Inductors for Decoupling Circuits
Multilayer/STD • magnetic shielded

MLZ series

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions Code JIS[EIA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLZ1005W</td>
<td>1005[0402 inch]*</td>
</tr>
<tr>
<td>MLZ1608</td>
<td>1608[0603 inch]</td>
</tr>
<tr>
<td>MLZ2012</td>
<td>2012[0805 inch]</td>
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</tbody>
</table>

* Dimensions Code JIS[EIA]

Issue date: May 2012

- All specifications are subject to change without notice.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
Inductors for Decoupling Circuits
Multilayer/STD • Magnetic Shielded

MLZ Series MLZ1005W

The MLZ Series is a new line of multilayer choke coils for decoupling with the industry’s best DC superimposition characteristics and lowest DC resistance. TDK has developed this coil using its proprietary ferrite material technique and dense electrodes. The MLZ Series exerts an excellent effect mainly on the decoupling of power circuits. It also exerts an effect on audio lines because of its low DC resistance.
The MLZ1005 series is now available in addition to the MLZ1608/2012 series.

* The MLZ Series was regarded as having the industry’s best DC superimposition characteristics and lowest DC resistance according to research conducted in September 2010.

FEATURES
- MLZ1005 series products have the best DC superimposition characteristics in the industry.
- Magnetically sealed configuration allowing for high-density mounting.
- Does not contain lead and is compatible with lead-free soldering.
- It is a product conforming to RoHS directive.

APPLICATIONS
Modules such as digital cellular phone and camera module, Netbooks, note PCs, DSCs, DVCs, video games, portable memory audio devices, navigation systems, PNDs, TVs, W-LANs, solid state drives

SPECIFICATIONS

<table>
<thead>
<tr>
<th>OPERATING TEMPERATURE RANGE</th>
<th>-55 to +125°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Including self-temperature rise]</td>
<td></td>
</tr>
</tbody>
</table>

| STORAGE TEMPERATURE RANGE | -55 to +125°C (After mount) |

RECOMMENDED SOLDERING CONDITION

REFLOW SOLDERING

PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>MLZ</th>
<th>1005 M 1R0 W T</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2) (3) (4) (5) (6)</td>
</tr>
</tbody>
</table>

(1) Series name
(2) Dimensions L×W
1005 1.0×0.5×0.5mm
(3) Management symbol
(4) Inductance
R47 0.47µH
1R0 1.0µH
(5) Characteristic type
W IDC-UP
(6) Packaging style
T Taping [reel]
(7) TDK internal code

PACKAGING STYLE AND QUANTITIES

<table>
<thead>
<tr>
<th>Packaging style</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taping</td>
<td>10000 pieces/reel</td>
</tr>
</tbody>
</table>

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components.
  The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

• Please contact our Sales office when your application is considered the following:
The device’s failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

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**ELECTRICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Part No.</th>
<th>Inductance (µH)</th>
<th>Inductance tolerance</th>
<th>Test frequency L (MHz)</th>
<th>Test current L (mA)</th>
<th>Self-resonant frequency (MHz)typ.</th>
<th>DC resistance (Ω)±30%</th>
<th>Rated current1 (mA)</th>
<th>Rated current2 (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDC-UP</td>
<td>MLZ1005MR47WT</td>
<td>0.47</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>260</td>
<td>0.20</td>
<td>120</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>MLZ1005MR68WT</td>
<td>0.68</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>210</td>
<td>0.30</td>
<td>110</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>MLZ1005MR100WT</td>
<td>1.00</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>170</td>
<td>0.35</td>
<td>100</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>MLZ1005MR150WT</td>
<td>1.50</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>140</td>
<td>0.50</td>
<td>80</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>MLZ1005MR220WT</td>
<td>2.20</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>120</td>
<td>0.55</td>
<td>60</td>
<td>350</td>
</tr>
</tbody>
</table>

1. Current assumed when inductance ratio has decreased by 50% max.
2. Current assumed when temperature has risen to 20°C max. (reference value). The maximum operating temperature at this time is 105°C.

* Test equipment
  * Inductance: Ag-4294A+16034G

**TYPICAL ELECTRICAL CHARACTERISTICS**

**INDUCTANCE vs. FREQUENCY CHARACTERISTICS**

**IMPEDANCE vs. FREQUENCY CHARACTERISTICS**

**INDUCTANCE CHANGE vs. DC SUPERPOSITION CHARACTERISTICS**

**TEMPERATURE CHARACTERISTICS**

- All specifications are subject to change without notice.
PACKAGING STYLES

REEL DIMENSIONS

Dimensions in mm

TAPE DIMENSIONS

Dimensions in mm

- All specifications are subject to change without notice.
Inductors for Decoupling Circuits
Multilayer/STD • Magnetic Shielded

MLZ Series  MLZ1608

The MLZ Series is a line of multilayer choke coils for decoupling power circuits.
The MLZ1608-W Series, a line of the MLZ Series, has increased its DC superimposition characteristics by up to 225% compared with existing products through the use of TDK's proprietary ferrite material technology.
Also available is the MLZ1608-L Series. This series has lowered its resistance by up to 40% compared with existing products through the adoption of a new ferrite material and dense electrodes. This series includes the E3 Series, which handles 1.0 to 10µH, hence it is extremely useful in the power-supply design of low-voltage circuits.

FEATURES
• The W Series (IDC UP type) is a line of products that have achieved the industry's best DC superimposition characteristics.
• According to research conducted in August 2010.
• The L Series (Low-resistance type) has lowered its resistance by up to 40% compared with existing products.
• The D Series (High frequency type) is a line of decoupling coil products for high frequencies. It can handle higher noise frequencies.

APPLICATIONS
Modules such as digital cellular phone and camera module, Netbooks, note PCs, DSCs, DVCs, video games, portable memory audio devices, navigation systems, PNDs, TVs, W-LANs, solid state drives

SPECIFICATIONS
Operating temperature range: -55 to +125°C (Including self-temperature rise)
Storage temperature range: -55 to +125°C (After mount)

RECOMMENDED SOLDERING CONDITION
REFLOW SOLDERING

PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLZ</td>
<td>1608</td>
<td>A</td>
<td>1R0</td>
<td>W</td>
<td>T</td>
<td></td>
</tr>
</tbody>
</table>

(1) Series name
(2) Dimensions L×W
1608 1.6×0.8mm
(3) Management symbol
(4) Inductance
R10 0.1µH
1R0 1.0 µH
100 10.0 µH
(5) Characteristic type
D High frequency type
W IDC-UP type
L Low-resistance type
(6) Packaging style
T Taping [reel]
(7) TDK internal code

HANDLING AND PRECAUTIONS
• Before soldering, be sure to preheat components.
The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
• After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
• Do not expose the inductors to stray magnetic fields.
• Avoid static electricity discharge during handling.
• When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

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The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

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ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Classification</th>
<th>Part No.</th>
<th>Inductance (µH)</th>
<th>Inductance tolerance</th>
<th>Test frequency L (MHz)</th>
<th>Test current L (mA)</th>
<th>Self-resonant frequency (MHz)typ.</th>
<th>DC resistance (Ω)×30%</th>
<th>Rated current¹ (mA)</th>
<th>Rated current² (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High frequency type</td>
<td>MLZ1608DR10DT</td>
<td>0.10</td>
<td>±20%</td>
<td>25</td>
<td>1.0</td>
<td>600</td>
<td>0.14</td>
<td>700</td>
<td>850</td>
</tr>
<tr>
<td></td>
<td>MLZ1608DR22DT</td>
<td>0.22</td>
<td>±20%</td>
<td>25</td>
<td>1.0</td>
<td>400</td>
<td>0.27</td>
<td>550</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>MLZ1608DR47DT</td>
<td>0.47</td>
<td>±20%</td>
<td>25</td>
<td>1.0</td>
<td>260</td>
<td>0.42</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>IDC-UP type</td>
<td>MLZ1608A1R0WT</td>
<td>2.20</td>
<td>±20%</td>
<td>10</td>
<td>1.0</td>
<td>120</td>
<td>0.25</td>
<td>130</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>MLZ1608M200WT</td>
<td>22.0</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>38</td>
<td>2.40</td>
<td>55</td>
<td>150</td>
</tr>
<tr>
<td>Low-resistance type</td>
<td>MLZ1608N1R0LT</td>
<td>1.00</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>170</td>
<td>0.11</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>MLZ1608N4R7LT</td>
<td>4.70</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>80</td>
<td>0.32</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>MLZ1608N100LT</td>
<td>10.0</td>
<td>±20%</td>
<td>2</td>
<td>0.1</td>
<td>50</td>
<td>0.60</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

¹ Current assumed when inductance ratio has decreased by 50% max.
² Current assumed when temperature has risen to 20°C max. (reference value). The maximum operating temperature at this time is 105°C.

Test equipment
Inductance: Ag-4294A+16034G

TYPICAL ELECTRICAL CHARACTERISTICS
INDUCTANCE vs. FREQUENCY CHARACTERISTICS

IMPEDANCE vs. FREQUENCY CHARACTERISTICS

• All specifications are subject to change without notice.
TYPICAL ELECTRICAL CHARACTERISTICS

INDUCTANCE CHANGE vs. DC SUPERPOSITION CHARACTERISTICS

TEMPERATURE CHARACTERISTICS

PACKAGING STYLES

REEL DIMENSIONS

TAPE DIMENSIONS

- All specifications are subject to change without notice.
Inductors for Decoupling Circuits
Multilayer/STD • Magnetic Shielded

MLZ Series MLZ2012

The MLZ Series is a line of multilayer choke coils for decoupling power circuits. The MLZ2012-W Series, a line of the MLZ Series, has increased its DC superimposition characteristics by up to 250% compared with existing products through the use of TDK’s proprietary ferrite material technology. Also available is the MLZ2012-L Series. This series has lowered its resistance by up to 50% compared with existing products through the adoption of a new ferrite material and dense electrodes. This series includes the E6 Series, which handles 1.0 to 15μH, hence it is extremely useful in the power-supply design of low-voltage circuits.

FEATURES
- The W Series (IDC UP type) is a line of products that have achieved the industry's best DC superimposition characteristics.
  * According to research conducted in August 2010.
- The L Series (Low-resistance type) has lowered its resistance by up to 50% compared with existing products.
- The D Series (High frequency type) is a line of decoupling coil products for high frequencies. It can handle higher noise frequencies.
- With its wider inductance range (0.1 to 47μH) and the addition of the E6 Series, this series can satisfy a wide variety of requirements.

APPLICATIONS
Modules such as digital cellular phone and camera module, Netbooks, note PCs, DSCs, DVCs, video games, portable memory audio devices, navigation systems, PNDs, TVs, W-LANs, solid state drives

SPECIFICATIONS
Operating temperature range −55 to +125°C
[Including self-temperature rise]
Storage temperature range −55 to +125°C (After mount)

RECOMMENDED SOLDERING CONDITION

REFLOW SOLDERING

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time(s)</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>150°C</td>
<td>60 to 120s</td>
<td>Preheating</td>
</tr>
<tr>
<td>180°C</td>
<td>30 to 60s</td>
<td>Soldering</td>
</tr>
<tr>
<td>230°C</td>
<td>10s max</td>
<td>Natural cooling</td>
</tr>
<tr>
<td>250 to 260°C</td>
<td></td>
<td></td>
</tr>
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PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>(1)</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
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<tbody>
<tr>
<td>MLZ</td>
<td>2012</td>
<td>A</td>
<td>R0</td>
<td>W</td>
<td>T</td>
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</tbody>
</table>

(1) Series name
(2) Dimensions L×W
2012 2.0×1.25mm
(3) Management symbol
(4) Inductance
R10 0.1μH
1R0 1.0 μH
100 10.0 μH
(5) Characteristic type
D High frequency type
W IDC-UP type
L Low-resistance type
(6) Packaging style
T Taping [reel]
(7) TDK internal code

HANDLING AND PRECAUTIONS
- Before soldering, be sure to preheat components.
  The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

Conformity to RoHS Directive
Operating temperature range −55 to +125°C [Including self-temperature rise]
Storage temperature range −55 to +125°C (After mount)

CONFORMITY TO ROHS DIRECTIVE
Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

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### SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN

![Dimensions in mm](image)

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Weight (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.85±0.2</td>
<td>10</td>
</tr>
<tr>
<td>1.25±0.2</td>
<td>14</td>
</tr>
</tbody>
</table>

### ELECTRICAL CHARACTERISTICS

#### TYPICAL ELECTRICAL CHARACTERISTICS

#### INDUCTION vs. FREQUENCY CHARACTERISTICS

#### Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Part No.</th>
<th>Inductance (µH)</th>
<th>Inductance tolerance</th>
<th>Thickness (mm)</th>
<th>Test frequency L (MHz)</th>
<th>Test current L (mA)</th>
<th>Self-resonant frequency (MHz) typ.</th>
<th>DC resistance (Ω) ±30%</th>
<th>Rated current 1</th>
<th>Rated current 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>High frequency</td>
<td>MLZ2012DR10DT</td>
<td>0.10</td>
<td>±20%</td>
<td>0.85</td>
<td>25</td>
<td>1.0</td>
<td>500</td>
<td>0.07</td>
<td>1000</td>
<td>1150</td>
</tr>
<tr>
<td></td>
<td>MLZ2012DR22DT</td>
<td>0.22</td>
<td>±20%</td>
<td>0.85</td>
<td>25</td>
<td>1.0</td>
<td>330</td>
<td>0.13</td>
<td>800</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td>MLZ2012DR47DT</td>
<td>0.47</td>
<td>±20%</td>
<td>1.25</td>
<td>25</td>
<td>1.0</td>
<td>230</td>
<td>0.18</td>
<td>550</td>
<td>700</td>
</tr>
</tbody>
</table>

| IDC-UP type   | MLZ2012A1R0WT  | 1.00            | ±20%                 | 0.85           | 10                     | 1.0                 | 160                                | 0.10                    | 280            | 900            |
|                | MLZ2012A1R5WT  | 1.50            | ±20%                 | 0.85           | 10                     | 1.0                 | 140                                | 0.13                    | 250            | 750            |
|                | MLZ2012A2R0WT  | 2.20            | ±20%                 | 0.85           | 10                     | 1.0                 | 120                                | 0.15                    | 210            | 650            |
|                | MLZ2012A3R3WT  | 3.30            | ±20%                 | 0.85           | 10                     | 1.0                 | 90                                 | 0.34                    | 200            | 450            |
|                | MLZ2012M4R7WT  | 4.70            | ±20%                 | 0.85           | 2                      | 1.0                 | 70                                 | 0.30                    | 180            | 500            |
|                | MLZ2012M6R8WT  | 6.80            | ±20%                 | 1.25           | 2                      | 0.1                 | 60                                 | 0.40                    | 160            | 400            |
|                | MLZ2012M100WT  | 10.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 50                                 | 0.47                    | 150            | 350            |
|                | MLZ2012M150WT  | 15.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 40                                 | 0.95                    | 120            | 250            |
|                | MLZ2012M220WT  | 22.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 35                                 | 2.00                    | 60             | 220            |
|                | MLZ2012M330WT  | 33.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 28                                 | 2.60                    | 55             | 190            |
|                | MLZ2012M470WT  | 47.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 20                                 | 3.70                    | 50             | 170            |
|                | MLZ2012N1R0LT  | 1.00            | ±20%                 | 0.85           | 2                      | 0.1                 | 160                                | 0.08                    | 220            | 1150           |
|                | MLZ2012N1R5LT  | 1.50            | ±20%                 | 0.85           | 2                      | 0.1                 | 140                                | 0.10                    | 190            | 900            |
|                | MLZ2012N2R2LT  | 2.20            | ±20%                 | 0.85           | 2                      | 0.1                 | 120                                | 0.12                    | 170            | 800            |
|                | MLZ2012N3R3LT  | 3.30            | ±20%                 | 0.85           | 2                      | 0.1                 | 90                                 | 0.15                    | 130            | 750            |
|                | MLZ2012N4R7LT  | 4.70            | ±20%                 | 0.85           | 2                      | 0.1                 | 70                                 | 0.18                    | 130            | 600            |
|                | MLZ2012N6R8LT  | 6.80            | ±20%                 | 0.85           | 2                      | 0.1                 | 60                                 | 0.25                    | 110            | 550            |
|                | MLZ2012N100LT  | 10.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 50                                 | 0.30                    | 110            | 500            |
|                | MLZ2012N150LT  | 15.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 40                                 | 0.47                    | 90             | 350            |
|                | MLZ2012N220LT  | 22.0            | ±20%                 | 1.25           | 2                      | 0.1                 | 40                                 | 0.67                    | 70             | 300            |
|                | MLZ2012N101LT  | 100.0           | ±20%                 | 1.25           | 2                      | 0.1                 | 12                                 | 3.50                    | 30             | 140            |

1. Current assumed when inductance ratio has decreased by 50% max..
2. Current assumed when temperature has risen to 20°C max. (reference value). The maximum operating temperature at this time is 105°C.

- Test equipment: Ag4294A-16034G

### TYPICAL ELECTRICAL CHARACTERISTICS

#### INDUCTION vs. FREQUENCY CHARACTERISTICS

- All specifications are subject to change without notice.
TYPICAL ELECTRICAL CHARACTERISTICS

IMPEDANCE vs. FREQUENCY CHARACTERISTICS

INDUCTANCE CHANGE vs. DC SUPERPOSITION CHARACTERISTICS

TEMPERATURE CHARACTERISTICS

• All specifications are subject to change without notice.
PACKAGING STYLES

REEL DIMENSIONS

Dimensions in mm

Tape Dimensions

- $t=0.85\text{mm}$
- $t=1.25\text{mm}$

**All specifications are subject to change without notice.**