

TEST DATA OF MGFS1R52405

Regulated DC Power Supply
December 29, 2016

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

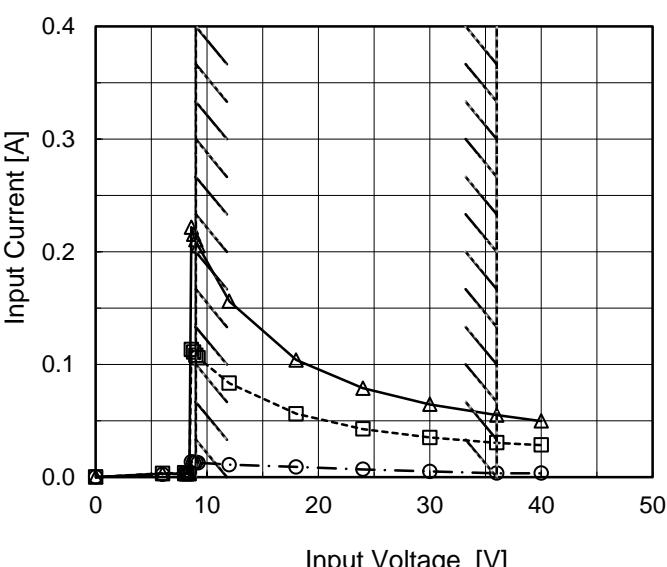
Prepared by : Takaaki Sekiguchi
Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

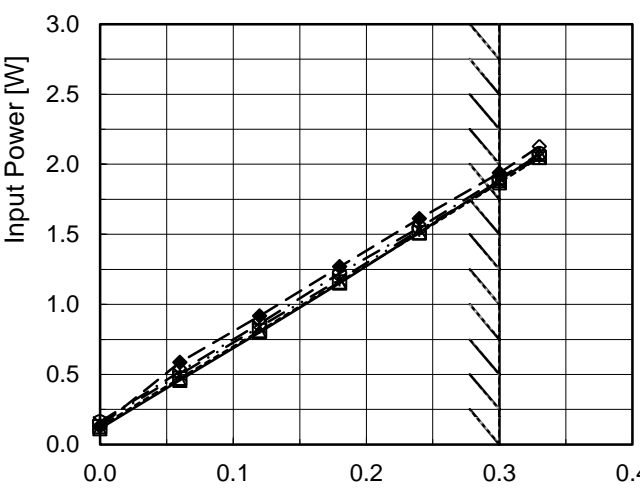
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<div><div><div>---□---</div><div>Load 50%</div><div>---△---</div><div>Load 100%</div></div><div><div>Output Voltage [V]</div><div><div>5.3</div><div>5.2</div><div>5.1</div><div>5.0</div><div>4.9</div><div>4.8</div></div><div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div></div><div>Input Voltage [V]</div></div></div>		<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>8.6</td><td>5.047</td><td>5.047</td></tr><tr><td>9.0</td><td>5.047</td><td>5.047</td></tr><tr><td>12.0</td><td>5.047</td><td>5.047</td></tr><tr><td>15.0</td><td>5.047</td><td>5.047</td></tr><tr><td>18.0</td><td>5.047</td><td>5.047</td></tr><tr><td>24.0</td><td>5.047</td><td>5.047</td></tr><tr><td>30.0</td><td>5.047</td><td>5.047</td></tr><tr><td>36.0</td><td>5.047</td><td>5.047</td></tr><tr><td>40.0</td><td>5.047</td><td>5.047</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	8.6	5.047	5.047	9.0	5.047	5.047	12.0	5.047	5.047	15.0	5.047	5.047	18.0	5.047	5.047	24.0	5.047	5.047	30.0	5.047	5.047	36.0	5.047	5.047	40.0	5.047	5.047
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<div>Note: Slanted line shows the range of the rated input voltage.</div>																																			

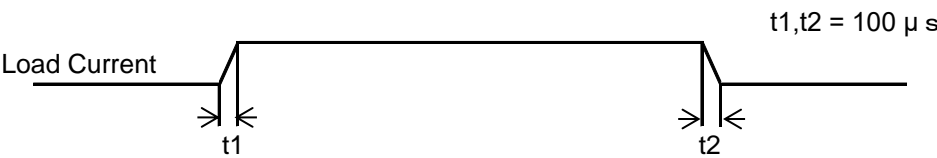
Model		MGFS1R52405		Temperature25°C																																																																															
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		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Output Voltage [V]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.00</td><td>5.049</td><td>5.049</td><td>5.049</td><td>5.049</td><td>5.049</td></tr><tr><td>0.06</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td></tr><tr><td>0.12</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td></tr><tr><td>0.18</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td><td>5.048</td></tr><tr><td>0.24</td><td>5.047</td><td>5.047</td><td>5.047</td><td>5.047</td><td>5.047</td></tr><tr><td>0.30</td><td>5.047</td><td>5.047</td><td>5.047</td><td>5.047</td><td>5.047</td></tr><tr><td>0.33</td><td>5.046</td><td>5.047</td><td>5.047</td><td>5.047</td><td>5.047</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>					Load Current [A]	Output Voltage [V]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	5.049	5.049	5.049	5.049	5.049	0.06	5.048	5.048	5.048	5.048	5.048	0.12	5.048	5.048	5.048	5.048	5.048	0.18	5.048	5.048	5.048	5.048	5.048	0.24	5.047	5.047	5.047	5.047	5.047	0.30	5.047	5.047	5.047	5.047	5.047	0.33	5.046	5.047	5.047	5.047	5.047	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
Load Current [A]	Output Voltage [V]																																																																																		
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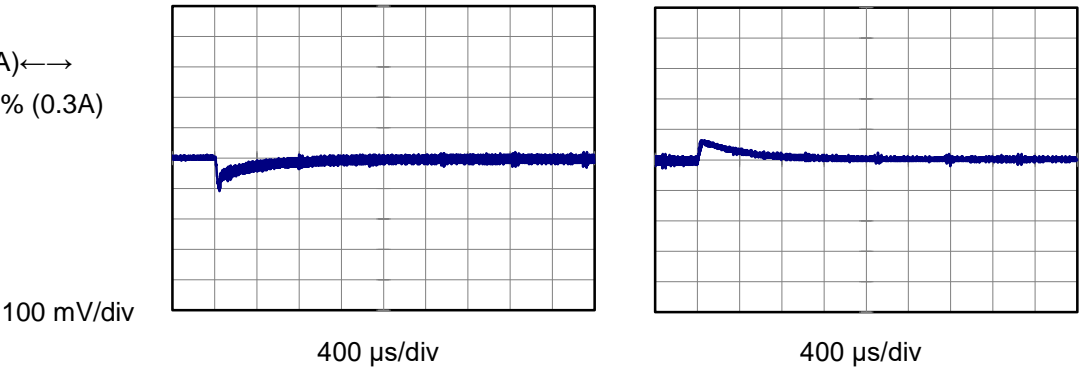


Model		MGFS1R52405	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Response	
Object		+5V0.3A	

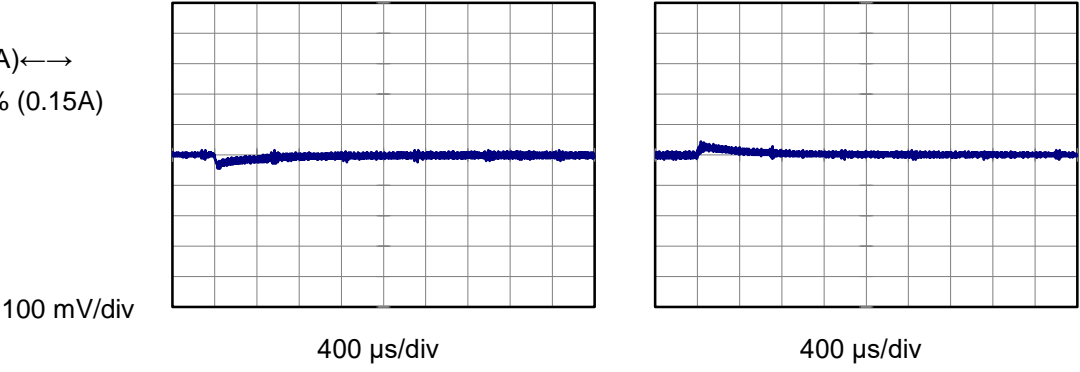
Input Volt. 24 V
Cycle 100 ms



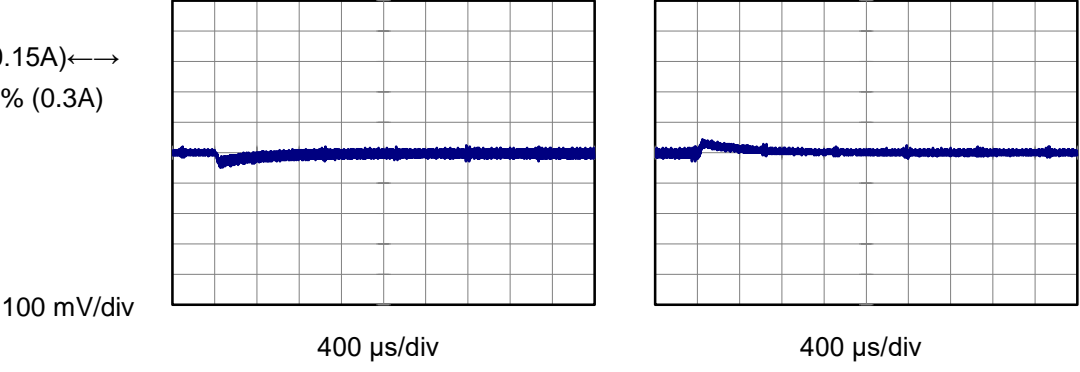
Min.Load (0A) ←→
Load 100% (0.3A)



Min.Load (0A) ←→
Load 50% (0.15A)



Load 50% (0.15A) ←→
Load 100% (0.3A)

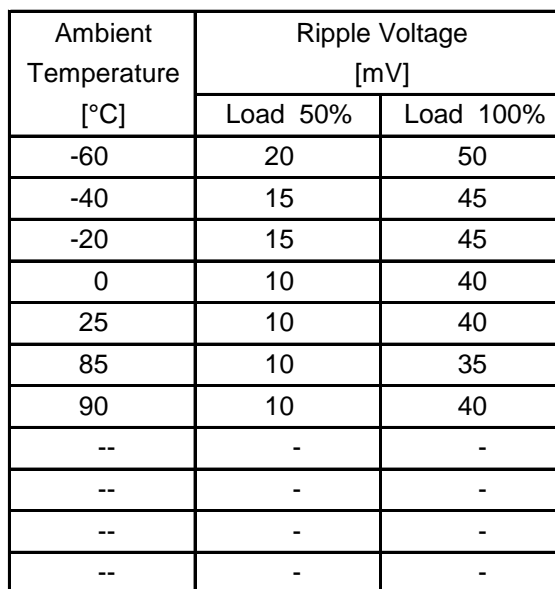


COSEL																																									
Model	MGFS1R52405																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
		Testing Circuitry	Figure B																																						
Object	+5V0.3A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>9V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>36V</div></div></div> <p>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.</p> <p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 9 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.00</td><td>5</td><td>10</td></tr><tr><td>0.06</td><td>15</td><td>10</td></tr><tr><td>0.12</td><td>25</td><td>10</td></tr><tr><td>0.18</td><td>30</td><td>10</td></tr><tr><td>0.24</td><td>50</td><td>15</td></tr><tr><td>0.30</td><td>65</td><td>25</td></tr><tr><td>0.33</td><td>75</td><td>35</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 9 [V]	Input Volt. 36 [V]	0.00	5	10	0.06	15	10	0.12	25	10	0.18	30	10	0.24	50	15	0.30	65	25	0.33	75	35	--	-	-	--	-	-	--	-	-	--	-	-
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Model		MGFS1R52405																																							
Item		Ripple-Noise																																							
Object		+5V0.3A																																							
1.Graph		2.Values																																							
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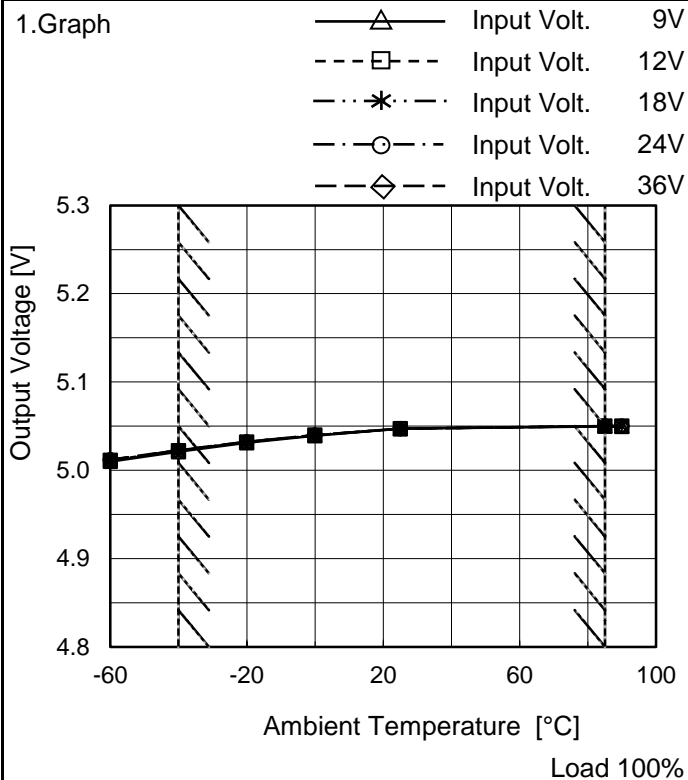
Testing Circuitry Figure B

2.Values



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

Model	MGFS1R52405
Item	Ambient Temperature Drift
Object	+5V0.3A



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

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	5.010	5.011	5.012	5.012	5.012
-40	5.021	5.022	5.022	5.023	5.023
-20	5.031	5.032	5.032	5.032	5.032
0	5.039	5.040	5.040	5.040	5.040
25	5.047	5.047	5.047	5.047	5.047
85	5.050	5.050	5.050	5.050	5.050
90	5.050	5.050	5.050	5.050	5.050
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-



Model		MGFS1R52405	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
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 : 9 - 36V

Load Current : 0 - 0.3A

* 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	75	36	0	5.052	±16	±0.3
Minimum Voltage	-40	9	0.3	5.021		

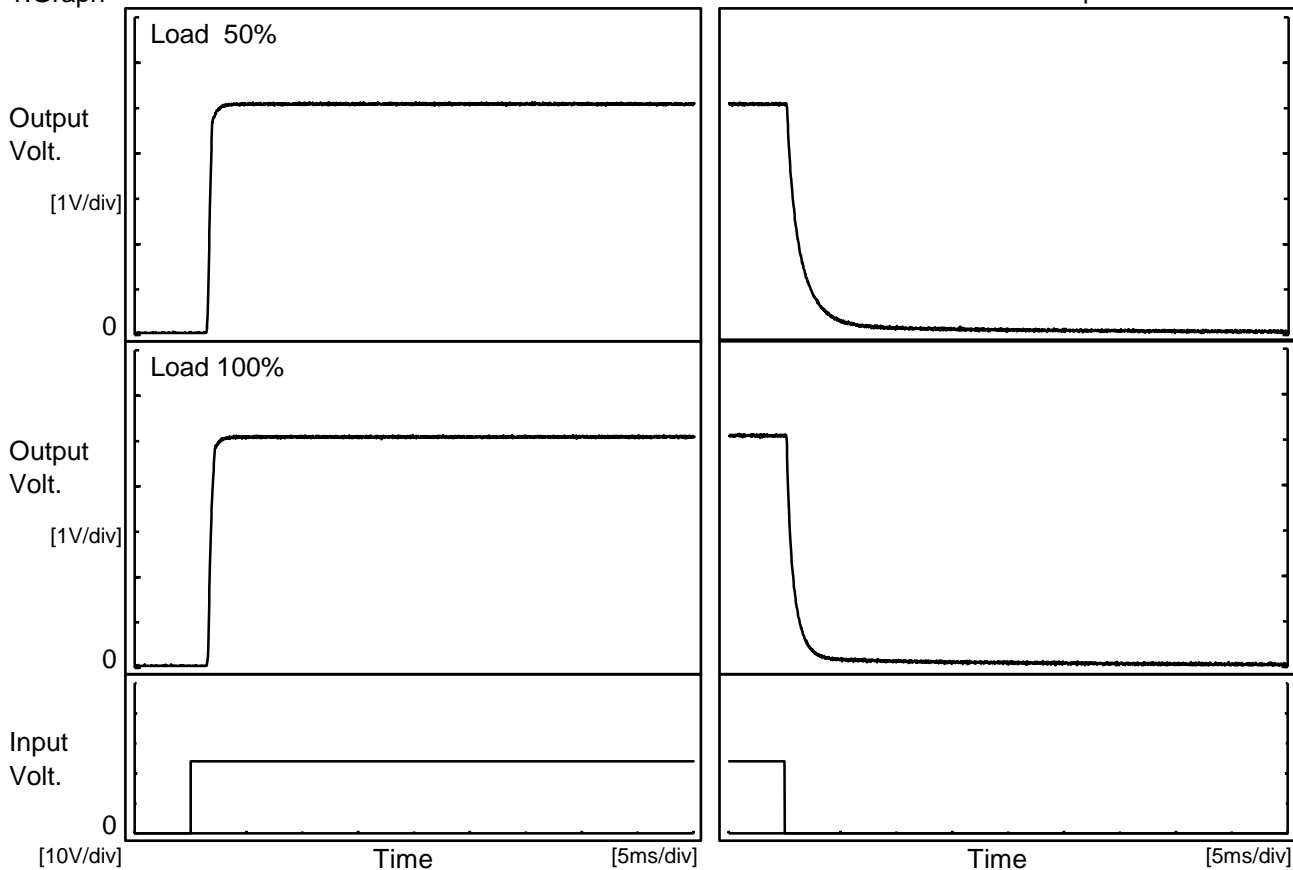


Model		MGFS1R52405		Temperature25°C Testing CircuitryFigure A	
Item		Time Lapse Drift			
Object		+5V0.3A			
1.Graph				2.Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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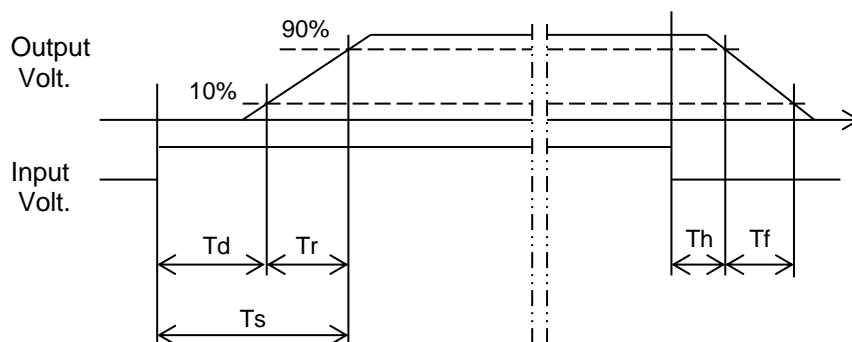
Model	MGFS1R52405	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+5V0.3A		

1.Graph



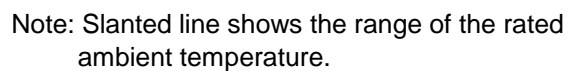
2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.6	0.4	2.0	0.3	3.3
100 %	1.6	0.5	2.1	0.2	1.7



Testing Circuitry Figure A

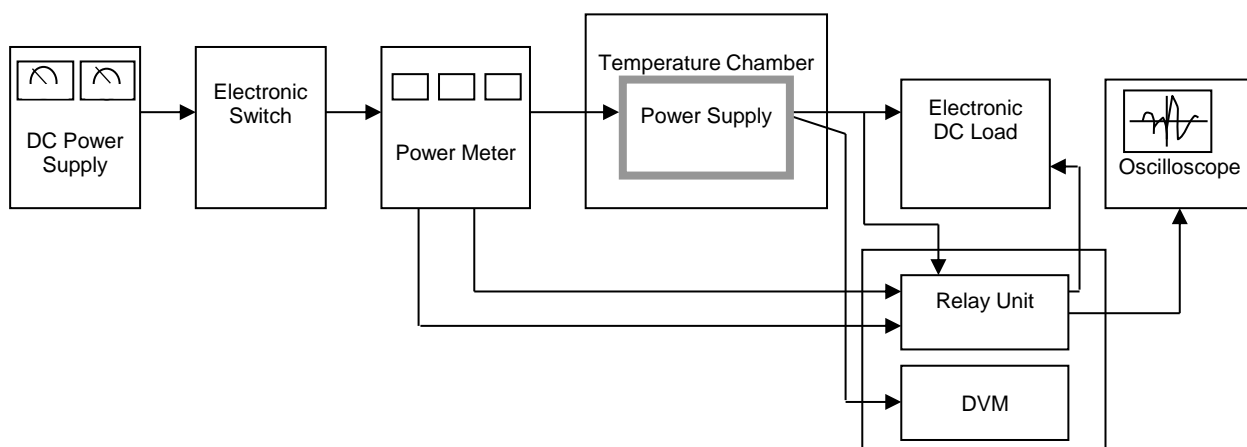
2.Values



Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.4	7.4
-40	7.4	7.4
-20	7.4	7.4
0	7.4	7.4
25	7.4	7.4
85	7.3	7.4
90	7.3	7.3
--	-	-
--	-	-
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Model	MGFS1R52405																																																																																								
Item	Overcurrent Protection																																																																																								
Object	+5V0.3A																																																																																								
1.Graph		2.Values																																																																																							
<div><div><div></div><div>Input Volt.</div><div>9V</div></div><div><div></div><div>Input Volt.</div><div>12V</div></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> <div><div>Output Voltage [V]</div><div><div>8</div><div>6</div><div>4</div><div>2</div><div>0</div></div><div><div>0.0</div><div>0.4</div><div>0.8</div><div>1.2</div></div><div>Load Current [A]</div></div> <div>Note: Slanted line shows the range of the rated load current.</div>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="5">Load Current [A]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>4.75</td><td>0.405</td><td>0.428</td><td>0.423</td><td>0.422</td><td>0.427</td></tr><tr><td>4.50</td><td>0.420</td><td>0.443</td><td>0.439</td><td>0.435</td><td>0.438</td></tr><tr><td>4.00</td><td>0.456</td><td>0.479</td><td>0.474</td><td>0.464</td><td>0.460</td></tr><tr><td>3.50</td><td>0.499</td><td>0.522</td><td>0.509</td><td>0.495</td><td>0.489</td></tr><tr><td>3.00</td><td>0.548</td><td>0.570</td><td>0.545</td><td>0.528</td><td>0.517</td></tr><tr><td>2.50</td><td>0.605</td><td>0.621</td><td>0.585</td><td>0.562</td><td>0.549</td></tr><tr><td>2.00</td><td>0.670</td><td>0.676</td><td>0.630</td><td>0.600</td><td>0.581</td></tr><tr><td>1.50</td><td>0.745</td><td>0.740</td><td>0.680</td><td>0.642</td><td>0.617</td></tr><tr><td>1.00</td><td>0.835</td><td>0.816</td><td>0.736</td><td>0.689</td><td>0.657</td></tr><tr><td>0.50</td><td>0.939</td><td>0.901</td><td>0.794</td><td>0.736</td><td>0.694</td></tr><tr><td>0.00</td><td>1.014</td><td>0.936</td><td>0.798</td><td>0.726</td><td>0.672</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>					Output Voltage [V]	Load Current [A]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	4.75	0.405	0.428	0.423	0.422	0.427	4.50	0.420	0.443	0.439	0.435	0.438	4.00	0.456	0.479	0.474	0.464	0.460	3.50	0.499	0.522	0.509	0.495	0.489	3.00	0.548	0.570	0.545	0.528	0.517	2.50	0.605	0.621	0.585	0.562	0.549	2.00	0.670	0.676	0.630	0.600	0.581	1.50	0.745	0.740	0.680	0.642	0.617	1.00	0.835	0.816	0.736	0.689	0.657	0.50	0.939	0.901	0.794	0.736	0.694	0.00	1.014	0.936	0.798	0.726	0.672	--	-	-	-	-	-
Output Voltage [V]	Load Current [A]																																																																																								
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Model		MGFS1R52405		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+5V0.3A																																																																																
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>9V</div></div><div><div>---□---</div><div>Input Volt.</div><div>12V</div></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> <div><div>Switching Frequency [kHz]</div><div><div>10000</div><div>1000</div><div>100</div></div><div><div>0.0</div><div>0.1</div><div>0.2</div><div>0.3</div><div>0.4</div></div><div>Load Current [A]</div></div>		2.Values																																																																														
		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Input Current [A]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.00</td><td>553</td><td>631</td><td>740</td><td>780</td><td>870</td></tr><tr><td>0.06</td><td>387</td><td>472</td><td>576</td><td>640</td><td>702</td></tr><tr><td>0.12</td><td>294</td><td>371</td><td>472</td><td>539</td><td>608</td></tr><tr><td>0.18</td><td>236</td><td>307</td><td>401</td><td>465</td><td>535</td></tr><tr><td>0.24</td><td>197</td><td>260</td><td>352</td><td>409</td><td>476</td></tr><tr><td>0.30</td><td>169</td><td>226</td><td>309</td><td>365</td><td>430</td></tr><tr><td>0.33</td><td>158</td><td>212</td><td>291</td><td>346</td><td>410</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Input Current [A]					Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	553	631	740	780	870	0.06	387	472	576	640	702	0.12	294	371	472	539	608	0.18	236	307	401	465	535	0.24	197	260	352	409	476	0.30	169	226	309	365	430	0.33	158	212	291	346	410	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-		
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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.																																																																																		



Data Acquisition/Control Unit

Figure A

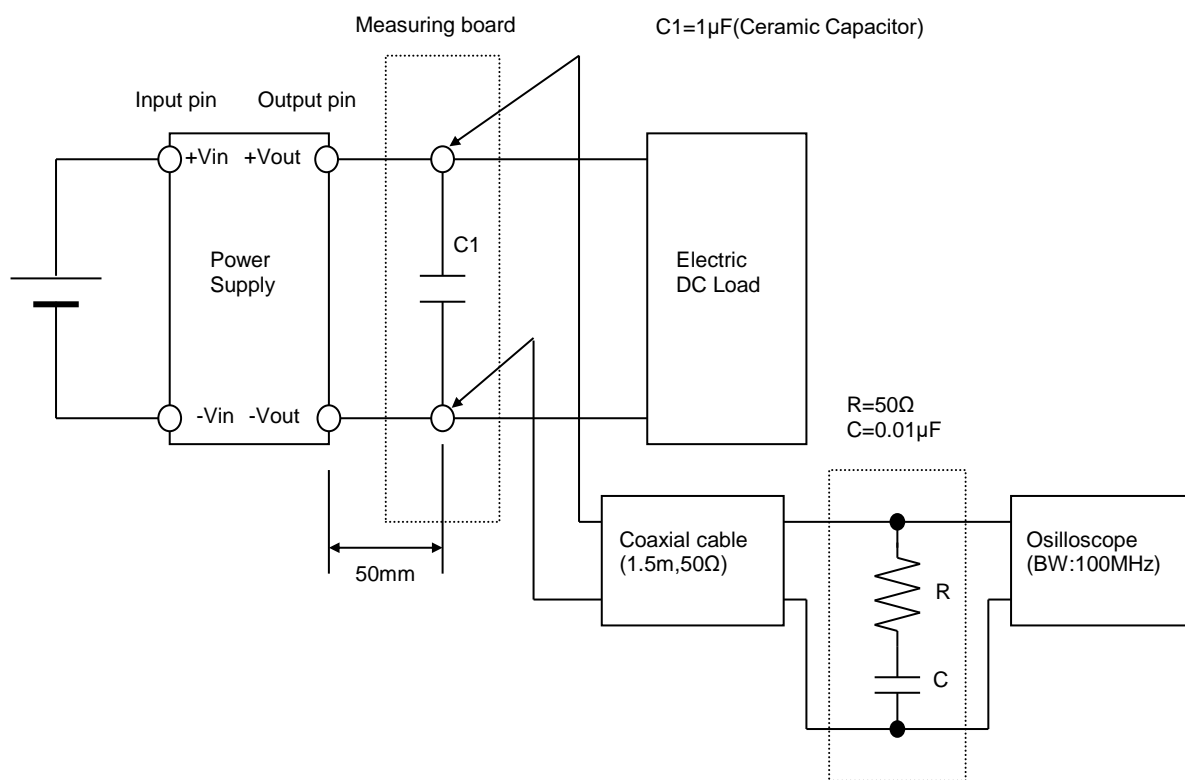


Figure B (Ripple and Ripple noise Characteristic)