



TEST DATA OF CQS24033-40

Regulated DC Power Supply
Oct 1, 2007

Approved by : Tatsuya Mano
Tatsuya Mano Design Manager

Prepared by : Masahiro Miyake
Masahiro Miyake 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)

COSEL

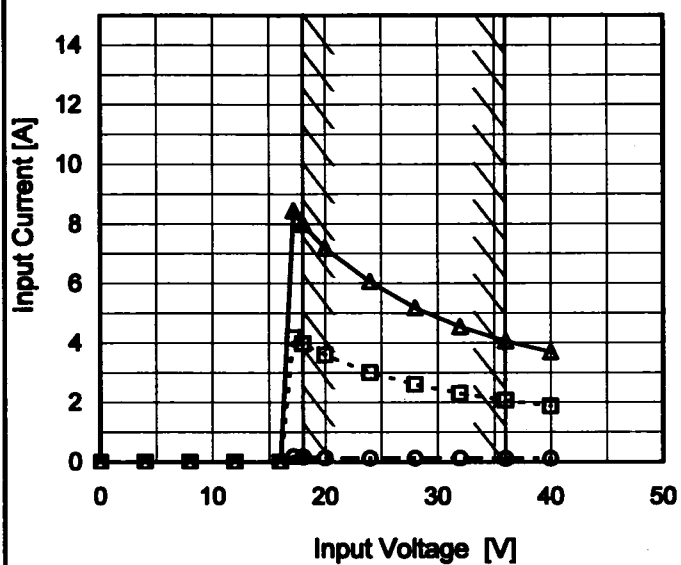
Model CQS24033-40

Item Input Current (by Input Voltage)

Object
Temperature 25°C
Testing Circuitry Figure A

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	0.000	0.000	0.000
4.0	0.000	0.000	0.000
8.0	0.000	0.000	0.000
12.0	0.000	0.000	0.000
16.0	0.000	0.000	0.000
17.2	0.182	4.184	8.450
18.0	0.167	3.976	8.000
20.0	0.145	3.598	7.190
24.0	0.132	3.011	6.066
28.0	0.131	2.610	5.180
32.0	0.128	2.302	4.546
36.0	0.123	2.066	4.060
40.0	0.121	1.880	3.691
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model

CQS24033-40

Item

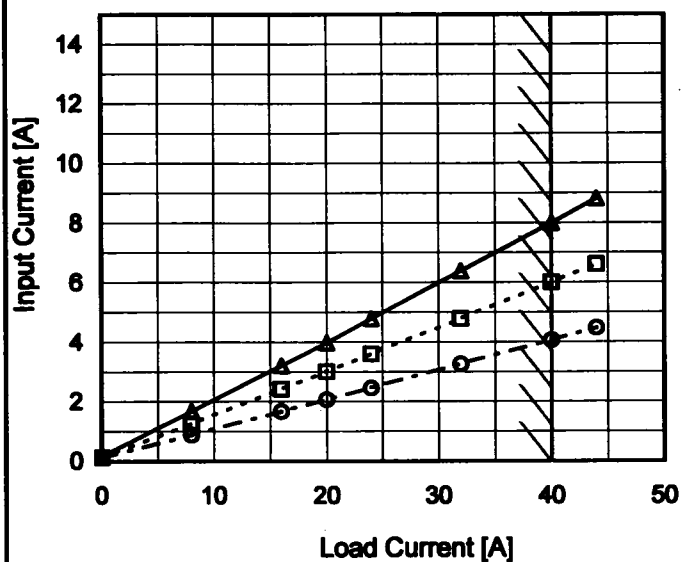
Input Current (by Load Current)

Object

Temperature
Testing Circuitry25°C
Figure A

1. Graph

—△— Input Volt. 18V
 ---□--- Input Volt. 24V
 ---○--- Input Volt. 36V



Note: Slanted line shows the range of the rated load current.

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.167	0.132	0.123
8	1.679	1.262	0.882
16	3.216	2.424	1.669
20	3.976	3.011	2.066
24	4.780	3.595	2.452
32	6.390	4.780	3.266
40	8.000	6.000	4.060
44	8.820	6.610	4.476
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model

CQS24033-40

Item

Efficiency (by Input Voltage)

Object

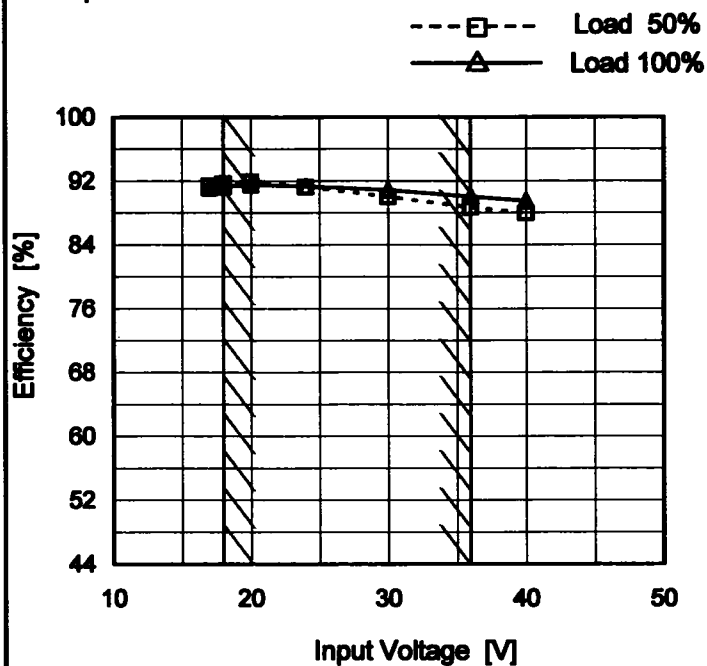
Temperature

25°C

Testing Circuitry

Figure A

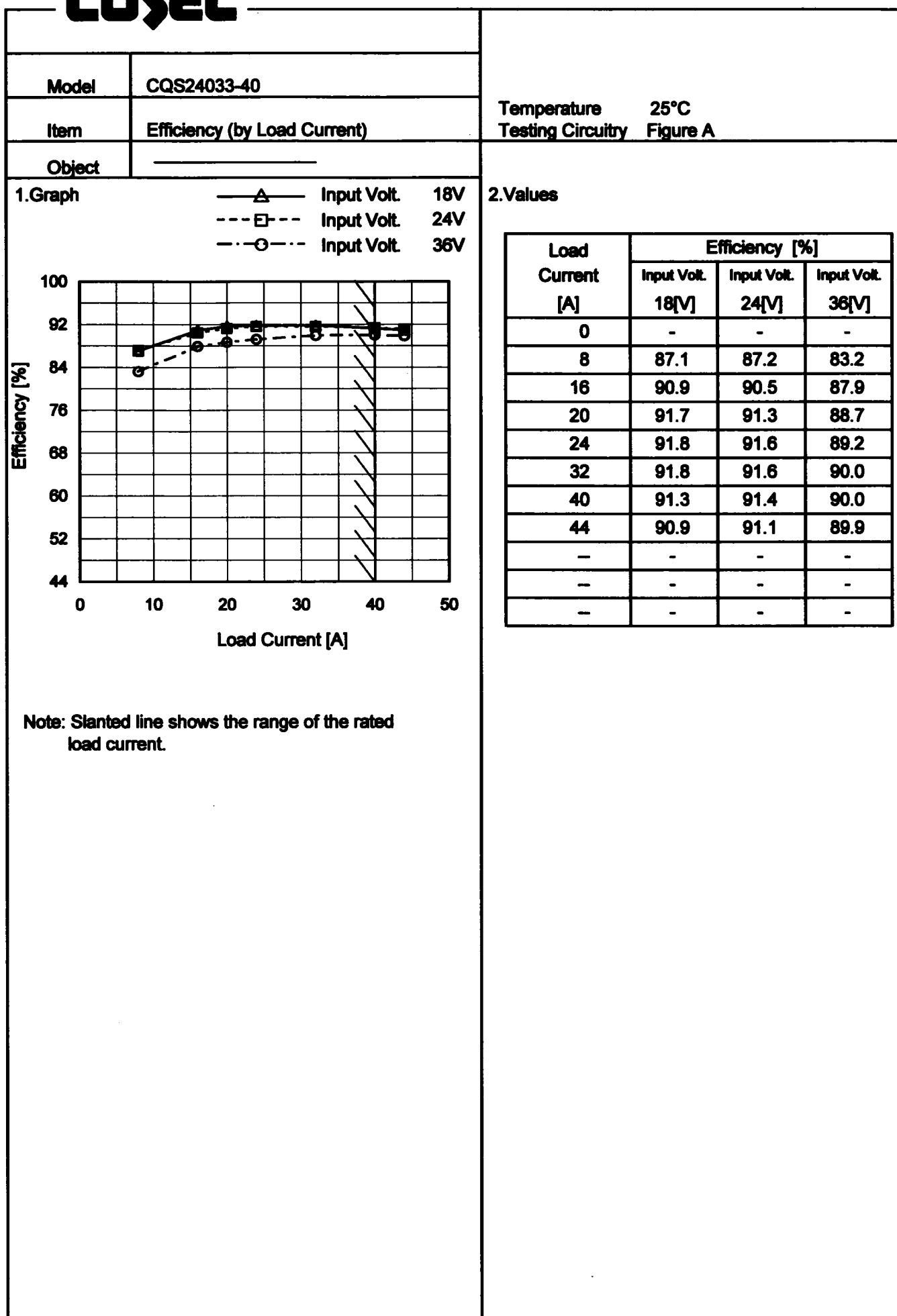
1. Graph



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

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
17	91.4	91.2
18	91.7	91.3
20	91.9	91.6
24	91.3	91.4
30	90.0	90.9
36	88.7	90.0
40	88.0	89.5
—	—	—
—	—	—

COSEL



Model	CQS24033-40																																		
Item	Line Regulation	Temperature	25°C																																
Object	+3.3V40A	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> <p>Output Voltage [V]</p> <p>Input Voltage [V]</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<table><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><tr><td>17</td><td>3.302</td><td>3.302</td></tr><tr><td>18</td><td>3.302</td><td>3.302</td></tr><tr><td>20</td><td>3.302</td><td>3.301</td></tr><tr><td>24</td><td>3.302</td><td>3.301</td></tr><tr><td>30</td><td>3.302</td><td>3.301</td></tr><tr><td>36</td><td>3.301</td><td>3.301</td></tr><tr><td>40</td><td>3.301</td><td>3.301</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	17	3.302	3.302	18	3.302	3.302	20	3.302	3.301	24	3.302	3.301	30	3.302	3.301	36	3.301	3.301	40	3.301	3.301	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
17	3.302	3.302																																	
18	3.302	3.302																																	
20	3.302	3.301																																	
24	3.302	3.301																																	
30	3.302	3.301																																	
36	3.301	3.301																																	
40	3.301	3.301																																	
--	-	-																																	
--	-	-																																	

<div> <div>Model</div> <div>CQS24033-40</div> </div>		<div> <div>Temperature</div> <div>25°C</div> </div> <div> <div>Testing Circuitry</div> <div>Figure A</div> </div>
<div> <div>Item</div> <div>Load Regulation</div> </div>		
<div> <div>Object</div> <div>+3.3V40A</div> </div>		

1.Graph

—△—

Input Volt.

18V

---□---

Input Volt.

24V

---○---

Input Volt.

36V

Note: Slanted line shows the range of the rated load current.

2.Values

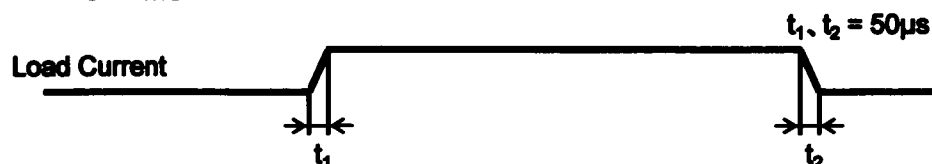
Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	3.301	3.301	3.301
8	3.302	3.301	3.301
16	3.302	3.302	3.301
20	3.302	3.302	3.301
24	3.302	3.302	3.301
32	3.302	3.302	3.301
40	3.302	3.301	3.301
44	3.301	3.301	3.301
--	-	-	-
--	-	-	-
--	-	-	-

BC-10128

COSEL

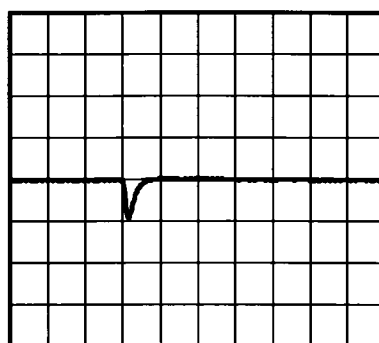
Model	CQS24033-40	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+3.3V40A		

Input Volt. 24 V
Cycle 5 mS

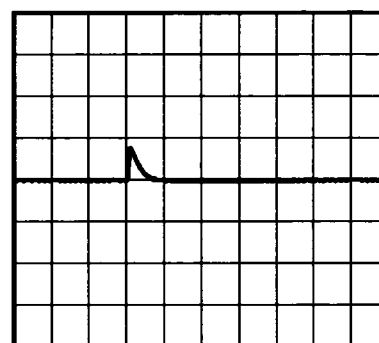


Min. Load (0A) \longleftrightarrow
Load 100% (40A)

100mV/div



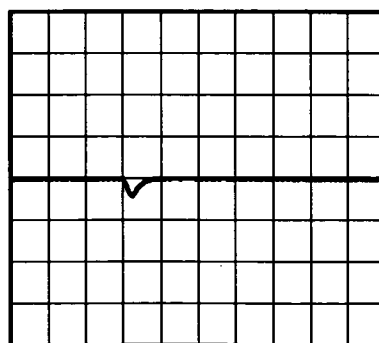
200µs/div



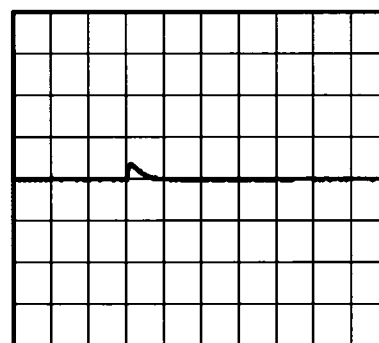
200µs/div

Min. Load (0A) \longleftrightarrow
Load 50% (20A)

100mV/div



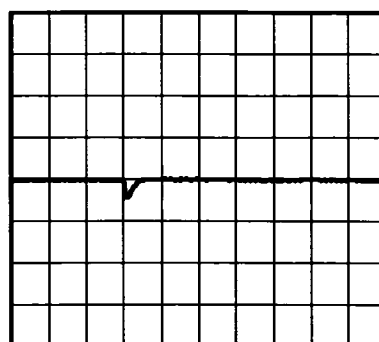
200µs/div



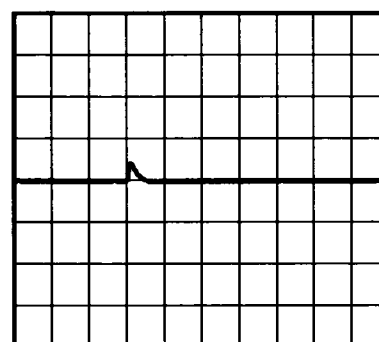
200µs/div

Load 50% (20A) \longleftrightarrow
Load 100% (40A)

100mV/div

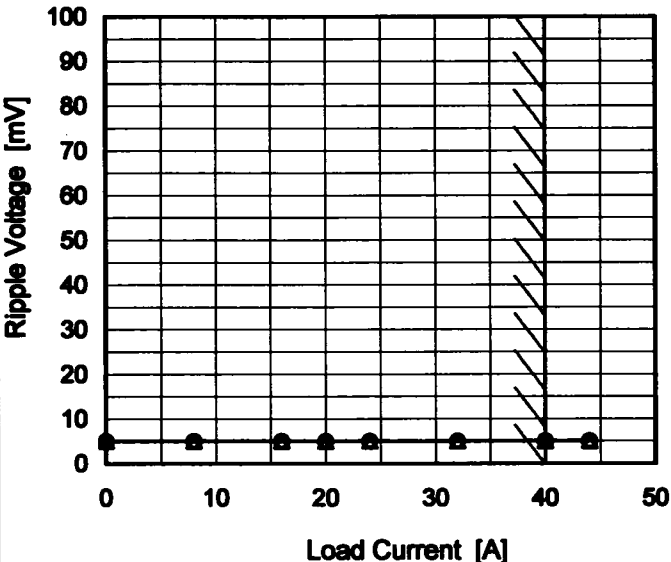
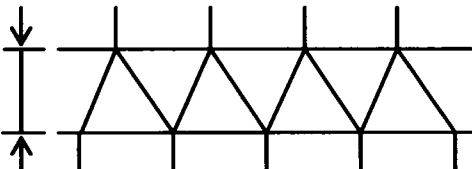


200µs/div



200µs/div

COSEL

Model		CQS24033-40		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																							
Object		+3.3V40A																																									
1.Graph				2.Values																																							
<div><div><div>—△— Input Volt. 18V</div><div>- - -○- - - Input Volt. 36V</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. 36 [V]</th></tr><tr><td>0</td><td>5</td><td>5</td></tr><tr><td>8</td><td>5</td><td>5</td></tr><tr><td>16</td><td>5</td><td>5</td></tr><tr><td>20</td><td>5</td><td>5</td></tr><tr><td>24</td><td>5</td><td>5</td></tr><tr><td>32</td><td>5</td><td>5</td></tr><tr><td>40</td><td>5</td><td>5</td></tr><tr><td>44</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0	5	5	8	5	5	16	5	5	20	5	5	24	5	5	32	5	5	40	5	5	44	5	5	—	-	-	—	-	-	—	-	-
Load Current [A]	Ripple Voltage [mV]																																										
	Input Volt. 18 [V]	Input Volt. 36 [V]																																									
0	5	5																																									
8	5	5																																									
16	5	5																																									
20	5	5																																									
24	5	5																																									
32	5	5																																									
40	5	5																																									
44	5	5																																									
—	-	-																																									
—	-	-																																									
—	-	-																																									
<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>Ripple [mVp-p]</div></div> <div>Fig.Complex Ripple Wave Form</div>																																											

COSEL

Model		CQS24033-40		Temperature 25°C	
Item		Ripple-Noise		Testing Circuitry Figure B	
Object		+3.3V40A			
1.Graph					
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></</div></div>					

COSEL

		Testing Circuitry Figure A
Model	CQS24033-40	
Item	Output Voltage Accuracy	
Object	+3.3V40A	

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 : 18 - 36V

Load Current : 0 - 40A

* 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	0	18	0	3.302	±4	±0.1
Minimum Voltage	85	36	40	3.295		

COSEL

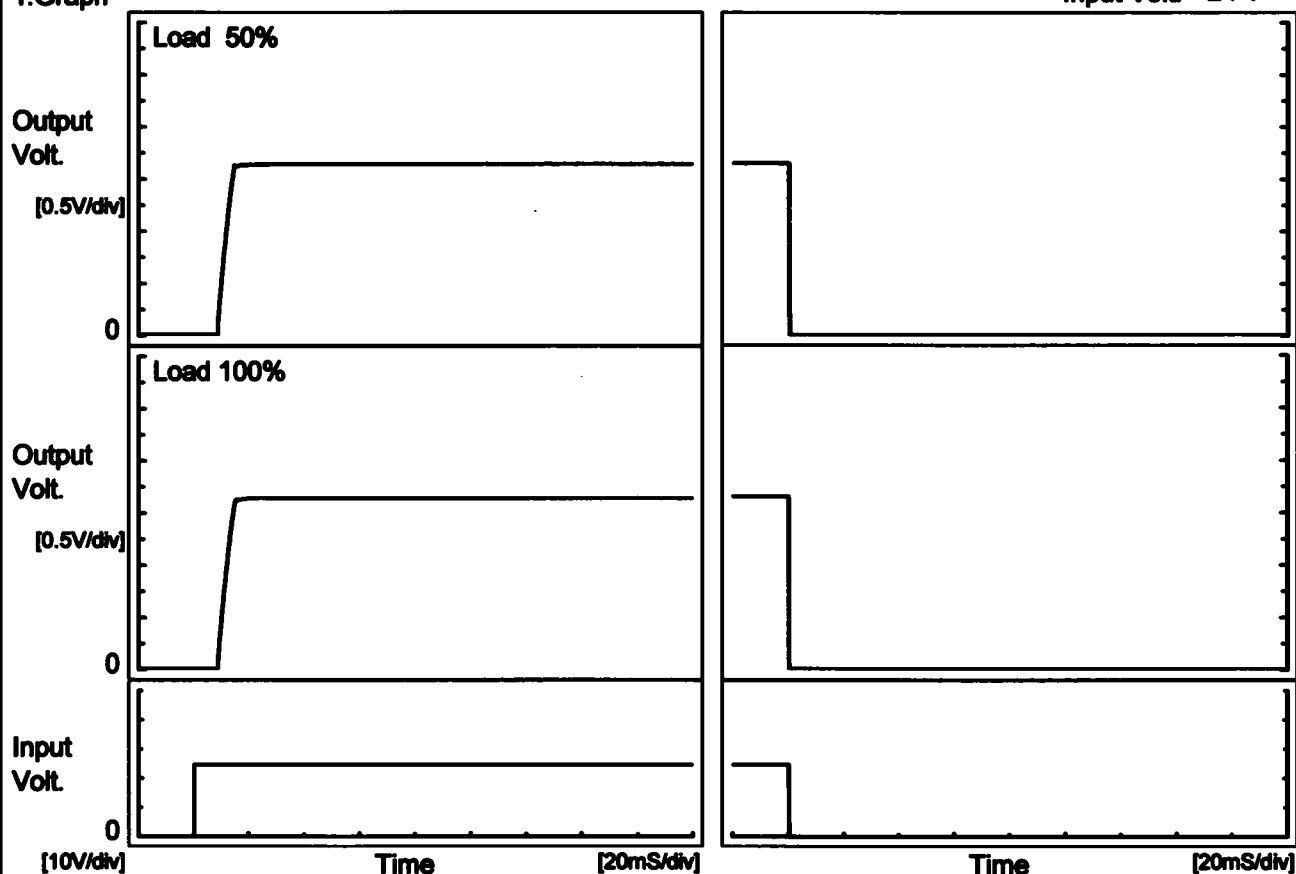
Model	CQS24033-40	Temperature 25°C Testing Circuitry Figure A																							
Item	Time Lapse Drift																								
Object	+3.3V40A																								
1.Graph		2.Values																							
<div><div><div>3.36</div><div>3.34</div><div>3.32</div><div>3.30</div><div>3.28</div><div>3.26</div><div>3.24</div><div>3.22</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Output Voltage [V]</div><div>Time [H]</div></div><div><div>Input Volt. 24V</div><div>Load 100%</div></div></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>3.302</td></tr><tr><td>0.5</td><td>3.301</td></tr><tr><td>1.0</td><td>3.301</td></tr><tr><td>2.0</td><td>3.301</td></tr><tr><td>3.0</td><td>3.301</td></tr><tr><td>4.0</td><td>3.301</td></tr><tr><td>5.0</td><td>3.301</td></tr><tr><td>6.0</td><td>3.301</td></tr><tr><td>7.0</td><td>3.301</td></tr><tr><td>8.0</td><td>3.301</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	3.302	0.5	3.301	1.0	3.301	2.0	3.301	3.0	3.301	4.0	3.301	5.0	3.301	6.0	3.301	7.0	3.301	8.0	3.301
Time since start [H]	Output Voltage [V]																								
0.0	3.302																								
0.5	3.301																								
1.0	3.301																								
2.0	3.301																								
3.0	3.301																								
4.0	3.301																								
5.0	3.301																								
6.0	3.301																								
7.0	3.301																								
8.0	3.301																								

COSEL

Model	CQS24033-40	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V40A		

1.Graph

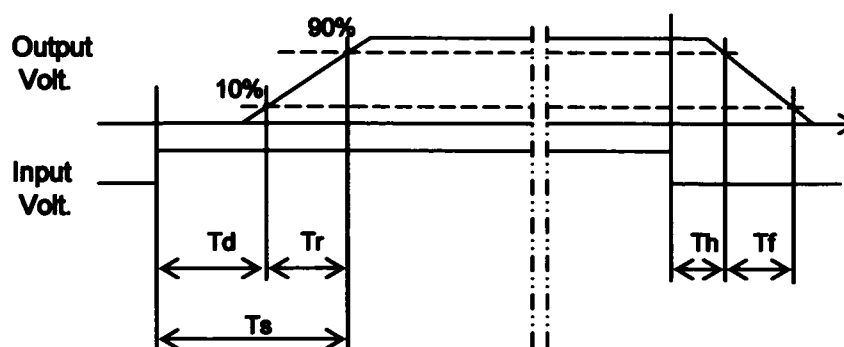
Input Volt. 24 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	9.1	5.2	14.3	0.2	0.1
100 %	9.2	5.4	14.6	0.2	0.1



COSEL

Model

CQS24033-40

Item

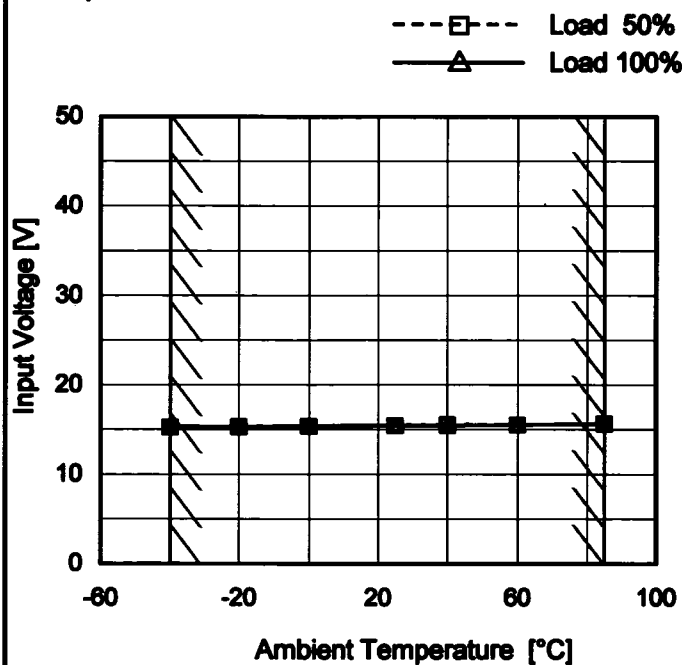
Minimum Input Voltage
for Regulated Output Voltage

Object

+3.3V40A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	15.3	15.4
-20	15.4	15.4
0	15.4	15.5
25	15.5	15.5
40	15.6	15.5
60	15.6	15.6
85	15.7	15.7
—	—	—
—	—	—
—	—	—
—	—	—

[illegible]

COSEL

Model CQS24033-40

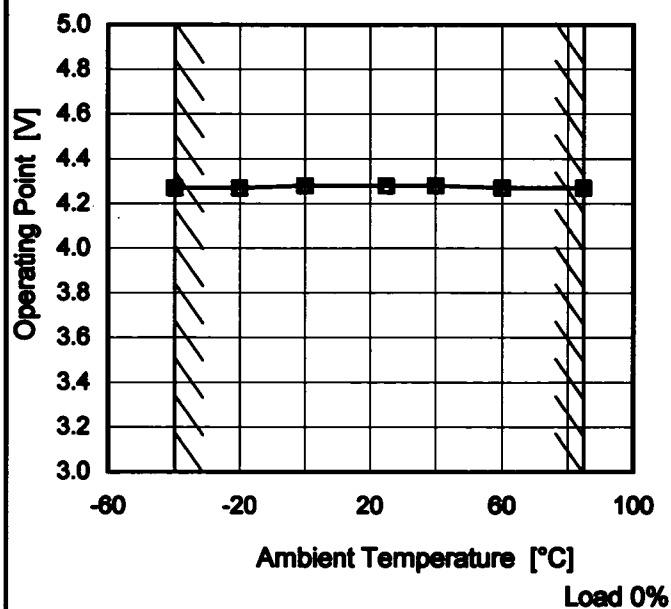
Item Overvoltage Protection

Object +3.3V40A

Testing Circuitry Figure A

1. Graph

—△— Input Volt. 20V
 ---□--- Input Volt. 24V
 ---○--- Input Volt. 36V



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

2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]
-40	4.27	4.27	4.27
-20	4.27	4.27	4.27
0	4.28	4.28	4.28
25	4.28	4.28	4.28
40	4.28	4.28	4.28
60	4.27	4.27	4.27
85	4.27	4.27	4.27
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

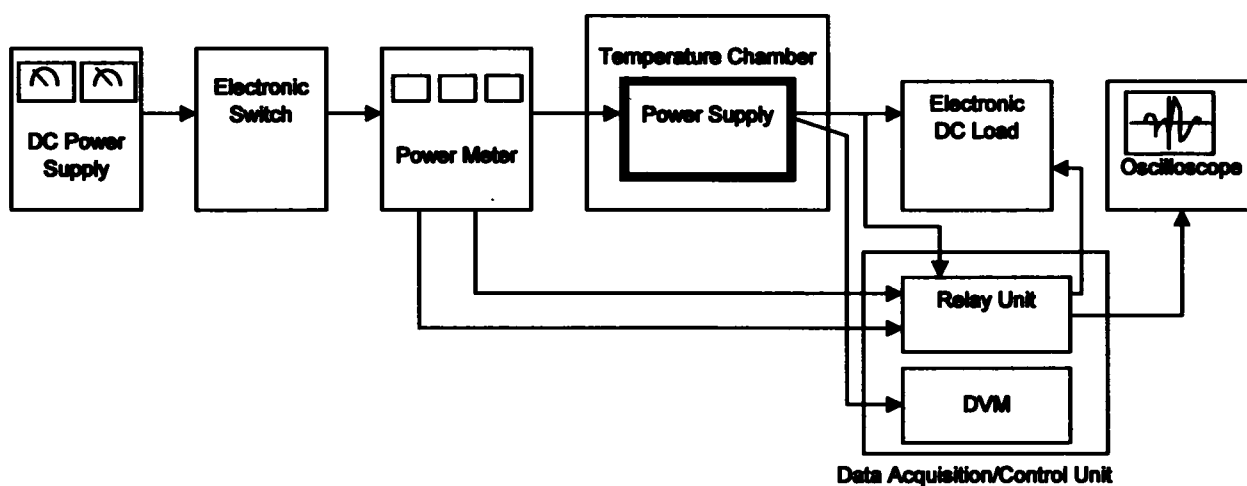


Figure A

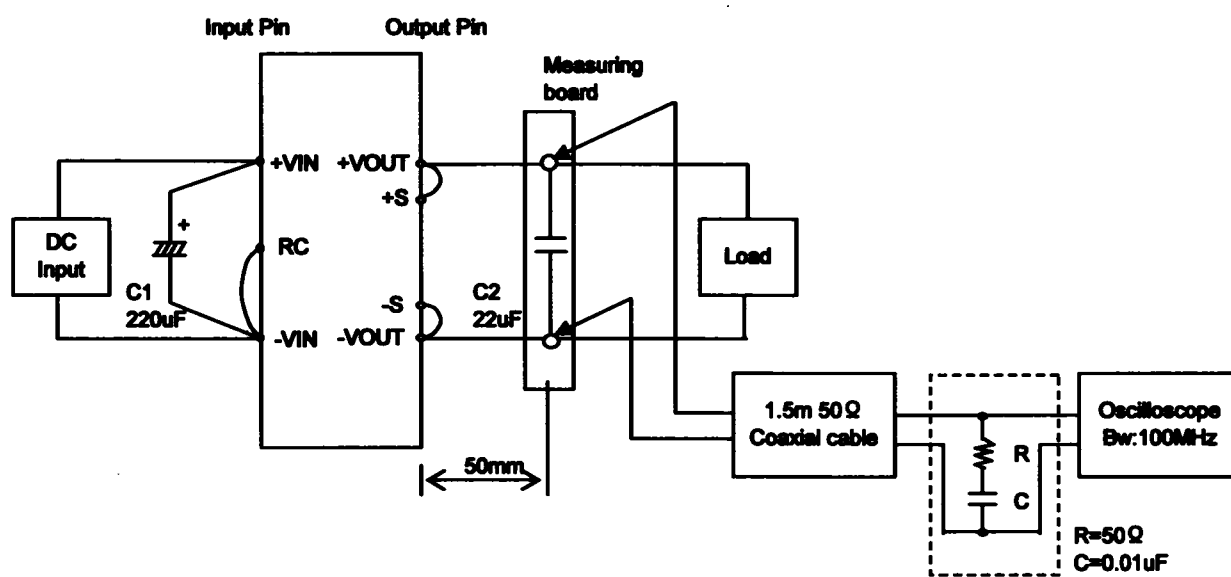


Figure B