

TEST DATA OF GT3.5W-12

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.

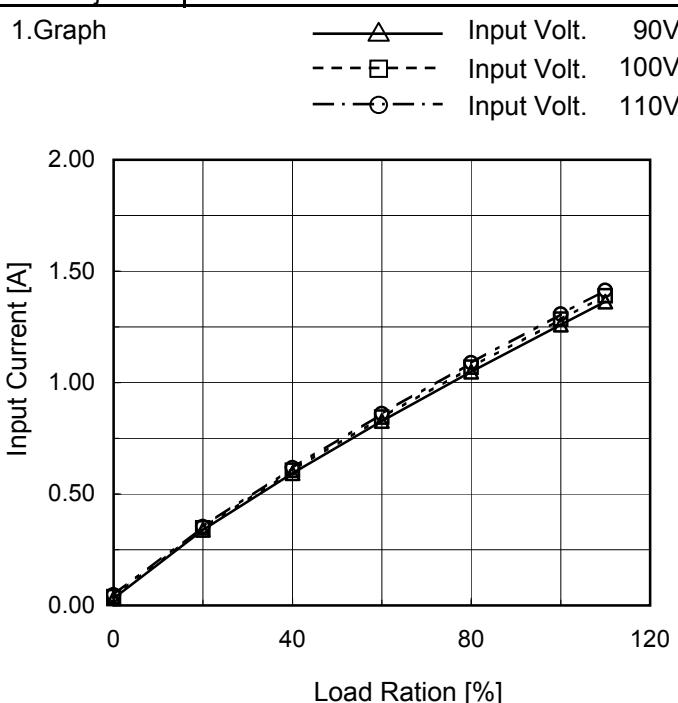
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Model	GT3.5W-12
Item	Input Current (by Load Current)
Object	_____


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Ration [%]	Input Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0	0.032	0.039	0.047
20	0.339	0.347	0.354
40	0.594	0.606	0.618
60	0.828	0.845	0.860
80	1.049	1.069	1.089
100	1.260	1.285	1.308
110	1.363	1.389	1.414
--	-	-	-
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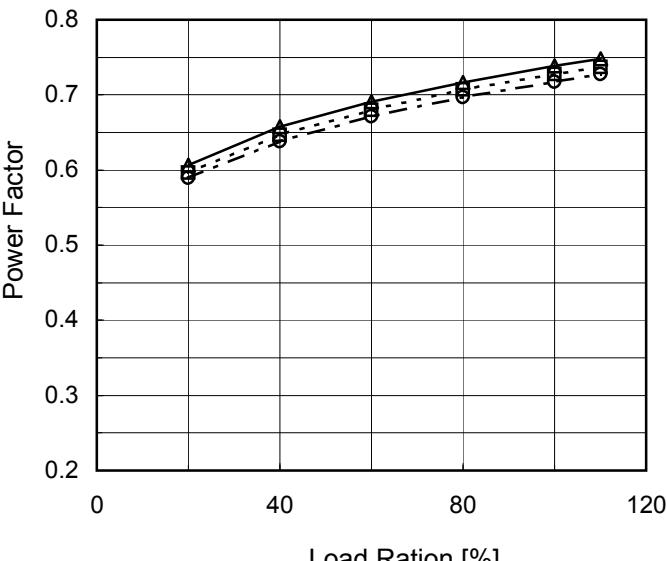
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<p>The graph plots Efficiency [%] on the y-axis (22 to 78) against Input Voltage [V] on the x-axis (80 to 120). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a downward trend as input voltage increases. A slanted line on the graph indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr> <td>85</td> <td>65.0</td> <td>67.3</td> </tr> <tr> <td>90</td> <td>61.2</td> <td>63.4</td> </tr> <tr> <td>100</td> <td>54.9</td> <td>56.8</td> </tr> <tr> <td>110</td> <td>49.7</td> <td>51.4</td> </tr> <tr> <td>115</td> <td>47.4</td> <td>49.0</td> </tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	85	65.0	67.3	90	61.2	63.4	100	54.9	56.8	110	49.7	51.4	115	47.4	49.0														
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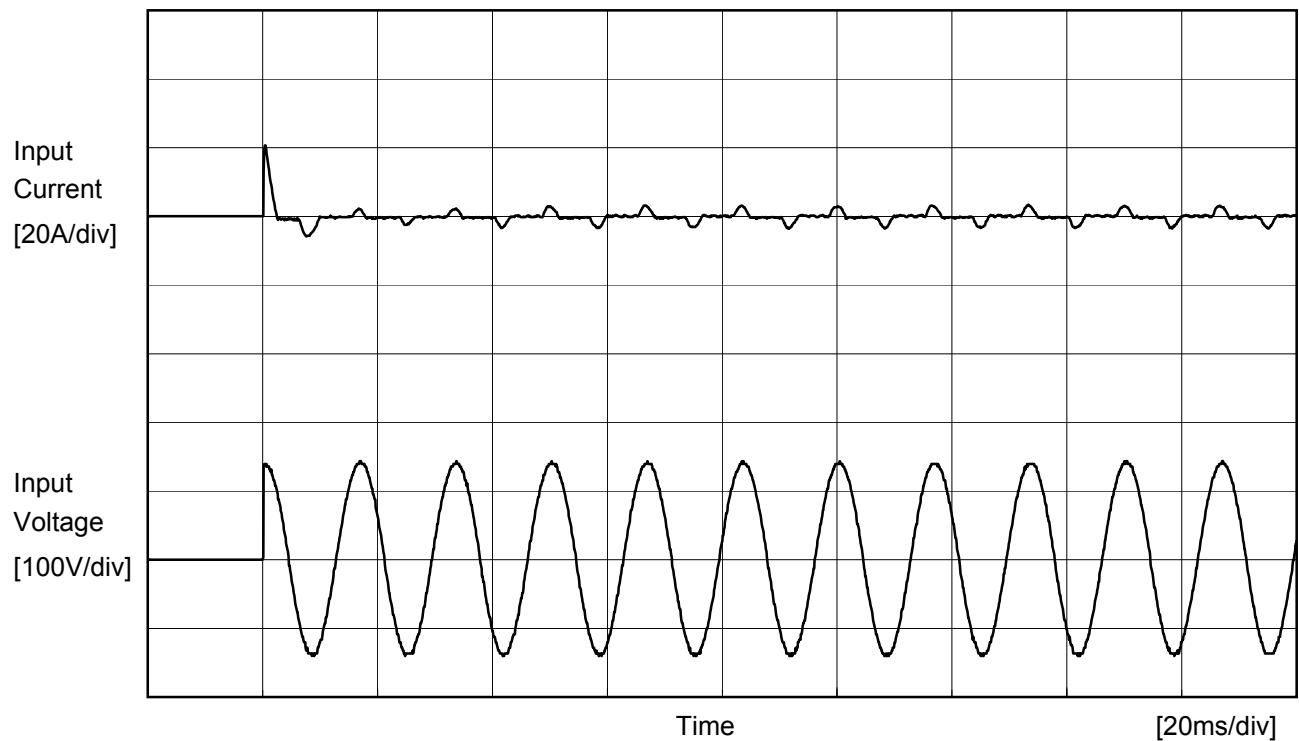
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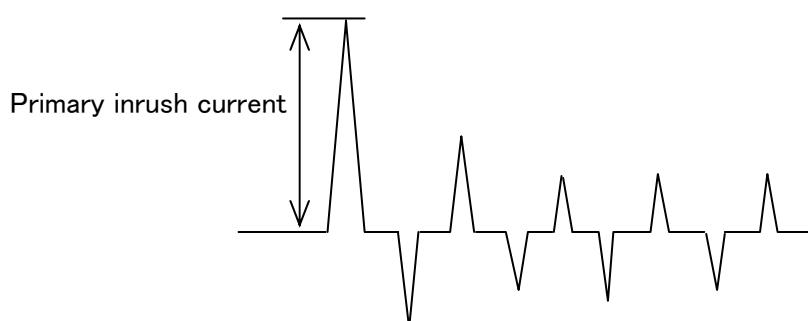
Item Inrush Current

Object _____

Temperature 25°C
Testing Circuitry Figure A

Input Voltage	100 V
Frequency	60 Hz
Load	100 %

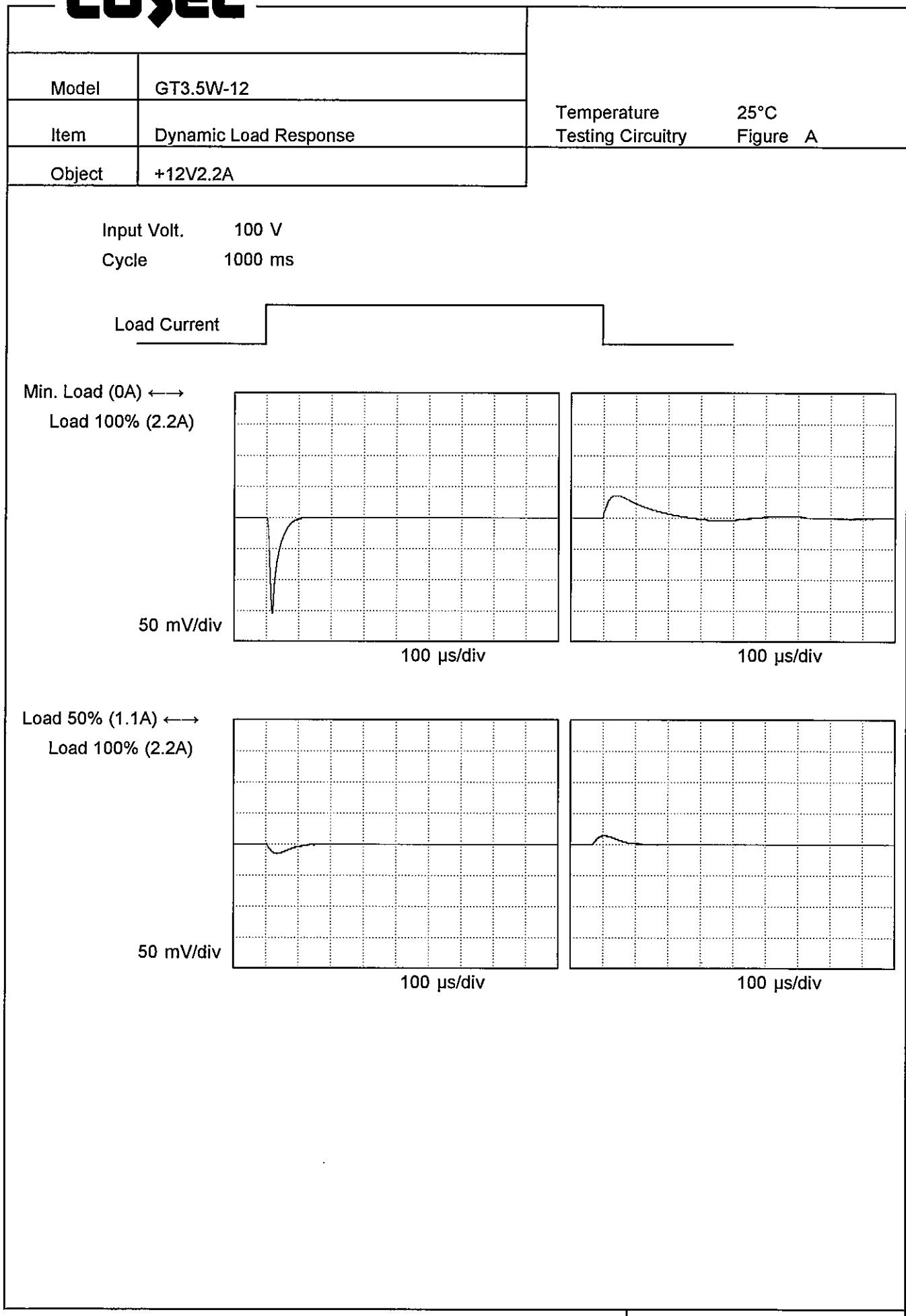
Primary inrush current	20.7 A
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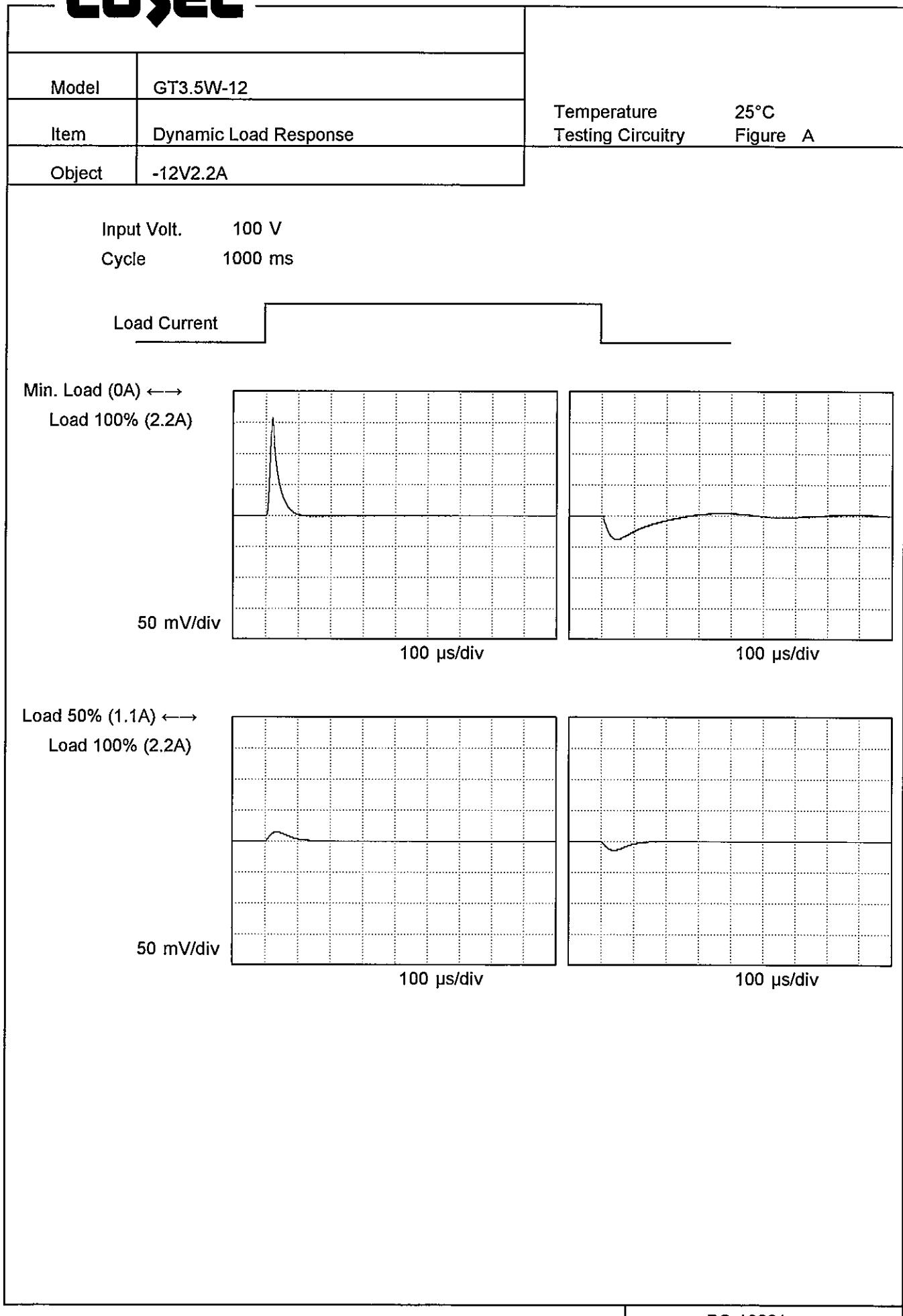


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Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure A																																						
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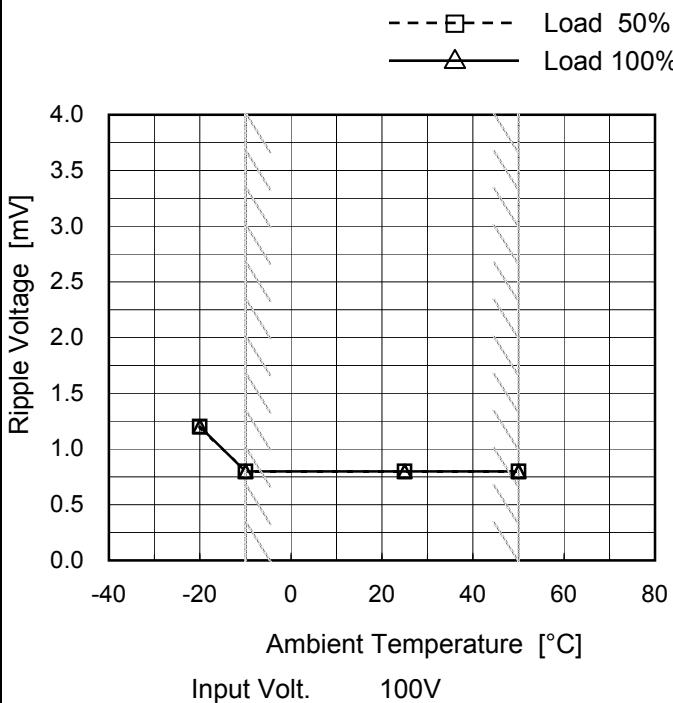
COSEL

Model	GT3.5W-12																																															
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COSEL

Model	GT3.5W-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V2.2A

1.Graph

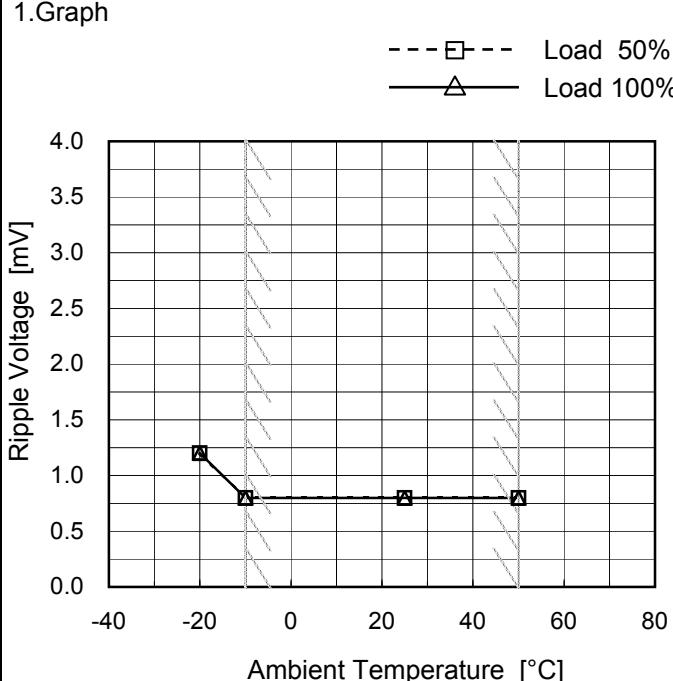


Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	1.2	1.2
-10	0.8	0.8
25	0.8	0.8
50	0.8	0.8
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

1.Graph



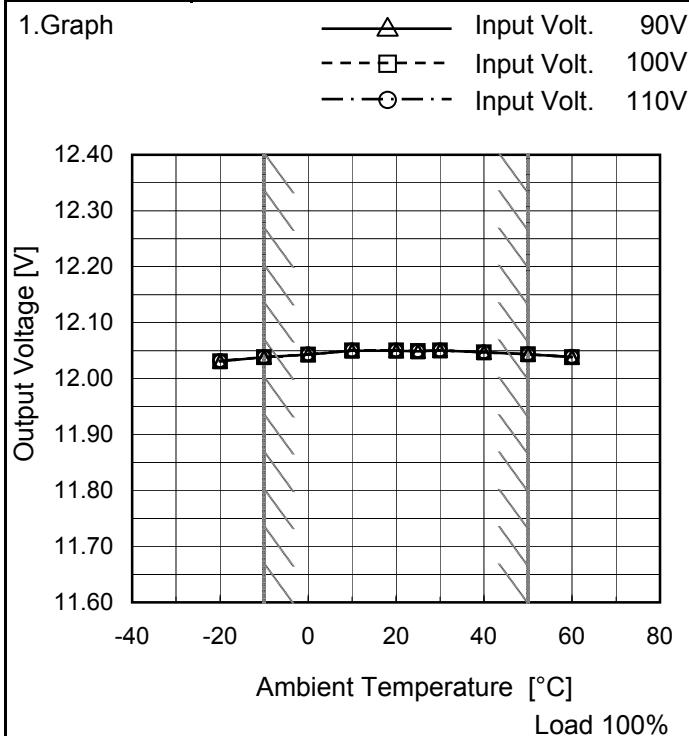
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	1.2	1.2
-10	0.8	0.8
25	0.8	0.8
50	0.8	0.8
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.

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

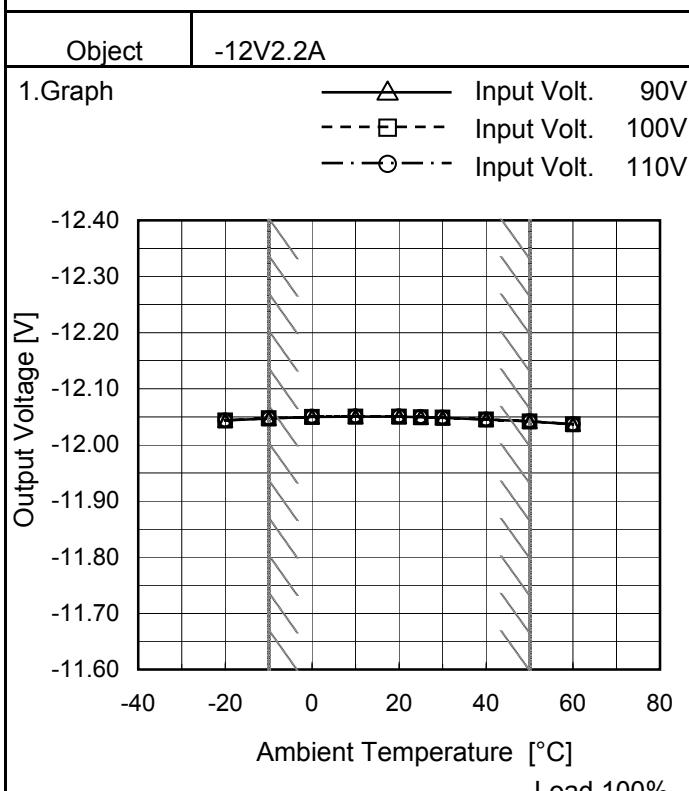
Model	GT3.5W-12
Item	Ambient Temperature Drift
Object	+12V2.2A



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	12.031	12.031	12.031
-10	12.038	12.038	12.039
0	12.043	12.043	12.044
10	12.050	12.050	12.050
20	12.050	12.050	12.050
25	12.049	12.049	12.049
30	12.050	12.051	12.051
40	12.047	12.047	12.047
50	12.043	12.044	12.044
60	12.038	12.038	12.039
--	-	-	-



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-20	-12.043	-12.044	-12.044
-10	-12.047	-12.048	-12.048
0	-12.050	-12.050	-12.050
10	-12.050	-12.051	-12.051
20	-12.050	-12.051	-12.051
25	-12.049	-12.050	-12.050
30	-12.048	-12.049	-12.049
40	-12.045	-12.045	-12.046
50	-12.042	-12.042	-12.042
60	-12.037	-12.037	-12.037
--	-	-	-

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



Model	GT3.5W-12	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 : 90 - 110V

Load Current (AVR 1) : 0 - 2.2A (AVR 2) : 0 - 2.2A

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

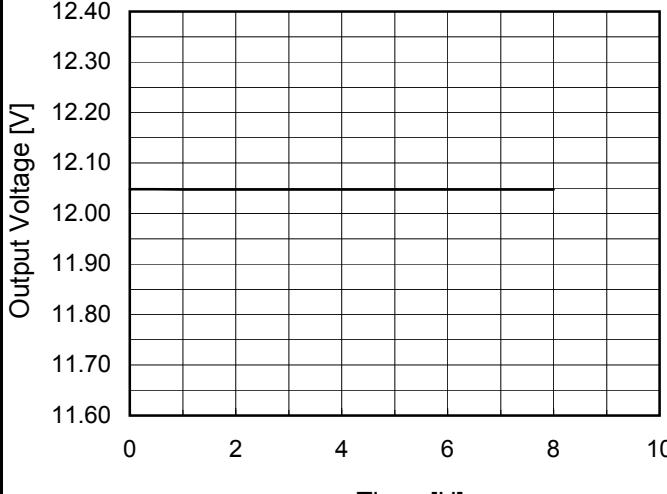
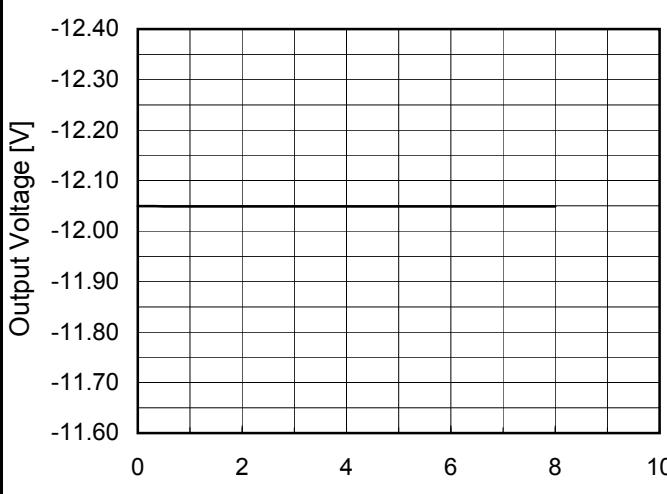
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Object	+12V2.2A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	30	110	2.2	12.051	± 7	± 0.1
Minimum Voltage	-10	90	0	12.037		

Object	-12V2.2A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	20	110	0	-12.051	± 5	± 0.1
Minimum Voltage	50	90	2.2	-12.042		

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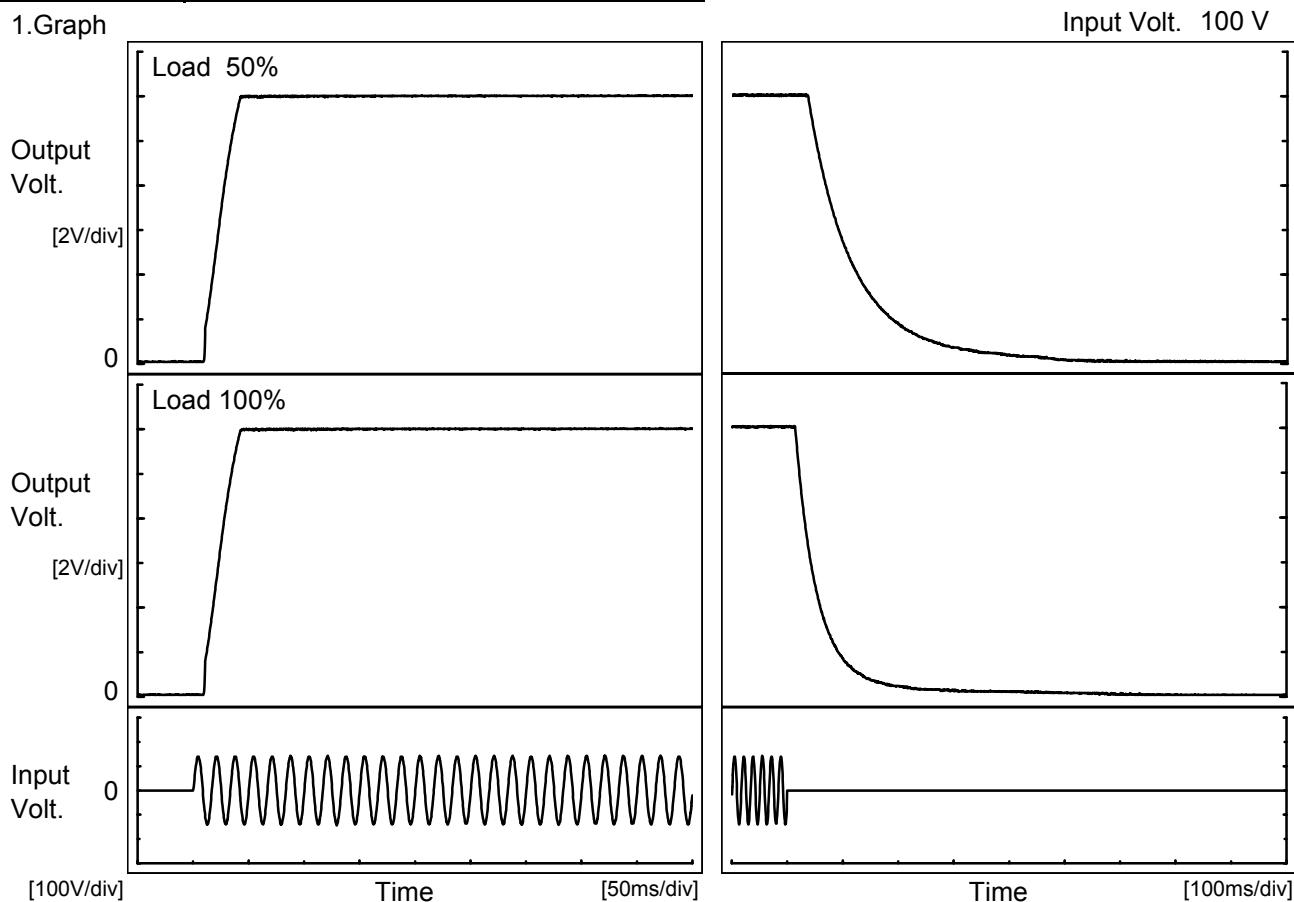
Model	GT3.5W-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V2.2A																								
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 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V</p> <p>Load 100%</p>			<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>12.048</td></tr> <tr><td>0.5</td><td>12.048</td></tr> <tr><td>1.0</td><td>12.048</td></tr> <tr><td>2.0</td><td>12.048</td></tr> <tr><td>3.0</td><td>12.048</td></tr> <tr><td>4.0</td><td>12.048</td></tr> <tr><td>5.0</td><td>12.048</td></tr> <tr><td>6.0</td><td>12.048</td></tr> <tr><td>7.0</td><td>12.048</td></tr> <tr><td>8.0</td><td>12.048</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.048	0.5	12.048	1.0	12.048	2.0	12.048	3.0	12.048	4.0	12.048	5.0	12.048	6.0	12.048	7.0	12.048	8.0	12.048
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4.0	-12.049																								
5.0	-12.049																								
6.0	-12.049																								
7.0	-12.049																								
8.0	-12.049																								

COSEL

Model	GT3.5W-12
Item	Rise and Fall Time
Object	+12V2.2A

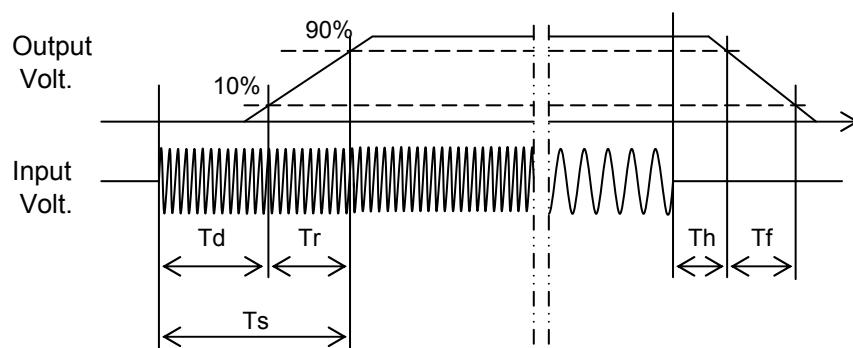
Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		11.0	27.0	38.0	44.0	189.0
100 %		10.8	27.3	38.1	18.0	99.0

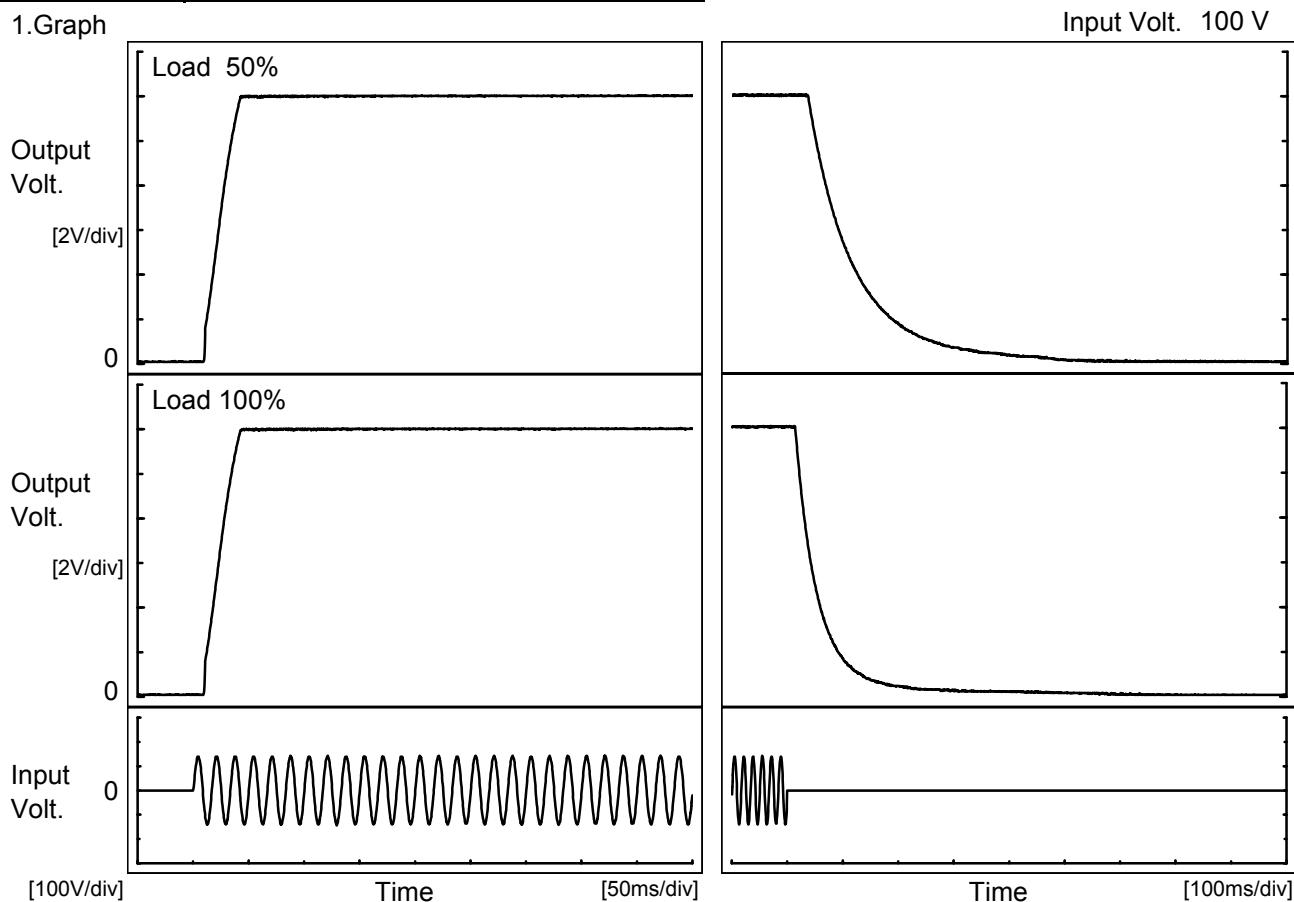


COSEL

Model	GT3.5W-12
Item	Rise and Fall Time
Object	-12V2.2A

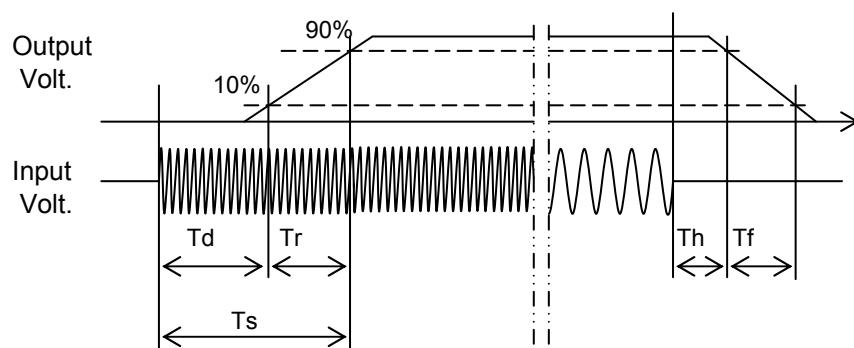
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		10.8	27.3	38.1	45.0	194.0	
100 %		11.0	26.8	37.8	18.5	96.5	

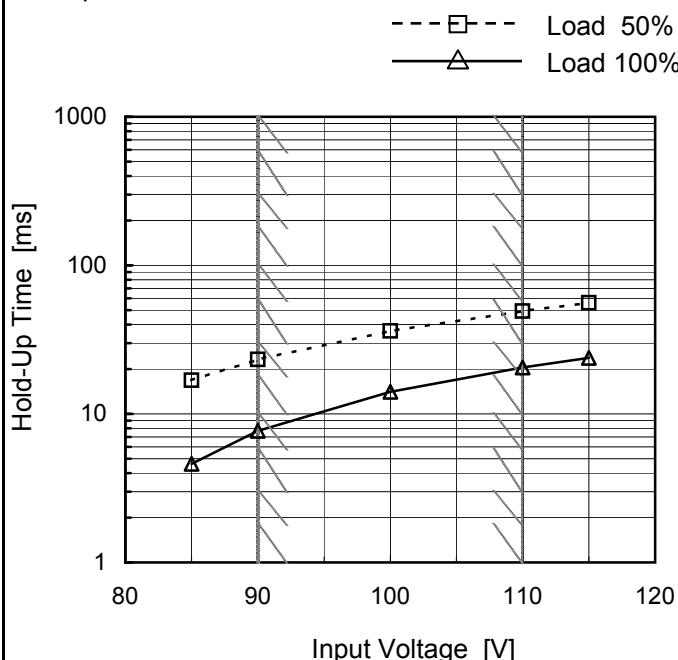


COSEL

Model	GT3.5W-12
Item	Hold-Up Time
Object	+12V2.2A

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	17	5
90	23	8
100	36	14
110	49	21
115	56	24
--	-	-
--	-	-
--	-	-
--	-	-

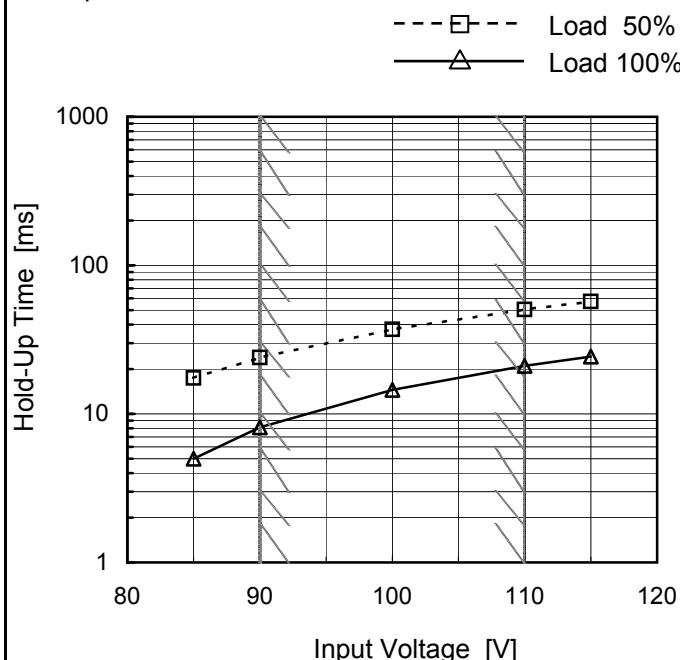
This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
 Note: Slanted line shows the range of the rated input voltage.

COSEL

Model	GT3.5W-12
Item	Hold-Up Time
Object	-12V2.2A

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	17	5
90	24	8
100	37	15
110	50	21
115	57	24
--	-	-
--	-	-
--	-	-
--	-	-

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.

COSEL

Model	GT3.5W-12																																																					
Item	Instantaneous Interruption Compensation																																																					
Object	+12V2.2A																																																					
1.Graph																																																						
<p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>—△— Input Volt. 90V -□- Input Volt. 100V -○--- Input Volt. 110V</p>																																																						
2.Values																																																						
<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>0.40</td><td>71</td><td>110</td><td>146</td></tr> <tr> <td>0.80</td><td>23</td><td>51</td><td>69</td></tr> <tr> <td>1.20</td><td>20</td><td>23</td><td>40</td></tr> <tr> <td>1.60</td><td>5</td><td>21</td><td>23</td></tr> <tr> <td>2.00</td><td>5</td><td>6</td><td>22</td></tr> <tr> <td>2.20</td><td>4</td><td>5</td><td>21</td></tr> <tr> <td>2.42</td><td>4</td><td>5</td><td>18</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	-	-	-	0.40	71	110	146	0.80	23	51	69	1.20	20	23	40	1.60	5	21	23	2.00	5	6	22	2.20	4	5	21	2.42	4	5	18	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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COSEL

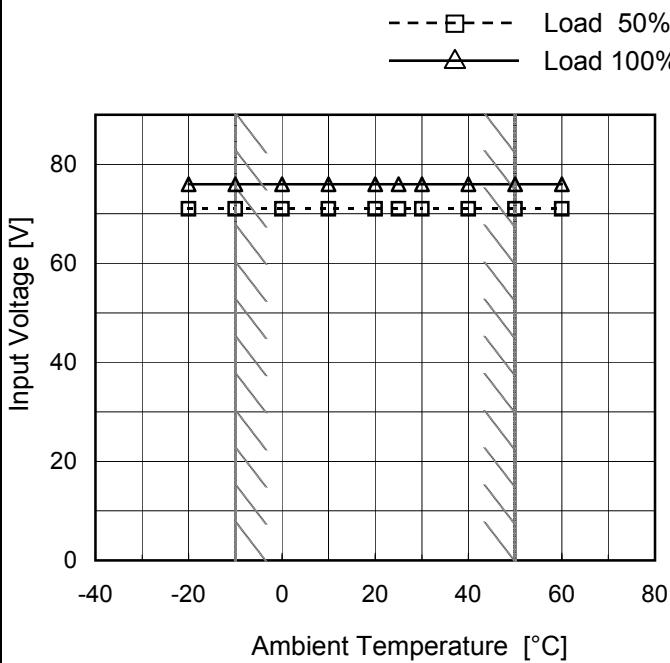
Model	GT3.5W-12																																																					
Item	Instantaneous Interruption Compensation																																																					
Object	-12V2.2A																																																					
1.Graph																																																						
<p>Graph showing Instantaneous Compensation Time [ms] vs Load Current [A]. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis is linear from 0.0 to 2.0 A. Three curves are shown for Input Volt. 90V (solid line with open triangles), Input Volt. 100V (dashed line with open squares), and Input Volt. 110V (dash-dot line with open circles). A slanted line indicates the rated load current range.</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>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.40</td><td>73</td><td>113</td><td>150</td></tr> <tr><td>0.80</td><td>23</td><td>53</td><td>71</td></tr> <tr><td>1.20</td><td>20</td><td>23</td><td>45</td></tr> <tr><td>1.60</td><td>5</td><td>22</td><td>23</td></tr> <tr><td>2.00</td><td>5</td><td>6</td><td>22</td></tr> <tr><td>2.20</td><td>5</td><td>6</td><td>21</td></tr> <tr><td>2.42</td><td>4</td><td>5</td><td>19</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]	0.00	-	-	-	0.40	73	113	150	0.80	23	53	71	1.20	20	23	45	1.60	5	22	23	2.00	5	6	22	2.20	5	6	21	2.42	4	5	19	--	-	-	-	--	-	-	-	--	-	-	-			
Load Current [A]	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																			
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						



Model	GT3.5W-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V2.2A

Testing Circuitry Figure A

1.Graph

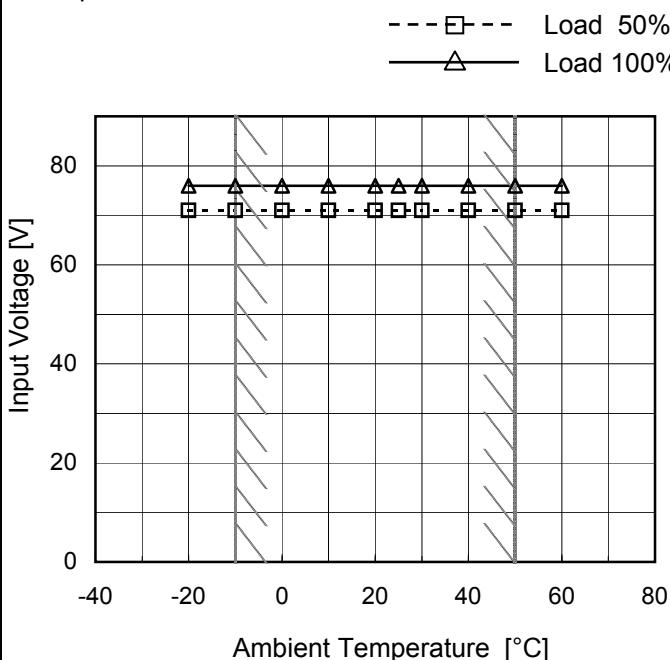


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	71	76
-10	71	76
0	71	76
10	71	76
20	71	76
25	71	76
30	71	76
40	71	76
50	71	76
60	71	76
--	-	-

Object	-12V2.2A
--------	----------

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	71	76
-10	71	76
0	71	76
10	71	76
20	71	76
25	71	76
30	71	76
40	71	76
50	71	76
60	71	76
--	-	-

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

COSEL

Model	GT3.5W-12	Temperature 25°C Testing Circuitry Figure A																																																									
Item	Overcurrent Protection																																																										
Object	+12V2.2A																																																										
1.Graph	<p>Input Volt. 90V Input Volt. 100V Input Volt. 110V</p>																																																										
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Output Voltage [V]	Load Current [A]																																																										
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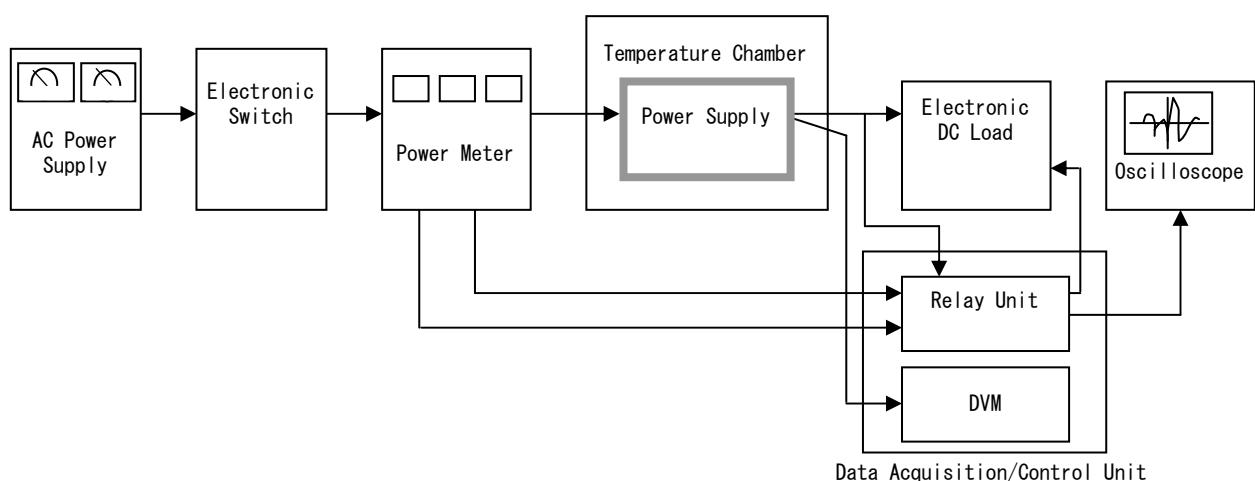


Figure A