

# TEST DATA OF SUW1R52415

Regulated DC Power Supply  
Sep 27, 2004

Approved by : Tetsuo Sugimori  
Tetsuo Sugimori Design Manager

Prepared by : Masahiro Shima  
Masahiro Shima Design Engineer

**COSEL CO.,LTD.**

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(Final Page 22)

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Model		SUW1R52415	
Item		Input Current (by Input Voltage)	
Object			

1.Graph

—△—

Load 100%

---□---

Load 50%

---○---

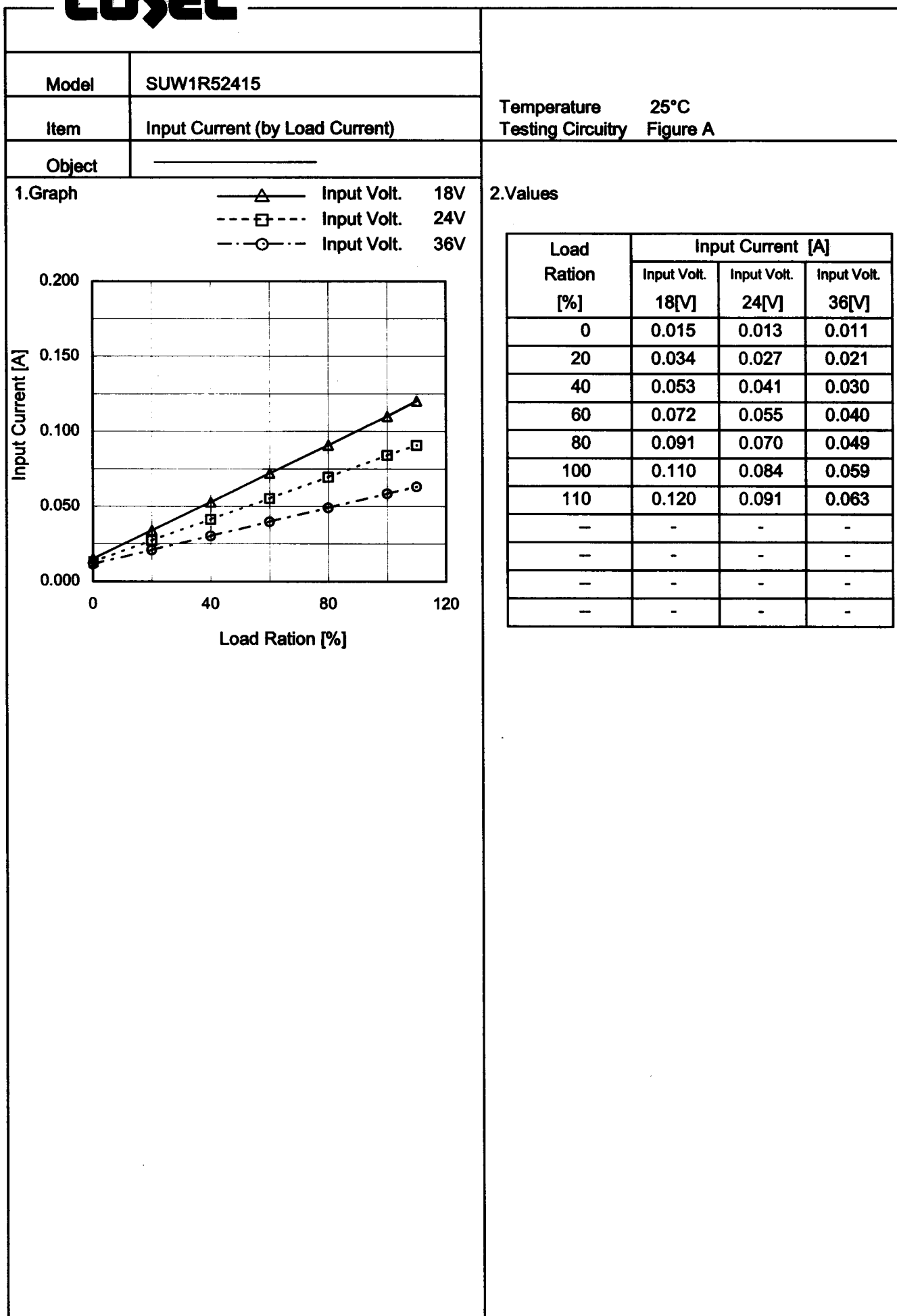
Load 0%

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

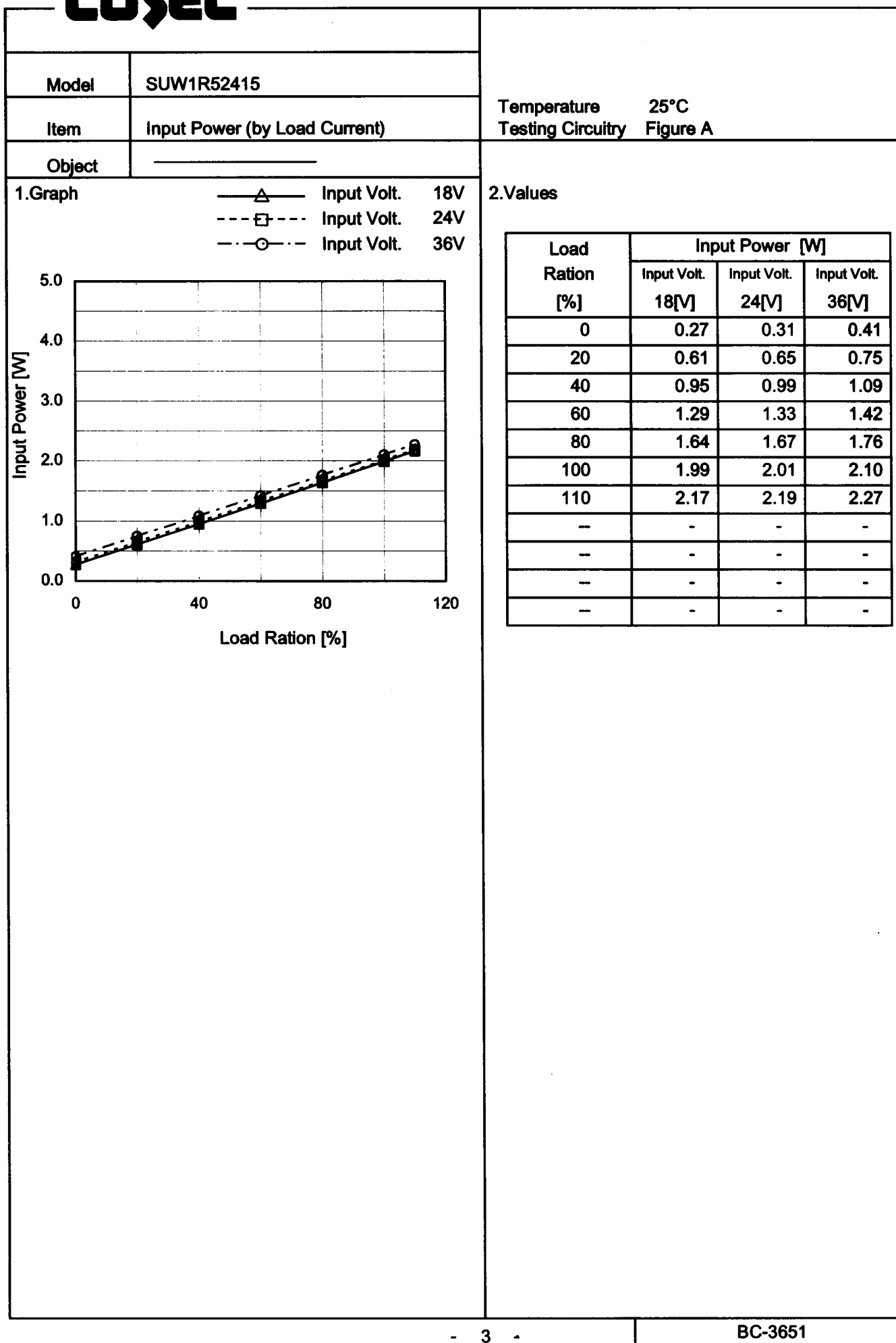
2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
4.0	0.000	0.000	0.000
8.0	0.030	0.192	0.170
8.4	0.028	0.174	0.200
12.0	0.019	0.091	0.168
16.0	0.016	0.069	0.124
18.0	0.015	0.062	0.110
20.0	0.014	0.056	0.100
24.0	0.013	0.048	0.085
28.0	0.012	0.042	0.073
32.0	0.011	0.037	0.065
36.0	0.011	0.034	0.059
40.0	0.012	0.032	0.054
—	-	-	-
—	-	-	-
—	-	-	-

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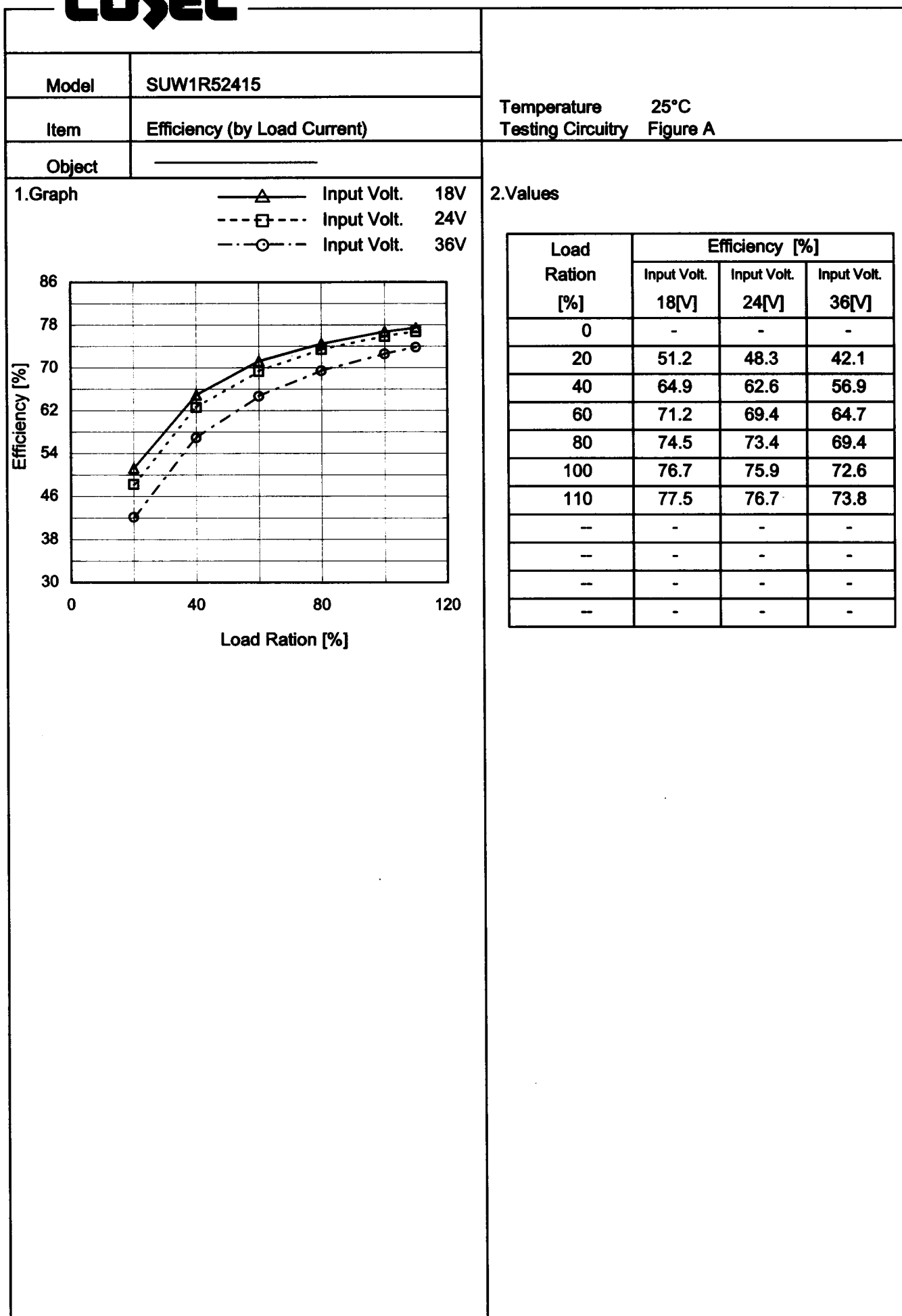
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Model		SUW1R52415		Temperature 25°C																															
Item		Efficiency (by Input Voltage)		Testing Circuitry Figure A																															
Object																																			
1.Graph				2.Values																															
<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>Load 50%</div></div> <div><div>---</div><div>△</div><div>---</div></div> <div>Load 100%</div> <table border="1"><thead><tr><th>Input Voltage [V]</th><th>Load 50% Efficiency [%]</th><th>Load 100% Efficiency [%]</th></tr></thead><tbody><tr><td>16</td><td>69.1</td><td>76.8</td></tr><tr><td>18</td><td>68.6</td><td>76.7</td></tr><tr><td>20</td><td>67.8</td><td>76.6</td></tr><tr><td>24</td><td>66.5</td><td>75.9</td></tr><tr><td>30</td><td>64.1</td><td>74.5</td></tr><tr><td>36</td><td>61.3</td><td>72.6</td></tr><tr><td>40</td><td>58.9</td><td>71.0</td></tr><tr><td>—</td><td>-</td><td>-</td></tr><tr><td>—</td><td>-</td><td>-</td></tr></tbody></table>				Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]	16	69.1	76.8	18	68.6	76.7	20	67.8	76.6	24	66.5	75.9	30	64.1	74.5	36	61.3	72.6	40	58.9	71.0	—	-	-	—	-	-		
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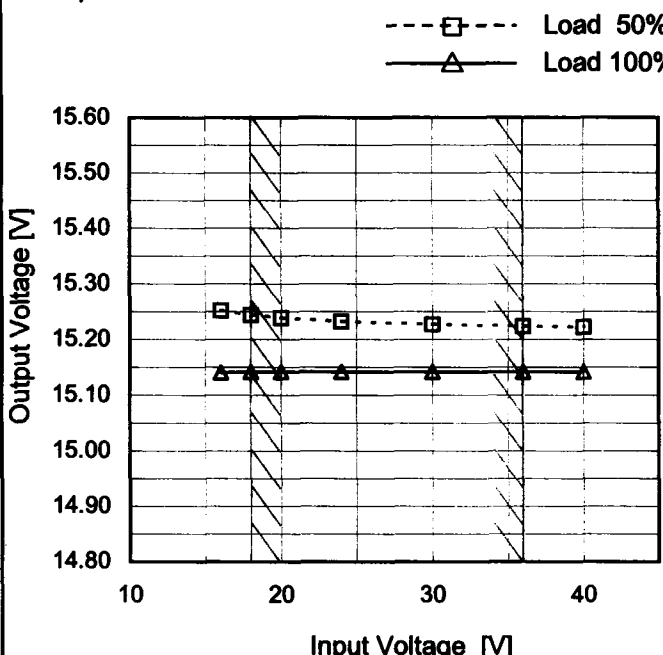
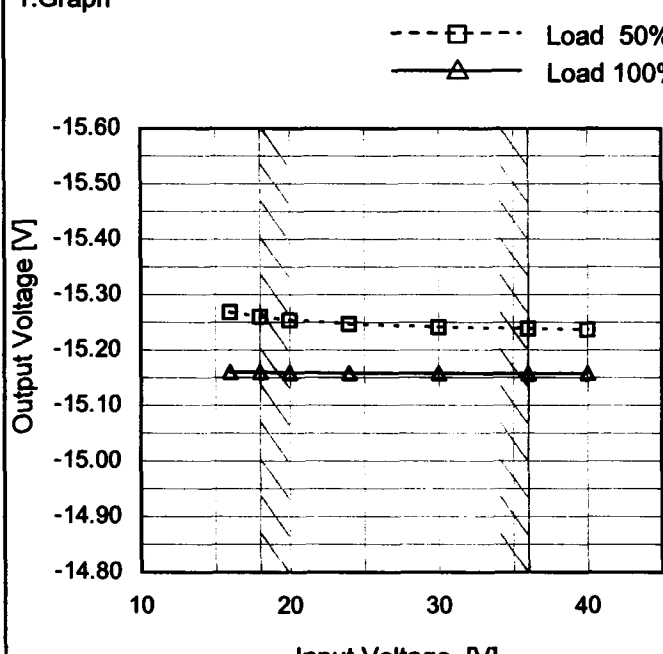
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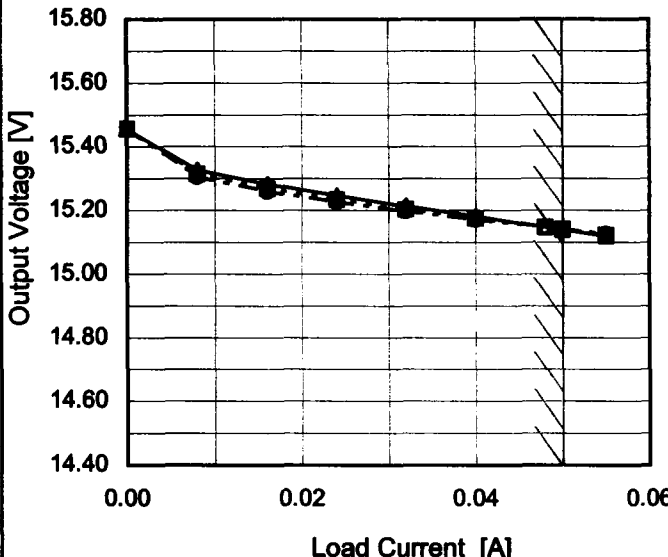
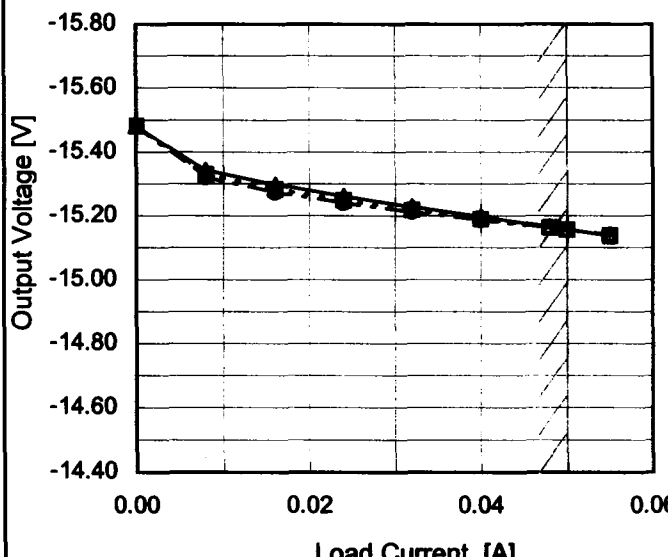
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Item	Line Regulation																																		
Object	+15V0.05A																																		
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Model		SUW1R52415		Temperature		25°C																																																				
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<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> 				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.000</td><td>15.457</td><td>15.458</td><td>15.459</td></tr><tr><td>0.008</td><td>15.327</td><td>15.315</td><td>15.305</td></tr><tr><td>0.016</td><td>15.283</td><td>15.270</td><td>15.259</td></tr><tr><td>0.024</td><td>15.247</td><td>15.235</td><td>15.226</td></tr><tr><td>0.032</td><td>15.214</td><td>15.204</td><td>15.198</td></tr><tr><td>0.040</td><td>15.182</td><td>15.176</td><td>15.171</td></tr><tr><td>0.048</td><td>15.149</td><td>15.148</td><td>15.147</td></tr><tr><td>0.050</td><td>15.141</td><td>15.141</td><td>15.141</td></tr><tr><td>0.055</td><td>15.120</td><td>15.123</td><td>15.126</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.000	15.457	15.458	15.459	0.008	15.327	15.315	15.305	0.016	15.283	15.270	15.259	0.024	15.247	15.235	15.226	0.032	15.214	15.204	15.198	0.040	15.182	15.176	15.171	0.048	15.149	15.148	15.147	0.050	15.141	15.141	15.141	0.055	15.120	15.123	15.126	—	—	—	—	—	—	—	—
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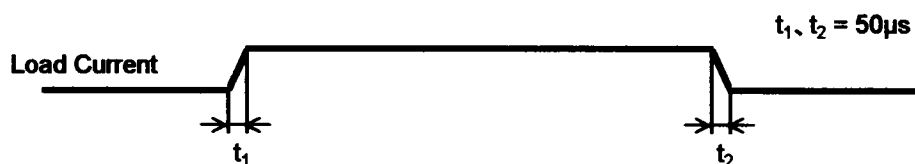
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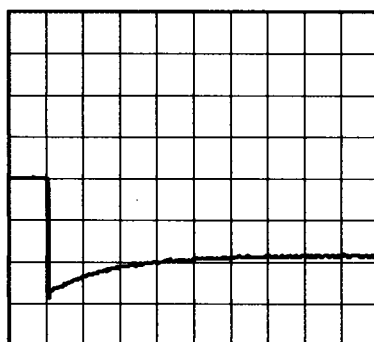
Model	SUW1R52415	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.05A		

Input Volt. 24 V  
Cycle 100 mS

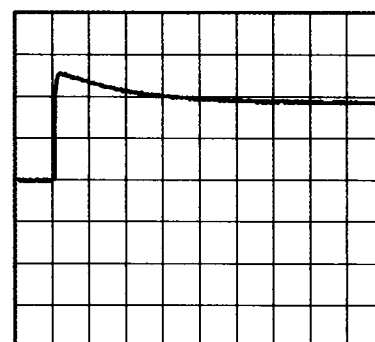


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.05A)

200mV/div



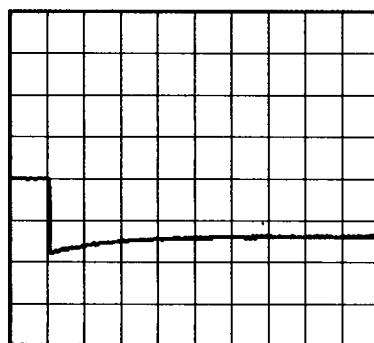
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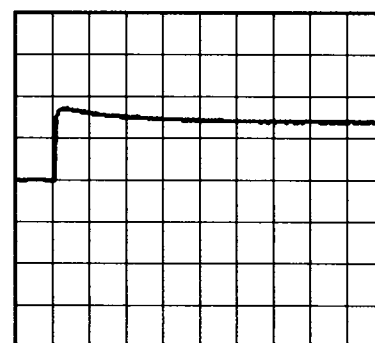
2ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.025A)

200mV/div



2ms/div



2ms/div

Load 50% (0.025A)  $\longleftrightarrow$   
Load 100% (0.05A)

200mV/div



2ms/div

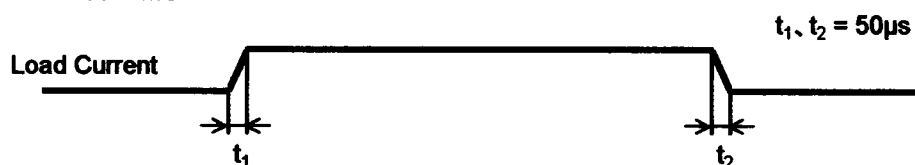


2ms/div

# COSEL

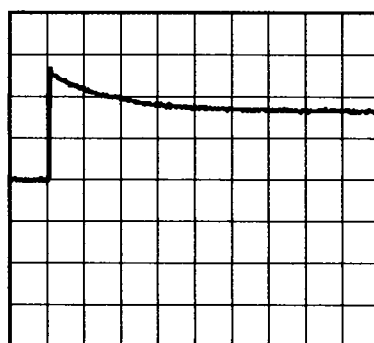
Model	SUW1R52415	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-15V0.05A		

Input Volt. 24 V  
Cycle 100 mS

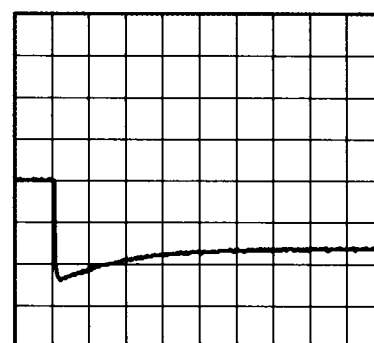


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.05A)

200mV/div



2ms/div



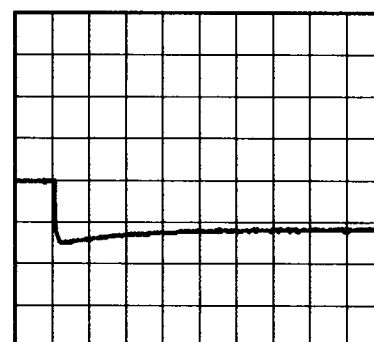
2ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.025A)

200mV/div



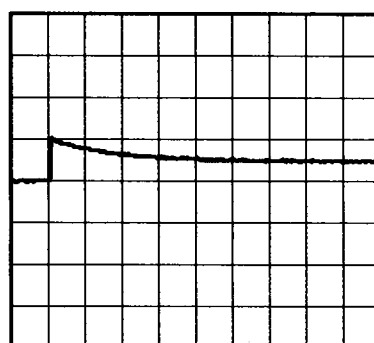
2ms/div



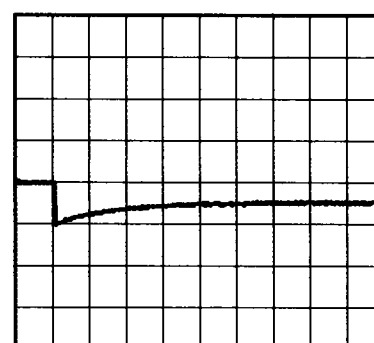
2ms/div

Load 50% (0.025A)  $\longleftrightarrow$   
Load 100% (0.05A)

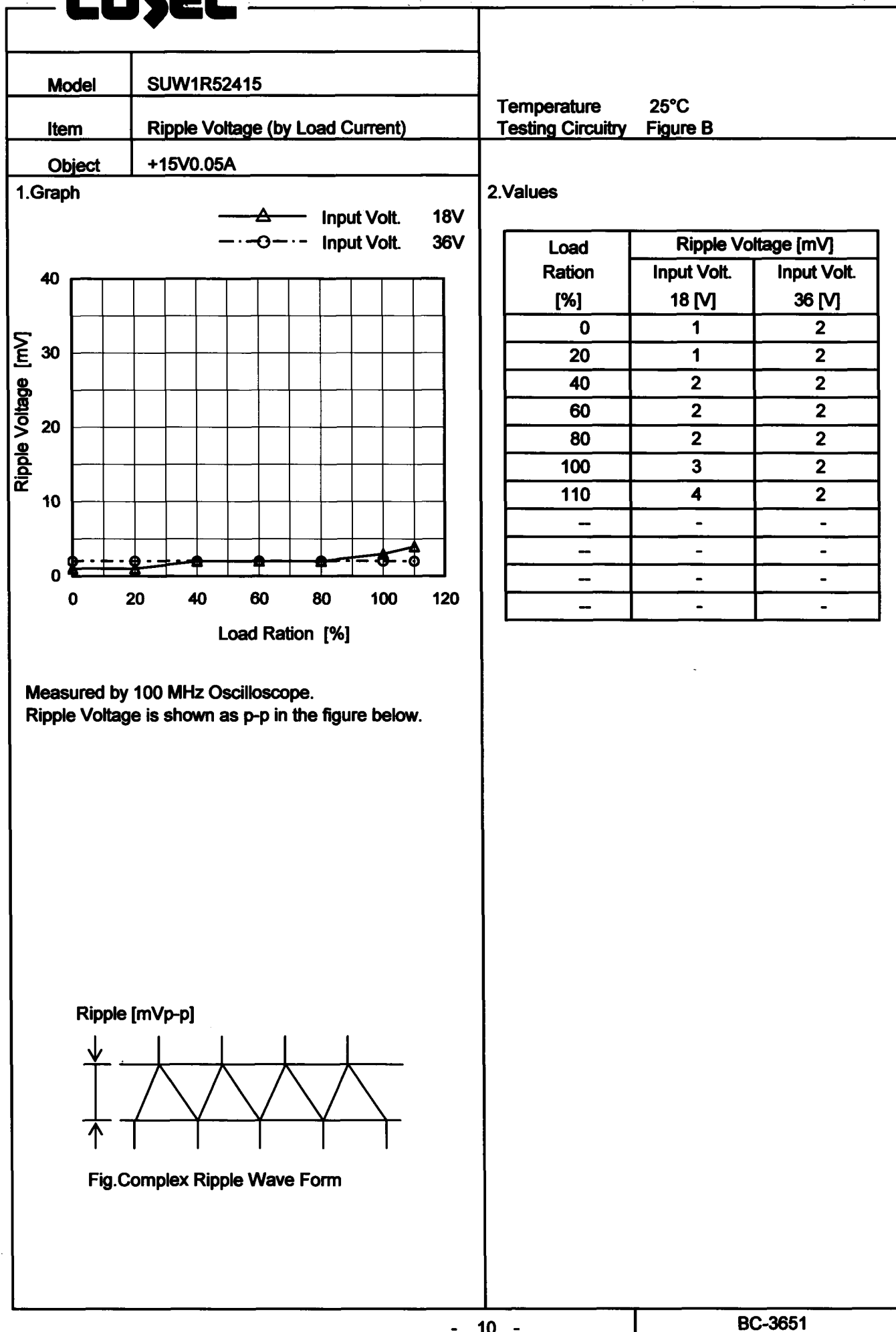
200mV/div



2ms/div



2ms/div

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Model

SUW1R52415

Item

Ripple Voltage (by Load Current)

Object

-15V0.05A

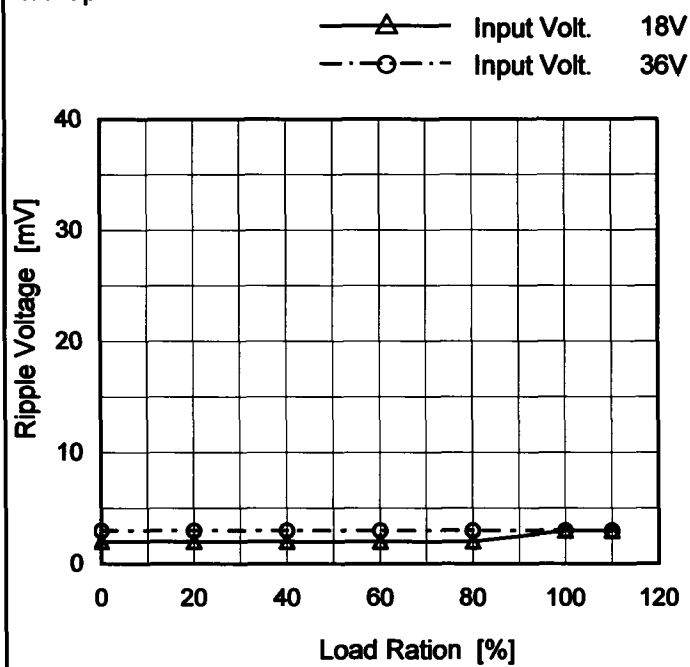
Temperature

25°C

Testing Circuitry

Figure B

## 1. Graph



Measured by 100 MHz Oscilloscope.

Ripple Voltage is shown as p-p in the figure below.

Ripple [mVp-p]

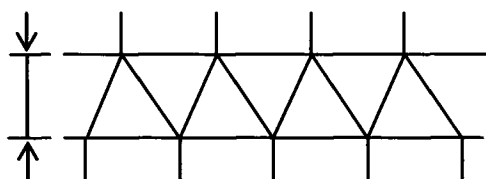


Fig. Complex Ripple Wave Form

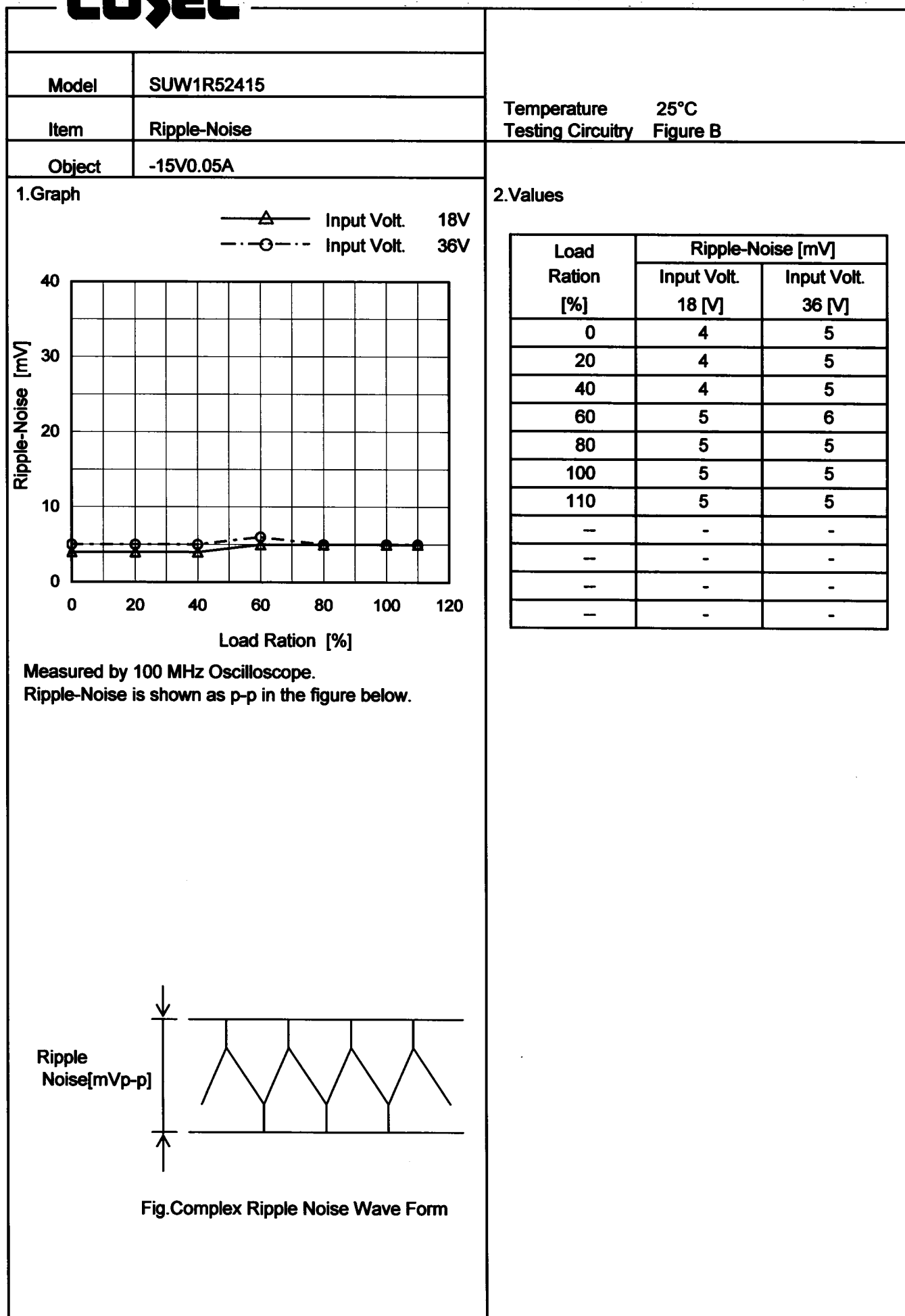
## 2. Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	2	3
20	2	3
40	2	3
60	2	3
80	2	3
100	3	3
110	3	3
-	-	-
-	-	-
-	-	-
-	-	-

# COSEL

Model		SUW1R52415	
Item		Ripple-Noise	
Object		+15V0.05A	
1.Graph		2.Values	

<

**COSEL**

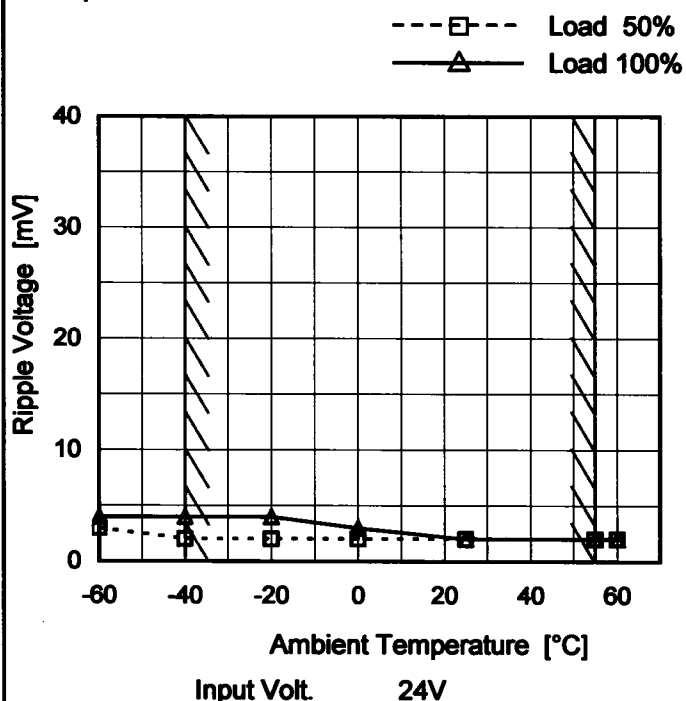
# COSEL

**Model** SUW1R52415

**Item** Ripple Voltage (by Ambient Temp.)

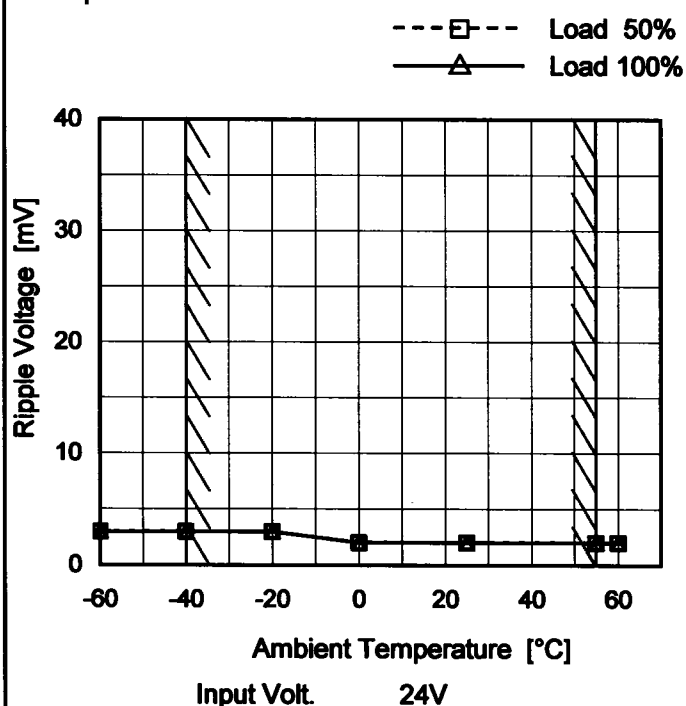
**Object** +15V0.05A

**Testing Circuitry** Figure B

**1.Graph**

**2.Values**

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	4
-40	2	4
-20	2	4
0	2	3
25	2	2
55	2	2
60	2	2
—	—	—
—	—	—
—	—	—
—	—	—

**Object** -15V0.05A

**1.Graph**

**2.Values**

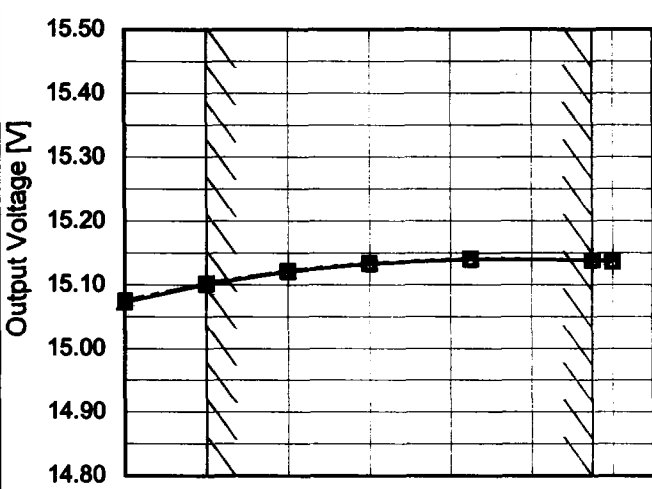
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	3
-40	3	3
-20	3	3
0	2	2
25	2	2
55	2	2
60	2	2
—	—	—
—	—	—
—	—	—
—	—	—

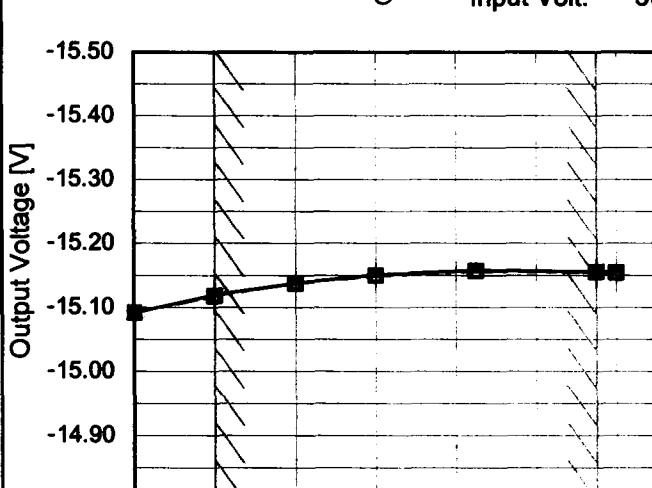
Measured by 100 MHz Oscilloscope.

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



# COSEL

Model		SUW1R52415																																																				
Item		Ambient Temperature Drift																																																				
Object		+15V0.05A																																																				
1.Graph		<div><div><div></div><div></div><div></div></div><div>Input Volt. 18V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div>  <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div> <div>Load 100%</div>																																																				
2.Values		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-60</td><td>15.073</td><td>15.075</td><td>15.075</td></tr><tr><td>-40</td><td>15.101</td><td>15.102</td><td>15.102</td></tr><tr><td>-20</td><td>15.121</td><td>15.122</td><td>15.122</td></tr><tr><td>0</td><td>15.133</td><td>15.134</td><td>15.133</td></tr><tr><td>25</td><td>15.140</td><td>15.141</td><td>15.140</td></tr><tr><td>55</td><td>15.139</td><td>15.138</td><td>15.138</td></tr><tr><td>60</td><td>15.137</td><td>15.136</td><td>15.136</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	-60	15.073	15.075	15.075	-40	15.101	15.102	15.102	-20	15.121	15.122	15.122	0	15.133	15.134	15.133	25	15.140	15.141	15.140	55	15.139	15.138	15.138	60	15.137	15.136	15.136	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
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Object		-15V0.05A																																																				
1.Graph		<div><div><div></div><div></div><div></div></div><div>Input Volt. 18V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div>  <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div> <div>Load 100%</div>																																																				
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Ambient Temperature [°C]	Output Voltage [V]																																																					
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25	-15.158	-15.157	-15.156																																																			
55	-15.156	-15.155	-15.154																																																			
60	-15.154	-15.154	-15.153																																																			
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Note: Slanted line shows the range of the rated ambient temperature.

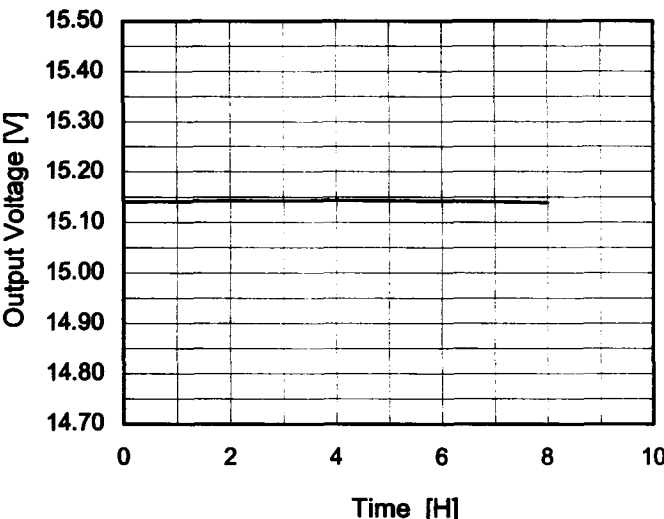
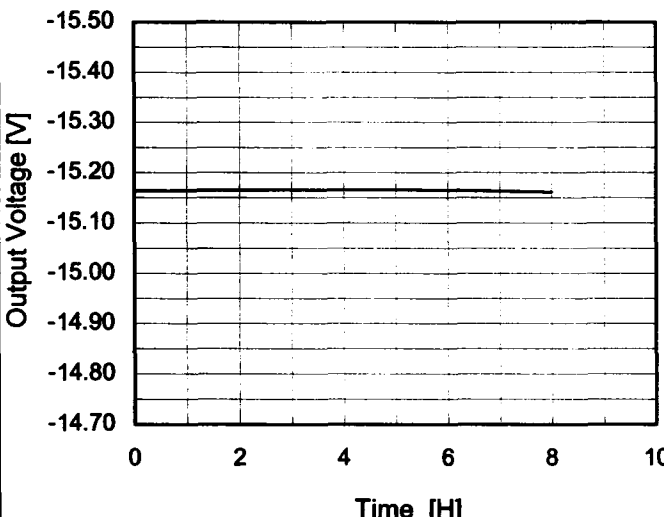
**COSEL**

Model	SUW1R52415					
Item	Output Voltage Accuracy		Testing Circuitry    Figure A			
1.Output Voltage Accuracy						
This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.						
Temperature            : -40 - 55°C						
Input Voltage        : 18 - 36V						
Load Current (AVR 1) : 0 - 0.05A    (AVR 2):0 - 0.05A						
* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2						
* Output Voltage Accuracy (Ration) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$						
2.Values						
Object		+15V0.05A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	24	0	15.456	±178	±1.2
Minimum Voltage	-40	18	0.05	15.101		
Object		-15V0.05A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	24	0	-15.480	±181	±1.2
Minimum Voltage	-40	36	0.05	-15.118		

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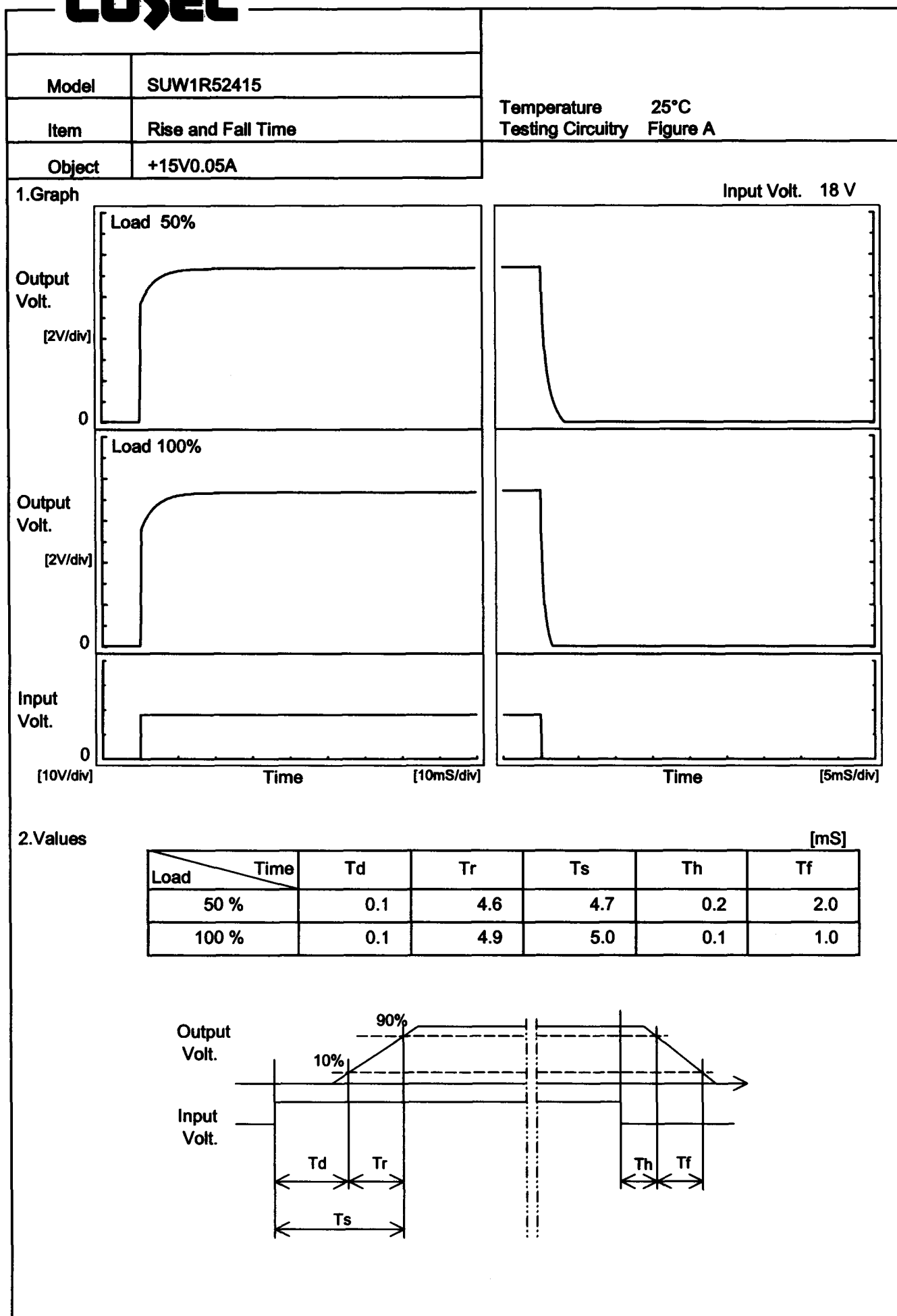
BC-3651

# COSEL

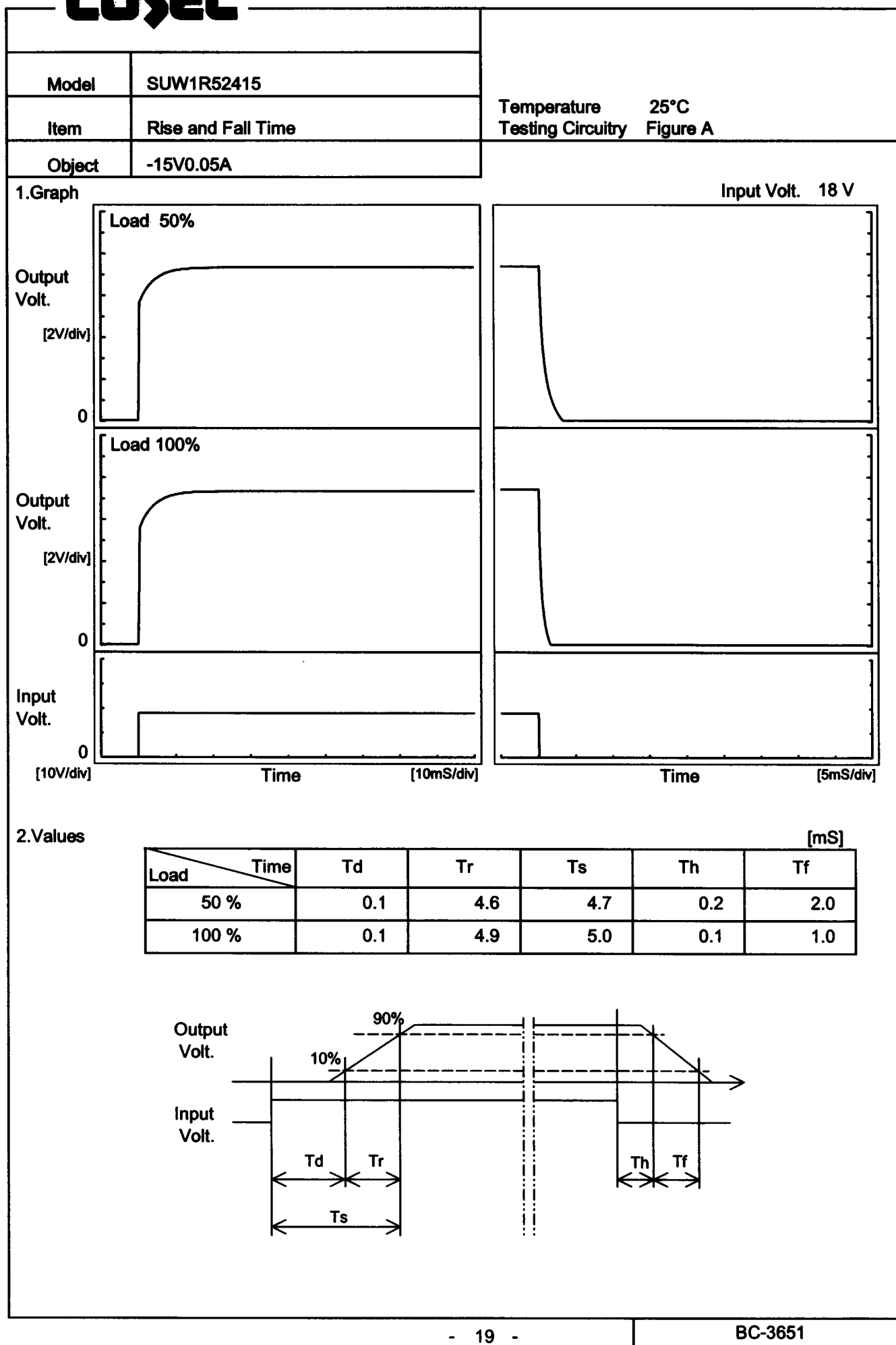
Model	SUW1R52415																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+15V0.05A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>15.141</td></tr><tr><td>0.5</td><td>15.142</td></tr><tr><td>1.0</td><td>15.142</td></tr><tr><td>2.0</td><td>15.143</td></tr><tr><td>3.0</td><td>15.143</td></tr><tr><td>4.0</td><td>15.144</td></tr><tr><td>5.0</td><td>15.143</td></tr><tr><td>6.0</td><td>15.142</td></tr><tr><td>7.0</td><td>15.141</td></tr><tr><td>8.0</td><td>15.140</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	15.141	0.5	15.142	1.0	15.142	2.0	15.143	3.0	15.143	4.0	15.144	5.0	15.143	6.0	15.142	7.0	15.141	8.0	15.140
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. 24V</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>-15.161</td></tr><tr><td>0.5</td><td>-15.164</td></tr><tr><td>1.0</td><td>-15.165</td></tr><tr><td>2.0</td><td>-15.165</td></tr><tr><td>3.0</td><td>-15.166</td></tr><tr><td>4.0</td><td>-15.166</td></tr><tr><td>5.0</td><td>-15.166</td></tr><tr><td>6.0</td><td>-15.165</td></tr><tr><td>7.0</td><td>-15.164</td></tr><tr><td>8.0</td><td>-15.162</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	-15.161	0.5	-15.164	1.0	-15.165	2.0	-15.165	3.0	-15.166	4.0	-15.166	5.0	-15.166	6.0	-15.165	7.0	-15.164	8.0	-15.162
Time since start [H]	Output Voltage [V]																								
0.0	-15.161																								
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1.0	-15.165																								
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5.0	-15.166																								
6.0	-15.165																								
7.0	-15.164																								
8.0	-15.162																								

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**COSEL**

# COSEL



# COSEL

Model		SUW1R52415																																							
Item		Minimum Input Voltage for Regulated Output Voltage																																							
Object		+15V0.05A																																							
1.Graph																																									
<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% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-60</td><td>9.3</td><td>9.7</td></tr><tr><td>-40</td><td>9.0</td><td>9.8</td></tr><tr><td>-20</td><td>8.8</td><td>9.9</td></tr><tr><td>0</td><td>8.6</td><td>10.1</td></tr><tr><td>25</td><td>8.3</td><td>10.3</td></tr><tr><td>55</td><td>8.1</td><td>10.7</td></tr><tr><td>60</td><td>8.1</td><td>10.9</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>				Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]	-60	9.3	9.7	-40	9.0	9.8	-20	8.8	9.9	0	8.6	10.1	25	8.3	10.3	55	8.1	10.7	60	8.1	10.9	--	-	-	--	-	-	--	-	-	--	-	-		
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Ambient Temperature [°C]	Input Voltage [V]																																								
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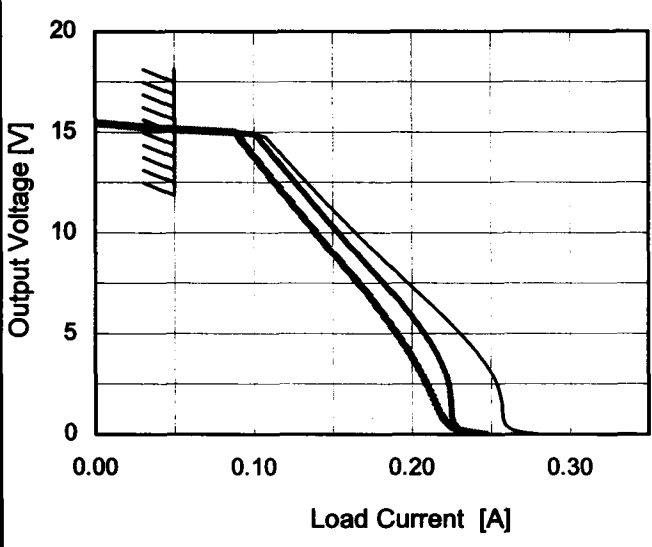
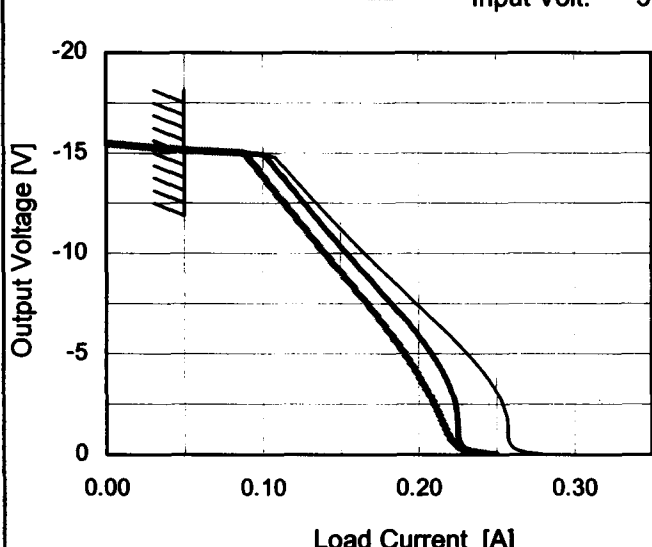
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Note: Slanted line shows the range of the rated ambient temperature.

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# COSEL

Model	SUW1R52415																																																									
Item	Overcurrent Protection		Temperature 25°C																																																							
Object	+15V0.05A		Testing Circuitry Figure A																																																							
1.Graph		<div><div></div>Input Volt. 18V</div> <div><div></div>Input Volt. 24V</div> <div><div></div>Input Volt. 36V</div>	2.Values																																																							
		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>15.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr><tr><td>14.3</td><td>0.11</td><td>0.11</td><td>0.10</td></tr><tr><td>13.5</td><td>0.12</td><td>0.12</td><td>0.10</td></tr><tr><td>12.0</td><td>0.14</td><td>0.13</td><td>0.12</td></tr><tr><td>10.5</td><td>0.16</td><td>0.15</td><td>0.13</td></tr><tr><td>9.0</td><td>0.18</td><td>0.17</td><td>0.15</td></tr><tr><td>7.5</td><td>0.20</td><td>0.18</td><td>0.17</td></tr><tr><td>6.0</td><td>0.22</td><td>0.20</td><td>0.18</td></tr><tr><td>4.5</td><td>0.24</td><td>0.21</td><td>0.20</td></tr><tr><td>3.0</td><td>0.25</td><td>0.22</td><td>0.21</td></tr><tr><td>1.5</td><td>0.26</td><td>0.22</td><td>0.22</td></tr><tr><td>0.0</td><td>0.28</td><td>0.24</td><td>0.25</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	15.0	0.05	0.05	0.05	14.3	0.11	0.11	0.10	13.5	0.12	0.12	0.10	12.0	0.14	0.13	0.12	10.5	0.16	0.15	0.13	9.0	0.18	0.17	0.15	7.5	0.20	0.18	0.17	6.0	0.22	0.20	0.18	4.5	0.24	0.21	0.20	3.0	0.25	0.22	0.21	1.5	0.26	0.22	0.22	0.0	0.28	0.24	0.25
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Note: Slanted line shows the range of the rated load current.																																																										

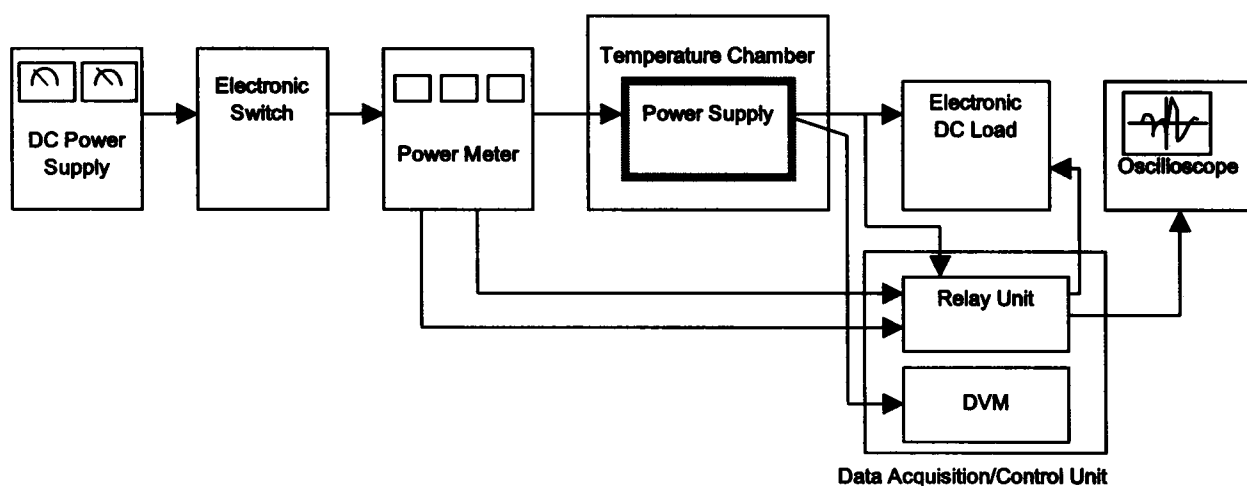


Figure A

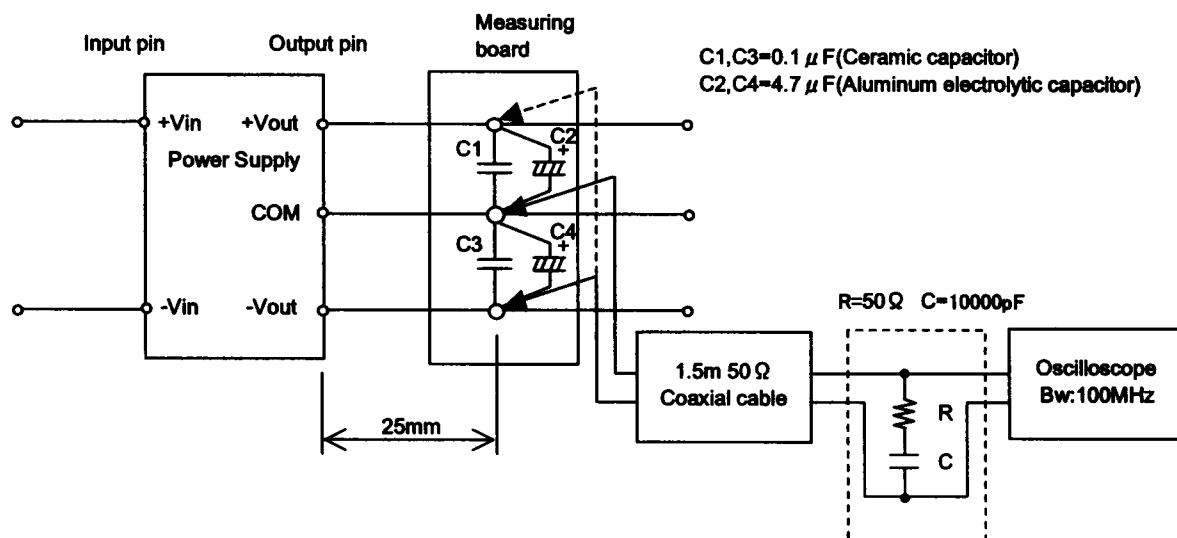


Figure B (Ripple and Ripple noise Characteristic)