COSEL

参考資料

TEST DATA OF SUW1R52412

Regulated DC Power Supply
Sep 27, 2004

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Prepared by : Masahiro Shima
Masahiro Shima Design Engineer

COSEL CO.,LTD.

参考資料

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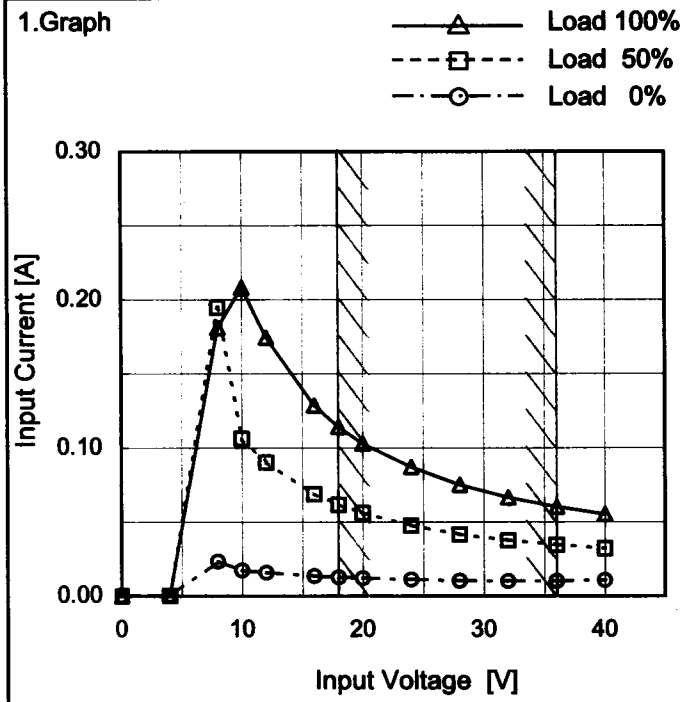
COSEL

Model	SUW1R52412
Item	Input Current (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]	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	0.023	0.195	0.181
10.0	0.017	0.106	0.208
12.0	0.016	0.090	0.175
16.0	0.013	0.069	0.129
18.0	0.013	0.062	0.114
20.0	0.012	0.056	0.103
24.0	0.011	0.048	0.087
28.0	0.010	0.042	0.075
32.0	0.010	0.038	0.067
36.0	0.010	0.034	0.060
40.0	0.011	0.032	0.055
–	-	-	-
–	-	-	-
–	-	-	-

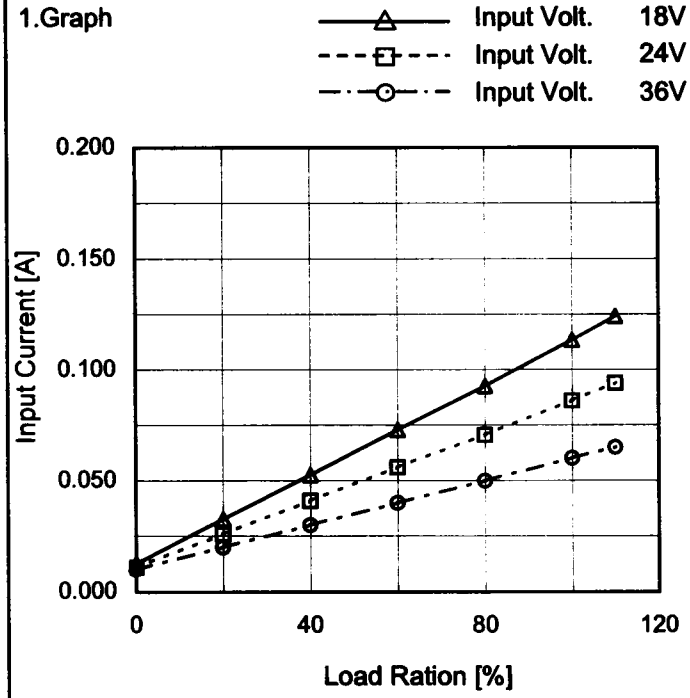
BC-3649

COSEL

Model	SUW1R52412
Item	Input Current (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ration [%]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.013	0.011	0.010
20	0.033	0.026	0.020
40	0.053	0.041	0.030
60	0.073	0.056	0.040
80	0.093	0.071	0.050
100	0.113	0.086	0.060
110	0.124	0.094	0.065
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

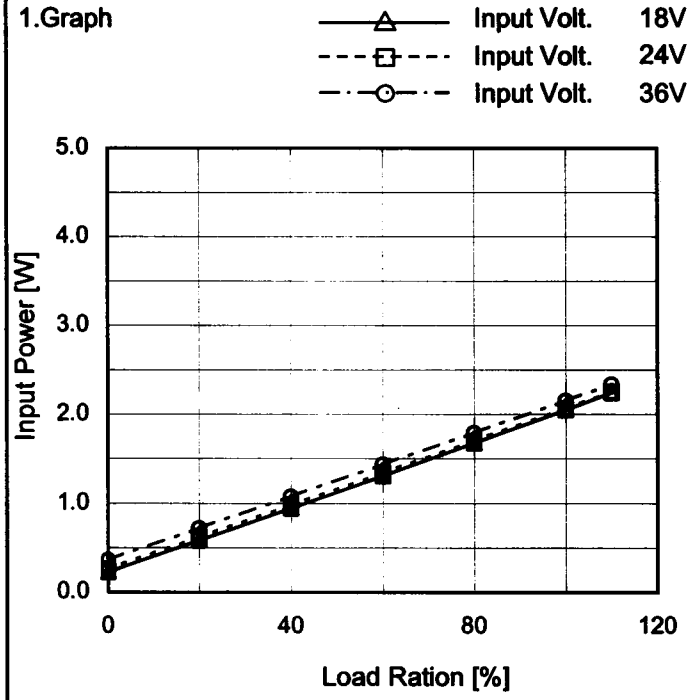
BC-3649

COSEL

Model	SUW1R52412
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

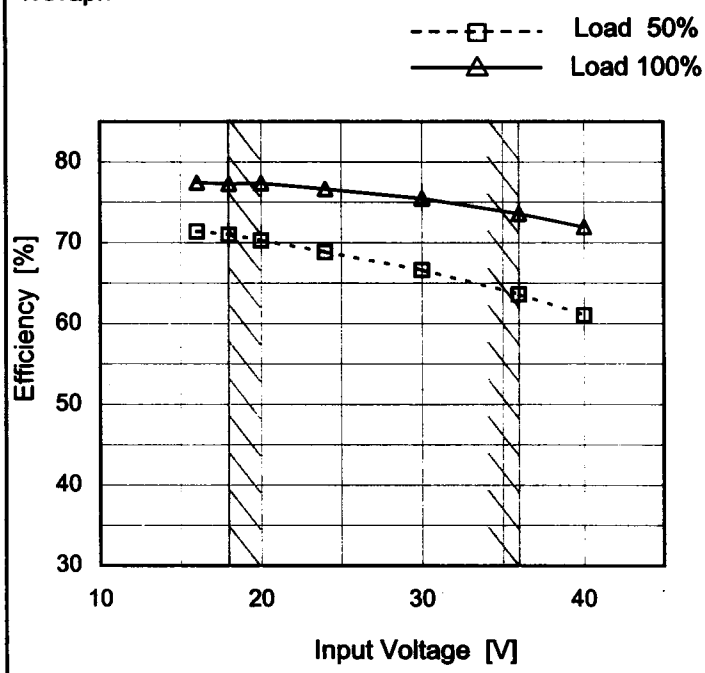
Load Ration [%]	Input Power [W]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.23	0.26	0.36
20	0.59	0.62	0.72
40	0.95	0.98	1.08
60	1.31	1.34	1.44
80	1.68	1.70	1.79
100	2.05	2.07	2.16
110	2.25	2.25	2.34
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUW1R52412
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

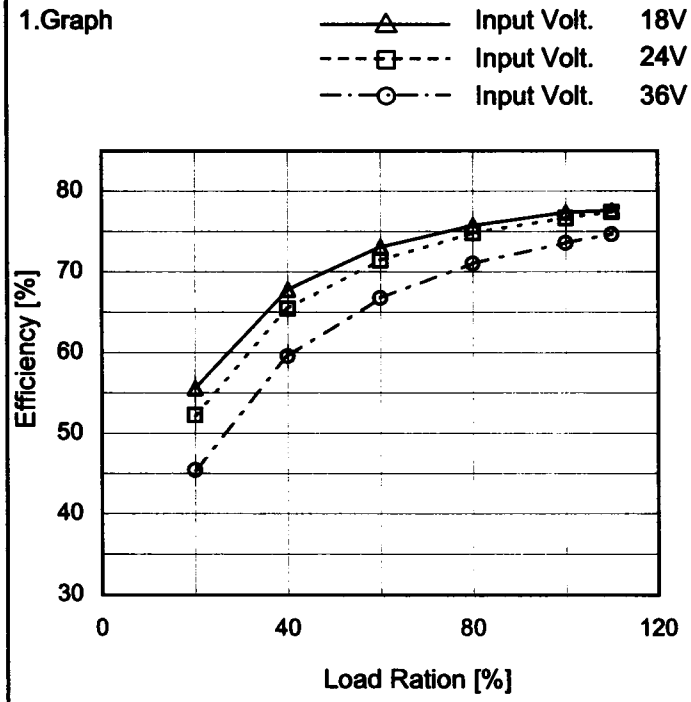
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
16	71.4	77.4
18	71.0	77.3
20	70.2	77.4
24	68.9	76.7
30	66.6	75.5
36	63.6	73.6
40	61.1	71.9
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Efficiency (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

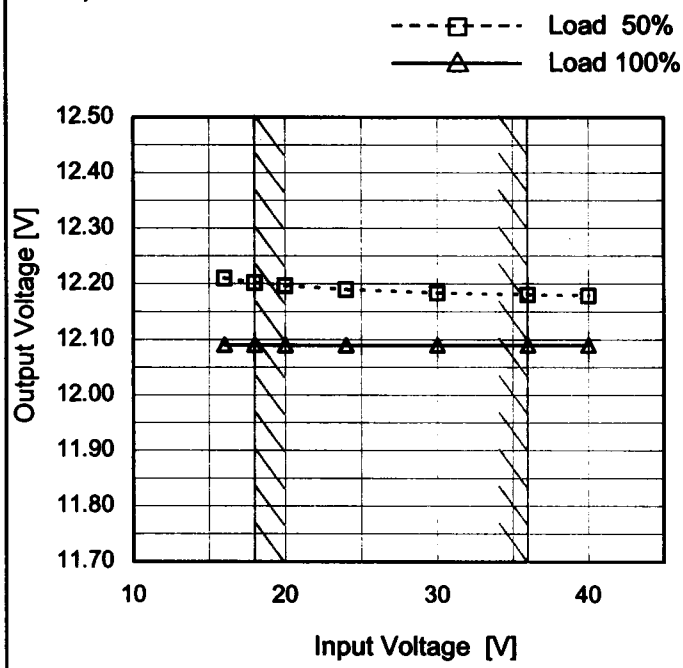
Load Ration [%]	Efficiency [%]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	-	-	-
20	55.6	52.3	45.4
40	67.8	65.5	59.6
60	73.1	71.4	66.7
80	75.8	74.8	71.0
100	77.4	76.7	73.6
110	77.6	77.4	74.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW1R52412
Item	Line Regulation
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

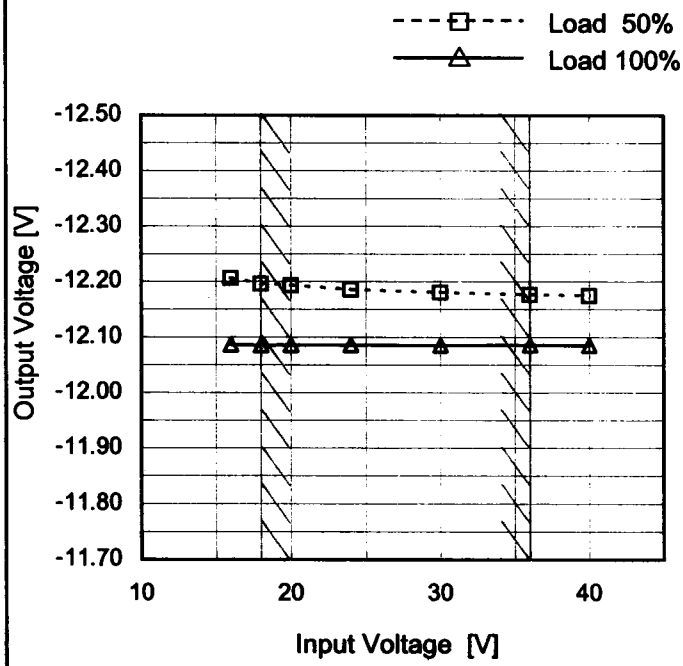


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
16	12.210	12.091
18	12.202	12.091
20	12.196	12.091
24	12.189	12.090
30	12.183	12.090
36	12.181	12.090
40	12.179	12.090
–	-	-
–	-	-

Object	-12V0.065A

1.Graph



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

2.Values

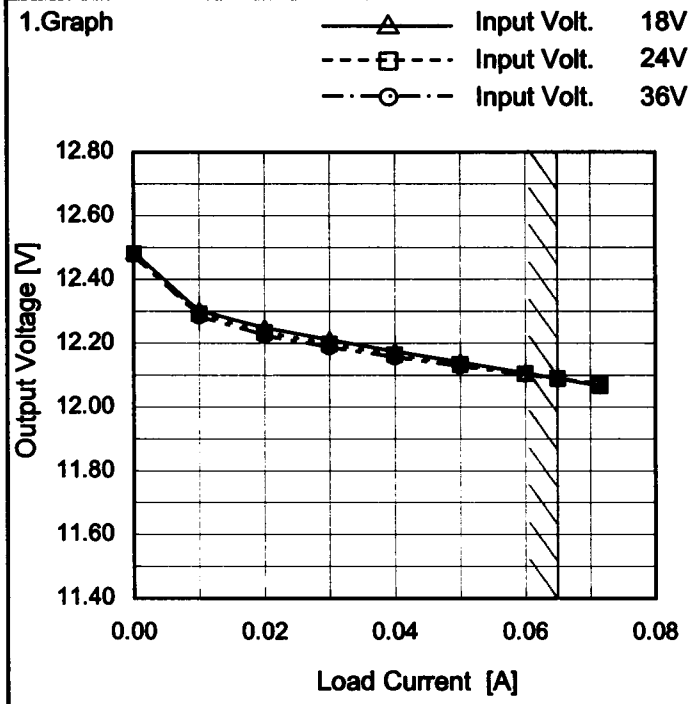
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
16	-12.206	-12.087
18	-12.196	-12.086
20	-12.193	-12.086
24	-12.186	-12.086
30	-12.181	-12.086
36	-12.176	-12.086
40	-12.175	-12.086
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Load Regulation
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

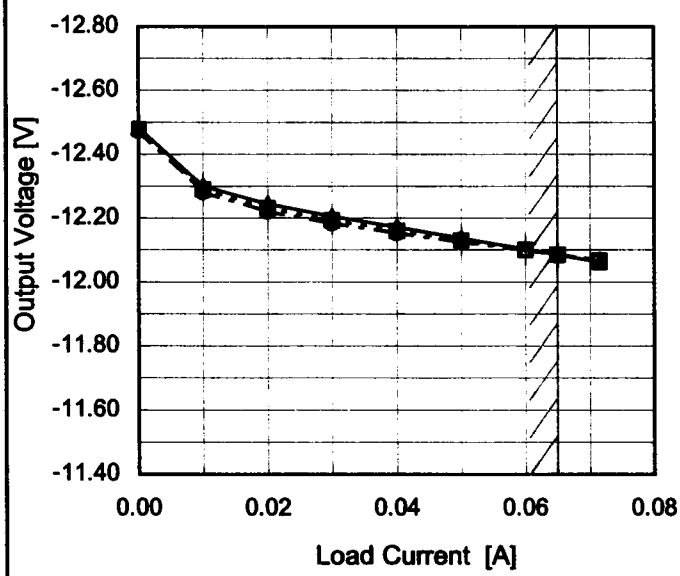


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	12.486	12.481	12.477
0.010	12.304	12.293	12.284
0.020	12.249	12.234	12.224
0.030	12.211	12.197	12.187
0.040	12.176	12.164	12.156
0.050	12.141	12.134	12.128
0.060	12.108	12.105	12.102
0.065	12.090	12.090	12.089
0.072	12.067	12.071	12.073
–	-	-	-
–	-	-	-

Object	-12V0.065A

1.Graph



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

2.Values

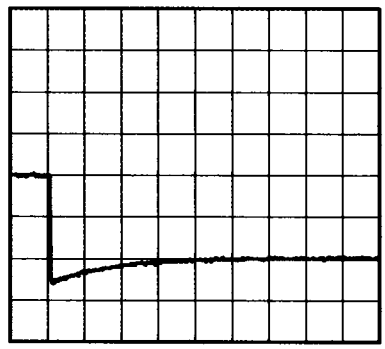
Load Current [A]	Output Voltage [V] Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	-12.483	-12.479	-12.473
0.010	-12.301	-12.290	-12.281
0.020	-12.246	-12.231	-12.221
0.030	-12.207	-12.193	-12.184
0.040	-12.172	-12.160	-12.153
0.050	-12.138	-12.130	-12.125
0.060	-12.103	-12.101	-12.098
0.065	-12.086	-12.086	-12.086
0.072	-12.063	-12.066	-12.069
–	-	-	-
–	-	-	-

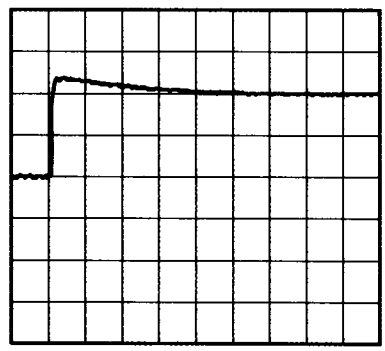
COSEL

Model	SUW1R52412	Temperature 25°C
Item	Dynamic Load Response	Testing Circuitry Figure A
Object	+12V0.065A	

Input Volt. 24 V
Cycle 100 mS

Min. Load (0A) ←→
Load 100% (0.065A)

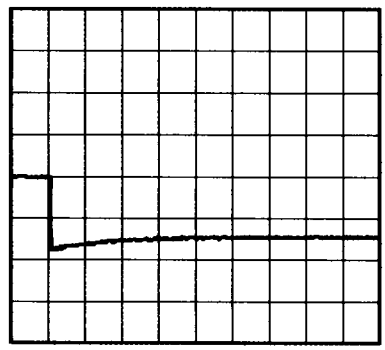


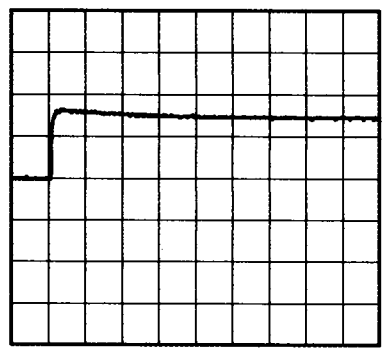


200mV/div

2ms/div 2ms/div

Min. Load (0A) ←→
Load 50% (0.0325A)

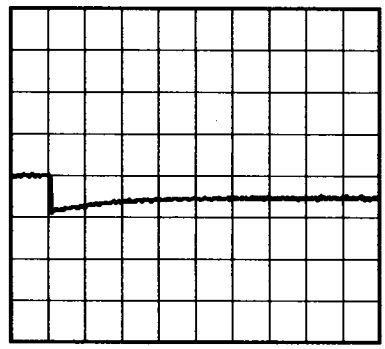


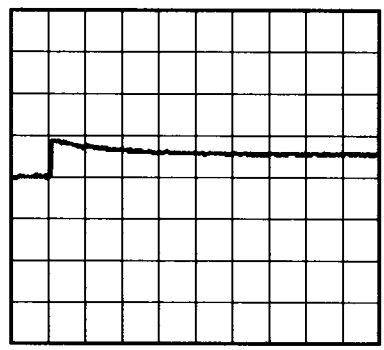


200mV/div

2ms/div 2ms/div

Load 50% (0.0325A) ←→
Load 100% (0.065A)





200mV/div

2ms/div 2ms/div

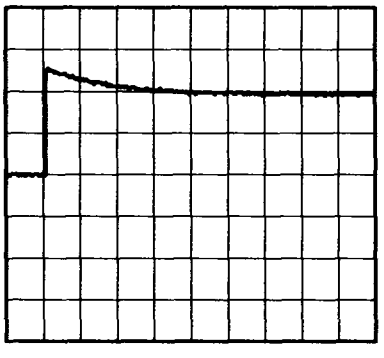
COSEL

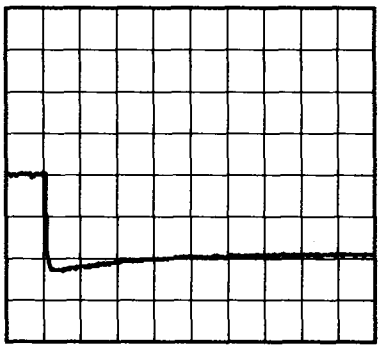
Model	SUW1R52412
Item	Dynamic Load Response
Object	-12V0.065A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 24 V
Cycle 100 mS

Min. Load (0A) ⟷
Load 100% (0.065A)

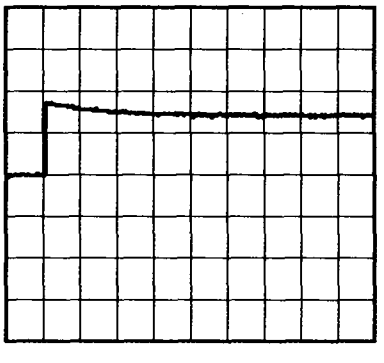


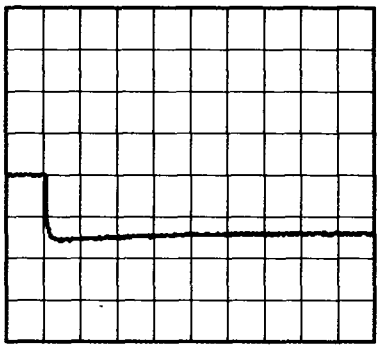


200mV/div

2ms/div 2ms/div

Min. Load (0A) ⟷
Load 50% (0.0325A)

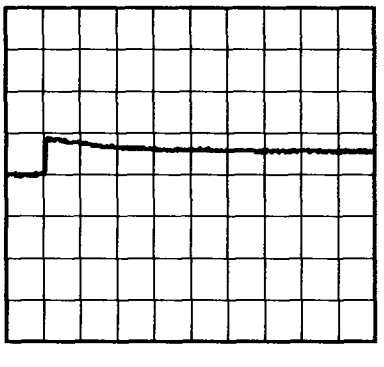


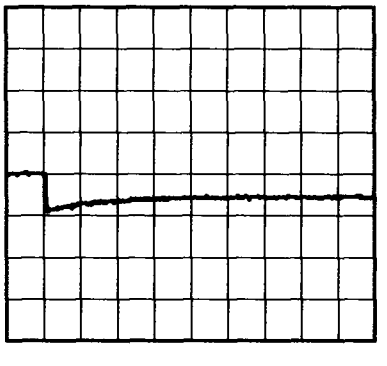


200mV/div

2ms/div 2ms/div

Load 50% (0.0325A) ⟷
Load 100% (0.065A)





200mV/div

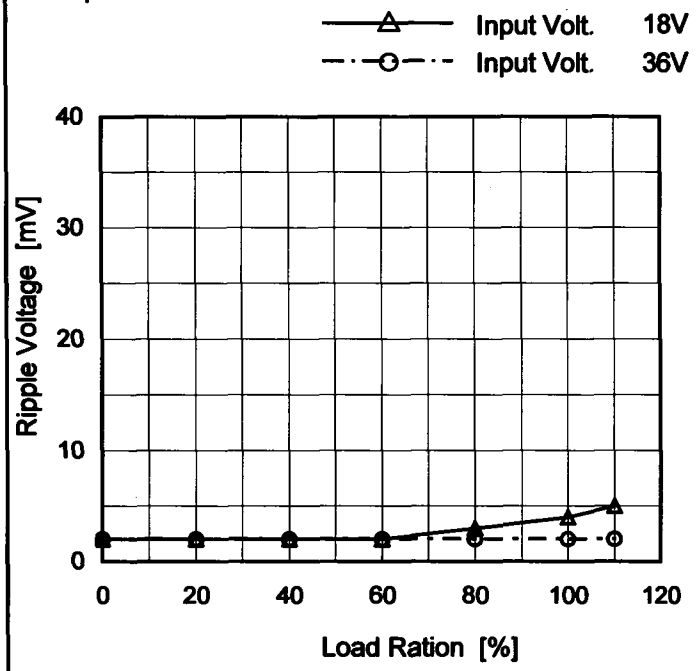
2ms/div 2ms/div

COSEL

Model	SUW1R52412
Item	Ripple Voltage (by Load Current)
Object	+12V0.065A

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.

2.Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	2	2
20	2	2
40	2	2
60	2	2
80	3	2
100	4	2
110	5	2
–	-	-
–	-	-
–	-	-
–	-	-

Ripple [mVp-p]

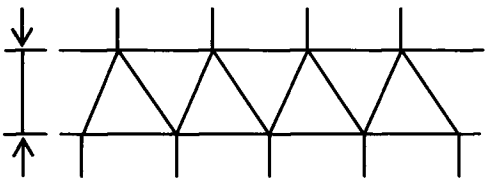


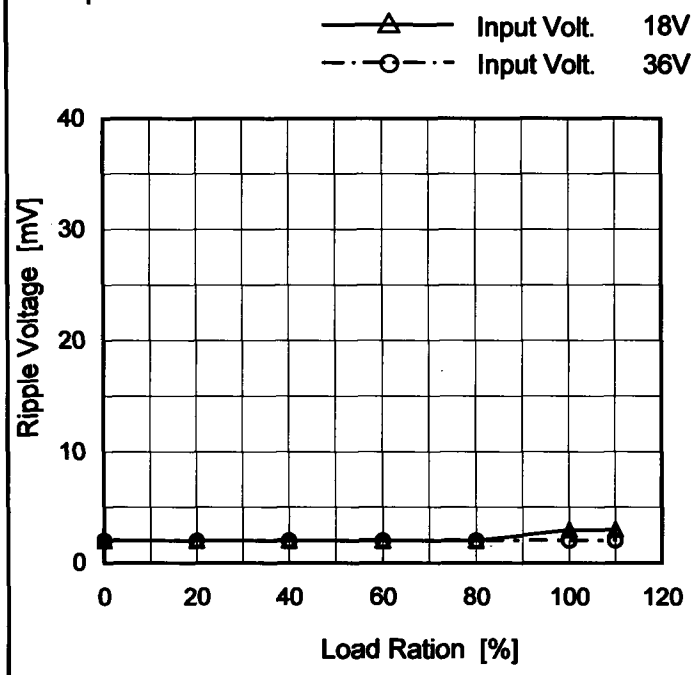
Fig.Complex Ripple Wave Form

COSEL

Model	SUW1R52412
Item	Ripple Voltage (by Load Current)
Object	-12V0.065A

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]

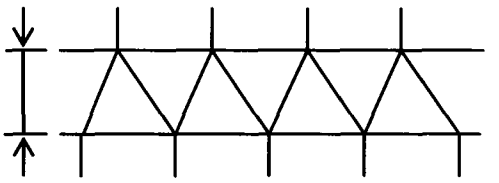


Fig.Complex Ripple Wave Form

2.Values

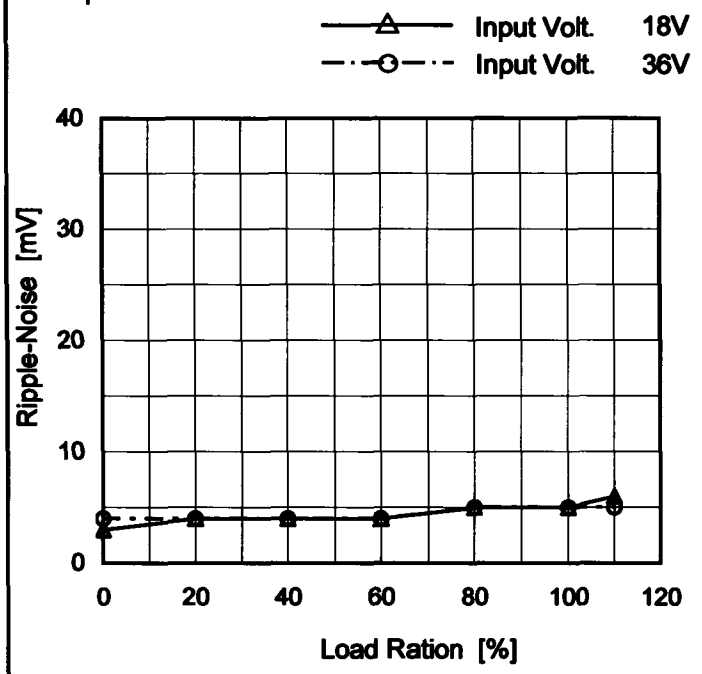
Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	2	2
20	2	2
40	2	2
60	2	2
80	2	2
100	3	2
110	3	2
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Ripple-Noise
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.

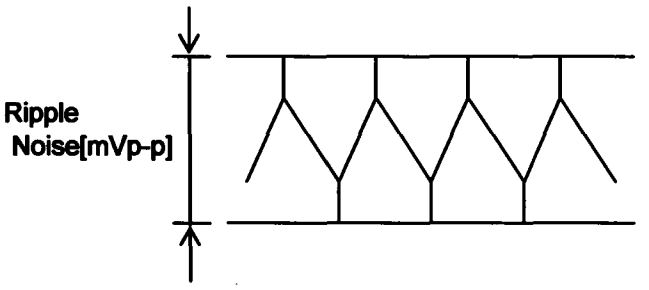


Fig.Complex Ripple Noise Wave Form

2.Values

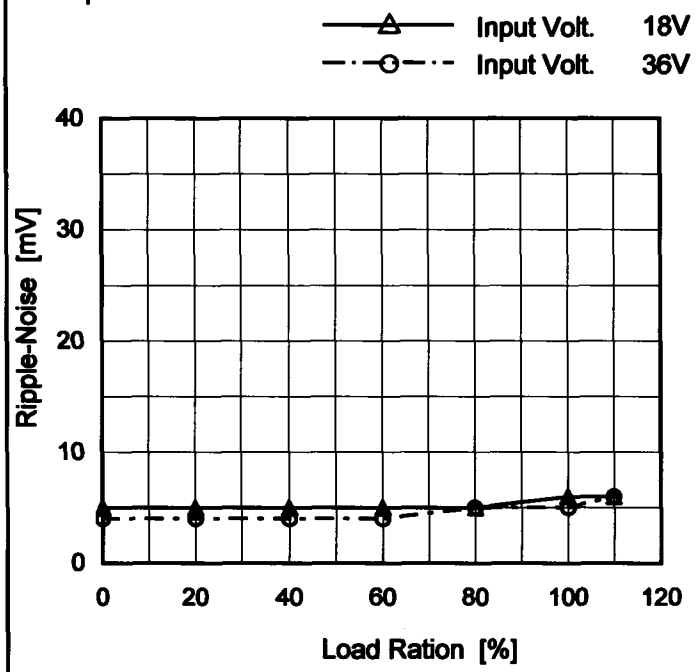
Load Ration [%]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	3	4
20	4	4
40	4	4
60	4	4
80	5	5
100	5	5
110	6	5
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Ripple-Noise
Object	-12V0.065A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.

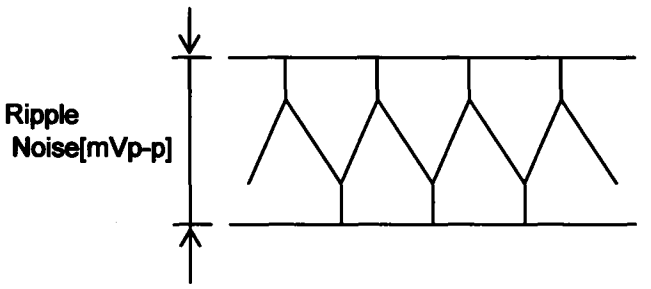


Fig.Complex Ripple Noise Wave Form

2.Values

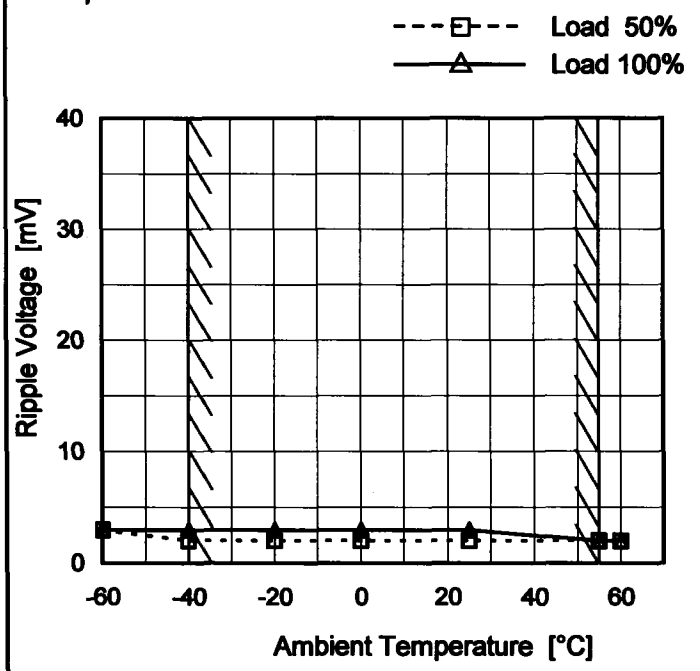
Load Ration [%]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	5	4
20	5	4
40	5	4
60	5	4
80	5	5
100	6	5
110	6	6
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.065A

Testing Circuitry Figure B

1.Graph



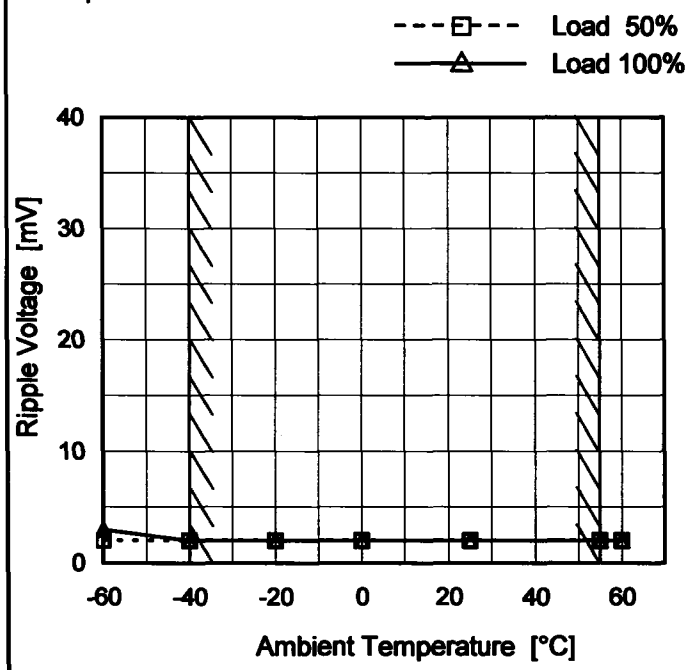
Input Volt. 24V

2.Values

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

Object	-12V0.065A

1.Graph



Input Volt. 24V

Measured by 100 MHz Oscilloscope.

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

2.Values

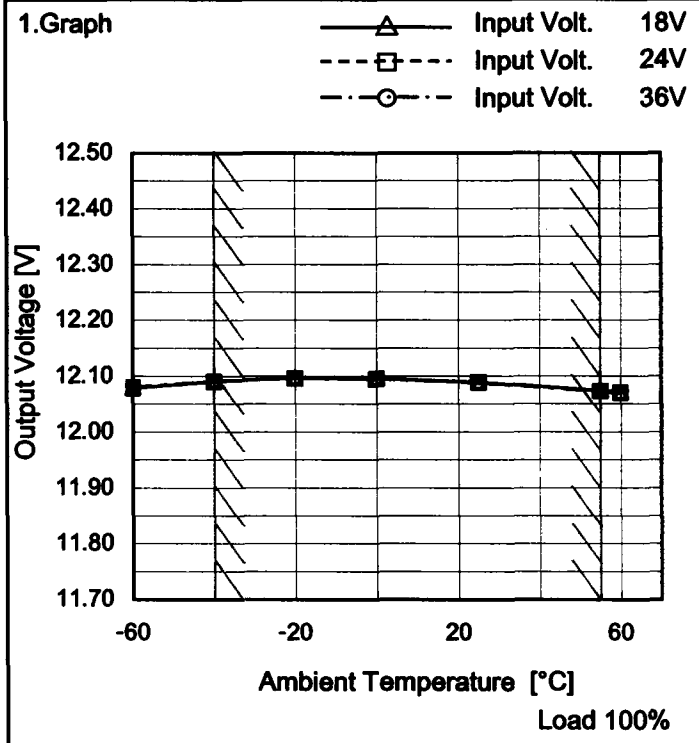
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	2	3
-40	2	2
-20	2	2
0	2	2
25	2	2
55	2	2
60	2	2
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Ambient Temperature Drift
Object	+12V0.065A

Testing Circuitry Figure A

1.Graph

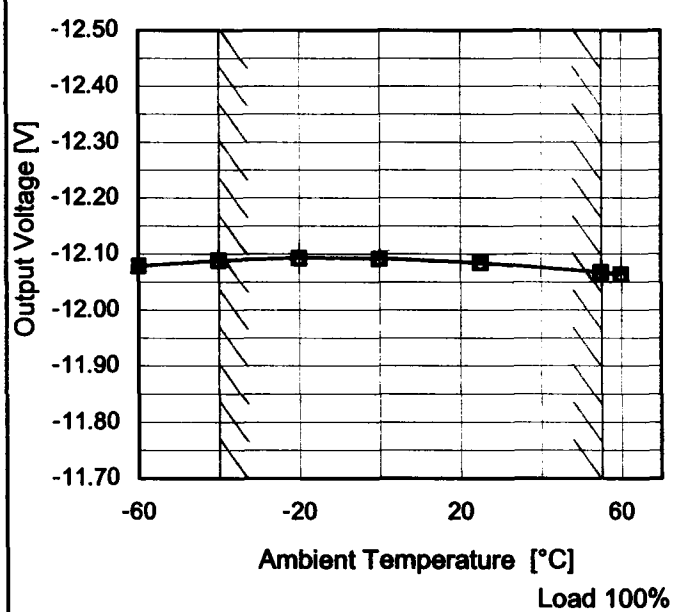


2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	12.079	12.080	12.080
-40	12.091	12.090	12.091
-20	12.097	12.096	12.096
0	12.096	12.095	12.095
25	12.089	12.089	12.088
55	12.074	12.073	12.072
60	12.071	12.070	12.069
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

Object	-12V0.065A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-12.079	-12.079	-12.078
-40	-12.089	-12.089	-12.088
-20	-12.094	-12.093	-12.093
0	-12.093	-12.092	-12.092
25	-12.085	-12.085	-12.084
55	-12.068	-12.068	-12.067
60	-12.065	-12.064	-12.064
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUW1R52412	
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 - 0.065A (AVR 2) : 0 - 0.065A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

2.Values

Object	+12V0.065A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	18	0	12.485	±206	±1.7
Minimum Voltage	55	18	0.065	12.074		

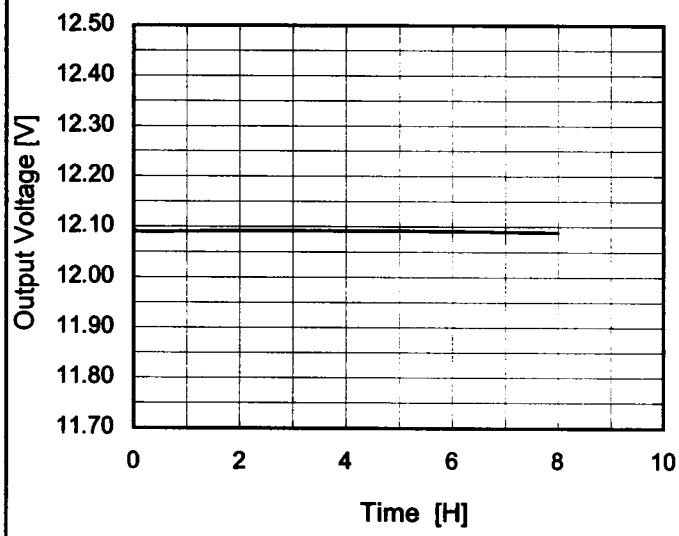
Object	-12V0.065A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	18	0	-12.482	±208	±1.7
Minimum Voltage	55	18	0.065	-12.067		

COSEL

Model	SUW1R52412
Item	Time Lapse Drift
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



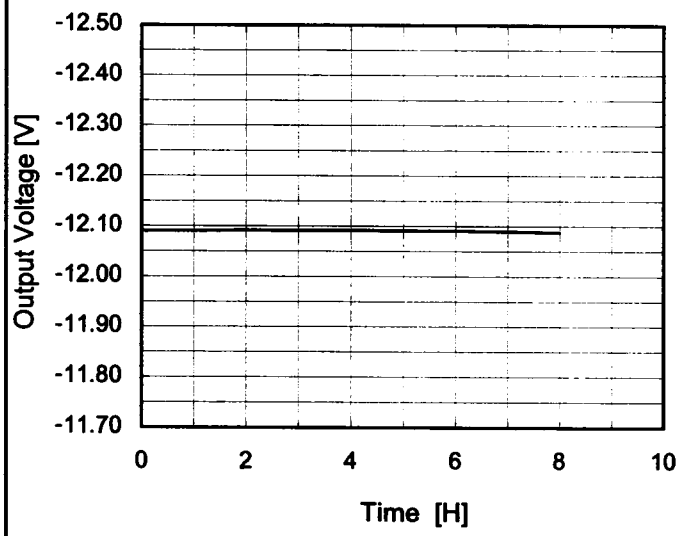
Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.095
0.5	12.090
1.0	12.091
2.0	12.092
3.0	12.092
4.0	12.092
5.0	12.092
6.0	12.091
7.0	12.090
8.0	12.088

Object	-12V0.065A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.095
0.5	-12.091
1.0	-12.091
2.0	-12.092
3.0	-12.091
4.0	-12.092
5.0	-12.091
6.0	-12.091
7.0	-12.090
8.0	-12.088

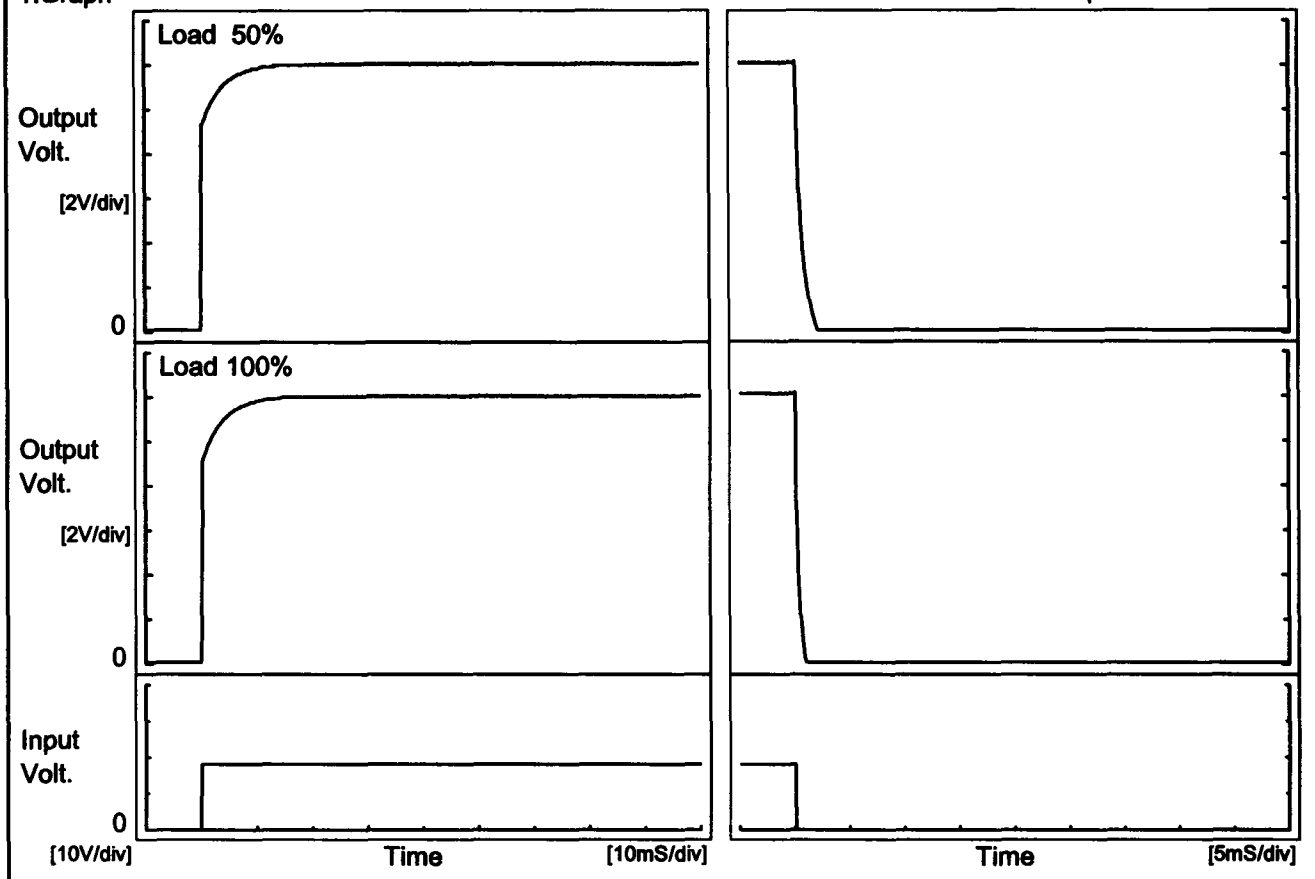
COSEL

Model	SUW1R52412
Item	Rise and Fall Time
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

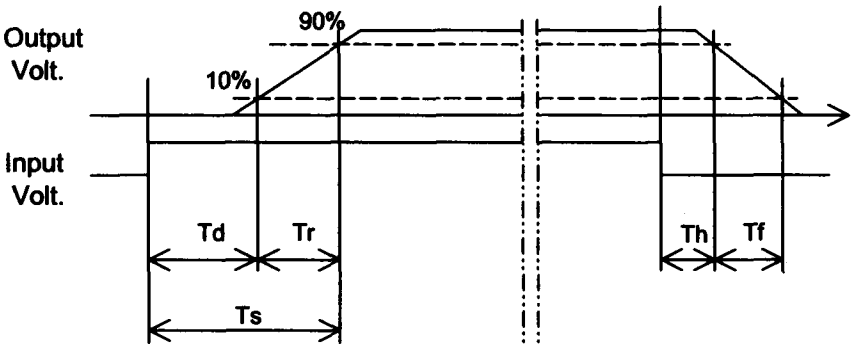
Input Volt. 18 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	3.6	3.7	0.2	1.3
100 %	0.1	3.8	3.9	0.1	0.7



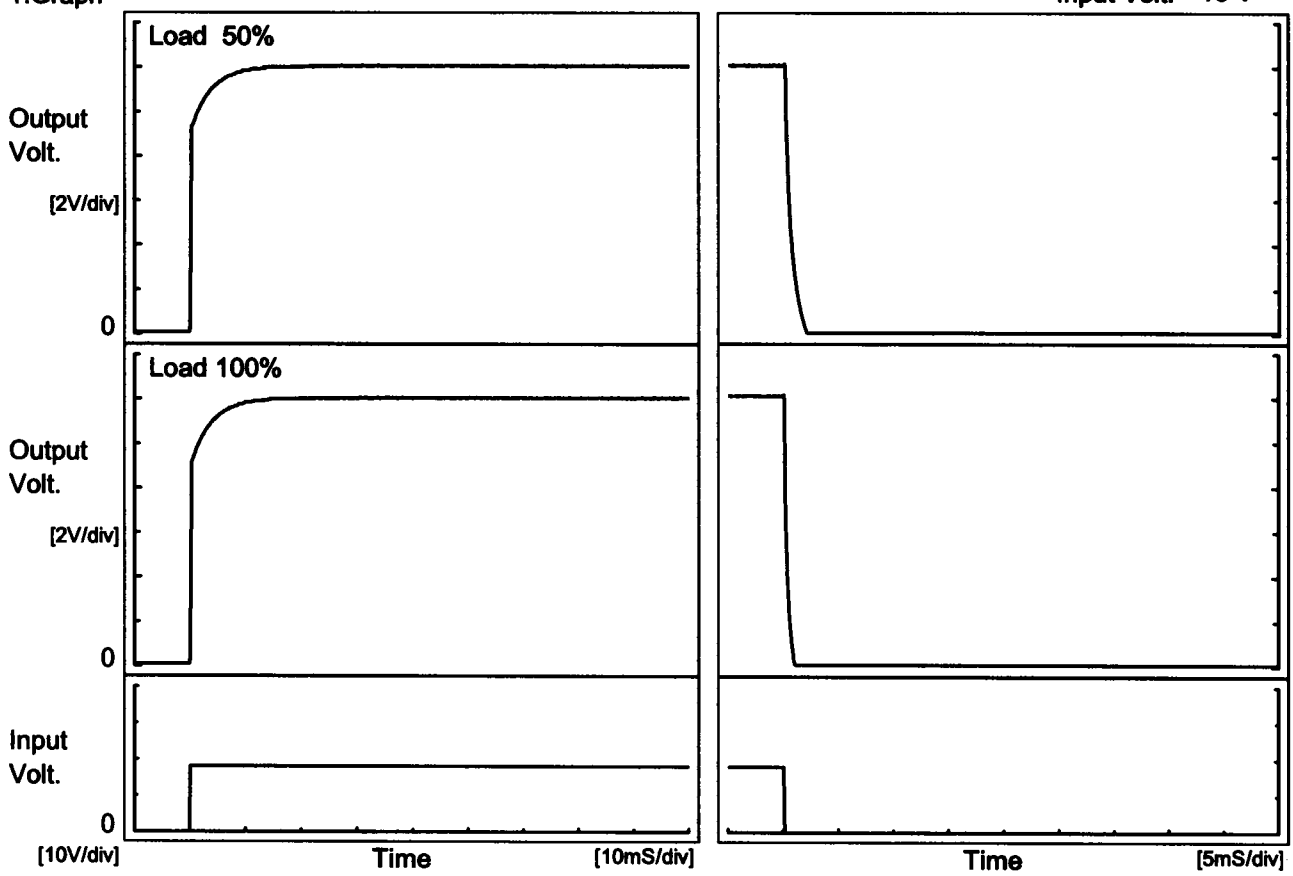
COSEL

Model	SUW1R52412
Item	Rise and Fall Time
Object	-12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

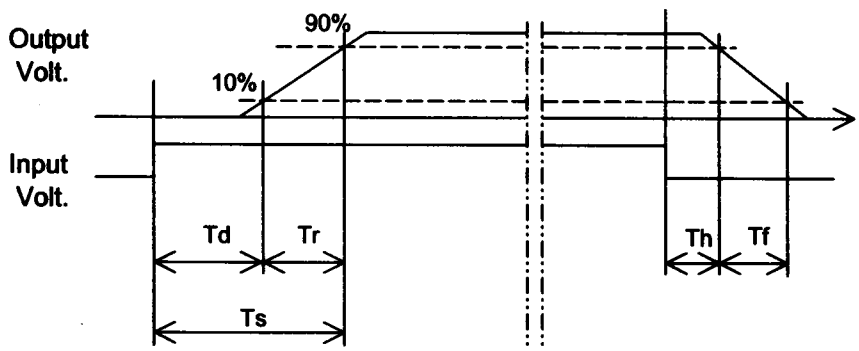
Input Volt. 18 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	3.6	3.7	0.2	1.3
100 %	0.1	3.8	3.9	0.1	0.7



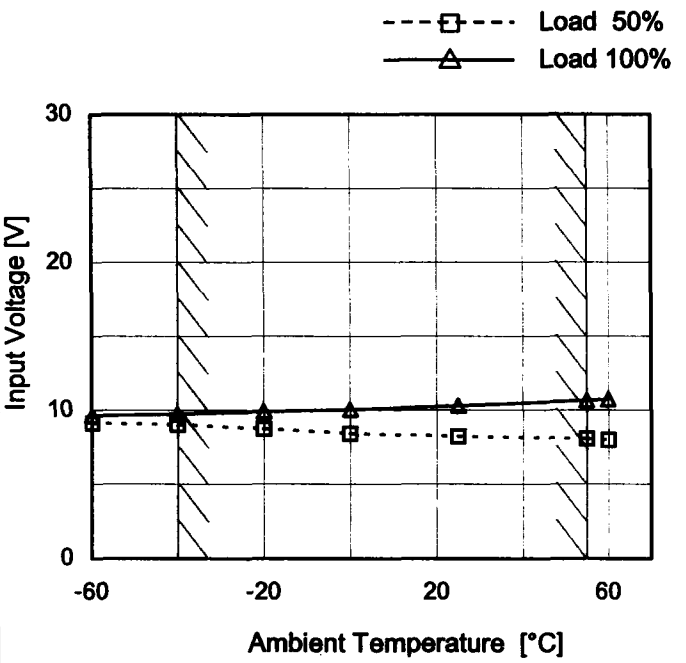
COSEL

Model	SUW1R52412
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object: +12V0.065A

1.Graph

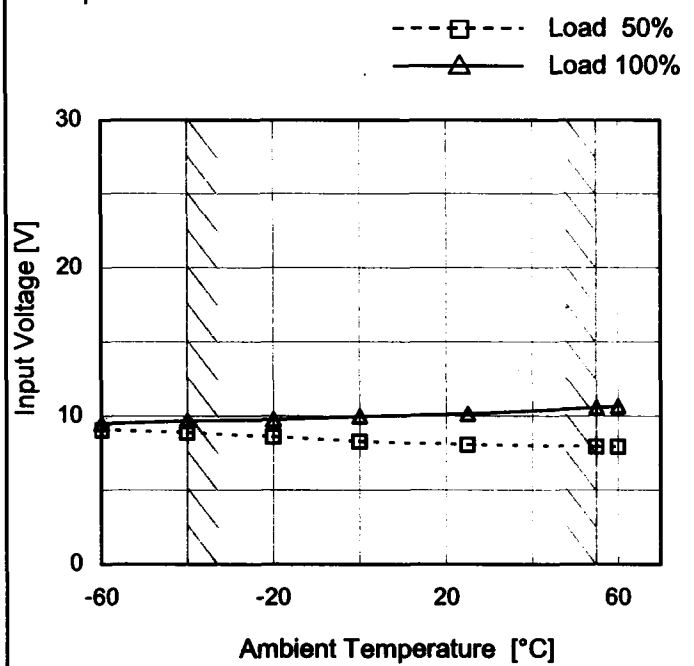


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	9.2	9.7
-40	9.1	9.8
-20	8.8	10.0
0	8.5	10.1
25	8.3	10.3
55	8.1	10.7
60	8.0	10.8
–	-	-
–	-	-
–	-	-
–	-	-

Object: -12V0.065A

1.Graph



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

2.Values

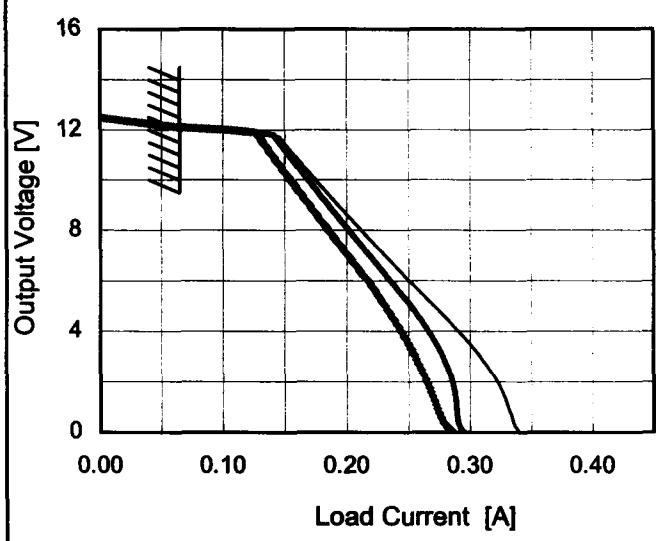
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	9.1	9.5
-40	8.9	9.7
-20	8.6	9.8
0	8.3	10.0
25	8.1	10.2
55	8.0	10.6
60	8.0	10.7
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW1R52412
Item	Overcurrent Protection
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

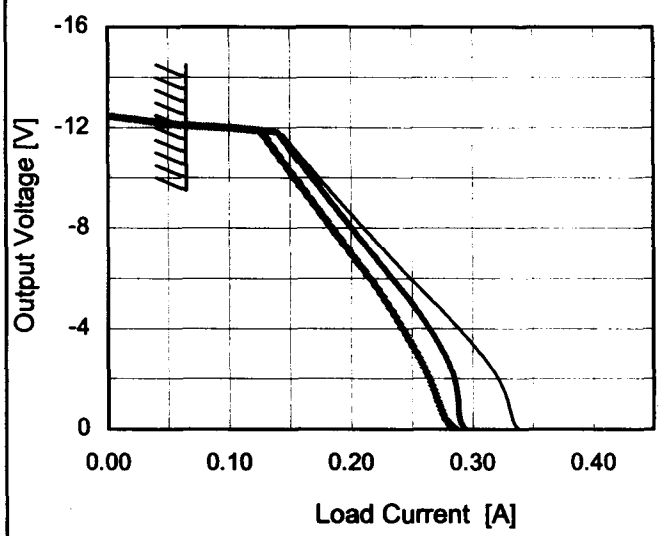


2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
12.0	0.07	0.07	0.07
11.4	0.15	0.15	0.13
10.8	0.16	0.16	0.14
9.6	0.18	0.18	0.16
8.4	0.20	0.19	0.18
7.2	0.23	0.21	0.20
6.0	0.25	0.24	0.22
4.8	0.27	0.25	0.23
3.6	0.30	0.27	0.25
2.4	0.32	0.28	0.26
1.2	0.33	0.29	0.27
0.0	0.34	0.30	0.29

Object	-12V0.065A

1.Graph



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

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-12.0	0.07	0.07	0.07
-11.4	0.15	0.15	0.13
-10.8	0.16	0.16	0.14
-9.6	0.18	0.17	0.16
-8.4	0.20	0.19	0.18
-7.2	0.23	0.21	0.20
-6.0	0.25	0.23	0.22
-4.8	0.27	0.25	0.23
-3.6	0.30	0.27	0.25
-2.4	0.32	0.28	0.26
-1.2	0.33	0.29	0.27
0.0	0.34	0.29	0.29

COSEL

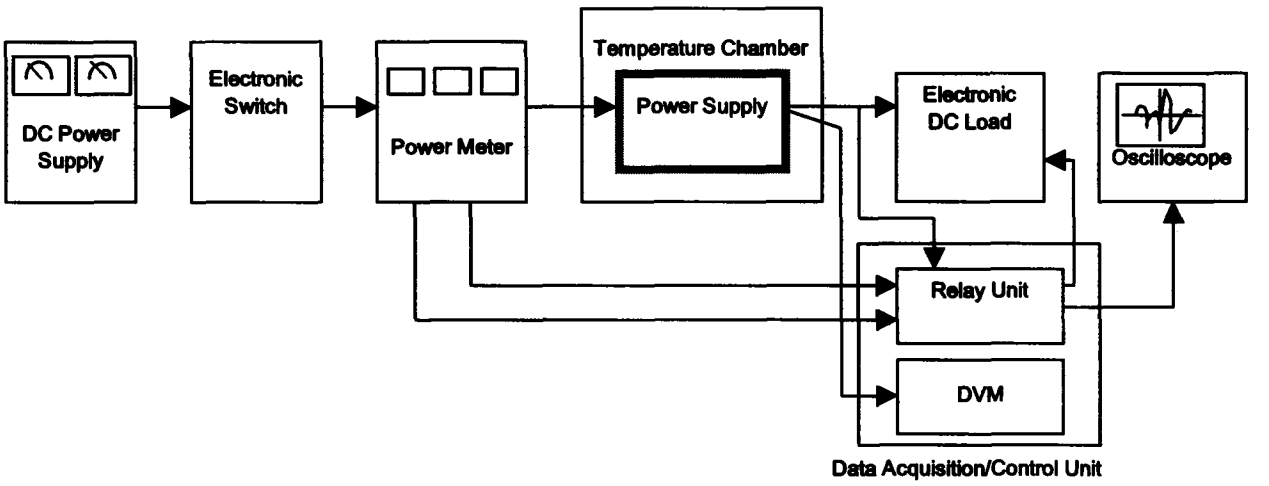


Figure A

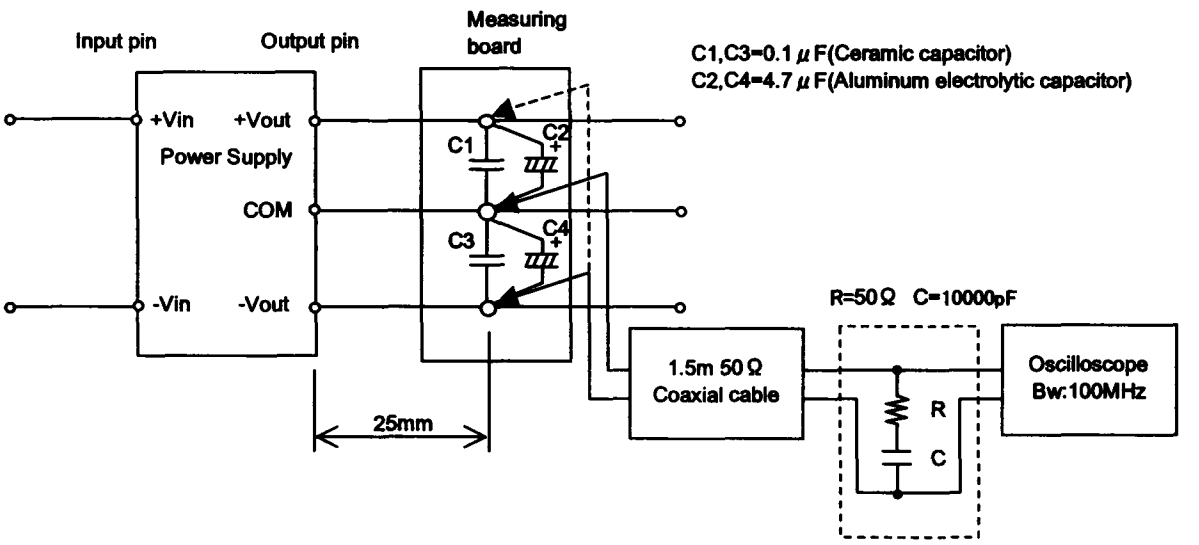


Figure B (Ripple and Ripple noise Characteristic)