

TEST DATA OF STMGFW154815

Regulated DC Power Supply
January 30, 2013

Approved by : Takahiro Yoneda
Takahiro Yoneda Design Manager

Prepared by : Satoshi Kinoshita
Satoshi Kinoshita Design Engineer

COSEL CO.,LTD.

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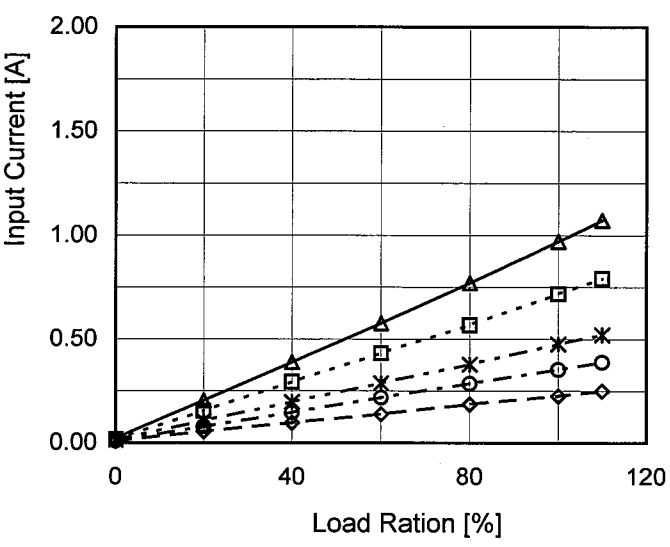
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Model	STMGFW154815					
Item	Input Current (by Load Current)					
Object						
1.Graph		<div><div>—△—</div>Input Volt. 18V</div>				18V
		<div>---□---</div> Input Volt. 24V				24V
		<div>---*---</div> Input Volt. 36V				36V
		<div>---○---</div> Input Volt. 48V				48V
		<div>---◇---</div> Input Volt. 76V				76V
						

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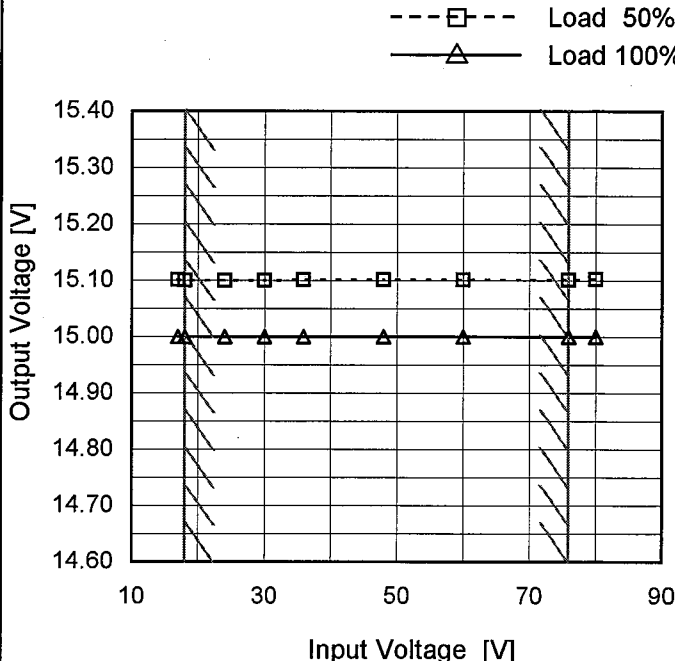
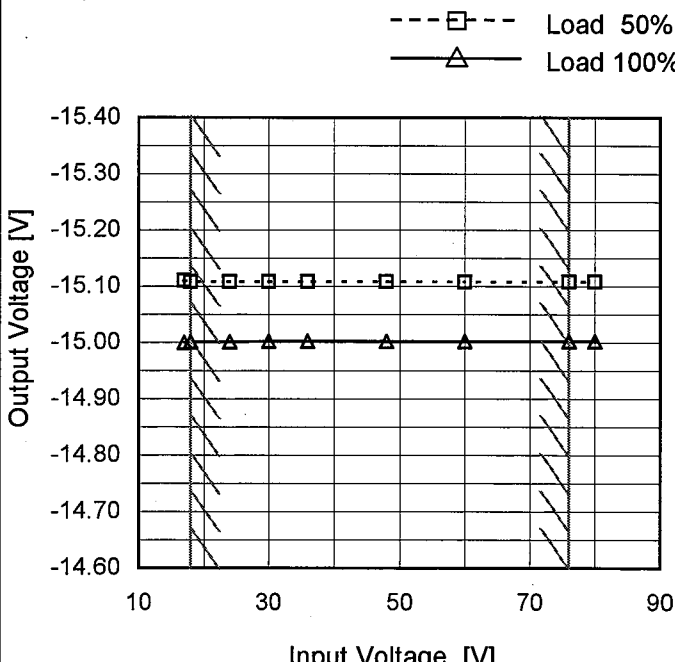
Model	STMGFW154815					Temperature25°C Testing CircuitryFigure A	
Item	Input Power (by Load Current)						
Object							
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>---□---</div><div>Input Volt.</div><div>24V</div></div><div><div>-...*...-</div><div>Input Volt.</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>				2.Values	
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[W]</div><div></div><div>25</div><div>20</div><div>15</div><div>10</div><div>5</div><div>0</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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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18	86.3	86.1																																																																	
24	86.9	87.6																																																																	
30	87.0	88.8																																																																	
36	86.9	87.8																																																																	
48	85.8	88.5																																																																	
60	86.2	87.2																																																																	
76	82.5	87.6																																																																	
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Note: Slanted line shows the range of the rated input voltage.																																																																			



Model	STMGEFW154815	Temperature	25°C																																																																																
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Object																																																																																			
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80	86.9	88.6	88.6	87.5	85.1																																																																														
100	86.4	87.7	87.9	88.6	87.6																																																																														
110	86.1	87.6	88.4	88.8	86.8																																																																														
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Model	STMGFW154815																																		
Item	Line Regulation	Temperature	25°C																																
Object	+15V0.5A	Testing Circuitry	Figure A																																
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Model	STMGFW154815	Temperature 25°C																																																																																	
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Load Current [A]	Output Voltage [V]																																																																																		
	18[V]	24[V]	36[V]	48[V]	76[V]																																																																														
0.00	-15.582	-15.577	-15.571	-15.567	-15.566																																																																														
0.10	-15.222	-15.222	-15.222	-15.222	-15.221																																																																														
0.20	-15.139	-15.140	-15.140	-15.140	-15.140																																																																														
0.30	-15.086	-15.084	-15.084	-15.084	-15.084																																																																														
0.40	-15.043	-15.040	-15.040	-15.040	-15.040																																																																														
0.50	-15.001	-15.001	-15.002	-15.002	-15.002																																																																														
0.55	-14.980	-14.983	-14.985	-14.985	-14.985																																																																														
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Note: Slanted line shows the range of the rated load current.																																																																																			

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Model		STMGFW154815																																							
Item		Ripple Voltage (by Load Current)																																							
Object		+15V0.5A																																							
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>76V</div></div></div> <p>Ripple Voltage [mV]</p> <p>Load Current [A]</p>		<table><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><tr><td>0.000</td><td>20</td><td>30</td></tr><tr><td>0.100</td><td>35</td><td>40</td></tr><tr><td>0.200</td><td>35</td><td>40</td></tr><tr><td>0.300</td><td>35</td><td>40</td></tr><tr><td>0.400</td><td>40</td><td>40</td></tr><tr><td>0.500</td><td>40</td><td>45</td></tr><tr><td>0.550</td><td>40</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><tr><td>--</td><td>-</td><td>-</td></tr></table> <p>-15V: Rated output current</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 76 [V]	0.000	20	30	0.100	35	40	0.200	35	40	0.300	35	40	0.400	40	40	0.500	40	45	0.550	40	45	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 18 [V]	Input Volt. 76 [V]																																							
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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>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																									

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Model		STMGFW154815		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																							
Object		-15V0.5A																																									
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<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>---○---</div><div>Input Volt.</div><div>76V</div></div></div><div><div><div><div>100</div><div>80</div><div>60</div><div>40</div><div>20</div><div>0</div></div><div><div>Ripple Voltage [mV]</div><div>0.0</div><div>0.2</div><div>0.4</div><div>0.6</div></div></div><div><div>Load Current [A]</div></div></div></div>				<table><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><tr><td>0.000</td><td>30</td><td>30</td></tr><tr><td>0.100</td><td>30</td><td>30</td></tr><tr><td>0.200</td><td>30</td><td>30</td></tr><tr><td>0.300</td><td>30</td><td>30</td></tr><tr><td>0.400</td><td>35</td><td>35</td></tr><tr><td>0.500</td><td>35</td><td>35</td></tr><tr><td>0.550</td><td>35</td><td>35</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table> <div>+15V: Rated output current</div>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 76 [V]	0.000	30	30	0.100	30	30	0.200	30	30	0.300	30	30	0.400	35	35	0.500	35	35	0.550	35	35	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																										
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<div>Measured by 100 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div>																																											
<div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>Ripple [mVp-p]</div></div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div></div></div> <div>Fig.Complex Ripple Wave Form</div>																																											

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.

Ripple [mVp-p]

Fig.Complex Ripple Wave Form

Model		STMGFW154815	
Item		Ripple-Noise	
Object		+15V0.5A	
1.Graph		2.Values	
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Model		STMGFW154815																																							
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<div><div><div>—△— Input Volt. 18V</div><div>-·-○-·- Input Volt. 76V</div></div><div>Ripple-Noise [mV]</div><div>Load Current [A]</div></div> <div><p>Measured by 100 MHz Oscilloscope.</p><p>Ripple-Noise is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p><div><div>Ripple Noise[mVp-p]</div><div>Fig.Complex Ripple Noise Wave Form</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 76 [V]</th></tr><tr><td>0.000</td><td>40</td><td>40</td></tr><tr><td>0.100</td><td>40</td><td>40</td></tr><tr><td>0.200</td><td>40</td><td>45</td></tr><tr><td>0.300</td><td>45</td><td>45</td></tr><tr><td>0.400</td><td>50</td><td>50</td></tr><tr><td>0.500</td><td>50</td><td>50</td></tr><tr><td>0.550</td><td>55</td><td>55</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> <div>+15V: Rated output current</div>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 18 [V]	Input Volt. 76 [V]	0.000	40	40	0.100	40	40	0.200	40	45	0.300	45	45	0.400	50	50	0.500	50	50	0.550	55	55	--	-	-	--	-	-	--	-	-	--	-	-
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Model		STMGEFW154815																																							
Item		Ripple Voltage (by Ambient Temp.)																																							
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10	-14.989	-14.990	-14.991	-14.991	-14.992																																																																														
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30	-14.999	-15.000	-15.001	-15.001	-15.002																																																																														
40	-15.003	-15.003	-15.005	-15.005	-15.005																																																																														
50	-15.006	-15.007	-15.008	-15.008	-15.008																																																																														
60	-15.009	-15.009	-15.010	-15.010	-15.010																																																																														
65	-15.009	-15.010	-15.011	-15.011	-15.011																																																																														
--	-	-	-	-	-																																																																														

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

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Model		STMGFW154815			
Item		Output Voltage Accuracy		Testing Circuitry Figure A	

1. Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -20 - 60°C
Input Voltage : 18 - 76V
Load Current (AVR 1) : 0 - 0.5A (AVR 2) : 0 - 0.5A

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

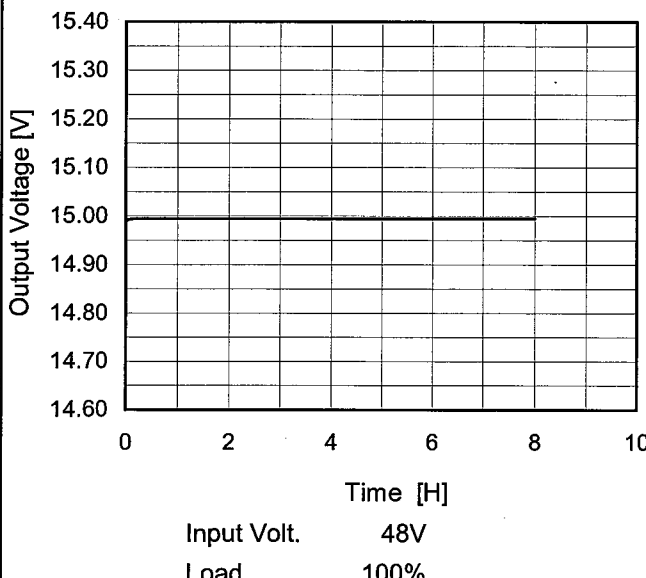
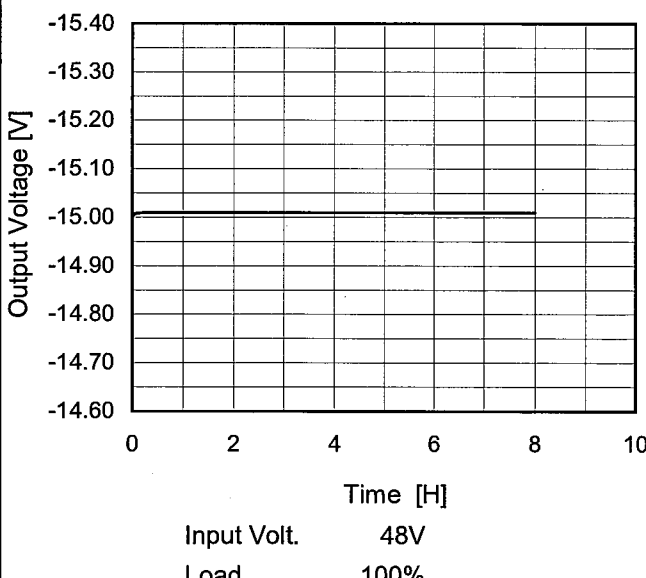
* Output Voltage Accuracy (Ration) =
$$\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Object	+15V0.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	18	0	15.619	±327	±2.2
Minimum Voltage	-20	18	0.5	14.965		

Object	-15V0.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	18	0	-15.612	±324	±2.2
Minimum Voltage	-20	18	0.5	-14.964		

COSEL

Model	STMGFW154815																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+15V0.5A																								
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>14.986</td></tr><tr><td>0.5</td><td>14.995</td></tr><tr><td>1.0</td><td>14.995</td></tr><tr><td>2.0</td><td>14.995</td></tr><tr><td>3.0</td><td>14.995</td></tr><tr><td>4.0</td><td>14.995</td></tr><tr><td>5.0</td><td>14.995</td></tr><tr><td>6.0</td><td>14.995</td></tr><tr><td>7.0</td><td>14.995</td></tr><tr><td>8.0</td><td>14.995</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	14.986	0.5	14.995	1.0	14.995	2.0	14.995	3.0	14.995	4.0	14.995	5.0	14.995	6.0	14.995	7.0	14.995	8.0	14.995
Time since start [H]	Output Voltage [V]																								
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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>-15.001</td></tr><tr><td>0.5</td><td>-15.009</td></tr><tr><td>1.0</td><td>-15.009</td></tr><tr><td>2.0</td><td>-15.009</td></tr><tr><td>3.0</td><td>-15.010</td></tr><tr><td>4.0</td><td>-15.010</td></tr><tr><td>5.0</td><td>-15.010</td></tr><tr><td>6.0</td><td>-15.010</td></tr><tr><td>7.0</td><td>-15.010</td></tr><tr><td>8.0</td><td>-15.009</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	-15.001	0.5	-15.009	1.0	-15.009	2.0	-15.009	3.0	-15.010	4.0	-15.010	5.0	-15.010	6.0	-15.010	7.0	-15.010	8.0	-15.009
Time since start [H]	Output Voltage [V]																								
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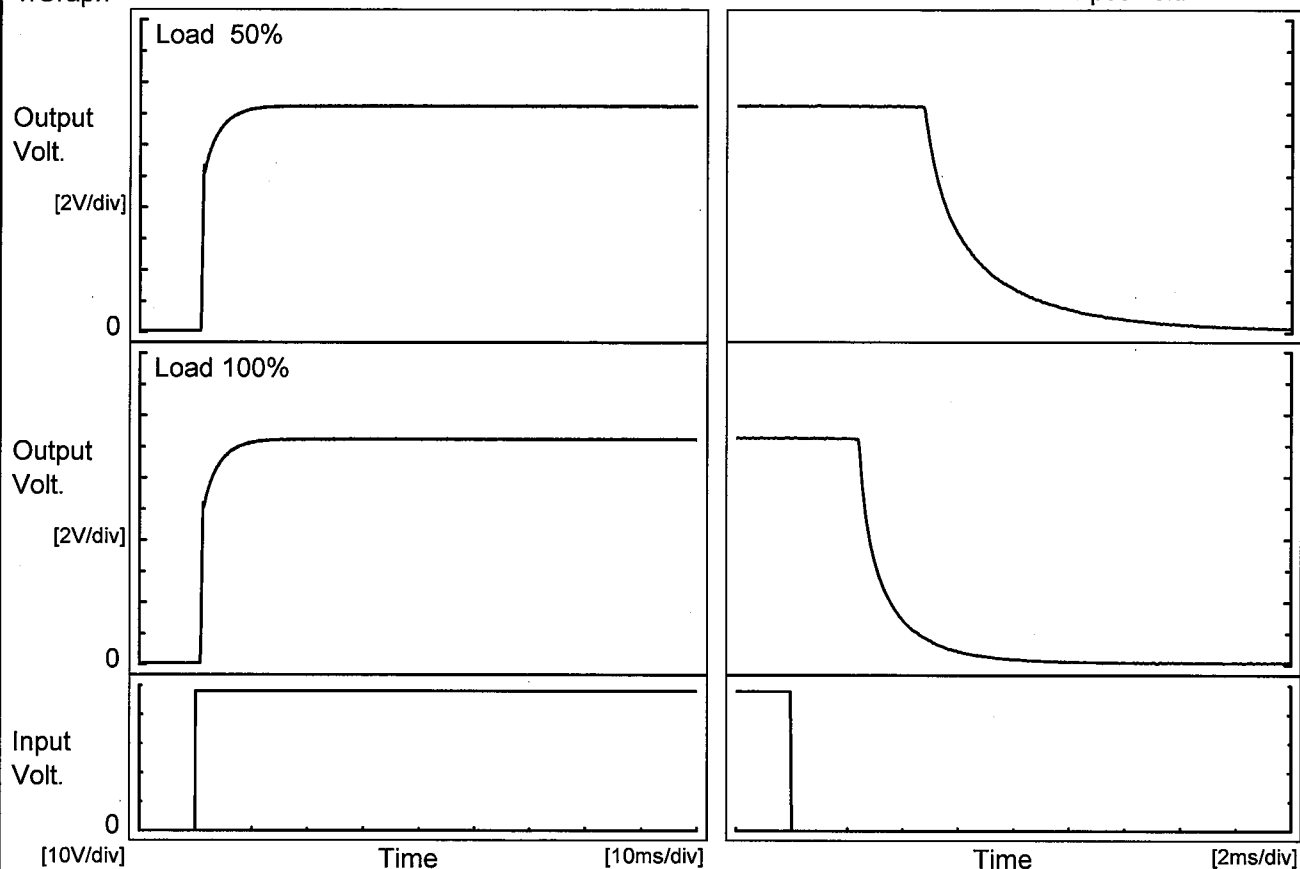
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Model	STMGFW154815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V0.5A		

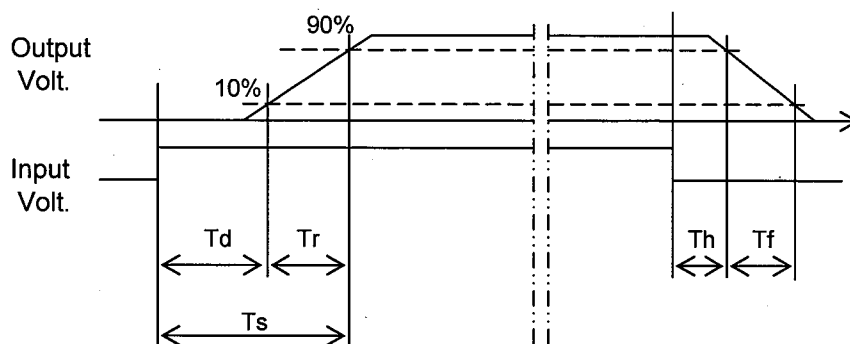
1. Graph

Input Volt. 48 V



2. Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.0	4.8	5.8	4.8	5.1
100 %	1.0	4.9	5.9	2.4	2.5

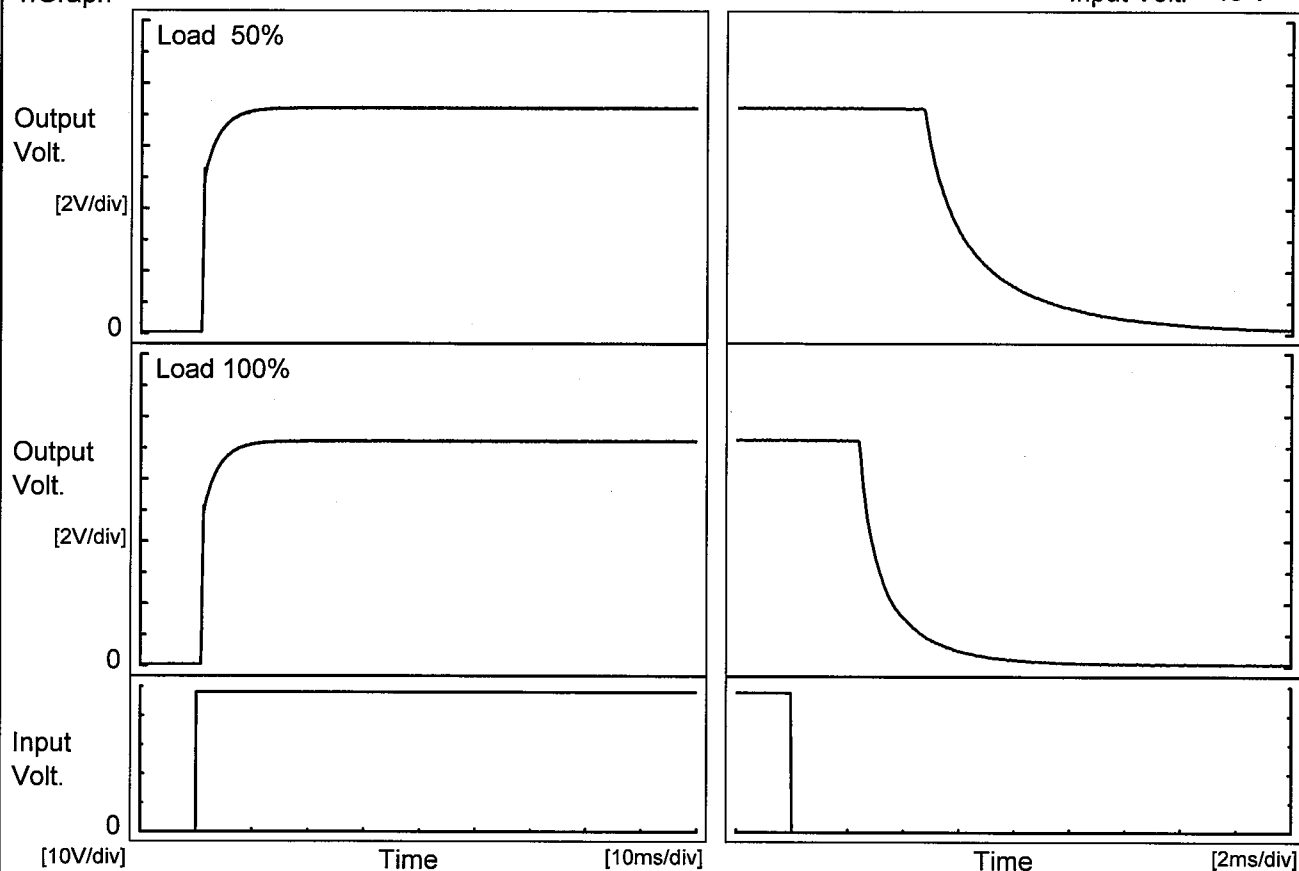


COSEL

Model	STMGFW154815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-15V0.5A		

1.Graph

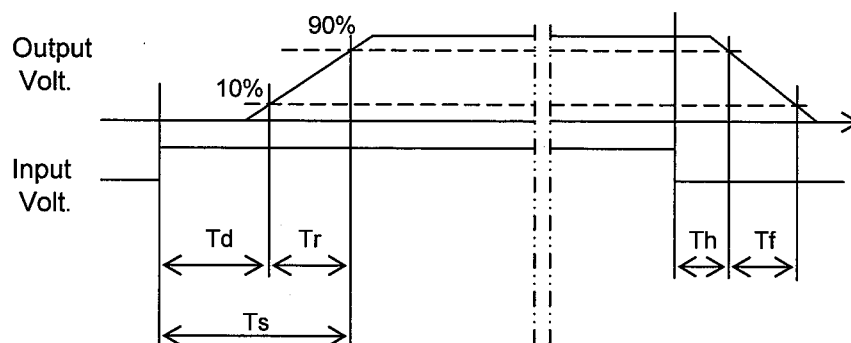
Input Volt. 48 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.0	5.0	6.0	4.8	5.4
100 %	1.0	5.0	6.0	2.4	2.7



Model	STMGEW154815	Testing Circuitry Figure A																																					
Item	Minimum Input Voltage for Regulated Output Voltage																																						
Object	+15V0.5A																																						
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>Ambient Temperature [°C]</th><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-40</td><td>15.8</td><td>16.2</td></tr><tr><td>-20</td><td>15.9</td><td>16.2</td></tr><tr><td>0</td><td>16.3</td><td>16.2</td></tr><tr><td>10</td><td>16.3</td><td>16.2</td></tr><tr><td>25</td><td>16.2</td><td>16.1</td></tr><tr><td>30</td><td>16.2</td><td>16.2</td></tr><tr><td>40</td><td>16.3</td><td>16.2</td></tr><tr><td>50</td><td>16.2</td><td>16.2</td></tr><tr><td>60</td><td>16.2</td><td>16.1</td></tr><tr><td>65</td><td>16.2</td><td>16.1</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Ambient Temperature [°C]	Load 50%	Load 100%	-40	15.8	16.2	-20	15.9	16.2	0	16.3	16.2	10	16.3	16.2	25	16.2	16.1	30	16.2	16.2	40	16.3	16.2	50	16.2	16.2	60	16.2	16.1	65	16.2	16.1	--	-	-		
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Object	-15V0.5A	2.Values																																					
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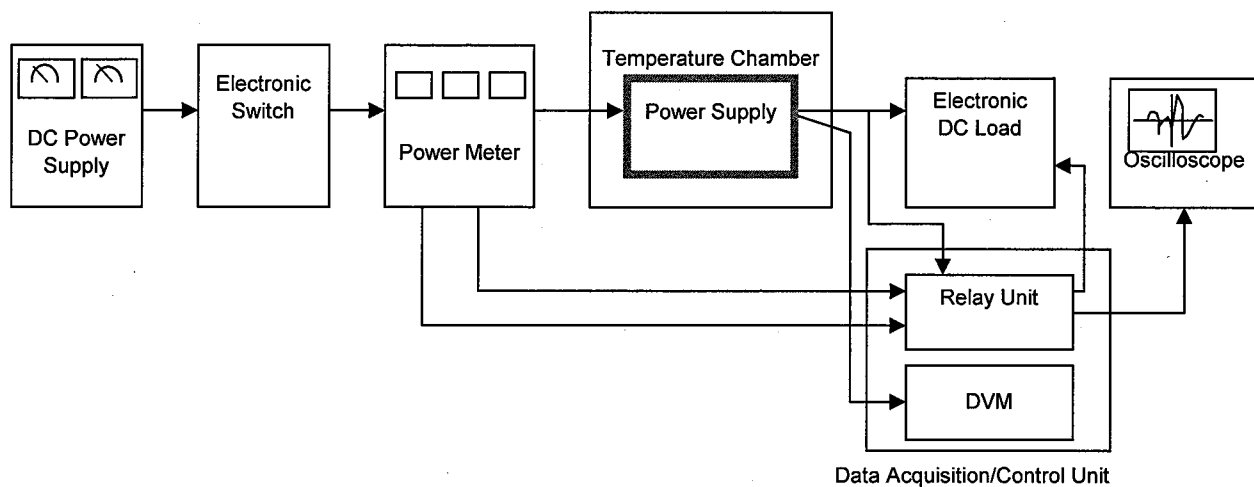


Figure A

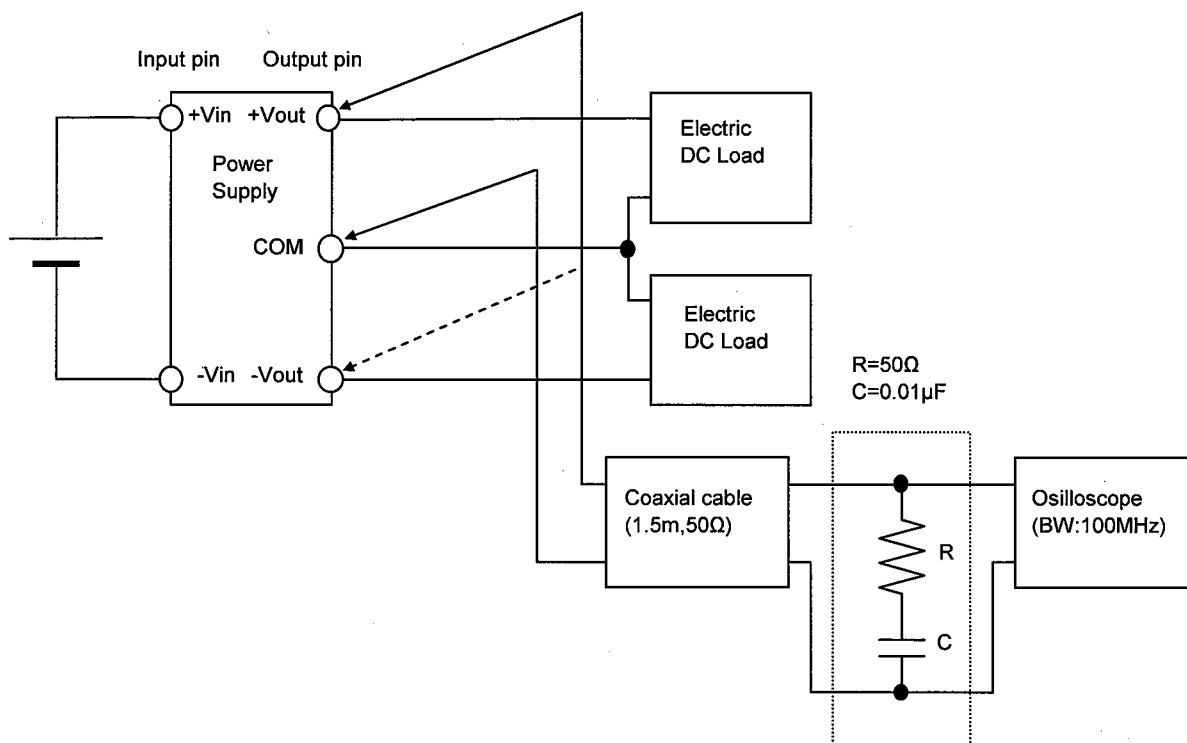


Figure B (Ripple and Ripple noise Characteristic)