

# TEST DATA OF GT3-24

Regulated DC Power Supply  
July 23, 2010

Approved by : Eiyoshi Wakamatsu  
Eiyoshi Wakamatsu Design Manager

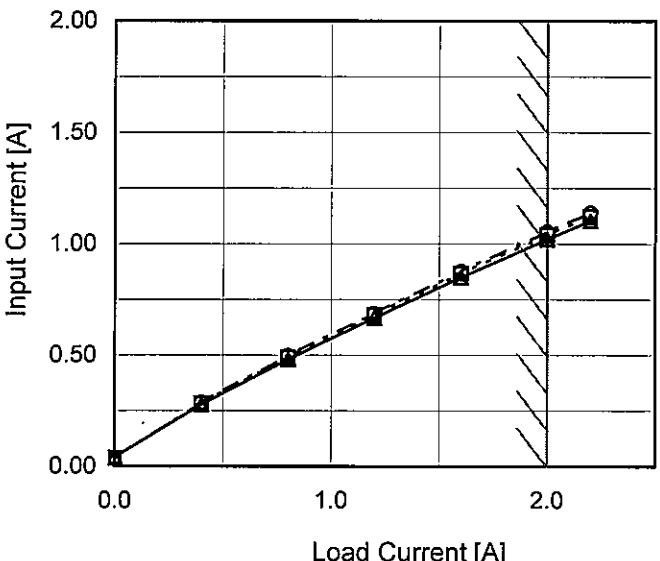
Prepared by : Satoshi Kinoshita  
Satoshi Kinoshita Design Engineer

**COSEL CO.,LTD.**

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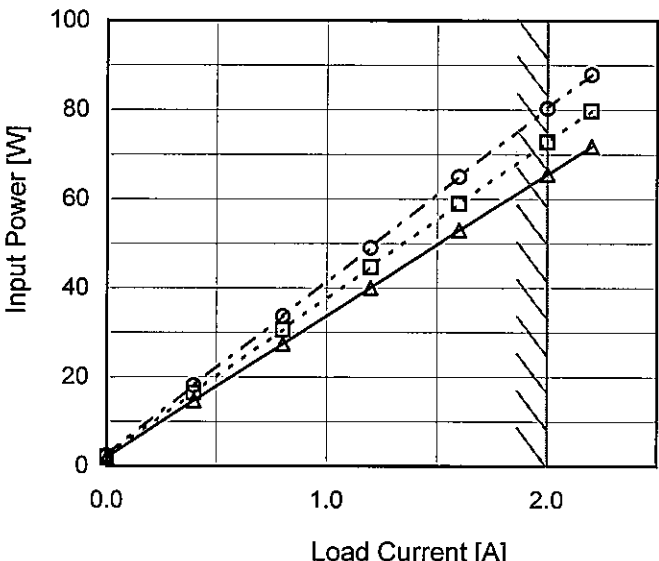
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Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
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1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>---○---</div><div>Input Volt.</div><div>110V</div></div></div>  <p>Note: Slanted line shows the range of the rated load current.</p>		2.Values																																																				
		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>0.0</td><td>0.041</td><td>0.038</td><td>0.036</td></tr><tr><td>0.4</td><td>0.278</td><td>0.284</td><td>0.288</td></tr><tr><td>0.8</td><td>0.481</td><td>0.490</td><td>0.497</td></tr><tr><td>1.2</td><td>0.667</td><td>0.680</td><td>0.687</td></tr><tr><td>1.6</td><td>0.851</td><td>0.866</td><td>0.877</td></tr><tr><td>2.0</td><td>1.022</td><td>1.040</td><td>1.055</td></tr><tr><td>2.2</td><td>1.105</td><td>1.121</td><td>1.140</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></table>				Load Current [A]	Input Current [A]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.0	0.041	0.038	0.036	0.4	0.278	0.284	0.288	0.8	0.481	0.490	0.497	1.2	0.667	0.680	0.687	1.6	0.851	0.866	0.877	2.0	1.022	1.040	1.055	2.2	1.105	1.121	1.140	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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# COSEL

Model

GT3-24

Item

Efficiency (by Input Voltage)

Object

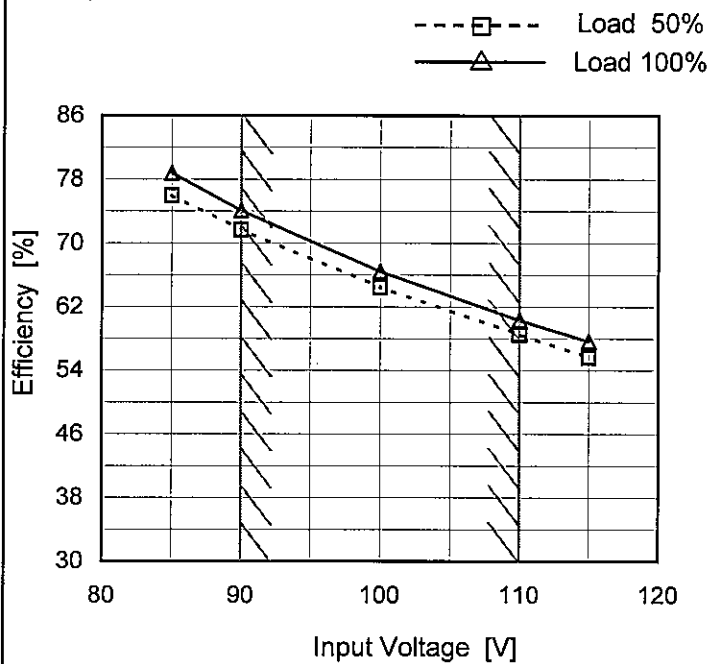
Temperature

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%
85	75.9	78.8
90	71.7	74.1
100	64.4	66.5
110	58.5	60.3
115	55.7	57.7
--	-	-
--	-	-
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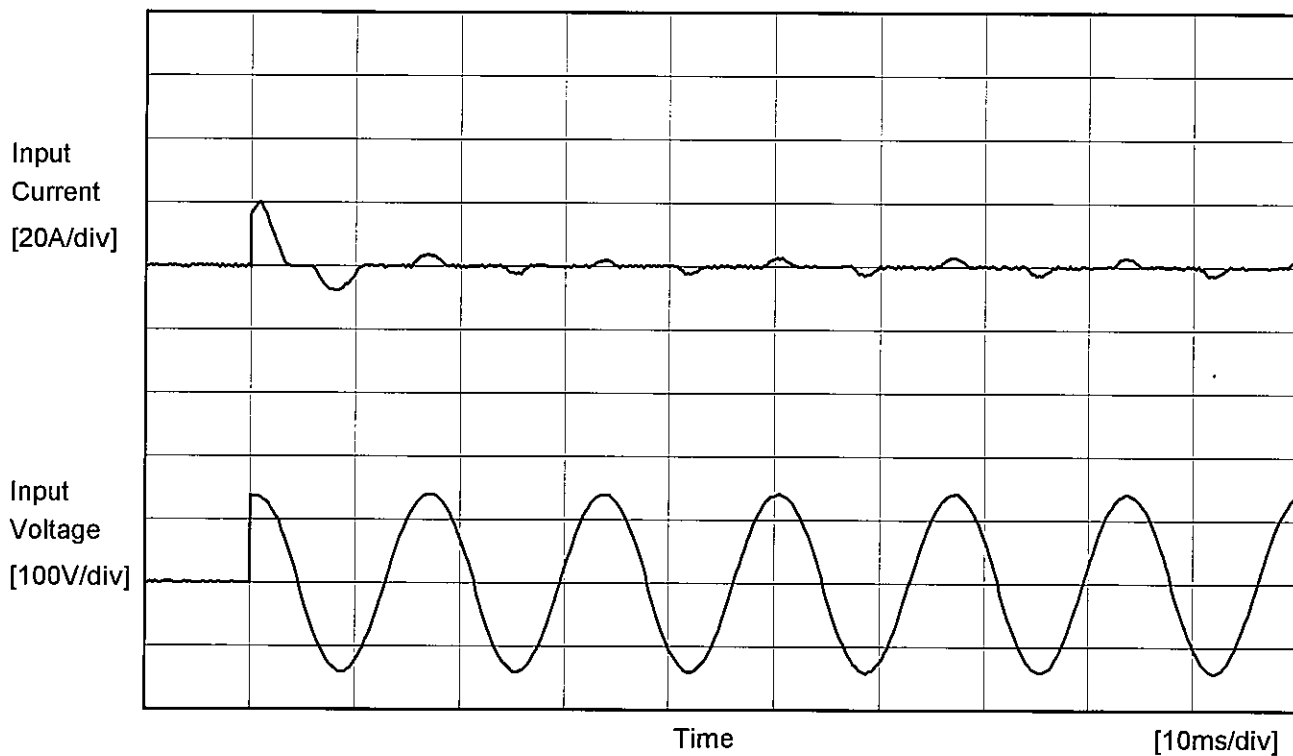
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Model		GT3-24	
Item		Power Factor (by Input Voltage)	
Object			
1.Graph		2.Values	
<div><div><div><div><div></div><div></div></div><div></div></div><div>Load 50%</div></div><div><div><div><div></div><div></div></div><div></div></div><div>Load 100%</div></div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Power Factor</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Input Voltage [V]</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Note: Slanted line shows the range of the rated input voltage.</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Input Voltage</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Power Factor</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Load 50%</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>Load 100%</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>85</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>90</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>100</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>110</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>115</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>--</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>--</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>--</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>--</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.660</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.654</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.643</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.634</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.630</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.718</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.713</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.702</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.692</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>0.688</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><div></div></div><div>-</div></div> <div><div><div><div><div></div><div></div></div><div></div></div><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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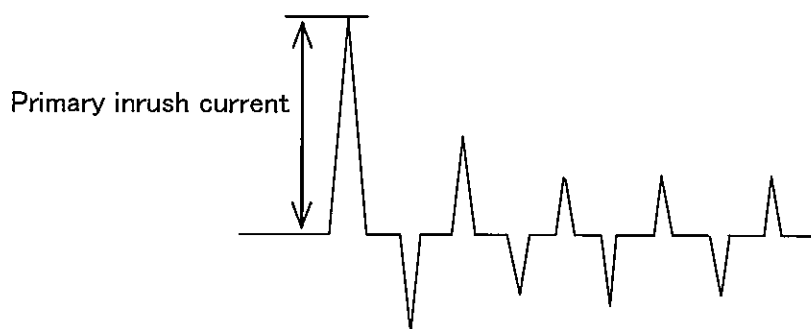


Model		GT3-24	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	



Input Voltage 100 V  
Frequency 60 Hz  
Load 100 %

Primary inrush current 20.0 A



Model	GT3-24																																
Item	Line Regulation	Temperature	25°C																														
Object	+24V2A	Testing Circuitry	Figure A																														
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<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>---○---</div><div>Input Volt.</div><div>110V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>0.0</td><td>24.183</td><td>24.183</td><td>24.184</td></tr><tr><td>0.4</td><td>24.183</td><td>24.183</td><td>24.183</td></tr><tr><td>0.8</td><td>24.183</td><td>24.183</td><td>24.183</td></tr><tr><td>1.2</td><td>24.183</td><td>24.183</td><td>24.183</td></tr><tr><td>1.6</td><td>24.183</td><td>24.183</td><td>24.183</td></tr><tr><td>2.0</td><td>24.183</td><td>24.183</td><td>24.183</td></tr><tr><td>2.2</td><td>24.183</td><td>24.183</td><td>24.183</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></table>		Load Current [A]	Output Voltage [V]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.0	24.183	24.183	24.184	0.4	24.183	24.183	24.183	0.8	24.183	24.183	24.183	1.2	24.183	24.183	24.183	1.6	24.183	24.183	24.183	2.0	24.183	24.183	24.183	2.2	24.183	24.183	24.183	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																			
0.0	24.183	24.183	24.184																																																			
0.4	24.183	24.183	24.183																																																			
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2.0	24.183	24.183	24.183																																																			
2.2	24.183	24.183	24.183																																																			
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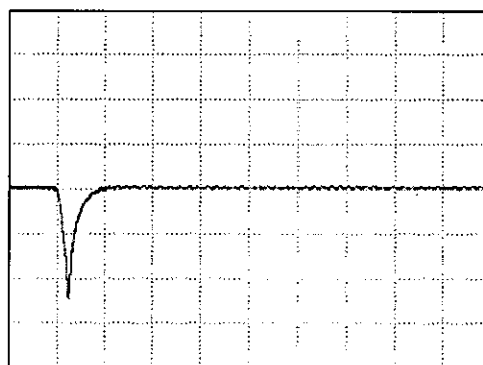
Model	GT3-24	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+24V2A		

Input Volt. 100 V  
Cycle 1000 ms

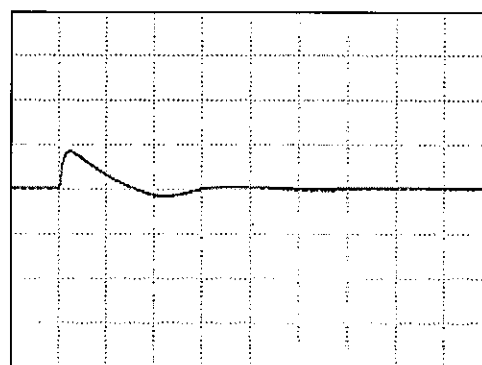
Load Current

Min. Load (0A) ←→  
Load 100% (2A)

100 mV/div



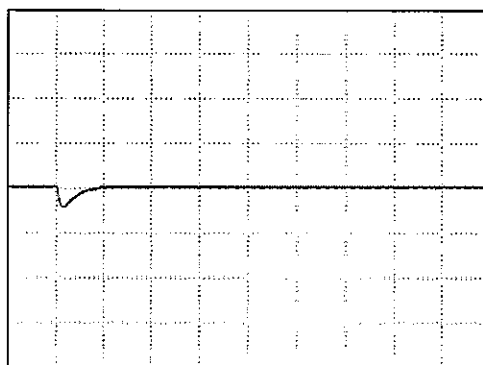
100 μs/div



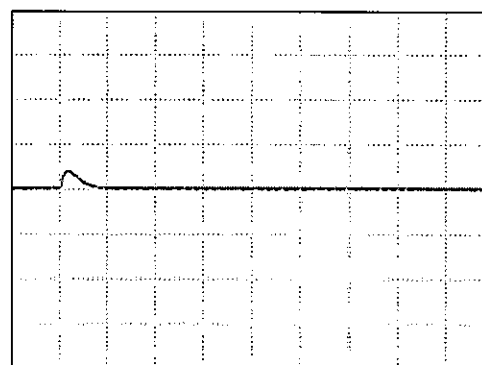
100 μs/div

Load 50% (1A) ←→  
Load 100% (2A)

100 mV/div



100 μs/div



100 μs/div

# COSEL

Model	GT3-24																																											
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																									
Object	+24V2A	Testing Circuitry	Figure A																																									
1.Graph		2.Values																																										
<div><div><div>—△—</div><div>Input Volt. 90V</div></div><div><div>-·-○-·-</div><div>Input Volt. 110V</div></div></div> <p>Ripple Voltage [mV]</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 90 [V]</th><th>Input Volt. 110 [V]</th></tr><tr><td>0.0</td><td>1.5</td><td>1.5</td></tr><tr><td>1.0</td><td>1.5</td><td>1.5</td></tr><tr><td>2.0</td><td>1.5</td><td>1.5</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><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><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. 90 [V]	Input Volt. 110 [V]	0.0	1.5	1.5	1.0	1.5	1.5	2.0	1.5	1.5	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																											
	Input Volt. 90 [V]	Input Volt. 110 [V]																																										
0.0	1.5	1.5																																										
1.0	1.5	1.5																																										
2.0	1.5	1.5																																										
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--	-	-																																										
<p>Measured by 20 MHz Oscilloscope.</p> <p>Note: Slanted line shows the range of the rated load current.</p>																																												

BC-10198

Model	GT3-24																																																					
Item	Ambient Temperature Drift		Testing Circuitry    Figure A																																																			
Object	+24V2A																																																					
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>---○---</div><div>Input Volt.</div><div>110V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>-20</td><td>24.172</td><td>24.172</td><td>24.172</td></tr><tr><td>-10</td><td>24.182</td><td>24.182</td><td>24.183</td></tr><tr><td>0</td><td>24.189</td><td>24.189</td><td>24.190</td></tr><tr><td>10</td><td>24.192</td><td>24.192</td><td>24.193</td></tr><tr><td>20</td><td>24.194</td><td>24.194</td><td>24.194</td></tr><tr><td>25</td><td>24.192</td><td>24.192</td><td>24.193</td></tr><tr><td>30</td><td>24.190</td><td>24.190</td><td>24.190</td></tr><tr><td>40</td><td>24.185</td><td>24.185</td><td>24.185</td></tr><tr><td>50</td><td>24.174</td><td>24.175</td><td>24.175</td></tr><tr><td>60</td><td>24.160</td><td>24.160</td><td>24.161</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	-20	24.172	24.172	24.172	-10	24.182	24.182	24.183	0	24.189	24.189	24.190	10	24.192	24.192	24.193	20	24.194	24.194	24.194	25	24.192	24.192	24.193	30	24.190	24.190	24.190	40	24.185	24.185	24.185	50	24.174	24.175	24.175	60	24.160	24.160	24.161	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]																																																			
-20	24.172	24.172	24.172																																																			
-10	24.182	24.182	24.183																																																			
0	24.189	24.189	24.190																																																			
10	24.192	24.192	24.193																																																			
20	24.194	24.194	24.194																																																			
25	24.192	24.192	24.193																																																			
30	24.190	24.190	24.190																																																			
40	24.185	24.185	24.185																																																			
50	24.174	24.175	24.175																																																			
60	24.160	24.160	24.161																																																			
--	-	-	-																																																			



		Testing Circuitry Figure A
Model	GT3-24	
Item	Output Voltage Accuracy	
Object	+24V2A	

### 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 : -10 - 50°C

Input Voltage : 90 - 110V

Load Current : 0 - 2A

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

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

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	20	110	0	24.195	±11	±0.1
Minimum Voltage	50	90	2	24.174		



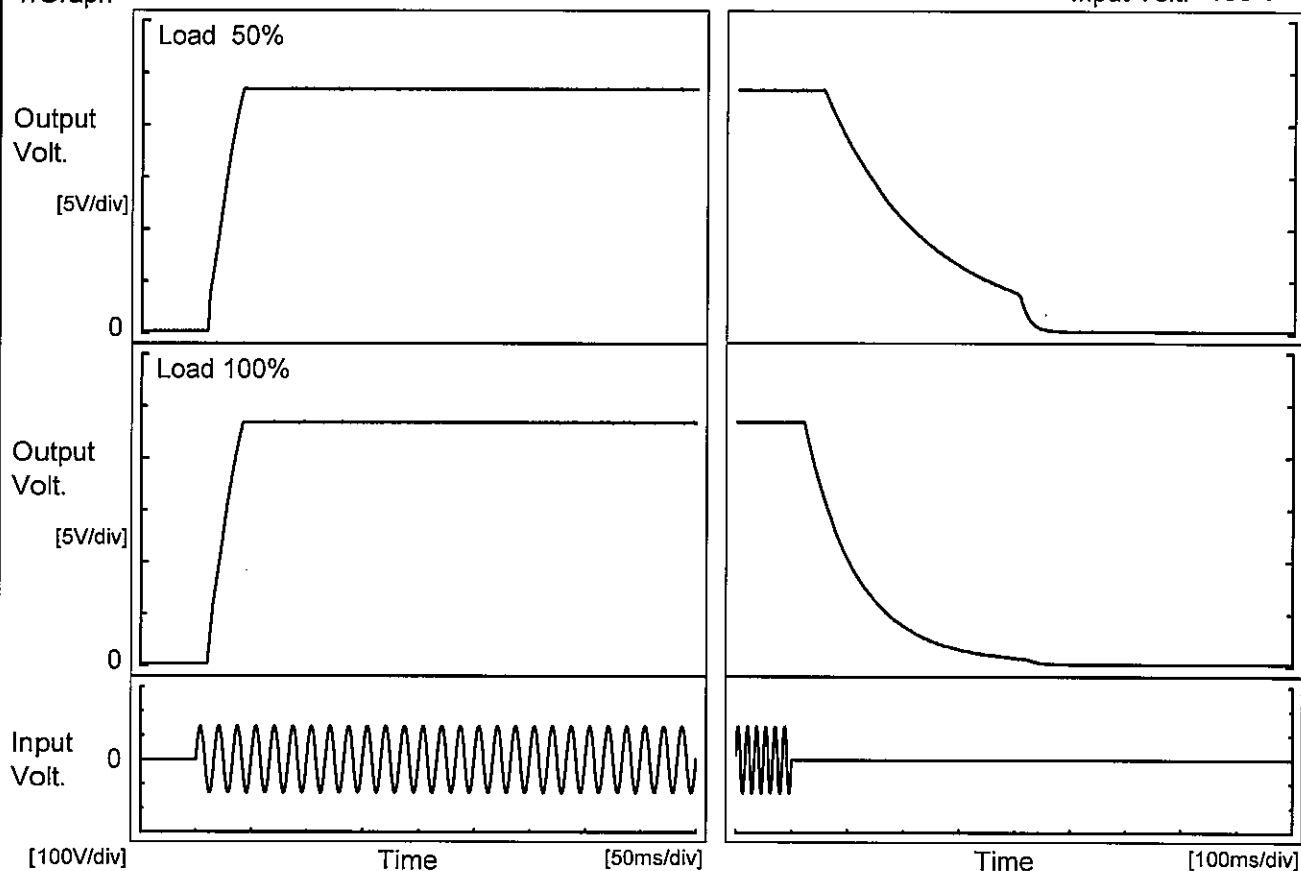
# COSEL

Model	GT3-24	Temperature25°C Testing CircuitryFigure A	
Item	Time Lapse Drift		
Object	+24V2A		
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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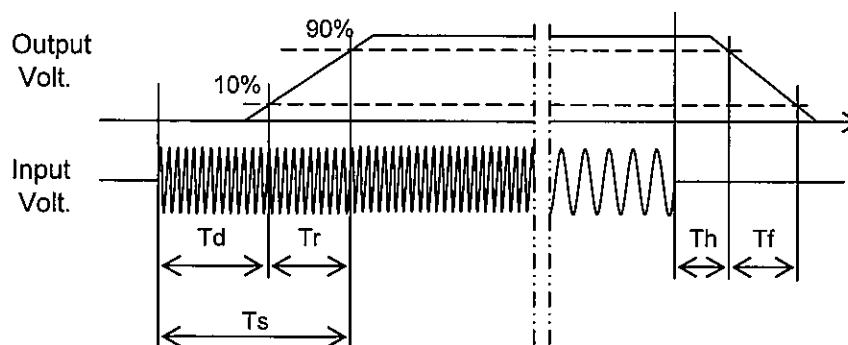
Model	GT3-24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V2A		

## 1. Graph



## 2. Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	11.5	26.8	38.3	68.0	345.5
100 %	12.5	26.0	38.5	28.5	216.5



BC-10198

Model	GT3-24																																																					
Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+24V2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>110V</div></div></div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.4</td><td>89</td><td>156</td><td>223</td></tr><tr><td>0.8</td><td>38</td><td>72</td><td>106</td></tr><tr><td>1.2</td><td>21</td><td>39</td><td>69</td></tr><tr><td>1.6</td><td>5</td><td>22</td><td>39</td></tr><tr><td>2.0</td><td>4</td><td>21</td><td>37</td></tr><tr><td>2.2</td><td>4</td><td>21</td><td>22</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></table>		Load Current [A]	Time [ms]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.0	-	-	-	0.4	89	156	223	0.8	38	72	106	1.2	21	39	69	1.6	5	22	39	2.0	4	21	37	2.2	4	21	22	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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# COSEL

Model

GT3-24

Item

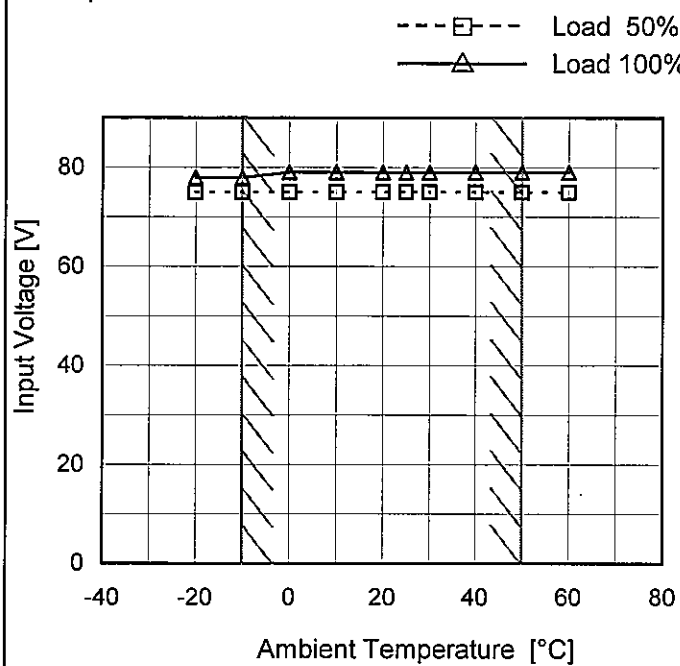
Minimum Input Voltage  
for Regulated Output Voltage

Object

+24V2A

Testing Circuitry Figure A

## 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%
-20	75	78
-10	75	78
0	75	79
10	75	79
20	75	79
25	75	79
30	75	79
40	75	79
50	75	79
60	75	79
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# COSEL

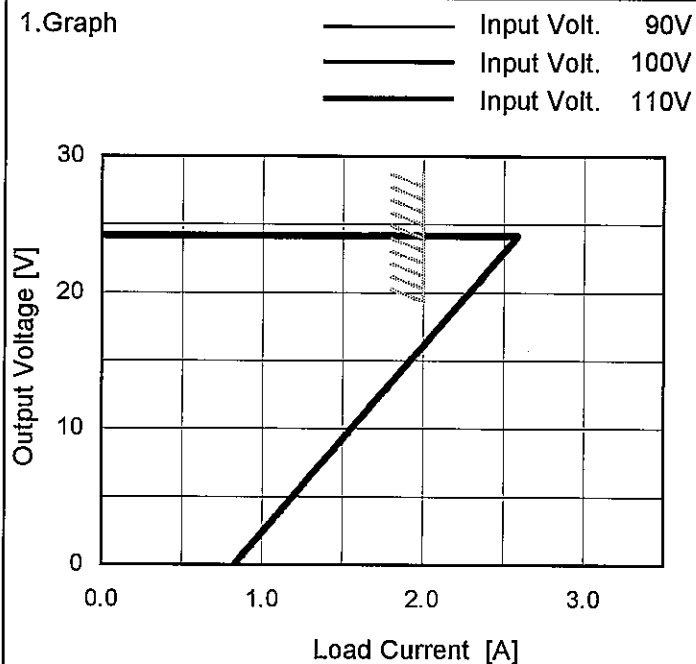
Model GT3-24

Item Overcurrent Protection

Object +24V2A

 Temperature 25°C  
 Testing Circuitry Figure A

## 1. Graph



## 2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
24.0	2.58	2.58	2.58
22.8	2.48	2.48	2.48
21.6	2.42	2.43	2.40
19.2	2.23	2.23	2.23
16.8	2.05	2.05	2.06
14.4	1.89	1.89	1.89
12.0	1.70	1.70	1.70
9.6	1.54	1.53	1.53
7.2	1.35	1.35	1.35
4.8	1.18	1.18	1.18
2.4	1.00	1.01	1.01
0.0	0.83	0.83	0.83

**COSEL**

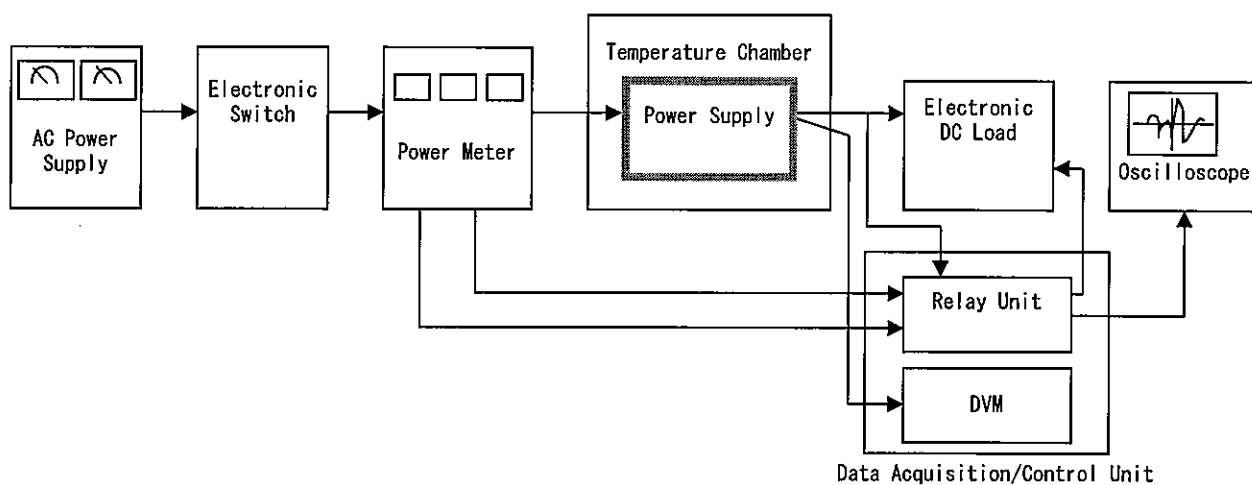


Figure A