

## Comparison data

PTFM04\*\*B0 vs PTFM04\*\*BS

PTGL07BD100N vs PTGL07AR250H

PTGL07BD470N vs PTGL07BD330N

PTGL09BD2R2N vs PTGL05AS3R9K

Designing Section  
Device Production Group Quality &  
Engineering Department  
Wuxi Murata Electronics Co., Ltd.





## 1, Summary of comparison

## 2, Comparison between PTFM\*\*B0 and PTFM\*\*BS

## 3, Comparison between PTGL\*\*

PTGL07BD100N vs PTGL07AR250H  
PTGL07BD470N vs PTGL07BD330N  
PTGL09BD2R2N vs PTGL05AS3R9K

# 1, Summary of comparison ①

(PTFM04\*\*B0 vs PTFM04\*\*BS)



| Item          | < Production stop ><br>PTFM04**B0 | <Alternatives><br>PTFM04**BS | Difference   |
|---------------|-----------------------------------|------------------------------|--|
| Spec          | ---                               | ---                          | No difference  |
| Shape         | ---                               | ---                          | No difference  |
| Resin         | Epoxy resin                       | Silicone resin               | Resin is change from epoxy to silicone.                      |
| Reliability   | Please refer to P11~13 in detail  |                              | Performance of alternatives is better.                       |
| Certification | Did not got UL certification      | Obtained UL certification    | Alternatives perform better for having got UL certification. |

**The detail contents are present from page 6 to 13. Please refer to it.**

# 1, Summary of comparison ②

PTGL07BD100N vs PTGL07AR250H  
 PTGL07BD470N vs PTGL07BD330N  
 PTGL09BD2R2N vs PTGL05AS3R9K



| item          | <Production stop><br>PTGL07BD100N<br>PTGL07BD470N<br>PTGL09BD2R2N  | <Alternatives><br>PTGL07AR250H<br>PTGL07BD330N<br>PTGL05AS3R9K | Difference                                      |
|---------------|--|--|---|
| Spec          | There is little difference , but there is no influence in electric specifications and mounting.  |  | Please refer to page 15 in detail.              |
| Shape         | The shape of lead is inside  | The shape of lead is inside                                    | No difference                                   |
| Size          | The size of PTGL07** has no change.<br>The size of PTGL09 and PTGL05 is as below.<br>Diameter: 9.5mm→5.5mm、<br>Thickness: 4.0mm→3.5mm、 |  | The head size of PTGL05 is smaller than PTGL09. |
| Reliability   | --   | --   | No difference                                   |
| Certification | Obtained UL certification  | Obtained UL certification                                      | No difference                                   |

**The detail contents are present from page 15 to 20. Please refer to it .**



## 1, Summary of comparison

## **2, Comparison between PTFM\*\*B0 and PTFM\*\*BS**

## 3, Comparison between PTGL\*\*

PTGL07BD100N vs PTGL07AR250H  
PTGL07BD470N vs PTGL07BD330N  
PTGL09BD2R2N vs PTGL05AS3R9K

# 2, Comparison of spec



(PTFM04\*\*B0 vs PTFM04\*\*BS)

**Production stop: PTFM04\*\*471Q2N34B0**

| Part number        | Temp. Char. (C.P.) | Resistance Value |               |               | Max. Voltage | Max. Current | External dielectric withstand voltage |
|--------------------|--------------------|------------------|---------------|---------------|--------------|--------------|---------------------------------------|
|                    |                    | 25°C             | TS – 10°C     | ※ TS          |              |              |                                       |
| PTFM04BH471Q2N34B0 | BH                 | 100Ω max         | 330Ωmax/ 50°C | 470Ωmin/ 60°C | 16VDC.       | 0.1A         | 500V DC.<br>5sec.                     |
| PTFM04BG471Q2N34B0 | BG                 |                  | 330Ωmax/ 60°C | 470Ωmin/ 70°C |              |              |                                       |
| PTFM04BF471Q2N34B0 | BF                 |                  | 330Ωmax/ 70°C | 470Ωmin/ 80°C |              |              |                                       |
| PTFM04BE471Q2N34B0 | BE                 |                  | 330Ωmax/ 80°C | 470Ωmin/ 90°C |              |              |                                       |
| PTFM04BD471Q2N34B0 | BD                 |                  | 330Ωmax/ 90°C | 470Ωmin/100°C |              |              |                                       |
| PTFM04BC471Q2N34B0 | BC                 |                  | 330Ωmax/100°C | 470Ωmin/110°C |              |              |                                       |
| PTFM04BB471Q2N34B0 | BB                 |                  | 330Ωmax/110°C | 470Ωmin/120°C |              |              |                                       |

**Alternatives: PTFM04\*\*471Q2N34BS**

The spec are the same

| Part number        | Temp. Char. (C.P.) | Resistance Value |               |               | Max. Voltage | Max. Current | External dielectric withstand voltage |
|--------------------|--------------------|------------------|---------------|---------------|--------------|--------------|---------------------------------------|
|                    |                    | 25°C             | TS – 10°C     | ※ TS          |              |              |                                       |
| PTFM04BH471Q2N34BS | BH                 | 100Ω max         | 330Ωmax/ 50°C | 470Ωmin/ 60°C | 16VDC.       | 0.1A         | 500V DC.<br>5sec.                     |
| PTFM04BG471Q2N34BS | BG                 |                  | 330Ωmax/ 60°C | 470Ωmin/ 70°C |              |              |                                       |
| PTFM04BF471Q2N34BS | BF                 |                  | 330Ωmax/ 70°C | 470Ωmin/ 80°C |              |              |                                       |
| PTFM04BE471Q2N34BS | BE                 |                  | 330Ωmax/ 80°C | 470Ωmin/ 90°C |              |              |                                       |
| PTFM04BD471Q2N34BS | BD                 |                  | 330Ωmax/ 90°C | 470Ωmin/100°C |              |              |                                       |
| PTFM04BC471Q2N34BS | BC                 |                  | 330Ωmax/100°C | 470Ωmin/110°C |              |              |                                       |
| PTFM04BB471Q2N34BS | BB                 |                  | 330Ωmax/110°C | 470Ωmin/120°C |              |              |                                       |



# 2, Comparison of spec



(PTFM04\*\*B0 vs PTFM04\*\*BS)

**Production stop: PTFM04\*\*471Q2N34B0**

| Part number        | Temp. Char. (C.P.) | Resistance Value |                 |                 | Max. Voltage | Max. Current | External dielectric withstand voltage |
|--------------------|--------------------|------------------|-----------------|-----------------|--------------|--------------|---------------------------------------|
|                    |                    | 25°C             | TS – 10°C       | ※ TS            |              |              |                                       |
| PTFM04BH222Q2N34B0 | BH                 | 330Ω<br>max      | 1.5KΩ max/ 50°C | 2.2KΩ min/ 60°C | 16VDC.       | 0.1A         | 500V DC<br><br>5 Sec                  |
| PTFM04BG222Q2N34B0 | BG                 |                  | 1.5KΩ max/ 60°C | 2.2KΩ min/ 70°C |              |              |                                       |
| PTFM04BF222Q2N34B0 | BF                 |                  | 1.5KΩ max/ 70°C | 2.2KΩ min/ 80°C |              |              |                                       |
| PTFM04BE222Q2N34B0 | BE                 |                  | 1.5KΩ max/ 80°C | 2.2KΩ min/ 90°C |              |              |                                       |
| PTFM04BD222Q2N34B0 | BD                 |                  | 1.5KΩ max/ 90°C | 2.2KΩ min/100°C |              |              |                                       |
| PTFM04BC222Q2N34B0 | BC                 |                  | 1.5KΩ max/100°C | 2.2KΩ min/110°C |              |              |                                       |
| PTFM04BB222Q2N34B0 | BB                 |                  | 1.5KΩ max/110°C | 2.2KΩ min/120°C |              |              |                                       |

**Alternatives: PTFM04\*\*471Q2N34BS**

The spec are the same

| Part number        | Temp. Char. (C.P.) | Resistance Value |                 |                 | Max. Voltage | Max. Current | External dielectric withstand voltage |
|--------------------|--------------------|------------------|-----------------|-----------------|--------------|--------------|---------------------------------------|
|                    |                    | 25°C             | TS – 10°C       | ※ TS            |              |              |                                       |
| PTFM04BH222Q2N34BS | BH                 | 330Ω<br>max      | 1.5KΩ max/ 50°C | 2.2KΩ min/ 60°C | 16VDC.       | 0.1A         | 500V DC<br><br>5 Sec                  |
| PTFM04BG222Q2N34BS | BG                 |                  | 1.5KΩ max/ 60°C | 2.2KΩ min/ 70°C |              |              |                                       |
| PTFM04BF222Q2N34BS | BF                 |                  | 1.5KΩ max/ 70°C | 2.2KΩ min/ 80°C |              |              |                                       |
| PTFM04BE222Q2N34BS | BE                 |                  | 1.5KΩ max/ 80°C | 2.2KΩ min/ 90°C |              |              |                                       |
| PTFM04BD222Q2N34BS | BD                 |                  | 1.5KΩ max/ 90°C | 2.2KΩ min/100°C |              |              |                                       |
| PTFM04BC222Q2N34BS | BC                 |                  | 1.5KΩ max/100°C | 2.2KΩ min/110°C |              |              |                                       |
| PTFM04BB222Q2N34BS | BB                 |                  | 1.5KΩ max/110°C | 2.2KΩ min/120°C |              |              |                                       |



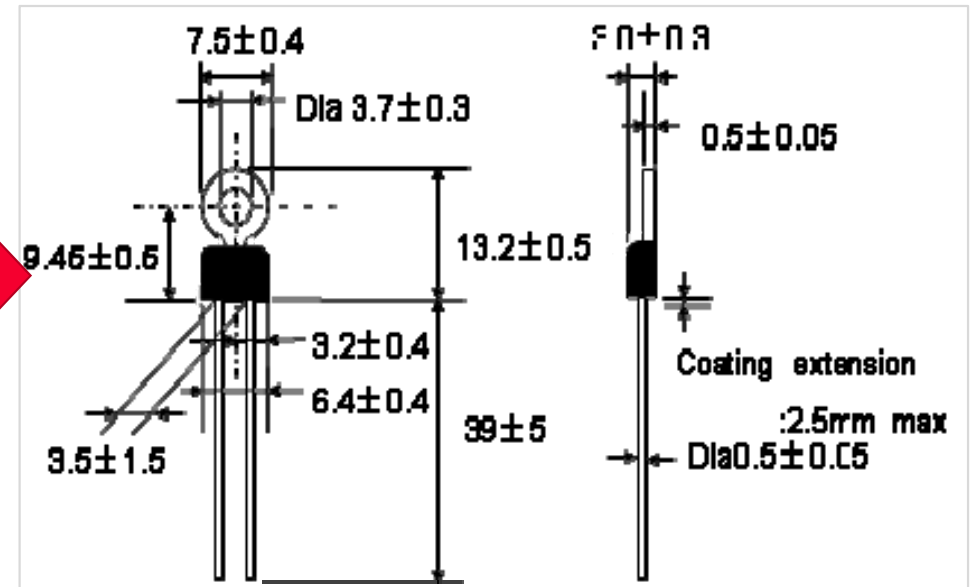
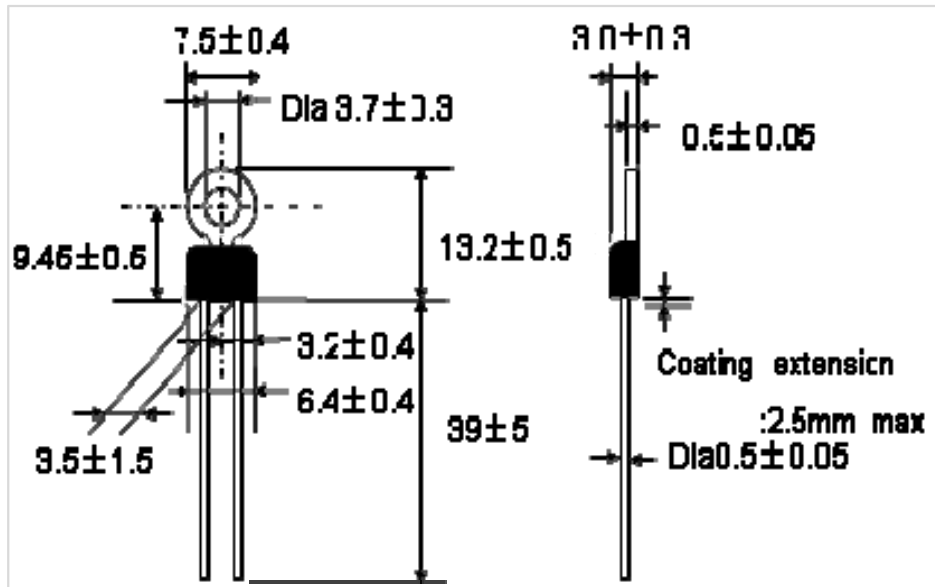
# 2, Comparison of shape



(PTFM04\*\*B0 vs PTFM04\*\*BS)

PTFM\*\*B0 series

PTFM\*\*BS series



unit (mm)

There is no change in shape and size



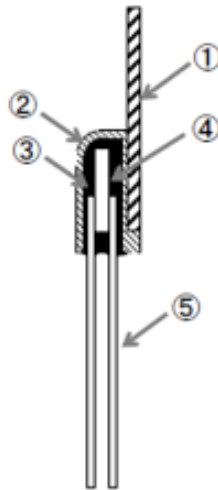
# 2, Comparison of resin materials



## (PTFM04\*\*B0 vs PTFM04\*\*BS)

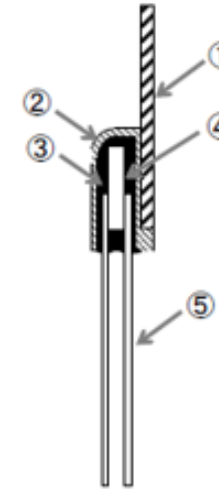
**PTFM04\_B0 Series**  
(De-emphasized Type)

Construction  
構造断面



**PTFM04\_BS Series**  
(Standard Type / UL Recognition Type)

Construction  
構造断面



Difference exists only in resin

| No. | Part<br>部品                 | Material<br>材料  |
|-----|----------------------------|---|
| ①   | Metal lug<br>ラグ端子          | Nickel plated alloy copper<br>銅合金板、Niめっき                                      |
| ②   | Case<br>ケース                | PBT(Flammability Equivalent to UL94V-0)<br>PBT樹脂(難燃グレード UL94V-0)              |
| ③   | Resin<br>樹脂                | Epoxy resin(Flammability Equivalent to UL94V-1)<br>エポキシ系樹脂(難燃グレード UL94V-1 相当) |
| ④   | Posistor element<br>ポジスタ素子 | BaTiO3 Semi-Conductive ceramics<br>BaTiO3系半導体                                 |
| ⑤   | Lead wire<br>リード線          | Sn-2.5Cu Solder plated copper ply wire<br>Sn-2.5Cuはんだめっき銅覆銅線                  |



| No. | Part<br>部品                 | Material<br>材料   |
|-----|----------------------------|--|
| ①   | Metal lug<br>ラグ端子          | Nickel plated alloy copper<br>銅合金板、Niめっき   |
| ②   | Case<br>ケース                | PBT(Flammability Equivalent to UL94V-0)<br>PBT樹脂(難燃グレード UL94V-0)                 |
| ③   | Resin<br>樹脂                | Silicone resin(Flammability Equivalent to UL94V-0)<br>シリコン系樹脂(難燃グレード UL94V-0 相当) |
| ④   | Posistor element<br>ポジスタ素子 | BaTiO3 Semi-Conductive ceramics<br>BaTiO3系半導体                                    |
| ⑤   | Lead wire<br>リード線          | Sn-2.5Cu Solder plated copper ply wire<br>Sn-2.5Cuはんだめっき銅覆銅線                     |

# 2, Comparison of reliability test

(PTFM04\*\*B0 vs PTFM04\*\*BS)



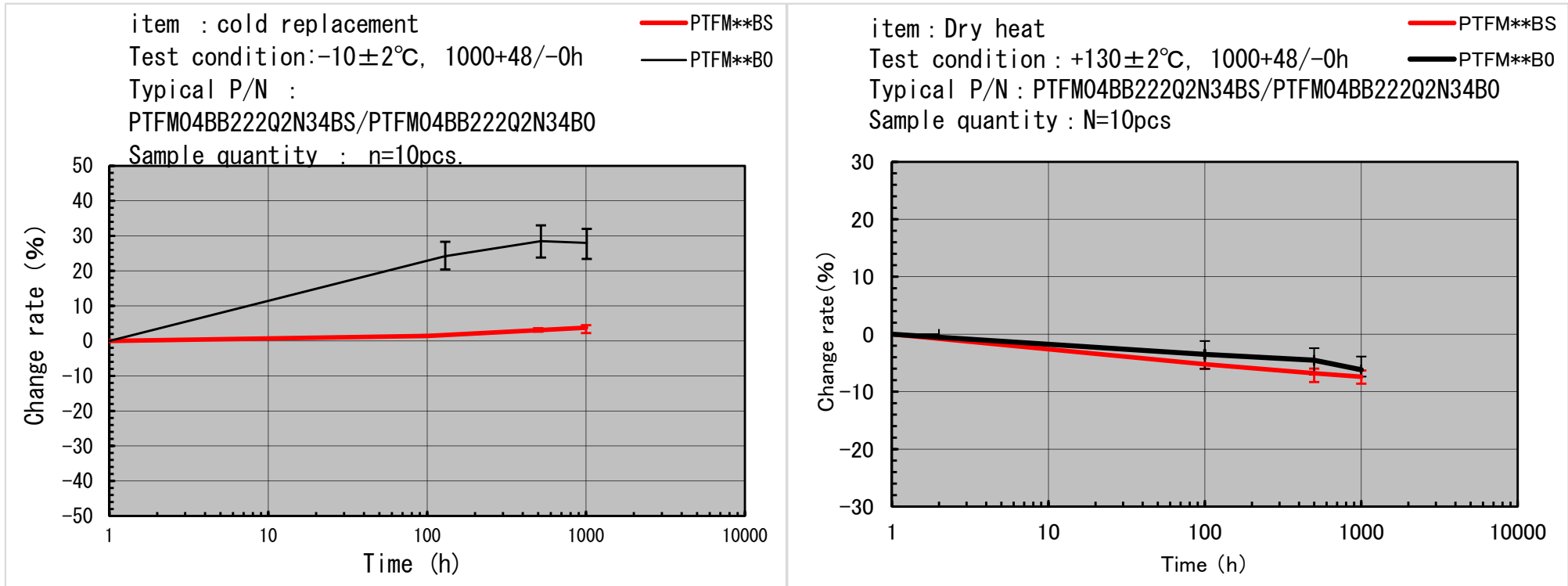
## Test items and detail conditions of PTFM\*\*B0/BS

| Item                                  | Criteria                                      | Test Condition   |      |           |            |   |              |    |   |       |    |
|---------------------------------------|---|--|------|-----------|------------|---|--------------|----|---|-------|----|
| Dry Heat                              | • Change in resistance<br>max. $\pm 20\%$ (*) | Reference standard : IEC60068-2-2(2007)<br>• TS+10°C<br>• 1000+48/-0h  |      |           |            |   |              |    |   |       |    |
| Cold                                  | • No damage about marking                     | Reference standard : IEC60068-2-1(2007)<br>• -10 $\pm$ 3°C<br>• 1000+48/-0h  |      |           |            |   |              |    |   |       |    |
| Damp Heat                             |   | • +60 $\pm$ 2°C, 95 $\pm$ 5%RH<br>• 1000+48/-0h  |      |           |            |   |              |    |   |       |    |
| Thermal Shock                         |   | Reference standard : IEC60068-2-14(2009)<br>[ Test Na ]<br>• Transport time : < 3m<br>• Test condition: See below table<br><table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40<math>\pm</math>3</td> <td>30</td> </tr> <tr> <td>2</td> <td>TS+10</td> <td>30</td> </tr> </tbody> </table> | Step | Temp.(°C) | Time(min.) | 1 | -40 $\pm$ 3  | 30 | 2 | TS+10 | 30 |
| Step                                  | Temp.(°C)                                     | Time(min.)   |      |           |            |   |              |    |   |       |    |
| 1                                     | -40 $\pm$ 3                                   | 30   |      |           |            |   |              |    |   |       |    |
| 2                                     | TS+10   | 30   |      |           |            |   |              |    |   |       |    |
| High temperature with continuous load |   | Reference standard : IEC60068-2-2(2007)<br>• +60 $\pm$ 2°C<br>• Test condition: See below table<br><table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Step</th> <th>Voltage</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Max. Voltage</td> <td>90</td> </tr> <tr> <td>2</td> <td>OFF</td> <td>30</td> </tr> </tbody> </table>                                     | Step | Voltage   | Time(min.) | 1 | Max. Voltage | 90 | 2 | OFF   | 30 |
| Step                                  | Voltage                                       | Time(min.)   |      |           |            |   |              |    |   |       |    |
| 1                                     | Max. Voltage                                  | 90   |      |           |            |   |              |    |   |       |    |
| 2                                     | OFF   | 30   |      |           |            |   |              |    |   |       |    |
|                                       |   | • Test cycle : 1000cycles<br>• Test cycle : 1000+48/-0h<br>(A protective resistance is to be connected in series and the inrush current through Posistor must be limited below max. rated value.)  |      |           |            |   |              |    |   |       |    |

# 2, Comparison of reliability test data



## (PTFM04\*\*B0 vs PTFM04\*\*BS)



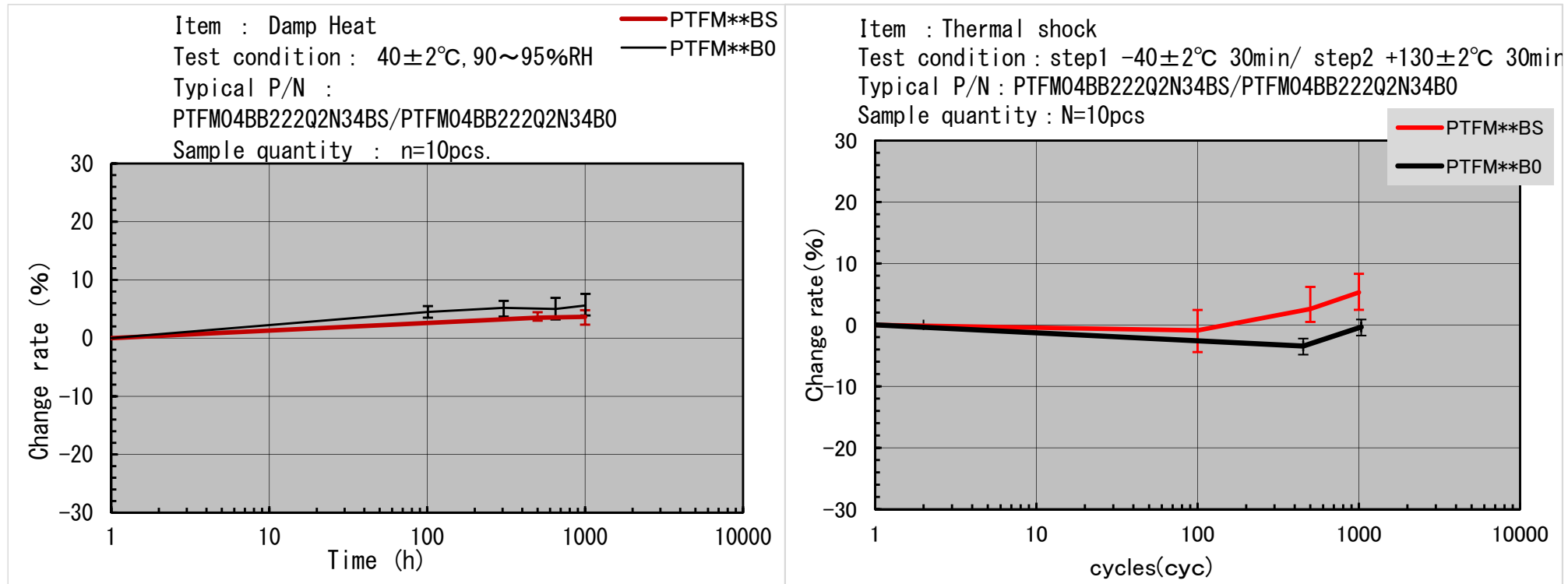
### Result :

The change rate of PTFM\*\*BS is smaller than PTFM\*B0 in cold replacement test ,and the change rate of dry heat are almost in the same level.

# 2, Comparison of reliability test data



## (PTFM04\*\*B0 vs PTFM04\*\*BS)



### Result :

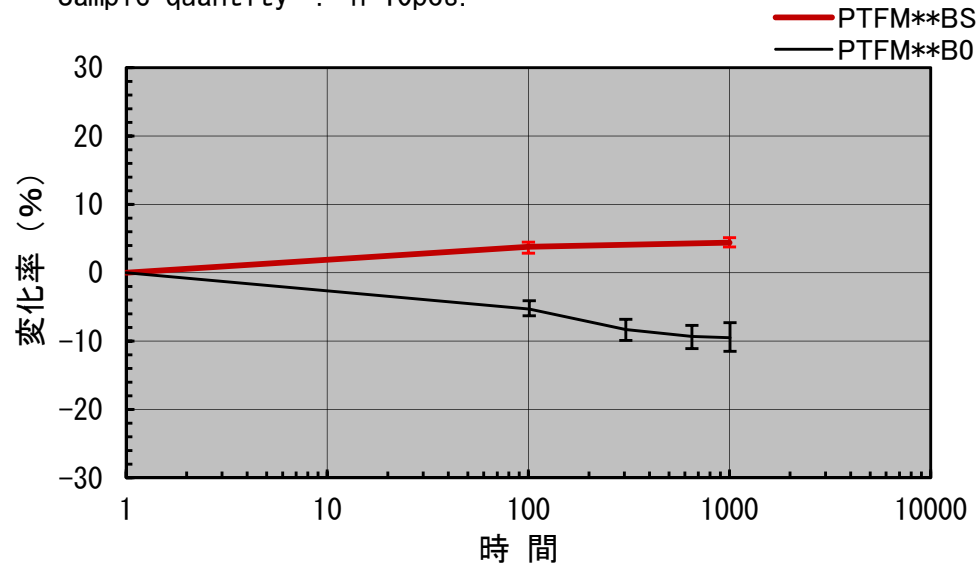
The change rate of damp heat and thermal shock are almost in the same level.

# 2, Comparison of reliability test data



## (PTFM04\*\*B0 vs PTFM04\*\*BS)

Item : High temperature with continuous load  
Test condition :  $60 \pm 2^\circ\text{C}$ , 16VAC, 90min ON-30min OFF  
Typical P/N : PTFM04BB222Q2N34BS/PTFM04BB222Q2N34B0  
Sample quantity : n=10pcs.



### Result :

The change rate of High temperature with continuous Load are almost in the same level.

### Summary of reliability test :

The test results of PTFM\*\*BS series perform better than PTFM\*\*B0 series, So there is no problem to use PTFM\*\*BS series to replace PTFM\*\*B0 series.



1, Summary of comparison

2, Comparison between PTFM\*\*B0 and PTFM\*\*BS

**3, Comparison between PTGL\*\***

PTGL07BD100N vs PTGL07AR250H  
PTGL07BD470N vs PTGL07BD330N  
PTGL09BD2R2N vs PTGL05AS3R9K

# 3, Comparison of spec

PTGL07BD100N vs PTGL07AR250H  
 PTGL07BD470N vs PTGL07BD330N  
 PTGL09BD2R2N vs PTGL05AS3R9K



| Production stop |                             | Comparison of spec        |                   |              |                       |                       |
|-----------------|-----------------------------|---------------------------|-------------------|--------------|-----------------------|-----------------------|
| -               | Part number                 | Resistance Value at +25°C | Max. Voltage Vrms | Max. Current | Hold current at +60°C | Trip current at -10°C |
| ①               | PTGL07BD100N2B51B0 (Bulk)   | 10Ω±30%                   | AC 24Vrms.        | 2.0 A        | 80 mA                 | 320 mA                |
|                 | PTGL07BD100N2B51A0 (Taping) |                           |                   |              |                       |                       |
| ②               | PTGL07BD470N3B51B0 (Bulk)   | 47Ω±30%                   | AC 32Vrms.        | 1.5A         | 30mA                  | 140 mA                |
|                 | PTGL07BD470N3B51A0 (Taping) |                           |                   |              |                       |                       |
| ③               | PTGL09BD2R2N2B51B0 (Bulk)   | 2.2Ω±30%                  | AC 24Vrms.        | 2.0A         | 180mA                 | 710mA                 |
|                 | PTGL09BD2R2N2B51A0 (Taping) |                           |                   |              |                       |                       |

## Difference:

There is a little difference of resistance ability ,but voltage of alternative is increased .

And the operating current specification perform better than the level of the existing products , so we think that there is no problem to replacement.

※As for the max current of ①, the alternative's max current becomes 0.5 times , but the resistance becomes 2.5 times , so the max current will not exceed the spec of 1A when applied in the same circuit.

## Alternatives

| - | Part number                 | Resistance Value at +25°C | Max. Voltage Vrms | Max. Current | Hold current at +60°C | Trip current at -10°C |
|---|-----------------------------|---------------------------|-------------------|--------------|-----------------------|-----------------------|
| ① | PTGL07AR250H4B51B0 (Bulk)   | 25Ω± 25%                  | AC 32Vrms.        | 1.0 A        | 110 mA                | 300 mA                |
|   | PTGL07AR250H4B51A0 (Taping) |                           |                   |              |                       |                       |
| ② | PTGL07BD330N3B51B0 (Bulk)   | 33Ω± 25%                  | AC 32Vrms.        | 1.5 A        | 40 mA                 | 170 mA                |
|   | PTGL07BD330N3B51A0 (Taping) |                           |                   |              |                       |                       |
| ③ | PTGL05AS3R9K2B51B0 (Bulk)   | 3.9Ω± 25%                 | AC 30Vrms.        | 3.5 A        | 269 mA                | 530 mA                |
|   | PTGL05AS3R9K2B51A0 (Taping) |                           |                   |              |                       |                       |

# 3, Comparison of shape and size

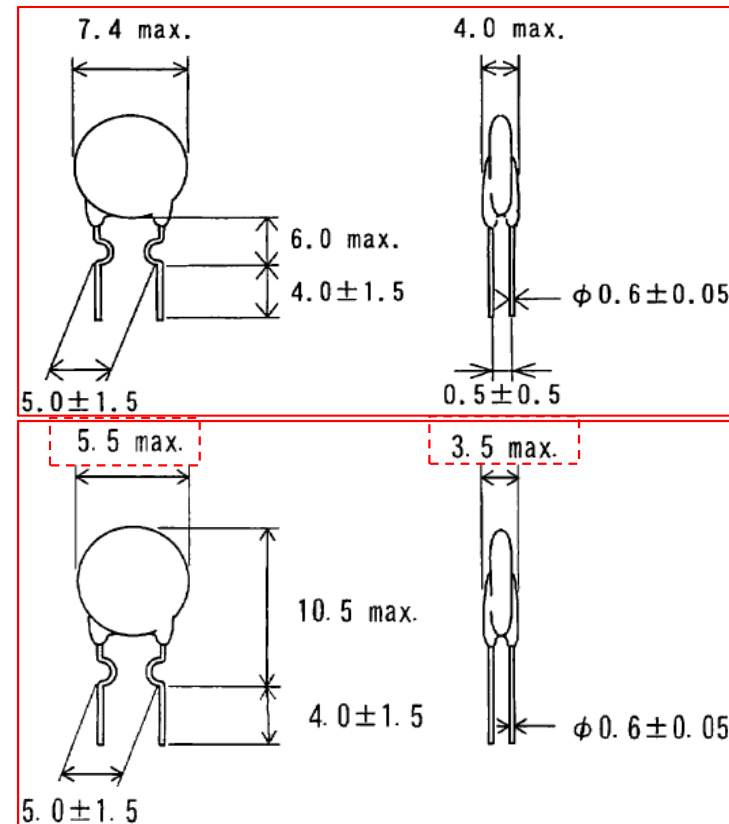
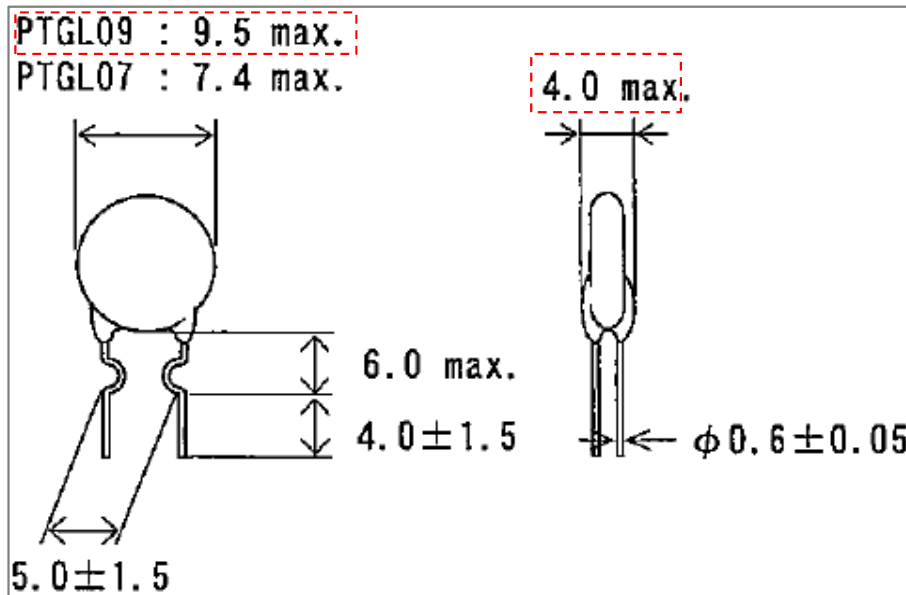
PTGL07BD100N vs PTGL07AR250H  
PTGL07BD470N vs PTGL07BD330N  
PTGL09BD2R2N vs PTGL05AS3R9K



PTGL07BD100N2B51A0/B0  
PTGL07BD470N3B51A0/B0  
PTGL09BD2R2N2B51A0/B0



PTGL07AR250H4B51A0/B0  
PTGL07BD330N3B51A0/B0  
PTGL05AS3R9K2B51A0/B0



## ■ Difference :

There is no change in shape. The size of PTGL07 are in the same, and the size of PTGL09 is bigger than PTGL05, but there is no influence in electric specifications and mounting.



# 3, Comparison of reliability test

PTGL07BD100N vs PTGL07AR250H

PTGL07BD470N vs PTGL07BD330N

PTGL09BD2R2N vs PTGL05AS3R9K



## Test items and detail conditions

| Item                                  | Criteria   | Test Condition   |
|---------------------------------------|--|--|
| Damp Heat                             | • Change in resistance<br>max. $\pm 20\%$ (*)<br><br>• No damage about marking | • $+60\pm 2^\circ\text{C}$ , $95\pm 5\%\text{RH}$<br>• 1000+48/-0h   |
| High temperature with continuous load |  | Reference standard : IEC60068-2-2(2007)<br>• $+60\pm 2^\circ\text{C}$<br>• Applied Max. voltage<br>• 1000+48/-0h<br>(A protective resistance is to be connected in series and the inrush current through Posistor must be limited below max. rated value.) |

# 3, Comparison of reliability test

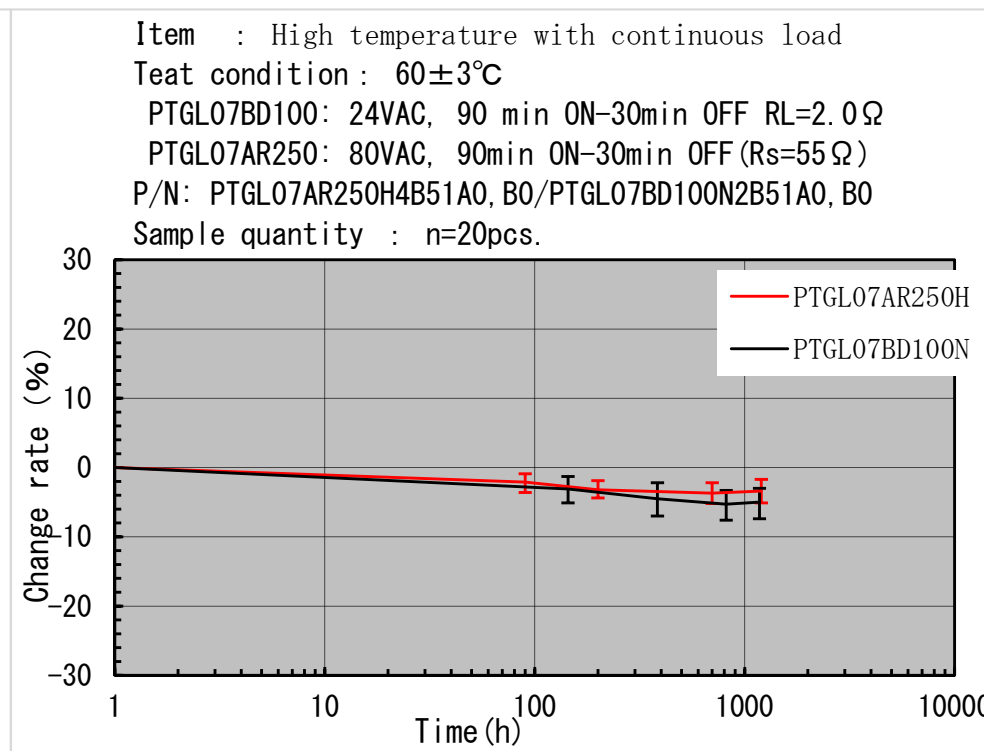
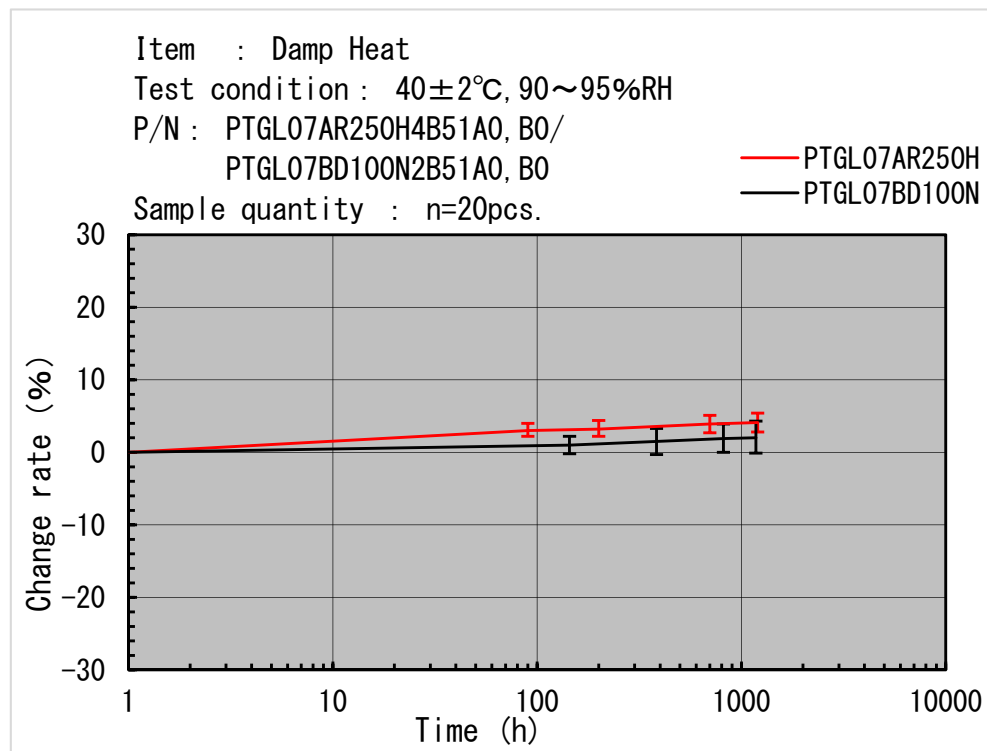


PTGL07BD100N vs PTGL07AR250H

PTGL07BD470N vs PTGL07BD330N

PTGL09BD2R2N vs PTGL05AS3R9K

PTGL07BD100N2B51A0/B0 → PTGL07AR250H4B51A0/B0



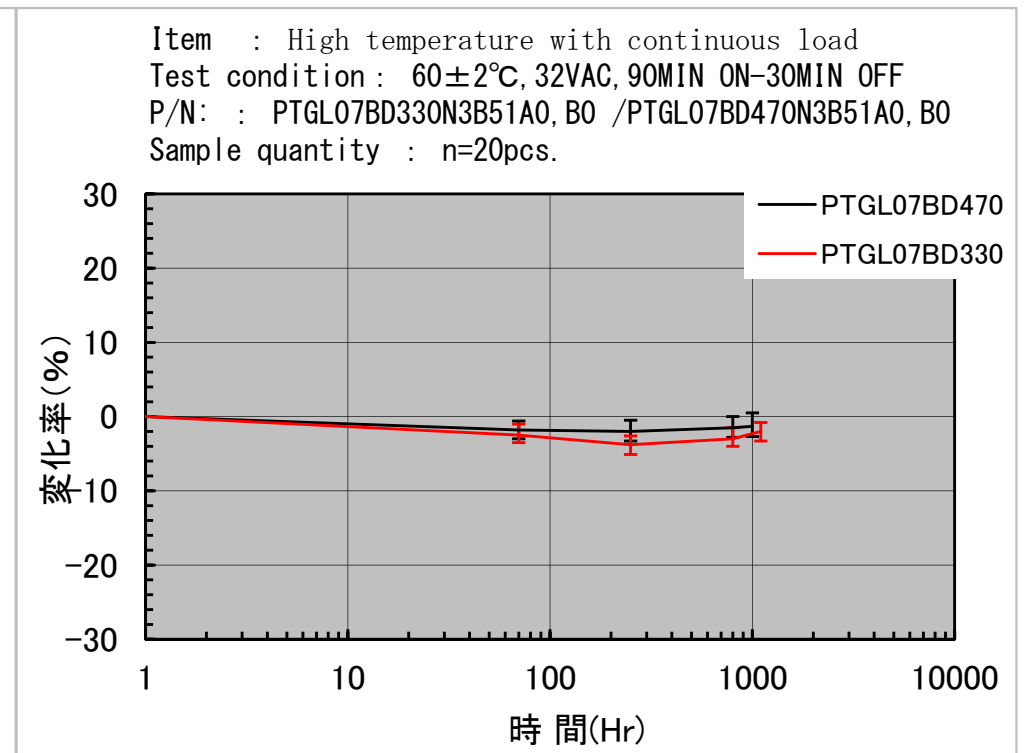
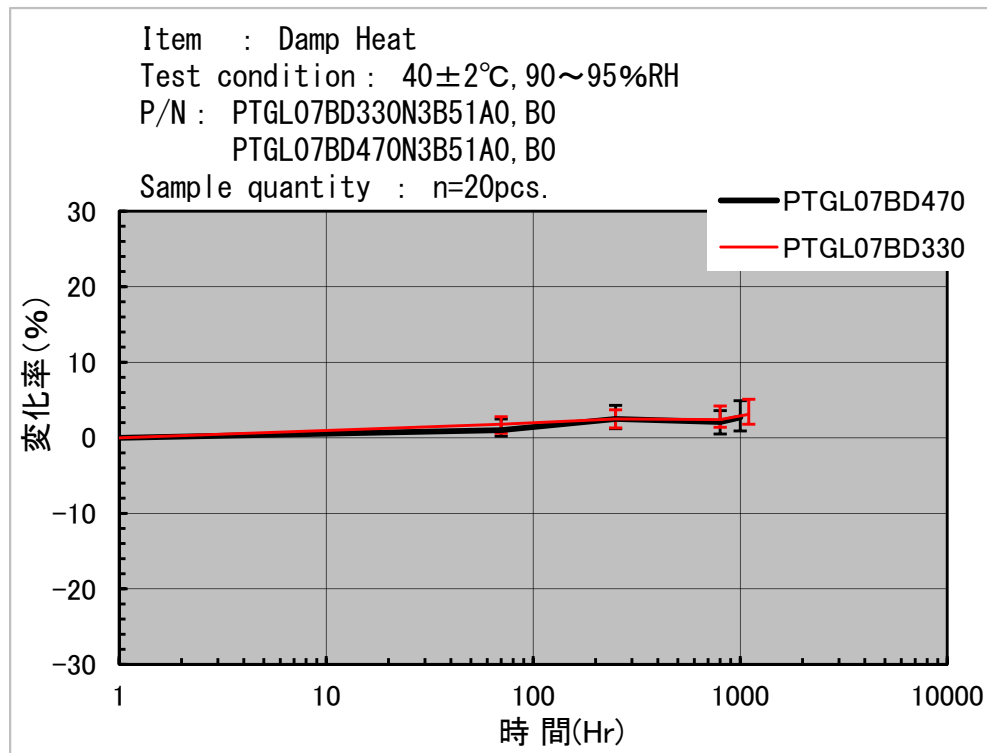
**Result :** The test result are almost in the same level.

# 3, Comparison of reliability test



PTGL07BD100N vs PTGL07AR250H  
**PTGL07BD470N vs PTGL07BD330N**  
PTGL09BD2R2N vs PTGL05AS3R9K

PTGL07BD470N3B51A0/B0 → PTGL07BD330N3B51A0/B0



**Result :** The test result are almost in the same level.

# 3, Comparison of reliability test

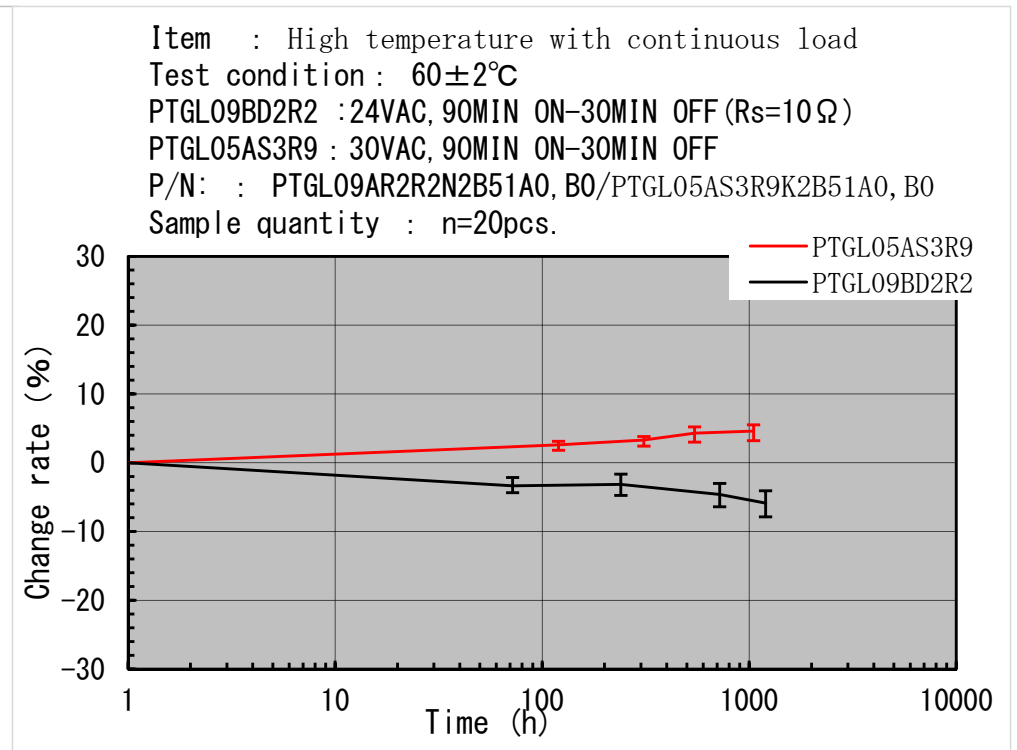
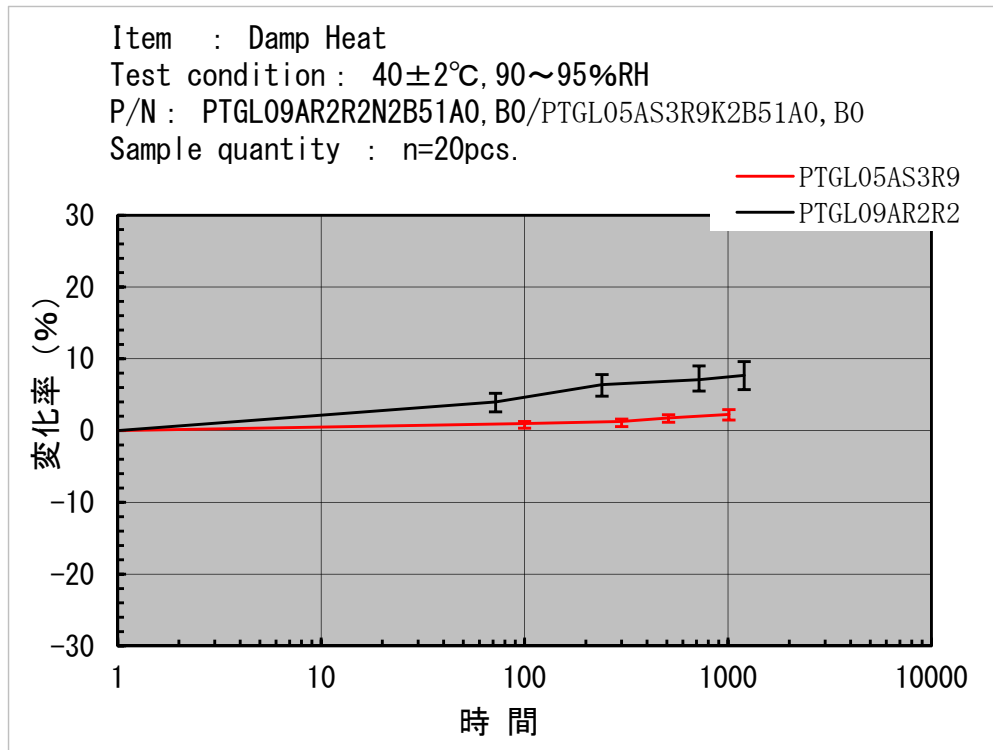


PTGL07BD100N vs PTGL07AR250H

PTGL07BD470N vs PTGL07BD330N

**PTGL09BD2R2N vs PTGL05AS3R9K**

PTGL09BD2R2N2B51A0/B0 → PTGL05AS3R9K2B51A0/B0



**Result :** The test result are almost in the same level.