

# TEST DATA OF GT2W-15

Regulated DC Power Supply  
October 26, 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) . . . . . 12

12.Ripple Voltage (by Ambient Temperature) . . . . . 14

13.Ambient Temperature Drift . . . . . 15

14.Output Voltage Accuracy . . . . . 16

15.Time Lapse Drift . . . . . 17

16.Rise and Fall Time . . . . . 18

17.Hold-Up Time . . . . . 20

18.Instantaneous Interruption Compensation . . . . . 22

19.Minimum Input Voltage for Regulated Output Voltage . . . . . 24

20.Overcurrent Protection . . . . . 25

21.Figure of Testing Circuitry . . . . . 26

(Final Page 26)



Model		GT2W-15		Temperature 25°C																																																				
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph			2.Values																																																					
<p>                 —△— Input Volt. 90V                  - - □ - - Input Volt. 100V                  ···○··· Input Volt. 110V             </p> <p>Input Current [A]</p> <p>Load Ratio [%]</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Input 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>0</td><td>0.020</td><td>0.022</td><td>0.024</td></tr> <tr><td>20</td><td>0.114</td><td>0.117</td><td>0.120</td></tr> <tr><td>40</td><td>0.193</td><td>0.197</td><td>0.201</td></tr> <tr><td>60</td><td>0.265</td><td>0.271</td><td>0.276</td></tr> <tr><td>80</td><td>0.334</td><td>0.341</td><td>0.347</td></tr> <tr><td>100</td><td>0.400</td><td>0.408</td><td>0.416</td></tr> <tr><td>110</td><td>0.432</td><td>0.441</td><td>0.449</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. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0	0.020	0.022	0.024	20	0.114	0.117	0.120	40	0.193	0.197	0.201	60	0.265	0.271	0.276	80	0.334	0.341	0.347	100	0.400	0.408	0.416	110	0.432	0.441	0.449	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Input Current [A]																																																							
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																					
0	0.020	0.022	0.024																																																					
20	0.114	0.117	0.120																																																					
40	0.193	0.197	0.201																																																					
60	0.265	0.271	0.276																																																					
80	0.334	0.341	0.347																																																					
100	0.400	0.408	0.416																																																					
110	0.432	0.441	0.449																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



Model		GT2W-15		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<p>—△— Input Volt. 90V</p> <p>- - □ - - Input Volt. 100V</p> <p>- · - ○ - · - Input Volt. 110V</p>		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. 90[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 110[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>1.10</td><td>1.30</td><td>1.40</td></tr> <tr><td>20</td><td>6.20</td><td>6.90</td><td>7.70</td></tr> <tr><td>40</td><td>11.20</td><td>12.50</td><td>13.90</td></tr> <tr><td>60</td><td>16.20</td><td>18.10</td><td>20.00</td></tr> <tr><td>80</td><td>21.10</td><td>23.60</td><td>26.10</td></tr> <tr><td>100</td><td>26.10</td><td>29.10</td><td>32.20</td></tr> <tr><td>110</td><td>28.50</td><td>31.80</td><td>35.20</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. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0	1.10	1.30	1.40	20	6.20	6.90	7.70	40	11.20	12.50	13.90	60	16.20	18.10	20.00	80	21.10	23.60	26.10	100	26.10	29.10	32.20	110	28.50	31.80	35.20	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Input Power [W]																																																							
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																					
0	1.10	1.30	1.40																																																					
20	6.20	6.90	7.70																																																					
40	11.20	12.50	13.90																																																					
60	16.20	18.10	20.00																																																					
80	21.10	23.60	26.10																																																					
100	26.10	29.10	32.20																																																					
110	28.50	31.80	35.20																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



Model		GT2W-15																																	
Item		Efficiency (by Input Voltage)																																	
Object		Temperature 25°C Testing Circuitry Figure A																																	
1.Graph		2.Values																																	
<p>---□--- Load 50%</p> <p>—△— Load 100%</p> <p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Note: Slanted line shows the range of the rated input voltage.</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>85</td> <td>69.8</td> <td>73.5</td> </tr> <tr> <td>90</td> <td>65.7</td> <td>69.0</td> </tr> <tr> <td>100</td> <td>58.8</td> <td>61.9</td> </tr> <tr> <td>110</td> <td>53.3</td> <td>56.1</td> </tr> <tr> <td>115</td> <td>50.6</td> <td>53.4</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]	Efficiency [%]		Load 50%	Load 100%	85	69.8	73.5	90	65.7	69.0	100	58.8	61.9	110	53.3	56.1	115	50.6	53.4	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Efficiency [%]																																		
	Load 50%	Load 100%																																	
85	69.8	73.5																																	
90	65.7	69.0																																	
100	58.8	61.9																																	
110	53.3	56.1																																	
115	50.6	53.4																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	



Model		GT2W-15		Temperature 25°C																																																				
Item		Efficiency (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<p>—△— Input Volt. 90V                  ---□--- Input Volt. 100V                  -·-○-·- Input Volt. 110V</p>		2.Values																																																				
		<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Efficiency [%]</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>0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>20</td><td>58.3</td><td>52.4</td><td>46.9</td></tr> <tr><td>40</td><td>64.5</td><td>57.8</td><td>51.9</td></tr> <tr><td>60</td><td>66.8</td><td>59.8</td><td>54.1</td></tr> <tr><td>80</td><td>68.4</td><td>61.1</td><td>55.3</td></tr> <tr><td>100</td><td>69.1</td><td>62.0</td><td>56.0</td></tr> <tr><td>110</td><td>69.6</td><td>62.4</td><td>56.4</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 [%]	Efficiency [%]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0	-	-	-	20	58.3	52.4	46.9	40	64.5	57.8	51.9	60	66.8	59.8	54.1	80	68.4	61.1	55.3	100	69.1	62.0	56.0	110	69.6	62.4	56.4	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Efficiency [%]																																																							
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																					
0	-	-	-																																																					
20	58.3	52.4	46.9																																																					
40	64.5	57.8	51.9																																																					
60	66.8	59.8	54.1																																																					
80	68.4	61.1	55.3																																																					
100	69.1	62.0	56.0																																																					
110	69.6	62.4	56.4																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



Model		GT2W-15																																	
Item		Power Factor (by Input Voltage)																																	
Object		_____																																	
1.Graph		Temperature 25°C Testing Circuitry Figure A																																	
<p>1.Graph</p> <p>---□--- Load 50% —△— Load 100%</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<p>2.Values</p> <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>85</td> <td>0.672</td> <td>0.729</td> </tr> <tr> <td>90</td> <td>0.665</td> <td>0.725</td> </tr> <tr> <td>100</td> <td>0.654</td> <td>0.715</td> </tr> <tr> <td>110</td> <td>0.643</td> <td>0.704</td> </tr> <tr> <td>115</td> <td>0.643</td> <td>0.701</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]	Power Factor		Load 50%	Load 100%	85	0.672	0.729	90	0.665	0.725	100	0.654	0.715	110	0.643	0.704	115	0.643	0.701	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Power Factor																																		
	Load 50%	Load 100%																																	
85	0.672	0.729																																	
90	0.665	0.725																																	
100	0.654	0.715																																	
110	0.643	0.704																																	
115	0.643	0.701																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	

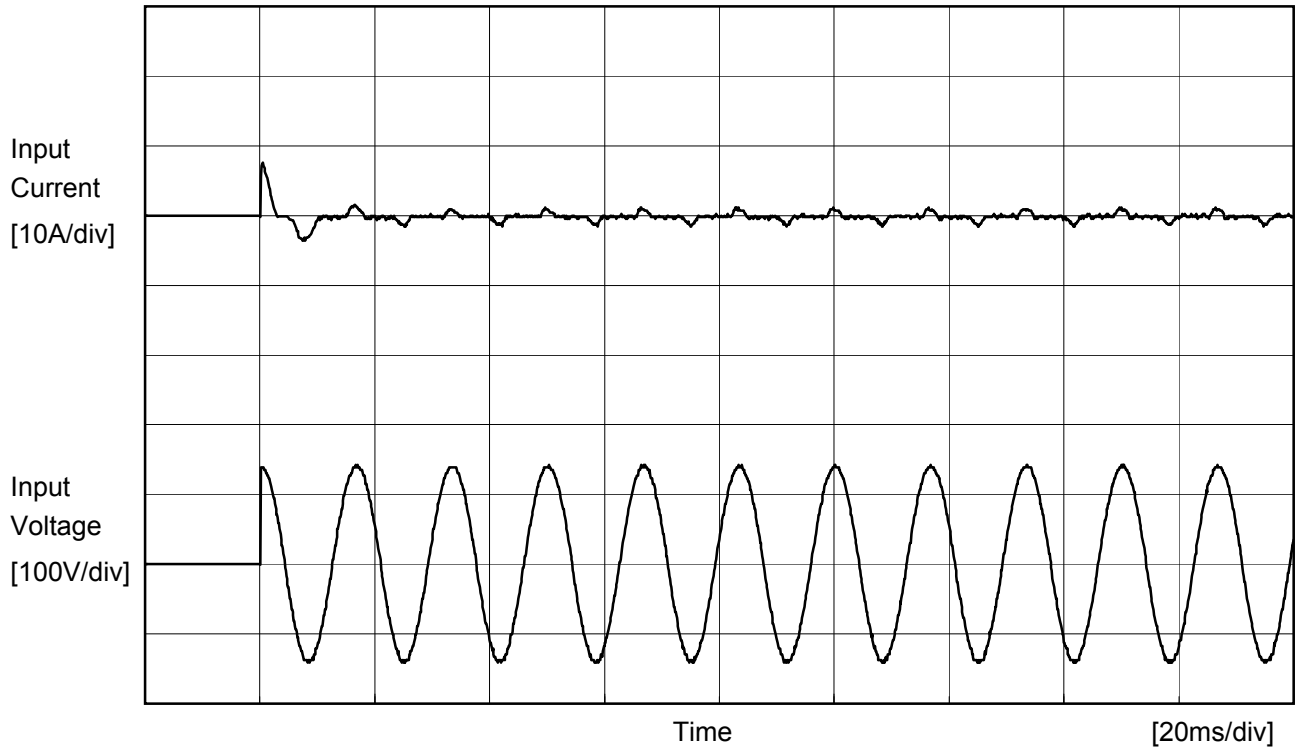


<p>Model GT2W-15</p>		<p>Temperature 25°C</p>																																																			
<p>Item Power Factor (by Load Current)</p>		<p>Testing Circuitry Figure A</p>																																																			
<p>Object _____</p>																																																					
<p>1.Graph</p> <p>                     —△— Input Volt. 90V                      - - - □ - - - Input Volt. 100V                      - · - ○ - · - - Input Volt. 110V                 </p> <p>Power Factor</p> <p>Load Ration [%]</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Power Factor</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>0</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>20</td> <td>0.608</td> <td>0.590</td> <td>0.583</td> </tr> <tr> <td>40</td> <td>0.647</td> <td>0.635</td> <td>0.629</td> </tr> <tr> <td>60</td> <td>0.678</td> <td>0.668</td> <td>0.658</td> </tr> <tr> <td>80</td> <td>0.701</td> <td>0.692</td> <td>0.683</td> </tr> <tr> <td>100</td> <td>0.725</td> <td>0.713</td> <td>0.705</td> </tr> <tr> <td>110</td> <td>0.733</td> <td>0.721</td> <td>0.714</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 [%]	Power Factor			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0	-	-	-	20	0.608	0.590	0.583	40	0.647	0.635	0.629	60	0.678	0.668	0.658	80	0.701	0.692	0.683	100	0.725	0.713	0.705	110	0.733	0.721	0.714	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Power Factor																																																				
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																		
0	-	-	-																																																		
20	0.608	0.590	0.583																																																		
40	0.647	0.635	0.629																																																		
60	0.678	0.668	0.658																																																		
80	0.701	0.692	0.683																																																		
100	0.725	0.713	0.705																																																		
110	0.733	0.721	0.714																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		

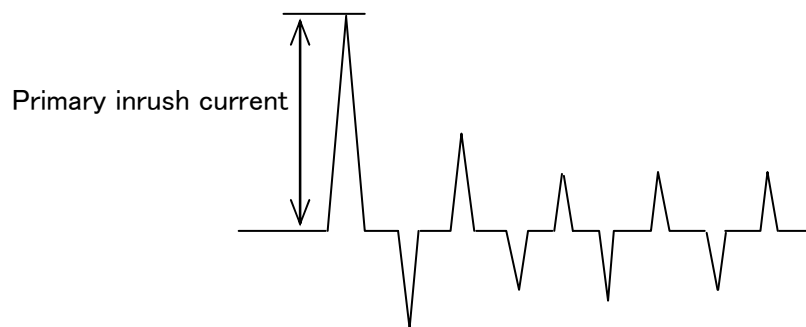




Model		GT2W-15	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	

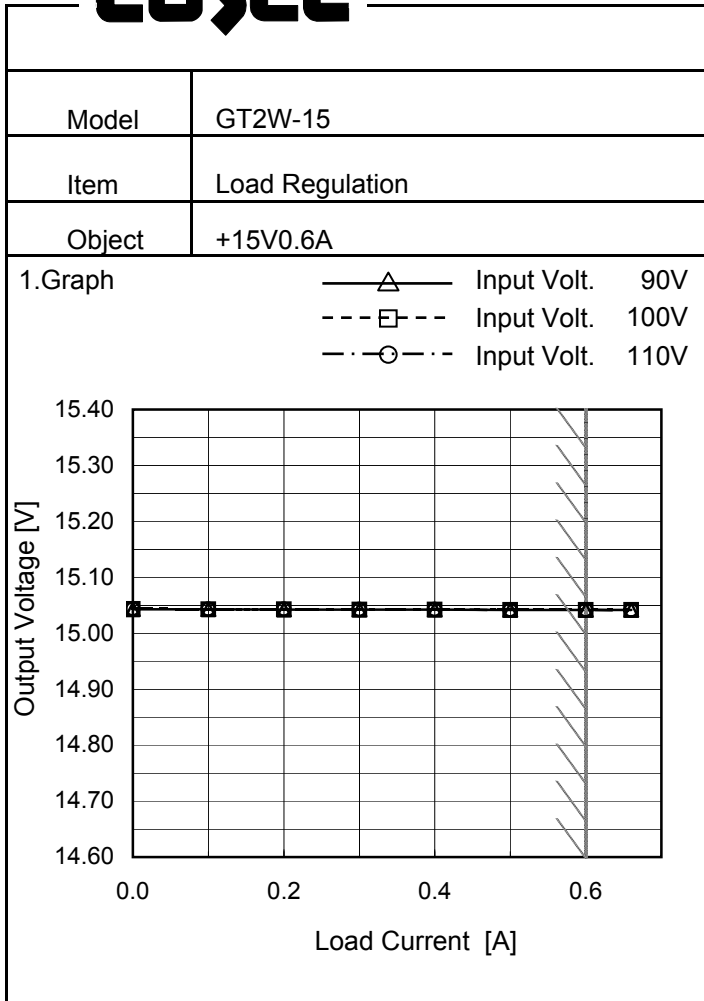


Input Voltage	100 V
Frequency	60 Hz
Load	100 %
Primary inrush current	7.8 A





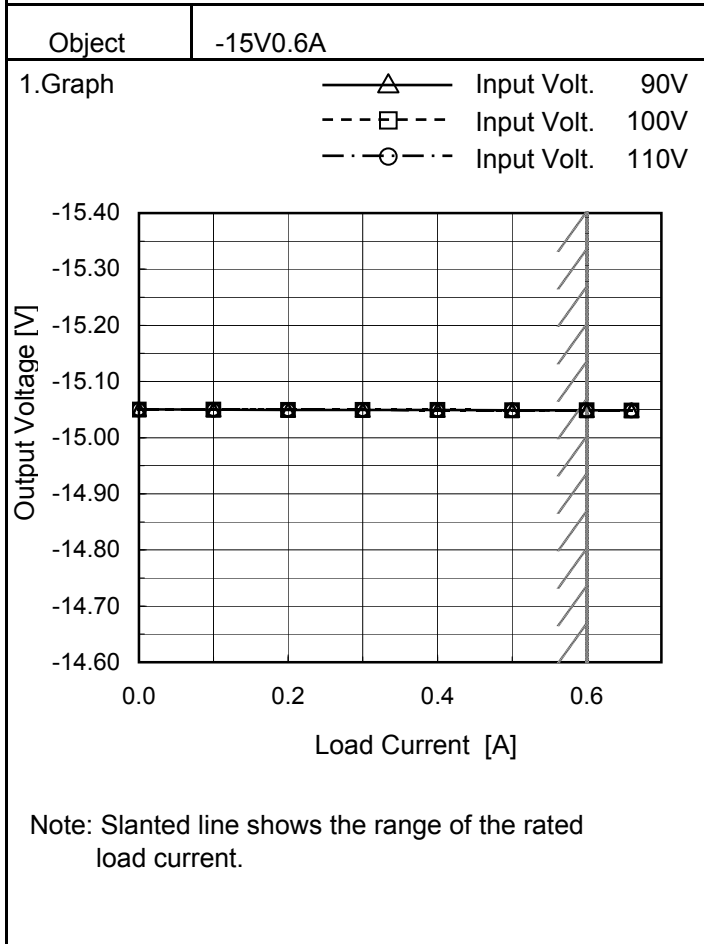
<b>COSEL</b>																																			
Model	GT2W-15	Temperature	25°C																																
Item	Line Regulation	Testing Circuitry	Figure A																																
Object	+15V0.6A																																		
<p>1.Graph</p>		<p>2.Values</p> <table border="1"> <thead> <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>15.042</td><td>15.042</td></tr> <tr><td>90</td><td>15.042</td><td>15.042</td></tr> <tr><td>100</td><td>15.042</td><td>15.042</td></tr> <tr><td>110</td><td>15.042</td><td>15.042</td></tr> <tr><td>115</td><td>15.042</td><td>15.042</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	15.042	15.042	90	15.042	15.042	100	15.042	15.042	110	15.042	15.042	115	15.042	15.042	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
85	15.042	15.042																																	
90	15.042	15.042																																	
100	15.042	15.042																																	
110	15.042	15.042																																	
115	15.042	15.042																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
Object	-15V0.6A																																		
<p>1.Graph</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<p>2.Values</p> <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>-15.049</td><td>-15.049</td></tr> <tr><td>90</td><td>-15.049</td><td>-15.049</td></tr> <tr><td>100</td><td>-15.049</td><td>-15.049</td></tr> <tr><td>110</td><td>-15.049</td><td>-15.049</td></tr> <tr><td>115</td><td>-15.049</td><td>-15.049</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	-15.049	-15.049	90	-15.049	-15.049	100	-15.049	-15.049	110	-15.049	-15.049	115	-15.049	-15.049	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
85	-15.049	-15.049																																	
90	-15.049	-15.049																																	
100	-15.049	-15.049																																	
110	-15.049	-15.049																																	
115	-15.049	-15.049																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	



Temperature 25°C  
Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.00	15.043	15.043	15.043
0.10	15.043	15.043	15.043
0.20	15.043	15.043	15.043
0.30	15.042	15.042	15.042
0.40	15.042	15.042	15.042
0.50	15.042	15.042	15.042
0.60	15.042	15.042	15.042
0.66	15.042	15.042	15.041
--	-	-	-
--	-	-	-
--	-	-	-



2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.00	-15.050	-15.050	-15.050
0.10	-15.050	-15.050	-15.050
0.20	-15.050	-15.050	-15.049
0.30	-15.049	-15.049	-15.049
0.40	-15.049	-15.049	-15.049
0.50	-15.049	-15.049	-15.049
0.60	-15.049	-15.049	-15.048
0.66	-15.049	-15.048	-15.048
--	-	-	-
--	-	-	-
--	-	-	-

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



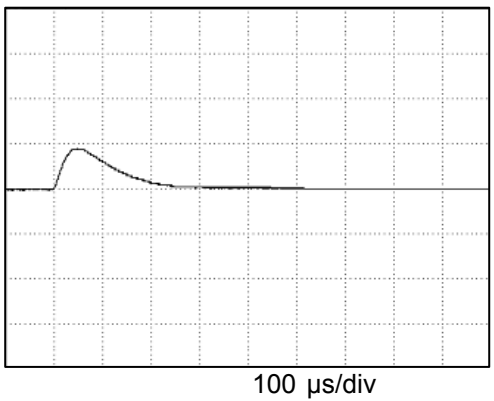
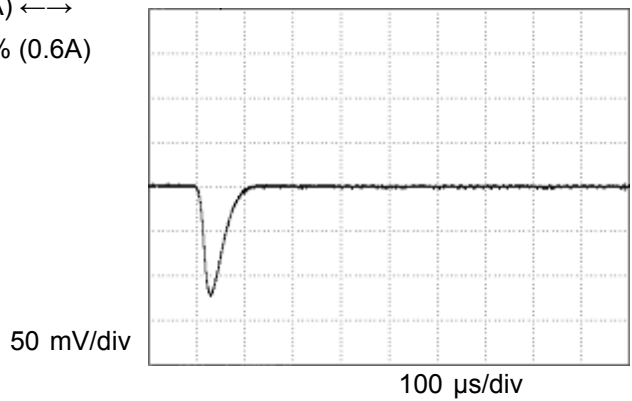
Model		GT2W-15	
Item		Dynamic Load Response	
Object		+15V0.6A	
		Temperature	25°C
		Testing Circuitry	Figure A

Input Volt. 100 V  
 Cycle 1000 ms

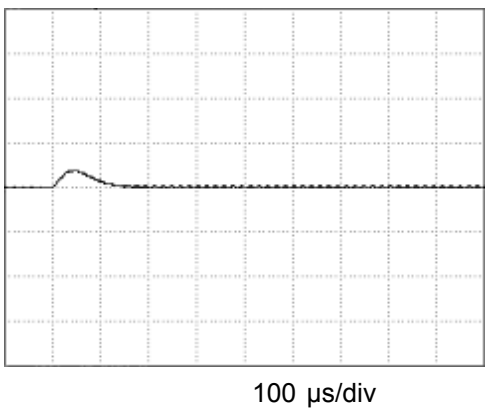
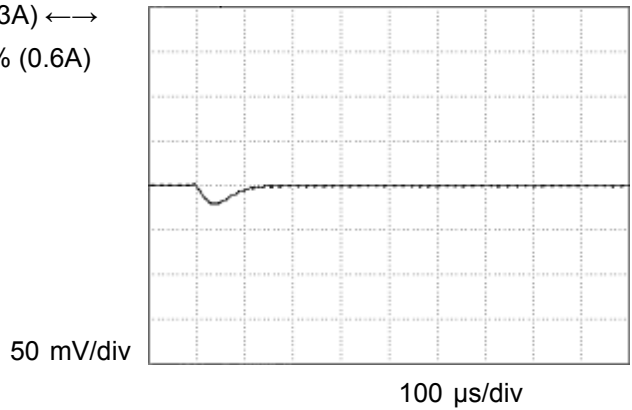
Load Current



Min. Load (0A) ←→  
 Load 100% (0.6A)



Load 50% (0.3A) ←→  
 Load 100% (0.6A)





Model		GT2W-15	
Item		Dynamic Load Response	
Object		-15V0.6A	
		Temperature	25°C
		Testing Circuitry	Figure A

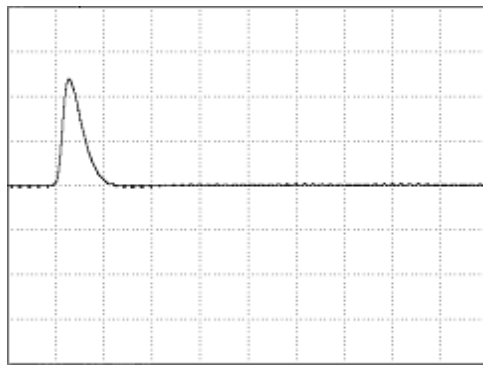
Input Volt. 100 V  
 Cycle 1000 ms

Load Current

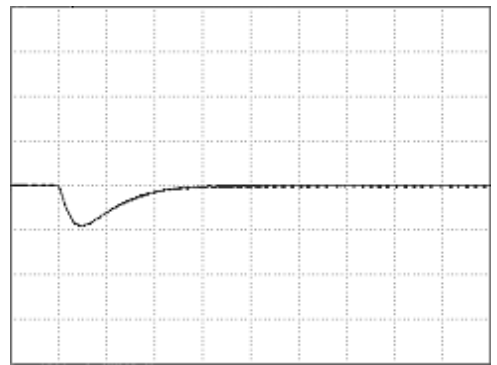


Min. Load (0A) ←→  
 Load 100% (0.6A)

50 mV/div



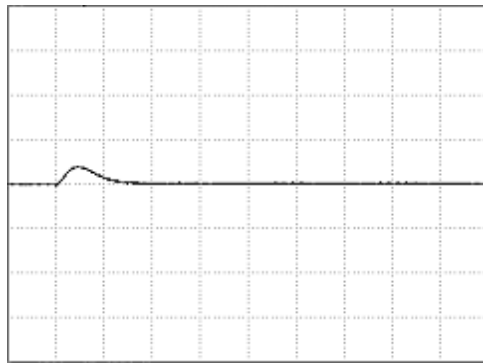
100 μs/div



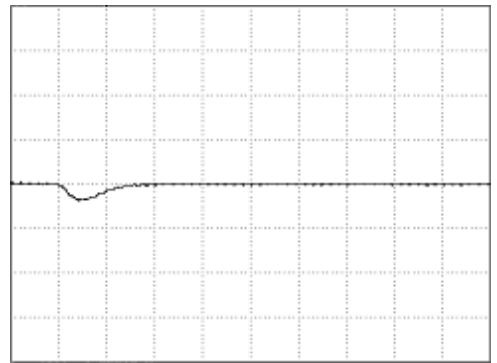
100 μs/div

Load 50% (0.3A) ←→  
 Load 100% (0.6A)

50 mV/div



100 μs/div



100 μs/div



<p>Model GT2W-15</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																									
<p>Item</p>	<p>Ripple Voltage (by Load Current)</p>																																										
<p>Object</p>	<p>+15V0.6A</p>																																										
<p>1.Graph</p> <div style="text-align: right;"> <p>—△— Input Volt. 90V -·-○-·- Input Volt. 110V</p> </div> <p>Measured by 20 MHz Oscilloscope. Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</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. 90 [V]</th> <th>Input Volt. 110 [V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.7</td> <td>0.7</td> </tr> <tr> <td>0.3</td> <td>0.8</td> <td>0.8</td> </tr> <tr> <td>0.6</td> <td>0.9</td> <td>0.9</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> <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> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 90 [V]	Input Volt. 110 [V]	0.0	0.7	0.7	0.3	0.8	0.8	0.6	0.9	0.9	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																										
	Input Volt. 90 [V]	Input Volt. 110 [V]																																									
0.0	0.7	0.7																																									
0.3	0.8	0.8																																									
0.6	0.9	0.9																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									
--	-	-																																									

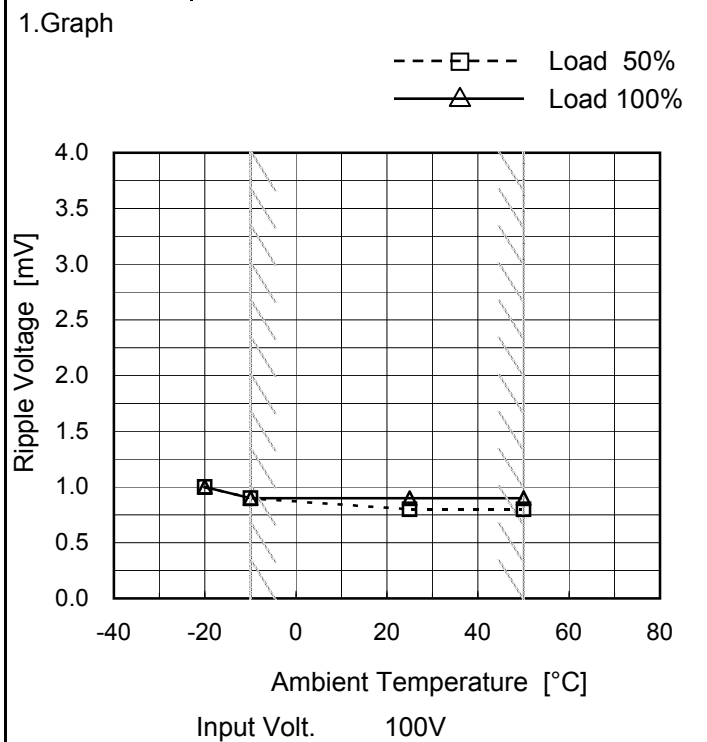


<b>COSEL</b>																																																		
Model	GT2W-15	Temperature	25°C																																															
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure A																																															
Object	-15V0.6A																																																	
<p>1.Graph</p> <div style="text-align: right;"> <p>—△— Input Volt. 90V</p> <p>-·-○-·- Input Volt. 110V</p> </div> <p style="text-align: center;">Ripple Voltage [mV]</p> <p style="text-align: center;">Load Current [A]</p> <p>Measured by 20 MHz Oscilloscope. Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</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. 90 [V]</th> <th>Input Volt. 110 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>1.0</td><td>1.0</td></tr> <tr><td>0.3</td><td>1.1</td><td>1.1</td></tr> <tr><td>0.6</td><td>1.1</td><td>1.1</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> <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> <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>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 90 [V]	Input Volt. 110 [V]	0.0	1.0	1.0	0.3	1.1	1.1	0.6	1.1	1.1	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																																	
	Input Volt. 90 [V]	Input Volt. 110 [V]																																																
0.0	1.0	1.0																																																
0.3	1.1	1.1																																																
0.6	1.1	1.1																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																
--	-	-																																																



Model	GT2W-15
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.6A

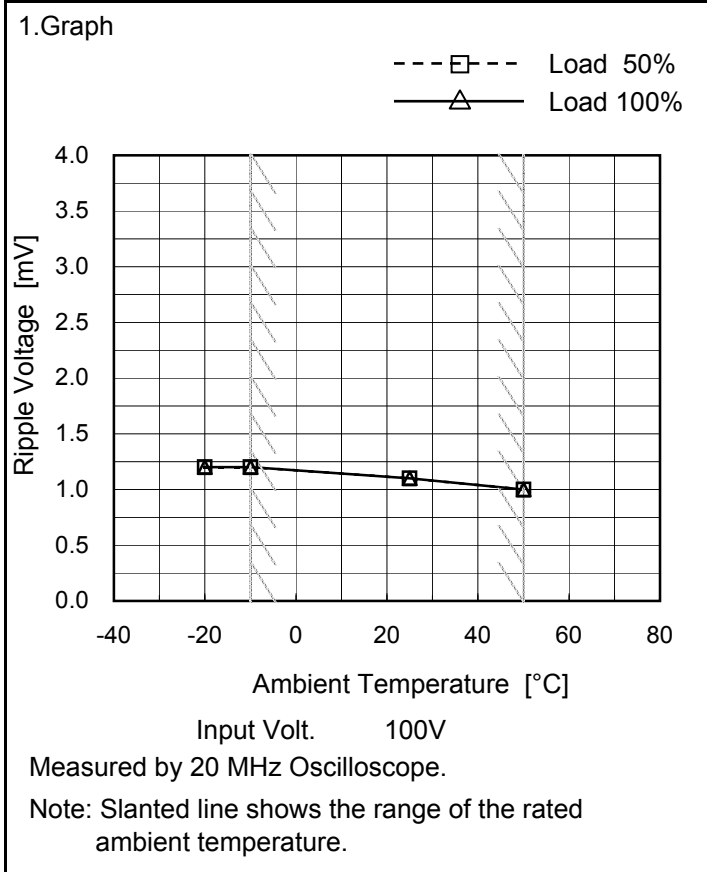
Testing Circuitry Figure A



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	1.0	1.0
-10	0.9	0.9
25	0.8	0.9
50	0.8	0.9
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

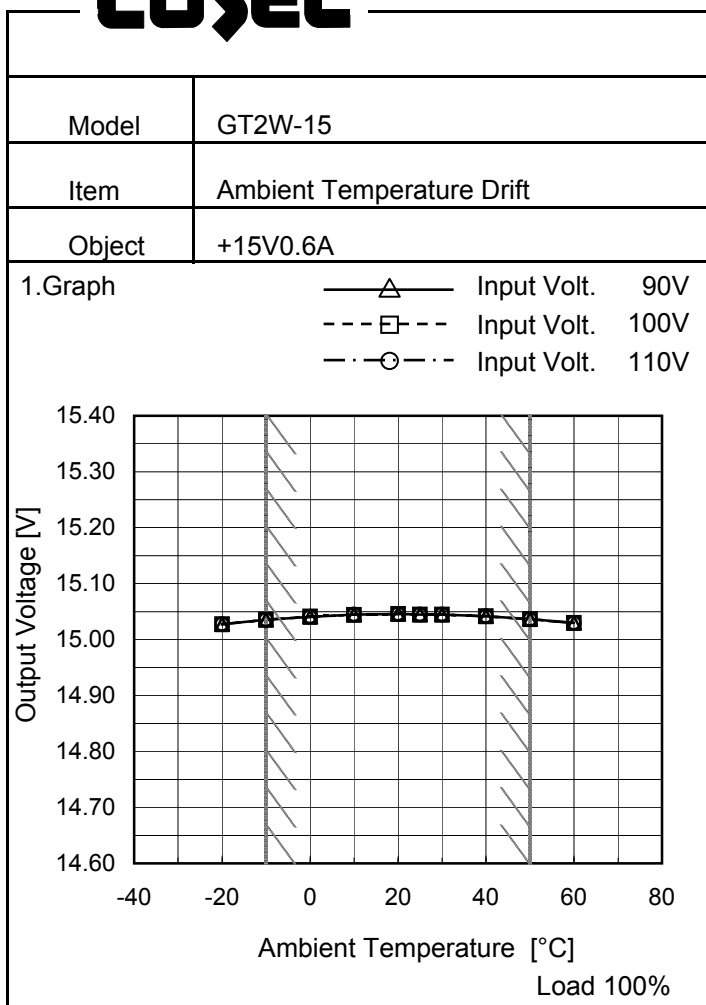
Object	-15V0.6A
--------	----------



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	1.2	1.2
-10	1.2	1.2
25	1.1	1.1
50	1.0	1.0
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

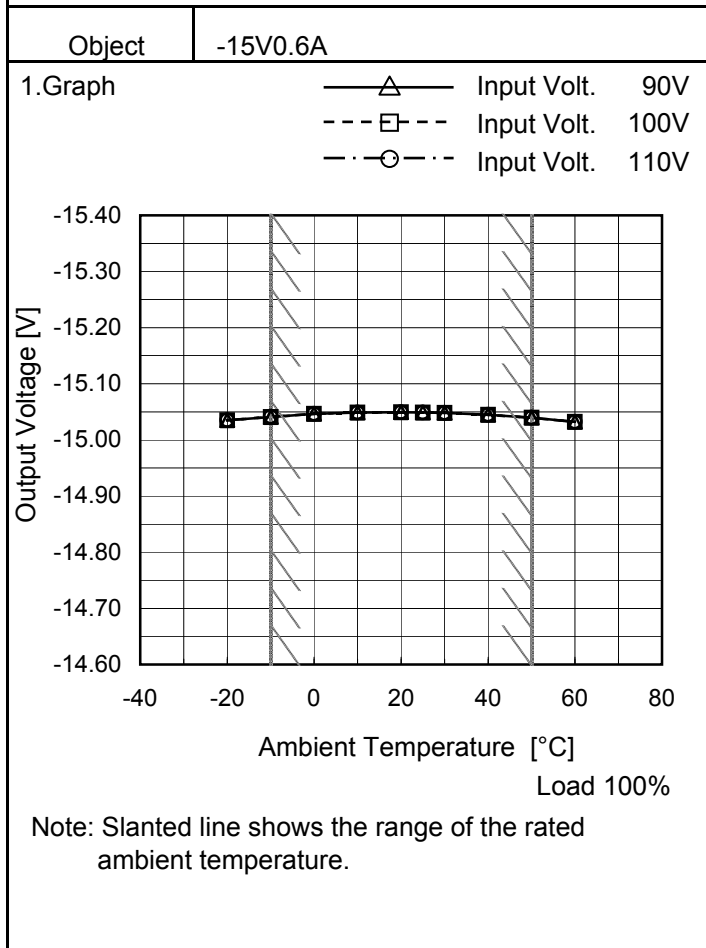




Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-20	15.028	15.028	15.028
-10	15.035	15.036	15.036
0	15.041	15.041	15.041
10	15.044	15.044	15.044
20	15.046	15.046	15.046
25	15.045	15.045	15.045
30	15.045	15.044	15.045
40	15.042	15.042	15.042
50	15.037	15.036	15.036
60	15.030	15.030	15.030
--	-	-	-



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-20	-15.035	-15.035	-15.035
-10	-15.041	-15.041	-15.041
0	-15.046	-15.046	-15.046
10	-15.049	-15.049	-15.049
20	-15.049	-15.049	-15.049
25	-15.049	-15.049	-15.049
30	-15.048	-15.048	-15.048
40	-15.045	-15.045	-15.045
50	-15.040	-15.039	-15.039
60	-15.032	-15.032	-15.032
--	-	-	-



<b>COSEL</b>		
Model	GT2W-15	
Item	Output Voltage Accuracy	Testing Circuitry Figure A

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 (AVR 1) : 0 - 0.6A (AVR 2) : 0 - 0.6A

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

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

2. Values

Object		+15V0.6A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy		
			Current[A]	Voltage[V]	Value [mV]	Ration [%]	
Maximum Voltage	20	100	0	15.047	±6	±0.1	
Minimum Voltage	-10	90	0.6	15.035			

Object		-15V0.6A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy		
			Current[A]	Voltage[V]	Value [mV]	Ration [%]	
Maximum Voltage	20	90	0	-15.051	±6	±0.1	
Minimum Voltage	50	110	0.6	-15.039			

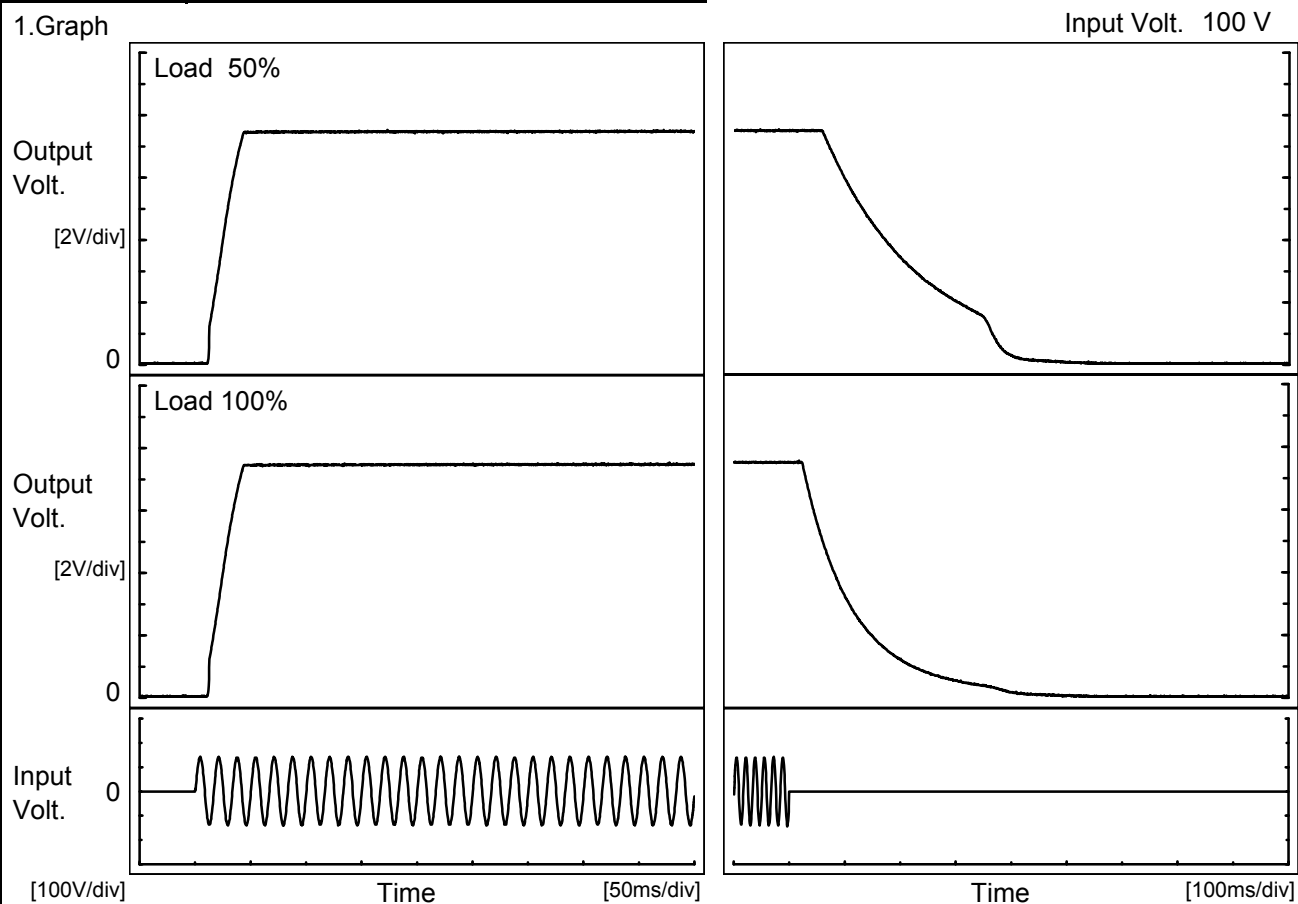


<b>COSEL</b>																									
Model	GT2W-15	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+15V0.6A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt.    100V Load            100%</p>		<p>2.Values</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>15.043</td></tr> <tr><td>0.5</td><td>15.042</td></tr> <tr><td>1.0</td><td>15.042</td></tr> <tr><td>2.0</td><td>15.042</td></tr> <tr><td>3.0</td><td>15.042</td></tr> <tr><td>4.0</td><td>15.042</td></tr> <tr><td>5.0</td><td>15.042</td></tr> <tr><td>6.0</td><td>15.042</td></tr> <tr><td>7.0</td><td>15.042</td></tr> <tr><td>8.0</td><td>15.042</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	15.043	0.5	15.042	1.0	15.042	2.0	15.042	3.0	15.042	4.0	15.042	5.0	15.042	6.0	15.042	7.0	15.042	8.0	15.042
Time since start [H]	Output Voltage [V]																								
0.0	15.043																								
0.5	15.042																								
1.0	15.042																								
2.0	15.042																								
3.0	15.042																								
4.0	15.042																								
5.0	15.042																								
6.0	15.042																								
7.0	15.042																								
8.0	15.042																								
Object	-15V0.6A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt.    100V Load            100%</p>		<p>2.Values</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>-15.049</td></tr> <tr><td>0.5</td><td>-15.049</td></tr> <tr><td>1.0</td><td>-15.049</td></tr> <tr><td>2.0</td><td>-15.049</td></tr> <tr><td>3.0</td><td>-15.049</td></tr> <tr><td>4.0</td><td>-15.049</td></tr> <tr><td>5.0</td><td>-15.049</td></tr> <tr><td>6.0</td><td>-15.049</td></tr> <tr><td>7.0</td><td>-15.049</td></tr> <tr><td>8.0</td><td>-15.049</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	-15.049	0.5	-15.049	1.0	-15.049	2.0	-15.049	3.0	-15.049	4.0	-15.049	5.0	-15.049	6.0	-15.049	7.0	-15.049	8.0	-15.049
Time since start [H]	Output Voltage [V]																								
0.0	-15.049																								
0.5	-15.049																								
1.0	-15.049																								
2.0	-15.049																								
3.0	-15.049																								
4.0	-15.049																								
5.0	-15.049																								
6.0	-15.049																								
7.0	-15.049																								
8.0	-15.049																								



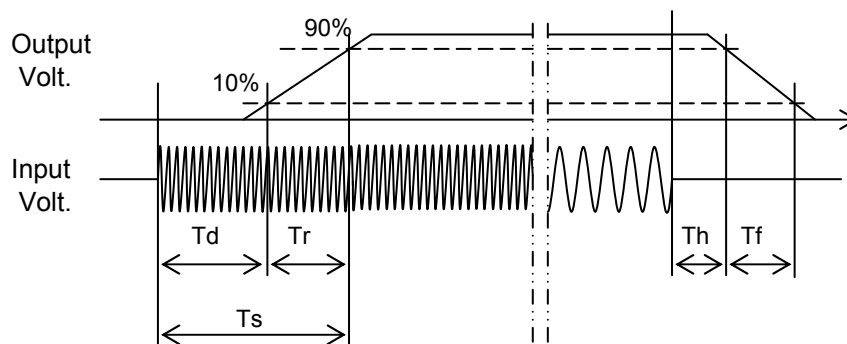
Model	GT2W-15	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V0.6A		

1.Graph



2.Values

Load	Time	[ms]				
		Td	Tr	Ts	Th	Tf
50 %		12.8	26.3	39.1	76.5	295.0
100 %		12.8	26.3	39.1	32.5	219.0

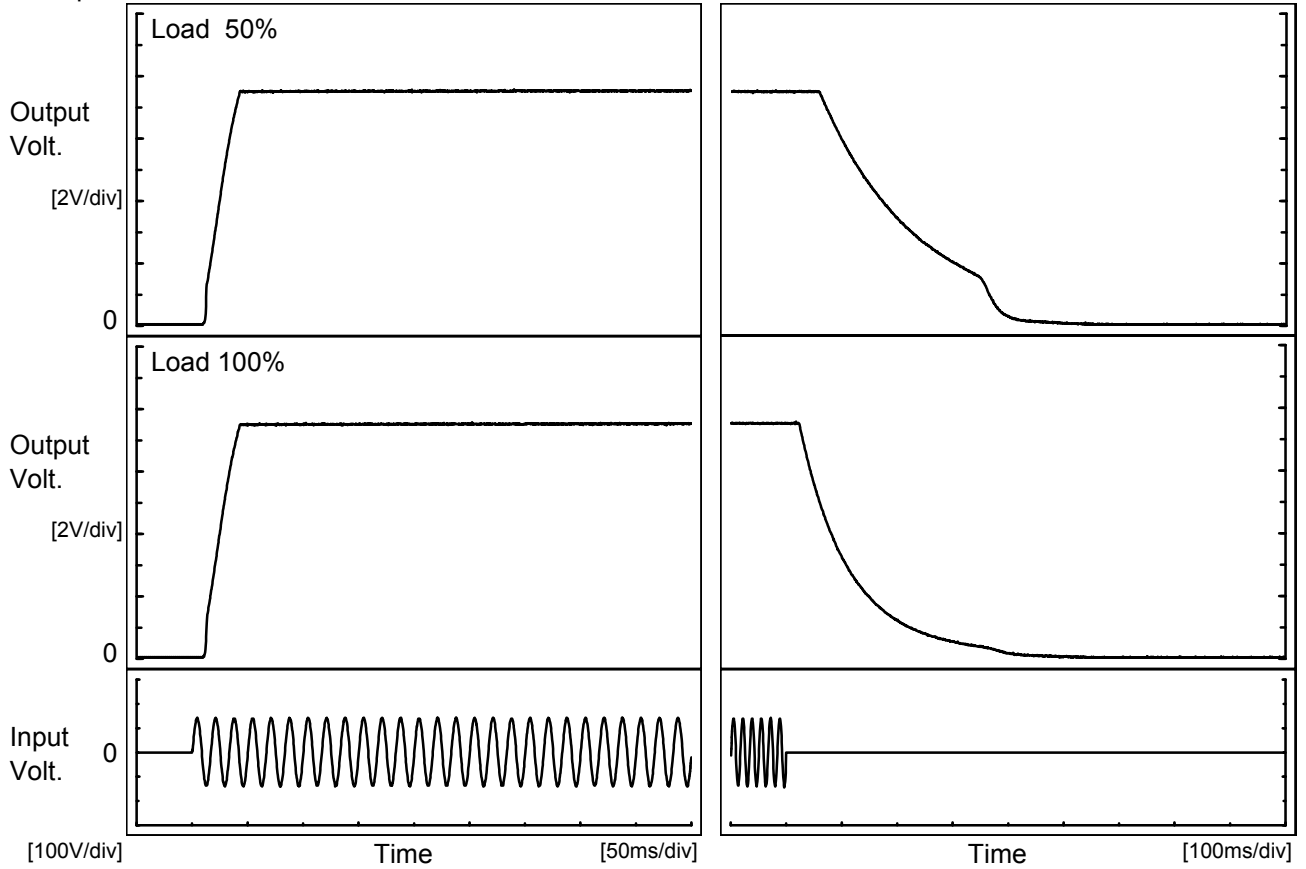




Model	GT2W-15	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-15V0.6A		

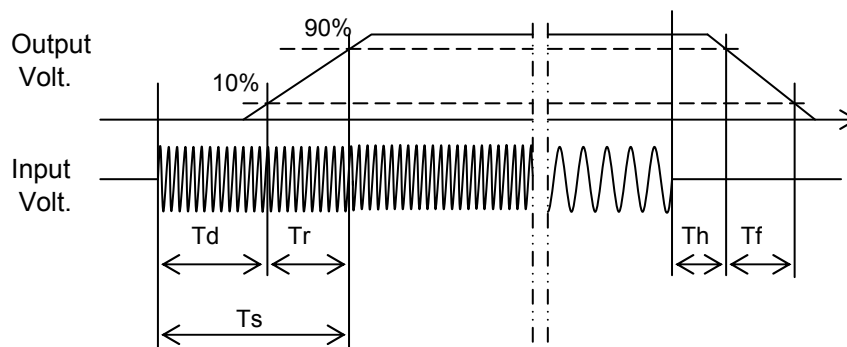
1. Graph

Input Volt. 100 V



2. Values

Load	Time	[ms]				
		T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>
50 %		12.8	25.8	38.6	76.5	296.0
100 %		13.0	25.5	38.5	32.0	216.0





Model		GT2W-15																																	
Item		Hold-Up Time																																	
Object		+15V0.6A																																	
1.Graph		Temperature 25°C Testing Circuitry Figure A																																	
<p>1.Graph</p> <p>---□--- Load 50% —△— Load 100%</p> <p>Hold-Up Time [ms]</p> <p>Input Voltage [V]</p>		2.Values																																	
<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>		<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>22</td> <td>5</td> </tr> <tr> <td>90</td> <td>35</td> <td>12</td> </tr> <tr> <td>100</td> <td>61</td> <td>24</td> </tr> <tr> <td>110</td> <td>88</td> <td>37</td> </tr> <tr> <td>115</td> <td>101</td> <td>44</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	22	5	90	35	12	100	61	24	110	88	37	115	101	44	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
85	22	5																																	
90	35	12																																	
100	61	24																																	
110	88	37																																	
115	101	44																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	



Model		GT2W-15																																	
Item		Hold-Up Time																																	
Object		-15V0.6A																																	
Temperature		25°C																																	
Testing Circuitry		Figure A																																	
1.Graph		2.Values																																	
		<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>21</td> <td>5</td> </tr> <tr> <td>90</td> <td>34</td> <td>11</td> </tr> <tr> <td>100</td> <td>60</td> <td>24</td> </tr> <tr> <td>110</td> <td>87</td> <td>37</td> </tr> <tr> <td>115</td> <td>100</td> <td>43</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	21	5	90	34	11	100	60	24	110	87	37	115	100	43	--	-	-	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
85	21	5																																	
90	34	11																																	
100	60	24																																	
110	87	37																																	
115	100	43																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
--	-	-																																	
<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>																																			



<p>Model GT2W-15</p> <p>Item Instantaneous Interruption Compensation</p> <p>Object +15V0.6A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																			
<p>1.Graph</p> <p>—△— Input Volt. 90V</p> <p>- - -□- - Input Volt. 100V</p> <p>- · -○- · - Input Volt. 110V</p> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</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>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.10</td><td>121</td><td>190</td><td>273</td></tr> <tr><td>0.20</td><td>54</td><td>89</td><td>123</td></tr> <tr><td>0.30</td><td>22</td><td>56</td><td>87</td></tr> <tr><td>0.40</td><td>21</td><td>39</td><td>56</td></tr> <tr><td>0.50</td><td>5</td><td>22</td><td>39</td></tr> <tr><td>0.60</td><td>5</td><td>22</td><td>38</td></tr> <tr><td>0.66</td><td>4</td><td>21</td><td>23</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]	Time [ms]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.00	-	-	-	0.10	121	190	273	0.20	54	89	123	0.30	22	56	87	0.40	21	39	56	0.50	5	22	39	0.60	5	22	38	0.66	4	21	23	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																		
0.00	-	-	-																																																		
0.10	121	190	273																																																		
0.20	54	89	123																																																		
0.30	22	56	87																																																		
0.40	21	39	56																																																		
0.50	5	22	39																																																		
0.60	5	22	38																																																		
0.66	4	21	23																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		





<p>Model GT2W-15</p> <p>Item Instantaneous Interruption Compensation</p> <p>Object -15V0.6A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																			
<p>1.Graph</p> <p>—△— Input Volt. 90V</p> <p>- - -□- - Input Volt. 100V</p> <p>- - -○- - Input Volt. 110V</p> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</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>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.10</td><td>121</td><td>189</td><td>268</td></tr> <tr><td>0.20</td><td>54</td><td>88</td><td>123</td></tr> <tr><td>0.30</td><td>22</td><td>55</td><td>83</td></tr> <tr><td>0.40</td><td>21</td><td>38</td><td>56</td></tr> <tr><td>0.50</td><td>5</td><td>22</td><td>39</td></tr> <tr><td>0.60</td><td>5</td><td>21</td><td>38</td></tr> <tr><td>0.66</td><td>4</td><td>21</td><td>23</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]	Time [ms]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.00	-	-	-	0.10	121	189	268	0.20	54	88	123	0.30	22	55	83	0.40	21	38	56	0.50	5	22	39	0.60	5	21	38	0.66	4	21	23	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																		
0.00	-	-	-																																																		
0.10	121	189	268																																																		
0.20	54	88	123																																																		
0.30	22	55	83																																																		
0.40	21	38	56																																																		
0.50	5	22	39																																																		
0.60	5	21	38																																																		
0.66	4	21	23																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		

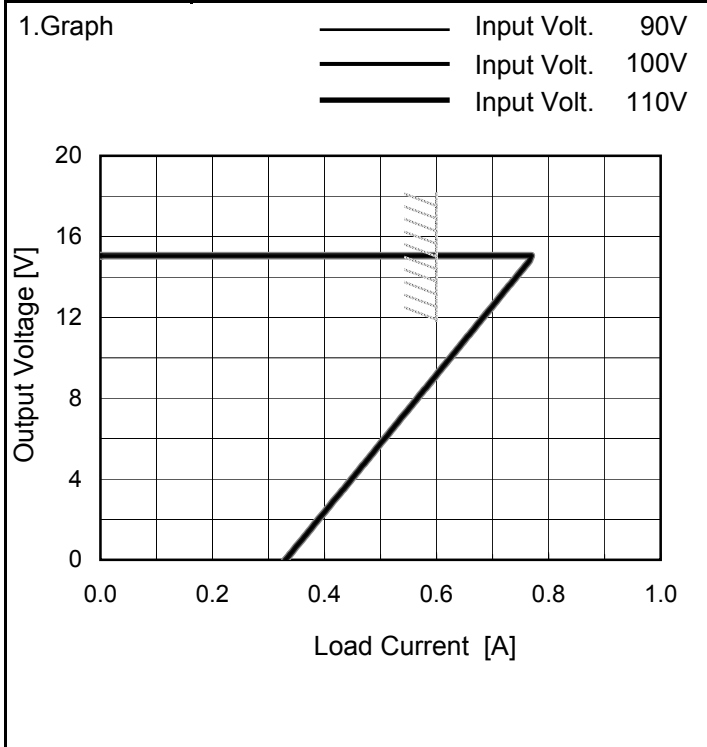


<b>COSEL</b>																																								
Model	GT2W-15																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+15V0.6A																																							
1.Graph		2.Values																																						
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-20</td><td>75</td><td>81</td></tr> <tr><td>-10</td><td>75</td><td>81</td></tr> <tr><td>0</td><td>75</td><td>81</td></tr> <tr><td>10</td><td>75</td><td>81</td></tr> <tr><td>20</td><td>75</td><td>81</td></tr> <tr><td>25</td><td>75</td><td>81</td></tr> <tr><td>30</td><td>75</td><td>81</td></tr> <tr><td>40</td><td>75</td><td>81</td></tr> <tr><td>50</td><td>75</td><td>81</td></tr> <tr><td>60</td><td>75</td><td>81</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	75	81	-10	75	81	0	75	81	10	75	81	20	75	81	25	75	81	30	75	81	40	75	81	50	75	81	60	75	81	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																							
	Load 50%	Load 100%																																						
-20	75	81																																						
-10	75	81																																						
0	75	81																																						
10	75	81																																						
20	75	81																																						
25	75	81																																						
30	75	81																																						
40	75	81																																						
50	75	81																																						
60	75	81																																						
--	-	-																																						
Object	-15V0.6A																																							
1.Graph		2.Values																																						
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-20</td><td>75</td><td>81</td></tr> <tr><td>-10</td><td>75</td><td>81</td></tr> <tr><td>0</td><td>75</td><td>81</td></tr> <tr><td>10</td><td>75</td><td>81</td></tr> <tr><td>20</td><td>75</td><td>81</td></tr> <tr><td>25</td><td>75</td><td>81</td></tr> <tr><td>30</td><td>75</td><td>81</td></tr> <tr><td>40</td><td>76</td><td>81</td></tr> <tr><td>50</td><td>76</td><td>81</td></tr> <tr><td>60</td><td>76</td><td>81</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	75	81	-10	75	81	0	75	81	10	75	81	20	75	81	25	75	81	30	75	81	40	76	81	50	76	81	60	76	81	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																							
	Load 50%	Load 100%																																						
-20	75	81																																						
-10	75	81																																						
0	75	81																																						
10	75	81																																						
20	75	81																																						
25	75	81																																						
30	75	81																																						
40	76	81																																						
50	76	81																																						
60	76	81																																						
--	-	-																																						
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								



Model	GT2W-15
Item	Overcurrent Protection
Object	+15V0.6A

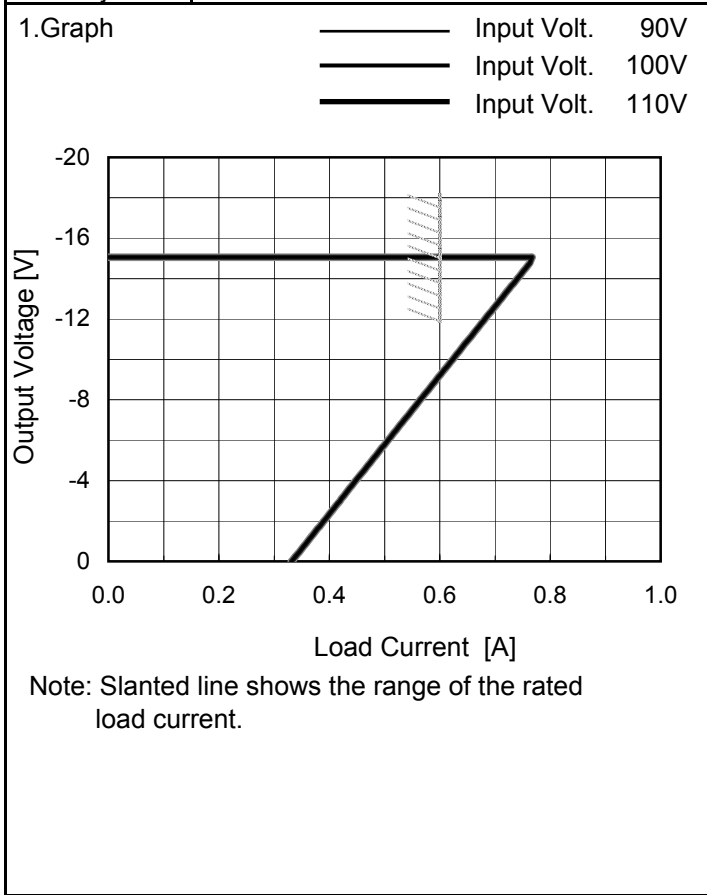
Temperature 25°C  
Testing Circuitry Figure A



2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
15.0	0.77	0.77	0.77
14.3	0.75	0.75	0.75
13.5	0.73	0.73	0.73
12.0	0.68	0.68	0.68
10.5	0.64	0.64	0.64
9.0	0.60	0.60	0.60
7.5	0.55	0.55	0.55
6.0	0.51	0.51	0.51
4.5	0.46	0.46	0.46
3.0	0.42	0.42	0.42
1.5	0.38	0.38	0.38
0.0	0.33	0.33	0.33

Object	-15V0.6A
--------	----------



2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-15.00	0.77	0.77	0.77
-14.25	0.75	0.75	0.75
-13.50	0.73	0.73	0.73
-12.00	0.68	0.68	0.68
-10.50	0.64	0.64	0.64
-9.00	0.59	0.59	0.59
-7.50	0.55	0.55	0.55
-6.00	0.51	0.51	0.51
-4.50	0.47	0.47	0.47
-3.00	0.42	0.42	0.42
-1.50	0.38	0.38	0.38
0.00	0.33	0.33	0.33

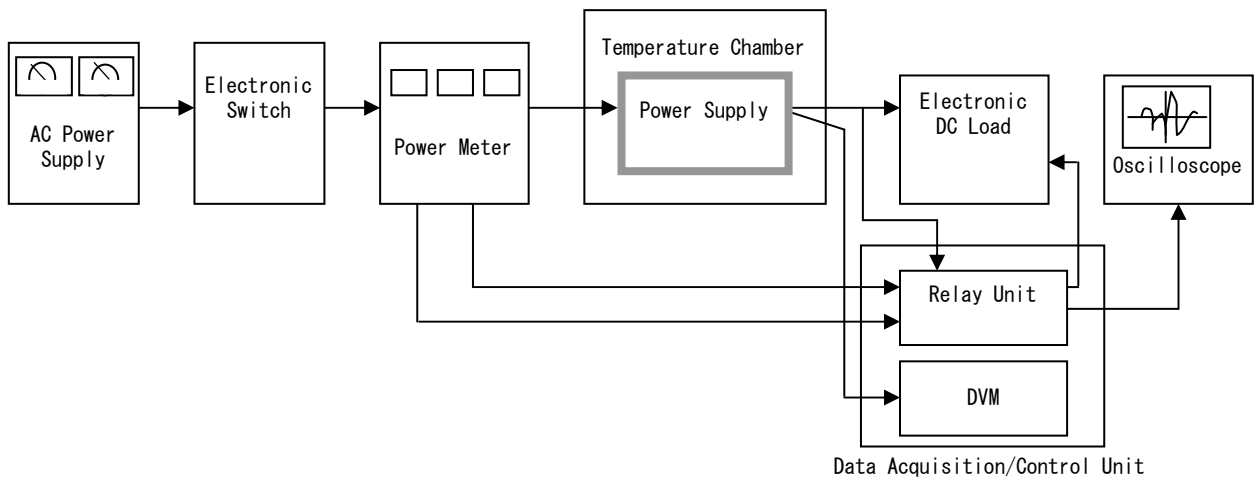


Figure A