

# TEST DATA OF MGXS1R52412

Regulated DC Power Supply  
February 19, 2018

Approved by : Takayuki Fukuda  
Takayuki Fukuda Design Manager

Prepared by : Masumi Kitamura  
Masumi Kitamura Design Engineer

**COSEL CO.,LTD.**

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1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>6V</div></div><div><div>---□---</div><div>Input Volt.</div><div>12V</div></div><div><div>---*---</div><div>Input Volt.</div><div>24V</div></div><div><div>---○---</div><div>Input Volt.</div><div>48V</div></div><div><div>---◇---</div><div>Input Volt.</div><div>60V</div></div></div> <div><div><div>Output Voltage [V]</div><div><div>12.60</div><div>12.40</div><div>12.20</div><div>12.00</div><div>11.80</div><div>11.60</div></div><div><div>0.00</div><div>0.05</div><div>0.10</div><div>0.15</div></div><div>Load Current [A]</div></div><div>Note: Slanted line shows the range of the rated load current.</div></div>		2.Values		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Output Voltage [V]</th></tr><tr><th>Input Volt. 6[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 60[V]</th></tr><tr><td>0.000</td><td>12.023</td><td>12.023</td><td>12.022</td><td>12.021</td><td>12.024</td></tr><tr><td>0.026</td><td>12.022</td><td>12.022</td><td>12.021</td><td>12.021</td><td>12.020</td></tr><tr><td>0.052</td><td>12.020</td><td>12.021</td><td>12.020</td><td>12.020</td><td>12.019</td></tr><tr><td>0.078</td><td>12.018</td><td>12.020</td><td>12.020</td><td>12.019</td><td>12.019</td></tr><tr><td>0.104</td><td>12.014</td><td>12.019</td><td>12.019</td><td>12.018</td><td>12.018</td></tr><tr><td>0.130</td><td>- ※</td><td>12.017</td><td>12.018</td><td>12.017</td><td>12.017</td></tr><tr><td>0.143</td><td>- ※</td><td>12.016</td><td>12.017</td><td>12.017</td><td>12.017</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> <div>※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.</div>		Load Current [A]	Output Voltage [V]					Input Volt. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]	0.000	12.023	12.023	12.022	12.021	12.024	0.026	12.022	12.022	12.021	12.021	12.020	0.052	12.020	12.021	12.020	12.020	12.019	0.078	12.018	12.020	12.020	12.019	12.019	0.104	12.014	12.019	12.019	12.018	12.018	0.130	- ※	12.017	12.018	12.017	12.017	0.143	- ※	12.016	12.017	12.017	12.017	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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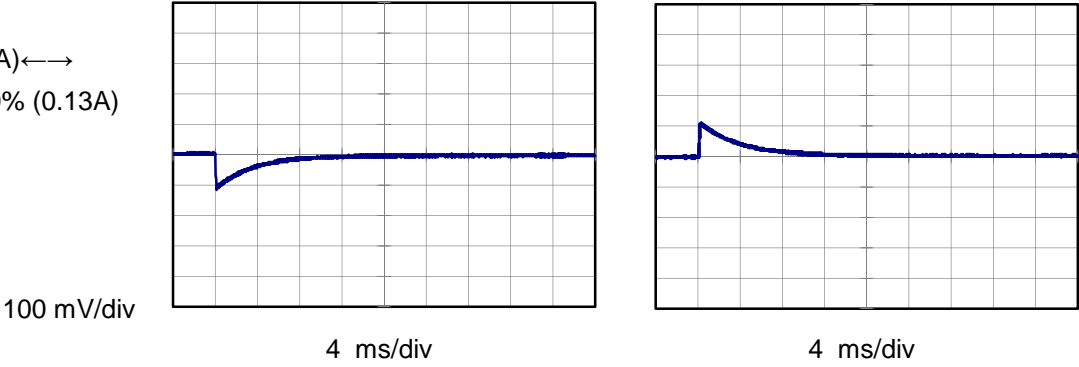


Model	MGXS1R52412		
Item	Dynamic Load Response	Temperature	25°C
Object	+12V0.13A	Testing Circuitry	Figure A

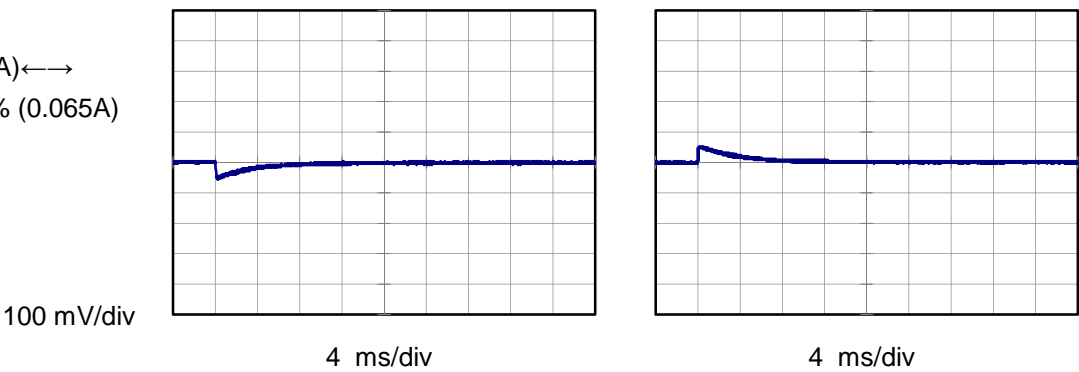
Input Volt. 24 V  
Cycle 100 ms



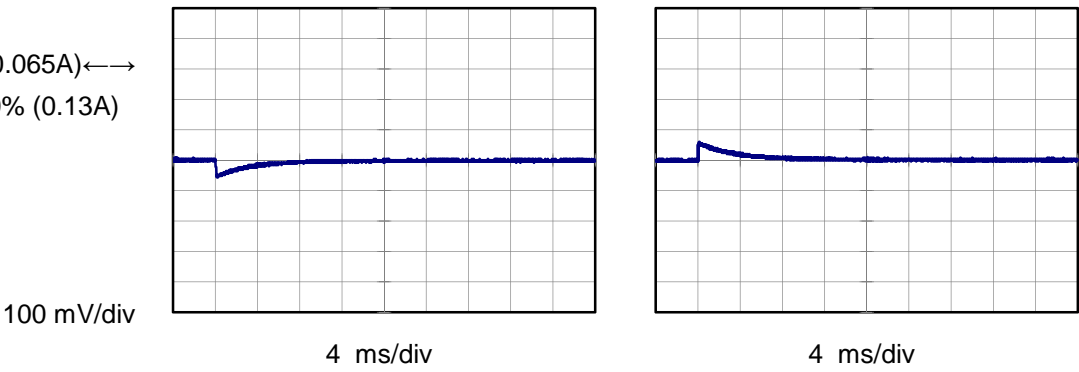
Min.Load (0A) ←→  
Load 100% (0.13A)



Min.Load (0A) ←→  
Load 50% (0.065A)



Load 50% (0.065A) ←→  
Load 100% (0.13A)

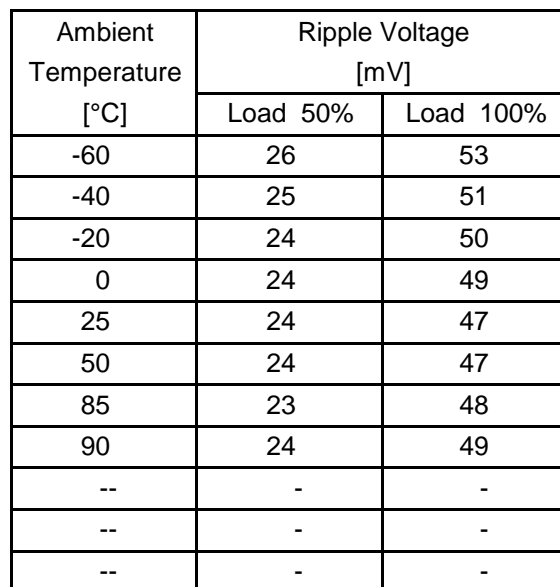


COSEL																																									
Model	MGXS1R52412																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
		Testing Circuitry	Figure B																																						
Object	+12V0.13A																																								
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 6V</div><div>- -○- - Input Volt. 60V</div></div><p>Ripple Voltage [mV]</p><p>Load Current [A]</p></div> <div><p>Measured by 100 MHz Oscilloscope.</p><p>Ripple Voltage is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p><p>Ripple [mVp-p]</p><p>Fig.Complex Ripple Wave Form</p></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 6 [V]</th><th>Input Volt. 60 [V]</th></tr><tr><td>0.000</td><td>4</td><td>15</td></tr><tr><td>0.026</td><td>23</td><td>9</td></tr><tr><td>0.052</td><td>44</td><td>13</td></tr><tr><td>0.065</td><td>54</td><td>17</td></tr><tr><td>0.078</td><td>67</td><td>23</td></tr><tr><td>0.104</td><td>86</td><td>34</td></tr><tr><td>0.130</td><td>- ※</td><td>37</td></tr><tr><td>0.143</td><td>- ※</td><td>38</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> <p>※ Maximum output current at minimum input Voltage is 70% of rated load current.</p> <p>Refer to instruction manuals for details of input derating.</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 6 [V]	Input Volt. 60 [V]	0.000	4	15	0.026	23	9	0.052	44	13	0.065	54	17	0.078	67	23	0.104	86	34	0.130	- ※	37	0.143	- ※	38	--	-	-	--	-	-	--	-	-
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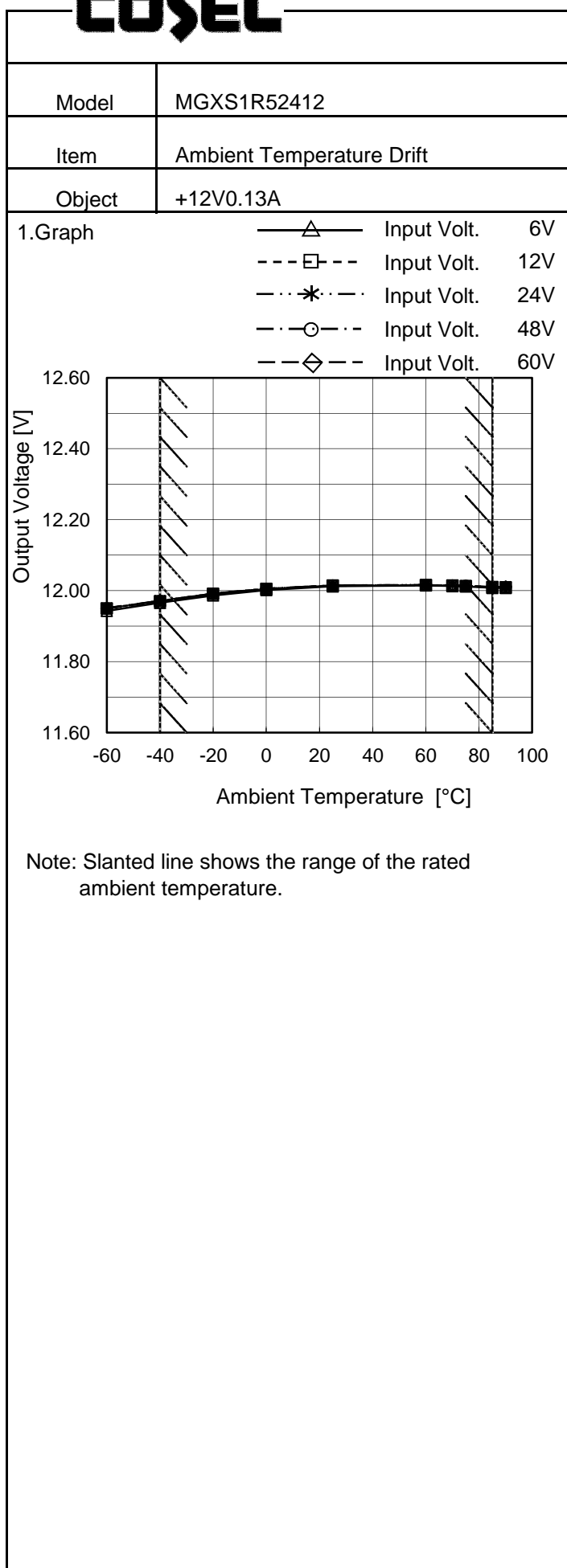
Model	MGXS1R52412																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	+12V0.13A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>6V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>60V</div></div></div> <p>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.</p> <p>Ripple Noise[mVp-p]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 6 [V]</th><th>Input Volt. 60 [V]</th></tr><tr><td>0.000</td><td>9</td><td>23</td></tr><tr><td>0.026</td><td>29</td><td>14</td></tr><tr><td>0.052</td><td>49</td><td>19</td></tr><tr><td>0.065</td><td>60</td><td>21</td></tr><tr><td>0.078</td><td>77</td><td>32</td></tr><tr><td>0.104</td><td>97</td><td>44</td></tr><tr><td>0.130</td><td>- ※</td><td>47</td></tr><tr><td>0.143</td><td>- ※</td><td>50</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> <p>※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.</p>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 6 [V]	Input Volt. 60 [V]	0.000	9	23	0.026	29	14	0.052	49	19	0.065	60	21	0.078	77	32	0.104	97	44	0.130	- ※	47	0.143	- ※	50	--	-	-	--	-	-	--	-	-
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Testing Circuitry Figure B

## 2.Values



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. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]
-60	11.943	11.950	11.951	11.950	11.950
-40	11.966	11.970	11.971	11.971	11.971
-20	11.987	11.991	11.992	11.991	11.991
0	12.002	12.005	12.005	12.005	12.005
25	12.012	12.014	12.015	12.015	12.014
60	12.015	12.016	12.016	12.016	12.016
70	12.013	12.014	12.015	12.015	12.014
75	12.012	12.013	12.013	12.013	12.013
85	12.008	12.010	12.010	12.010	12.010
90	12.008	12.009	12.010	12.010	12.011
--	-	-	-	-	-

Note: In case of input Volt. 6V, Load 70%.  
Other case Load 100%.



Model		MGXS1R52412	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+12V0.13A	

### 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 : 6 - 60V

Load Current : 0 - 0.13A

\* 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	85	60	0	12.024	±29	±0.2
Minimum Voltage	-40	6	0.091 ※	11.966		

※ Maximum output current at minimum input Voltage is 70% of rated load current.  
Refer to instruction manuals for details of input derating.



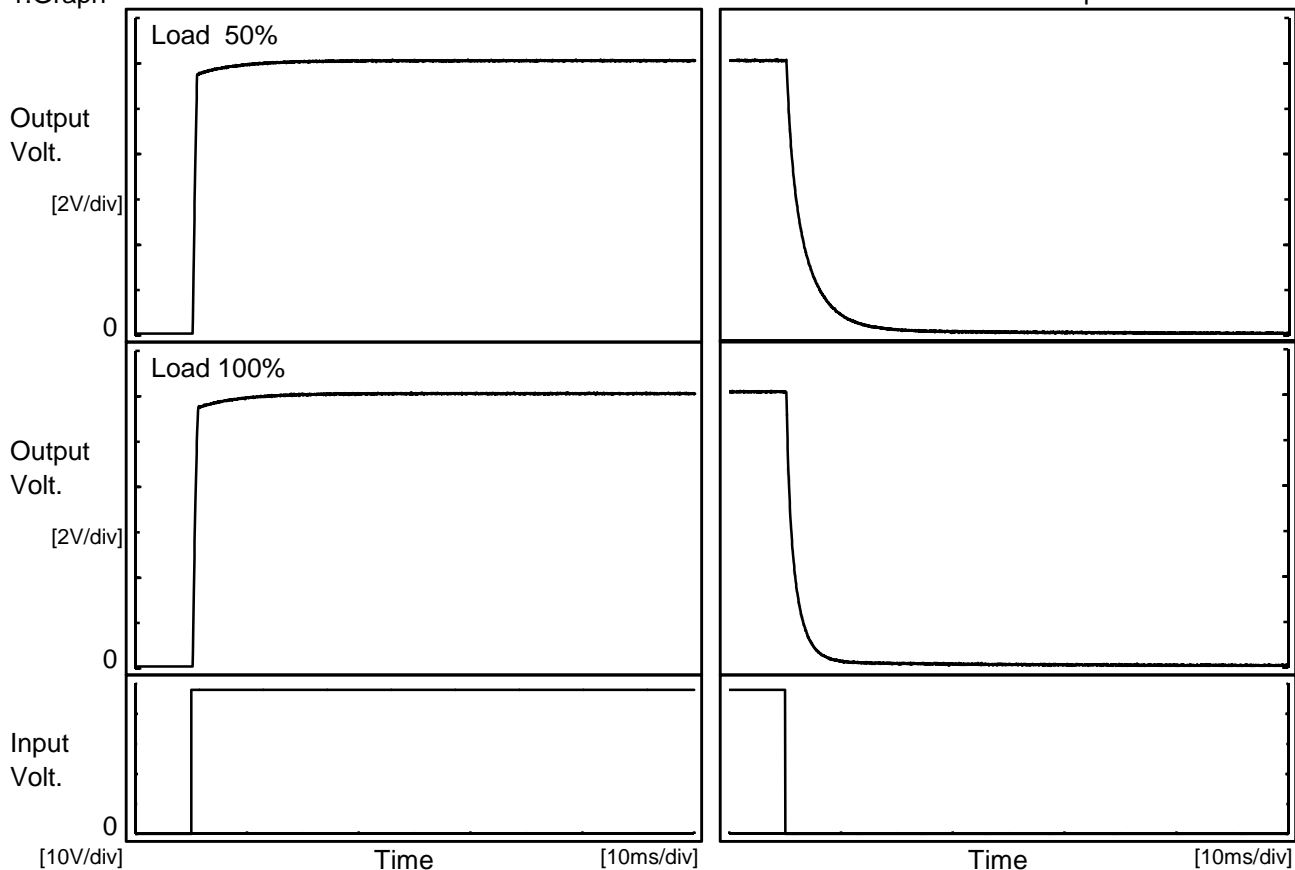
Model		MGXS1R52412	Temperature25°C Testing CircuitryFigure A
Item		Time Lapse Drift	
Object		+12V0.13A	
1.Graph			2.Values
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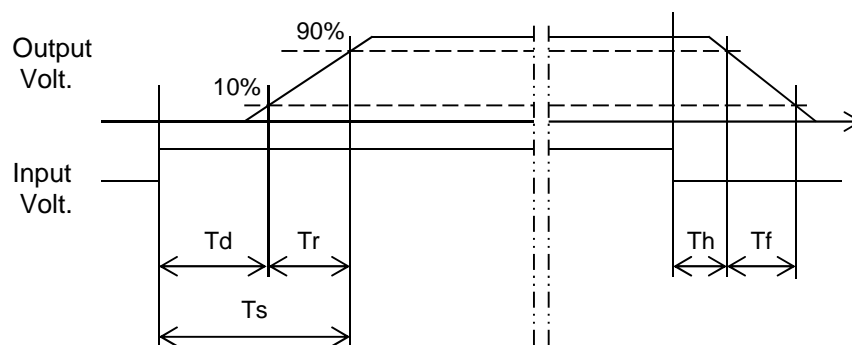
Model	MGXS1R52412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.13A		

# 1.Graph



# 2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.4	0.7	1.1	0.4	7.9
100 %	0.4	0.8	1.2	0.3	3.9





Model		MGXS1R52412	Testing Circuitry    Figure A
Item		Minimum Input Voltage for Regulated Output Voltage	
Object		+12V0.13A	
1.Graph			2.Values
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> 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Model		MGXS1R52412		Temperature 25°C																																																																																				
Item		Overcurrent Protection		Testing Circuitry Figure A																																																																																				
Object		+12V0.13A																																																																																						
1.Graph		<div><div><div></div>Input Volt. 6V</div><div><div></div>Input Volt. 12V</div><div><div></div>Input Volt. 24V</div><div><div></div>Input Volt. 48V</div><div><div></div>Input Volt. 60V</div></div> <div><div><div>Output Voltage [V]</div><div><div>16</div><div>12</div><div>8</div><div>4</div><div>0</div></div><div><div>0.0</div><div>0.2</div><div>0.4</div><div>0.6</div><div>0.8</div></div></div><div>Load Current [A]</div></div>		2.Values																																																																																				
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# COSEL

Model		MGXS1R52412		Temperature 25°C																																																																												
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																												
Object		+12V0.13A																																																																														
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<div><div>Switching Frequency [kHz]</div><div><div>1000</div><div>100</div><div>10</div><div>0.00</div><div>0.05</div><div>0.10</div><div>0.15</div><div>Load Current [A]</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Input Current [A]</th></tr><tr><th>Input Volt. 6[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 60[V]</th></tr><tr><td>0.000</td><td>217</td><td>321</td><td>415</td><td>480</td><td>505</td></tr><tr><td>0.026</td><td>158</td><td>263</td><td>362</td><td>434</td><td>449</td></tr><tr><td>0.052</td><td>123</td><td>222</td><td>320</td><td>394</td><td>411</td></tr><tr><td>0.065</td><td>111</td><td>206</td><td>303</td><td>377</td><td>393</td></tr><tr><td>0.078</td><td>101</td><td>192</td><td>287</td><td>361</td><td>377</td></tr><tr><td>0.091</td><td>92</td><td>180</td><td>273</td><td>346</td><td>363</td></tr><tr><td>0.104</td><td>84</td><td>169</td><td>260</td><td>332</td><td>349</td></tr><tr><td>0.111</td><td>82</td><td>165</td><td>255</td><td>327</td><td>343</td></tr><tr><td>0.130</td><td>- ※</td><td>151</td><td>238</td><td>308</td><td>325</td></tr><tr><td>0.143</td><td>- ※</td><td>143</td><td>228</td><td>298</td><td>314</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. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]	0.000	217	321	415	480	505	0.026	158	263	362	434	449	0.052	123	222	320	394	411	0.065	111	206	303	377	393	0.078	101	192	287	361	377	0.091	92	180	273	346	363	0.104	84	169	260	332	349	0.111	82	165	255	327	343	0.130	- ※	151	238	308	325	0.143	- ※	143	228	298	314	--	-	-	-	-	-
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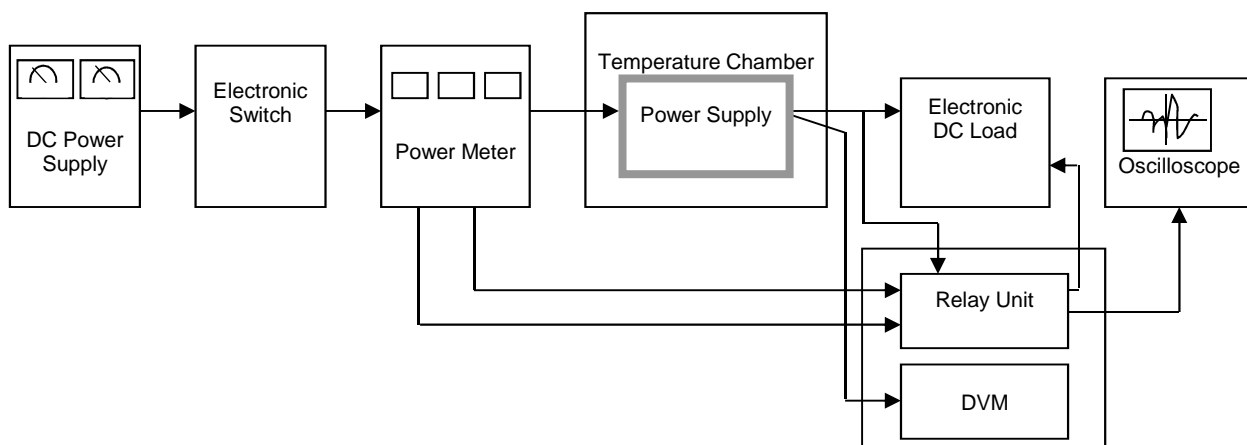


Figure A

Data Acquisition/Control Unit

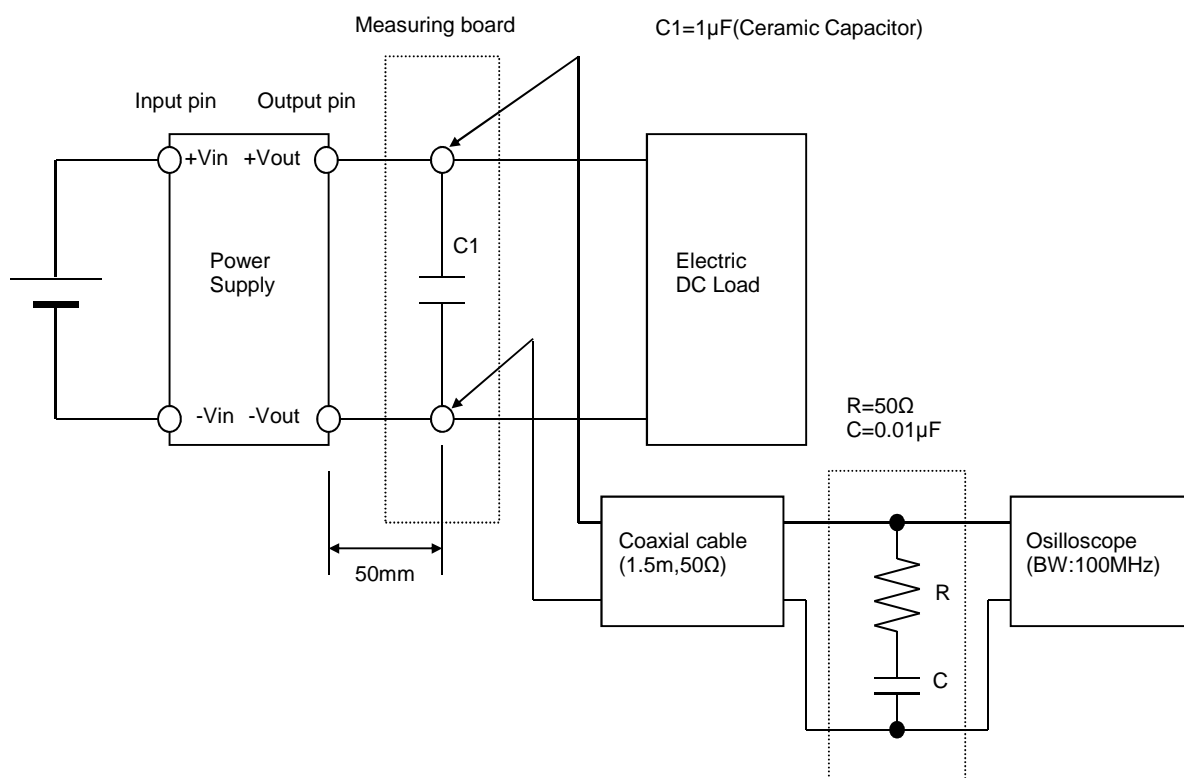


Figure B (Ripple and Ripple noise Characteristic)