

# 信 頼 性 試 験 デ ー タ

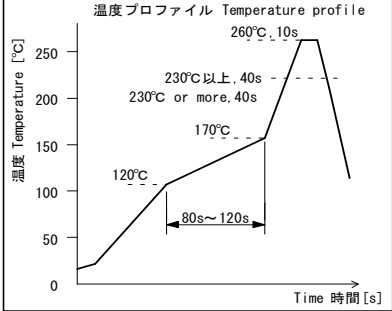
## RELIABILITY TEST DATA

品名	メタルグレース皮膜半固定可変抵抗器
Product Name	VARIABLE RESISTOR
形番	
Model No.	VG039NCHXT
管理No.	
Control No.	DS-1056
日付	
Date	2020/11/30

北 陸 電 気 工 業 株 式 会 社  
コ ン ポ ー ネ ン ト 事 業 本 部  
機 構 部 品 工 場  
HOKURIKU ELECTRIC INDUSTRY CO., LTD.  
COMPONENTS DIVISION  
MECHANICAL PARTS FACTORY

本データに記載の内容は予告なく変更する場合がありますので、お問合わせの際には表紙に記載の品名、形番及び管理No. をご連絡戴けますようお願い致します。

The contents of this reliability test data may change without prior notice. For inquiries, please refer product name, model No., and control No. written in the cover sheet of this reliability test data.

研究調査		仕様書	仕様 No. PKS-E0115										
VG039N 信頼性試験データ		作成 2015年 6月 2日											
VG039N Reliability Test Data													
項目	内容		注意事項										
1 目的 Purpose	1-1) 標記VRの信頼性について調査する。 1-1) Investigation of the reliability test of VG039N series												
2 試料 Item	2-1) VG039NCH B 100 Ω ↑ B 10 kΩ ↑ B 1 MΩ 各N=10pcs Ten pieces each examination *VG039NCHはVG039Nシリーズの代表とする。 VG039NCH is the representation of VG039N series.												
3 試験 Test method	<p>3-1) 抵抗温度特性 Temperature Coefficient (T.C.R.) 下記の温度条件にて測定する。(初期 Initial→試験後 After) The trimmer potentiometer shall be maintained in a thermostatic chamber at a temperature, according to the table as shown below.</p> <table border="1"> <thead> <tr> <th>段階 Step</th> <th>温度 [°C] Temperature</th> </tr> </thead> <tbody> <tr> <td>初期値 Initial</td> <td>+25±2</td> </tr> <tr> <td>1</td> <td>-40±3</td> </tr> <tr> <td>2</td> <td>+25±2</td> </tr> <tr> <td>3</td> <td>+100±3</td> </tr> </tbody> </table> <p>所定の温度に達してから、30 min~45 min 放置し測定する。 The measurement shall be made, after the thermostatic chamber achieved the mark temperature and maintained for 30 min ~ 45min.</p> <p>3-2) 耐振性 Vibration 掃引の割合 (10 Hz~55 Hz~10 Hz)/min, 全振幅1.5 mm, X, Y, Z方向に各2 h。 (初期 Initial → 試験後 After) The entire frequency range, from 10 Hz to 55 Hz and return to 10 Hz, shall be transverse in 1 min. Amplitude (total excursion): 1.5 mm This motion shall be applied for a period of 2 h in each of 3 mutually perpendicular directions. (A total of 6 h)</p> <p>3-3) はんだ耐熱性 Resistance to Soldering Heat <u>リフロー条件 Re-flow soldering method</u> 以下の温度プロファイルにてリフローを実施する。(初期 Initial→試験後 After) Reflow is carried out in the following temperature profiles. ピーク温度 Peak temperature : 260 °C, 10 s 230°C以上の温度 Time of 230°C or more : 40 s</p>  <p><u>手はんだ条件 Soldering iron method</u> コテ先温度 : 400 °C±10 °C, 3 s+1 s/-0 s (初期 Initial→試験後 After) Tip temperature : 400 °C±10 °C Application time of soldering iron: 3 s+1 s/-0 s</p> <p>3-4) 耐熱性 High Temperature Storage 温度70 °C±2 °Cの恒温槽中にて1 000 h±12 h放置し、取り出して常温常湿中に1 h~2 h放置し測定する。(0→250→500→1000h) The trimmer potentiometer shall be subjected in a thermostatic chamber at a temperature of 70 °C±2 °C without electrical load for 1 000 h±12 h. Then the trimmer potentiometer shall be taken out from the chamber and maintained at standard atmospheric conditions for 1 h ~ 2 h, after which measurements shall be made.</p>		段階 Step	温度 [°C] Temperature	初期値 Initial	+25±2	1	-40±3	2	+25±2	3	+100±3	
段階 Step	温度 [°C] Temperature												
初期値 Initial	+25±2												
1	-40±3												
2	+25±2												
3	+100±3												

## 研究調査 仕様書

仕様 No. PKS-E0115

項目	内容	注意事項															
3 試験 Test method	<p>3-5) 負荷耐久性 Load Life            温度<math>70\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math>の恒温槽中で定格直流電圧を端子1-3間に1.5 h加え、0.5 h切るサイクルを1 000 h<math>\pm</math>12 h繰り返し、取り出し常温常湿中に無負荷で1 h<math>\sim</math>2 h放置後測定する。(0<math>\rightarrow</math>250<math>\rightarrow</math>500<math>\rightarrow</math>1000h)            The trimmer potentiometer shall be subjected in a thermostatic chamber at a temperature of <math>70\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math> with a DC rated voltage for 1.5 h between terminals 1 and 3 followed by a pause of 30 min for 1 000 h<math>\pm</math>12 h.            Then the trimmer potentiometer shall be taken out from the chamber and maintained at standard atmospheric conditions for 1 h <math>\sim</math> 2 h without electrical load, after which measurements shall be made.</p> <p>3-6) 温度サイクル耐久性 Temperature Cycle            下表に示した温度サイクル中で放置を連続5回行う。その後、常温常湿中に1 h<math>\sim</math>2 h放置後測定する。(初期 Initial<math>\rightarrow</math>試験後 After)            The trimmer potentiometer shall be subjected in a thermostatic chamber at 5 successive changes of temperature cycles, each as shown in table below.            Then the trimmer potentiometer shall be taken out from the chamber and maintained at standard atmospheric conditions for 1 h <math>\sim</math> 2 h, after which measurements shall be made.</p> <table border="1" data-bbox="491 952 1026 1270"> <thead> <tr> <th>段階 Step</th> <th>温度[<math>^{\circ}\text{C}</math>] Temperature</th> <th>時間[min] Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40<math>\pm</math>3</td> <td>30</td> </tr> <tr> <td>2</td> <td>常温 Standard atmospheric conditions</td> <td>10<math>\sim</math>15</td> </tr> <tr> <td>3</td> <td>+100<math>\pm</math>2</td> <td>30</td> </tr> <tr> <td>4</td> <td>常温 Standard atmospheric conditions</td> <td>10<math>\sim</math>15</td> </tr> </tbody> </table> <p>3-7) 耐湿性 Humidity            温度<math>40\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math>, 相対湿度90 %<math>\sim</math>95 %の恒温恒湿槽中に無負荷で1 000 h<math>\pm</math>12 h放置し、取り出し表面の水分をふきとり常温常湿中に1 h<math>\sim</math>2 h放置後測定する。(0<math>\rightarrow</math>250<math>\rightarrow</math>500<math>\rightarrow</math>1000h)            The trimmer potentiometer shall be subjected in a thermostatic chamber at a temperature of <math>40\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math> with relative humidity of 90% to 95% without electrical load for 1 000 h<math>\pm</math>12 h.            Then the trimmer potentiometer shall be taken out from the chamber and its surface moisture shall be removed.            And then the trimmer potentiometer shall be maintained at standard atmospheric conditions for 1 h <math>\sim</math> 2 h, after which measurement shall be made.</p> <p>3-8) 耐湿負荷耐久性 Humidity Load Life (0<math>\rightarrow</math>250<math>\rightarrow</math>500<math>\rightarrow</math>1000h)            温度<math>40\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math>, 相対湿度90 %<math>\sim</math>95 %の恒温恒湿槽中で定格直流電圧を端子1-3間に1.5 h加え、0.5 h切るサイクルを1 000 h<math>\pm</math>12 h繰り返し、取り出し表面の水分をふきとり常温常湿中に無負荷で1 h<math>\sim</math>2 h放置後測定する。            The trimmer potentiometer shall be subjected in a thermostatic chamber at a temperature of <math>40\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}</math> and a relative humidity of 90 % to 95 % with a DC rated voltage for 1.5 hours between terminals 1 and 3 followed by a pause of 30 minutes for 1 000 h <math>\pm</math>12 h. Then the trimmer potentiometer shall be taken out from the chamber and its surface moisture shall be removed.            And then the trimmer potentiometer shall be maintained at standard atmospheric conditions for 1 h <math>\sim</math> 2 h without electrical load, after which measurement shall be made.</p>	段階 Step	温度[ $^{\circ}\text{C}$ ] Temperature	時間[min] Duration	1	-40 $\pm$ 3	30	2	常温 Standard atmospheric conditions	10 $\sim$ 15	3	+100 $\pm$ 2	30	4	常温 Standard atmospheric conditions	10 $\sim$ 15	
段階 Step	温度[ $^{\circ}\text{C}$ ] Temperature	時間[min] Duration															
1	-40 $\pm$ 3	30															
2	常温 Standard atmospheric conditions	10 $\sim$ 15															
3	+100 $\pm$ 2	30															
4	常温 Standard atmospheric conditions	10 $\sim$ 15															

## 研究調査仕様書

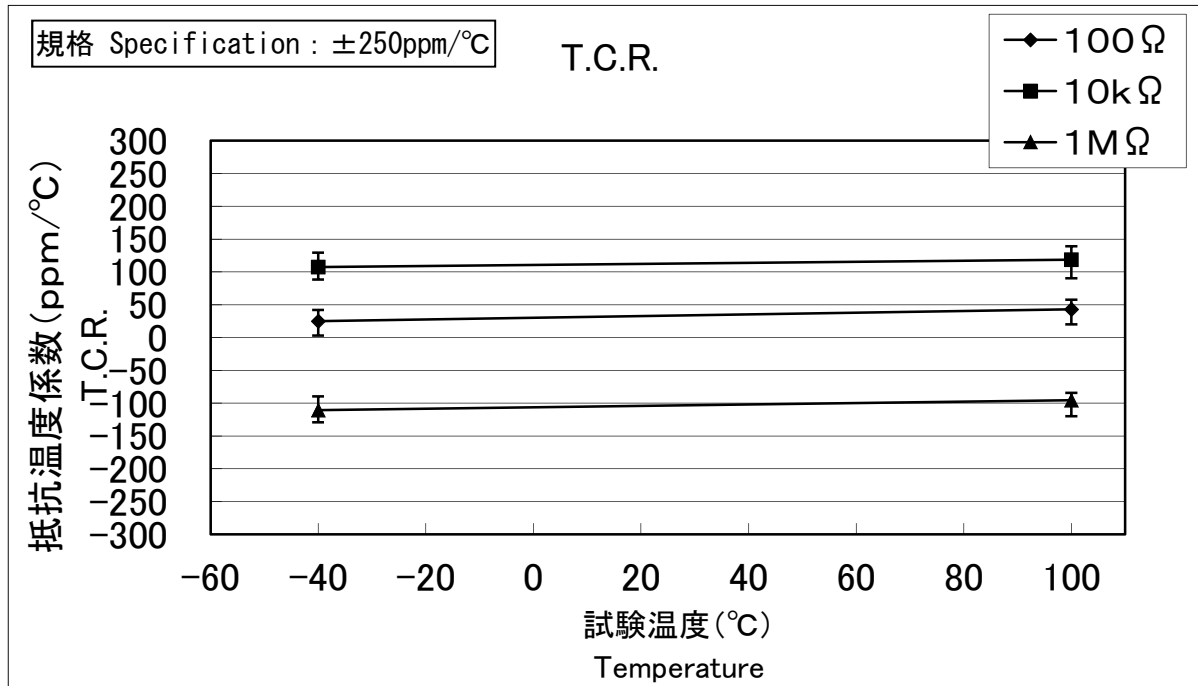
仕様 No. PKS-E0115

項目	内容	注意事項
3 試験 Test method	3-9)動作耐久性 Rotational Life 無負荷で軸を $10 \text{ min}^{-1}$ (1往復を1回とする)の速さで全回転角度の90 %以上に わたり20 回転 $\pm 2$ 回転させる。(初期 Initial→試験後 After) The moving contact shall be rotated without electrical load for 20 cycles $\pm 2$ cycles at a rate of $10 \text{ min}^{-1}$ . (A cycle of operation is defined as the travel of the moving contact from one end of the resistance element to the other and back through 90 % of the total mechanical rotation.)	
4 測定項目 Measurement	4-1)T. C. R...3-1)のみ 4-2)1-3間抵抗値 Total resistance...3-2)~9) 4-3)1-2間抵抗値 between 1 and 2 resistance...3-2)~9) 4-4)2-3間抵抗値 between 2 and 3 resistance...3-2)~9)	
5 算出項目 Calculation	5-1)1-3間抵抗値変化率 Total resistance change...3-3)~9) 5-2)集中接触抵抗 contact resistance...3-3)~8) 5-3)1-2間抵抗値変化率 between 1 and 2 resistance change...3-2)	
6 試験結果 Test Result	試験結果は次項~の通りであり、全て規格内でありました。 Test results are following page. All test results were in the specification.	

# VG039N

## [抵抗温度特性 T.C.R.]

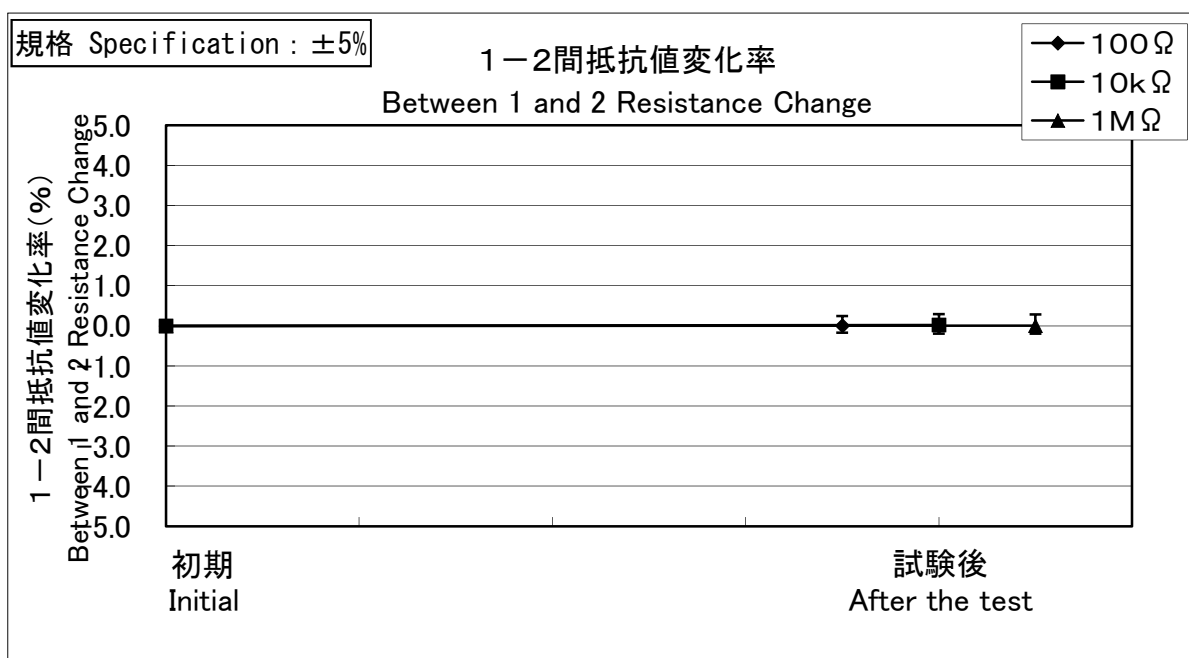
### 1. 抵抗温度特性 T.C.R.



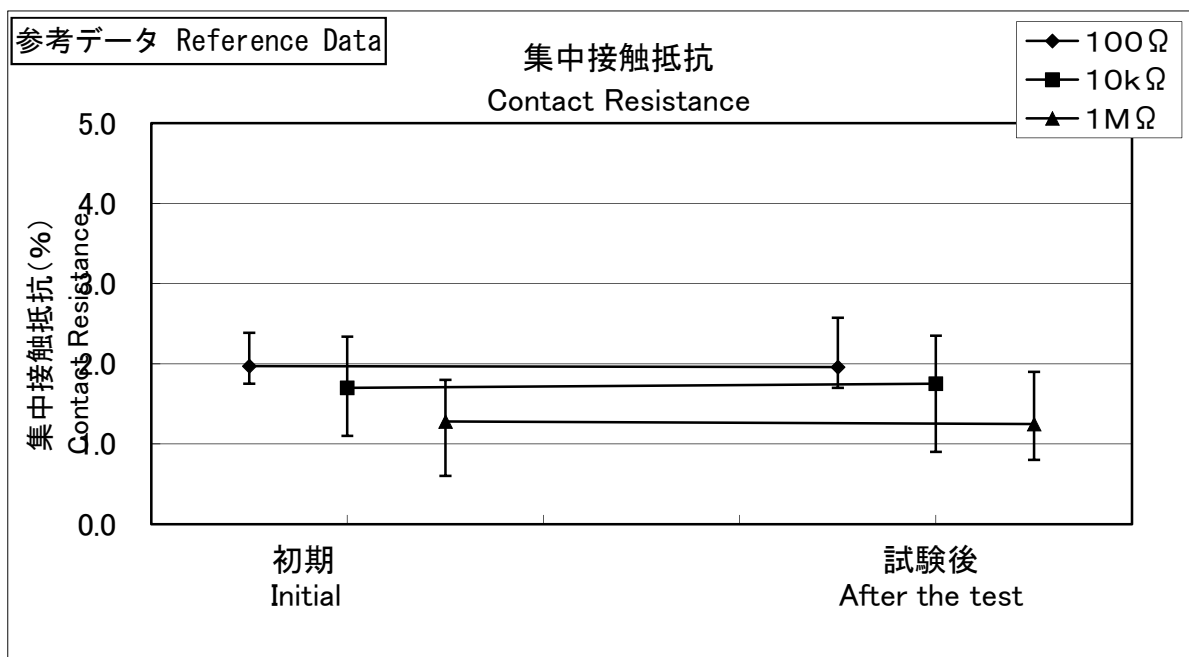
# VG039N

## 〔耐振性 Vibration〕

### 1. 1-2間抵抗値変化率 Between 1 and 2 Resistance Change



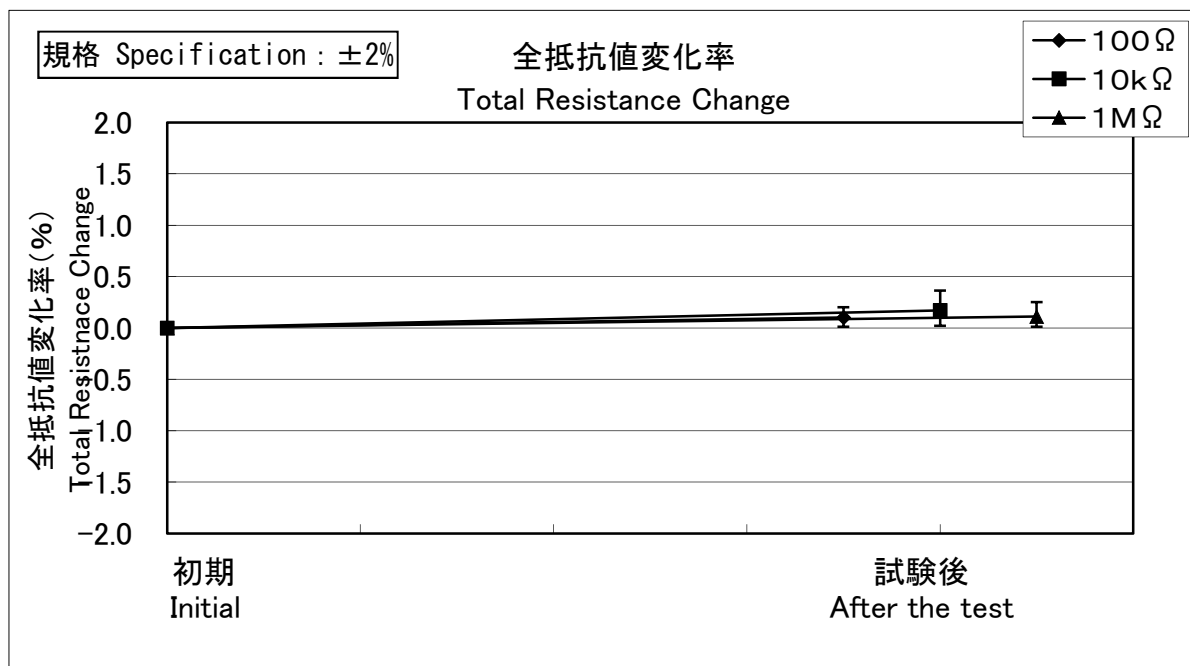
### 2. 集中接触抵抗 Contact Resistance



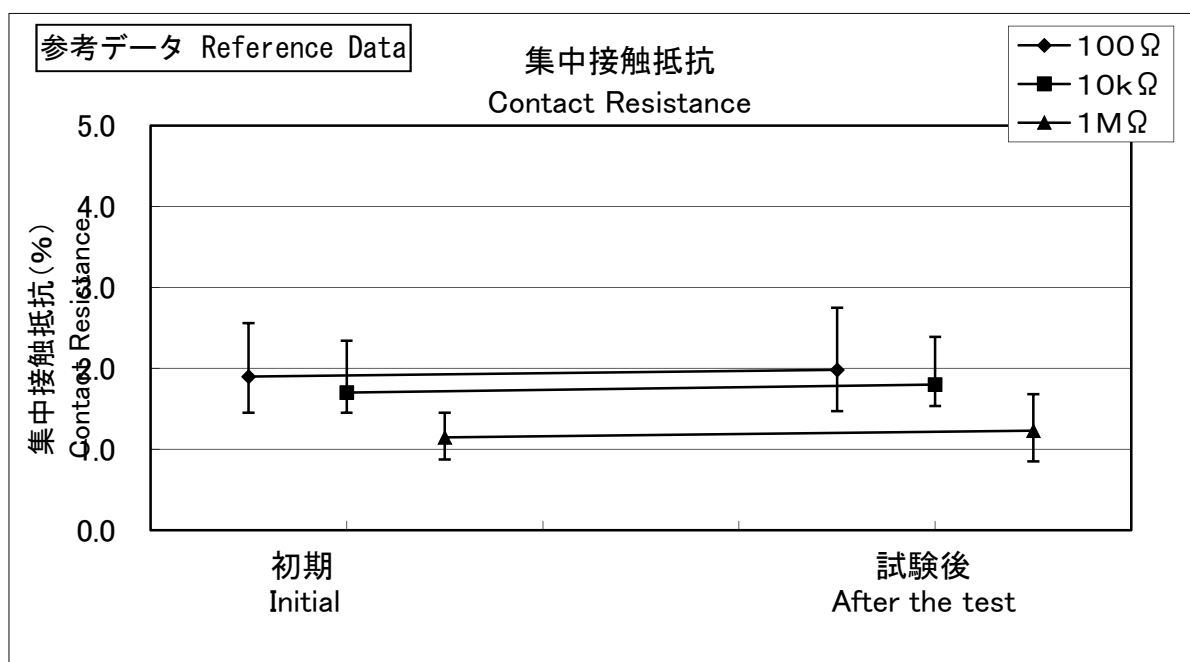
# VG039N

[はんだ耐熱性(リフロー) Resistance to Soldering Heat(Re-flow)]

## 1. 全抵抗値変化率 Total Resistance Change



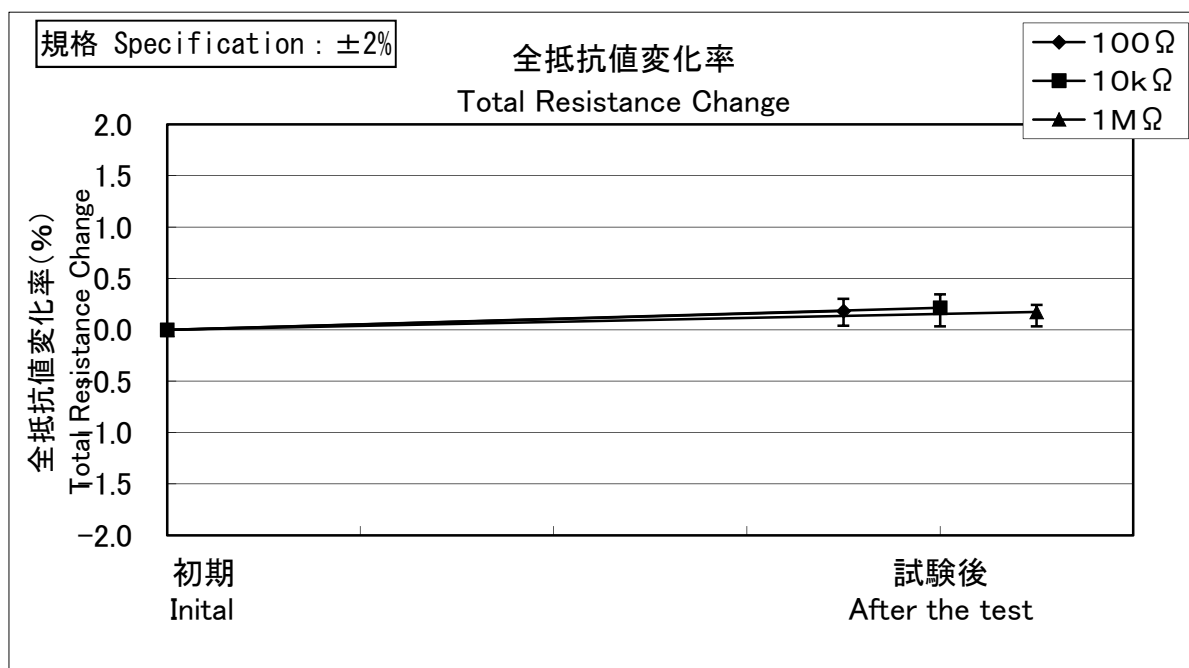
## 2. 集中接触抵抗 Contact Resistance



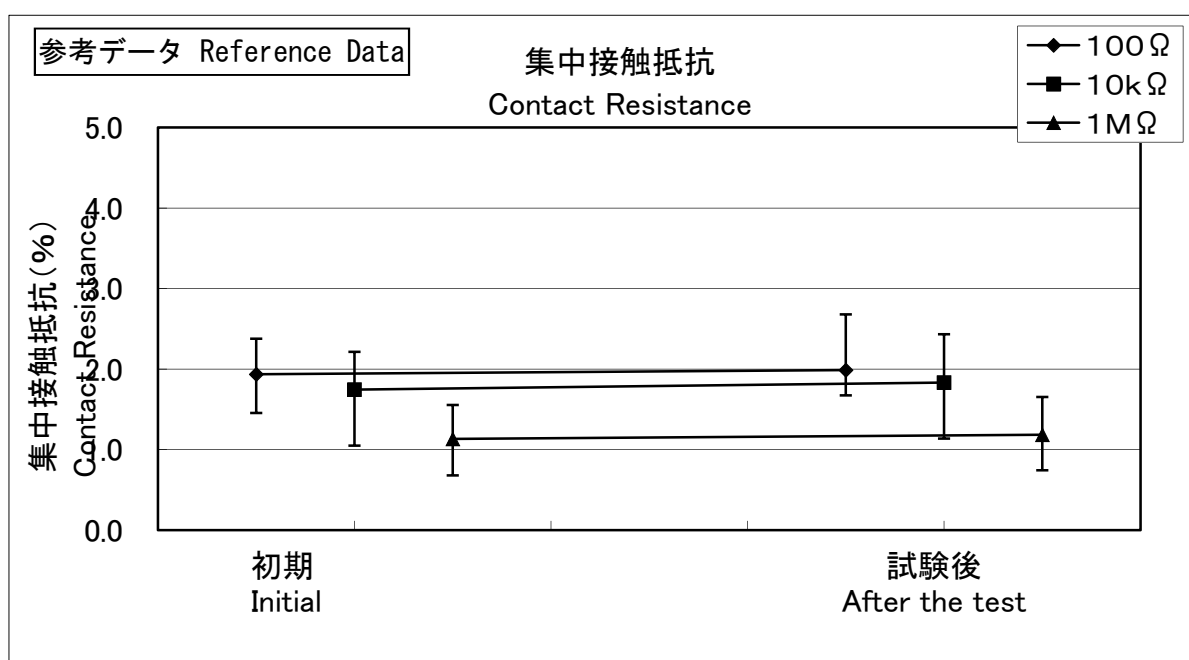
## VG039N

〔はんだ耐熱性(手はんだ) Resistance to Soldering Heat(Soldering iron)]

## 1. 全抵抗値変化率 Total Resistance Change



## 2. 集中接触抵抗 Contact Resistance

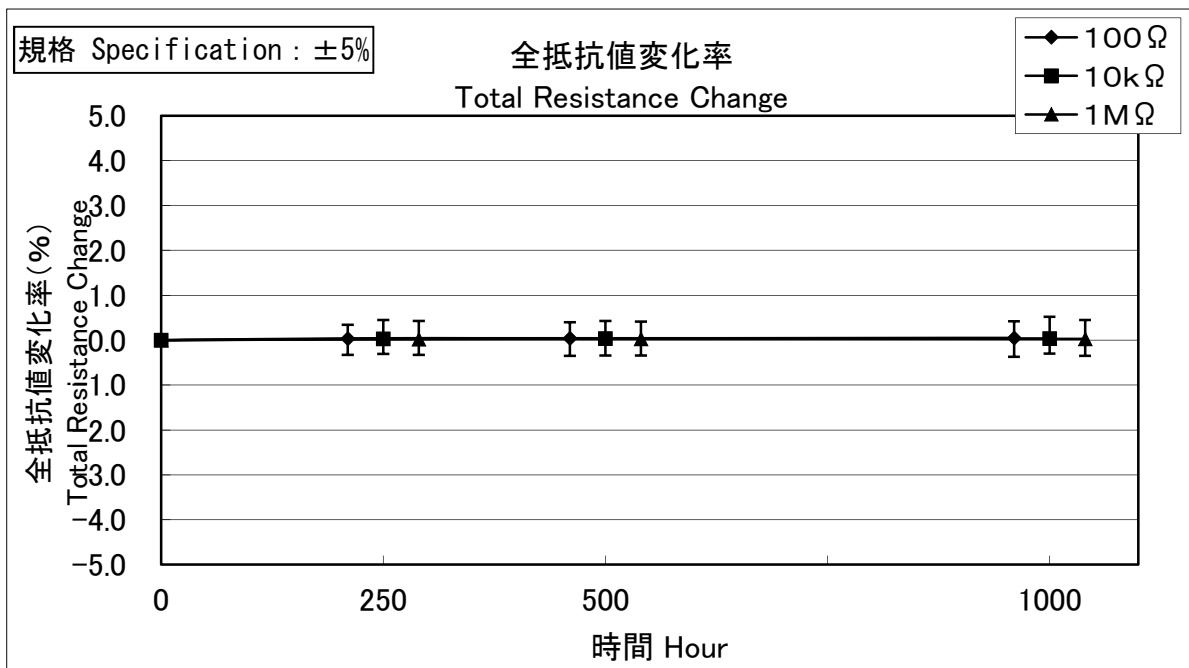




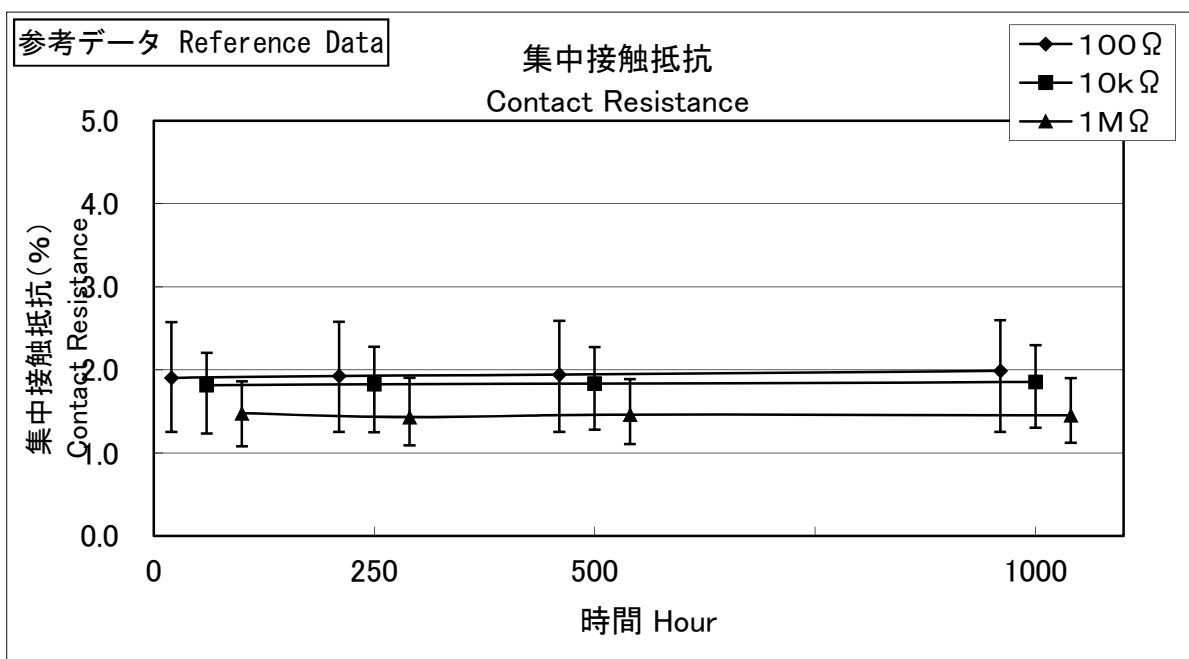
# VG039N

## [耐熱性 High Temperature Strage]

### 1. 全抵抗値変化率 Total Resistance Change



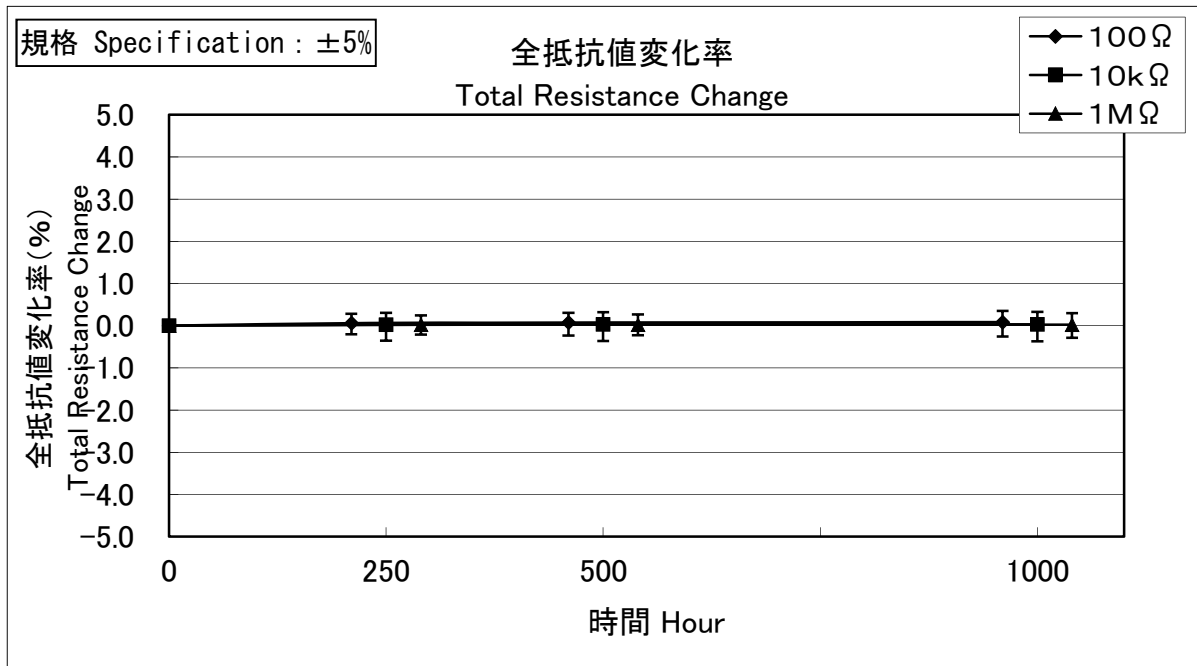
### 2. 集中接触抵抗 Contact Resistance



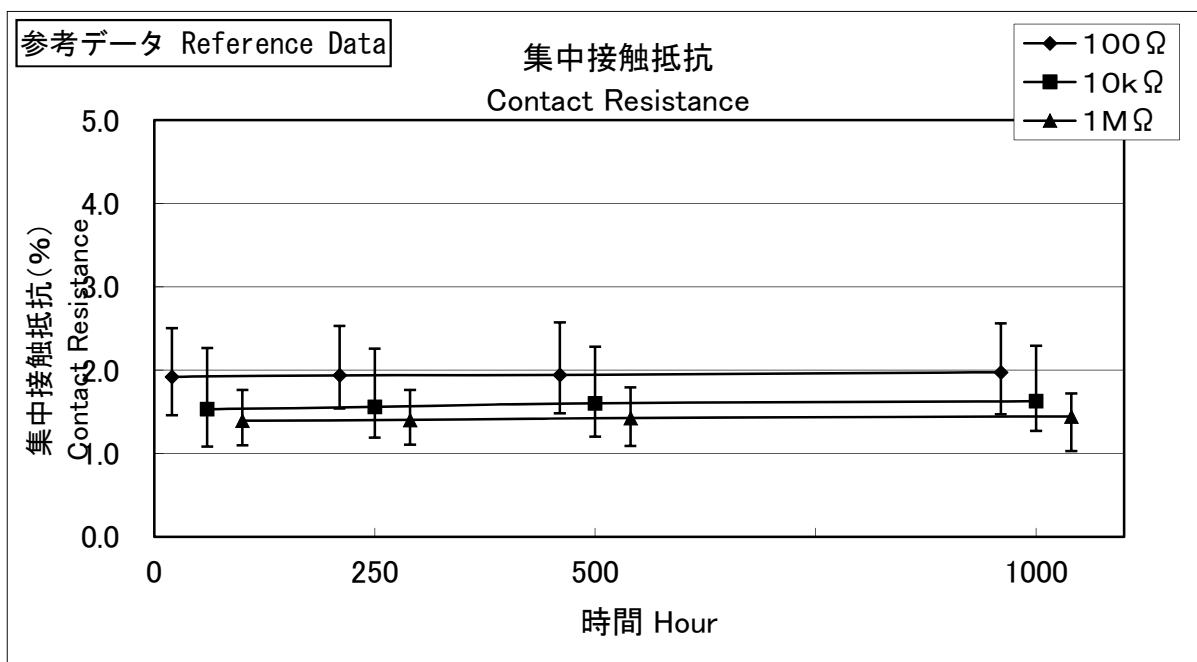
# VG039N

## 〔負荷耐久性 Load Life〕

### 1. 全抵抗値変化率 Total Resistance Change

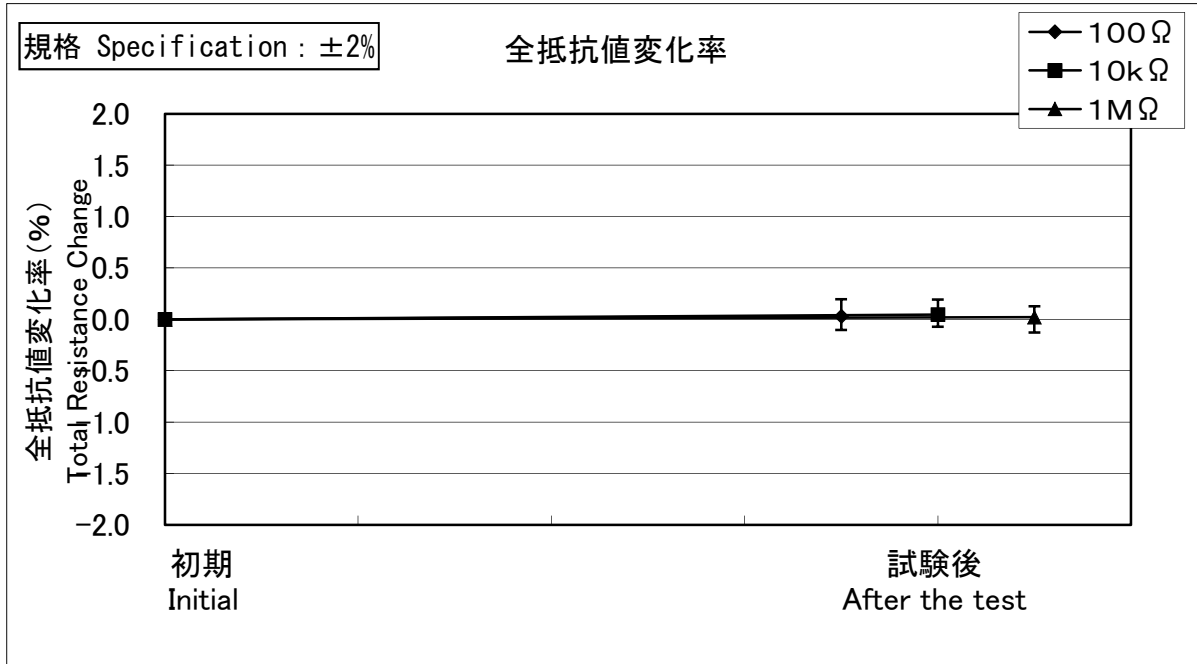


### 2. 集中接触抵抗 Contact Resistance

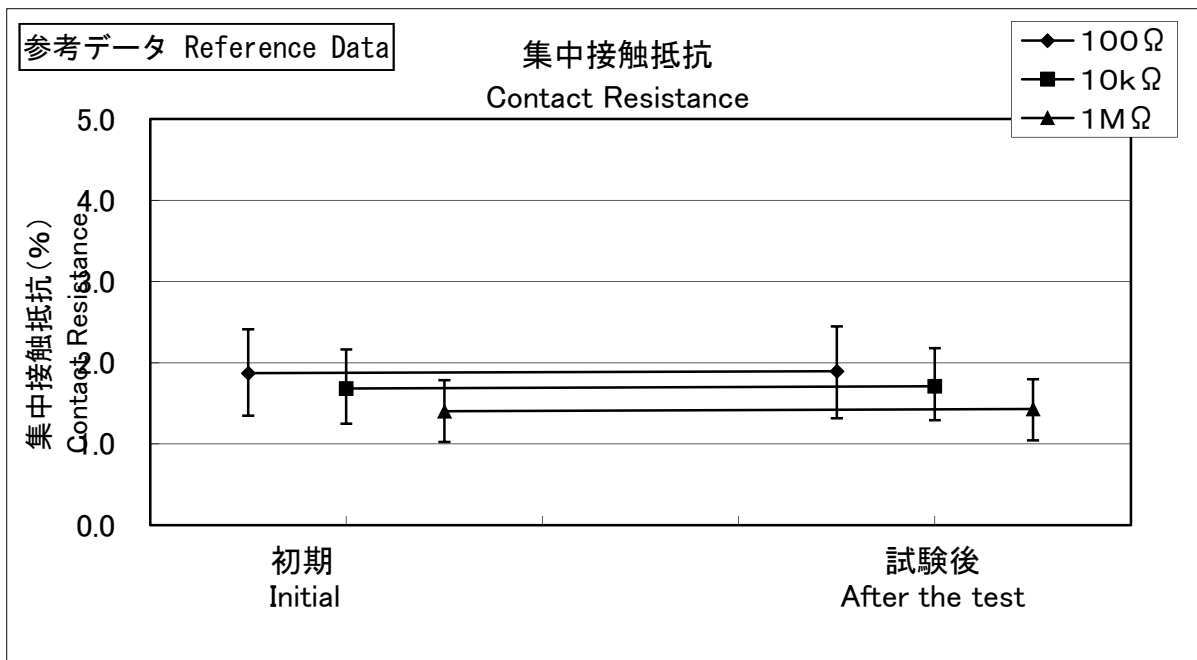


〔温度サイクル耐久性 Temperature Cycle〕

1. 全抵抗値変化率 Total Resistance Change



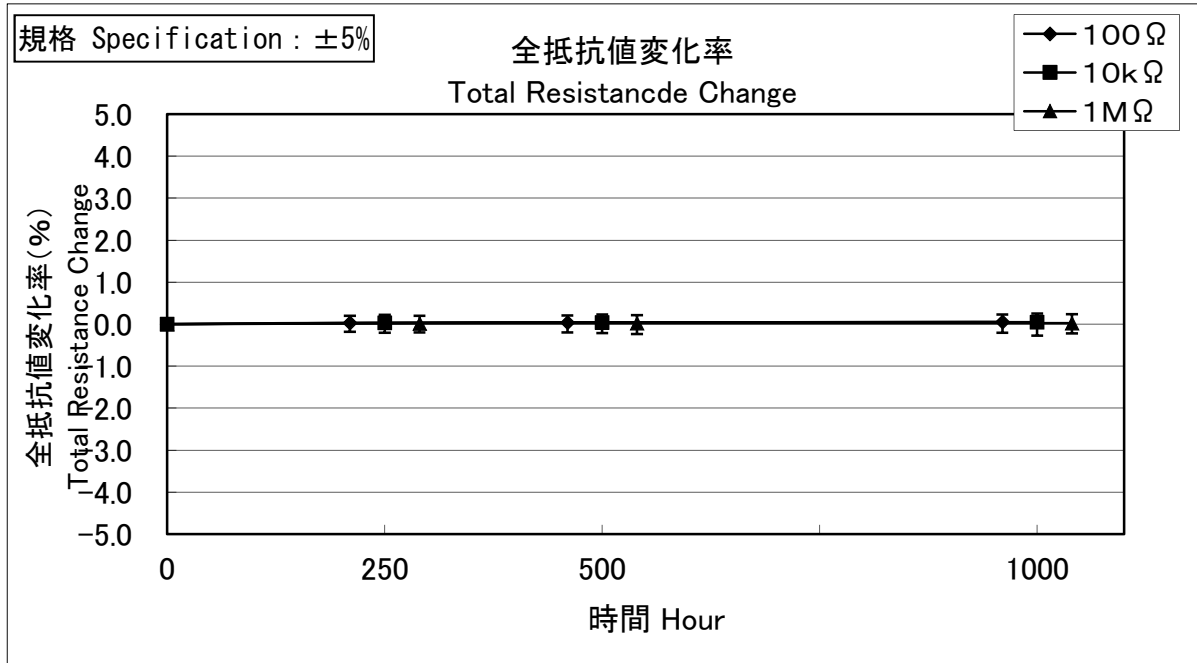
2. 集中接触抵抗 Contact Resistance



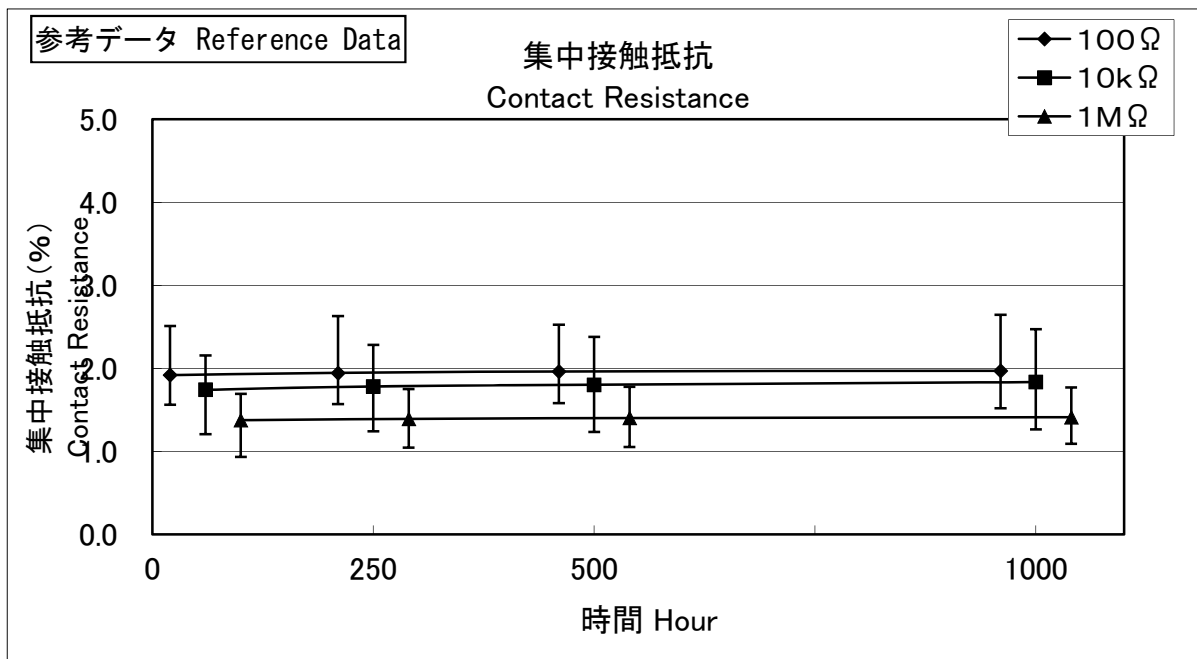
# VG039N

## [耐湿性 Humidity]

### 1. 全抵抗値変化率 Total Resistance Change



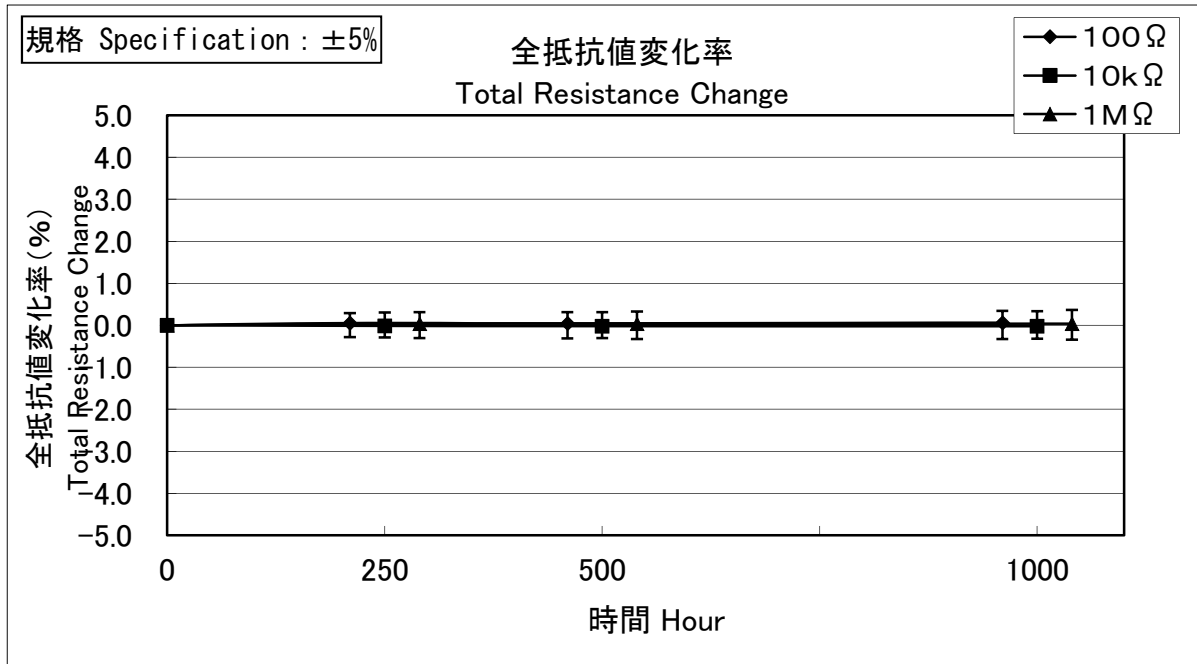
### 2. 集中接触抵抗 Contact Resistance



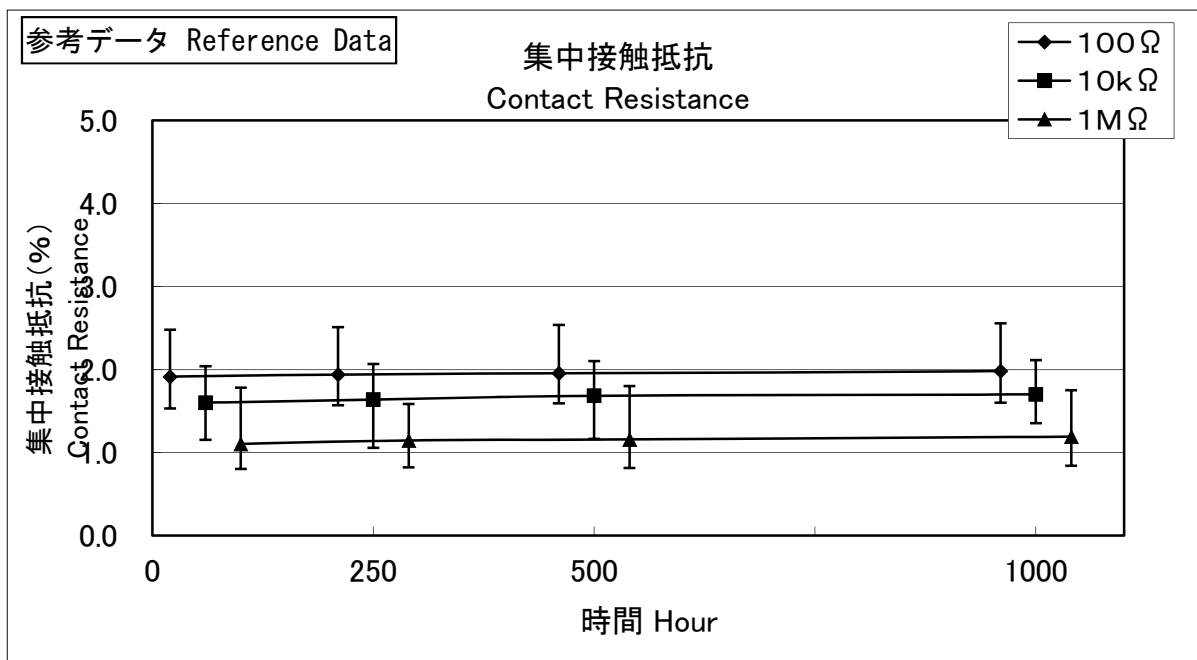
# VG039N

## [耐湿負荷耐久性 Humidity Load Life]

### 1. 全抵抗値変化率 Total Resistance Change



### 2. 集中接触抵抗 Contact Resistance



## 〔動作耐久性 Rotational Life〕

### 1. 全抵抗値変化率 Total Resistance Change

