



# TEST DATA OF STMGFW302415

Regulated DC Power Supply  
January 31, 2013

Approved by : Takahiro Yoneda  
Takahiro Yoneda Design Manager

Prepared by : Satoshi Kinoshita  
Satoshi Kinoshita Design Engineer

**COSEL CO.,LTD.**

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<p>The graph plots Input Power [W] on the Y-axis (0 to 50) against Load Ration [%] on the X-axis (0 to 120). Five linear data series are shown for different input voltages:</p> <ul style="list-style-type: none"> <li>Input Volt. 9V: Solid line with open triangle markers</li> <li>Input Volt. 12V: Dashed line with open square markers</li> <li>Input Volt. 18V: Dashed line with asterisk markers</li> <li>Input Volt. 24V: Dashed line with open circle markers</li> <li>Input Volt. 36V: Dashed line with open diamond markers</li> </ul> <table border="1"> <thead> <tr> <th>Load Ration [%]</th> <th>9[V]</th> <th>12[V]</th> <th>18[V]</th> <th>24[V]</th> <th>36[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.44</td><td>0.55</td><td>0.75</td><td>0.73</td><td>1.03</td></tr> <tr><td>20</td><td>7.20</td><td>7.30</td><td>7.45</td><td>7.64</td><td>8.36</td></tr> <tr><td>40</td><td>13.86</td><td>13.93</td><td>14.20</td><td>14.51</td><td>15.34</td></tr> <tr><td>60</td><td>20.76</td><td>20.71</td><td>20.93</td><td>21.26</td><td>22.20</td></tr> <tr><td>80</td><td>27.84</td><td>27.66</td><td>27.77</td><td>28.10</td><td>29.09</td></tr> <tr><td>100</td><td>35.19</td><td>34.77</td><td>34.80</td><td>35.06</td><td>36.10</td></tr> <tr><td>110</td><td>38.97</td><td>38.38</td><td>38.30</td><td>38.57</td><td>39.60</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Ration [%]	9[V]	12[V]	18[V]	24[V]	36[V]	0	0.44	0.55	0.75	0.73	1.03	20	7.20	7.30	7.45	7.64	8.36	40	13.86	13.93	14.20	14.51	15.34	60	20.76	20.71	20.93	21.26	22.20	80	27.84	27.66	27.77	28.10	29.09	100	35.19	34.77	34.80	35.06	36.10	110	38.97	38.38	38.30	38.57	39.60	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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<p>Ripple Voltage is shown as p-p in the figure below.      Note: Slanted line shows the range of the rated load current.</p> <p style="text-align: center;">Ripple [mVp-p]</p> <p style="text-align: center;">Fig.Complex Ripple Wave Form</p>																																									

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Object	-15V1A																																						
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<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph shows two sets of data points: one for Input Volt. 9V (solid line with triangle markers) and one for Input Volt. 36V (dashed line with circle markers). The x-axis represents Load Current [A] from 0.0 to 1.2. The y-axis represents Ripple Voltage [mV] from 0 to 120. A slanted line indicates the range of the rated load current.</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (9V)</th> <th>Ripple Voltage [mV] (36V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>35</td></tr> <tr><td>0.2</td><td>20</td><td>25</td></tr> <tr><td>0.4</td><td>20</td><td>25</td></tr> <tr><td>0.6</td><td>20</td><td>25</td></tr> <tr><td>0.8</td><td>20</td><td>25</td></tr> <tr><td>1.0</td><td>20</td><td>25</td></tr> <tr><td>1.1</td><td>20</td><td>25</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV] (9V)	Ripple Voltage [mV] (36V)	0.0	20	35	0.2	20	25	0.4	20	25	0.6	20	25	0.8	20	25	1.0	20	25	1.1	20	25														
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<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 9 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>35</td></tr> <tr><td>0.2</td><td>20</td><td>25</td></tr> <tr><td>0.4</td><td>20</td><td>25</td></tr> <tr><td>0.6</td><td>20</td><td>25</td></tr> <tr><td>0.8</td><td>20</td><td>25</td></tr> <tr><td>1.0</td><td>20</td><td>25</td></tr> <tr><td>1.1</td><td>20</td><td>25</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> <p>+15V: Rated output current</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 9 [V]	Input Volt. 36 [V]	0.0	20	35	0.2	20	25	0.4	20	25	0.6	20	25	0.8	20	25	1.0	20	25	1.1	20	25	--	-	-	--	-	-	--	-	-	--	-	-
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	Input Volt. 9 [V]	Input Volt. 36 [V]																																					
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<p>Measured by 100 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>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																							

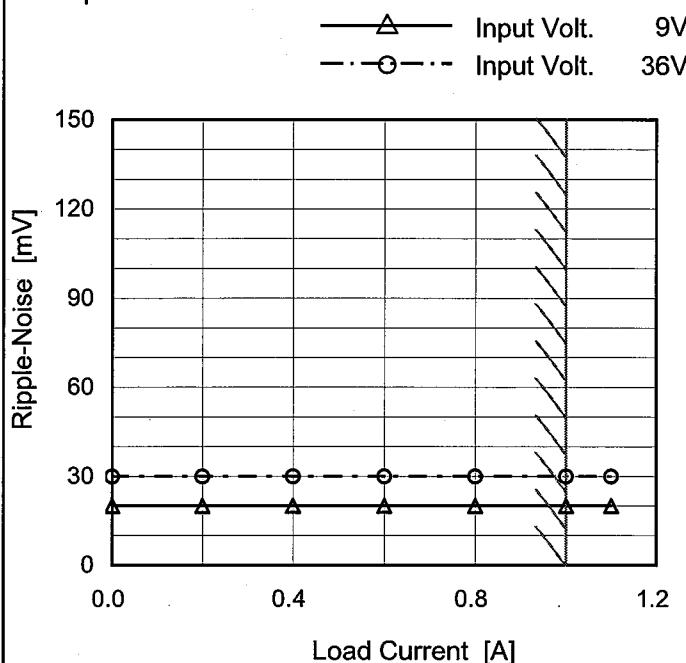
**COSEL**

Model STMGFW302415

Item Ripple-Noise

Object +15V1A

## 1.Graph



Ripple-Noise is shown as p-p in the figure below.  
Note: Slanted line shows the range of the rated load current.

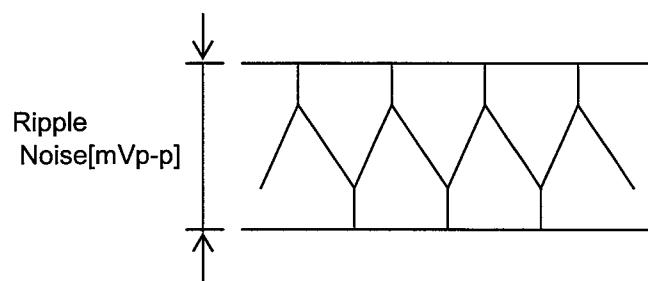


Fig.Complex Ripple Noise Wave Form

Temperature 25°C  
Testing Circuitry Figure B

## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.0	20	30
0.2	20	30
0.4	20	30
0.6	20	30
0.8	20	30
1.0	20	30
1.1	20	30
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated output current

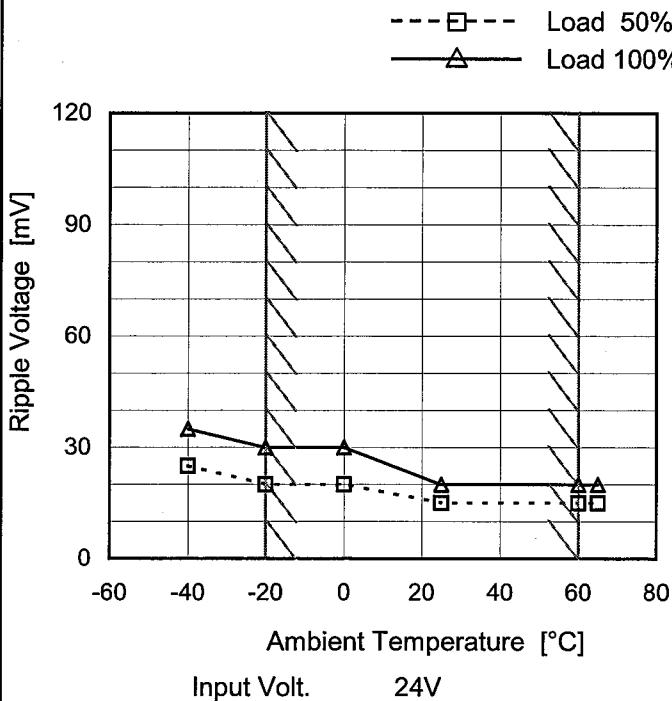
COSEL

Model	STMGFW302415																																							
Item	Ripple-Noise	Temperature      25°C Testing Circuitry      Figure B																																						
Object	-15V1A																																							
1.Graph																																								
<p>Y-axis: Ripple-Noise [mV] X-axis: Load Current [A]</p> <p>Legend: — ▲ — Input Volt. 9V - ○ - Input Volt. 36V</p>		2.Values																																						
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple-Noise [mV]</th> </tr> <tr> <th>Input Volt. 9 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>30</td><td>40</td></tr> <tr><td>0.2</td><td>30</td><td>35</td></tr> <tr><td>0.4</td><td>30</td><td>35</td></tr> <tr><td>0.6</td><td>30</td><td>35</td></tr> <tr><td>0.8</td><td>30</td><td>35</td></tr> <tr><td>1.0</td><td>30</td><td>35</td></tr> <tr><td>1.1</td><td>30</td><td>35</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> <p>+15V: Rated output current</p>			Load Current [A]	Ripple-Noise [mV]		Input Volt. 9 [V]	Input Volt. 36 [V]	0.0	30	40	0.2	30	35	0.4	30	35	0.6	30	35	0.8	30	35	1.0	30	35	1.1	30	35	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																							
	Input Volt. 9 [V]	Input Volt. 36 [V]																																						
0.0	30	40																																						
0.2	30	35																																						
0.4	30	35																																						
0.6	30	35																																						
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1.0	30	35																																						
1.1	30	35																																						
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<p>Measured by 100 MHz Oscilloscope. Ripple-Noise is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>																																								
<p>Ripple Noise[mVp-p]</p>																																								
<p>Fig.Complex Ripple Noise Wave Form</p>																																								

**COSEL**

Model	STMGFW302415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V1A

## 1.Graph



Testing Circuitry Figure B

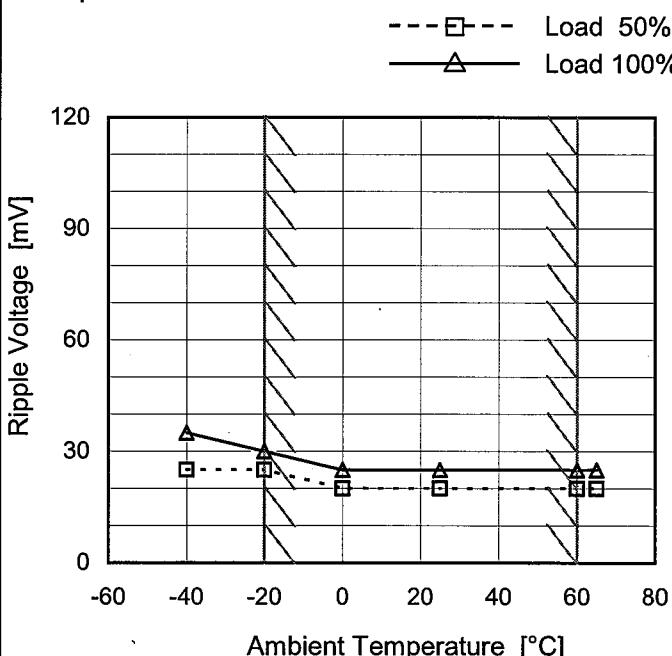
## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	25	35
-20	20	30
0	20	30
25	15	20
60	15	20
65	15	20
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated output current

Object	-15V1A
--------	--------

## 1.Graph



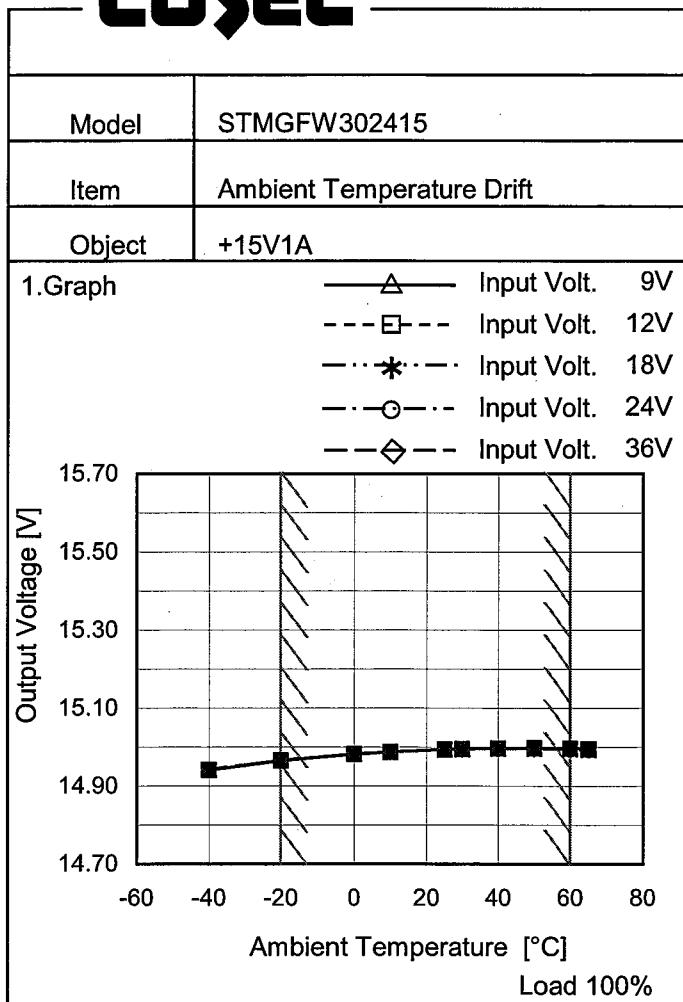
## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	25	35
-20	25	30
0	20	25
25	20	25
60	20	25
65	20	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated output current

Measured by 100 MHz Oscilloscope.

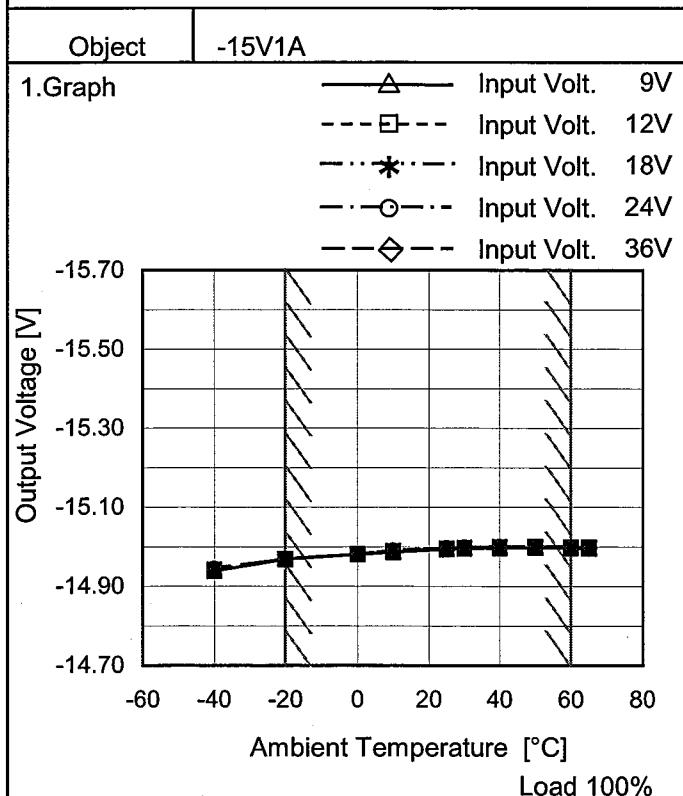
Note: Slanted line shows the range of the rated ambient temperature.

**COSEL**

Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	9[V]	12[V]	18[V]	24[V]	36[V]
-40	14.941	14.942	14.941	14.942	14.943
-20	14.966	14.966	14.966	14.966	14.966
0	14.982	14.982	14.982	14.982	14.982
10	14.988	14.988	14.987	14.987	14.987
25	14.995	14.994	14.993	14.993	14.993
30	14.996	14.995	14.995	14.994	14.994
40	14.998	14.997	14.996	14.996	14.996
50	14.998	14.998	14.996	14.996	14.995
60	14.997	14.996	14.995	14.995	14.994
65	14.996	14.995	14.994	14.993	14.993
--	-	-	-	-	-



## 2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	9[V]	12[V]	18[V]	24[V]	36[V]
-40	-14.939	-14.942	-14.943	-14.945	-14.946
-20	-14.969	-14.969	-14.969	-14.969	-14.969
0	-14.981	-14.981	-14.981	-14.981	-14.981
10	-14.987	-14.989	-14.990	-14.991	-14.991
25	-14.994	-14.995	-14.997	-14.997	-14.997
30	-14.995	-14.997	-14.998	-14.999	-14.998
40	-14.997	-14.999	-15.000	-15.000	-15.000
50	-14.998	-14.999	-15.000	-15.001	-15.000
60	-14.997	-14.999	-15.000	-15.000	-14.999
65	-14.996	-14.998	-14.999	-14.999	-14.998
--	-	-	-	-	-

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



Model	STMGFW302415	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 : -20 - 60°C

Input Voltage : 9 - 36V

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

Object	+15V1A			Output		Output Voltage Accuracy	
	Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage		60	24	0	15.362	±198	±1.3
Minimum Voltage		-20	9	1	14.966		

Object	-15V1A			Output		Output Voltage Accuracy	
	Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage		60	9	0	-15.310	±171	±1.1
Minimum Voltage		-20	9	1	-14.969		

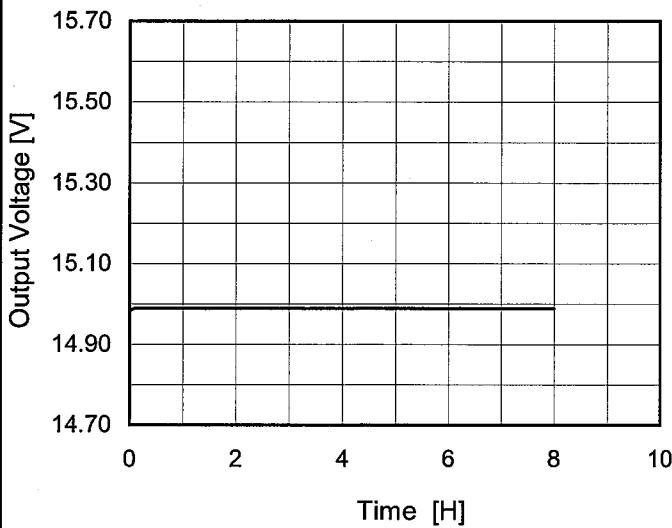
**COSEL**

Model STMGFW302415

Item Time Lapse Drift

Object +15V1A

## 1.Graph

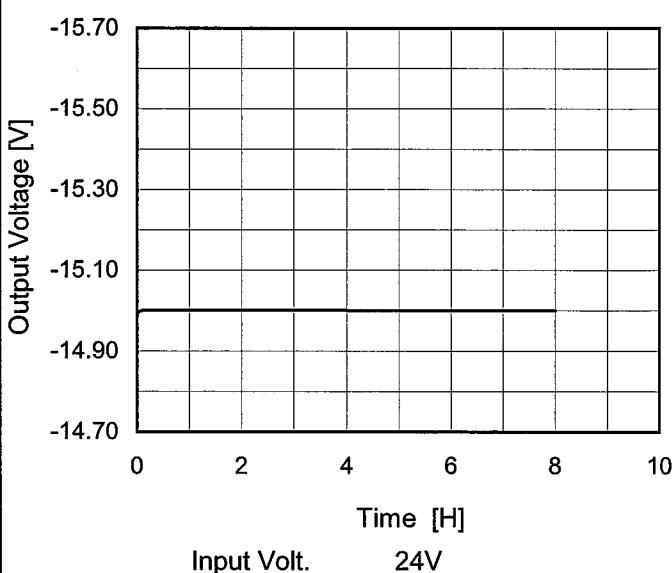
Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Time since start [H]	Output Voltage [V]
0.0	14.980
0.5	14.990
1.0	14.989
2.0	14.989
3.0	14.989
4.0	14.989
5.0	14.989
6.0	14.989
7.0	14.989
8.0	14.989

Object -15V1A

## 1.Graph



## 2.Values

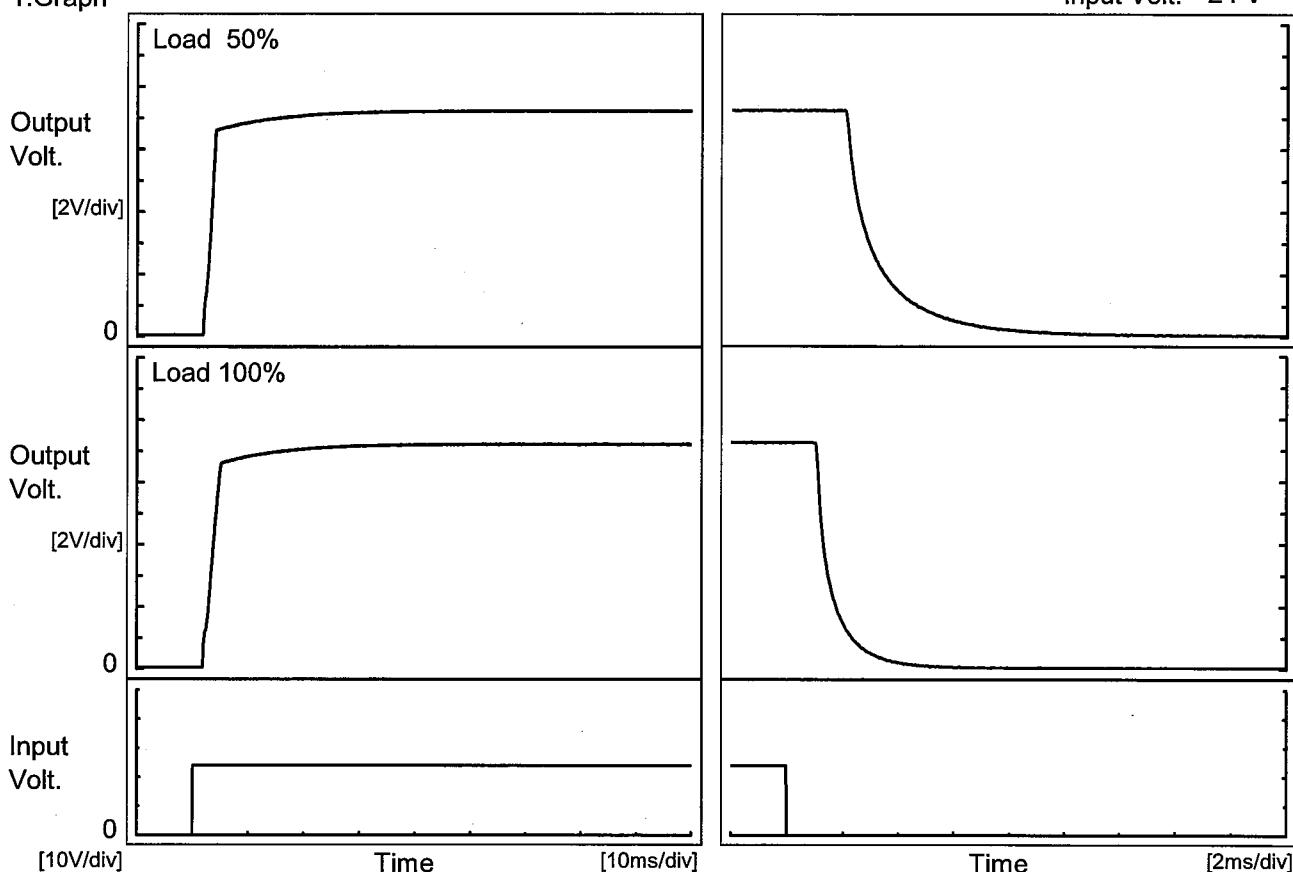
Time since start [H]	Output Voltage [V]
0.0	-14.990
0.5	-15.001
1.0	-15.001
2.0	-15.001
3.0	-15.001
4.0	-15.001
5.0	-15.001
6.0	-15.001
7.0	-15.001
8.0	-15.001

**COSEL**

Model STMGFW302415

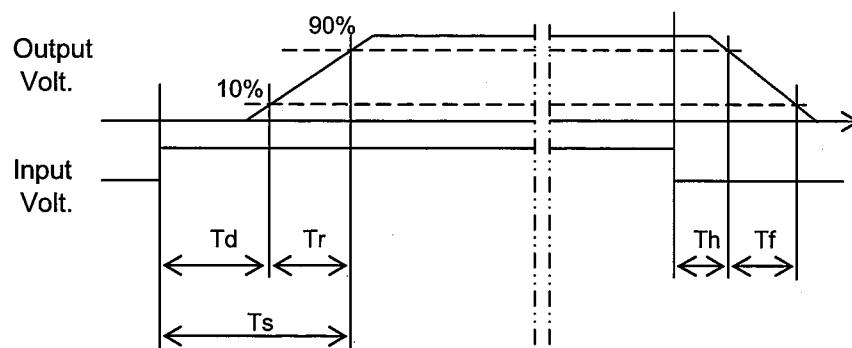
Temperature 25°C  
Testing Circuitry Figure AItem Rise and Fall Time  
Object +15V1A

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		2.1	6.2	8.3	2.1	3.0	
100 %		2.0	6.9	8.9	1.1	1.5	



**COSEL**

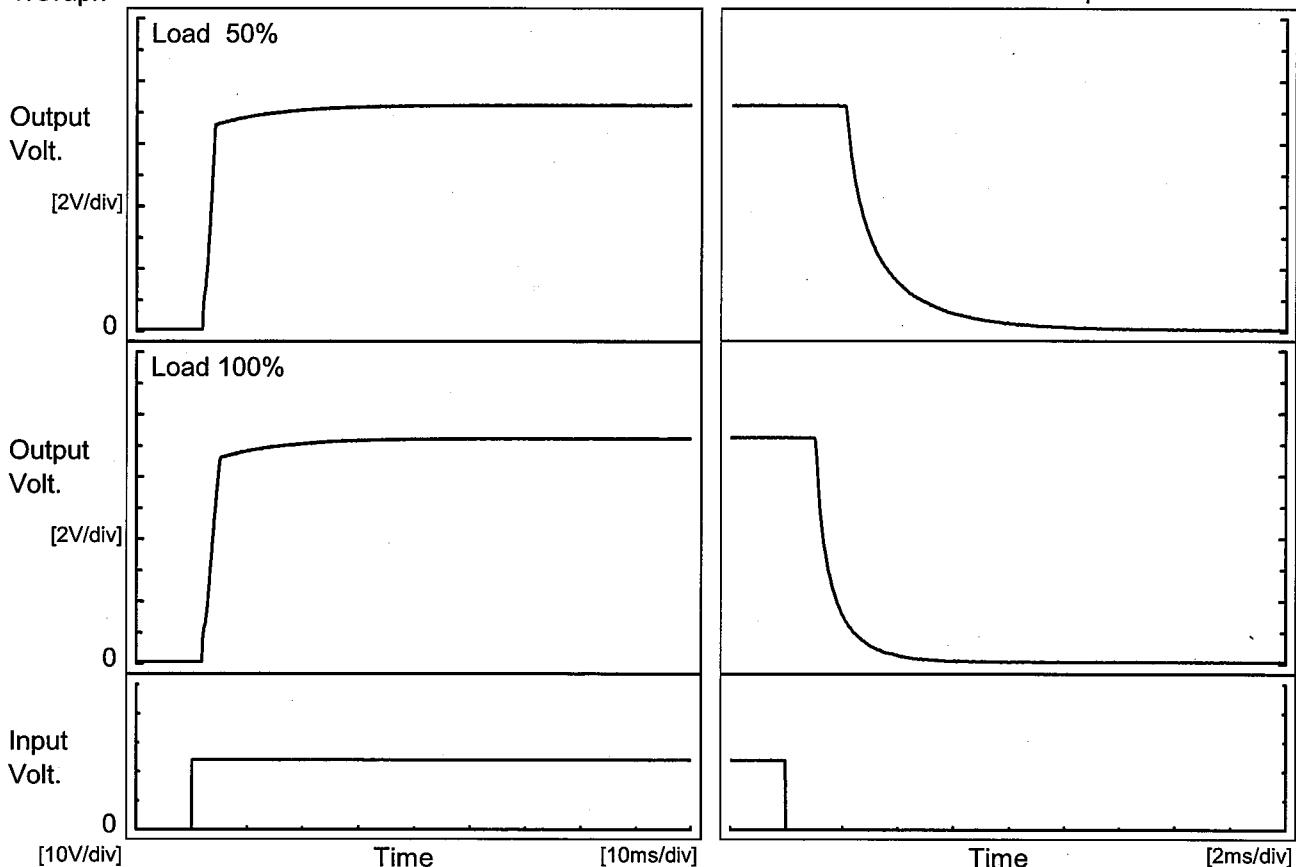
Model STMGFW302415

Temperature 25°C  
Testing Circuitry Figure A

Item Rise and Fall Time

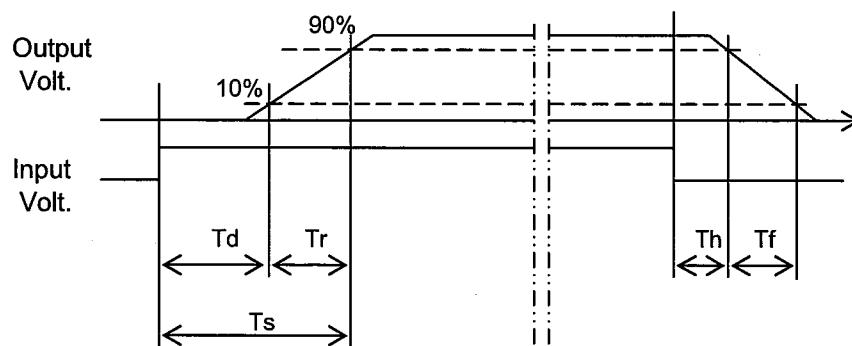
Object -15V1A

## 1. Graph



## 2. Values

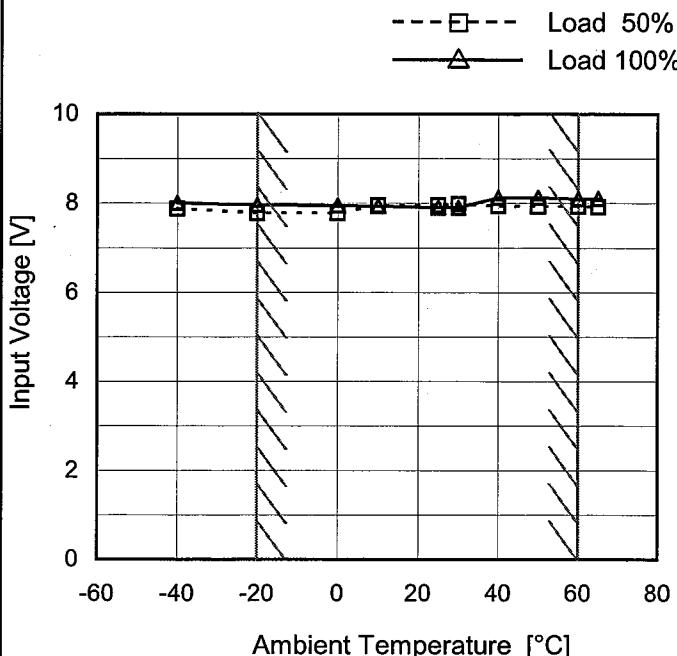
Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		2.1	6.1	8.2	2.1	3.2	
100 %		2.0	6.8	8.8	1.1	1.6	



**COSEL**

Model	STMGFW302415
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V1A

## 1.Graph



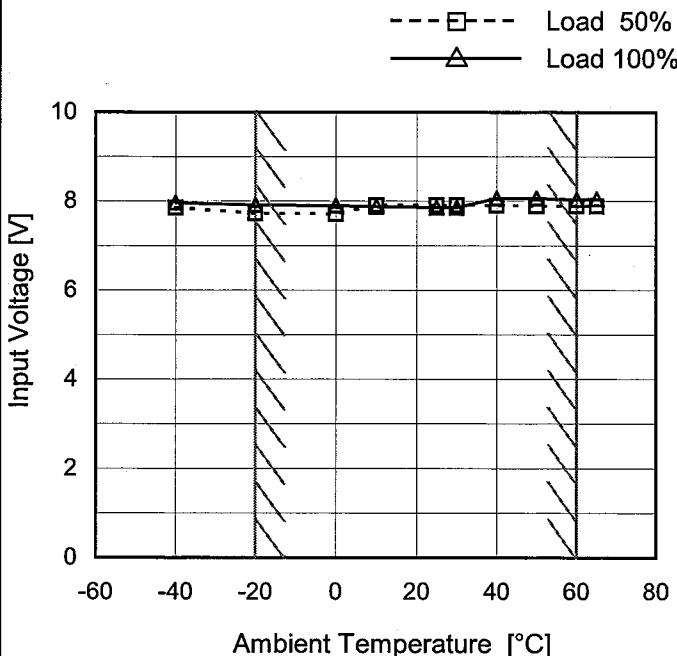
## Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	7.9	8.1
-20	7.8	8.0
0	7.8	8.0
10	7.8	8.0
25	7.8	8.0
30	7.8	8.0
40	7.8	8.2
50	7.8	8.2
60	7.8	8.1
65	7.8	8.2
--	-	-

Object	-15V1A
--------	--------

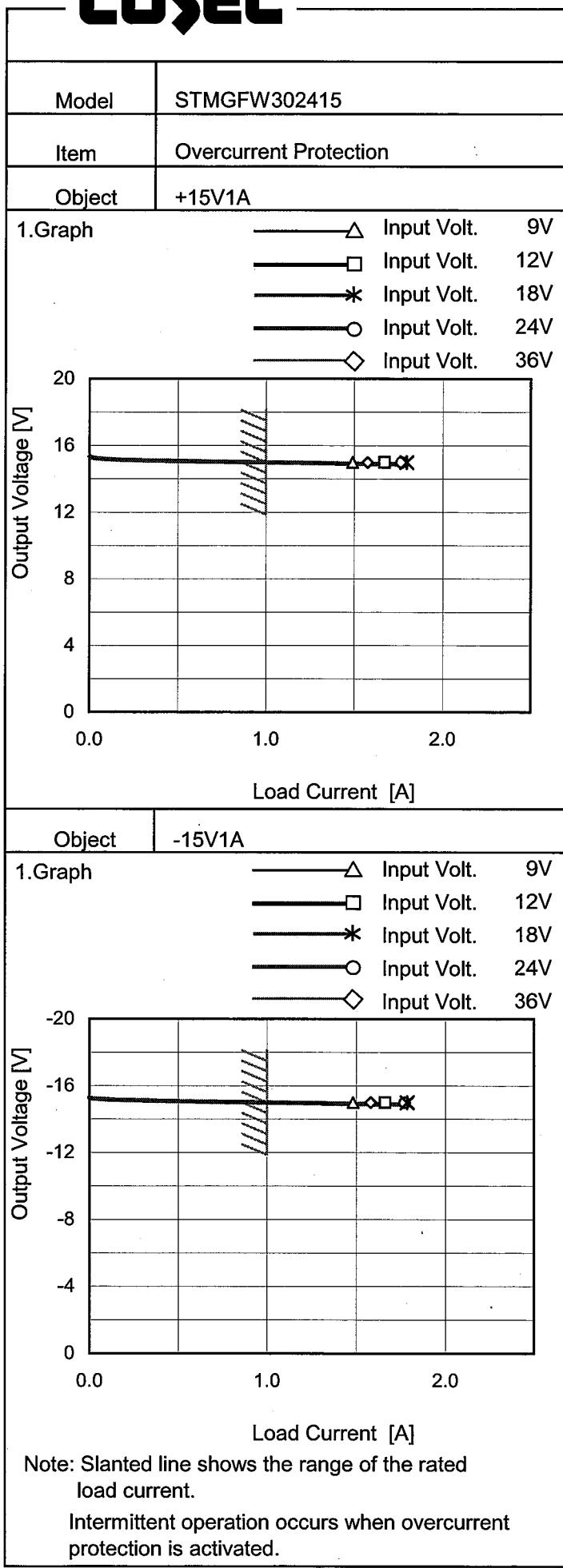
## 1.Graph



## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	7.9	8.0
-20	7.8	8.0
0	7.8	7.9
10	7.8	7.9
25	7.8	7.9
30	7.8	7.9
40	7.9	8.1
50	7.9	8.1
60	7.9	8.1
65	7.9	8.1
--	-	-

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

**COSEL**

Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

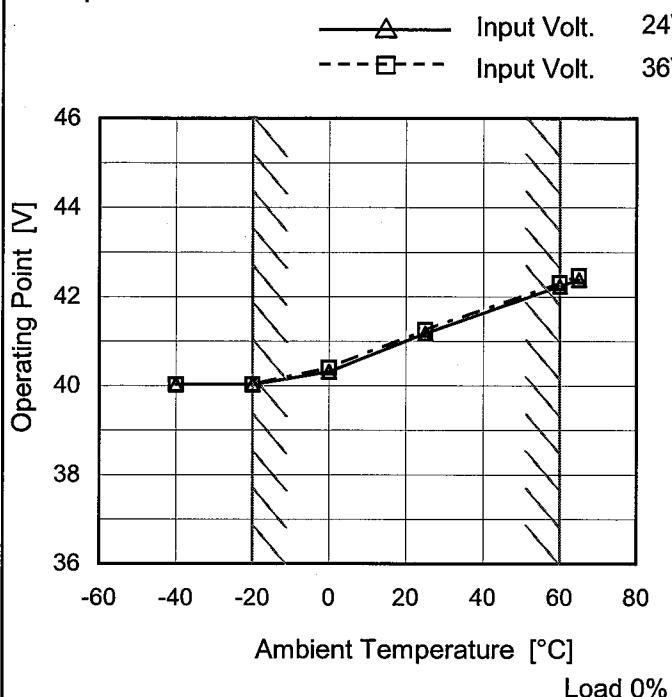
Output Voltage [V]	Load Current [A]				
	9[V]	12[V]	18[V]	24[V]	36[V]
15.0	1.490	1.672	1.795	1.769	1.575
14.3	-	-	-	-	-
13.5	-	-	-	-	-
12.0	-	-	-	-	-
10.5	-	-	-	-	-
9.0	-	-	-	-	-
7.5	-	-	-	-	-
6.0	-	-	-	-	-
4.5	-	-	-	-	-
3.0	-	-	-	-	-
1.5	-	-	-	-	-
0.0	-	-	-	-	-

## 2.Values

Output Voltage [V]	Load Current [A]				
	9[V]	12[V]	18[V]	24[V]	36[V]
-15.0	1.483	1.663	1.787	1.773	1.582
-14.3	-	-	-	-	-
-13.5	-	-	-	-	-
-12.0	-	-	-	-	-
-10.5	-	-	-	-	-
-9.0	-	-	-	-	-
-7.5	-	-	-	-	-
-6.0	-	-	-	-	-
-4.5	-	-	-	-	-
-3.0	-	-	-	-	-
-1.5	-	-	-	-	-
0.0	-	-	-	-	-

Model	STMGFW302415
Item	Overvoltage Protection
Object	+30V1A

## 1. Graph



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

## Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 24[V]	Input Volt. 36[V]
-40	40.03	40.03
-20	40.03	40.03
0	40.32	40.40
25	41.18	41.25
60	42.24	42.31
65	42.38	42.46
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

coSEL

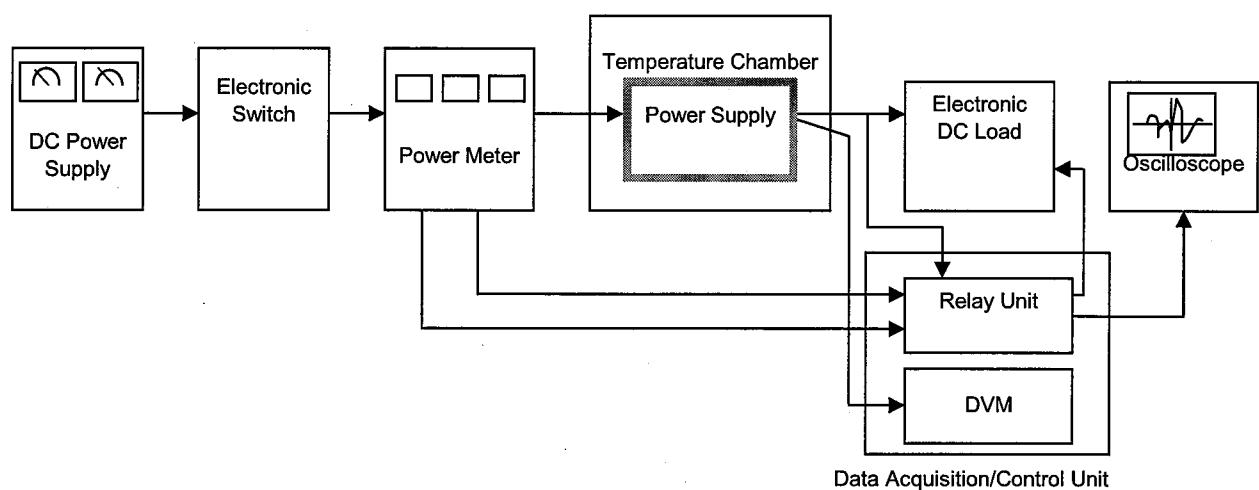


Figure A

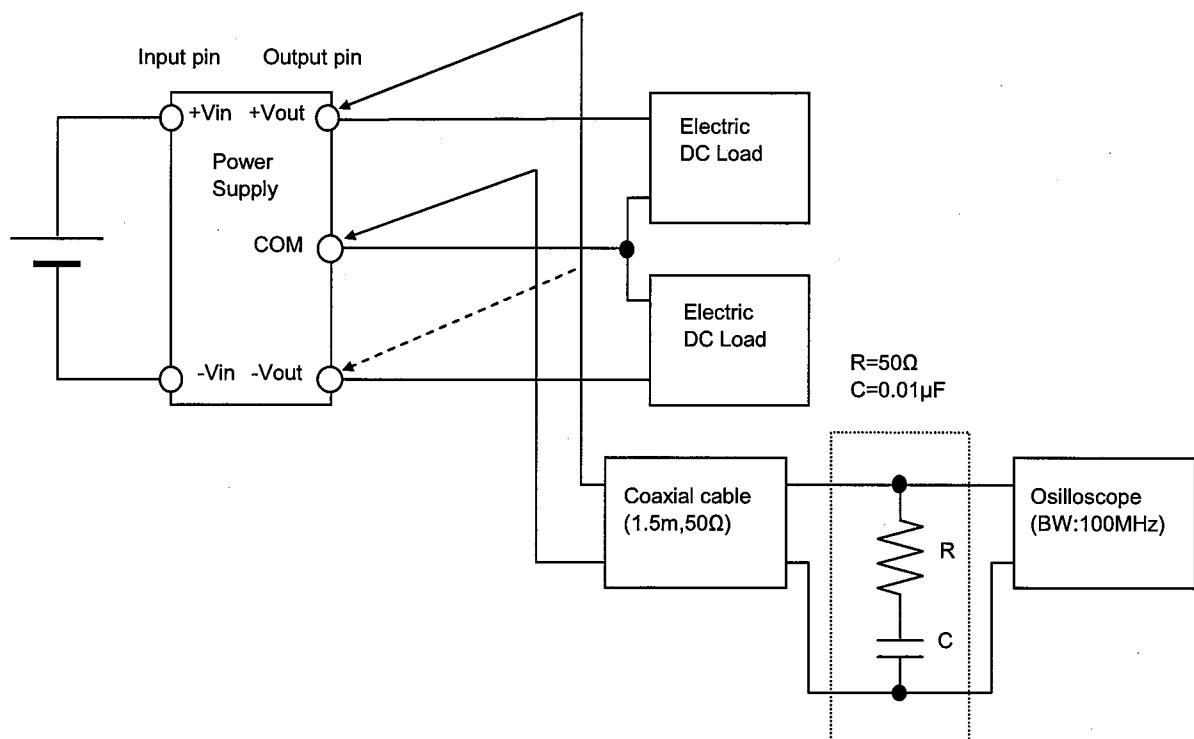


Figure B (Ripple and Ripple noise Characteristic)