



# TEST DATA OF CES48060-17

Regulated DC Power Supply  
Nov 27, 2006

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Tatsuya Mano Design Manager

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**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)



<b>COSEL</b>																																																																																		
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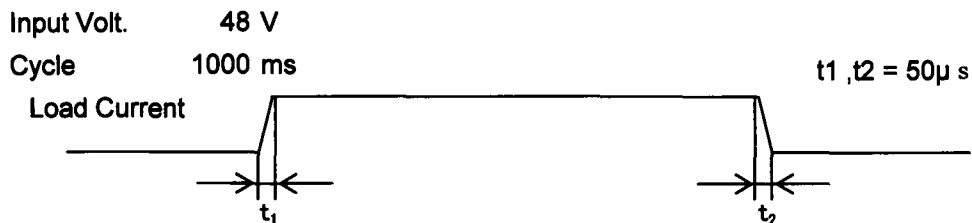




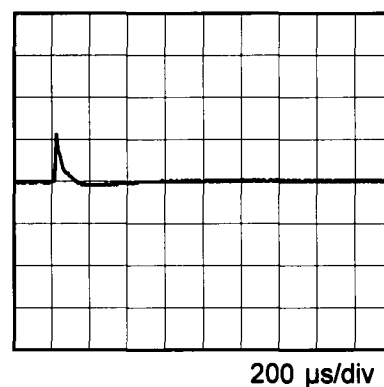
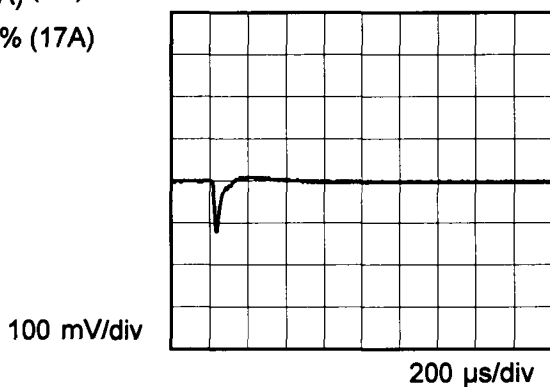
<p><b>Model</b> CES48060-17</p> <p><b>Item</b> Load Regulation</p> <p><b>Object</b> +6V17A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																			
<p>1. Graph</p> <p>—△— Input Volt. 36V</p> <p>---□--- Input Volt. 48V</p> <p>-·-○-·- Input Volt. 76V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<p>2. Values</p> <table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.0</td><td>6.003</td><td>6.004</td><td>6.004</td></tr> <tr><td>3.0</td><td>6.003</td><td>6.003</td><td>6.003</td></tr> <tr><td>6.0</td><td>6.002</td><td>6.002</td><td>6.002</td></tr> <tr><td>9.0</td><td>6.001</td><td>6.002</td><td>6.002</td></tr> <tr><td>12.0</td><td>6.001</td><td>6.001</td><td>6.001</td></tr> <tr><td>15.0</td><td>6.000</td><td>6.000</td><td>6.001</td></tr> <tr><td>17.0</td><td>6.000</td><td>6.000</td><td>6.000</td></tr> <tr><td>18.7</td><td>6.000</td><td>6.000</td><td>6.000</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> </tbody> </table>	Load Current [A]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	6.003	6.004	6.004	3.0	6.003	6.003	6.003	6.0	6.002	6.002	6.002	9.0	6.001	6.002	6.002	12.0	6.001	6.001	6.001	15.0	6.000	6.000	6.001	17.0	6.000	6.000	6.000	18.7	6.000	6.000	6.000	--	-	-	-	--	-	-	-	--	-	-	-
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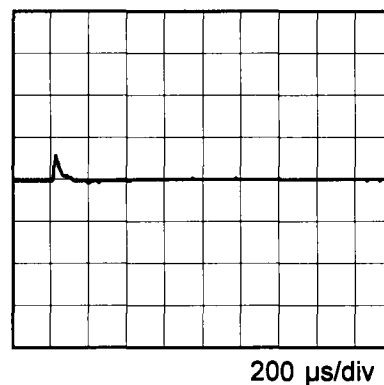
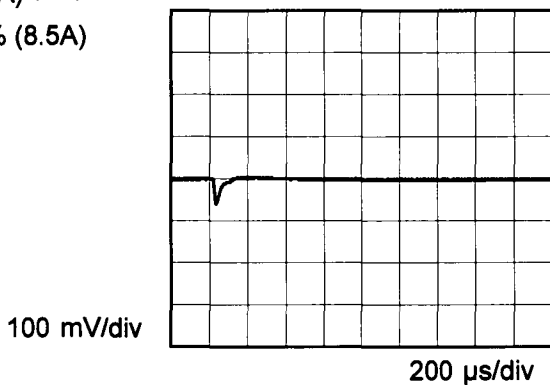
Model	CES48060-17	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+6V17A		



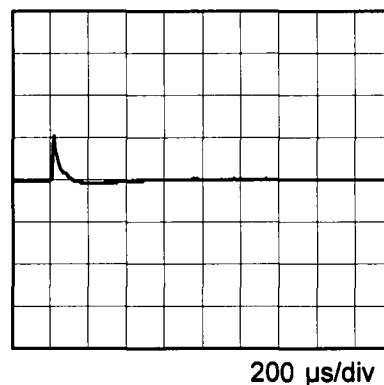
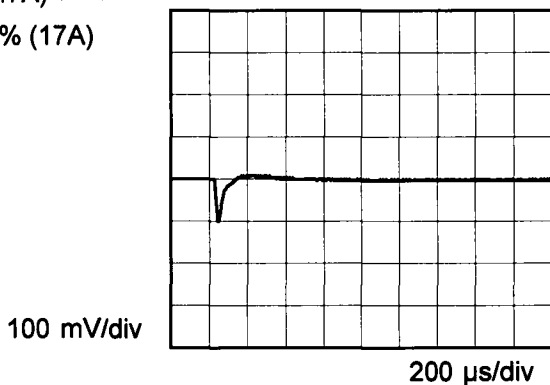
Min. Load (0A)  $\longleftrightarrow$   
 Load 100% (17A)



Min. Load (0A)  $\longleftrightarrow$   
 Load 50% (8.5A)



Load 10% (1.7A)  $\longleftrightarrow$   
 Load 100% (17A)





<p><b>Model</b> CES48060-17</p> <p><b>Item</b> Ripple Voltage (by Load Current)</p> <p><b>Object</b> +6V17A</p>		<p><b>Temperature</b> 25°C</p> <p><b>Testing Circuitry</b> Figure B</p>																																					
<p><b>1. Graph</b></p> <p>—△— Input Volt. 36V                  -·-○-·- Input Volt. 76V</p> <p><b>2. Values</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 36 [V]</th> <th>Input Volt. 76 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>5</td></tr> <tr><td>3.0</td><td>5</td><td>5</td></tr> <tr><td>6.0</td><td>5</td><td>5</td></tr> <tr><td>9.0</td><td>5</td><td>5</td></tr> <tr><td>12.0</td><td>5</td><td>5</td></tr> <tr><td>15.0</td><td>5</td><td>5</td></tr> <tr><td>17.0</td><td>5</td><td>5</td></tr> <tr><td>18.7</td><td>5</td><td>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> </tbody> </table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	5	5	3.0	5	5	6.0	5	5	9.0	5	5	12.0	5	5	15.0	5	5	17.0	5	5	18.7	5	5	--	-	-	--	-	-	--	-	-
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<p>Measured by 20 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>																																							
<p>Ripple [mVp-p]</p> <p><b>Fig. Complex Ripple Wave Form</b></p>																																							



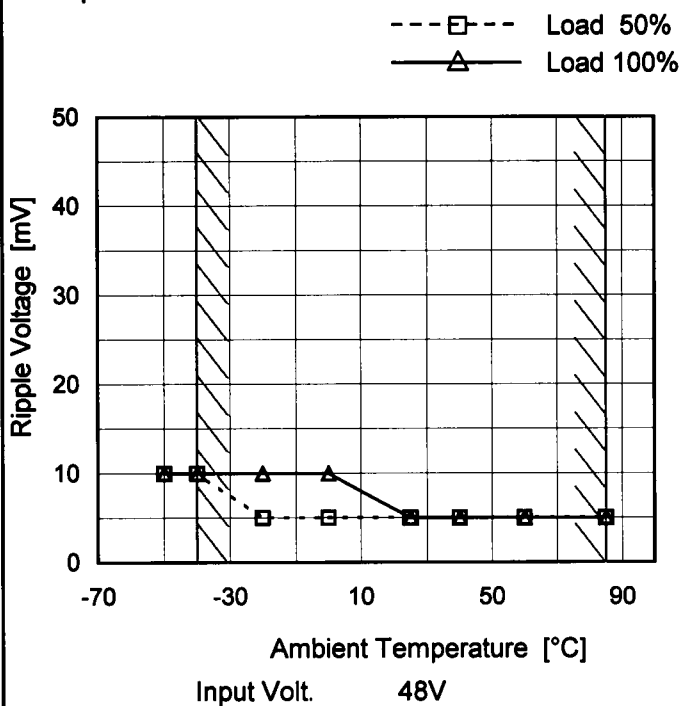
<b>COSEL</b>																																									
Model	CES48060-17	Temperature	25°C																																						
Item	Ripple-Noise	Testing Circuitry	Figure B																																						
Object	+6V17A																																								
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<p>Fig. Complex Ripple Noise Wave Form</p>																																									



Model	CES48060-17
Item	Ripple Voltage (by Ambient Temp.)
Object	+6V17A

Testing Circuitry Figure B

1. Graph



2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	10	10
-40	10	10
-20	5	10
0	5	10
25	5	5
40	5	5
60	5	5
85	5	5
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.

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



<b>Model</b>		CES48060-17																																																						
<b>Item</b>		Ambient Temperature Drift		Testing Circuitry Figure A																																																				
<b>Object</b>		+6V17A																																																						
<b>1.Graph</b>		—△— Input Volt. 36V ---□--- Input Volt. 48V ···○··· Input Volt. 76V		<b>2.Values</b>																																																				
<p style="text-align: center;">Ambient Temperature [°C] Load 100%</p>		<table border="1"> <thead> <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> </thead> <tbody> <tr><td>-50</td><td>6.000</td><td>6.000</td><td>6.001</td></tr> <tr><td>-40</td><td>6.001</td><td>6.001</td><td>6.001</td></tr> <tr><td>-20</td><td>6.002</td><td>6.002</td><td>6.002</td></tr> <tr><td>0</td><td>6.003</td><td>6.003</td><td>6.003</td></tr> <tr><td>25</td><td>6.002</td><td>6.002</td><td>6.001</td></tr> <tr><td>40</td><td>6.000</td><td>6.000</td><td>5.999</td></tr> <tr><td>60</td><td>5.997</td><td>5.996</td><td>5.996</td></tr> <tr><td>85</td><td>5.990</td><td>5.989</td><td>5.989</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> </tbody> </table>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	6.000	6.000	6.001	-40	6.001	6.001	6.001	-20	6.002	6.002	6.002	0	6.003	6.003	6.003	25	6.002	6.002	6.001	40	6.000	6.000	5.999	60	5.997	5.996	5.996	85	5.990	5.989	5.989	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																							
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-20	6.002	6.002	6.002																																																					
0	6.003	6.003	6.003																																																					
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40	6.000	6.000	5.999																																																					
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<b>COSEL</b>		
Model	CES48060-17	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+6V17A	

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 - 85°C

Input Voltage : 36 - 76V

Load Current : 0 - 17A

\* 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

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	36	0	6.006	±9	±0.2
Minimum Voltage	85	76	17	5.989		



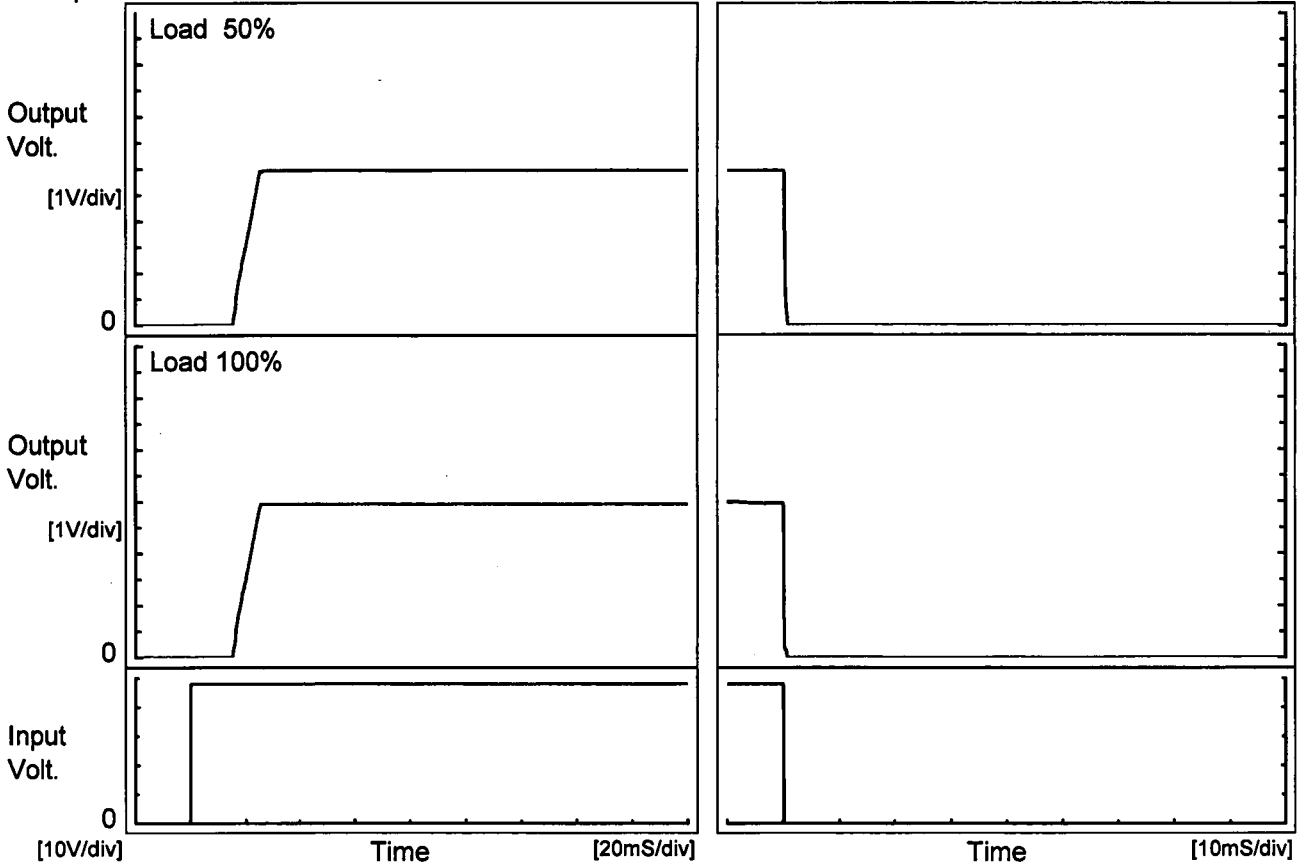
<b>COSEL</b>																								
Model	CES48060-17																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+6V17A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 48V Load 100%</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>6.001</td></tr> <tr><td>0.5</td><td>6.000</td></tr> <tr><td>1.0</td><td>6.000</td></tr> <tr><td>2.0</td><td>6.000</td></tr> <tr><td>3.0</td><td>6.000</td></tr> <tr><td>4.0</td><td>6.000</td></tr> <tr><td>5.0</td><td>6.000</td></tr> <tr><td>6.0</td><td>6.000</td></tr> <tr><td>7.0</td><td>6.000</td></tr> <tr><td>8.0</td><td>6.000</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	6.001	0.5	6.000	1.0	6.000	2.0	6.000	3.0	6.000	4.0	6.000	5.0	6.000	6.0	6.000	7.0	6.000	8.0	6.000
Time since start [H]	Output Voltage [V]																							
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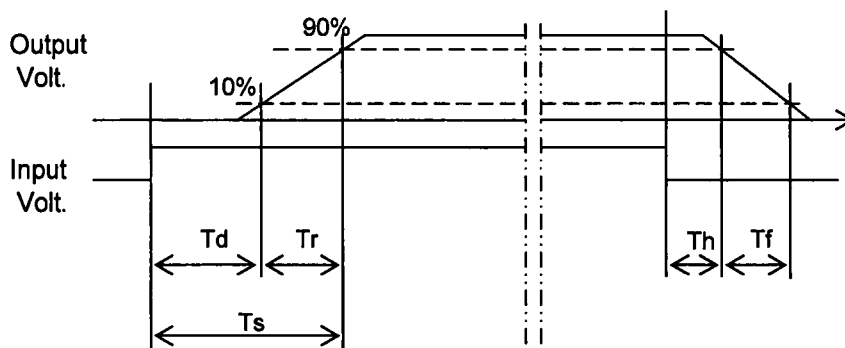
<b>Model</b> CES48060-17		Temperature 25°C Testing Circuitry Figure A
<b>Item</b>	Rise and Fall Time	
<b>Object</b>	+6V17A	

1. Graph



2. Values

		[mS]				
Load \ Time	Time	Td	Tr	Ts	Th	Tf
50 %		16.1	8.1	24.2	0.1	0.3
100 %		16.0	8.4	24.4	0.1	0.2





<b>COSEL</b>																																								
Model	CES48060-17																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+6V17A																																							
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<b>Model</b> CES48060-17		Temperature 25°C Testing Circuitry Figure A																																																											
<b>Item</b>	Overcurrent Protection																																																												
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<p>1. Graph</p> <p> <span style="display: inline-block; width: 20px; border-bottom: 1px solid black; margin-right: 5px;"></span> Input Volt. 36V  <span style="display: inline-block; width: 20px; border-bottom: 3px solid black; margin-right: 5px;"></span> Input Volt. 48V  <span style="display: inline-block; width: 20px; border-bottom: 5px solid black; margin-right: 5px;"></span> Input Volt. 76V                 </p> <p style="text-align: center;">Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 3.8V to 0V.</p>		<p>2. Values</p> <table border="1"> <thead> <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> </thead> <tbody> <tr><td>6.0</td><td>21.38</td><td>20.97</td><td>20.95</td></tr> <tr><td>5.7</td><td>21.44</td><td>20.91</td><td>20.94</td></tr> <tr><td>5.4</td><td>21.10</td><td>20.78</td><td>20.86</td></tr> <tr><td>4.8</td><td>20.65</td><td>20.62</td><td>20.83</td></tr> <tr><td>4.2</td><td>20.42</td><td>20.56</td><td>20.93</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> <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> </tbody> </table>	Output Voltage [V]	Load Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	6.0	21.38	20.97	20.95	5.7	21.44	20.91	20.94	5.4	21.10	20.78	20.86	4.8	20.65	20.62	20.83	4.2	20.42	20.56	20.93	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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<b>Model</b>		CES48060-17																																																						
<b>Item</b>		Overvoltage Protection		Testing Circuitry Figure A																																																				
<b>Object</b>		+6V17A																																																						
<b>1. Graph</b>		<p>—△— Input Volt. 36V                  ---□--- Input Volt. 48V                  -·-○-·- Input Volt. 76V</p>		<b>2. Values</b>																																																				
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>-50</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>-40</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>-20</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>0</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>25</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>40</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>60</td><td>7.17</td><td>7.17</td><td>7.17</td></tr> <tr><td>85</td><td>7.17</td><td>7.17</td><td>7.17</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> </tbody> </table>		Ambient Temperature [°C]	Operating Point [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	7.17	7.17	7.17	-40	7.17	7.17	7.17	-20	7.17	7.17	7.17	0	7.17	7.17	7.17	25	7.17	7.17	7.17	40	7.17	7.17	7.17	60	7.17	7.17	7.17	85	7.17	7.17	7.17	--	-	-	-	--	-	-	-	--	-	-	-		
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																								

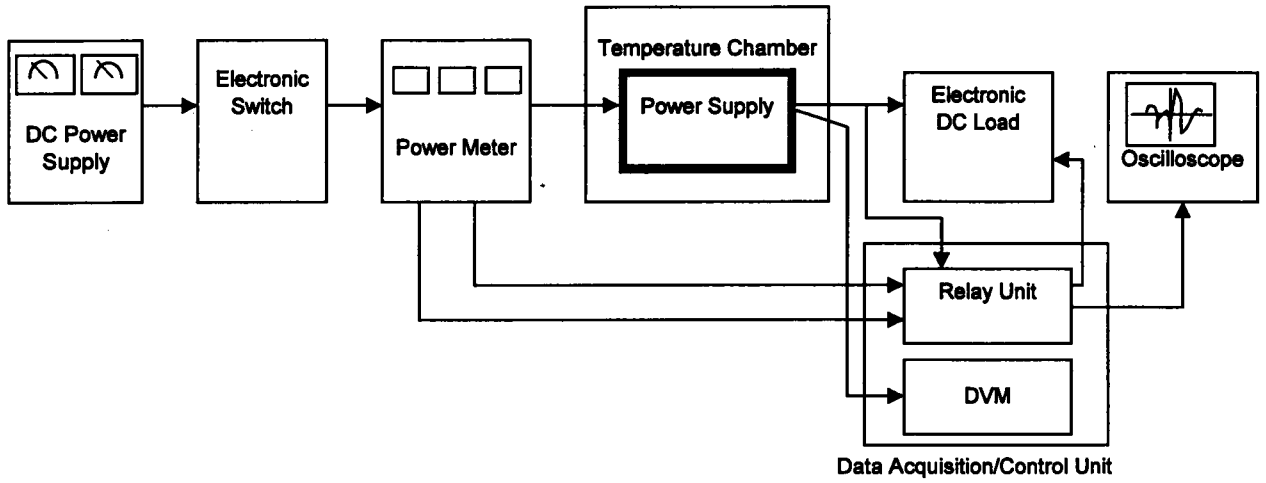


Figure A

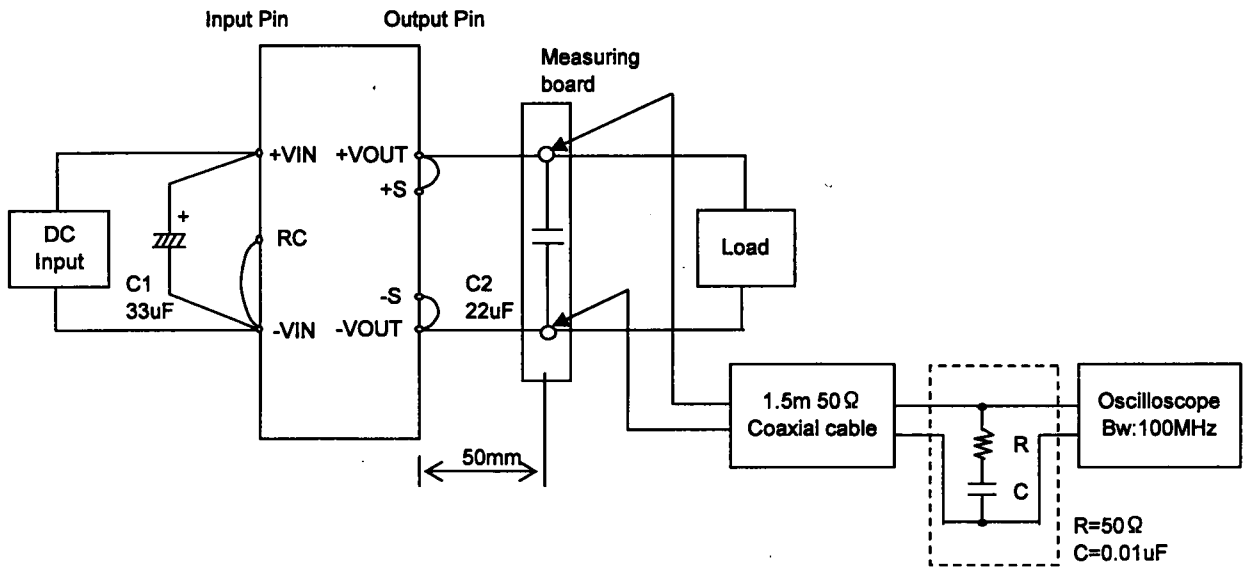


Figure B