

TEST DATA OF MGFS34815

Regulated DC Power Supply
January 11, 2017

Approved by : Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

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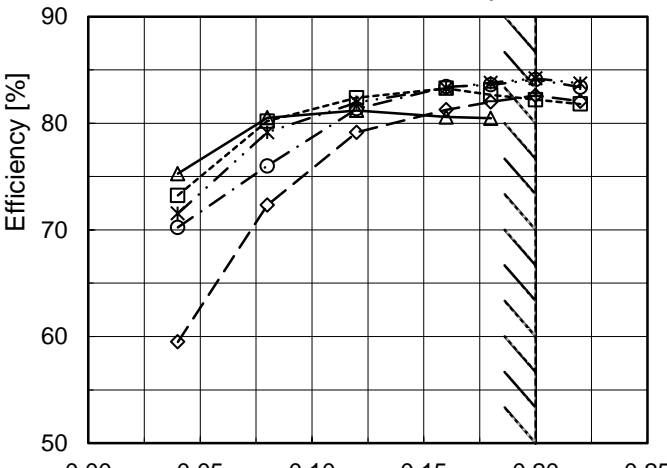
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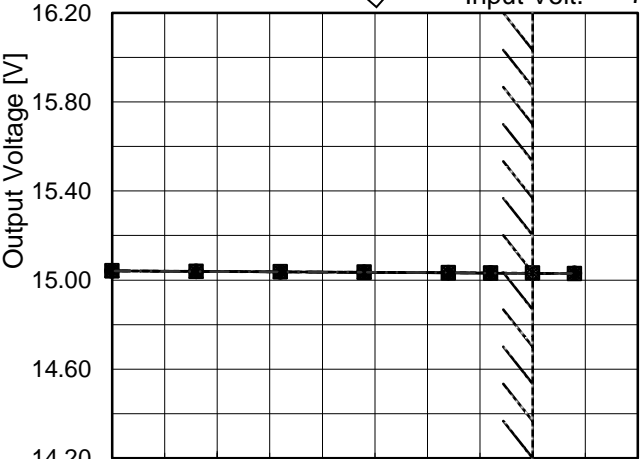
Model		MGFS34815		Temperature 25°C	
Item		Efficiency (by Load Current)		Testing Circuitry Figure A	
Object					
1.Graph		<div><div>—△—</div>Input Volt. 18V</div>		18V	
		<div>---□---</div> Input Volt. 24V		24V	
		<div>-·-*·-</div> Input Volt. 36V		36V	
		<div>-·-○-</div> Input Volt. 48V		48V	
		<div>---◇---</div> Input Volt. 76V		76V	
					
Note: Slanted line shows the range of the rated load current.					

2.Values					
Load Current [A]	Efficiency [%]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	-	-	-	-	-
0.04	75.3	73.2	71.5	70.2	59.5
0.08	80.5	80.2	79.1	76.0	72.3
0.12	81.2	82.4	81.9	81.3	79.1
0.16	80.6	83.3	83.3	83.4	81.3
0.18	80.5	82.7	83.8	83.6	82.0
0.20	- ※	82.2	84.2	84.1	82.6
0.22	- ※	81.8	83.7	83.4	82.1
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※ Maximum output current at minimum input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.



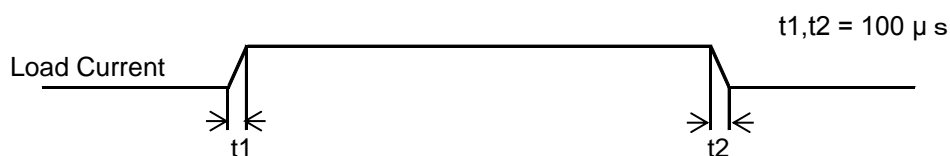
Model	MGFS34815																																																																
Item	Line Regulation	Temperature	25°C																																																														
Object	+15V0.2A	Testing Circuitry	Figure A																																																														
1.Graph		2.Values																																																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>17</td><td>15.033</td><td>- ※</td></tr><tr><td>18</td><td>15.033</td><td>- ※</td></tr><tr><td>24</td><td>15.034</td><td>15.031</td></tr><tr><td>30</td><td>15.034</td><td>15.032</td></tr><tr><td>36</td><td>15.034</td><td>15.030</td></tr><tr><td>48</td><td>15.033</td><td>15.030</td></tr><tr><td>60</td><td>15.033</td><td>15.031</td></tr><tr><td>76</td><td>15.033</td><td>15.030</td></tr><tr><td>80</td><td>15.033</td><td>15.031</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%	Output Voltage [V] Load 100%	17	15.033	- ※	18	15.033	- ※	24	15.034	15.031	30	15.034	15.032	36	15.034	15.030	48	15.033	15.030	60	15.033	15.031	76	15.033	15.030	80	15.033	15.031	<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>17</td><td>15.033</td><td>- ※</td></tr><tr><td>18</td><td>15.033</td><td>- ※</td></tr><tr><td>24</td><td>15.034</td><td>15.031</td></tr><tr><td>30</td><td>15.034</td><td>15.032</td></tr><tr><td>36</td><td>15.034</td><td>15.030</td></tr><tr><td>48</td><td>15.033</td><td>15.030</td></tr><tr><td>60</td><td>15.033</td><td>15.031</td></tr><tr><td>76</td><td>15.033</td><td>15.030</td></tr><tr><td>80</td><td>15.033</td><td>15.031</td></tr></tbody></table> <p>※ Maximum output current at minimum input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.</p>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	17	15.033	- ※	18	15.033	- ※	24	15.034	15.031	30	15.034	15.032	36	15.034	15.030	48	15.033	15.030	60	15.033	15.031	76	15.033	15.030	80	15.033	15.031
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COSEL

Model	MGFS34815	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.2A		

Input Volt. 48 V
Cycle 100 ms



Min.Load (0A) ←→
Load 100% (0.2A)

100 mV/div

4 ms/div

4 ms/div

Min.Load (0A) ←→
Load 50% (0.1A)

100 mV/div

4 ms/div

4 ms/div

Load 50% (0.1A) ←→
Load 100% (0.2A)

100 mV/div

4 ms/div

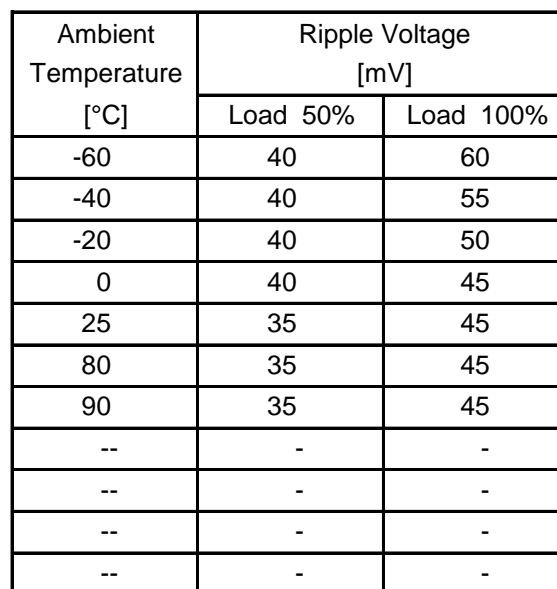
4 ms/div

Model		MGFS34815		Temperature 25°C																																																																											
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																																																											
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<div><div><div>—△—</div><div>Input Volt.</div><div>24V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>76V</div></div></div> <table><thead><tr><th>Load Current [A]</th><th>Input Volt. 24 [V]</th><th>Input Volt. 76 [V]</th></tr></thead><tbody><tr><td>0.00</td><td>5</td><td>20</td></tr><tr><td>0.04</td><td>25</td><td>15</td></tr><tr><td>0.08</td><td>25</td><td>20</td></tr><tr><td>0.12</td><td>50</td><td>30</td></tr><tr><td>0.16</td><td>65</td><td>45</td></tr><tr><td>0.18</td><td>75</td><td>45</td></tr><tr><td>0.20</td><td>85</td><td>45</td></tr><tr><td>0.22</td><td>95</td><td>45</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>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>				Load Current [A]	Input Volt. 24 [V]	Input Volt. 76 [V]	0.00	5	20	0.04	25	15	0.08	25	20	0.12	50	30	0.16	65	45	0.18	75	45	0.20	85	45	0.22	95	45	--	-	-	--	-	-	--	-	-	<table><thead><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 24 [V]</th><th>Input Volt. 76 [V]</th></tr></thead><tbody><tr><td>0.00</td><td>5</td><td>20</td></tr><tr><td>0.04</td><td>25</td><td>15</td></tr><tr><td>0.08</td><td>25</td><td>20</td></tr><tr><td>0.12</td><td>50</td><td>30</td></tr><tr><td>0.16</td><td>65</td><td>45</td></tr><tr><td>0.18</td><td>75</td><td>45</td></tr><tr><td>0.20</td><td>85</td><td>45</td></tr><tr><td>0.22</td><td>95</td><td>45</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>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 24 [V]	Input Volt. 76 [V]	0.00	5	20	0.04	25	15	0.08	25	20	0.12	50	30	0.16	65	45	0.18	75	45	0.20	85	45	0.22	95	45	--	-	-	--	-	-	--	-	-
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Model	MGFS34815																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	+15V0.2A	Testing Circuitry	Figure B																																						
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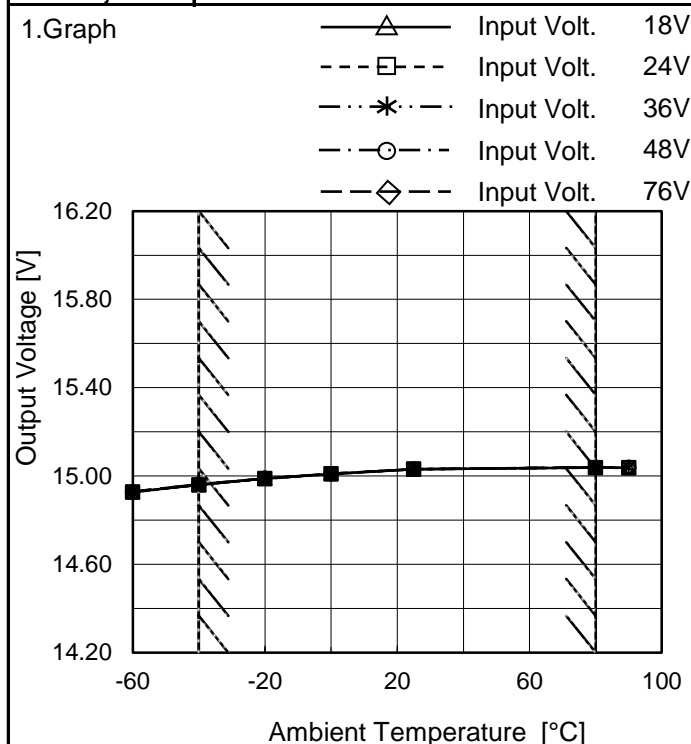
Testing Circuitry Figure B

2.Values



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

Model	MGFS34815
Item	Ambient Temperature Drift
Object	+15V0.2A



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	14.927	14.926	14.928	14.929	14.930
-40	14.960	14.959	14.961	14.962	14.962
-20	14.988	14.988	14.989	14.989	14.989
0	15.009	15.009	15.010	15.010	15.010
25	15.031	15.031	15.030	15.030	15.030
80	15.038	15.038	15.039	15.039	15.039
90	15.038	15.037	15.038	15.038	15.038
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Note: In case of Input Volt. 18V, Load 80%.
 Other case Load 100%.



Model		MGFS34815	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+15V0.2A	

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 - 80°C

Input Voltage : 24 - 76V

Load Current : 0 - 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	70	76	0	15.054	±48	±0.3
Minimum Voltage	-40	24	0.2	14.959		

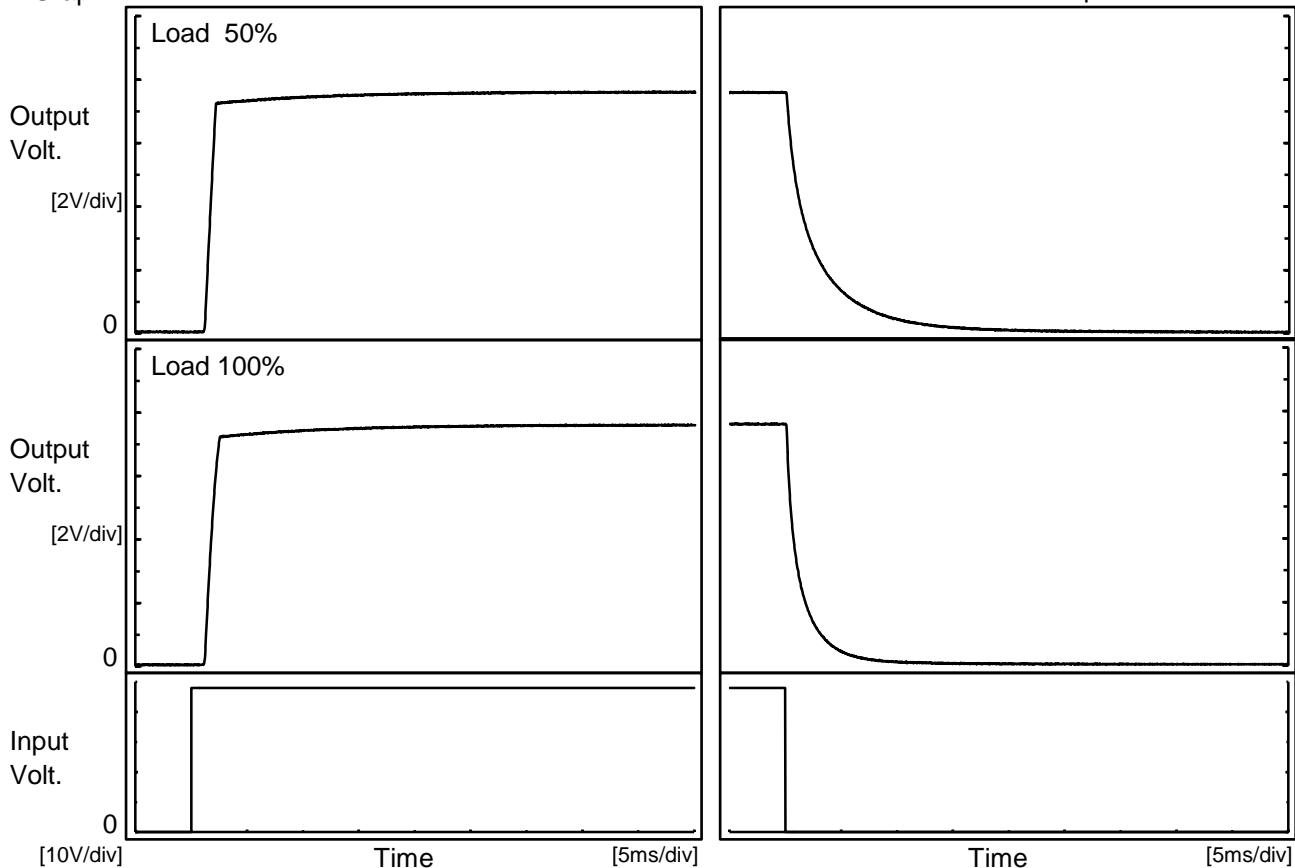
COSEL

Model		MGFS34815		Temperature 25°C Testing Circuitry Figure A	
Item		Time Lapse Drift			
Object		+15V0.2A			
1.Graph				2.Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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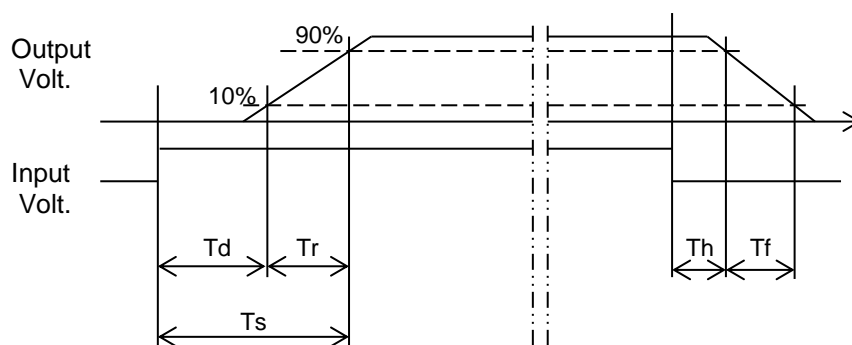
Model	MGFS34815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V0.2A		

1.Graph



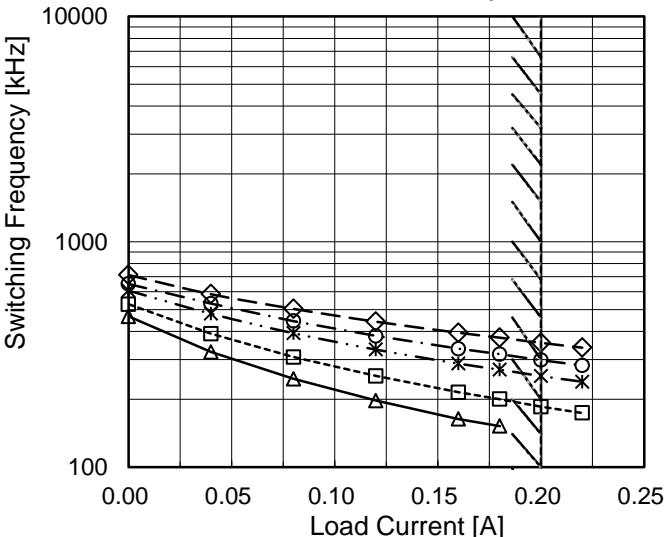
2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.3	0.9	2.2	0.3	7.1
100 %	1.3	1.1	2.4	0.2	3.5



Model	MGFS34815																																									
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																								
Object	+15V0.2A																																									
1.Graph		2.Values																																								
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 80%</div></div></div> <table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50%</th><th>Load 80%</th></tr></thead><tbody><tr><td>-60</td><td>14.7</td><td>14.7</td></tr><tr><td>-40</td><td>14.6</td><td>14.6</td></tr><tr><td>-20</td><td>14.6</td><td>14.6</td></tr><tr><td>0</td><td>14.5</td><td>14.5</td></tr><tr><td>25</td><td>14.4</td><td>14.4</td></tr><tr><td>50</td><td>14.3</td><td>14.3</td></tr><tr><td>75</td><td>14.3</td><td>14.2</td></tr><tr><td>90</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><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		Ambient Temperature [°C]	Load 50%	Load 80%	-60	14.7	14.7	-40	14.6	14.6	-20	14.6	14.6	0	14.5	14.5	25	14.4	14.4	50	14.3	14.3	75	14.3	14.2	90	-	-	--	-	-	--	-	-	--	-	-	--	-	-		
Ambient Temperature [°C]	Load 50%	Load 80%																																								
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-40	14.6	14.6																																								
-20	14.6	14.6																																								
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25	14.4	14.4																																								
50	14.3	14.3																																								
75	14.3	14.2																																								
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<div>LOREL</div>																																																																																						
Model	MGFS34815																																																																																					
Item	Overcurrent Protection	Temperature	25°C																																																																																			
Object	+15V0.2A	Testing Circuitry	Figure A																																																																																			
1.Graph		2.Values																																																																																				
<div><div><div><div></div><div>Input Volt. 18V</div></div><div><div></div><div>Input Volt. 24V</div></div><div><div></div><div>Input Volt. 36V</div></div><div><div></div><div>Input Volt. 48V</div></div><div><div></div><div>Input Volt. 76V</div></div></div><div><div>Output Voltage [V]</div><div><div>20</div><div>15</div><div>10</div><div>5</div><div>0</div></div><div><div>0.00</div><div>0.15</div><div>0.30</div><div>0.45</div><div>0.60</div></div></div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div><div>Maximum output current at minimum input Voltage is 80% of rated load current.</div><div>Refer to instruction manuals for details of input derating.</div></div>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="5">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>14.3</td><td>0.202</td><td>0.238</td><td>0.253</td><td>0.252</td><td>0.258</td></tr><tr><td>13.5</td><td>0.210</td><td>0.248</td><td>0.263</td><td>0.261</td><td>0.264</td></tr><tr><td>12.0</td><td>0.230</td><td>0.270</td><td>0.284</td><td>0.277</td><td>0.276</td></tr><tr><td>10.5</td><td>0.252</td><td>0.295</td><td>0.305</td><td>0.295</td><td>0.292</td></tr><tr><td>9.0</td><td>0.278</td><td>0.322</td><td>0.326</td><td>0.314</td><td>0.308</td></tr><tr><td>7.5</td><td>0.309</td><td>0.351</td><td>0.350</td><td>0.335</td><td>0.326</td></tr><tr><td>6.0</td><td>0.343</td><td>0.382</td><td>0.375</td><td>0.357</td><td>0.344</td></tr><tr><td>4.5</td><td>0.380</td><td>0.416</td><td>0.403</td><td>0.381</td><td>0.363</td></tr><tr><td>3.0</td><td>0.423</td><td>0.455</td><td>0.433</td><td>0.405</td><td>0.383</td></tr><tr><td>1.5</td><td>0.467</td><td>0.490</td><td>0.456</td><td>0.422</td><td>0.394</td></tr><tr><td>0.0</td><td>0.444</td><td>0.450</td><td>0.406</td><td>0.371</td><td>0.339</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]					Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	14.3	0.202	0.238	0.253	0.252	0.258	13.5	0.210	0.248	0.263	0.261	0.264	12.0	0.230	0.270	0.284	0.277	0.276	10.5	0.252	0.295	0.305	0.295	0.292	9.0	0.278	0.322	0.326	0.314	0.308	7.5	0.309	0.351	0.350	0.335	0.326	6.0	0.343	0.382	0.375	0.357	0.344	4.5	0.380	0.416	0.403	0.381	0.363	3.0	0.423	0.455	0.433	0.405	0.383	1.5	0.467	0.490	0.456	0.422	0.394	0.0	0.444	0.450	0.406	0.371	0.339	--	-	-	-	-	-
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Model		MGFS34815		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+15V0.2A																																																																																
1.Graph		<div><div><div>—△—</div>Input Volt. 18V</div><div><div>---□---</div>Input Volt. 24V</div><div><div>-··*·-</div>Input Volt. 36V</div><div><div>-··○-</div>Input Volt. 48V</div><div><div>--◇--</div>Input Volt. 76V</div></div>  <p>Note: Slanted line shows the range of the rated load current.</p> <p>When load current is low, MG operates intermittently, so switching frequency would not become constant.</p>																																																																																
2.Values				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Input Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.00</td><td>467</td><td>528</td><td>607</td><td>650</td><td>712</td></tr><tr><td>0.04</td><td>324</td><td>391</td><td>479</td><td>532</td><td>585</td></tr><tr><td>0.08</td><td>246</td><td>308</td><td>393</td><td>445</td><td>504</td></tr><tr><td>0.12</td><td>197</td><td>254</td><td>332</td><td>382</td><td>442</td></tr><tr><td>0.16</td><td>163</td><td>215</td><td>288</td><td>335</td><td>395</td></tr><tr><td>0.18</td><td>152</td><td>200</td><td>271</td><td>317</td><td>375</td></tr><tr><td>0.20</td><td>- ※</td><td>185</td><td>254</td><td>298</td><td>356</td></tr><tr><td>0.22</td><td>- ※</td><td>174</td><td>239</td><td>283</td><td>339</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></table> <p>※ Maximum output current at minimum input Voltage is 80% of rated load current. Refer to instruction manuals for details of input derating.</p>		Load Current [A]	Input Current [A]					Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.00	467	528	607	650	712	0.04	324	391	479	532	585	0.08	246	308	393	445	504	0.12	197	254	332	382	442	0.16	163	215	288	335	395	0.18	152	200	271	317	375	0.20	- ※	185	254	298	356	0.22	- ※	174	239	283	339	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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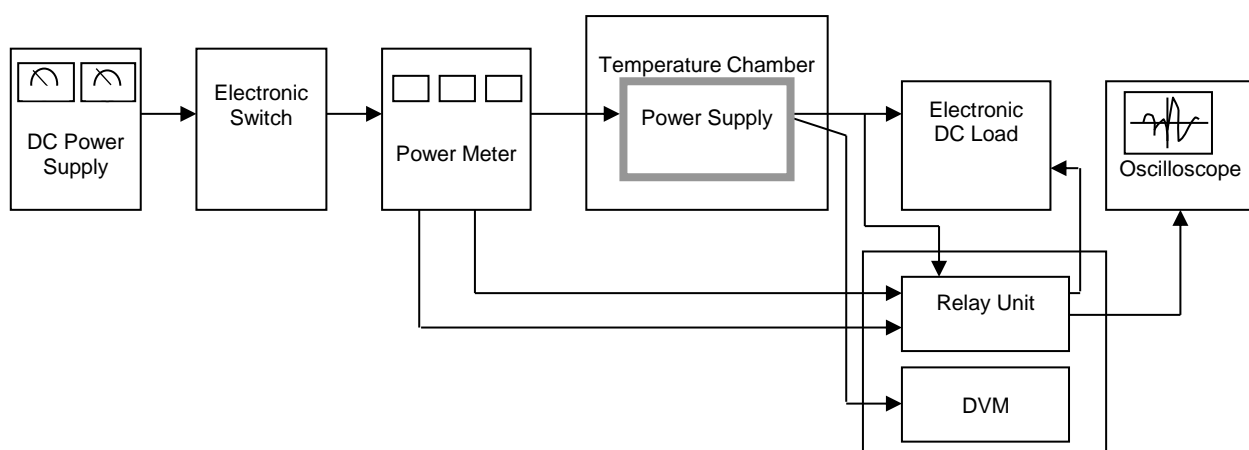


Figure A

Data Acquisition/Control Unit

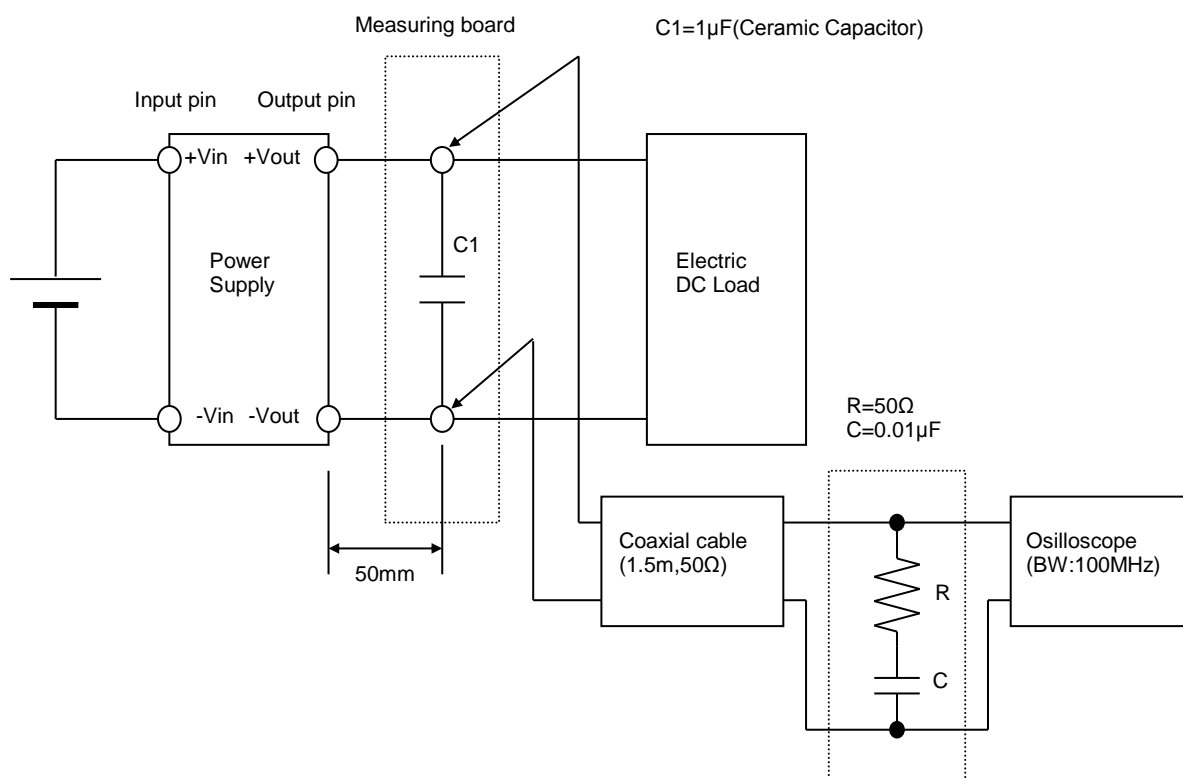


Figure B (Ripple and Ripple noise Characteristic)