

TEST DATA OF MGS304815

Regulated DC Power Supply
December 7, 2010

Approved by : Kazunari Asano
Kazunari Asano Design Manager

Prepared by : Sho Saito
Sho Saito Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage)	1
2.Input Current (by Load Current)	2
3.Input Power (by Load Current)	3
4.Efficiency (by Input Voltage)	4
5.Efficiency (by Load Current)	5
6.Line Regulation	6
7.Load Regulation	7
8.Dynamic Load Response	8
9.Ripple Voltage (by Load Current)	9
10.Ripple-Noise	10
11.Ripple Voltage (by Ambient Temperature)	11
12.Ambient Temperature Drift	12
13.Output Voltage Accuracy	13
14.Time Lapse Drift	14
15.Rise and Fall Time	15
16.Minimum Input Voltage for Regulated Output Voltage	16
17.Overcurrent Protection	17
18.Overvoltage Protection	18
19.Figure of Testing Circuitry	19

(Final Page 19)

Model	MGS304815																																																																																	
Item	Input Current (by Input Voltage)	Temperature	25°C																																																																															
Object		Testing Circuitry	Figure A																																																																															
1.Graph		2.Values																																																																																
<div><div><div>—△—</div><div>---□---</div><div>-·-○-·-</div></div><div>Load 100%</div><div>Load 50%</div><div>Load 0%</div></div> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Load 0%</th><th>Load 50%</th><th>Load 100%</th></tr><tr><td>0.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>8.0</td><td>0.002</td><td>0.000</td><td>0.002</td></tr><tr><td>16.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>24.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>28.0</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>32.0</td><td>0.003</td><td>0.003</td><td>0.003</td></tr><tr><td>32.8</td><td>0.034</td><td>0.513</td><td>1.015</td></tr><tr><td>34.0</td><td>0.031</td><td>0.492</td><td>0.974</td></tr><tr><td>36.0</td><td>0.028</td><td>0.461</td><td>0.914</td></tr><tr><td>40.0</td><td>0.025</td><td>0.414</td><td>0.821</td></tr><tr><td>48.0</td><td>0.025</td><td>0.348</td><td>0.684</td></tr><tr><td>60.0</td><td>0.025</td><td>0.284</td><td>0.551</td></tr><tr><td>70.0</td><td>0.025</td><td>0.248</td><td>0.477</td></tr><tr><td>76.0</td><td>0.025</td><td>0.231</td><td>0.442</td></tr><tr><td>80.0</td><td>0.025</td><td>0.221</td><td>0.422</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></table>		Input Voltage [V]	Input Current [A]			Load 0%	Load 50%	Load 100%	0.0	0.000	0.000	0.000	8.0	0.002	0.000	0.002	16.0	0.002	0.002	0.002	24.0	0.002	0.002	0.002	28.0	0.002	0.002	0.002	32.0	0.003	0.003	0.003	32.8	0.034	0.513	1.015	34.0	0.031	0.492	0.974	36.0	0.028	0.461	0.914	40.0	0.025	0.414	0.821	48.0	0.025	0.348	0.684	60.0	0.025	0.284	0.551	70.0	0.025	0.248	0.477	76.0	0.025	0.231	0.442	80.0	0.025	0.221	0.422	--	-	-	-	--	-	-	-	--	-	-	-
Input Voltage [V]	Input Current [A]																																																																																	
	Load 0%	Load 50%	Load 100%																																																																															
0.0	0.000	0.000	0.000																																																																															
8.0	0.002	0.000	0.002																																																																															
16.0	0.002	0.002	0.002																																																																															
24.0	0.002	0.002	0.002																																																																															
28.0	0.002	0.002	0.002																																																																															
32.0	0.003	0.003	0.003																																																																															
32.8	0.034	0.513	1.015																																																																															
34.0	0.031	0.492	0.974																																																																															
36.0	0.028	0.461	0.914																																																																															
40.0	0.025	0.414	0.821																																																																															
48.0	0.025	0.348	0.684																																																																															
60.0	0.025	0.284	0.551																																																																															
70.0	0.025	0.248	0.477																																																																															
76.0	0.025	0.231	0.442																																																																															
80.0	0.025	0.221	0.422																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															

Model	MGS304815																																																					
Item	Input Current (by Load Current)	Temperature	25°C																																																			
		Testing Circuitry	Figure A																																																			
Object	_____																																																					
1.Graph		2.Values																																																				
<div><div>—△—</div><div>Input Volt.</div><div>36V</div></div> <div><div>---□---</div><div>Input Volt.</div><div>48V</div></div> <div><div>---○---</div><div>Input Volt.</div><div>76V</div></div> <p>Input Current [A]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>0.027</td><td>0.025</td><td>0.025</td></tr><tr><td>0.4</td><td>0.199</td><td>0.153</td><td>0.107</td></tr><tr><td>0.8</td><td>0.374</td><td>0.283</td><td>0.189</td></tr><tr><td>1.2</td><td>0.552</td><td>0.416</td><td>0.272</td></tr><tr><td>1.6</td><td>0.735</td><td>0.550</td><td>0.357</td></tr><tr><td>2.0</td><td>0.919</td><td>0.688</td><td>0.443</td></tr><tr><td>2.2</td><td>1.015</td><td>0.758</td><td>0.486</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></table>		Load Current [A]	Input Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	0.027	0.025	0.025	0.4	0.199	0.153	0.107	0.8	0.374	0.283	0.189	1.2	0.552	0.416	0.272	1.6	0.735	0.550	0.357	2.0	0.919	0.688	0.443	2.2	1.015	0.758	0.486	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Current [A]																																																					
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																			
0.0	0.027	0.025	0.025																																																			
0.4	0.199	0.153	0.107																																																			
0.8	0.374	0.283	0.189																																																			
1.2	0.552	0.416	0.272																																																			
1.6	0.735	0.550	0.357																																																			
2.0	0.919	0.688	0.443																																																			
2.2	1.015	0.758	0.486																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			

Model	MGS304815																																																					
Item	Input Power (by Load Current)	Temperature	25°C																																																			
Object		Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div>—△— Input Volt. 36V</div><div>---□--- Input Volt. 48V</div><div>-·-○-·- Input Volt. 76V</div></div> <p>Input Power [W]</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>1.00</td><td>1.20</td><td>1.94</td></tr><tr><td>0.4</td><td>7.15</td><td>7.35</td><td>8.13</td></tr><tr><td>0.8</td><td>13.43</td><td>13.60</td><td>14.40</td></tr><tr><td>1.2</td><td>19.85</td><td>19.93</td><td>20.73</td></tr><tr><td>1.6</td><td>26.36</td><td>26.38</td><td>27.15</td></tr><tr><td>2.0</td><td>33.02</td><td>32.93</td><td>33.65</td></tr><tr><td>2.2</td><td>36.50</td><td>36.29</td><td>37.00</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></table>		Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	1.00	1.20	1.94	0.4	7.15	7.35	8.13	0.8	13.43	13.60	14.40	1.2	19.85	19.93	20.73	1.6	26.36	26.38	27.15	2.0	33.02	32.93	33.65	2.2	36.50	36.29	37.00	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Power [W]																																																					
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																			
0.0	1.00	1.20	1.94																																																			
0.4	7.15	7.35	8.13																																																			
0.8	13.43	13.60	14.40																																																			
1.2	19.85	19.93	20.73																																																			
1.6	26.36	26.38	27.15																																																			
2.0	33.02	32.93	33.65																																																			
2.2	36.50	36.29	37.00																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

Model	MGS304815																																		
Item	Efficiency (by Input Voltage)	Temperature	25°C																																
		Testing Circuitry	Figure A																																
Object																																			
1.Graph		2.Values																																	
<div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div></div> <div><div>—</div><div>△</div><div>—</div></div> <div>Load 100%</div> <table><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>34</td><td>90.1</td><td>90.6</td></tr><tr><td>36</td><td>91.0</td><td>91.2</td></tr><tr><td>40</td><td>91.0</td><td>91.6</td></tr><tr><td>48</td><td>90.0</td><td>91.5</td></tr><tr><td>60</td><td>88.4</td><td>90.9</td></tr><tr><td>76</td><td>86.0</td><td>89.6</td></tr><tr><td>80</td><td>85.3</td><td>89.3</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%	34	90.1	90.6	36	91.0	91.2	40	91.0	91.6	48	90.0	91.5	60	88.4	90.9	76	86.0	89.6	80	85.3	89.3	--	-	-	--	-	-		
Input Voltage [V]	Efficiency [%]																																		
	Load 50%	Load 100%																																	
34	90.1	90.6																																	
36	91.0	91.2																																	
40	91.0	91.6																																	
48	90.0	91.5																																	
60	88.4	90.9																																	
76	86.0	89.6																																	
80	85.3	89.3																																	
--	-	-																																	
--	-	-																																	
Note: Slanted line shows the range of the rated input voltage.																																			

Model	MGS304815																																																					
Item	Efficiency (by Load Current)	Temperature	25°C																																																			
		Testing Circuitry	Figure A																																																			
Object	_____																																																					
1.Graph		2.Values																																																				
<div><div>—△—</div><div>Input Volt.</div><div>36V</div></div> <div><div>---□---</div><div>Input Volt.</div><div>48V</div></div> <div><div>---○---</div><div>Input Volt.</div><div>76V</div></div> <p>Efficiency [%]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.4</td><td>84.3</td><td>82.0</td><td>74.1</td></tr><tr><td>0.8</td><td>89.8</td><td>88.7</td><td>83.7</td></tr><tr><td>1.2</td><td>91.2</td><td>90.8</td><td>87.3</td></tr><tr><td>1.6</td><td>91.5</td><td>91.5</td><td>88.9</td></tr><tr><td>2.0</td><td>91.3</td><td>91.6</td><td>89.6</td></tr><tr><td>2.2</td><td>90.9</td><td>91.4</td><td>89.7</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></table>		Load Current [A]	Efficiency [%]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	-	-	-	0.4	84.3	82.0	74.1	0.8	89.8	88.7	83.7	1.2	91.2	90.8	87.3	1.6	91.5	91.5	88.9	2.0	91.3	91.6	89.6	2.2	90.9	91.4	89.7	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																			
0.0	-	-	-																																																			
0.4	84.3	82.0	74.1																																																			
0.8	89.8	88.7	83.7																																																			
1.2	91.2	90.8	87.3																																																			
1.6	91.5	91.5	88.9																																																			
2.0	91.3	91.6	89.6																																																			
2.2	90.9	91.4	89.7																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			

Model	MGS304815	Temperature25°C Testing CircuitryFigure A																																	
Item	Line Regulation																																		
Object	+15V2A																																		
1.Graph		2.Values																																	
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><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>34</td><td>15.089</td><td>15.088</td></tr><tr><td>36</td><td>15.089</td><td>15.088</td></tr><tr><td>40</td><td>15.089</td><td>15.088</td></tr><tr><td>48</td><td>15.089</td><td>15.088</td></tr><tr><td>60</td><td>15.088</td><td>15.087</td></tr><tr><td>76</td><td>15.088</td><td>15.087</td></tr><tr><td>80</td><td>15.088</td><td>15.087</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	34	15.089	15.088	36	15.089	15.088	40	15.089	15.088	48	15.089	15.088	60	15.088	15.087	76	15.088	15.087	80	15.088	15.087	--	-	-	--	-	-		
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
34	15.089	15.088																																	
36	15.089	15.088																																	
40	15.089	15.088																																	
48	15.089	15.088																																	
60	15.088	15.087																																	
76	15.088	15.087																																	
80	15.088	15.087																																	
--	-	-																																	
--	-	-																																	

Model	MGS304815																																																					
Item	Load Regulation	Temperature	25°C																																																			
Object	+15V2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>36V</div></div><div><div>---□---</div><div>Input Volt.</div><div>48V</div></div><div><div>---○---</div><div>Input Volt.</div><div>76V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>15.094</td><td>15.093</td><td>15.092</td></tr><tr><td>0.4</td><td>15.093</td><td>15.092</td><td>15.091</td></tr><tr><td>0.8</td><td>15.092</td><td>15.091</td><td>15.090</td></tr><tr><td>1.2</td><td>15.091</td><td>15.090</td><td>15.089</td></tr><tr><td>1.6</td><td>15.090</td><td>15.089</td><td>15.088</td></tr><tr><td>2.0</td><td>15.089</td><td>15.089</td><td>15.087</td></tr><tr><td>2.2</td><td>15.089</td><td>15.088</td><td>15.087</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></table>		Load Current [A]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	15.094	15.093	15.092	0.4	15.093	15.092	15.091	0.8	15.092	15.091	15.090	1.2	15.091	15.090	15.089	1.6	15.090	15.089	15.088	2.0	15.089	15.089	15.087	2.2	15.089	15.088	15.087	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																			
0.0	15.094	15.093	15.092																																																			
0.4	15.093	15.092	15.091																																																			
0.8	15.092	15.091	15.090																																																			
1.2	15.091	15.090	15.089																																																			
1.6	15.090	15.089	15.088																																																			
2.0	15.089	15.089	15.087																																																			
2.2	15.089	15.088	15.087																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			

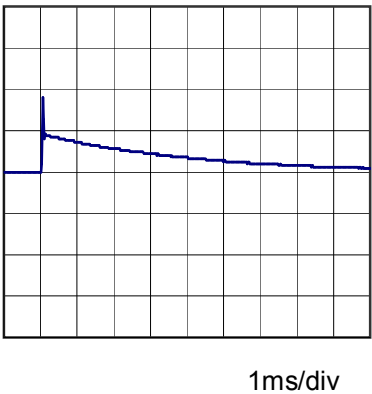
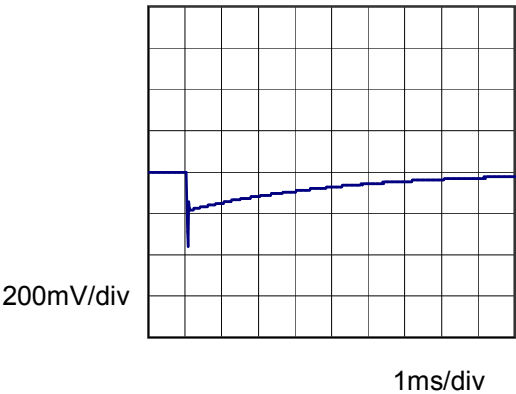


Model	MGS304815	Temperature 25°C Testing Circuitry Figure A	
Item	Dynamic Load Response		
Object	+15V2A		

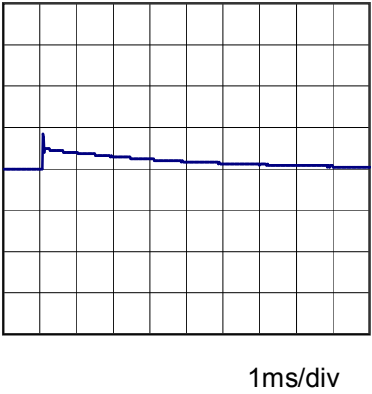
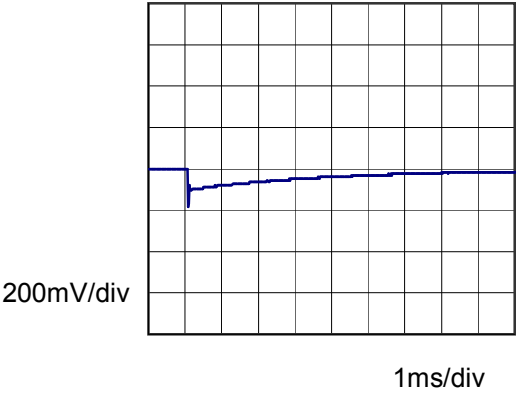
Input Volt. 48 V
Cycle 1000 ms



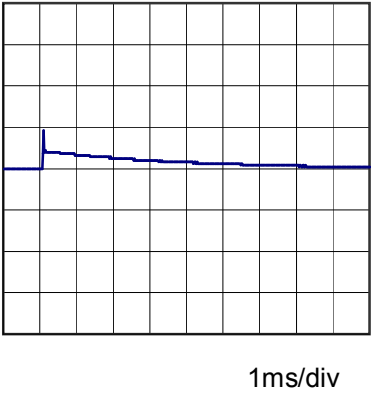
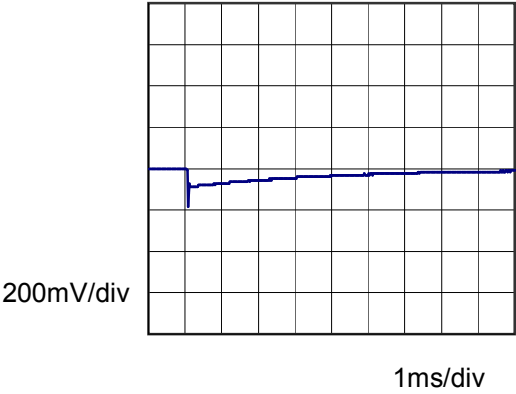
Min. Load (0A) \longleftrightarrow
Load 100% (2A)



Min. Load (0A) \longleftrightarrow
Load 50% (1A)



Load 50% (1A) \longleftrightarrow
Load 100% (2A)



Model	MGS304815																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
		Testing Circuitry	Figure B																																						
Object	+15V2A																																								
1.Graph		2.Values																																							
<div><div><div>△</div>Input Volt. 36V</div><div><div>○</div>Input Volt. 76V</div></div> <p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr><tr><td>0.0</td><td>15</td><td>29</td></tr><tr><td>0.4</td><td>15</td><td>29</td></tr><tr><td>0.8</td><td>15</td><td>29</td></tr><tr><td>1.2</td><td>15</td><td>29</td></tr><tr><td>1.6</td><td>15</td><td>29</td></tr><tr><td>2.0</td><td>15</td><td>29</td></tr><tr><td>2.2</td><td>15</td><td>29</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	15	29	0.4	15	29	0.8	15	29	1.2	15	29	1.6	15	29	2.0	15	29	2.2	15	29	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 36 [V]	Input Volt. 76 [V]																																							
0.0	15	29																																							
0.4	15	29																																							
0.8	15	29																																							
1.2	15	29																																							
1.6	15	29																																							
2.0	15	29																																							
2.2	15	29																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																									

Model	MGS304815		
Item	Ripple-Noise	Temperature	25°C
Object	+15V2A	Testing Circuitry	Figure B
1.Graph		2.Values	
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><</div>			

Model	MGS304815																																																															
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure B																																																														
Object	+15V2A																																																															
1.Graph		2.Values																																																														
<div><div>---□--- Load 50%</div><div>—△— Load 100%</div><table border="1"><caption>Graph Data</caption><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50% [mV]</th><th>Load 100% [mV]</th></tr></thead><tbody><tr><td>-60</td><td>35</td><td>35</td></tr><tr><td>-40</td><td>27</td><td>27</td></tr><tr><td>-20</td><td>25</td><td>25</td></tr><tr><td>0</td><td>24</td><td>24</td></tr><tr><td>25</td><td>23</td><td>23</td></tr><tr><td>60</td><td>21</td><td>21</td></tr><tr><td>65</td><td>21</td><td>21</td></tr></tbody></table></div>		Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]	-60	35	35	-40	27	27	-20	25	25	0	24	24	25	23	23	60	21	21	65	21	21	<table><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><tr><td>-60</td><td>35</td><td>35</td></tr><tr><td>-40</td><td>27</td><td>27</td></tr><tr><td>-20</td><td>25</td><td>25</td></tr><tr><td>0</td><td>24</td><td>24</td></tr><tr><td>25</td><td>23</td><td>23</td></tr><tr><td>60</td><td>21</td><td>21</td></tr><tr><td>65</td><td>21</td><td>21</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></table>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	35	35	-40	27	27	-20	25	25	0	24	24	25	23	23	60	21	21	65	21	21	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																																														
-60	35	35																																																														
-40	27	27																																																														
-20	25	25																																																														
0	24	24																																																														
25	23	23																																																														
60	21	21																																																														
65	21	21																																																														
Ambient Temperature [°C]	Ripple Voltage [mV]																																																															
	Load 50%	Load 100%																																																														
-60	35	35																																																														
-40	27	27																																																														
-20	25	25																																																														
0	24	24																																																														
25	23	23																																																														
60	21	21																																																														
65	21	21																																																														
--	-	-																																																														
--	-	-																																																														
--	-	-																																																														
--	-	-																																																														
Measured by 100 MHz Oscilloscope. Note: Slanted line shows the range of the rated ambient temperature.																																																																

- 11 -

BC-10512

Model	MGS304815																																																					
Item	Ambient Temperature Drift	Testing Circuitry Figure A																																																				
Object	+15V2A																																																					
1.Graph		2.Values																																																				
<div><div>—△— Input Volt. 36V</div><div>---□--- Input Volt. 48V</div><div>-·-○-·- Input Volt. 76V</div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>-60</td><td>14.966</td><td>14.965</td><td>14.965</td></tr><tr><td>-40</td><td>15.000</td><td>15.000</td><td>15.000</td></tr><tr><td>-20</td><td>15.030</td><td>15.029</td><td>15.029</td></tr><tr><td>0</td><td>15.054</td><td>15.054</td><td>15.053</td></tr><tr><td>25</td><td>15.089</td><td>15.089</td><td>15.088</td></tr><tr><td>60</td><td>15.098</td><td>15.098</td><td>15.098</td></tr><tr><td>65</td><td>15.103</td><td>15.103</td><td>15.102</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></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-60	14.966	14.965	14.965	-40	15.000	15.000	15.000	-20	15.030	15.029	15.029	0	15.054	15.054	15.053	25	15.089	15.089	15.088	60	15.098	15.098	15.098	65	15.103	15.103	15.102	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																			
-60	14.966	14.965	14.965																																																			
-40	15.000	15.000	15.000																																																			
-20	15.030	15.029	15.029																																																			
0	15.054	15.054	15.053																																																			
25	15.089	15.089	15.088																																																			
60	15.098	15.098	15.098																																																			
65	15.103	15.103	15.102																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated ambient temperature.																																																						



Model		MGS304815	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+15V2A	

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 : 36 - 76V

Load Current : 0 - 2A

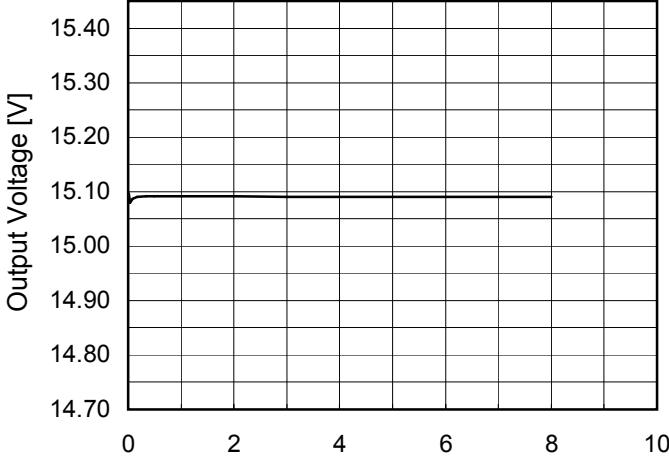
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

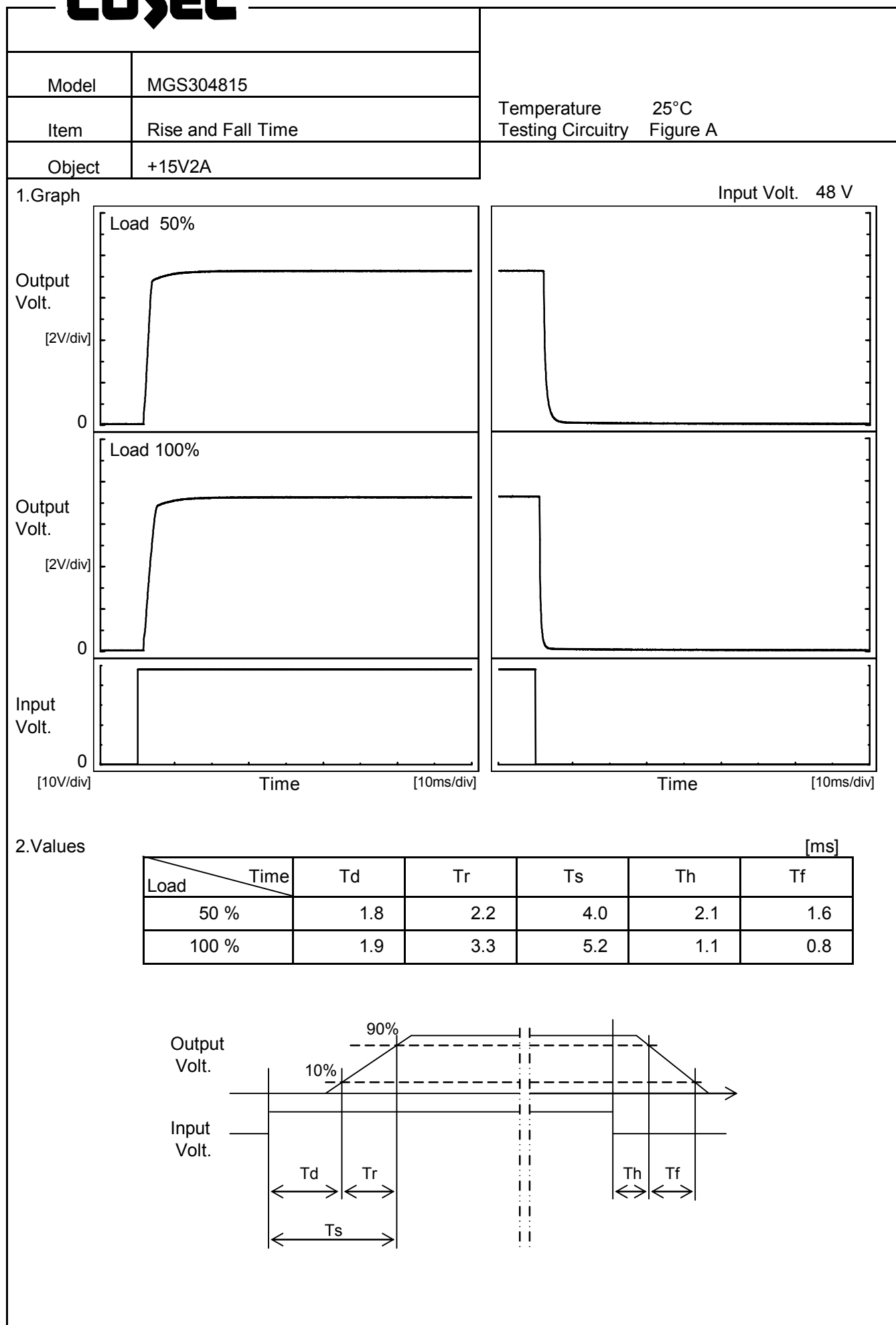
* Output Voltage Accuracy (Ratio) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	60	48	0	15.103	±52	±0.3
Minimum Voltage	-40	76	0	14.999		



Model	MGS304815																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+15V2A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 48V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>15.089</td></tr><tr><td>0.5</td><td>15.091</td></tr><tr><td>1.0</td><td>15.091</td></tr><tr><td>2.0</td><td>15.091</td></tr><tr><td>3.0</td><td>15.091</td></tr><tr><td>4.0</td><td>15.091</td></tr><tr><td>5.0</td><td>15.090</td></tr><tr><td>6.0</td><td>15.090</td></tr><tr><td>7.0</td><td>15.090</td></tr><tr><td>8.0</td><td>15.090</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	15.089	0.5	15.091	1.0	15.091	2.0	15.091	3.0	15.091	4.0	15.091	5.0	15.090	6.0	15.090	7.0	15.090	8.0	15.090
Time since start [H]	Output Voltage [V]																								
0.0	15.089																								
0.5	15.091																								
1.0	15.091																								
2.0	15.091																								
3.0	15.091																								
4.0	15.091																								
5.0	15.090																								
6.0	15.090																								
7.0	15.090																								
8.0	15.090																								



Model	MGS304815																																								
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																							
Object	+15V2A																																								
1.Graph		2.Values																																							
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><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><tr><td>-60</td><td>30.9</td><td>31.0</td></tr><tr><td>-40</td><td>30.9</td><td>31.0</td></tr><tr><td>-20</td><td>30.9</td><td>30.7</td></tr><tr><td>0</td><td>30.7</td><td>30.8</td></tr><tr><td>25</td><td>30.7</td><td>30.6</td></tr><tr><td>60</td><td>30.4</td><td>30.6</td></tr><tr><td>65</td><td>30.5</td><td>30.5</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></table>		Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-60	30.9	31.0	-40	30.9	31.0	-20	30.9	30.7	0	30.7	30.8	25	30.7	30.6	60	30.4	30.6	65	30.5	30.5	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-60	30.9	31.0																																							
-40	30.9	31.0																																							
-20	30.9	30.7																																							
0	30.7	30.8																																							
25	30.7	30.6																																							
60	30.4	30.6																																							
65	30.5	30.5																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

Model	MGS304815																																																									
Item	Overcurrent Protection	Temperature	25°C																																																							
Object	+15V2A	Testing Circuitry	Figure A																																																							
1.Graph		2.Values																																																								
<div><div><div>—△</div><div>Input Volt.</div><div>36V</div></div><div><div>—□</div><div>Input Volt.</div><div>48V</div></div><div><div>—○</div><div>Input Volt.</div><div>76V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when overcurrent protection is activated.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>15.0</td><td>2.56</td><td>2.64</td><td>2.68</td></tr><tr><td>14.3</td><td>-</td><td>-</td><td>-</td></tr><tr><td>13.5</td><td>-</td><td>-</td><td>-</td></tr><tr><td>12.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>10.5</td><td>-</td><td>-</td><td>-</td></tr><tr><td>9.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>7.5</td><td>-</td><td>-</td><td>-</td></tr><tr><td>6.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>4.5</td><td>-</td><td>-</td><td>-</td></tr><tr><td>3.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.5</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	15.0	2.56	2.64	2.68	14.3	-	-	-	13.5	-	-	-	12.0	-	-	-	10.5	-	-	-	9.0	-	-	-	7.5	-	-	-	6.0	-	-	-	4.5	-	-	-	3.0	-	-	-	1.5	-	-	-	0.0	-	-	-
Output Voltage [V]	Load Current [A]																																																									
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]																																																							
15.0	2.56	2.64	2.68																																																							
14.3	-	-	-																																																							
13.5	-	-	-																																																							
12.0	-	-	-																																																							
10.5	-	-	-																																																							
9.0	-	-	-																																																							
7.5	-	-	-																																																							
6.0	-	-	-																																																							
4.5	-	-	-																																																							
3.0	-	-	-																																																							
1.5	-	-	-																																																							
0.0	-	-	-																																																							

Model	MGS304815																																								
Item	Overvoltage Protection	Testing Circuitry Figure A																																							
Object	+15V2A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>48V</div></div><div><div>---□---</div><div>Input Volt.</div><div>76V</div></div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>-60</td><td>20.35</td><td>20.36</td></tr><tr><td>-40</td><td>20.51</td><td>20.56</td></tr><tr><td>-20</td><td>20.77</td><td>20.80</td></tr><tr><td>0</td><td>21.01</td><td>21.08</td></tr><tr><td>25</td><td>21.40</td><td>21.45</td></tr><tr><td>60</td><td>21.92</td><td>21.97</td></tr><tr><td>65</td><td>22.00</td><td>22.05</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></table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 48[V]	Input Volt. 76[V]	-60	20.35	20.36	-40	20.51	20.56	-20	20.77	20.80	0	21.01	21.08	25	21.40	21.45	60	21.92	21.97	65	22.00	22.05	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																								
	Input Volt. 48[V]	Input Volt. 76[V]																																							
-60	20.35	20.36																																							
-40	20.51	20.56																																							
-20	20.77	20.80																																							
0	21.01	21.08																																							
25	21.40	21.45																																							
60	21.92	21.97																																							
65	22.00	22.05																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

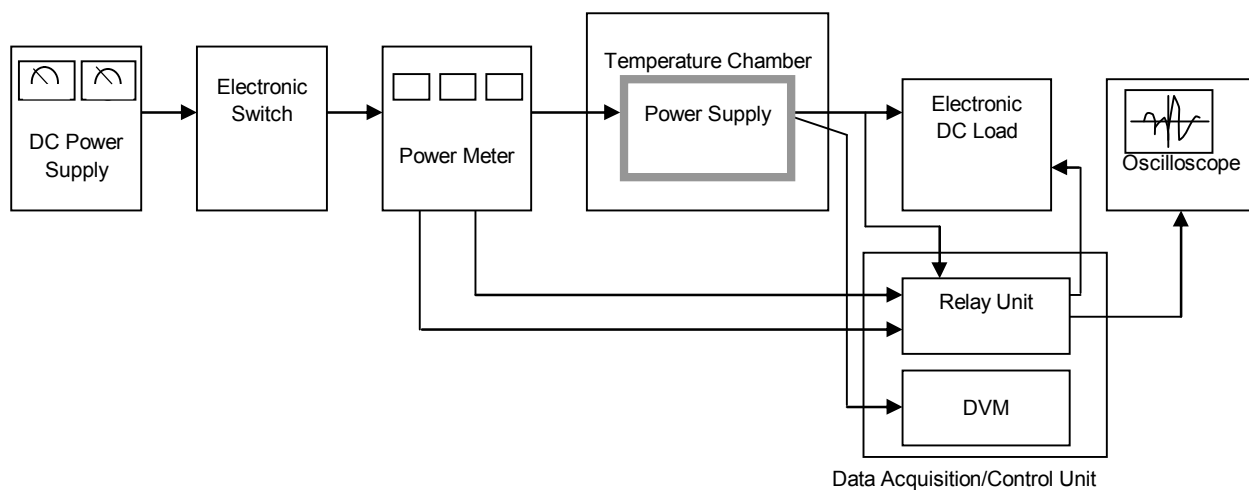


Figure A

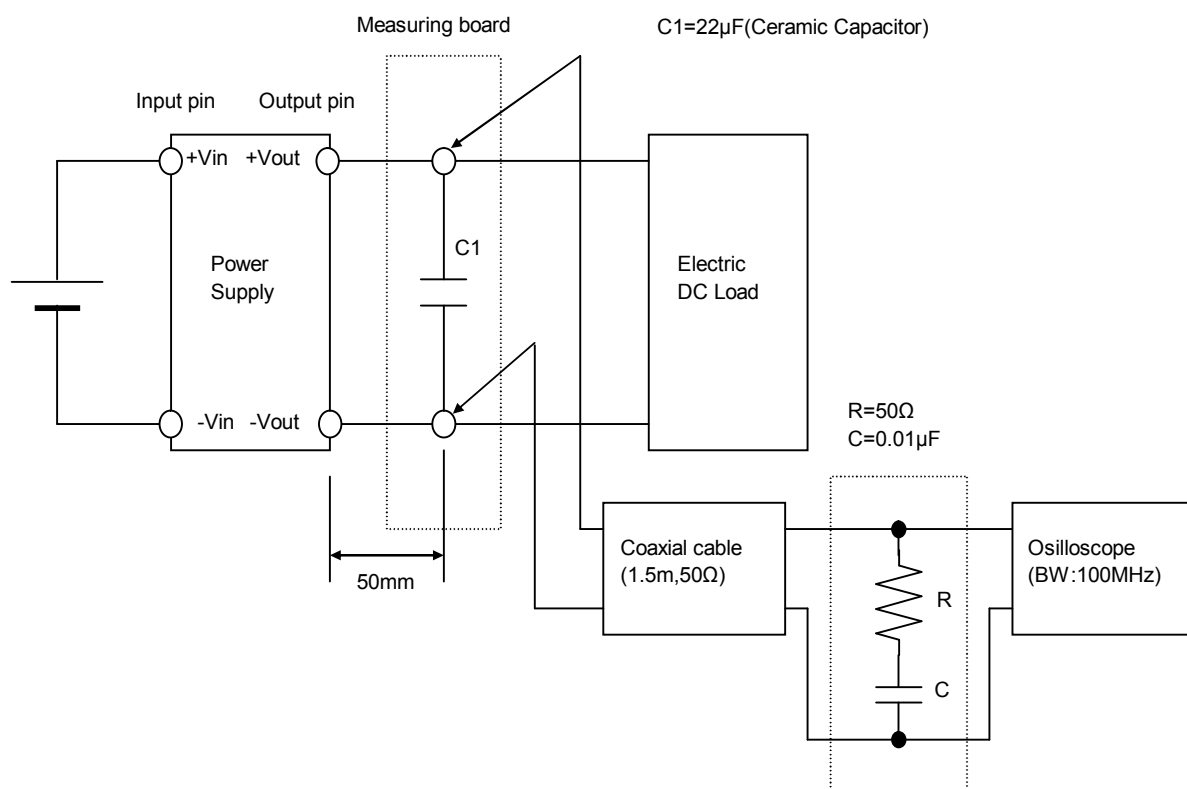


Figure B (Ripple and Ripple noise Characteristic)