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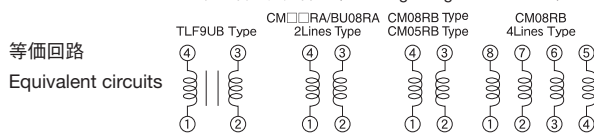
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# コモンモードチョークコイル (DC、信号ライン用) リードタイプ COMMON MODE CHOKE COILS (FOR DC AND SIGNAL LINES) LEADED TYPE



|                 |                    |
|-----------------|--------------------|
| OPERATING TEMP. | TLFタイプ: -25~+115°C |
|                 | CMタイプ: -25~+105°C  |

製品自己発熱含む (Including self-generated heat)



## 特長 FEATURES

- ・小形軽量、高信頼性
- ・基板への実装が容易

- ・High reliability, compact and lightweight
- ・Easily inserted into the PCB

## 用途 APPLICATIONS

- ・TLFタイプ: 低周波 (AM放送波) 帯域のノイズ対策 (多機能電話機、PBX、FAX等不要輻射電界及び放送波に対するイミュニティ対策)
- ・CM、BUタイプ: 高周波 (MHz) 帯域のノイズ対策

- ・TLF Type: Countermesure for noise in the low-frequency (AM) broad-casting band. Shields against radiated emissions in the broadcasting frequency for multi-functional telephone sets. PBXs, faxes, etc.
- ・CM/BU Type: Countermeasure for noise in the high-frequency (MHz) band

## 形名表記法 ORDERING CODE

### TLF Type

|  |  |   |   |
|--|--|---|---|
| <b>1</b><br>形式<br>TLF   ラインフィルタ              | <b>3</b><br>形状<br>UB△   U字コア分割巻縦形<br>UBH   U字コア分割巻横形<br>△=スペース | <b>4</b><br>公称インダクタンス (μH)<br>例   302   3000<br>203   20000 | <b>5</b><br>インダクタンス許容差 (%)<br>W   $\begin{matrix} +100 \\ -10 \end{matrix}$ |
| <b>2</b><br>コアの長辺寸法 (mm)<br>△9   9<br>△=スペース |  |   | <b>6 7</b><br>当社管理記号<br>△△   標準品<br>△=スペース                                  |



|  |  |  |   |
|--|--|--|---|
| <b>1</b><br>Type<br>TLF   Line filter                          | <b>3</b><br>Shape<br>UB△   U core, vertically split wound<br>UBH   U core, horizontally split wound<br>△=Blank space | <b>4</b><br>Nominal inductance (μH)<br>example   302   3000<br>203   20000 | <b>5</b><br>Inductance tolerance (%)<br>W   $\begin{matrix} +100 \\ -10 \end{matrix}$ |
| <b>2</b><br>Dimensions of core (mm)<br>△9   9<br>△=Blank space |  |  | <b>6 7</b><br>Internal code<br>△△   Standard product<br>△=Blank space                 |

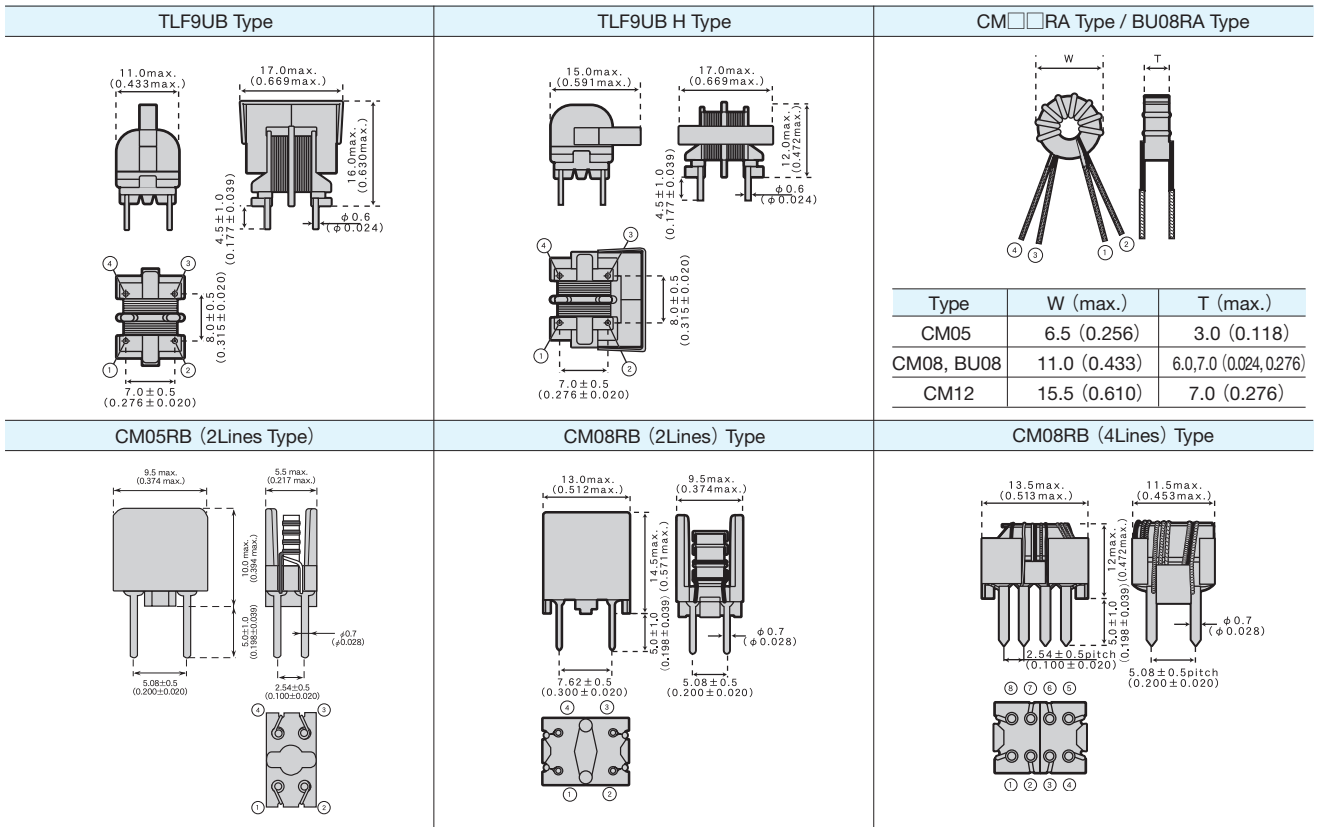
### CM-BU Type

|   |   |  |                           |   |
|---|---|--|---------------------------|---|
| <b>1</b><br>形式<br>CM   BU   コモンモードチョークコイル | <b>2</b><br>コアの寸法 (mm)<br>05   4.8<br>08   8.0<br>12   12.0 | <b>3</b><br>形状<br>RA   複線リード直出し<br>RB   ベース使用ピンタイプ | <b>4</b><br>試作番号<br>01~20 | <b>5</b><br>当社管理記号<br>△   標準品<br>△=スペース |
|---|---|--|---------------------------|---|



|  |   |   |  |  |
|--|---|---|--|--|
| <b>1</b><br>Type<br>CM   BU   Common mode choke coil | <b>2</b><br>Core dimensions (mm)<br>05   4.8<br>08   8.0<br>12   12.0 | <b>3</b><br>Shape<br>RA   Double-wire lead<br>RB   Pin type with base | <b>4</b><br>Product classification code<br>01~20 | <b>5</b><br>Internal code<br>△   Standard product<br>△=Blank space |
|--|---|---|--|--|

# 外形寸法 EXTERNAL DIMENSIONS



Unit: mm (inch)

## アイテム一覧 PART NUMBERS

| 形名<br>Ordering code | EHS<br>(Environmental<br>Hazardous<br>Substances) | ライン数<br>No. of lines | インダクタンス<br>Inductance<br>[ $\mu$ H]<br>[ $\pm 10\%$ ] | 直流抵抗<br>[ $\Omega$ ] DC<br>resistance<br>(max.) | 定格電流 [A]<br>Rated current<br>(max.) | 定格電圧 [V]<br>Rated voltage<br>D.C. | 絶縁抵抗 [M $\Omega$ ]<br>Insulation<br>resistance<br>(min.) | インピーダンス [K $\Omega$ ]<br>参考値<br>Impedance<br>(Reference values) |
|---------------------|---|----------------------|---|---|-------------------------------------|-----------------------------------|--|---|
| TLF9UBH302W         | RoHS  | 2                    | 3000  | 1.5   | 0.4                                 | 50                                | 100  | $\geq 20$ (at 1MHz)   |
| TLF9UB 302W         | RoHS  |                      |   |   |                                     |                                   |  |   |
| TLF9UBH802W         | RoHS  |                      |   |   |                                     |                                   |  |   |
| TLF9UB 802W         | RoHS  |                      |   |   |                                     |                                   |  |   |
| TLF9UBH203W         | RoHS  |                      |   |   |                                     |                                   |  |   |
| TLF9UB 203W         | RoHS  |                      | 20000   | 6.5   | 0.18                                |                                   | $\geq 150$ (at 500kHz)                                   |   |

| 形名<br>Ordering code | EHS<br>(Environmental<br>Hazardous<br>Substances) | ライン<br>No. of lines | インダクタンス[ $\mu$ H]<br>Inductance<br>[at 1kHz] | インピーダンス[ $\Omega$ ]<br>Impedance<br>(typical) | 直流抵抗 [ $\Omega$ ]<br>DC resistance<br>(max.) | 定格電流 [A]<br>Rated current<br>(max.) | 定格電圧 [V]<br>Rated voltage<br>D.C. | 絶縁抵抗 [M $\Omega$ ]<br>Insulation<br>resistance<br>(min.) |
|---------------------|---|---------------------|--|---|--|-------------------------------------|-----------------------------------|--|
| CM05RA 06           | RoHS  | 2                   | 0.7min                                       | 700 (at 200MHz)                               | 0.050  | 1.5                                 | 50                                | 100  |
| BU08RA 11           | RoHS  |                     | 0.7~1.3                                      | 1000 (at 250MHz)                              | 0.013  | 4.0                                 |                                   |  |
| BU08RA 16           | RoHS  |                     | 1.19~2.21                                    | 1200 (at 200MHz)                              | 0.011  | 3.0                                 |                                   |  |
| CM08RA 17           | RoHS  |                     | 15.0min                                      | 2000 (at 80MHz)                               | 0.040  | 2.4                                 |                                   |  |
| CM08RA 20           | RoHS  |                     | 6.0min                                       | 500 (at 200MHz)                               | 0.020  | 5.5                                 |                                   |  |
| CM12RA 02           | RoHS  |                     | 10.0min                                      | 2000 (at 80MHz)                               | 0.040  | 3.0                                 |                                   |  |
| CM05RB 01           | RoHS  |                     | 7.0min                                       | 700 (at 70MHz)                                | 0.050  | 2.0                                 |                                   |  |
| CM05RB 03           | RoHS  |                     | 15.0min                                      | 1400 (at 100MHz)                              | 0.060  | 1.5                                 |                                   |  |
| CM08RB 01           | RoHS  |                     | 40.0min                                      | 2500 (at 30MHz)                               | 0.040  | 2.0                                 |                                   |  |
| CM08RB 02           | RoHS  |                     | 15.0min                                      | 2000 (at 50MHz)                               | 0.040  | 2.4                                 |                                   |  |
| CM08RB 04           | RoHS  | 110.0min            | 2000 (at 70MHz)                              | 0.040   | 3.0  |                                     |                                   |  |
| CM08RB 05           | RoHS  | 6.0min              | 450 (at 100MHz)                              | 0.020   | 4.0  |                                     |                                   |  |
| CM08RB 03           | RoHS  | 4                   | 15.0min                                      | 1000 (at 50MHz)                               | 0.050  | 2.0                                 |                                   |  |

セレクションガイド  
Selection Guide

アイテム一覧  
Part Numbers

特性図  
Electrical Characteristics

梱包  
Packaging

信頼性  
Reliability Data

使用上の注意  
Precautions

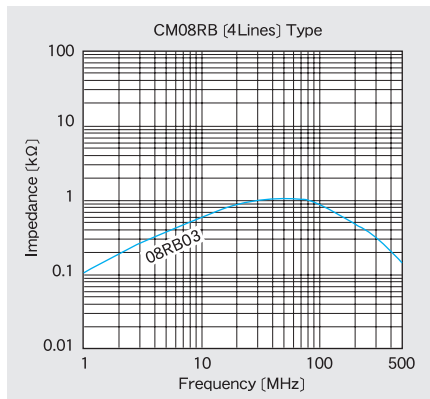
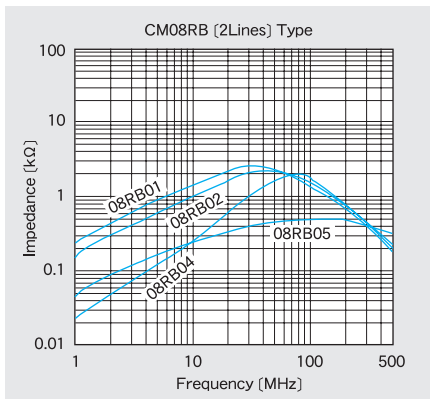
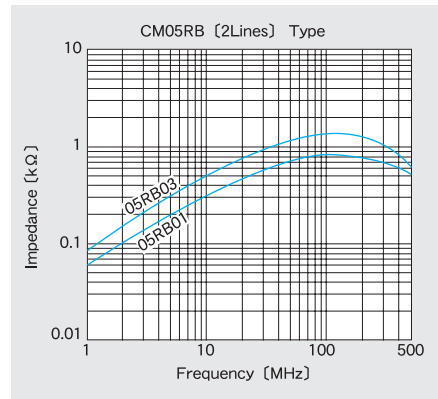
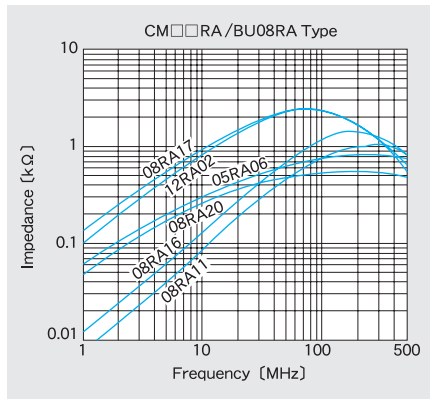
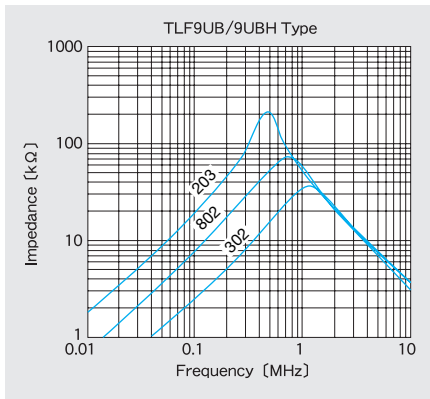


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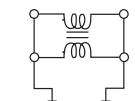
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(測定条件) Measuring conditions

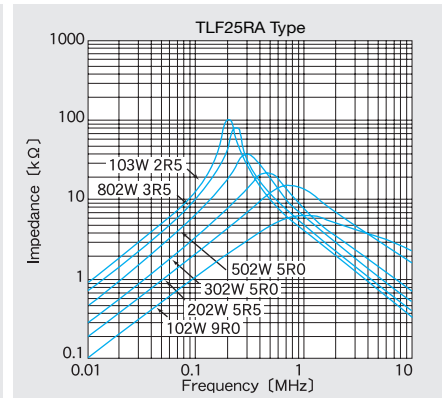
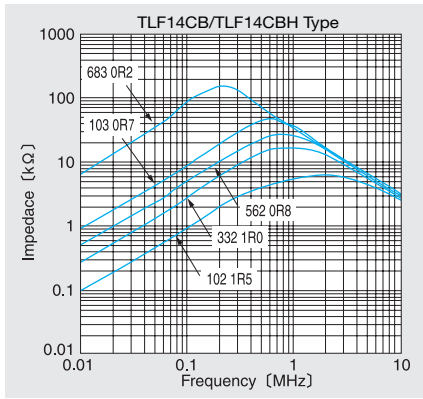
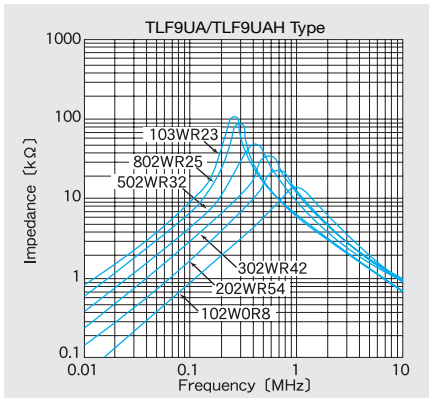
使用測定器 Equipment : HP 4291A Vosc: 0.5V (CM/BU type)  
 HP 4192A Vosc: 0.35V(TLF type)

測定回路 Measuring circuit



インピーダンス アナライザーへ To impedance analyzer

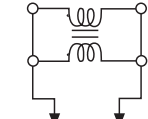
# インピーダンス—周波数特性 IMPEDANCE-FREQUENCY CHARACTERISTIC



(測定条件)

使用測定器 : HP-4192A  
Vosc=0.35V

測定回路



インピーダンス  
アナライザへ

Test conditions

Equipment : HP-4192A  
Vosc=0.35V

Test circuit

To impedance analyzer

## 梱包 PACKAGING

最小受注単位数 Minimum Quantity  
CM / BU Type

| Type     | 最小受注単位数 (pcs.)<br>Minimum Quantity |             |
|----------|------------------------------------|-------------|
|          | 箱づめ<br>Box                         | 袋づめ<br>Bulk |
| CM05RA06 | —                                  | 500         |
| CM05RB□□ | 1000                               | —           |
| CM08RA□□ | —                                  | 250         |
| CM08RB□□ | 500                                | —           |
| CM12RA02 | —                                  | 100         |
| BU08RA□□ | —                                  | 200         |

TLF Type

| Type     | 最小受注単位数 (pcs.)<br>Minimum Quantity |
|----------|------------------------------------|
|          | 箱づめ<br>Box                         |
| TLF9UA□  | 500                                |
| TLF9UB□  | 500                                |
| TLF14CB□ | 500                                |
| TLF25RA  | 200                                |

| Item   | Specified Value                   |              |  |            | Test method and remarks   |   |           |              |            |   |      |   |           |              |            |    |      |
|--|-----------------------------------|--------------|--|------------|---|---|-----------|--------------|------------|---|------|---|-----------|--------------|------------|----|------|
|  | CM-RA/<br>BU-RA Type              | CM-RB Type   | TLF9U<br>TLF14CB                           | TLF25RA    |   |   |           |              |            |   |      |   |           |              |            |    |      |
| 1. Operating Temperature Range                 | -25~+105°C                        |              | TLF9U : -25~+115°C<br>TLF14CB : -20~+105°C | -25~+105°C | Including temperature rise due to self-generated heat.  |   |           |              |            |   |      |   |           |              |            |    |      |
| 2. Storage temperature range                   | -40~+85°C                         |              |  |            |   |   |           |              |            |   |      |   |           |              |            |    |      |
| 3. Rated current                               | Within the specified range        |              |  |            | <p>CM :</p> <p>The maximum DC value having temperature increase within specified temperature, as detailed in individual specification.</p> <p>TLF9UA, 14CB, 25RA :</p> <p>The maximum AC value having temperature increase within 45°C by the application of AC current.</p> <p>TLF9UB :</p> <p>The maximum DC value having temperature increase within 45°C by the application of DC current.</p>  |   |           |              |            |   |      |   |           |              |            |    |      |
| 4. Inductance                                  | Within the specified tolerance    |              |  |            | <p>CM :</p> <p>Measuring equipment : 4262A (HP) or its equivalent<br/>Measuring frequency : 1kHz</p> <p>TLF9U, 25RA :</p> <p>Measuring equipment : Impedance analyzer (HP4192A) or its equivalent<br/>Measuring frequency : 1kHz<br/>Measuring voltage : 0.35Vosc</p> <p>TLF14CB :</p> <p>Measuring equipment : LCR meter 4284A or its equivalent<br/>Measuring frequency : 1kHz<br/>Measuring voltage : 1.0V</p>   |   |           |              |            |   |      |   |           |              |            |    |      |
| 5. DC resistance                               | Within the specified tolerance    |              |  |            | <p>CM, TLF :</p> <p>Measuring equipment : DC ohmmeter</p>   |   |           |              |            |   |      |   |           |              |            |    |      |
| 6. Terminal strength tensile force             | No abnormality                    |              |  |            | <p>CM :</p> <p>Fix the component in the direction to draw terminal and gradually apply tensile force as detailed in individual specifications.</p> <p>TLF9U :</p> <p>Apply the stated tensile force gradually in the direction to draw terminal.</p> <table border="1"> <thead> <tr> <th>Nominal wire diameter tensile <math>\phi</math> d (mm)</th> <th>force (N)</th> <th>duration (S)</th> </tr> </thead> <tbody> <tr> <td><math>\phi</math> 0.6</td> <td>5</td> <td>30±5</td> </tr> </tbody> </table> <p>TLF14CB :</p> <p>Apply the stated tensile force gradually in the direction to draw terminal.</p> <table border="1"> <thead> <tr> <th>Nominal wire diameter tensile <math>\phi</math> d (mm)</th> <th>force (N)</th> <th>duration (S)</th> </tr> </thead> <tbody> <tr> <td><math>\phi</math> 0.8</td> <td>10</td> <td>30±5</td> </tr> </tbody> </table> <p>TLF25RA :</p> <p>Apply the tensile force of 10N in the direction to draw terminal for 5 seconds.</p> | Nominal wire diameter tensile $\phi$ d (mm) | force (N) | duration (S) | $\phi$ 0.6 | 5 | 30±5 | Nominal wire diameter tensile $\phi$ d (mm) | force (N) | duration (S) | $\phi$ 0.8 | 10 | 30±5 |
| Nominal wire diameter tensile $\phi$ d (mm)    | force (N)                         | duration (S) |  |            |   |   |           |              |            |   |      |   |           |              |            |    |      |
| $\phi$ 0.6                                     | 5                                 | 30±5         |  |            |   |   |           |              |            |   |      |   |           |              |            |    |      |
| Nominal wire diameter tensile $\phi$ d (mm)    | force (N)                         | duration (S) |  |            |   |   |           |              |            |   |      |   |           |              |            |    |      |
| $\phi$ 0.8                                     | 10                                | 30±5         |  |            |   |   |           |              |            |   |      |   |           |              |            |    |      |
| 7. Temperature rise                            | Refer to individual specification |              | 45°C max.                                  |            | <p>TLF :</p> <p>Resistance substitution method<br/>Applied current : Rated current<br/>Duration : 1 hr</p>  |   |           |              |            |   |      |   |           |              |            |    |      |
| 8. Insulation resistance between wires         | 100M $\Omega$ min.                |              |  |            | <p>CM・TLF :</p> <p>Applied voltage : Rated voltage (CM-RA/BU-RA, CM-RB)<br/>: 500VDC (TLF9UA, 14CB, 25RA)<br/>: 250VDC (TLF 9UB)<br/>Duration : 60sec.</p>  |   |           |              |            |   |      |   |           |              |            |    |      |
| 9. Insulation resistance between wire and core |                                   |              | 100M $\Omega$ min.                         |            | <p>TLF :</p> <p>Applied voltage : 500VDC (TLF9UA, 14CB)<br/>: 250VDC (TLF 9UB)<br/>Duration : 60 sec.</p>   |   |           |              |            |   |      |   |           |              |            |    |      |

| Item   | Specified Value  |  |   |         | Test method and remarks  |
|--|--|--|---|---------|--|
|  | CM-RA/<br>BU-RA Type   | CM-RB Type   | TLF9U<br>TLF14CB  | TLF25RA |  |
| 10. Withstanding :<br>between wires          | No abnormality   |  |   |         | CM・TLF :<br>Applied voltage : 250VDC (CM-RA/BU-RA, CM-RB)<br>: 2000VAC (TLF9UA, 14CB, 25RA)<br>: 500VDC (TLF 9UB)<br>Duration : 60sec.   |
| 11. Withstanding :<br>between wires and core |  |  | No abnormality  |         | TLF :<br>Applied voltage : 2000VAC (TLF9UA, 14CB)<br>: 500VDC (TLF9UB)<br>Duration : 60sec.  |
| 12. Rated voltage                            | Within the specified range   |  |   |         | TLF9UA, 14CB, 25RA : 250VAC<br>TLF9UB : 50VDC  |
| 13. Resistance to vibration                  |  | Appearance :<br>No abnormality<br>Inductance change :<br>Within ±15% | TLF9U<br>Inductance change :<br>Within ±5%<br><br>TLF14CB<br>Within the specified<br>range      |         | CM, TLF :<br>According to JIS C0040<br>Direction : 2hrs each in X, Y and Z direction Total : 6hrs<br>Frequency range : 10 to 55 to 10Hz (1 min.)<br>Amplitude : 1.5mm (shall not exceed acceleration 196m <sup>2</sup> /s)<br>Mounting method : soldering onto PC board<br>Recovery : 2 to 24 hrs of recovery under the standard<br>condition after the test. (CM-RB)<br>: At least 1hr of recovery under the standard<br>condition after the removal from test chamber,<br>followed by the measurement within<br>2hrs. (TLF9U, 14CB)    |
| 14. Solderability                            | At least 75% of terminal electrode is covered by<br>new solder.                          |  | Solder shall be uniformly adhered onto im-<br>mersed surfaces.                                  |         | CM :<br>Solder temperature : 235±5°C<br>Duration : 2±0.5sec.<br>Immersion depth : According to detailed specification.<br><br>TLF :<br>Solder temperature : 230±5°C<br>Duration : 2±0.5sec. (9U, 25RA)<br>: 3±0.5sec. (14CB)<br>Immersion depth : Up to 1.0 to 1.5mm from PBC mount-<br>ed level.  |
| 15. Resistance to soldering<br>heat          | Appearance : No abnormality<br>Impedance change : Refer to individual speci-<br>fication |  | TLF9UA・TLF25RA :<br>Inductance change : Within ±5%<br><br>TLF14CB<br>Within the specified range |         | CM :<br>Solder temperature : 260±5°C<br>Duration : 5±0.5sec.<br>Immersion depth : Up to 2~2.5mm from terminal root.<br>Recovery : 1 to 2 hrs of recovery under the standard<br>condition after the test.<br><br>TLF :<br>Solder temperature : 260±5°C<br>Duration : 5±1sec. (25RA)<br>: 10±1sec. (9U, 14CB)<br>Immersion depth : Up to 1.0 to 1.5mm from PBC mount-<br>ed level.<br>Recovery : At least 1hr of recovery under the standard<br>condition after the removal from test chamber,<br>followed by the measurement within 2hrs. |

| Item                            | Specified Value  |                |   |         | Test method and remarks  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
|---------------------------------|--|----------------|---|---------|--|--------------|------------------|----------------|-------|-------|------|---|------------------|----------|---|-------|------|---|------------------|----------|
|                                 | CM-RA/<br>BU-RA Type   | CM-RB Type     | TLF9U<br>TLF14CB  | TLF25RA |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 16. Thermal shock               | Appearance : No abnormality<br>Impedance change : Refer to individual specification  |                | TLF9UA · TLF25RA :<br>Inductance change : Within ±15%<br><br>TLF14CB :<br>· Withstanding voltage : No abnormality<br>· Insulation resistance : No abnormality |         | CM, TLF :<br>According to JIS C0025<br>Conditions for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>+85±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temperature</td> <td>Within 3</td> </tr> </tbody> </table><br>Number of cycles : 10<br>Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.   | Step         | Temperature (°C) | Duration (min) | 1     | -25±3 | 30±3 | 2 | Room Temperature | Within 3 | 3 | +85±2 | 30±3 | 4 | Room Temperature | Within 3 |
| Step                            | Temperature (°C)   | Duration (min) |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 1                               | -25±3  | 30±3           |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 2                               | Room Temperature   | Within 3       |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 3                               | +85±2  | 30±3           |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 4                               | Room Temperature   | Within 3       |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 17. Damp heat                   |  |                | TLF9UA · TLF25RA :<br>Inductance change : Within ±15%<br><br>TLF14CB :<br>Withstanding voltage : No abnormality<br>Insulation resistance : No abnormality     |         | TLF :<br>Temperature : 60±2°C<br>※TLF14CB Temperature : 40±2°C<br>Humidity : 90~95%RH<br>Duration : 500 hrs<br>Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 18. Loading under damp heat     | Appearance : No abnormality<br>Inductance change : Refer to individual specification |                | Withstanding voltage : No abnormality<br>Insulation resistance : No abnormality   |         | CM :<br>Temperature : 40±2°C<br>Humidity : 90~95%RH<br>Duration : 500 (+12, -0) hrs<br>Applied current : Rated current<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.<br><br>TLF :<br>Temperature : 60±2°C<br>※TLF14CB Temperature : 40±2°C<br>Humidity : 90~95%RH<br>Duration : 100 hrs<br>Applied voltage : Apply the following specified voltage between windings. <table border="1"> <tbody> <tr> <td>TLF9UA, 25RA</td> <td>250VAC</td> </tr> <tr> <td>TLF9UB</td> <td>50VDC</td> </tr> </tbody> </table> ※TLF14CB Duration : 500 hrs Apply rated current across windings<br>Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | TLF9UA, 25RA | 250VAC           | TLF9UB         | 50VDC |       |      |   |                  |          |   |       |      |   |                  |          |
| TLF9UA, 25RA                    | 250VAC   |                |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| TLF9UB                          | 50VDC  |                |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| 19. Loading at high temperature |  |                | Withstanding voltage : No abnormality<br>Insulation resistance : No abnormality   |         | TLF :<br>Temperature : 85±2°C<br>Duration : 100 hrs<br>Applied voltage : Apply the following specified voltage between windings. <table border="1"> <tbody> <tr> <td>TLF9UA, 25RA</td> <td>250VAC</td> </tr> <tr> <td>TLF9UB</td> <td>50VDC</td> </tr> </tbody> </table> ※TLF14CB Duration : 500 hrs<br>Apply rated current across windings<br>Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.  | TLF9UA, 25RA | 250VAC           | TLF9UB         | 50VDC |       |      |   |                  |          |   |       |      |   |                  |          |
| TLF9UA, 25RA                    | 250VAC   |                |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |
| TLF9UB                          | 50VDC  |                |   |         |  |              |                  |                |       |       |      |   |                  |          |   |       |      |   |                  |          |



| Item                          | Specified Value  |            |  |         | Test method and remarks  |
|-------------------------------|--|------------|--|---------|--|
|                               | CM-RA/<br>BU-RA Type   | CM-RB Type | TLF9U<br>TLF14CB   | TLF25RA |  |
| 20.Low temperature life test  | Appearance : No abnormality<br>Inductance change : Refer to individual specification |            | TLF9U・TLF25RA :<br>Inductance change : Within $\pm 15\%$<br><br>TLF14CB :<br>・ Withstanding voltage : No abnormality<br>・ Insulation resistance : No abnormality |         | CM :<br>Temperature : $-40 \pm 3^\circ\text{C}$<br>Duration : 500 (+12, -0) hrs<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.<br>(CM-RA)<br>: 1 to 2hrs of recovery under the standard condition after the removal from test chamber.<br>(CM-RB)<br><br>TLF :<br>Temperature : $-25 \pm 2^\circ\text{C}$<br>※TLF14CB Temperature : $-40 \pm 2^\circ\text{C}$<br>Duration : 500 hrs<br>Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. |
| 21.High Temperature life test | Appearance : No abnormality<br>Inductance change : Refer to individual specification |            | TLF9U・TLF25RA :<br>Inductance change : Within $\pm 15\%$<br><br>TLF14CB :<br>・ Withstanding voltage : No abnormality<br>・ Insulation resistance : No abnormality |         | CM :<br>Temperature : $85 \pm 2^\circ\text{C}$<br>Duration : 500 (+12, -0) hrs<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.<br>(CM-RA)<br>: 1 to 2hrs of recovery under the standard condition after the removal from test chamber.<br>(CM-RB)<br><br>TLF :<br>Temperature : $85 \pm 2^\circ\text{C}$<br>※TLF14CB Temperature : $105 \pm 3^\circ\text{C}$<br>Duration : 500 hrs<br>Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.   |

CM-RA Type,CM-RB Type,TLF Type

| Stages               | Precautions  | Technical considerations   |
|----------------------|--|--|
| 1.Circuit Design     | <p>Operating environment,</p> <p>1.The products described in this specification are intended for use in general electronic equipment,(office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>                                      |  |
| 2.PCB Design         | <p>Design</p> <p>1.Please design insertion pitches of a base in the pitches that fitted a terminal interval.</p>   | <p>1.When Inductors are mounted onto a PC board, hole dimensions on the board should match the lead pitch of the component, if not, it will cause breakage of the terminals or cracking of terminal roots covered with resin as excess stress travels through the terminal legs.</p>               |
| 3.Soldering          | <p>Wave soldering</p> <p>1.Please refer to the specifications in the catalog for a wave soldering.</p> <p>2.Do not immerse the entire Inductors in the flux during the soldering operation.</p> <p>Lead free soldering</p> <p>1.When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, etc. sufficiently.</p> <p>Recommended conditions for using a soldering iron</p> <p>Put the soldering iron on the land-pattern.</p> <p>Soldering iron's temperature - Below 350 °C</p> <p>Duration - 3 seconds or less</p> <p>The soldering iron should not directly touch the product.</p>           | <p>1.If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p>   |
| 4.Cleaning           | <p>Cleaning conditions</p> <p>1.TLF type</p> <p>Please contact any of our offices for about a cleaning,</p>  |  |
| 5.Handling           | <p>Handling</p> <p>1.Keep the product away from all magnets and magnetic objects.</p> <p>Mechanical considerations</p> <p>1.Please do not give the product any excessive mechanical shocks.</p> <p>2.TLF type</p> <p>Please do not add any shock or and power to a product in transportation.</p> <p>Packing</p> <p>1.Please do not give the product any excessive mechanical shocks.</p> <p>In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).</p>  | <p>1.There is a case that a characteristic varies with magnetic influence.</p> <p>1.There is a case to be damaged by a mechanical shock.</p> <p>2.TLF type</p> <p>There is a case to be broken by a fall.</p> <p>1.There is a case that a lead route turns at by a fall or an excessive shock.</p> |
| 6.Storage conditions | <p>Storage</p> <p>1.To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.</p> <p>·Recommended conditions</p> <p>Ambient temperature           0~40°C</p> <p>Humidity                           Below 70% RH</p> <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within one year from the time of delivery.</p> <p>In case of storage over 6 months, solderability shall be checked before actual usage.</p> | <p>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</p>   |