

# 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

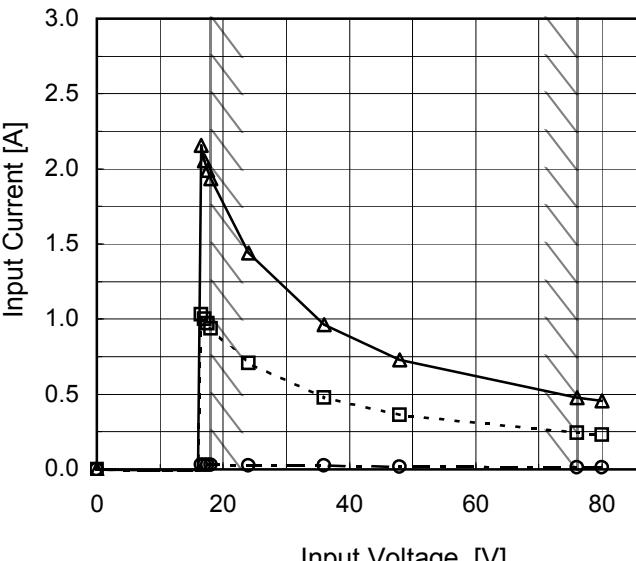
Design Engineer

**COSEL CO.,LTD.**

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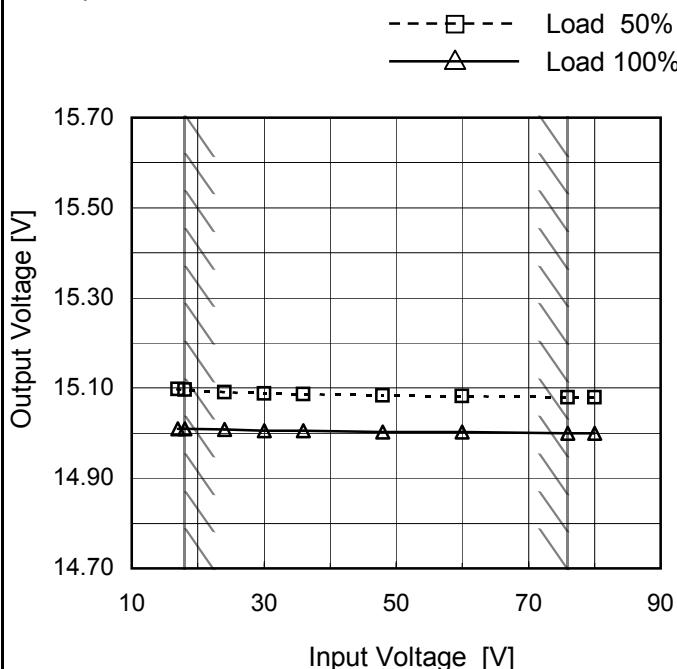
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<p>The graph plots Efficiency [%] on the y-axis (50 to 100) against Input Voltage [V] on the x-axis (10 to 90). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. A 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>15</td><td>88</td><td>87</td></tr> <tr><td>30</td><td>87</td><td>86</td></tr> <tr><td>50</td><td>86</td><td>85</td></tr> <tr><td>70</td><td>82</td><td>81</td></tr> <tr><td>80</td><td>80</td><td>81</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	15	88	87	30	87	86	50	86	85	70	82	81	80	80	81														
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80	87.9	87.9	87.4	86.3	82.9																																																																													
100	86.7	87.6	87.0	86.3	82.8																																																																													
110	85.9	87.2	86.8	86.2	82.9																																																																													
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Model	MGFW304815
Item	Line Regulation
Object	+15V1A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



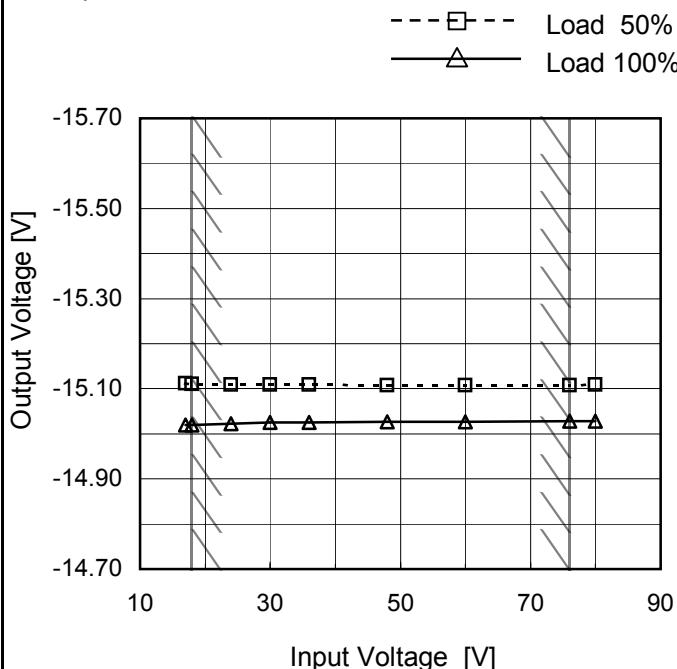
## 2.Values

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

## 1.Graph

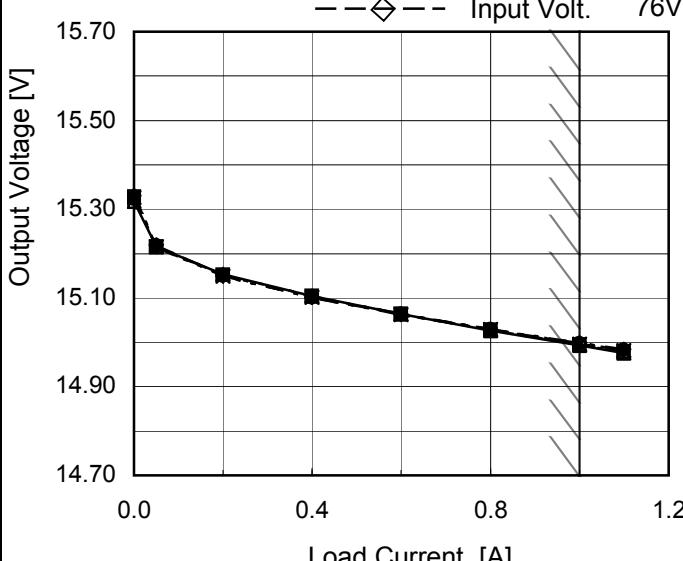
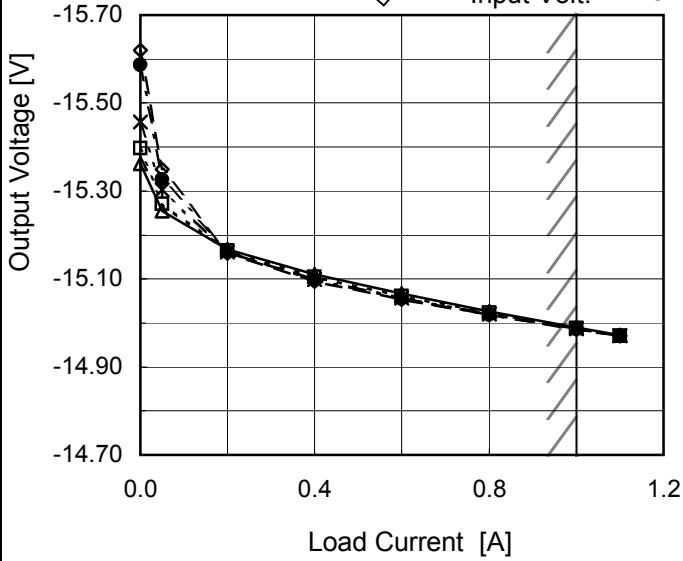


## 2.Values

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.

Model	MGFW304815	Temperature Testing Circuitry	25°C Figure A
Item	Load Regulation		
Object	+15V1A		
1.Graph	<p>—△— Input Volt. 18V        - - -□- - Input Volt. 24V        - - -★- - Input Volt. 36V        - - -○- - Input Volt. 48V        - - -◇- - Input Volt. 76V</p> 	2.Values	
Object	-15V1A		
1.Graph	<p>—△— Input Volt. 18V        - - -□- - Input Volt. 24V        - - -★- - Input Volt. 36V        - - -○- - Input Volt. 48V        - - -◇- - Input Volt. 76V</p> 	2.Values	

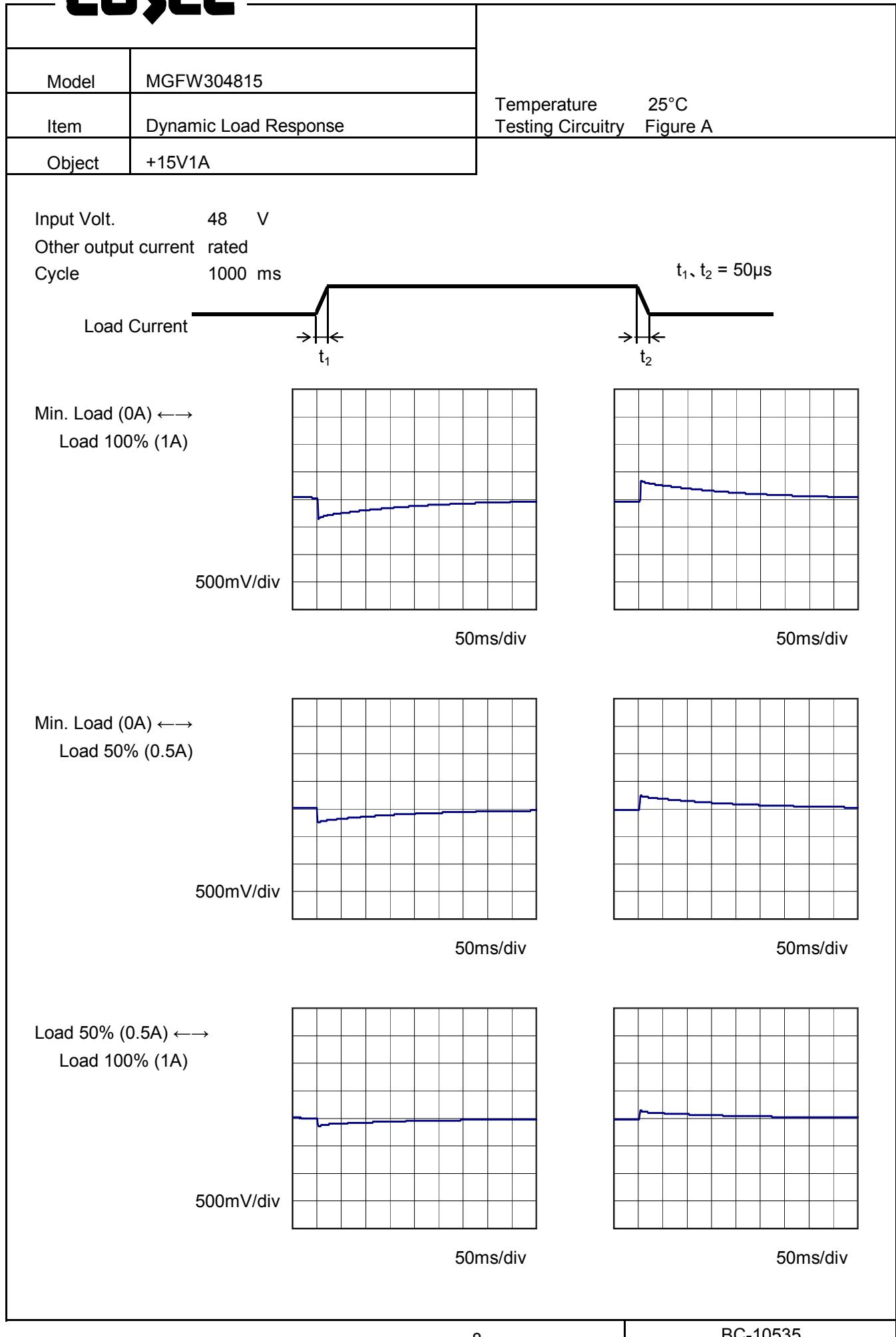
Note: Slanted line shows the range of the rated load current.

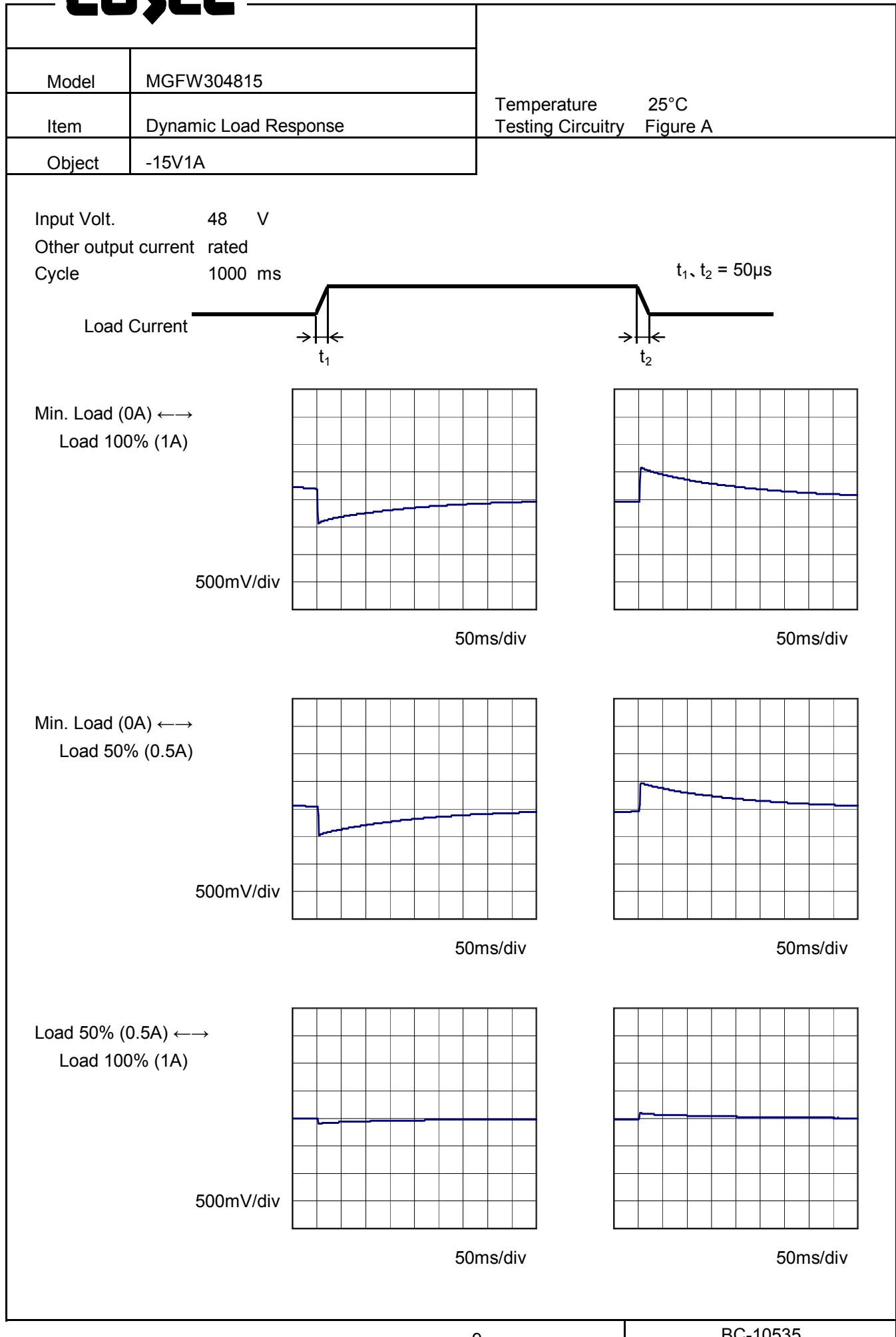
Load Current [A]	Output Voltage [V]				
	18[V]	24[V]	36[V]	48[V]	76[V]
0.00	15.318	15.327	15.326	15.324	15.330
0.05	15.215	15.215	15.215	15.218	15.219
0.20	15.154	15.152	15.149	15.150	15.151
0.40	15.104	15.104	15.101	15.102	15.101
0.60	15.063	15.063	15.063	15.064	15.063
0.80	15.026	15.028	15.029	15.029	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

Load Current [A]	Output Voltage [V]				
	18[V]	24[V]	36[V]	48[V]	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





**COSSEL**

Model	MGFW304815	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B																																						
Object	+15V1A																																								
1.Graph			2.Values																																						
<p>The graph plots Ripple Voltage [mV] on the Y-axis (0 to 120) against Load Current [A] on the X-axis (0.0 to 1.2). Two sets of data points are shown: one for an input voltage of 18V (solid triangles) and another for 76V (dashed circles). Both sets show a relatively flat line at approximately 22 mV until about 0.6A, after which it rises sharply. A slanted line is drawn through the data points to indicate the range of the rated load current.</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>10</td><td>21</td></tr> <tr><td>0.2</td><td>22</td><td>37</td></tr> <tr><td>0.4</td><td>22</td><td>37</td></tr> <tr><td>0.6</td><td>22</td><td>37</td></tr> <tr><td>0.8</td><td>22</td><td>37</td></tr> <tr><td>1.0</td><td>22</td><td>37</td></tr> <tr><td>1.1</td><td>22</td><td>37</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. 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	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 18 [V]	Input Volt. 76 [V]																																							
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0.6	22	37																																							
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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>The diagram illustrates a complex ripple wave form. It shows a series of triangular cycles between two horizontal lines. The vertical distance between these lines is labeled "Ripple [mVp-p]". Arrows at the top and bottom indicate the direction of the waveform's movement.</p>																																									
<p>Fig.Complex Ripple Wave Form</p>																																									

**COSSEL**

Model	MGFW304815																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	-15V1A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph shows two sets of data points: Input Volt. 18V (solid line with triangles) and Input Volt. 76V (dashed line with circles). The x-axis represents Load Current [A] from 0.0 to 1.2. The y-axis represents Ripple Voltage [mV] from 0 to 120. Both curves show a slight increase in ripple voltage as load current increases. A slanted line indicates the rated load current range.</p>																																								
2.Values																																								
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Load Current [A]	Ripple Voltage [mV]																																							
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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>Diagram illustrating a Complex Ripple Wave Form. The vertical axis is labeled "Ripple [mVp-p]" with arrows indicating the peak-to-peak measurement. The diagram shows a series of overlapping triangular waveforms, representing the complex harmonic content of the ripple voltage.</p>																																								
<p>Fig.Complex Ripple Wave Form</p>																																								

**COSEL**

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

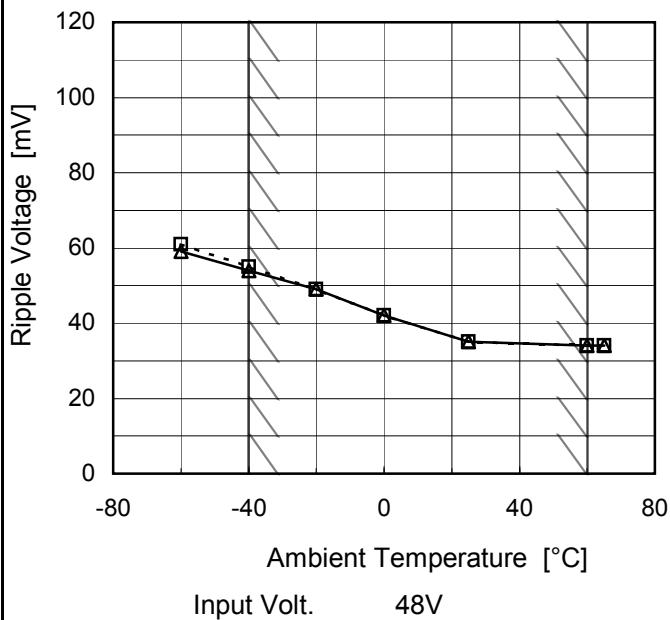
Model MGFW304815

Item Ripple Voltage (by Ambient Temp.)

Object +15V1A

## 1.Graph

--- □ --- Load 50%  
 —△— Load 100%



Input Volt. 48V

Testing Circuitry Figure A

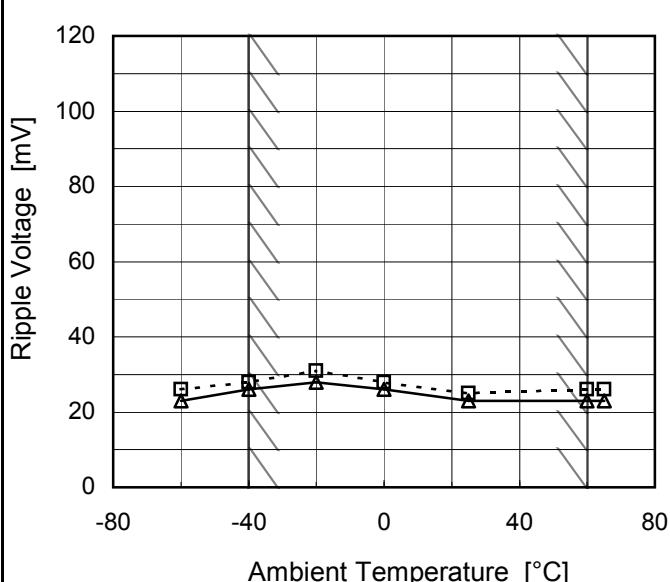
## 2.Values

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
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated output current

## 1.Graph

--- □ --- Load 50%  
 —△— Load 100%



Input Volt. 48V

## 2.Values

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
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated output current

Measured by 100 MHz Oscilloscope.

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

Model	MGFW304815	Testing Circuitry Figure A																																																																													
Item	Ambient Temperature Drift																																																																														
Object	+15V1A																																																																														
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <ul style="list-style-type: none"> <li>—△— Input Volt. 18V</li> <li>- -□-- Input Volt. 24V</li> <li>- ·*·- Input Volt. 36V</li> <li>- ·○-- Input Volt. 48V</li> <li>- -◇-- Input Volt. 76V</li> </ul>	2.Values																																																																													
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Note: Slanted line shows the range of the rated ambient temperature.



Model	MGFW304815	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 : -40 - 60°C

Input Voltage : 18 - 76V

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

\* Other Output : Rated Load

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

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

### 2. Values

Object	+15V1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	76		0	15.633	
Minimum Voltage	-40	76	1	14.984	±325	±2.2

Object	-15V1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	36		0	-15.366	
Minimum Voltage	-40	18	1	-14.997	±185	±1.2

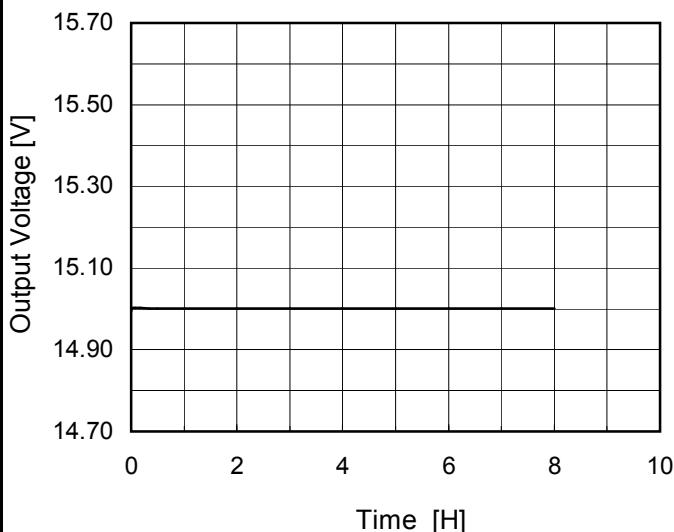
**COSEL**

Model	MGFW304815
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Item	Time Lapse Drift
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Object	+15V1A
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1.Graph



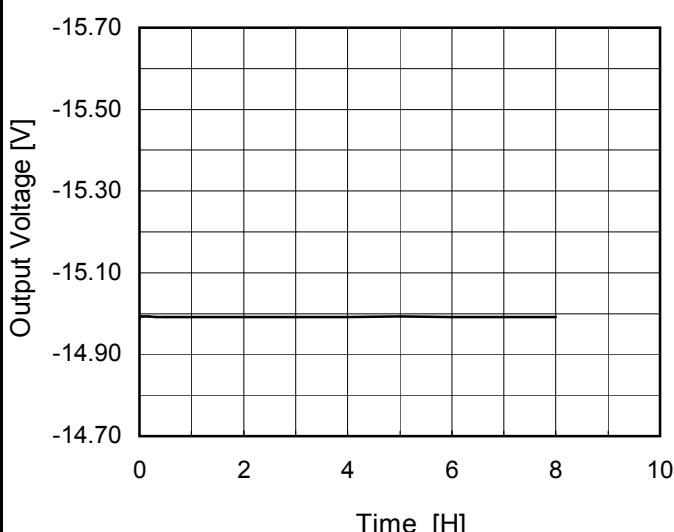
Temperature	25°C
Testing Circuitry	Figure A

2.Values

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

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

1.Graph



2.Values

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

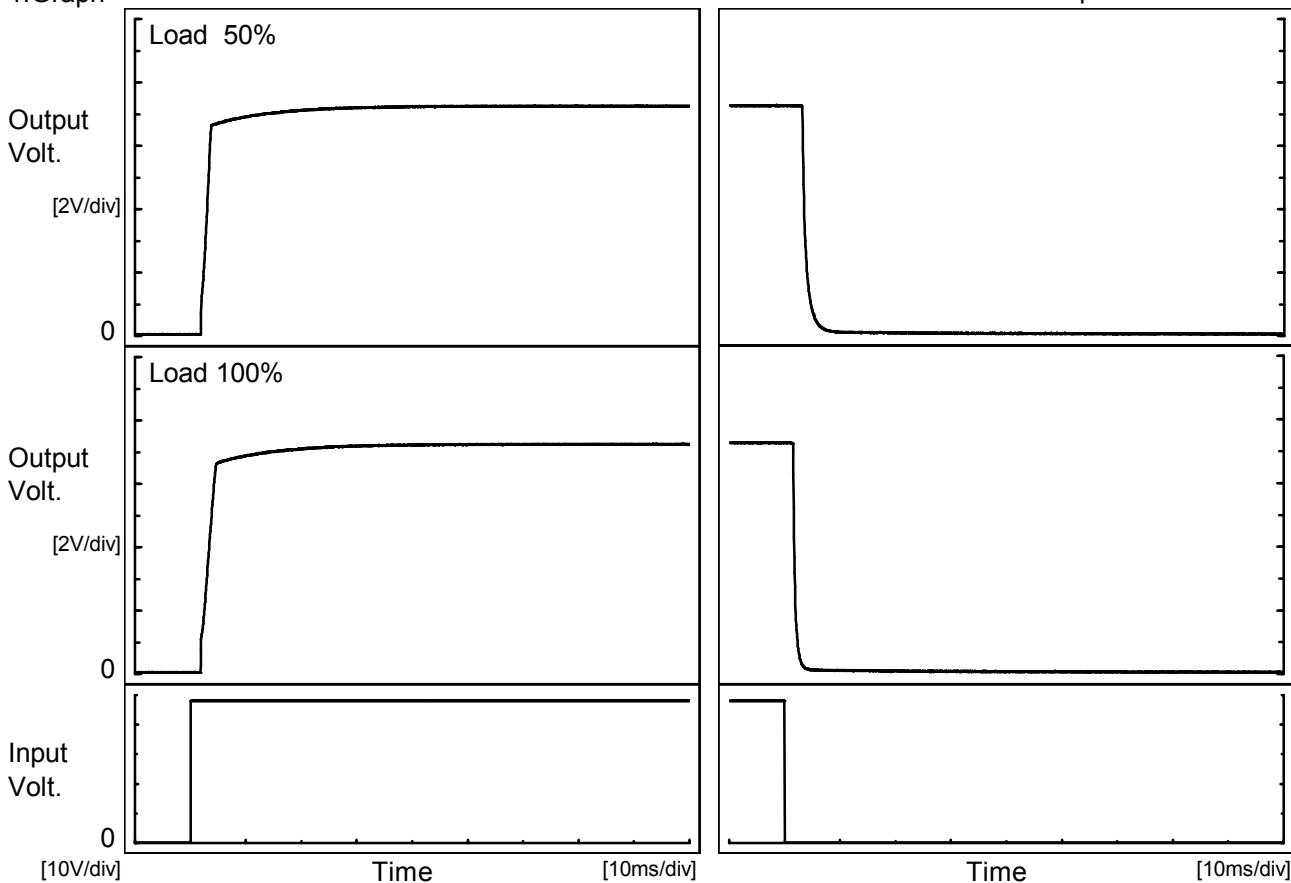
Input Volt.	48V
Load	100%

**COSEL**

Model	MGFW304815
Item	Rise and Fall Time
Object	+15V1A

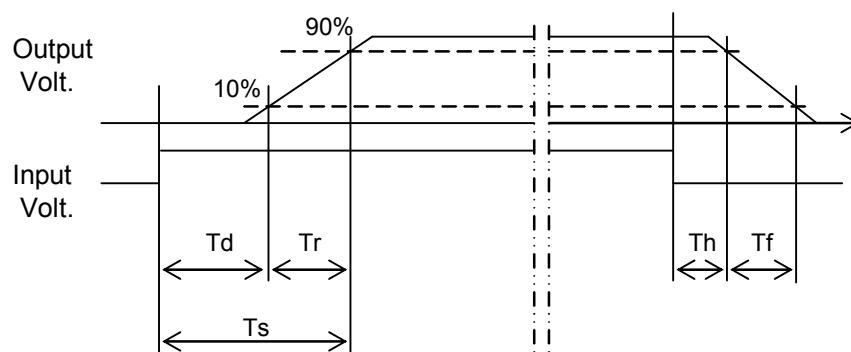
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Load	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

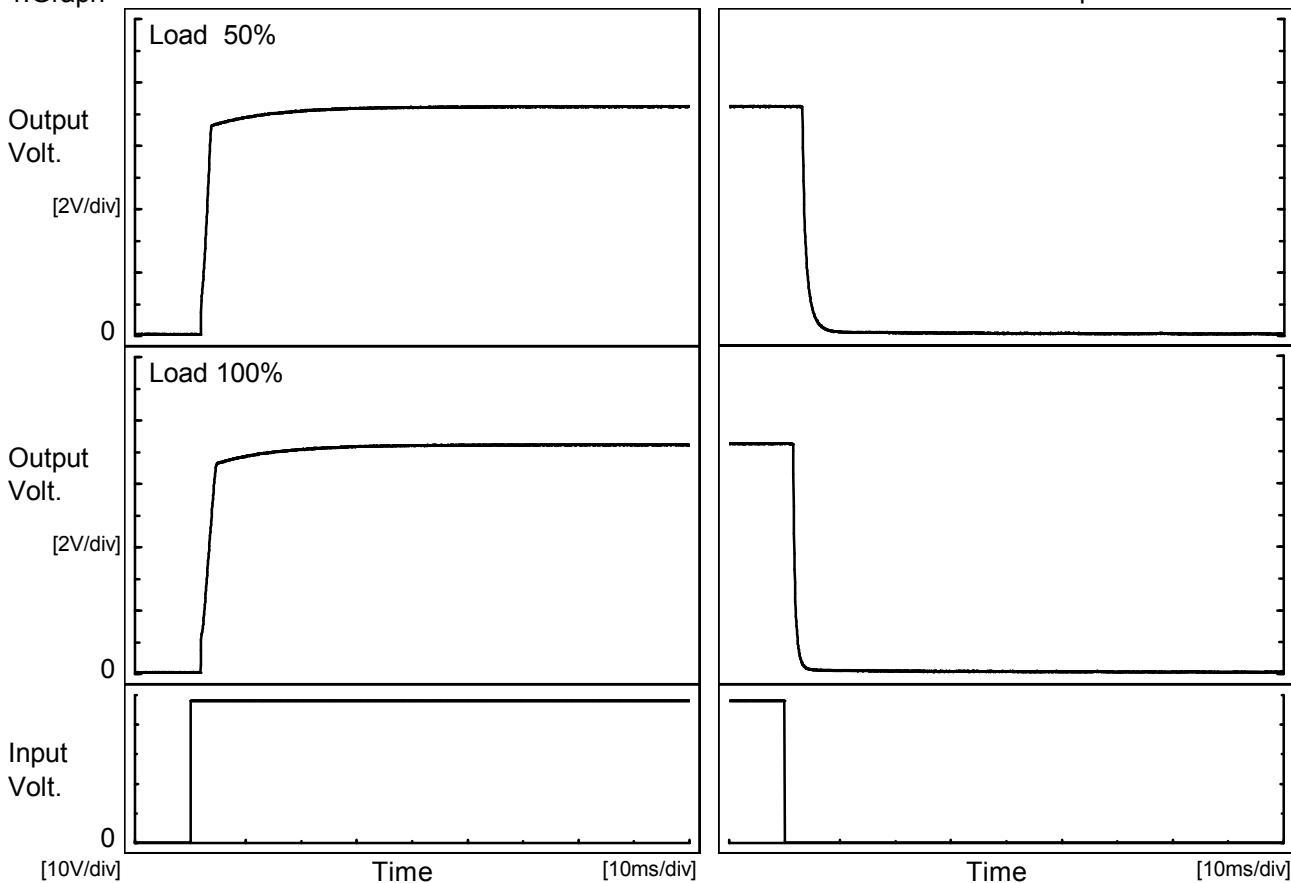


**COSEL**

Model	MGFW304815
Item	Rise and Fall Time
Object	-15V1A

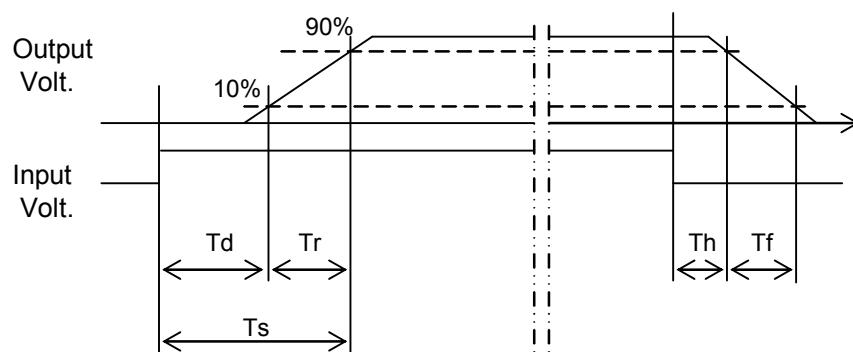
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

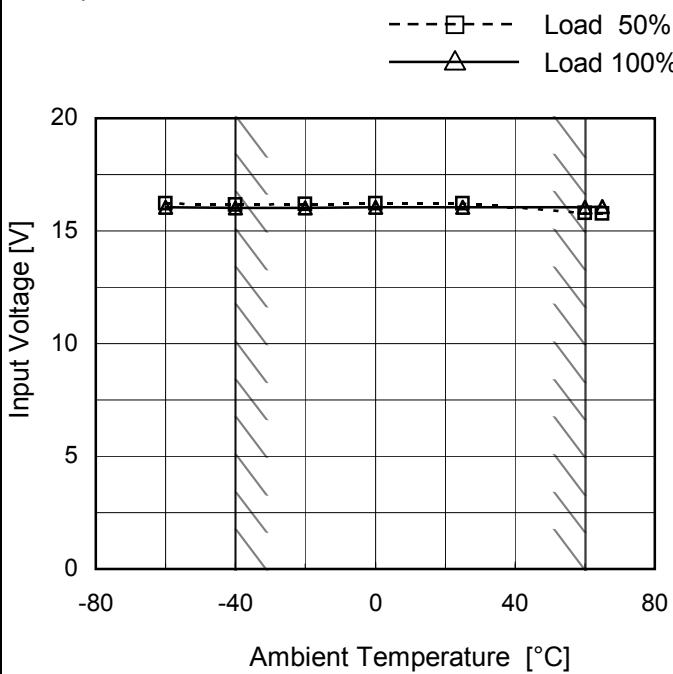
Load	Time	$T_d$	$T_r$	$T_s$	$T_h$	$T_f$
50 %		2.0	4.8	6.8	3.1	1.8
100 %		2.0	5.9	7.9	1.6	1.0



Model	MGFW304815
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V1A

Testing Circuitry Figure A

## 1.Graph

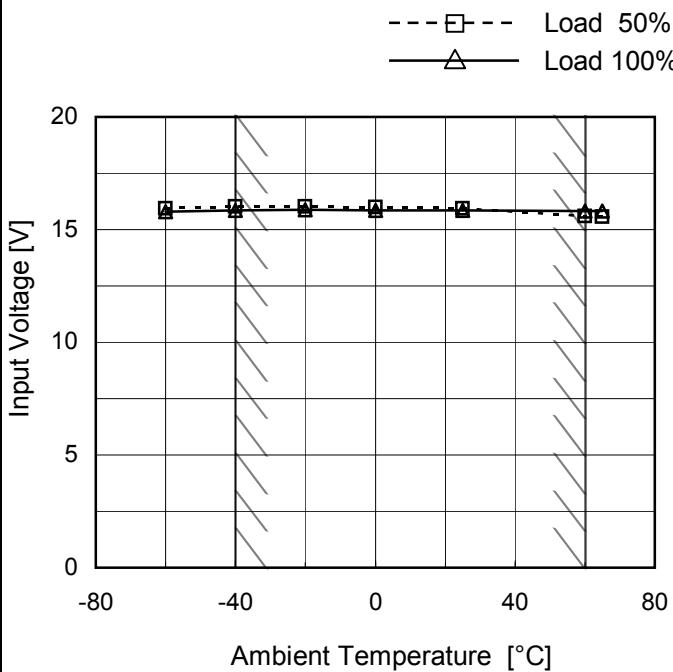


## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	16.3	16.1
-40	16.2	16.1
-20	16.2	16.1
0	16.3	16.1
25	16.3	16.1
60	15.8	16.1
65	15.8	16.1
--	-	-
--	-	-
--	-	-
--	-	-

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

## 1.Graph



## 2.Values

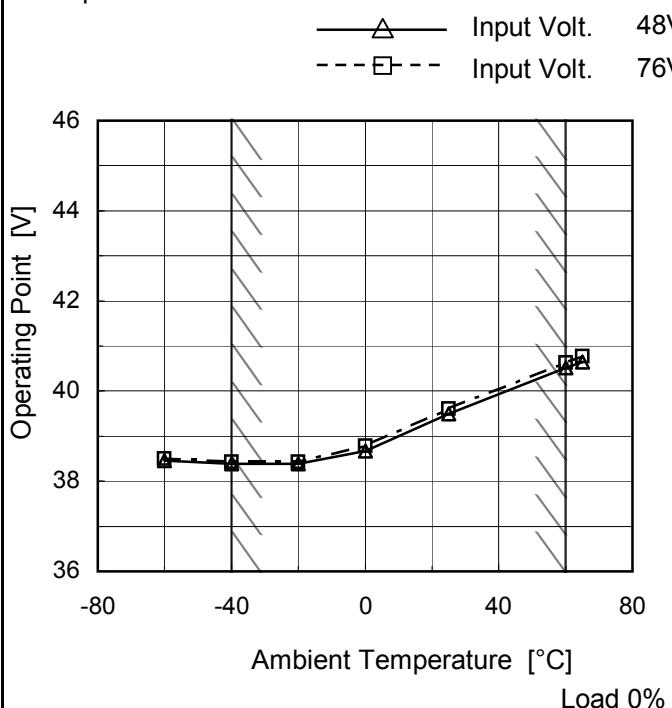
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	16.0	15.8
-40	16.1	15.9
-20	16.1	15.9
0	16.0	15.9
25	16.0	15.9
60	15.6	15.9
65	15.6	15.9
--	-	-
--	-	-
--	-	-
--	-	-

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

Model	MGFW304815	Temperature Testing Circuitry      25°C Figure A																																																																																							
Item	Overcurrent Protection																																																																																								
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		<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when overcurrent protection is activated.</p>																																																																																							

Model	MGFW304815
Item	Oversupply Protection
Object	+30V1A

## 1. Graph



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

Measured as a single output(+30V).

## Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 48[V]	Input Volt. 76[V]
-60	38.46	38.50
-40	38.39	38.43
-20	38.39	38.43
0	38.67	38.79
25	39.50	39.61
60	40.52	40.63
65	40.65	40.77
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

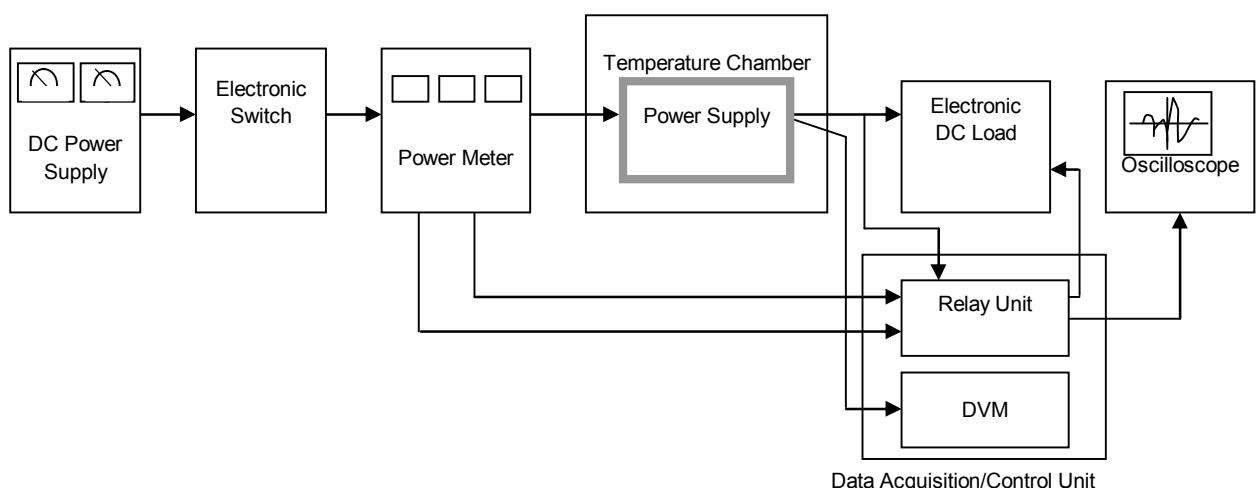


Figure A

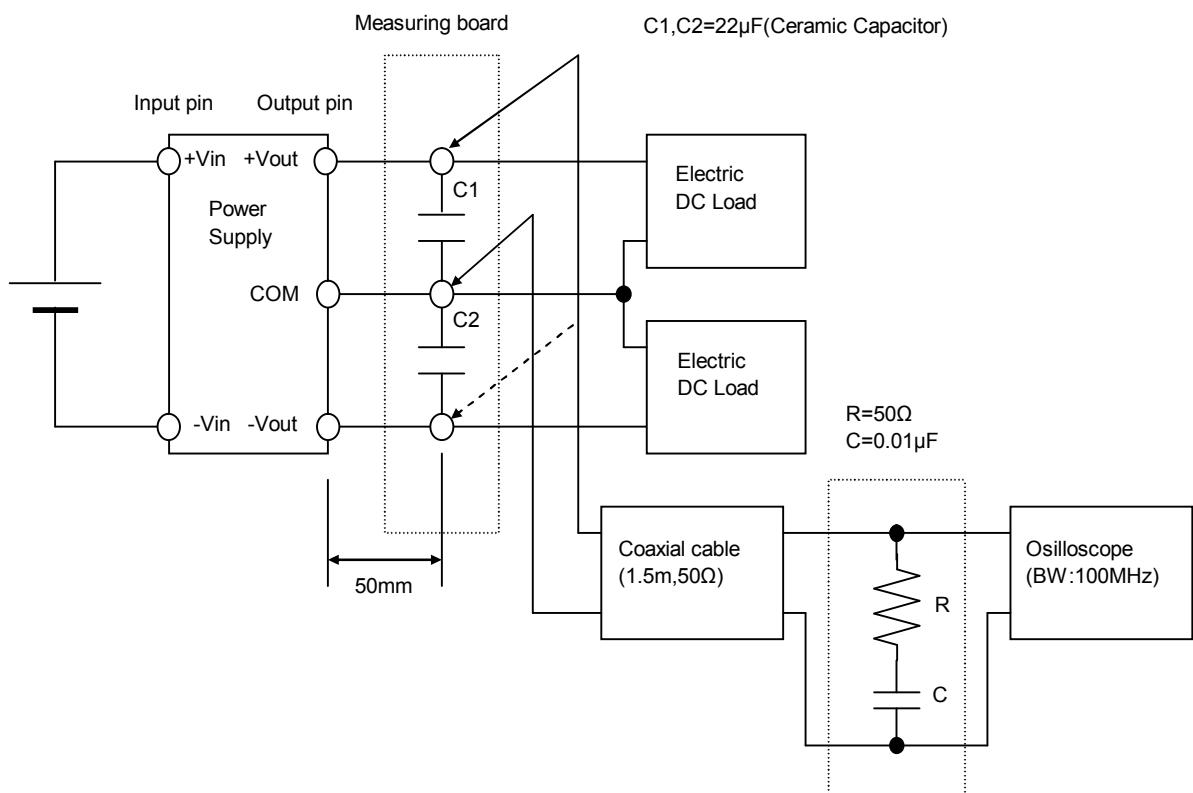


Figure B (Ripple and Ripple noise Characteristic)