3.3	30	30
-	-	-
-	-	-
-	-	-
-	-	-

-5V : Rated output current 1

T1: Due to AC Input Line
T2: Due to Switching

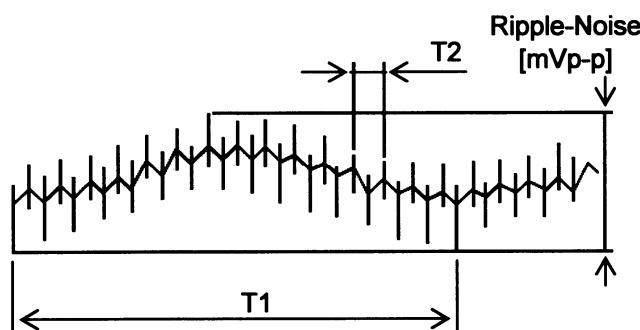


Fig. Complex Ripple Wave Form

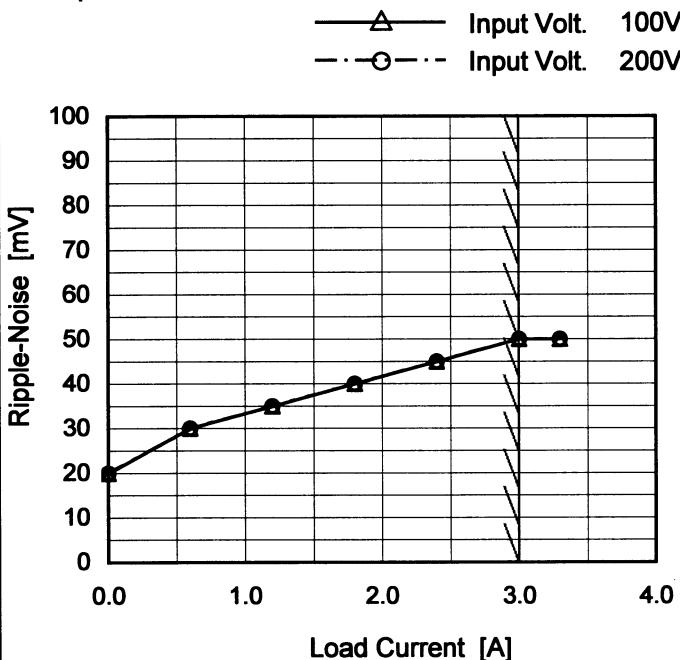
COSEL

Model PBW50F-5

Item Ripple-Noise

Object -5V3A

1. Graph



Measured by 20 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	20	20
0.6	30	30
1.2	35	35
1.8	40	40
2.4	45	45
3.0	50	50
3.3	50	50
-	-	-
-	-	-
-	-	-
-	-	-

+5V : Rated output current 1

T1: Due to AC Input Line
T2: Due to Switching

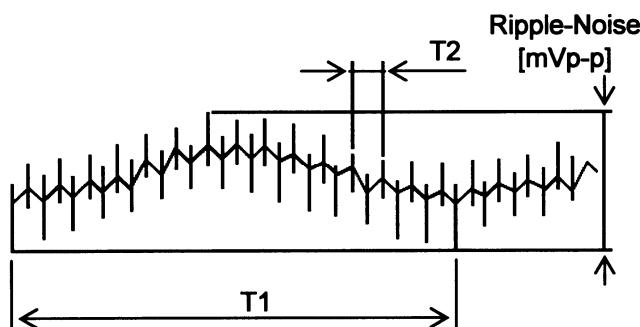
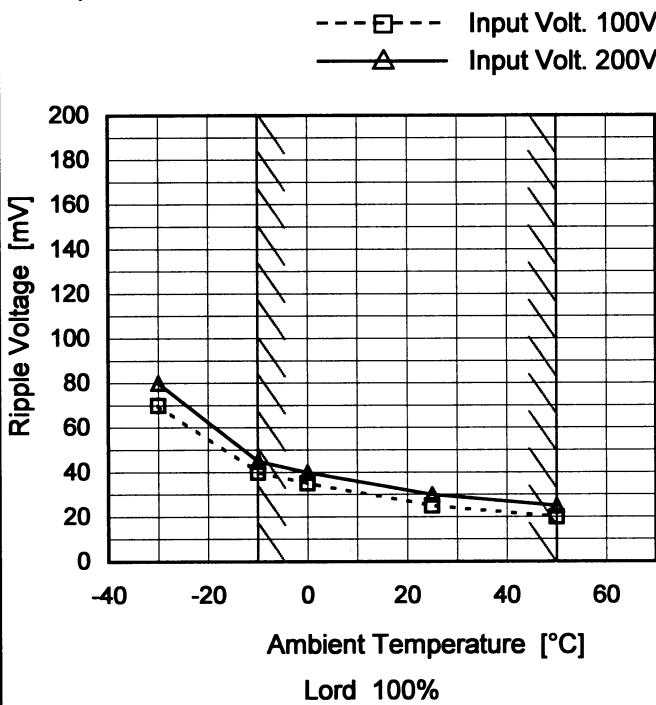


Fig. Complex Ripple Wave Form

COSEL

Model	PBW50F-5
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V3A

1.Graph



Testing Circuitry Figure A

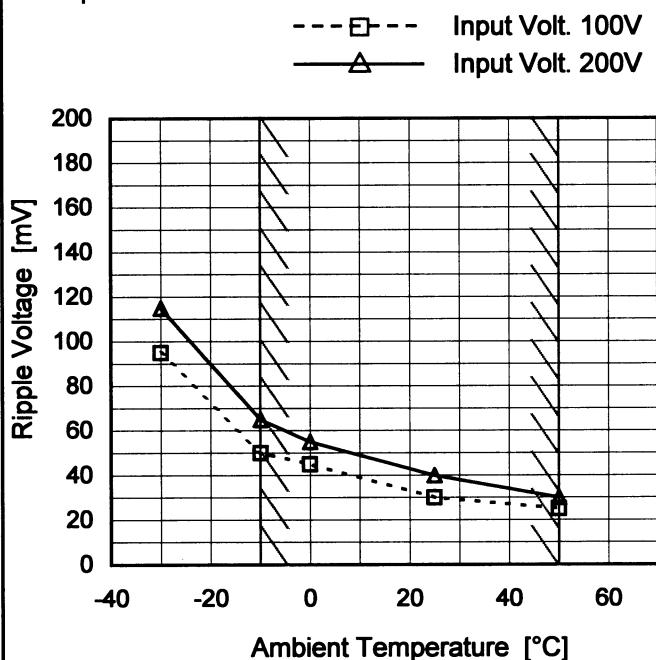
2.Values

Ambient Temperature [°C]	Ripple Voltage[mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	70	80
-10	40	45
0	35	40
25	25	30
50	20	25
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

-5V : Rated output current 1

Object	-5V3A
--------	-------

1.Graph



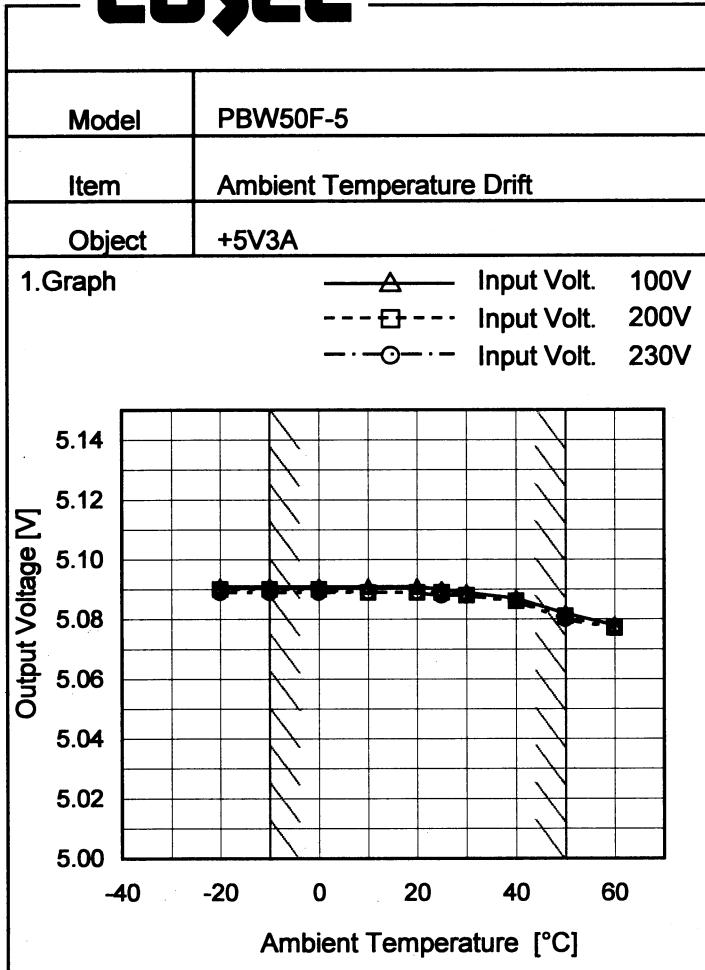
2.Values

Ambient Temperature [°C]	Ripple Voltage[mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	95	115
-10	50	65
0	45	55
25	30	40
50	25	30
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

+5V : Rated output current 1

Measured by 20 MHz Oscilloscope.

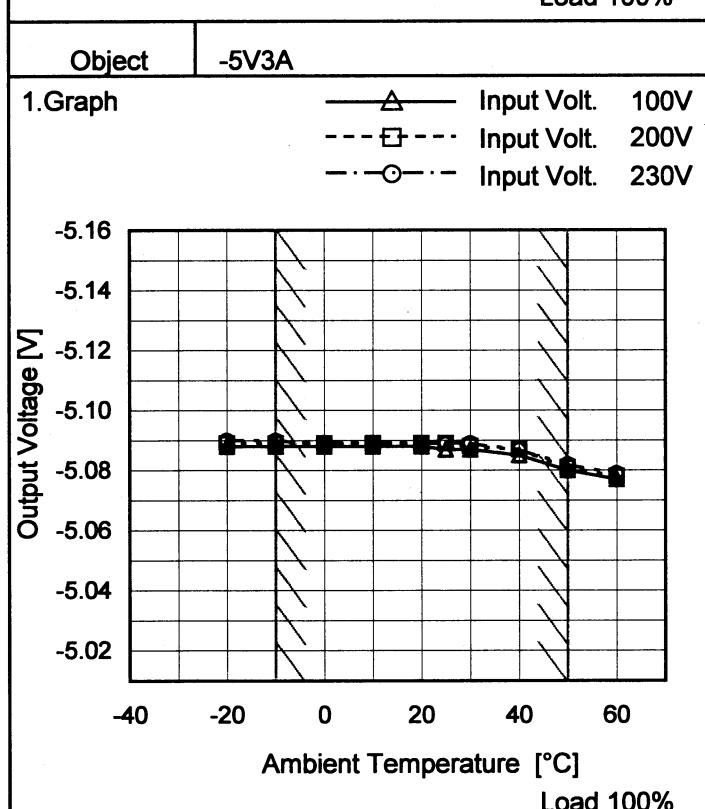
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	5.091	5.090	5.089
-10	5.091	5.090	5.089
0	5.091	5.090	5.089
10	5.091	5.089	5.089
20	5.091	5.089	5.089
25	5.090	5.089	5.088
30	5.089	5.088	5.088
40	5.087	5.086	5.086
50	5.082	5.081	5.080
60	5.078	5.077	5.077
-	-	-	-



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	-5.088	-5.089	-5.090
-10	-5.088	-5.089	-5.090
0	-5.088	-5.089	-5.089
10	-5.088	-5.089	-5.089
20	-5.088	-5.089	-5.089
25	-5.087	-5.089	-5.089
30	-5.087	-5.088	-5.089
40	-5.085	-5.087	-5.087
50	-5.080	-5.081	-5.082
60	-5.077	-5.078	-5.079
-	-	-	-

Note: Slanted line shows the range of the rated ambient temperature.



Model	PBW50F-5	Testing Circuitry Figure A
Item	Output Voltage Accuracy	

1. Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -10 - 50°C

Input Voltage : 85 - 264V

Load Current (AVR 1) : 0 - 3A (AVR 2) : 0 - 3A

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

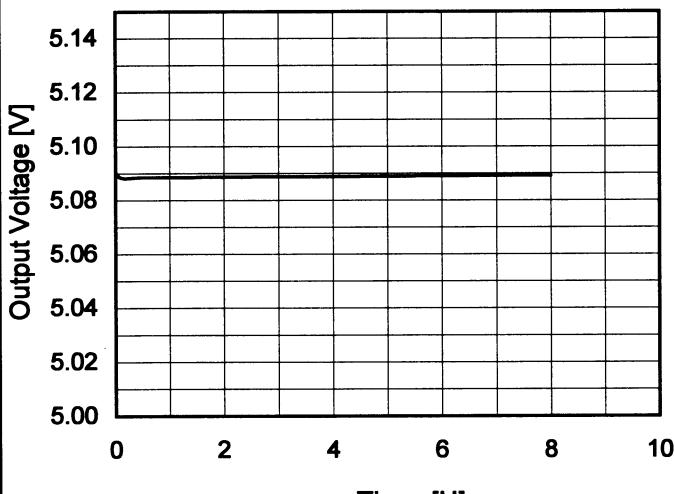
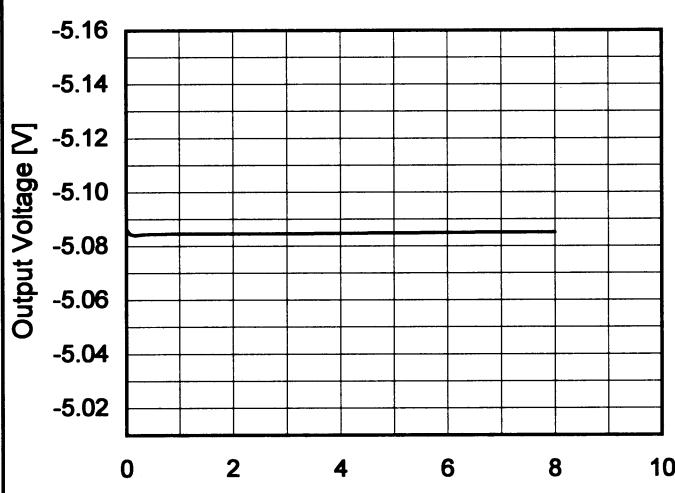
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Object	+5V3A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	264		0	5.266		
Minimum Voltage	-10	85		3	5.092	±87	±1.7

Object	-5V3A			Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]		Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	200		0	-5.256		
Minimum Voltage	50	85		3	-5.084	±86	±1.7

COSEL

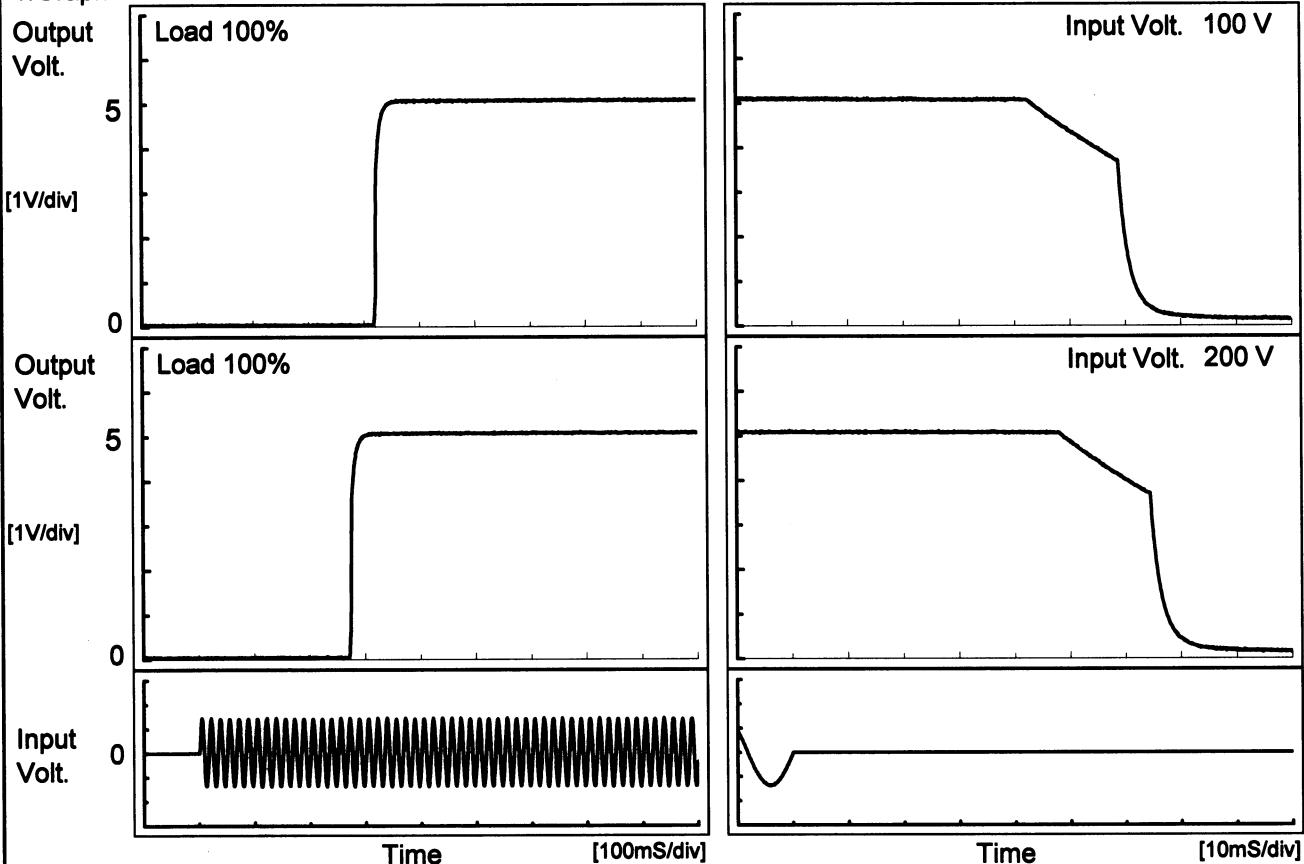
Model	PBW50F-5	Temperature Testing Circuitry Figure A	25°C																							
Item	Time Lapse Drift																									
Object	+5V3A																									
1.Graph			2.Values																							
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5.091</td></tr> <tr><td>0.5</td><td>5.089</td></tr> <tr><td>1.0</td><td>5.089</td></tr> <tr><td>2.0</td><td>5.089</td></tr> <tr><td>3.0</td><td>5.089</td></tr> <tr><td>4.0</td><td>5.089</td></tr> <tr><td>5.0</td><td>5.089</td></tr> <tr><td>6.0</td><td>5.089</td></tr> <tr><td>7.0</td><td>5.089</td></tr> <tr><td>8.0</td><td>5.089</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	5.091	0.5	5.089	1.0	5.089	2.0	5.089	3.0	5.089	4.0	5.089	5.0	5.089	6.0	5.089	7.0	5.089	8.0	5.089	
Time since start [H]	Output Voltage [V]																									
0.0	5.091																									
0.5	5.089																									
1.0	5.089																									
2.0	5.089																									
3.0	5.089																									
4.0	5.089																									
5.0	5.089																									
6.0	5.089																									
7.0	5.089																									
8.0	5.089																									
Object			2.Values																							
1.Graph			 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>	<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-5.086</td></tr> <tr><td>0.5</td><td>-5.085</td></tr> <tr><td>1.0</td><td>-5.085</td></tr> <tr><td>2.0</td><td>-5.085</td></tr> <tr><td>3.0</td><td>-5.085</td></tr> <tr><td>4.0</td><td>-5.085</td></tr> <tr><td>5.0</td><td>-5.085</td></tr> <tr><td>6.0</td><td>-5.085</td></tr> <tr><td>7.0</td><td>-5.085</td></tr> <tr><td>8.0</td><td>-5.085</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	-5.086	0.5	-5.085	1.0	-5.085	2.0	-5.085	3.0	-5.085	4.0	-5.085	5.0	-5.085	6.0	-5.085	7.0	-5.085	8.0	-5.085
Time since start [H]	Output Voltage [V]																									
0.0	-5.086																									
0.5	-5.085																									
1.0	-5.085																									
2.0	-5.085																									
3.0	-5.085																									
4.0	-5.085																									
5.0	-5.085																									
6.0	-5.085																									
7.0	-5.085																									
8.0	-5.085																									
*The characteristic of AC200V is equal.																										

COSEL

Model	PBW50F-5
Item	Rise and Fall Time
Object	+5V3A

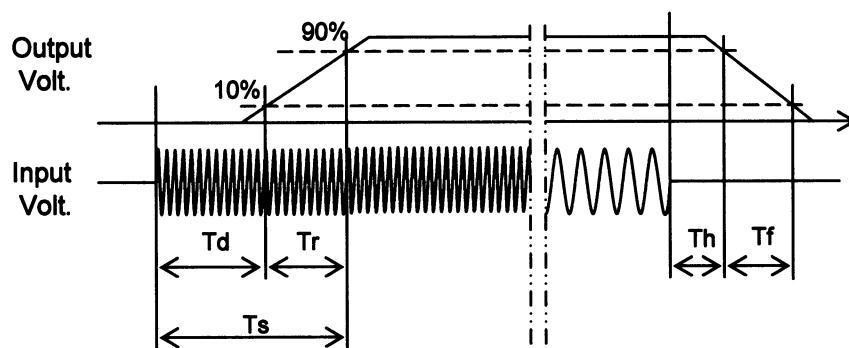
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

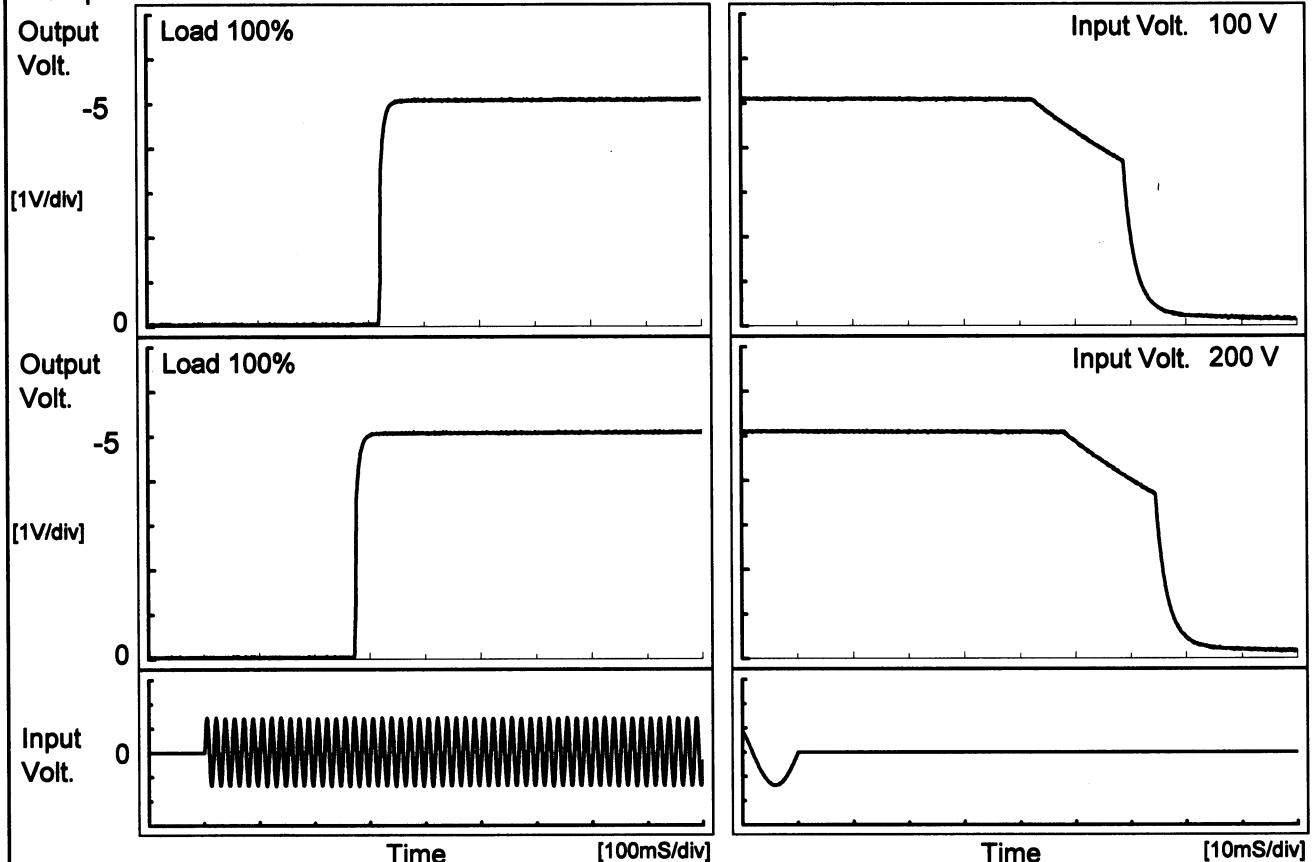
Input Volt.	Time	Td	Tr	Ts	Th	Tf	[mS]
100 V		320.0	9.5	329.5	48.0	15.5	
200 V		273.5	10.0	283.5	53.8	15.6	



COSEL

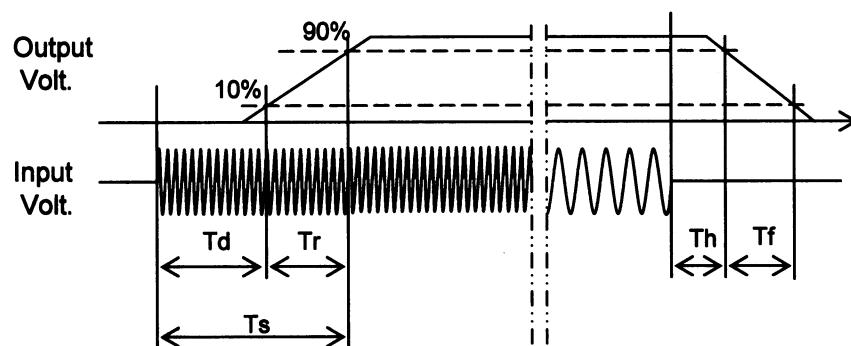
Model	PBW50F-5	Temperature Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	-5V3A	

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[mS]
100 V		319.0	10.5	329.5	48.1	15.8	
200 V		273.0	10.5	283.5	53.6	15.9	

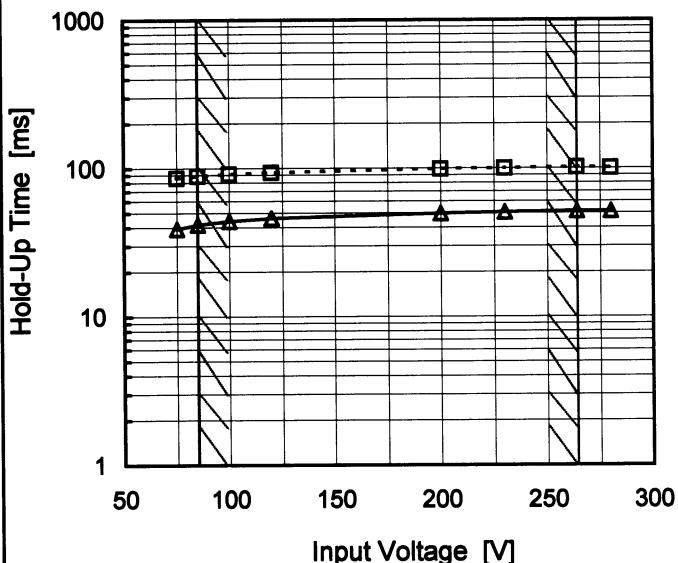


COSEL

Model	PBW50F-5	Temperature Testing Circuitry 25°C Figure A																																
Item	Hold-Up Time																																	
Object	+5V3A																																	
1. Graph		2. Values																																
<p>Graph showing Hold-Up Time [ms] vs Input Voltage [V] for PBW50F-5 at 25°C. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis is linear from 50 to 300 V. Two series are shown: Load 50% (dashed line with squares) and Load 100% (solid line with triangles). Both series show a slight increase in hold-up time as input voltage increases above 100V. A slanted line indicates the rated input voltage range.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Hold-Up Time [ms]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td> <td>86</td> <td>39</td> </tr> <tr> <td>85</td> <td>89</td> <td>42</td> </tr> <tr> <td>100</td> <td>91</td> <td>44</td> </tr> <tr> <td>120</td> <td>94</td> <td>46</td> </tr> <tr> <td>200</td> <td>99</td> <td>50</td> </tr> <tr> <td>230</td> <td>100</td> <td>51</td> </tr> <tr> <td>264</td> <td>101</td> <td>51</td> </tr> <tr> <td>280</td> <td>101</td> <td>51</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	86	39	85	89	42	100	91	44	120	94	46	200	99	50	230	100	51	264	101	51	280	101	51	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																	
	Load 50%	Load 100%																																
75	86	39																																
85	89	42																																
100	91	44																																
120	94	46																																
200	99	50																																
230	100	51																																
264	101	51																																
280	101	51																																
--	-	-																																
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy. Note: Slanted line shows the range of the rated input voltage.</p>																																		

COSEL
Model PBW50F-5
Item Hold-Up Time
Object -5V3A
1. Graph

--- □--- Load 50%
 —△— Load 100%



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
 Note: Slanted line shows the range of the rated input voltage.

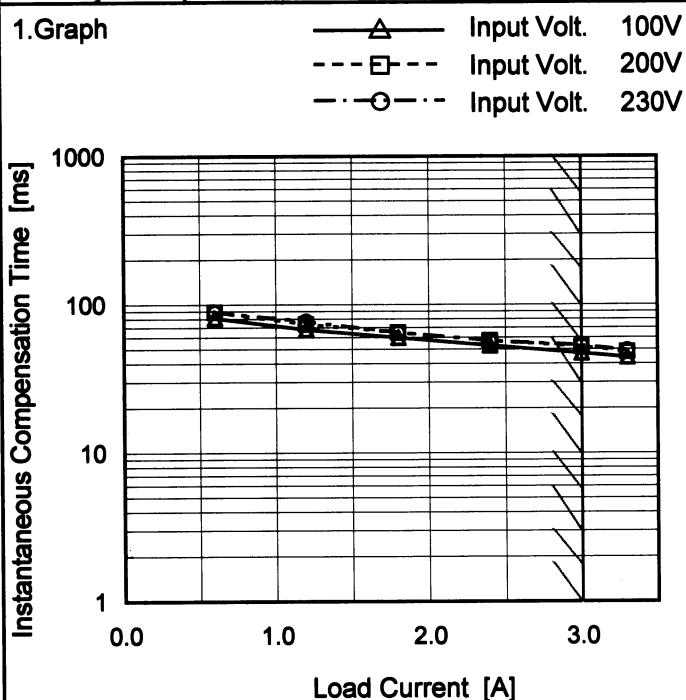
Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	86	39
85	89	42
100	91	44
120	94	46
200	99	50
230	100	51
264	101	51
280	101	51
--	-	-

COSEL

Model	PBW50F-5
Item	Instantaneous Interruption Compensation
Object	+5V3A


 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
0.6	81	89	89
1.2	68	74	77
1.8	60	65	65
2.4	53	57	57
3.0	47	52	53
3.3	44	48	49
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-5V : Rated output current 1

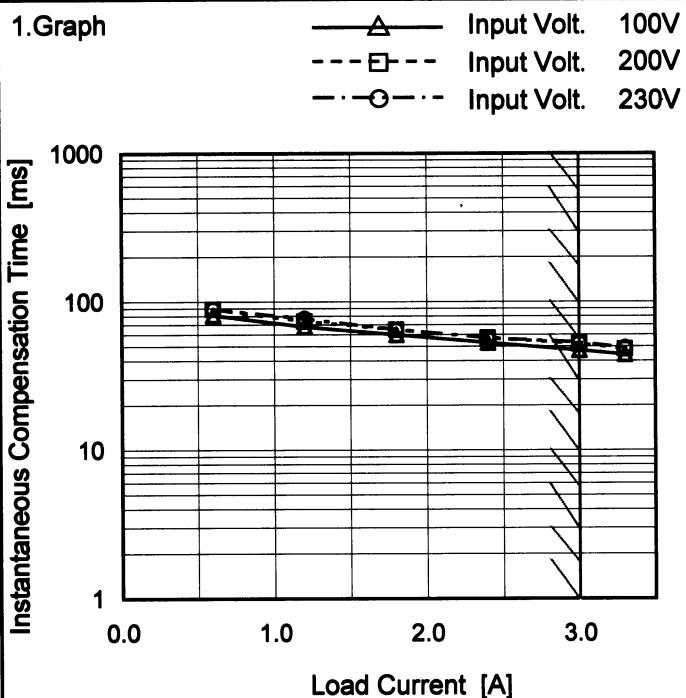
Note: Slanted line shows the range of the rated load current.

COSEL

Model PBW50F-5

Item Instantaneous Interruption Compensation

Object -5V3A



Note: Slanted line shows the range of the rated load current.

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
0.6	81	89	89
1.2	68	74	77
1.8	60	65	65
2.4	53	57	57
3.0	47	52	53
3.3	44	48	49
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+5V : Rated output current 1

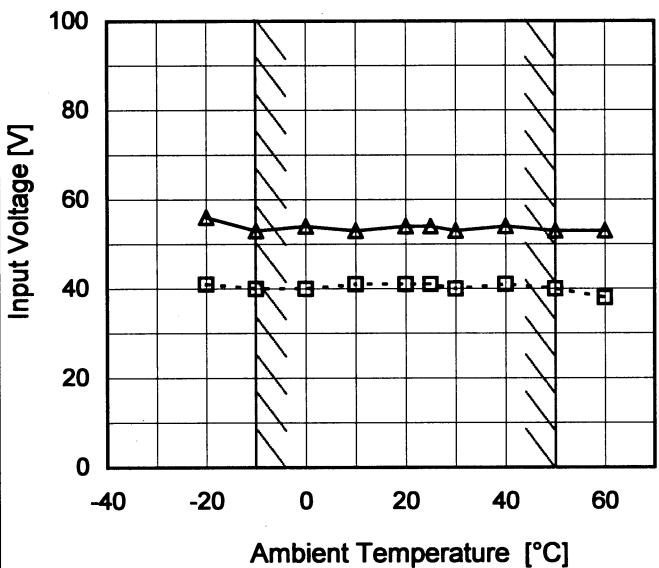
COSEL

Model PBW50F-5

Item Minimum Input Voltage
for Regulated Output Voltage

Object +5V3A

1.Graph

 ---□--- Load 50%
 —△— Load 100%


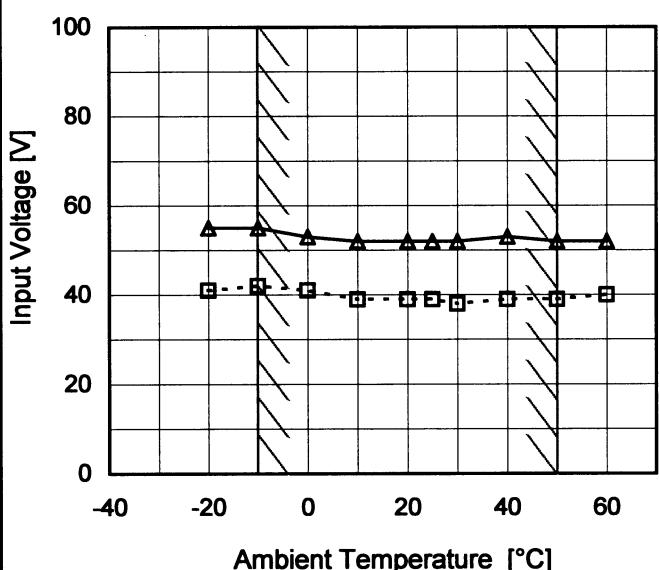
Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	41	56
-10	40	53
0	40	54
10	41	53
20	41	54
25	41	54
30	40	53
40	41	54
50	40	53
60	38	53
-	-	-

Object -5V3A

1.Graph

 ---□--- Load 50%
 —△— Load 100%


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	41	55
-10	42	55
0	41	53
10	39	52
20	39	52
25	39	52
30	38	52
40	39	53
50	39	52
60	40	52
-	-	-

Note: Slanted line shows the range of the rated ambient temperature.

COSEL

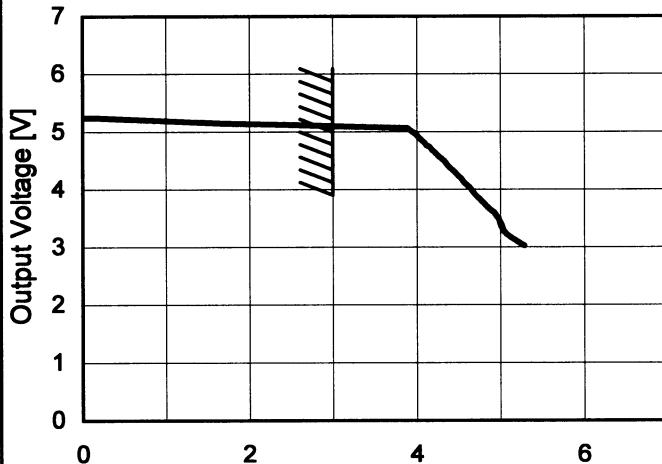
Model PBW50F-5

Item Overcurrent Protection

Object +5V3A

1.Graph

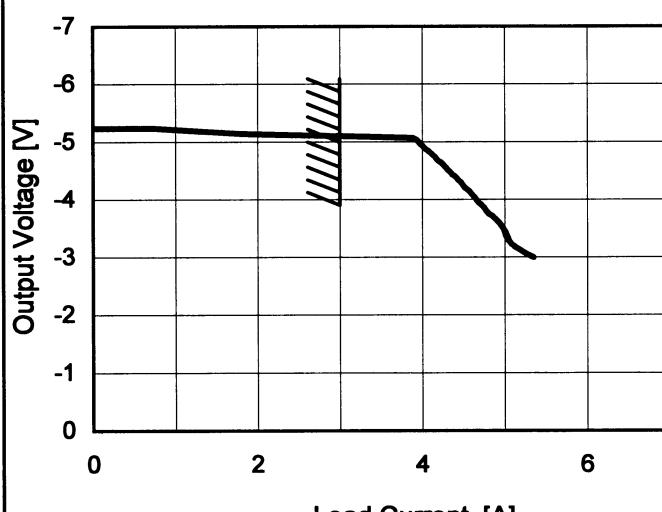
Input Volt. 100V
Input Volt. 200V



Intermittent operation occurs when the output voltage is from 3V to 0V.

1.Graph

Input Volt. 100V
Input Volt. 200V



Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from -3V to 0V.

Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt.	Input Volt.
100[V]	200[V]	
5.0	3.89	3.89
4.8	4.11	4.15
4.5	4.32	4.33
4.0	4.66	4.66
3.5	4.99	4.98
3.0	5.32	5.34
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt.	Input Volt.
100[V]	200[V]	
-5.0	3.89	3.89
-4.8	4.15	4.16
-4.5	4.33	4.33
-4.0	4.66	4.66
-3.5	5.00	4.98
-3.0	5.33	5.35
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

COSEL

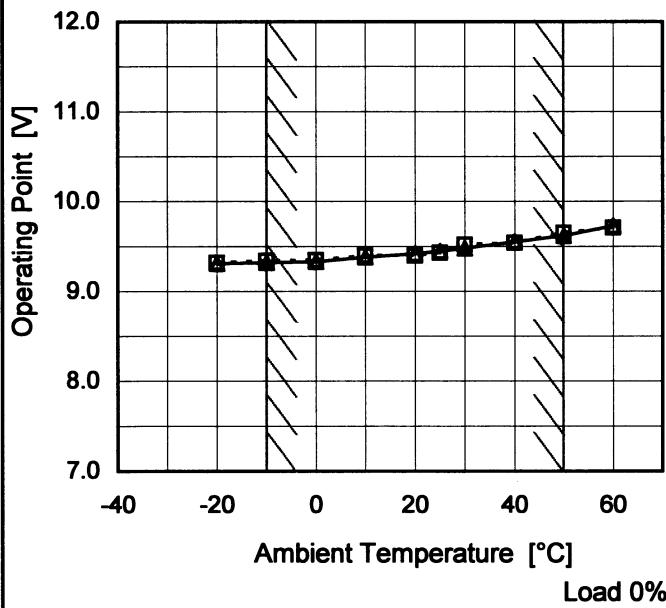
Model PBW50F-5

Item Overvoltage Protection

Object +5V3A

1.Graph

—▲— Input Volt. 100V
 - - - □ - - Input Volt. 200V



Testing Circuitry Figure A

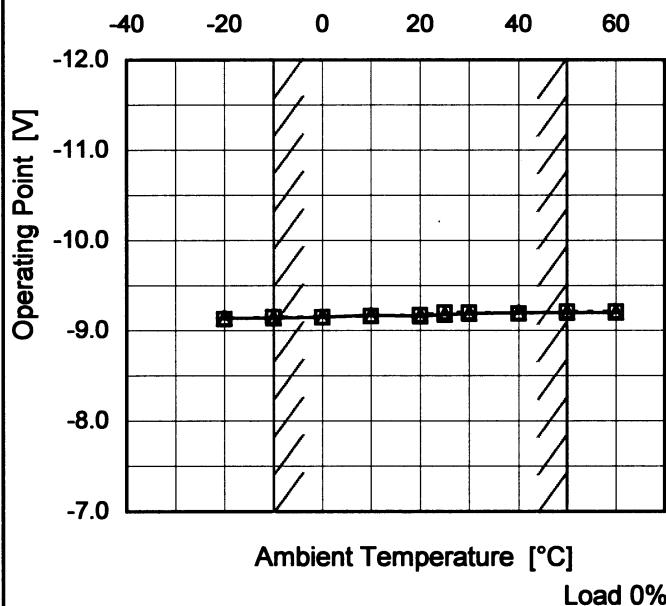
2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	9.31	9.32
-10	9.32	9.34
0	9.33	9.35
10	9.38	9.40
20	9.42	9.40
25	9.45	9.43
30	9.48	9.52
40	9.55	9.54
50	9.62	9.65
60	9.73	9.71
-	-	-

Object -5V3A

1.Graph

—▲— Input Volt. 100V
 - - - □ - - Input Volt. 200V



2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	-9.14	-9.13
-10	-9.14	-9.15
0	-9.15	-9.15
10	-9.17	-9.16
20	-9.16	-9.17
25	-9.18	-9.20
30	-9.19	-9.20
40	-9.20	-9.19
50	-9.20	-9.21
60	-9.20	-9.21
-	-	-

Note: Slanted line shows the range of the rated ambient temperature.

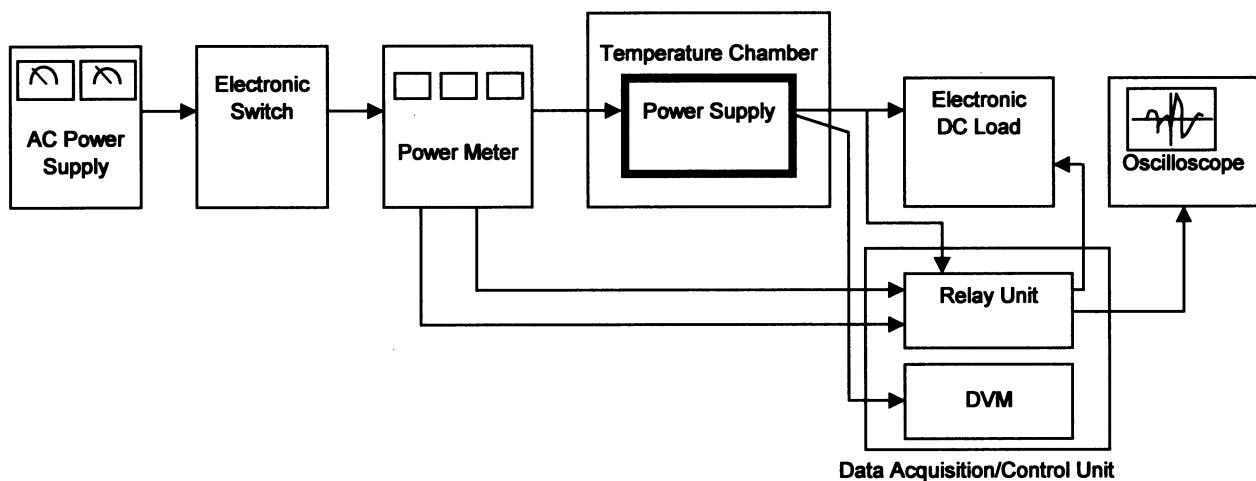


Figure A

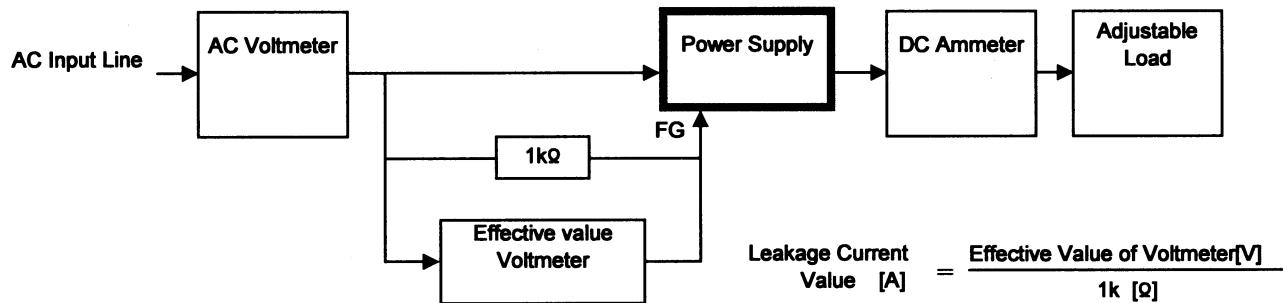


Figure B (DEN-AN)

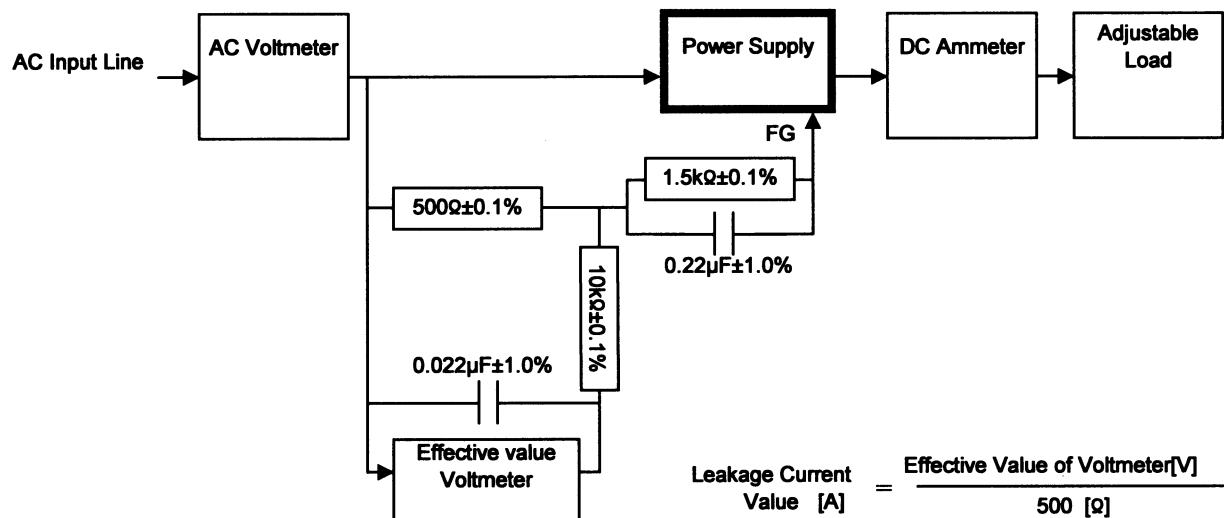


Figure B (IEC60950)