

TEST DATA OF G1-5

Regulated DC Power Supply
July 23, 2010

Approved by : Eiyoshi Wakamatsu
Eiyoshi Wakamatsu Design Manager

Prepared by : Satoshi Kinoshita
Satoshi Kinoshita 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. Line Regulation	8
9. Load Regulation	9
10. Dynamic Load Response	10
11. Ripple Voltage (by Load Current)	11
12. Ripple Voltage (by Ambient Temperature)	12
13. Ambient Temperature Drift	13
14. Output Voltage Accuracy	14
15. Time Lapse Drift	15
16. Rise and Fall Time	16
17. Hold-Up Time	17
18. Instantaneous Interruption Compensation	18
19. Minimum Input Voltage for Regulated Output Voltage	19
20. Overcurrent Protection	20
21. Figure of Testing Circuitry	21

(Final Page 21)

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Model	G1-5	Temperature	25°C																																																				
Item	Input Current (by Load Current)	Testing Circuitry	Figure A																																																				
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Model	G1-5
Item	Input Power (by Load Current)
Object	—

1.Graph

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	0.60	0.70	0.80
0.2	2.80	3.10	3.50
0.4	5.00	5.60	6.20
0.6	7.10	8.00	8.80
0.8	9.20	10.30	11.40
1.0	11.30	12.60	14.00
1.1	12.30	13.80	15.30
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--	-	-	-
--	-	-	-
--	-	-	-

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

 Temperature 25°C
 Testing Circuitry Figure A

COSEL

Model	G1-5	Temperature	25°C																																
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1.Graph																																			
<p>The graph plots Efficiency [%] on the y-axis (4 to 60) against Input Voltage [V] on the x-axis (80 to 120). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. A vertical dashed line is drawn through the graph at approximately 90V, indicating the rated input voltage range.</p>																																			
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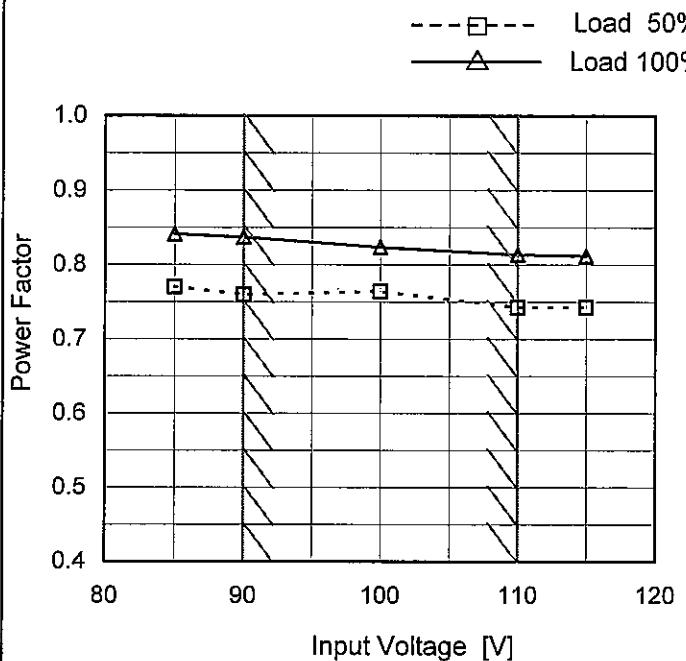
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COSEL

Model	G1-5
Item	Power Factor (by Input Voltage)
Object	—

1.Graph



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.770	0.841
90	0.759	0.837
100	0.764	0.824
110	0.743	0.814
115	0.743	0.812
--	-	-
--	-	-
--	-	-
--	-	-

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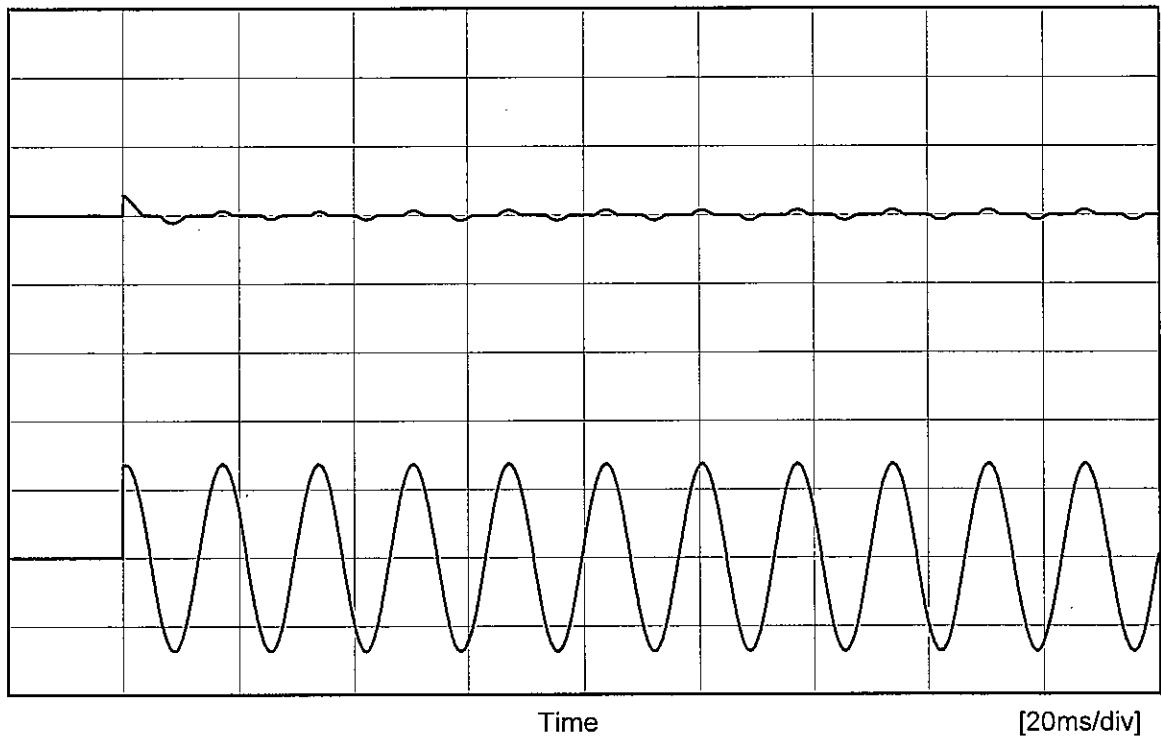
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1.Graph	Input Volt. 90V Input Volt. 100V Input Volt. 110V	2.Values																																																
<p>The graph plots Power Factor against Load Current for three input voltages: 90V, 100V, and 110V. The power factor increases with load current for all voltages. A slanted line on the graph indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 90[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 110[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.2</td><td>0.700</td><td>0.684</td><td>0.673</td></tr> <tr><td>0.4</td><td>0.758</td><td>0.747</td><td>0.729</td></tr> <tr><td>0.6</td><td>0.786</td><td>0.777</td><td>0.765</td></tr> <tr><td>0.8</td><td>0.814</td><td>0.798</td><td>0.792</td></tr> <tr><td>1.0</td><td>0.837</td><td>0.824</td><td>0.814</td></tr> <tr><td>1.1</td><td>0.842</td><td>0.836</td><td>0.827</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 Current [A]	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.0	-	-	-	0.2	0.700	0.684	0.673	0.4	0.758	0.747	0.729	0.6	0.786	0.777	0.765	0.8	0.814	0.798	0.792	1.0	0.837	0.824	0.814	1.1	0.842	0.836	0.827	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-		
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Model G1-5

Item Inrush Current

Object

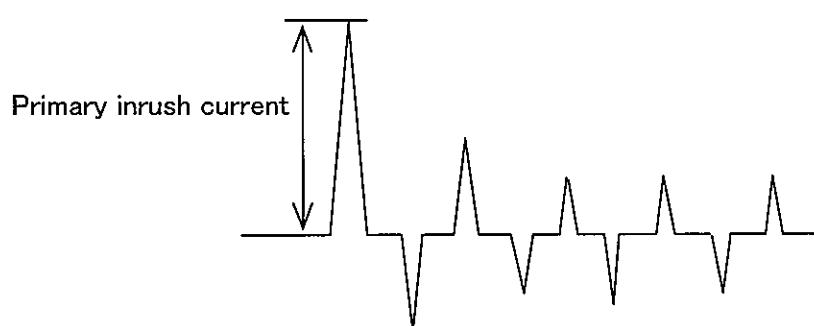
Temperature 25°C
Testing Circuitry Figure AInput
Current
[5A/div]

Input Voltage 100 V

Frequency 60 Hz

Load 100 %

Primary inrush current 1.5 A



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Model	G1-5	Temperature	25°C																																																		
Item	Line Regulation	Testing Circuitry	Figure A																																																		
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<p>The graph plots Output Voltage [V] on the y-axis (4.94 to 5.08) against Input Voltage [V] on the x-axis (80 to 120). Two sets of data points are shown: Load 50% (represented by squares) and Load 100% (represented by triangles). A horizontal dashed line at 5.02 V represents the rated output voltage. Slanted lines indicate the input voltage range from 90V to 110V.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Output Voltage [V] (Load 50%)</th> <th>Output Voltage [V] (Load 100%)</th> </tr> </thead> <tbody> <tr><td>85</td><td>5.015</td><td>5.015</td></tr> <tr><td>90</td><td>5.015</td><td>5.015</td></tr> <tr><td>100</td><td>5.015</td><td>5.015</td></tr> <tr><td>110</td><td>5.016</td><td>5.015</td></tr> <tr><td>115</td><td>5.016</td><td>5.015</td></tr> </tbody> </table>		Input Voltage [V]	Output Voltage [V] (Load 50%)	Output Voltage [V] (Load 100%)	85	5.015	5.015	90	5.015	5.015	100	5.015	5.015	110	5.016	5.015	115	5.016	5.015	<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Output Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>85</td><td>5.015</td><td>5.015</td></tr> <tr><td>90</td><td>5.015</td><td>5.015</td></tr> <tr><td>100</td><td>5.015</td><td>5.015</td></tr> <tr><td>110</td><td>5.016</td><td>5.015</td></tr> <tr><td>115</td><td>5.016</td><td>5.015</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	85	5.015	5.015	90	5.015	5.015	100	5.015	5.015	110	5.016	5.015	115	5.016	5.015	--	-	-	--	-	-	--	-	-	--	-	-
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1.Graph	<p>—▲— Input Volt. 90V - - - □ - - Input Volt. 100V - - ○ - - Input Volt. 110V</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>90V Output [V]</th> <th>100V Output [V]</th> <th>110V Output [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>0.4</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>0.8</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>0.9</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>1.0</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>1.1</td><td>5.02</td><td>5.02</td><td>5.02</td></tr> <tr><td>1.2</td><td>4.94</td><td>4.94</td><td>4.94</td></tr> </tbody> </table>				Load Current [A]	90V Output [V]	100V Output [V]	110V Output [V]	0.0	5.02	5.02	5.02	0.4	5.02	5.02	5.02	0.8	5.02	5.02	5.02	0.9	5.02	5.02	5.02	1.0	5.02	5.02	5.02	1.1	5.02	5.02	5.02	1.2	4.94	4.94	4.94																			
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Load Current [A]	Output Voltage [V]																																																						
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0.8	5.015	5.015	5.015																																																				
1.0	5.014	5.014	5.014																																																				
1.1	5.014	5.014	5.014																																																				
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Note:	Slanted line shows the range of the rated load current.																																																						

COSEL

Model	G1-5	Temperature Testing Circuitry Figure A	25°C
Item	Dynamic Load Response		
Object	+5V1A		

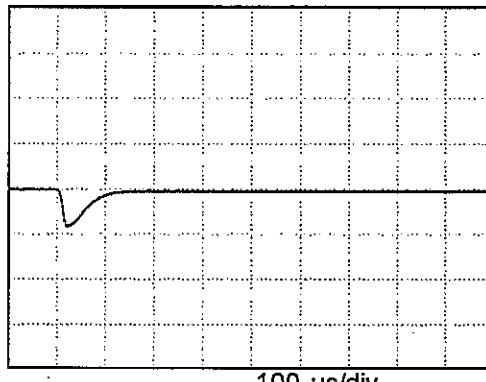
Input Volt. 100 V
 Cycle 1000 ms

Load Current

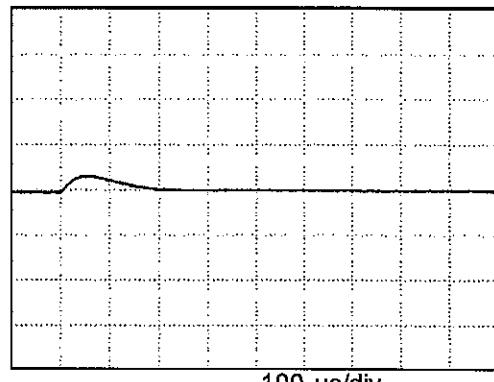


Min. Load (0A) ←→
 Load 100% (1A)

50 mV/div



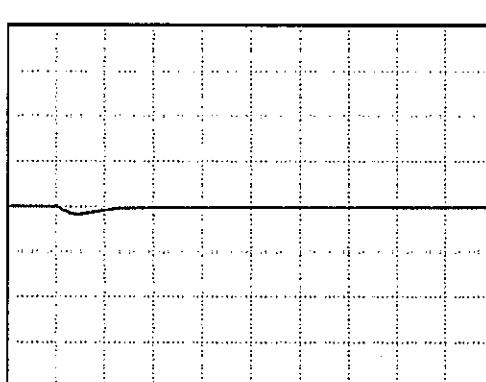
100 µs/div



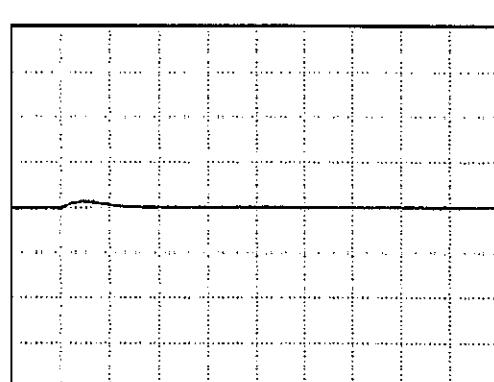
100 µs/div

Load 50% (0.5A) ←→
 Load 100% (1A)

50 mV/div



100 µs/div

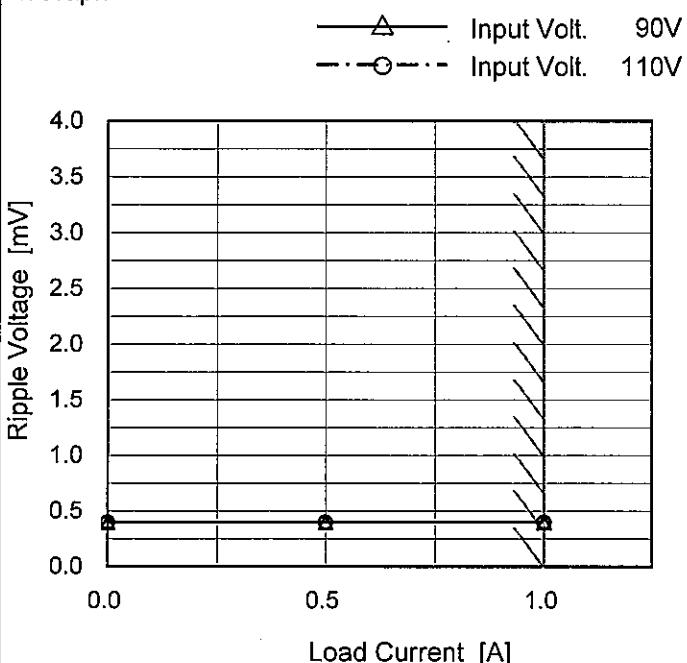


100 µs/div

COSEL

Model	G1-5
Item	Ripple Voltage (by Load Current)
Object	+5V1A

1.Graph



Measured by 20 MHz Oscilloscope.

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

Temperature 25°C
Testing Circuitry Figure A

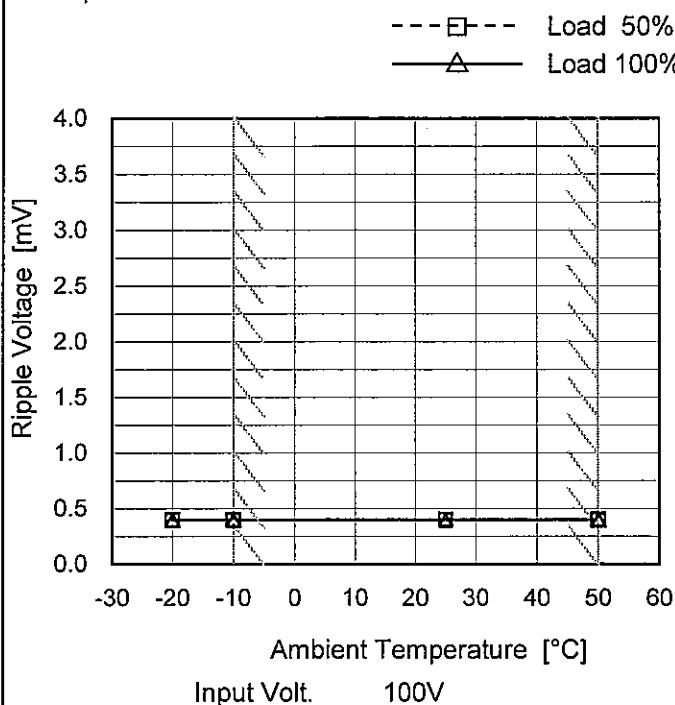
2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 90 [V]	Input Volt. 110 [V]
0.0	0.4	0.4
0.5	0.4	0.4
1.0	0.4	0.4
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	G1-5
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V1A

1.Graph



Measured by 20 MHz Oscilloscope.

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

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	0.4	0.4
-10	0.4	0.4
25	0.4	0.4
50	0.4	0.4
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	G1-5	Testing Circuitry Figure A																																																					
Item	Ambient Temperature Drift																																																						
Object	+5V1A																																																						
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <ul style="list-style-type: none"> — △ — Input Volt. 90V - - - □ - - Input Volt. 100V - - - ○ - - Input Volt. 110V 																																																						
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 90[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 110[V]</th> </tr> </thead> <tbody> <tr> <td>-20</td><td>5.000</td><td>5.000</td><td>5.000</td></tr> <tr> <td>-10</td><td>5.003</td><td>5.003</td><td>5.003</td></tr> <tr> <td>0</td><td>5.007</td><td>5.007</td><td>5.007</td></tr> <tr> <td>10</td><td>5.011</td><td>5.011</td><td>5.011</td></tr> <tr> <td>20</td><td>5.013</td><td>5.013</td><td>5.013</td></tr> <tr> <td>25</td><td>5.014</td><td>5.014</td><td>5.015</td></tr> <tr> <td>30</td><td>5.015</td><td>5.016</td><td>5.015</td></tr> <tr> <td>40</td><td>5.017</td><td>5.017</td><td>5.017</td></tr> <tr> <td>50</td><td>5.018</td><td>5.018</td><td>5.018</td></tr> <tr> <td>60</td><td>5.018</td><td>5.018</td><td>5.018</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	-20	5.000	5.000	5.000	-10	5.003	5.003	5.003	0	5.007	5.007	5.007	10	5.011	5.011	5.011	20	5.013	5.013	5.013	25	5.014	5.014	5.015	30	5.015	5.016	5.015	40	5.017	5.017	5.017	50	5.018	5.018	5.018	60	5.018	5.018	5.018	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																				
-20	5.000	5.000	5.000																																																				
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--	-	-	-																																																				

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



Model	G1-5	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+5V1A	

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 : 90 - 110V

Load Current : 0 - 1A

* 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

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	110	0	5.020	±9	±0.2
Minimum Voltage	-10	90	1	5.003		

COSEL

Model	G1-5
Item	Time Lapse Drift
Object	+5V1A

1. Graph

Time since start [H]	Output Voltage [V]
0.0	5.013
0.5	5.016
1.0	5.016
2.0	5.016
3.0	5.016
4.0	5.016
5.0	5.016
6.0	5.016
7.0	5.016
8.0	5.016

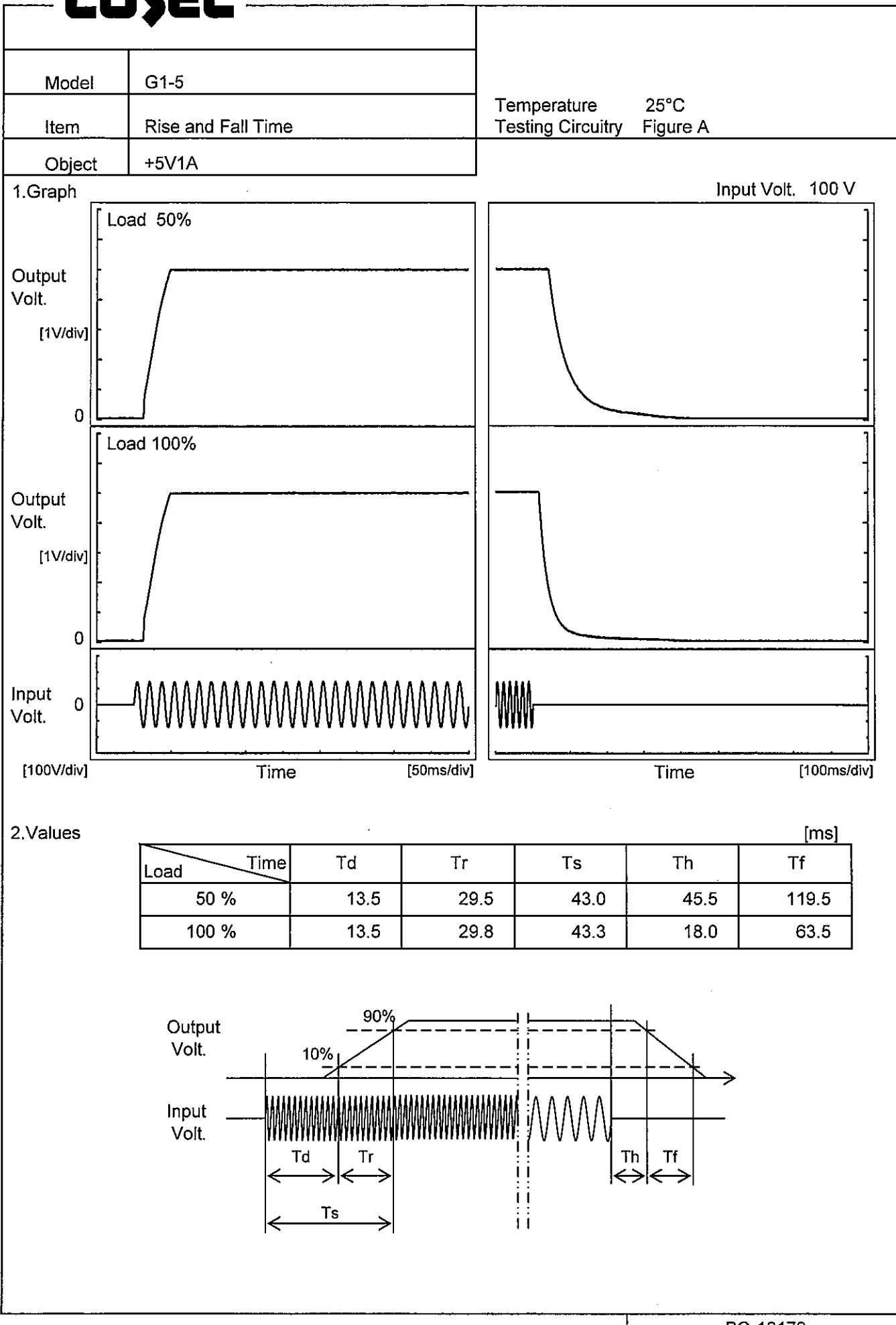
Input Volt. 100V
Load 100%

Temperature 25°C
Testing Circuitry Figure A

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.013
0.5	5.016
1.0	5.016
2.0	5.016
3.0	5.016
4.0	5.016
5.0	5.016
6.0	5.016
7.0	5.016
8.0	5.016

COSEL



COSEL

Model	G1-5	Temperature	25°C																																
Item	Hold-Up Time	Testing Circuitry	Figure A																																
Object	+5V1A																																		
1.Graph			2.Values																																
<p>Graph showing Hold-Up Time [ms] vs Input Voltage [V] for G1-5 at 25°C. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis ranges from 80 to 120 V. Two series are shown: Load 50% (dashed line with squares) and Load 100% (solid line with triangles). Both series show an increase in hold-up time as input voltage decreases below the rated range (90-110V). 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>85</td><td>26</td><td>8</td></tr> <tr> <td>90</td><td>31</td><td>11</td></tr> <tr> <td>100</td><td>41</td><td>16</td></tr> <tr> <td>110</td><td>52</td><td>21</td></tr> <tr> <td>115</td><td>57</td><td>23</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	26	8	90	31	11	100	41	16	110	52	21	115	57	23	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
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110	52	21																																	
115	57	23																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
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<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>																																			

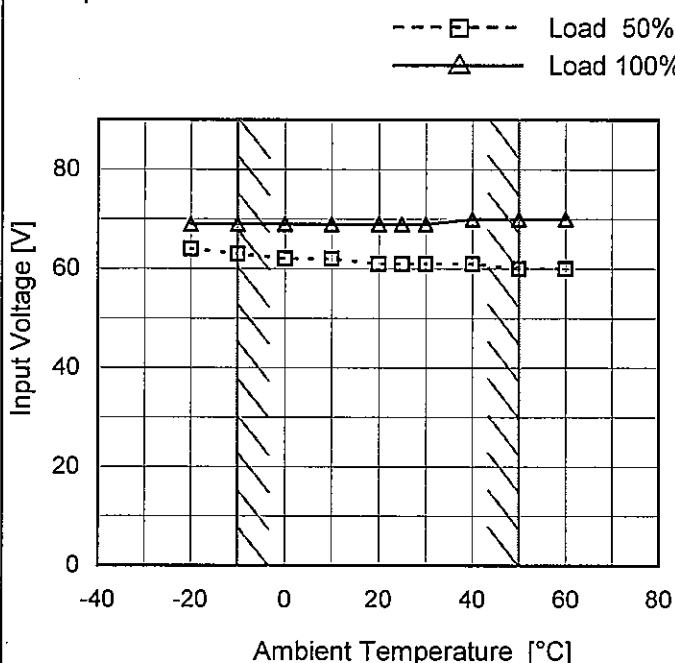
COSEL

Model	G1-5	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+5V1A																																																					
1.Graph	<p>—△— Input Volt. 90V - - □ - - Input Volt. 100V - - ○ - - Input Volt. 110V</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>90V [ms]</th> <th>100V [ms]</th> <th>110V [ms]</th> </tr> </thead> <tbody> <tr><td>0.3</td><td>~100</td><td>~150</td><td>~200</td></tr> <tr><td>0.5</td><td>~40</td><td>~60</td><td>~80</td></tr> <tr><td>0.8</td><td>~20</td><td>~30</td><td>~40</td></tr> <tr><td>1.0</td><td>~10</td><td>~15</td><td>~20</td></tr> <tr><td>1.1</td><td>~5</td><td>~6</td><td>~8</td></tr> </tbody> </table>			Load Current [A]	90V [ms]	100V [ms]	110V [ms]	0.3	~100	~150	~200	0.5	~40	~60	~80	0.8	~20	~30	~40	1.0	~10	~15	~20	1.1	~5	~6	~8																											
Load Current [A]	90V [ms]	100V [ms]	110V [ms]																																																			
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Load Current [A]	Time [ms]																																																					
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--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

Model	G1-5
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V1A

1. Graph



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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	64	69
-10	63	69
0	62	69
10	62	69
20	61	69
25	61	69
30	61	69
40	61	70
50	60	70
60	60	70
--	-	-

COSEL

Model	G1-5	Temperature	25°C																																																							
Item	Overcurrent Protection	Testing Circuitry	Figure A																																																							
Object	+5V1A																																																									
1.Graph	<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Input Volt. 90V Input Volt. 100V Input Volt. 110V</p>																																																									
Note:	Slanted line shows the range of the rated load current.																																																									
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 90[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 110[V]</th> </tr> </thead> <tbody> <tr><td>5.00</td><td>1.30</td><td>1.30</td><td>1.30</td></tr> <tr><td>4.75</td><td>1.26</td><td>1.26</td><td>1.26</td></tr> <tr><td>4.50</td><td>1.21</td><td>1.21</td><td>1.21</td></tr> <tr><td>4.00</td><td>1.16</td><td>1.16</td><td>1.16</td></tr> <tr><td>3.50</td><td>1.08</td><td>1.08</td><td>1.08</td></tr> <tr><td>3.00</td><td>0.98</td><td>0.98</td><td>0.98</td></tr> <tr><td>2.50</td><td>0.91</td><td>0.91</td><td>0.91</td></tr> <tr><td>2.00</td><td>0.84</td><td>0.84</td><td>0.84</td></tr> <tr><td>1.50</td><td>0.75</td><td>0.75</td><td>0.75</td></tr> <tr><td>1.00</td><td>0.69</td><td>0.69</td><td>0.69</td></tr> <tr><td>0.50</td><td>0.61</td><td>0.61</td><td>0.61</td></tr> <tr><td>0.00</td><td>0.53</td><td>0.53</td><td>0.53</td></tr> </tbody> </table>			Output Voltage [V]	Load Current [A]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	5.00	1.30	1.30	1.30	4.75	1.26	1.26	1.26	4.50	1.21	1.21	1.21	4.00	1.16	1.16	1.16	3.50	1.08	1.08	1.08	3.00	0.98	0.98	0.98	2.50	0.91	0.91	0.91	2.00	0.84	0.84	0.84	1.50	0.75	0.75	0.75	1.00	0.69	0.69	0.69	0.50	0.61	0.61	0.61	0.00	0.53	0.53	0.53
Output Voltage [V]	Load Current [A]																																																									
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																							
5.00	1.30	1.30	1.30																																																							
4.75	1.26	1.26	1.26																																																							
4.50	1.21	1.21	1.21																																																							
4.00	1.16	1.16	1.16																																																							
3.50	1.08	1.08	1.08																																																							
3.00	0.98	0.98	0.98																																																							
2.50	0.91	0.91	0.91																																																							
2.00	0.84	0.84	0.84																																																							
1.50	0.75	0.75	0.75																																																							
1.00	0.69	0.69	0.69																																																							
0.50	0.61	0.61	0.61																																																							
0.00	0.53	0.53	0.53																																																							

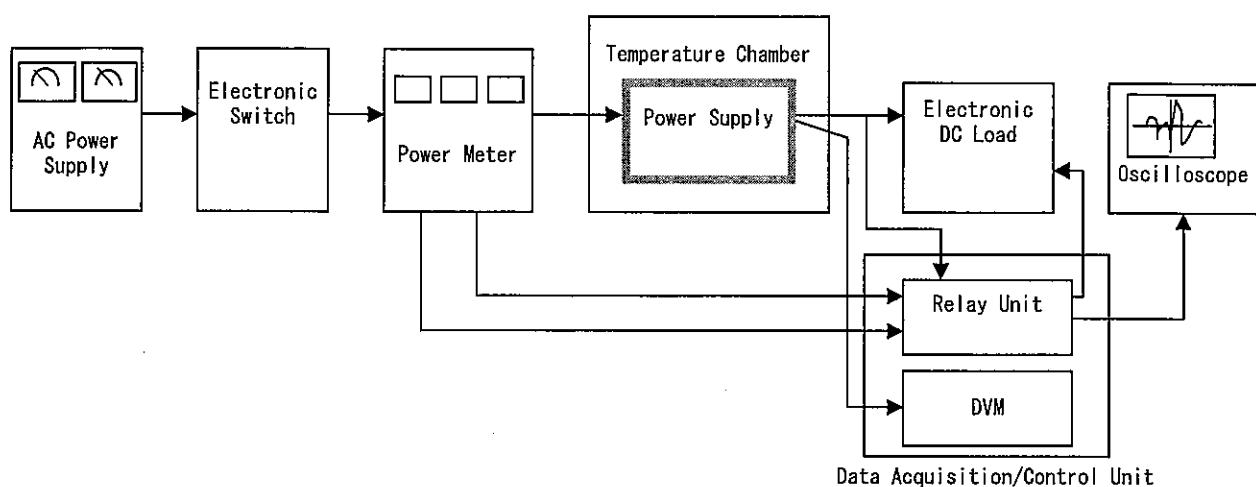
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Figure A