

# TEST DATA OF MGFW304815

Regulated DC Power Supply  
November 25, 2010

Approved by : Kazunari Asano  
Kazunari Asano Design Manager

Prepared by : Masashi Ueda  
Masashi Ueda Design Engineer

**COSEL CO.,LTD.**

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<b>COSEL</b>																																																																																		
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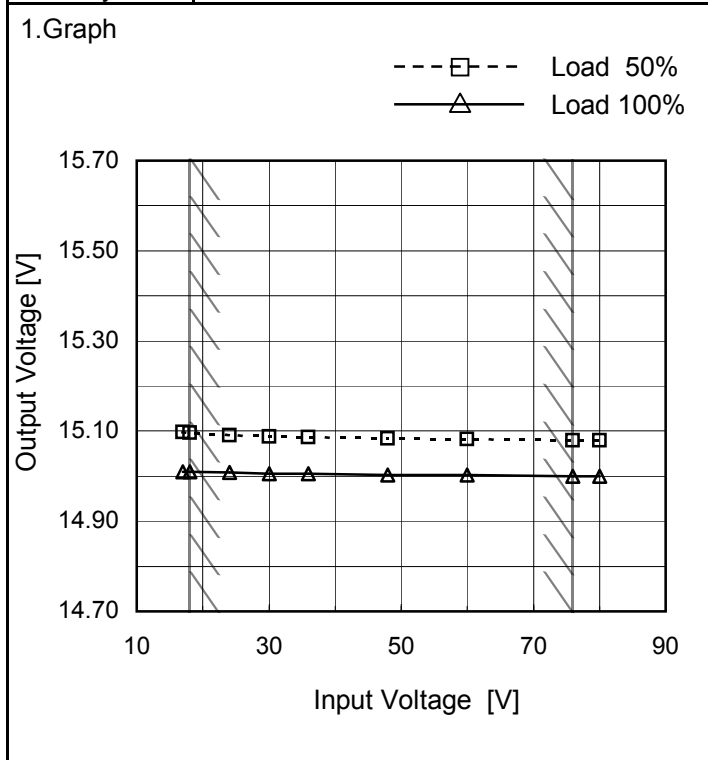


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Item	Line Regulation
Object	+15V1A

Temperature 25°C  
Testing Circuitry Figure A

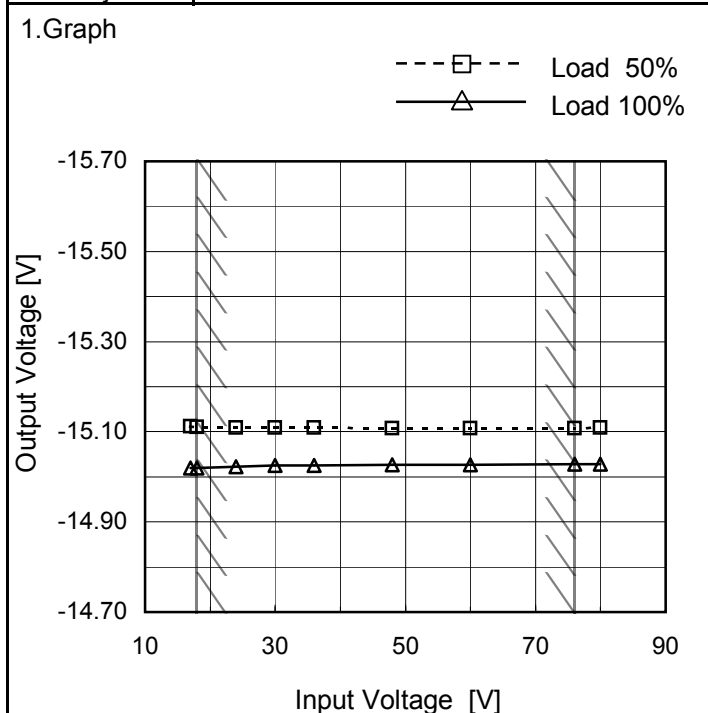


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	15.098	15.010
18	15.097	15.010
24	15.091	15.008
30	15.088	15.006
36	15.086	15.005
48	15.084	15.003
60	15.082	15.002
76	15.080	15.000
80	15.080	15.000

-15V: Rated output current

Object	-15V1A
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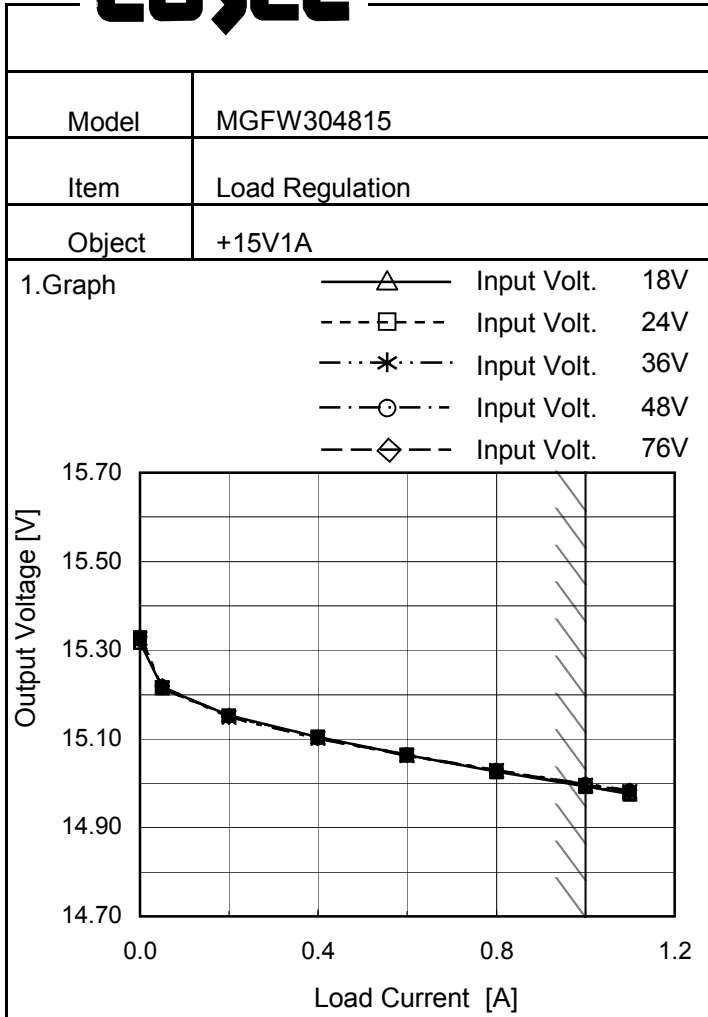
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	-15.111	-15.020
18	-15.111	-15.020
24	-15.109	-15.023
30	-15.109	-15.025
36	-15.108	-15.026
48	-15.108	-15.027
60	-15.108	-15.027
76	-15.108	-15.028
80	-15.108	-15.028

+15V: Rated output current

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

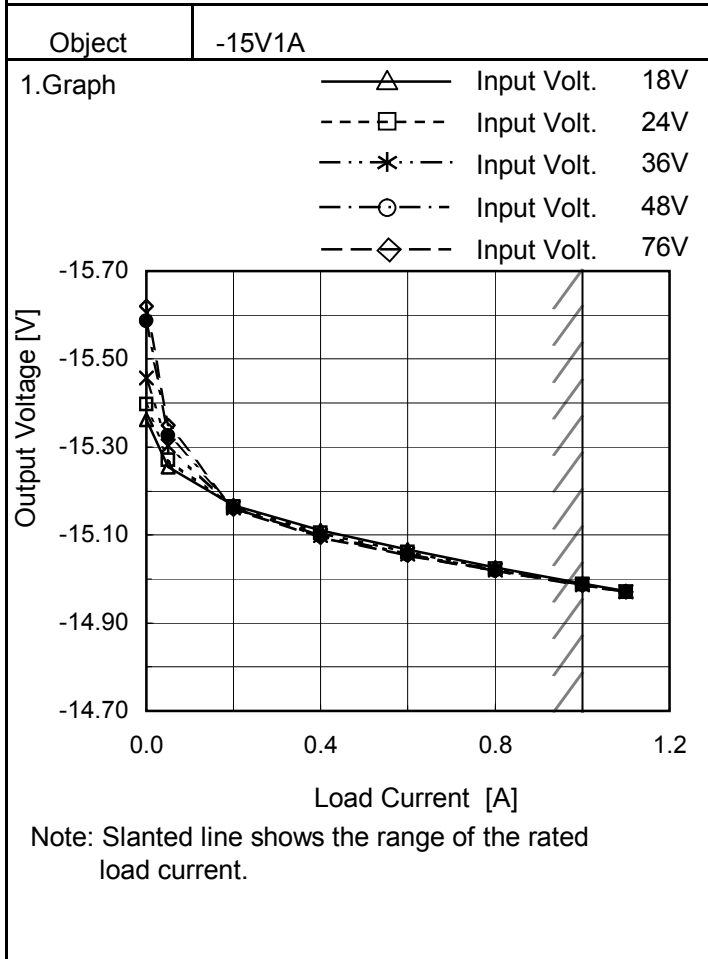




2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	15.318	15.327	15.326	15.324	15.330
0.05	15.215	15.215	15.215	15.218	15.219
0.20	15.154	15.152	15.149	15.150	15.151
0.40	15.104	15.104	15.101	15.102	15.101
0.60	15.063	15.063	15.063	15.064	15.063
0.80	15.026	15.028	15.029	15.029	15.030
1.00	14.993	14.994	14.996	14.998	14.999
1.10	14.975	14.979	14.982	14.983	14.985
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V: Rated output current



2.Values

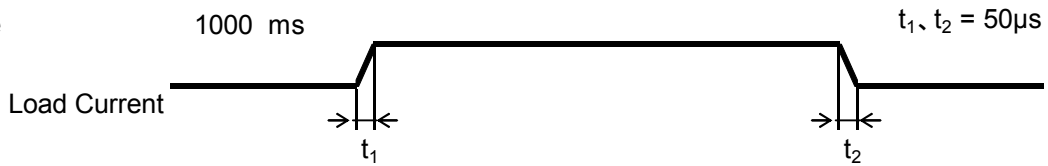
Load Current [A]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	-15.362	-15.398	-15.456	-15.587	-15.620
0.05	-15.255	-15.270	-15.303	-15.327	-15.349
0.20	-15.168	-15.164	-15.161	-15.161	-15.159
0.40	-15.111	-15.105	-15.099	-15.098	-15.095
0.60	-15.066	-15.061	-15.057	-15.056	-15.053
0.80	-15.026	-15.023	-15.020	-15.019	-15.018
1.00	-14.990	-14.988	-14.987	-14.987	-14.986
1.10	-14.972	-14.971	-14.971	-14.971	-14.971
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V: Rated output current

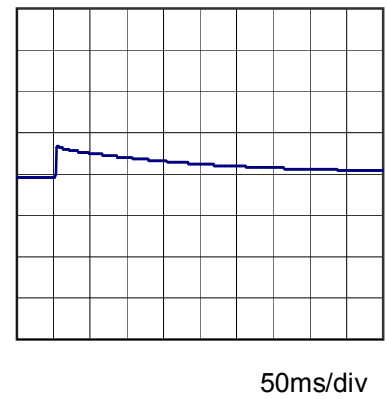
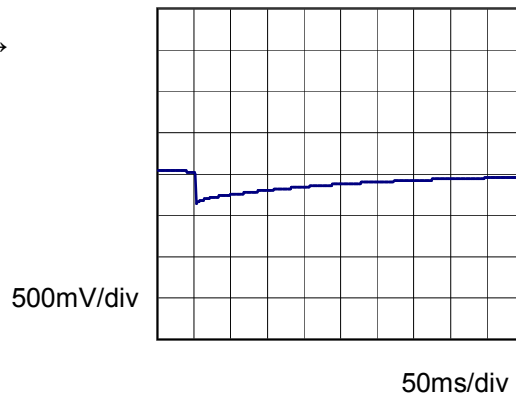


Model	MGFW304815	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V1A		

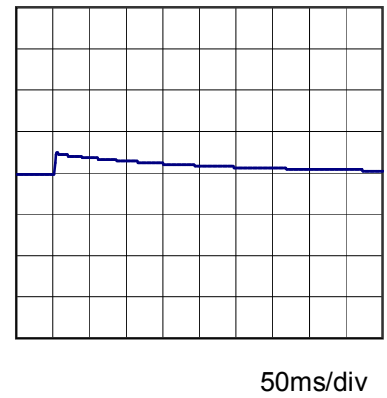
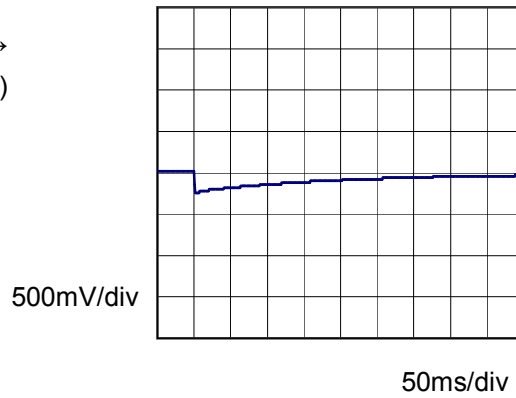
Input Volt. 48 V  
 Other output current rated  
 Cycle 1000 ms



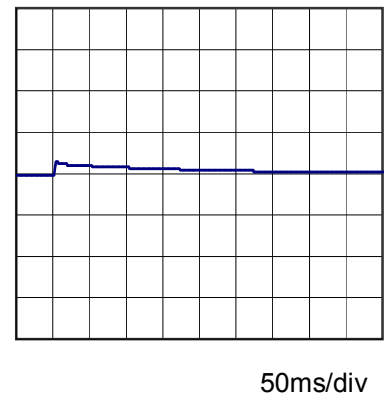
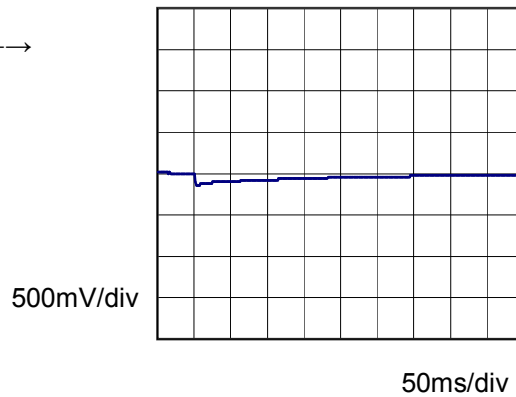
Min. Load (0A) ←→  
 Load 100% (1A)



Min. Load (0A) ←→  
 Load 50% (0.5A)



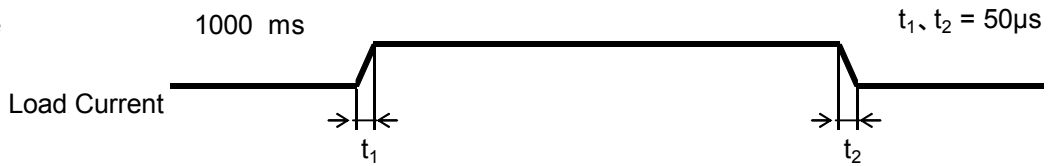
Load 50% (0.5A) ←→  
 Load 100% (1A)



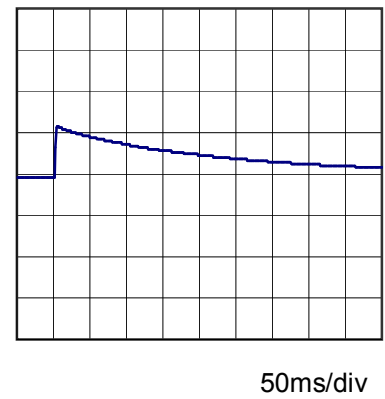
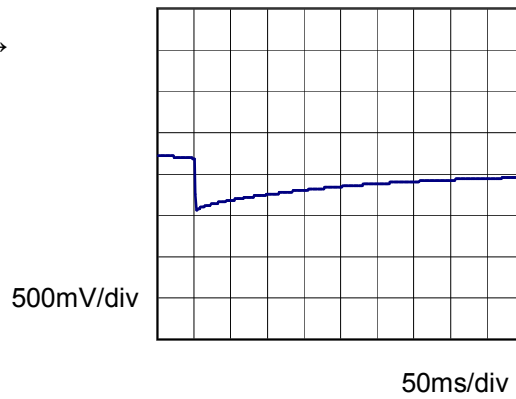


Model	MGFW304815	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-15V1A		

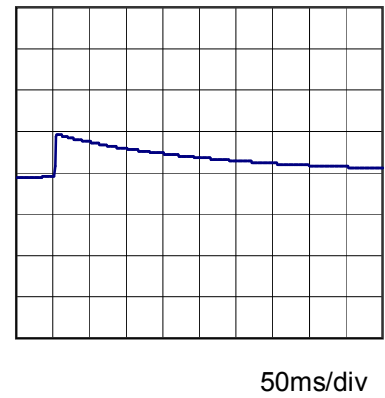
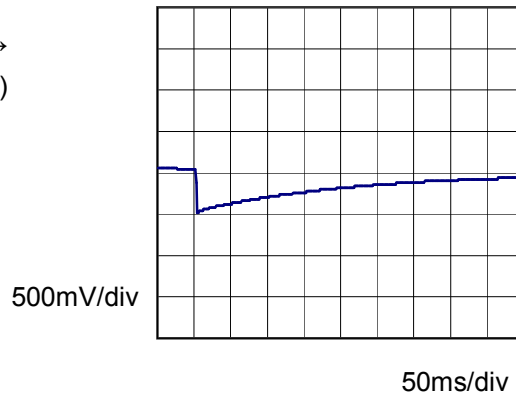
Input Volt. 48 V  
 Other output current rated  
 Cycle 1000 ms



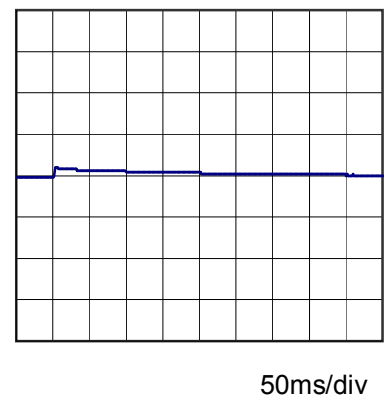
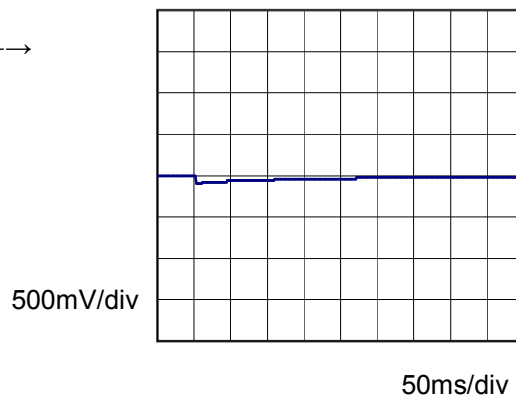
Min. Load (0A) ←→  
 Load 100% (1A)



Min. Load (0A) ←→  
 Load 50% (0.5A)



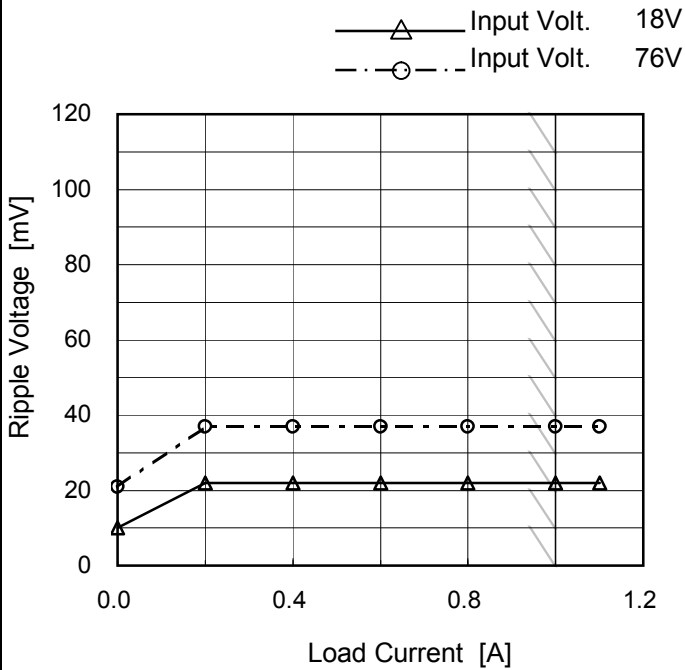
Load 50% (0.5A) ←→  
 Load 100% (1A)





Model	MGFW304815	
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B
Object	+15V1A	

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.0	10	21
0.2	22	37
0.4	22	37
0.6	22	37
0.8	22	37
1.0	22	37
1.1	22	37
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated output current

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

Ripple [mVp-p]

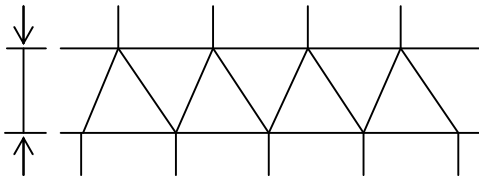


Fig. Complex Ripple Wave Form

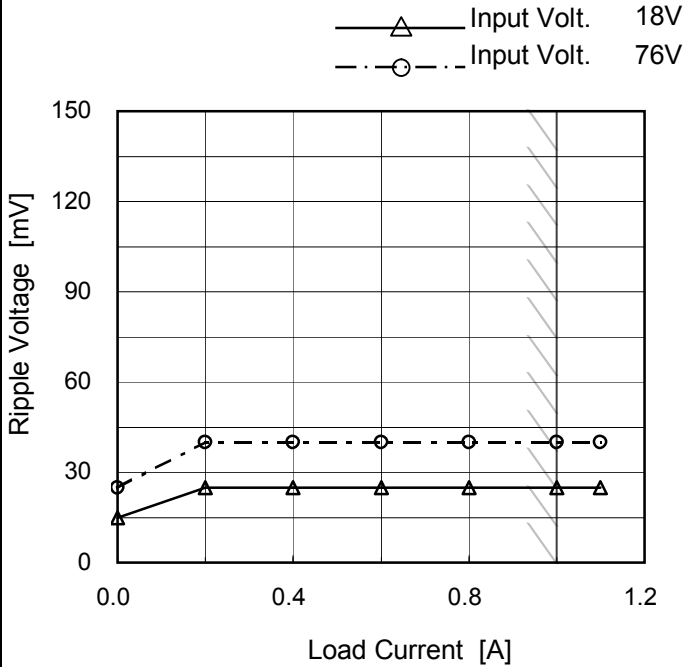


<b>COSEL</b>																																								
Model	MGFW304815	Temperature 25°C Testing Circuitry Figure B																																						
Item	Ripple Voltage (by Load Current)																																							
Object	-15V1A																																							
1.Graph		2.Values																																						
<p style="text-align: center;"> <span style="display: inline-block; width: 100px; border-bottom: 1px solid black; margin-right: 5px;"></span> △ Input Volt. 18V  <span style="display: inline-block; width: 100px; border-bottom: 1px dashed black; margin-right: 5px;"></span> ○ Input Volt. 76V                 </p> <p style="text-align: center;">Ripple Voltage [mV]</p> <p style="text-align: center;">Load Current [A]</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. 18 [V]</th> <th>Input Volt. 76 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>12</td><td>20</td></tr> <tr><td>0.2</td><td>9</td><td>17</td></tr> <tr><td>0.4</td><td>9</td><td>17</td></tr> <tr><td>0.6</td><td>9</td><td>17</td></tr> <tr><td>0.8</td><td>7</td><td>15</td></tr> <tr><td>1.0</td><td>7</td><td>15</td></tr> <tr><td>1.1</td><td>7</td><td>15</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 style="text-align: center;">+15V: Rated output current</p>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 76 [V]	0.0	12	20	0.2	9	17	0.4	9	17	0.6	9	17	0.8	7	15	1.0	7	15	1.1	7	15	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
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<p>Ripple [mVp-p]</p> <p style="text-align: center;">Fig.Complex Ripple Wave Form</p>																																								



Model	MGFW304815	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	+15V1A		

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.0	15	25
0.2	25	40
0.4	25	40
0.6	25	40
0.8	25	40
1.0	25	40
1.1	25	40
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated output current

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

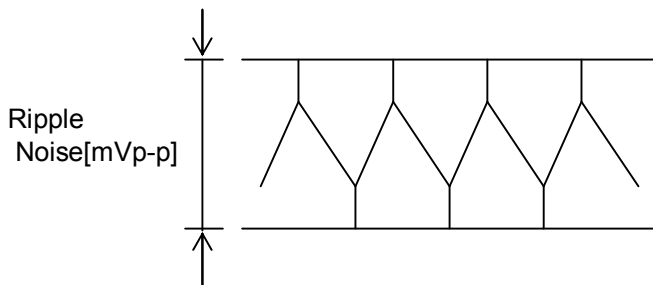
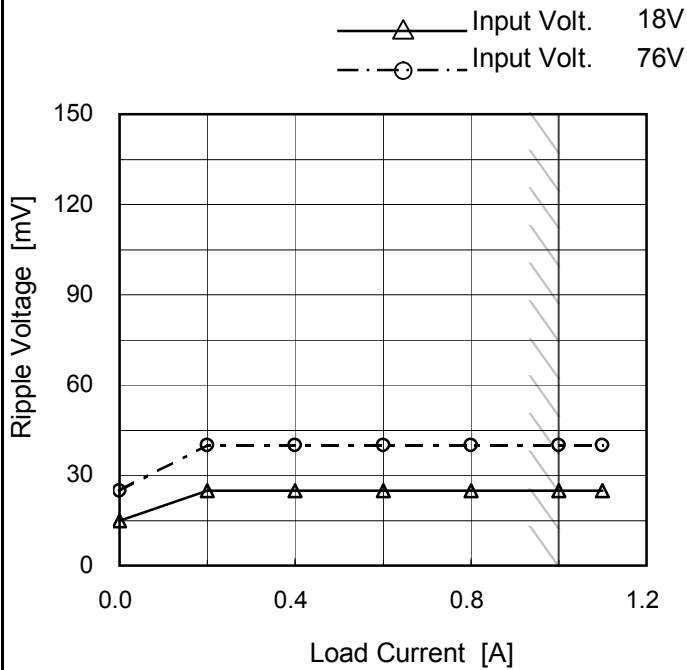


Fig.Complex Ripple Noise Wave Form



Model	MGFW304815	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure B
Object	-15V1A		

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.0	15	25
0.2	15	20
0.4	15	20
0.6	15	20
0.8	10	20
1.0	10	20
1.1	10	20
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated output current

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

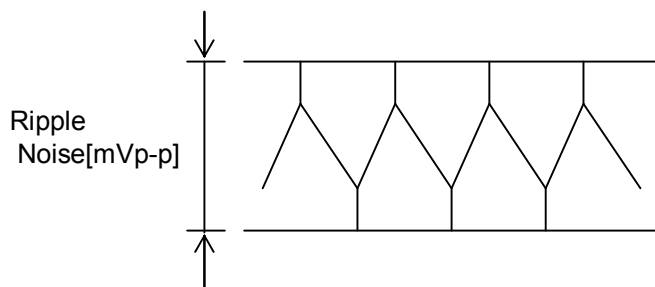
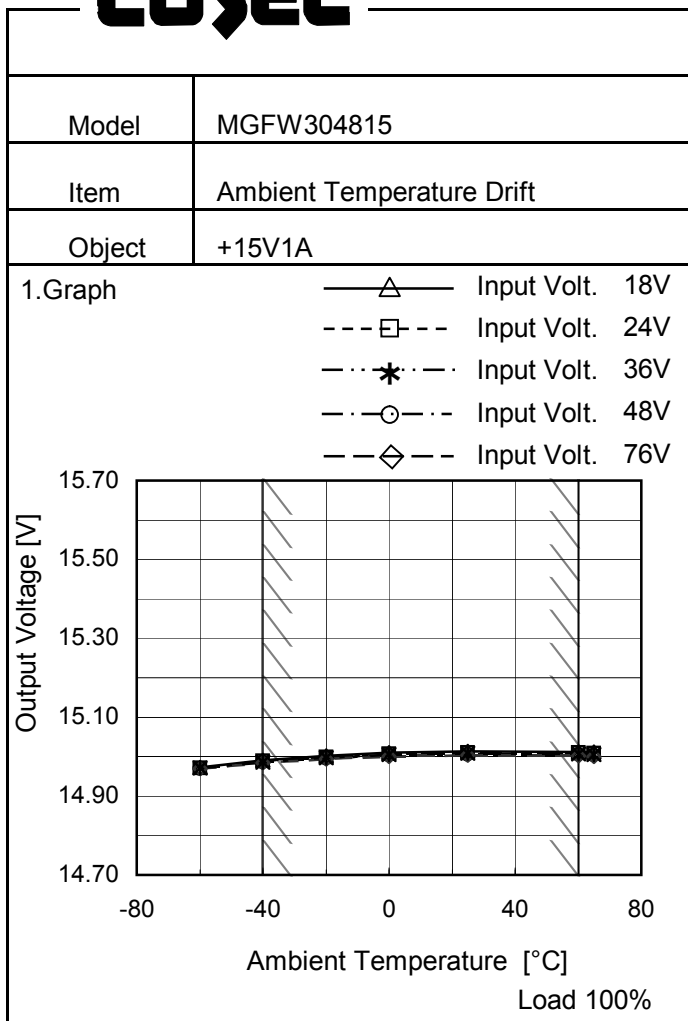


Fig.Complex Ripple Noise Wave Form



<b>COSEL</b>																																									
Model	MGFW304815	Testing Circuitry Figure A																																							
Item	Ripple Voltage (by Ambient Temp.)																																								
Object	+15V1A																																								
<p>1.Graph</p> <div style="text-align: right;">             ---□--- Load 50%              —△— Load 100%         </div> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Input Volt. 48V</p>		<p>2.Values</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-60</td><td>61</td><td>59</td></tr> <tr><td>-40</td><td>55</td><td>54</td></tr> <tr><td>-20</td><td>49</td><td>49</td></tr> <tr><td>0</td><td>42</td><td>42</td></tr> <tr><td>25</td><td>35</td><td>35</td></tr> <tr><td>60</td><td>34</td><td>34</td></tr> <tr><td>65</td><td>34</td><td>34</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 style="text-align: center;">-15V: Rated output current</p>		Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	61	59	-40	55	54	-20	49	49	0	42	42	25	35	35	60	34	34	65	34	34	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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<p>1.Graph</p> <div style="text-align: right;">             ---□--- Load 50%              —△— Load 100%         </div> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Input Volt. 48V</p> <p>Measured by 100 MHz Oscilloscope.              Note: Slanted line shows the range of the rated ambient temperature.</p>		<p>2.Values</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-60</td><td>26</td><td>23</td></tr> <tr><td>-40</td><td>28</td><td>26</td></tr> <tr><td>-20</td><td>31</td><td>28</td></tr> <tr><td>0</td><td>28</td><td>26</td></tr> <tr><td>25</td><td>25</td><td>23</td></tr> <tr><td>60</td><td>26</td><td>23</td></tr> <tr><td>65</td><td>26</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> <p style="text-align: center;">+15V: Rated output current</p>		Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	26	23	-40	28	26	-20	31	28	0	28	26	25	25	23	60	26	23	65	26	23	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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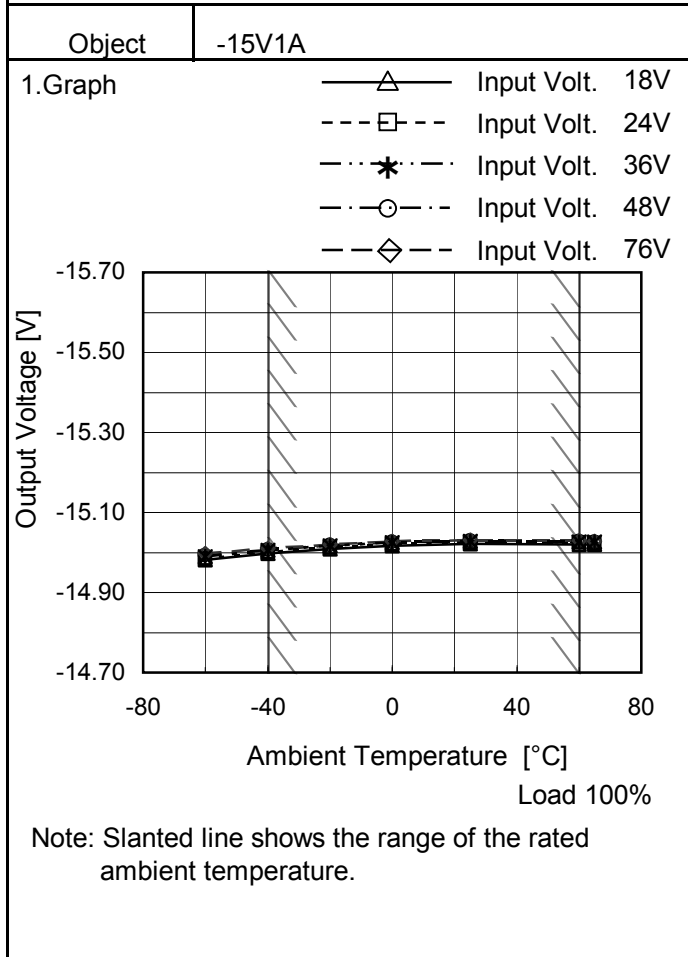




Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	14.973	14.972	14.970	14.970	14.969
-40	14.990	14.988	14.986	14.985	14.984
-20	15.002	14.999	14.997	14.996	14.994
0	15.010	15.008	15.005	15.003	15.001
25	15.014	15.011	15.008	15.006	15.003
60	15.012	15.010	15.007	15.005	15.002
65	15.011	15.008	15.006	15.004	15.001
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-



2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	-14.981	-14.986	-14.990	-14.993	-14.997
-40	-14.997	-15.001	-15.006	-15.008	-15.011
-20	-15.009	-15.013	-15.016	-15.018	-15.021
0	-15.017	-15.021	-15.024	-15.026	-15.028
25	-15.021	-15.025	-15.028	-15.029	-15.030
60	-15.021	-15.024	-15.027	-15.028	-15.029
65	-15.020	-15.023	-15.026	-15.027	-15.028
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-



<b>COSEL</b>		
Model	MGFW304815	
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 : -40 - 60°C

Input Voltage : 18 - 76V

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

\* Other Output : Rated Load

\* 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	+15V1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
			Maximum Voltage	60		
Minimum Voltage	-40	76	1	14.984		

Object	-15V1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
			Maximum Voltage	60		
Minimum Voltage	-40	18	1	-14.997		



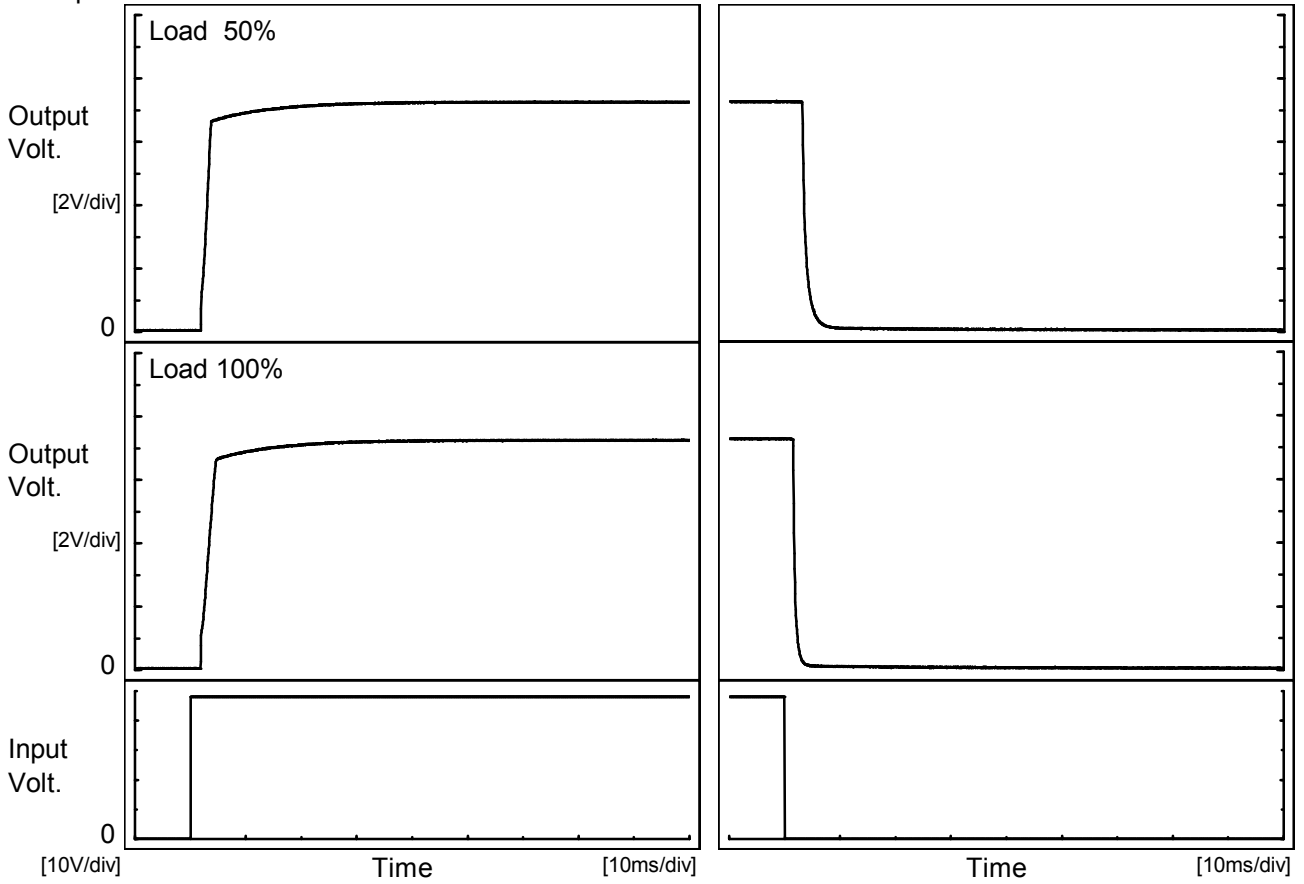
<b>COSEL</b>																									
Model	MGFW304815	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+15V1A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt.     48V Load             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>14.994</td></tr> <tr><td>0.5</td><td>15.001</td></tr> <tr><td>1.0</td><td>15.001</td></tr> <tr><td>2.0</td><td>15.002</td></tr> <tr><td>3.0</td><td>15.001</td></tr> <tr><td>4.0</td><td>15.002</td></tr> <tr><td>5.0</td><td>15.001</td></tr> <tr><td>6.0</td><td>15.001</td></tr> <tr><td>7.0</td><td>15.001</td></tr> <tr><td>8.0</td><td>15.001</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	14.994	0.5	15.001	1.0	15.001	2.0	15.002	3.0	15.001	4.0	15.002	5.0	15.001	6.0	15.001	7.0	15.001	8.0	15.001
Time since start [H]	Output Voltage [V]																								
0.0	14.994																								
0.5	15.001																								
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<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt.     48V 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>-14.987</td></tr> <tr><td>0.5</td><td>-14.992</td></tr> <tr><td>1.0</td><td>-14.992</td></tr> <tr><td>2.0</td><td>-14.992</td></tr> <tr><td>3.0</td><td>-14.992</td></tr> <tr><td>4.0</td><td>-14.992</td></tr> <tr><td>5.0</td><td>-14.992</td></tr> <tr><td>6.0</td><td>-14.992</td></tr> <tr><td>7.0</td><td>-14.992</td></tr> <tr><td>8.0</td><td>-14.992</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	-14.987	0.5	-14.992	1.0	-14.992	2.0	-14.992	3.0	-14.992	4.0	-14.992	5.0	-14.992	6.0	-14.992	7.0	-14.992	8.0	-14.992
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Model		MGFW304815	Temperature	25°C
Item		Rise and Fall Time	Testing Circuitry	Figure A
Object		+15V1A		

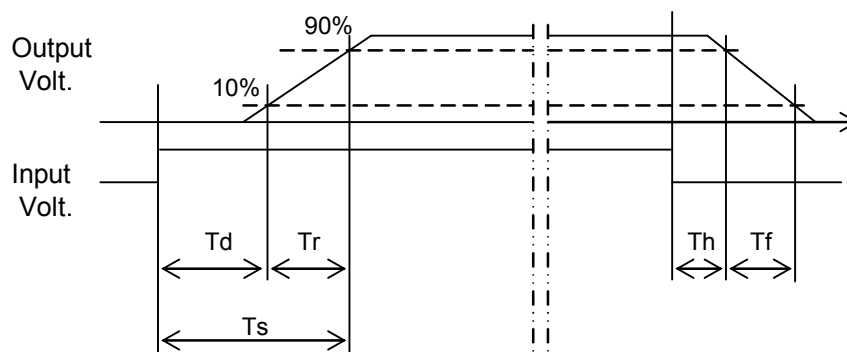
1. Graph

Input Volt. 48 V



2. Values

		[ms]				
Load \ Time	Time	Td	Tr	Ts	Th	Tf
50 %		2.0	4.4	6.4	3.1	1.7
100 %		2.0	5.4	7.4	1.6	0.9

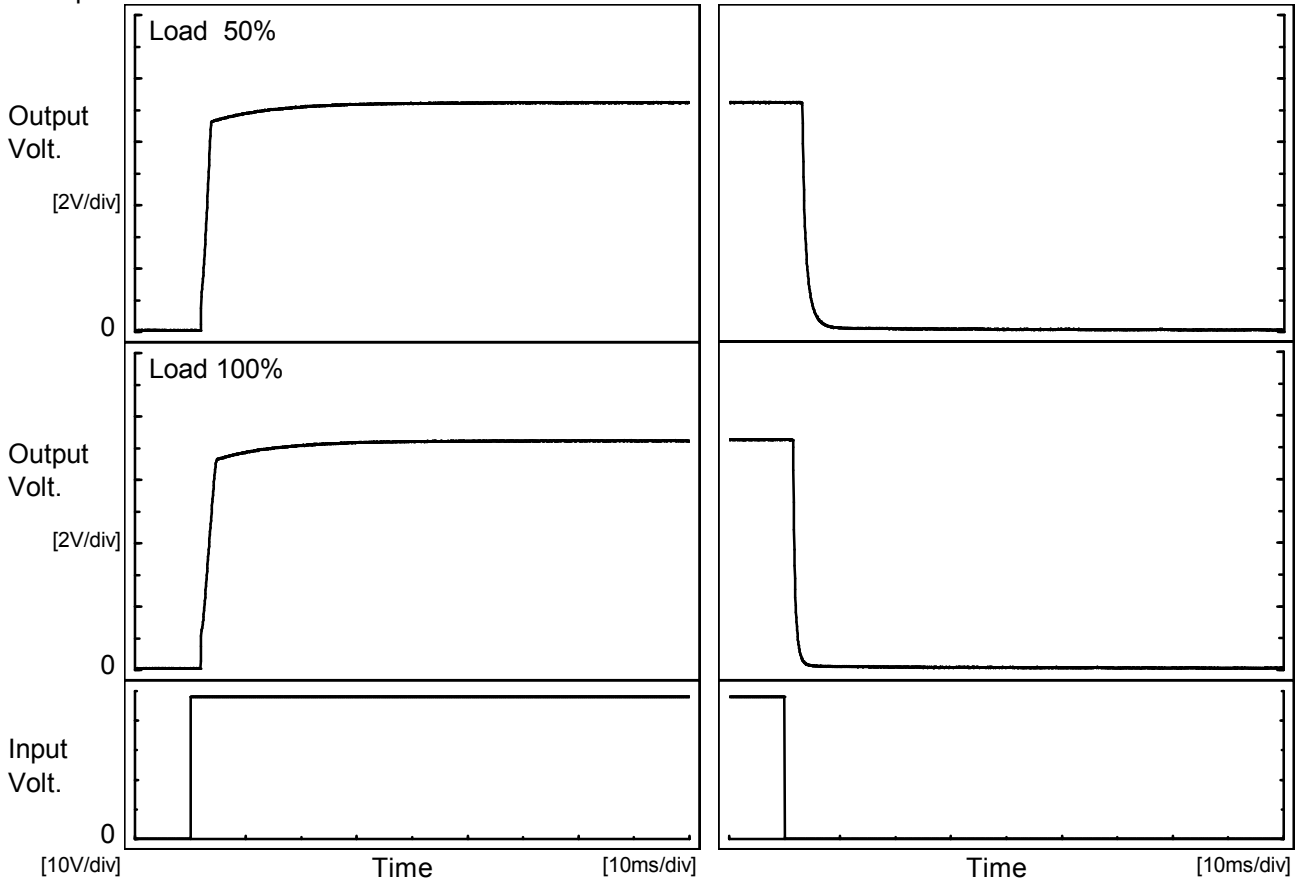




Model		MGFW304815	Temperature	25°C
Item		Rise and Fall Time	Testing Circuitry	Figure A
Object		-15V1A		

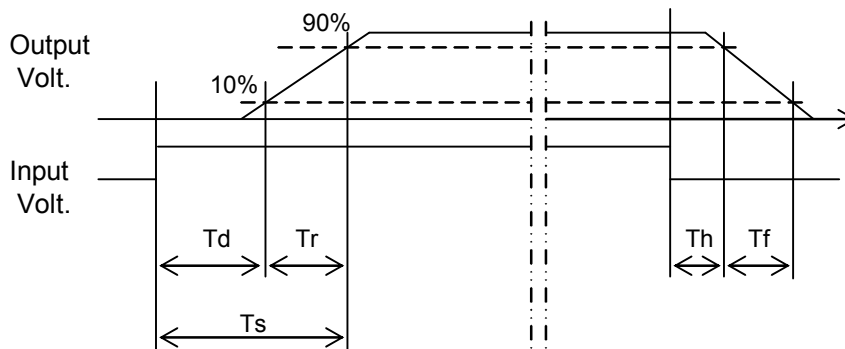
1. Graph

Input Volt. 48 V



2. Values

		[ms]				
Load \ Time	Time	Td	Tr	Ts	Th	Tf
50 %		2.0	4.8	6.8	3.1	1.8
100 %		2.0	5.9	7.9	1.6	1.0





<p>Model MGFW304815</p> <p>Item Minimum Input Voltage for Regulated Output Voltage</p> <p>Object +15V1A</p>		<p>Testing Circuitry Figure A</p>																																						
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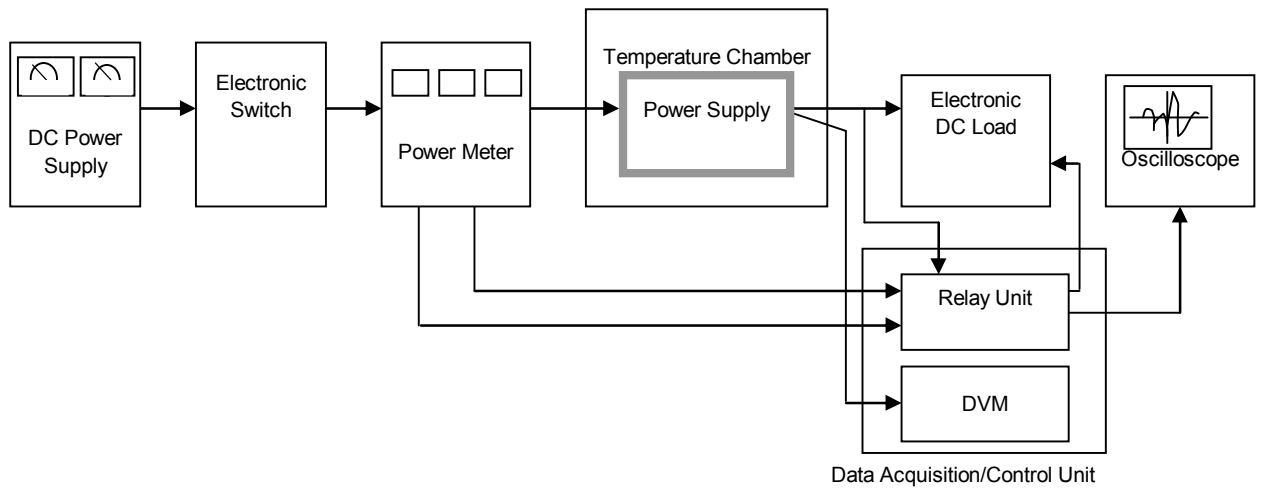


Figure A

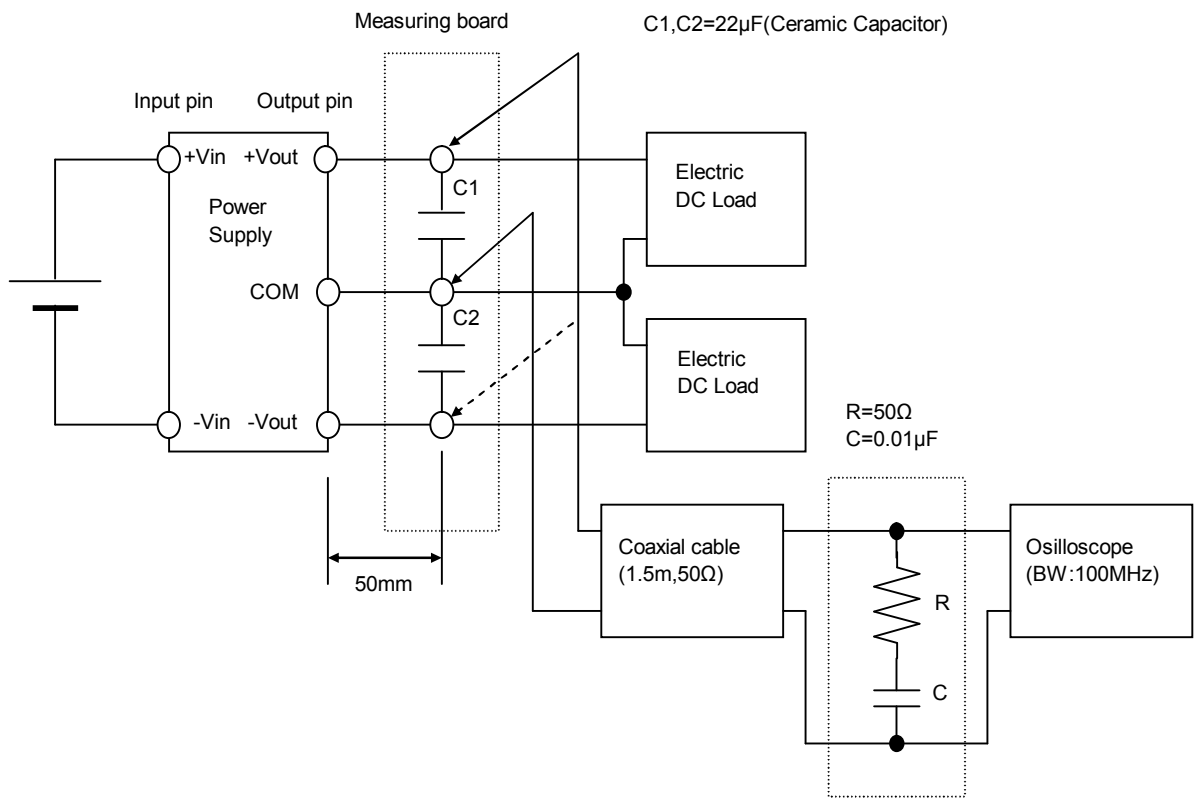


Figure B (Ripple and Ripple noise Characteristic)