



# TEST DATA OF MGS1R52405

Regulated DC Power Supply  
March 28, 2016

Approved by : Takayuki Fukuda  
Takayuki Fukuda Design Manager

Prepared by : Shohei Mukaide  
Shohei Mukaide Design Engineer

COSEL CO.,LTD.



## CONTENTS

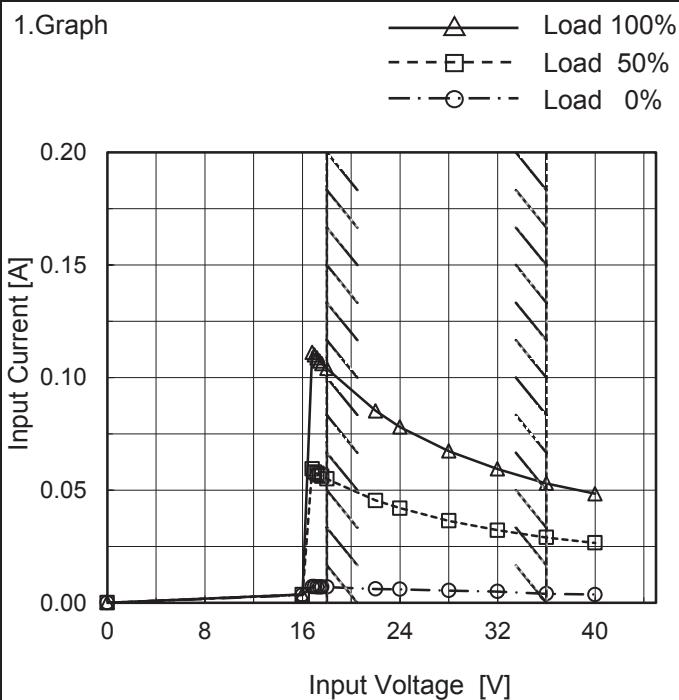
1.Input Current (by Input Voltage) . . . . .	1
2.Input Current (by Load Current) . . . . .	2
3.Input Power (by Load Current) . . . . .	3
4.Efficiency (by Input Voltage) . . . . .	4
5.Efficiency (by Load Current) . . . . .	5
6.Line Regulation . . . . .	6
7.Load Regulation . . . . .	7
8.Dynamic Load Response . . . . .	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.Switching frequency (by Load Current) . . . . .	18
19.Figure of Testing Circuitry . . . . .	19

(Final Page 19)

**COSEL**

Model	MGS1R52405
Item	Input Current (by Input Voltage)
Object	_____

## 1.Graph



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

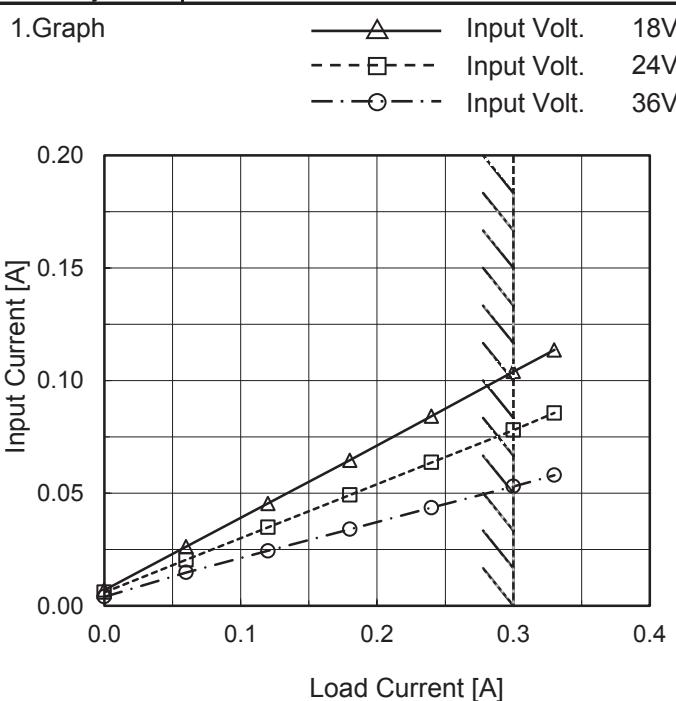
 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
16.0	0.003	0.004	0.004
16.8	0.007	0.059	0.111
17.0	0.007	0.058	0.110
17.2	0.007	0.057	0.109
17.4	0.007	0.057	0.107
17.6	0.007	0.056	0.106
18.0	0.007	0.055	0.104
22.0	0.006	0.045	0.085
24.0	0.006	0.042	0.078
28.0	0.005	0.036	0.067
32.0	0.005	0.032	0.059
36.0	0.004	0.029	0.053
40.0	0.004	0.027	0.048
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

**COSEL**

Model	MGS1R52405
Item	Input Current (by Load Current)
Object	_____


 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	0.007	0.006	0.004
0.06	0.026	0.020	0.015
0.12	0.045	0.035	0.024
0.18	0.065	0.049	0.034
0.24	0.084	0.064	0.044
0.30	0.104	0.078	0.053
0.33	0.114	0.086	0.058
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

**COSEL**

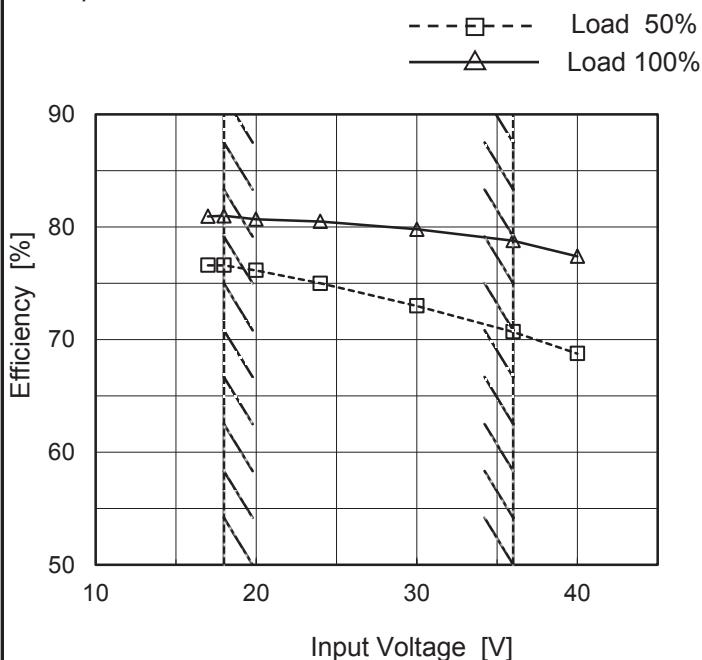
Model	MGS1R52405																																																					
Item	Input Power (by Load Current)																																																					
Object	_____																																																					
1.Graph	<p>—△— Input Volt. 18V - - □ - - Input Volt. 24V - - ○ - - Input Volt. 36V</p>																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Power [W]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td><td>0.13</td><td>0.17</td><td>0.17</td></tr> <tr> <td>0.06</td><td>0.49</td><td>0.51</td><td>0.58</td></tr> <tr> <td>0.12</td><td>0.83</td><td>0.85</td><td>0.89</td></tr> <tr> <td>0.18</td><td>1.17</td><td>1.20</td><td>1.25</td></tr> <tr> <td>0.24</td><td>1.51</td><td>1.57</td><td>1.58</td></tr> <tr> <td>0.30</td><td>1.88</td><td>1.88</td><td>1.92</td></tr> <tr> <td>0.33</td><td>2.06</td><td>2.06</td><td>2.12</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>			Load Current [A]	Input Power [W]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	0.13	0.17	0.17	0.06	0.49	0.51	0.58	0.12	0.83	0.85	0.89	0.18	1.17	1.20	1.25	0.24	1.51	1.57	1.58	0.30	1.88	1.88	1.92	0.33	2.06	2.06	2.12	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Power [W]																																																					
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																			
0.00	0.13	0.17	0.17																																																			
0.06	0.49	0.51	0.58																																																			
0.12	0.83	0.85	0.89																																																			
0.18	1.17	1.20	1.25																																																			
0.24	1.51	1.57	1.58																																																			
0.30	1.88	1.88	1.92																																																			
0.33	2.06	2.06	2.12																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

**COSEL**

Model	MGS1R52405
Item	Efficiency (by Input Voltage)
Object	_____

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph

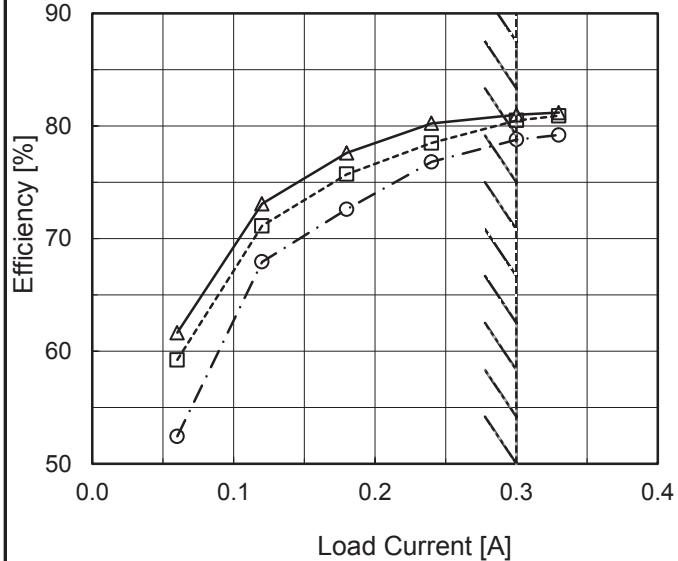


## 2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
17	76.6	81.0
18	76.6	81.0
20	76.2	80.7
24	75.0	80.5
30	73.0	79.8
36	70.7	78.8
40	68.8	77.4
--	-	-
--	-	-

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

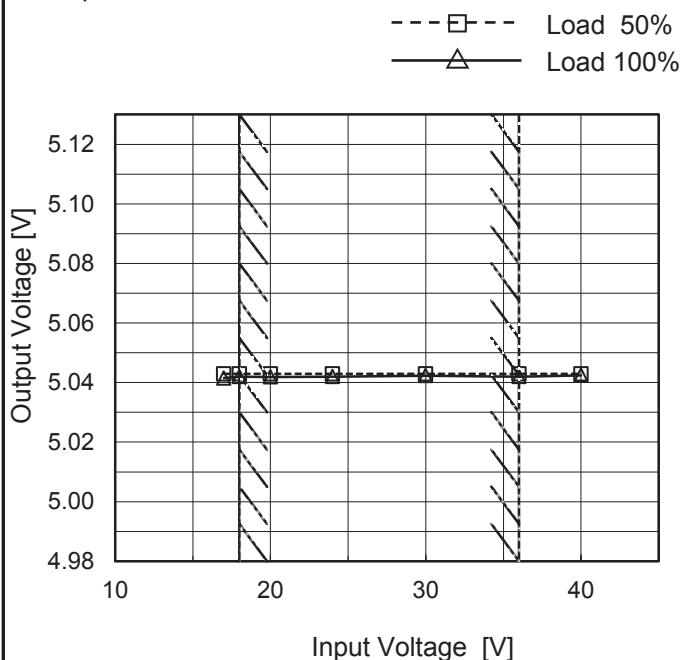
**COSEL**

Model	MGS1R52405																																																					
Item	Efficiency (by Load Current)																																																					
Object	_____																																																					
1.Graph	—△— Input Volt. 18V - - □--- Input Volt. 24V - - ○--- Input Volt. 36V																																																					
 <p>The graph plots Efficiency [%] on the y-axis (50 to 90) against Load Current [A] on the x-axis (0.0 to 0.4). Three curves are shown for different input voltages: 18V (solid line with triangles), 24V (dashed line with squares), and 36V (dash-dot line with circles). All curves show efficiency increasing with load current. A slanted line on the graph indicates the rated load current range.</p>																																																						
2.Values																																																						
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>0.06</td> <td>61.6</td> <td>59.2</td> <td>52.4</td> </tr> <tr> <td>0.12</td> <td>73.1</td> <td>71.1</td> <td>67.9</td> </tr> <tr> <td>0.18</td> <td>77.6</td> <td>75.7</td> <td>72.6</td> </tr> <tr> <td>0.24</td> <td>80.2</td> <td>78.5</td> <td>76.8</td> </tr> <tr> <td>0.30</td> <td>81.0</td> <td>80.5</td> <td>78.8</td> </tr> <tr> <td>0.33</td> <td>81.2</td> <td>80.9</td> <td>79.2</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Load Current [A]	Efficiency [%]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	-	-	-	0.06	61.6	59.2	52.4	0.12	73.1	71.1	67.9	0.18	77.6	75.7	72.6	0.24	80.2	78.5	76.8	0.30	81.0	80.5	78.8	0.33	81.2	80.9	79.2	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																			
0.00	-	-	-																																																			
0.06	61.6	59.2	52.4																																																			
0.12	73.1	71.1	67.9																																																			
0.18	77.6	75.7	72.6																																																			
0.24	80.2	78.5	76.8																																																			
0.30	81.0	80.5	78.8																																																			
0.33	81.2	80.9	79.2																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

**COSEL**

Model	MGS1R52405
Item	Line Regulation
Object	+5V0.3A

## 1. Graph



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

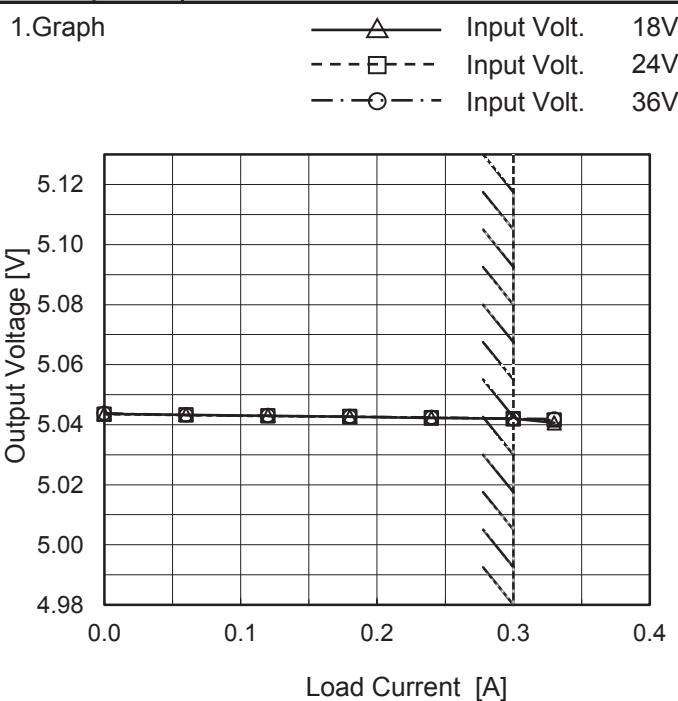
Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	5.043	5.042
18	5.043	5.042
20	5.043	5.042
24	5.043	5.042
30	5.043	5.042
36	5.043	5.042
40	5.043	5.042
--	-	-
--	-	-

**COSEL**

Model	MGS1R52405
Item	Load Regulation
Object	+5V0.3A


 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	5.044	5.044	5.044
0.06	5.043	5.043	5.043
0.12	5.043	5.043	5.043
0.18	5.043	5.043	5.043
0.24	5.042	5.042	5.042
0.30	5.042	5.042	5.042
0.33	5.041	5.042	5.042
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

**COSEL**

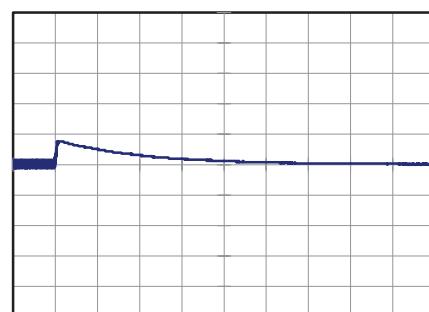
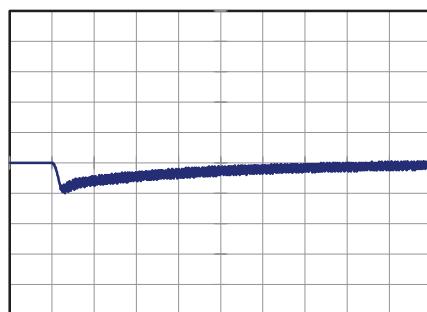
Model	MGS1R52405	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+5V0.3A		

Input Volt. 24 V  
 Cycle 1000 ms



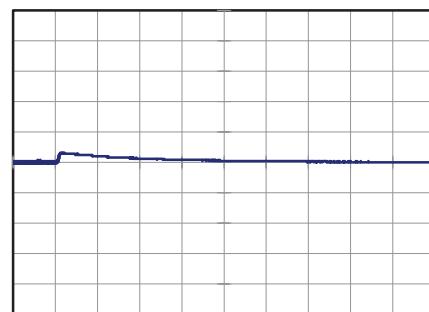
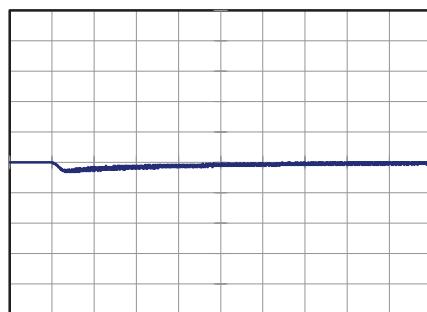
Min.Load (0A)↔  
 Load 100% (0.3A)

100 mV/div

100  $\mu s$ /div200  $\mu s$ /div

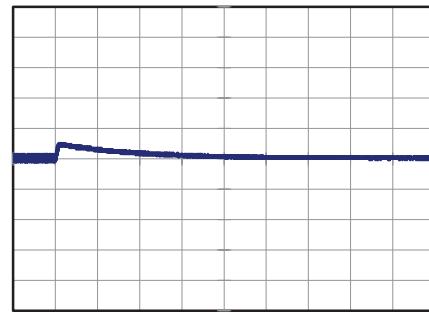
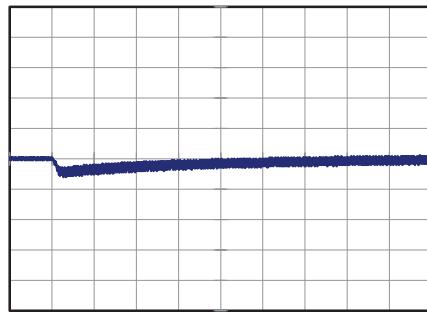
Min.Load (0A)↔  
 Load 50% (0.15A)

100 mV/div

100  $\mu s$ /div200  $\mu s$ /div

Load 50% (0.15A)↔  
 Load 100% (0.3A)

100 mV/div

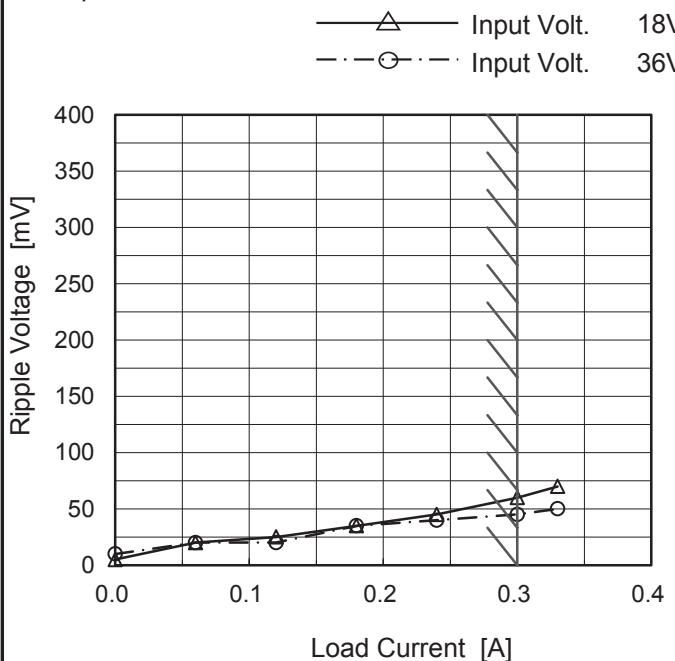
100  $\mu s$ /div200  $\mu s$ /div

**COSEL**

Model	MGS1R52405
Item	Ripple Voltage (by Load Current)
Object	+5V0.3A

 Temperature 25°C  
 Testing Circuitry Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	5	10
0.06	20	20
0.12	25	20
0.18	35	35
0.24	45	40
0.30	60	45
0.33	70	50
--	-	-
--	-	-
--	-	-
--	-	-

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]

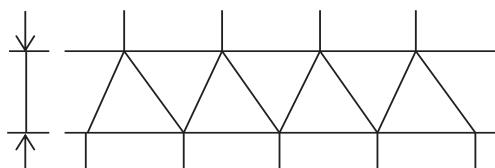


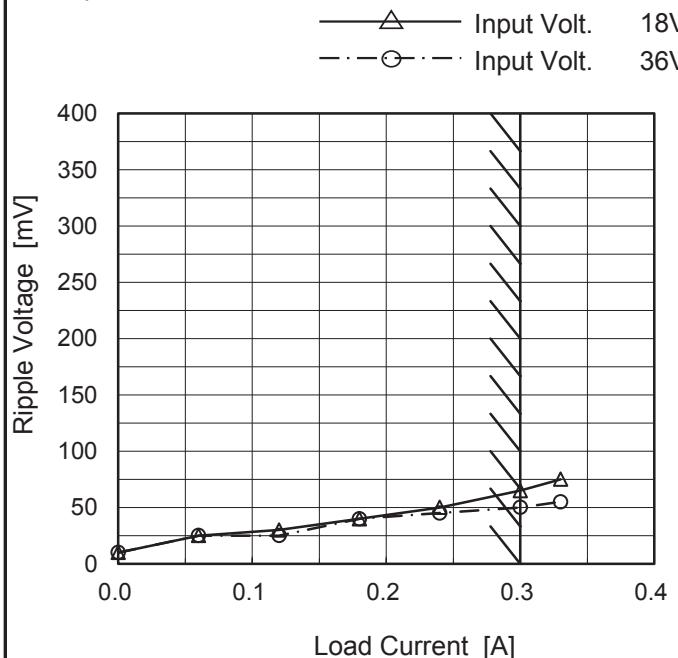
Fig.Complex Ripple Wave Form

**COSEL**

Model	MGS1R52405
Item	Ripple-Noise
Object	+5V0.3A

 Temperature 25°C  
 Testing Circuitry Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	10	10
0.06	25	25
0.12	30	25
0.18	40	40
0.24	50	45
0.30	65	50
0.33	75	55
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 100 MHz Oscilloscope.

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

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

Ripple Noise[mVp-p]

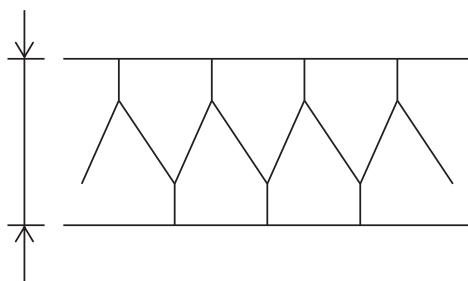
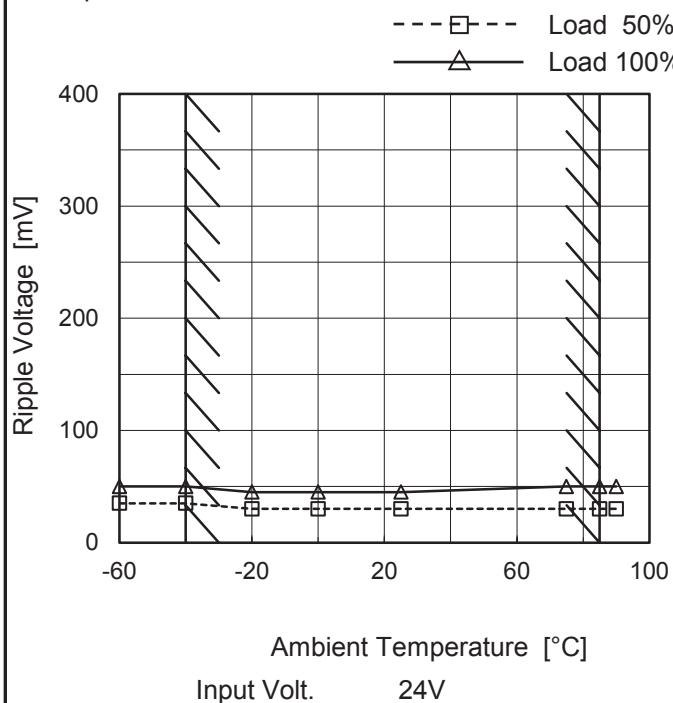


Fig.Complex Ripple Noise Wave Form

**COSEL**

Model	MGS1R52405
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V0.3A

## 1.Graph



Measured by 100 MHz Oscilloscope.

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

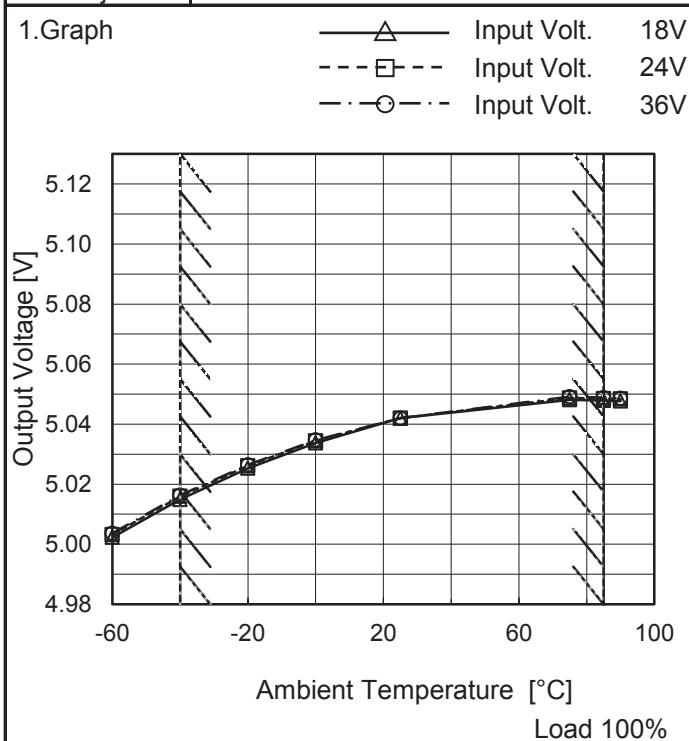
Testing Circuitry Figure B

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	35	50
-40	35	50
-20	30	45
0	30	45
25	30	45
75	30	50
85	30	50
90	30	50
--	-	-
--	-	-
--	-	-

**COSEL**

Model	MGS1R52405
Item	Ambient Temperature Drift
Object	+5V0.3A



Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	5.002	5.003	5.004
-40	5.015	5.016	5.016
-20	5.025	5.026	5.026
0	5.034	5.034	5.035
25	5.042	5.042	5.042
75	5.048	5.049	5.049
85	5.048	5.049	5.049
90	5.048	5.048	5.049
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	MGS1R52405	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+5V0.3A	

### 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 - 0.3A

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

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

### 2. Values

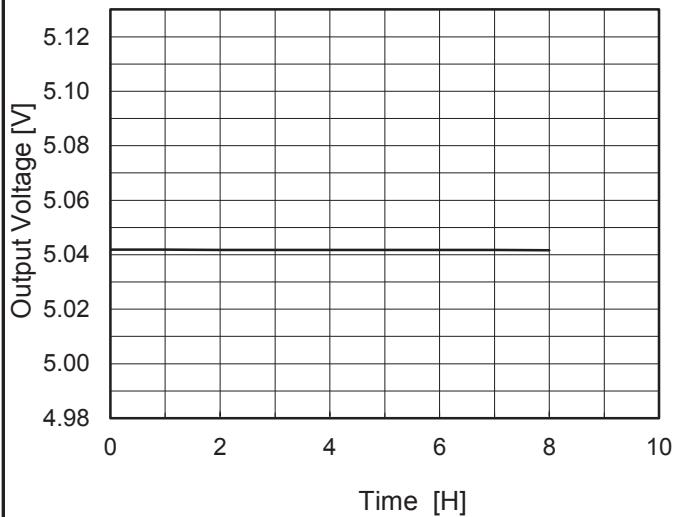
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	75	36	0	5.051	±18	±0.4
Minimum Voltage	-40	18	0.3	5.015		

**COSEL**

Model	MGS1R52405
Item	Time Lapse Drift
Object	+5V0.3A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



## 2.Values

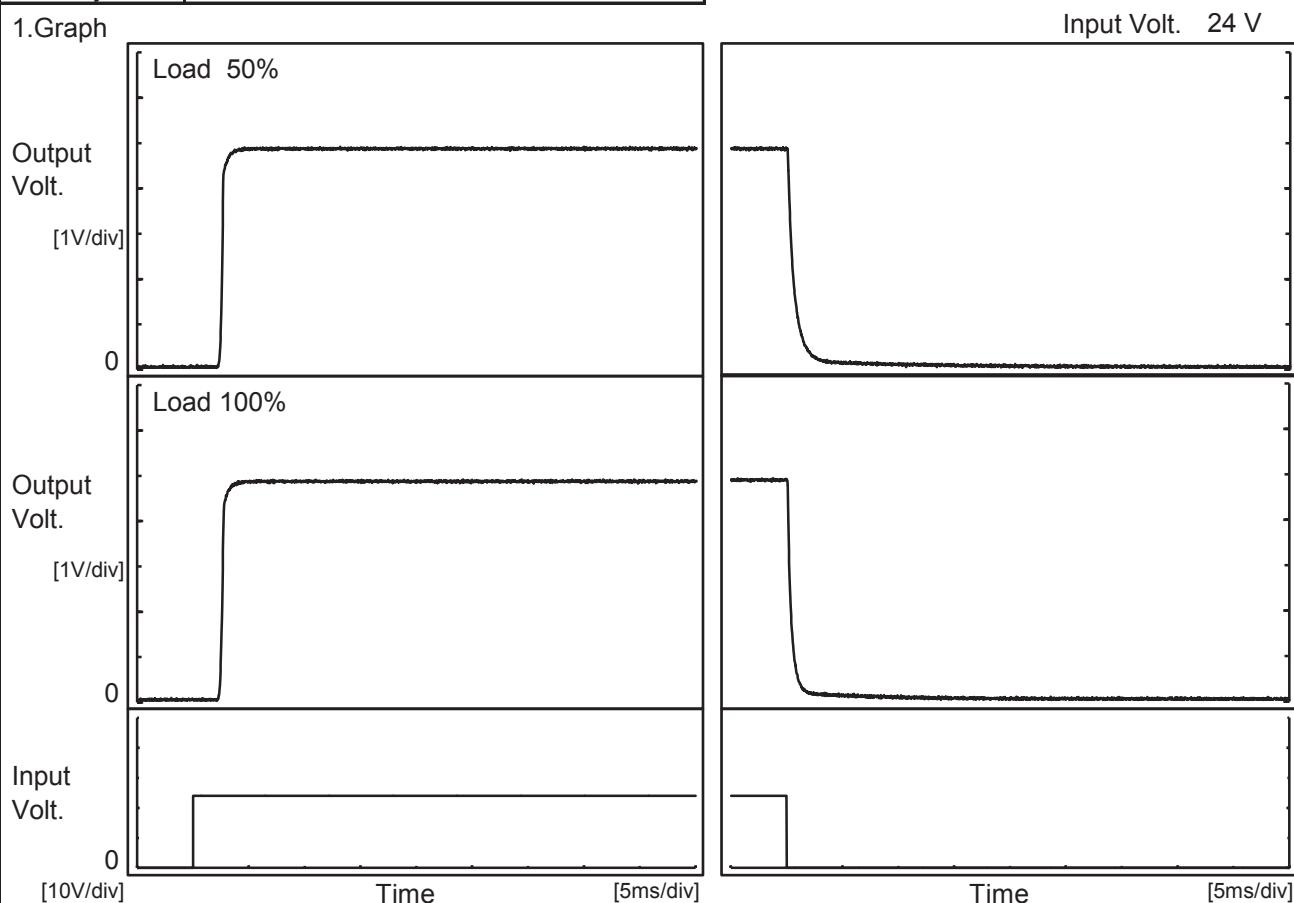
Time since start [H]	Output Voltage [V]
0.0	5.042
0.5	5.042
1.0	5.042
2.0	5.042
3.0	5.042
4.0	5.042
5.0	5.042
6.0	5.042
7.0	5.042
8.0	5.042

**COSEL**

Model	MGS1R52405
Item	Rise and Fall Time
Object	+5V0.3A

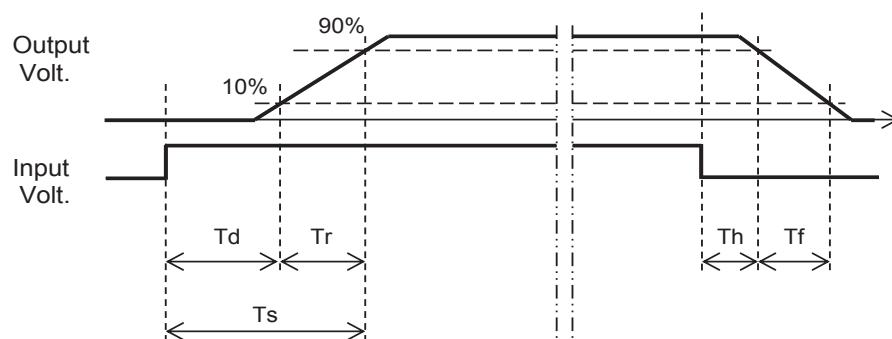
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		2.5	0.5	3.0	0.1	1.5
100 %		2.5	0.5	3.0	0.1	0.9

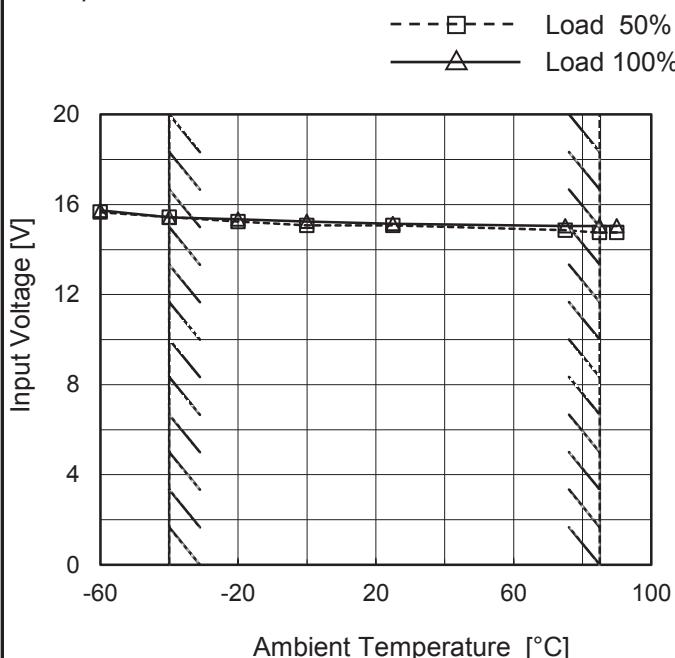


**COSEL**

Model	MGS1R52405
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V0.3A

## Testing Circuitry Figure A

## 1.Graph



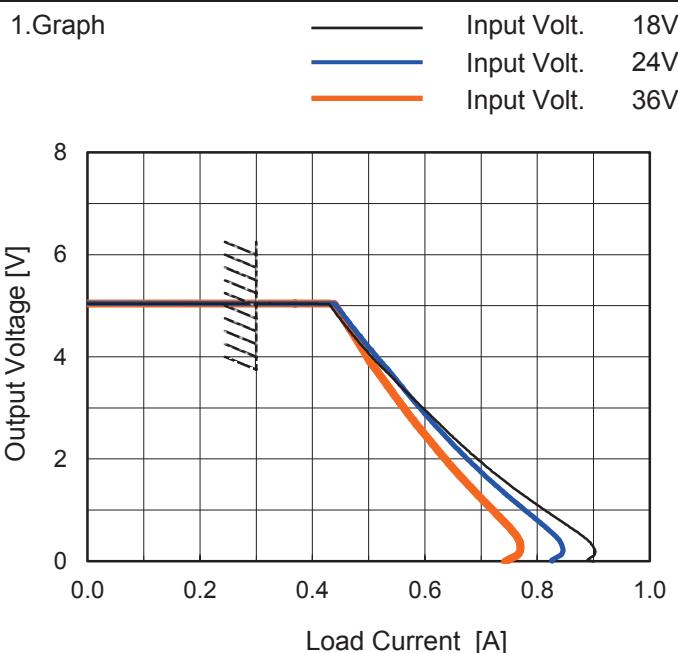
## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.7	15.8
-40	15.5	15.5
-20	15.3	15.4
0	15.1	15.3
25	15.1	15.2
75	14.9	15.1
85	14.8	15.1
90	14.8	15.1
--	-	-
--	-	-
--	-	-

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

**COSEL**

Model	MGS1R52405
Item	Overcurrent Protection
Object	+5V0.3A



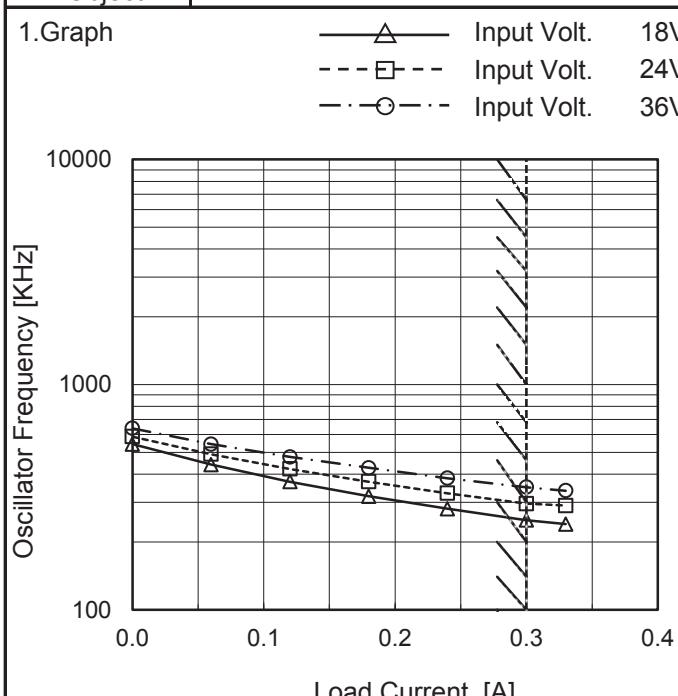
Note: Slanted line shows the range of the rated load current.

Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
5.00	0.31	0.31	0.31
4.75	0.45	0.46	0.46
4.50	0.47	0.48	0.47
4.00	0.51	0.51	0.50
3.50	0.55	0.55	0.53
3.00	0.60	0.59	0.56
2.50	0.64	0.63	0.60
2.00	0.69	0.67	0.63
1.50	0.75	0.72	0.68
1.00	0.81	0.78	0.72
0.50	0.88	0.83	0.76
0.00	0.90	0.83	0.74

**COSEL**

Model	MGS1R52405																																																					
Item	Switching frequency (by Load Current)	Temperature	25°C																																																			
Object	+5V0.3A	Testing Circuitry	Figure A																																																			
1.Graph																																																						
—△— Input Volt. 18V - - □--- Input Volt. 24V - - ○--- Input Volt. 36V			2.Values																																																			
																																																						
Note: Slanted line shows the range of the rated load current. -When load current is low, MG operates intermittently, so switching frequency would not become constant.																																																						
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Frequency [kHz]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>544</td> <td>587</td> <td>639</td> </tr> <tr> <td>0.06</td> <td>441</td> <td>491</td> <td>544</td> </tr> <tr> <td>0.12</td> <td>370</td> <td>422</td> <td>477</td> </tr> <tr> <td>0.18</td> <td>319</td> <td>370</td> <td>427</td> </tr> <tr> <td>0.24</td> <td>281</td> <td>329</td> <td>384</td> </tr> <tr> <td>0.30</td> <td>250</td> <td>296</td> <td>350</td> </tr> <tr> <td>0.33</td> <td>240</td> <td>290</td> <td>338</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Load Current [A]	Frequency [kHz]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	544	587	639	0.06	441	491	544	0.12	370	422	477	0.18	319	370	427	0.24	281	329	384	0.30	250	296	350	0.33	240	290	338	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Frequency [kHz]																																																					
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																			
0.00	544	587	639																																																			
0.06	441	491	544																																																			
0.12	370	422	477																																																			
0.18	319	370	427																																																			
0.24	281	329	384																																																			
0.30	250	296	350																																																			
0.33	240	290	338																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			

COSEL

