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Multilayer Ceramic Chip Capacitors

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MLCC

NP0 Ceramic Chip Series
GENERAL PURPOSE
MEDIUM VOLTAGE
HIGH VOLTAGE
Surface Mount Chip

Size _ 0201 to 1812
Capacitance Range _ 0.22pF to 33nF
Capacitance Tolerance _
C < 10pF: 0.1pF, 0.25pF, 0.5pF
C ≥ 10pF: ±1%, ±2%, ±5%
Rated Working Voltage _ 16Vdc to 1,000Vdc
Operating Temp. Range _ -55°C to +125°C
Packaging _ Reel, Bulk

X5R Ceramic Chip Series
GENERAL PURPOSE
MEDIUM VOLTAGE
HIGH VOLTAGE
Surface Mount Chip

Size _ 0201 to 1812
Capacitance Range _ 100pF to 100μF
Capacitance Tolerance _ ±10%, ±20%
Rated Working Voltage _ 6.3Vdc to 50Vdc
Operating Temp. Range _ -55°C to +85°C
Packaging _ Reel, Bulk

X7R Ceramic Chip Series
GENERAL PURPOSE
MEDIUM VOLTAGE
HIGH VOLTAGE
HIGH CAPACITANCE
Surface Mount Chip

Size _ 0201 to 1812
Capacitance Range _ 100pF to 22μF
Capacitance Tolerance _ ±10%, ±20%
Rated Working Voltage _ 6.3Vdc to 4,000Vdc
Operating Temp. Range _ -55°C to +125°C
Packaging _ Reel, Bulk

Y5V Ceramic Chip Series
GENERAL PURPOSE
HIGH CAPACITANCE
Surface Mount Chip

Size _ 0201 to 1210
Capacitance Range _ 10nF to 47μF
Capacitance Tolerance _ ±20%, -20% to +80%
Rated Working Voltage _ 6.3Vdc, 50Vdc
Operating Temp. Range _ -25°C to +85°C
Packaging _ Reel, Bulk

Array Series
NP0, X7R, Y5V CERAMIC CHIPS
MULTI-VALUE CAPACITORS ARRAY
Surface Mount Chip

Size _ 0508, 0612
Capacitance Range _ 10pF to 100nF
Capacitance Tolerance _
NP0: ±5%, ±10%
X7R: ±10%, ±20%
Y5V: -20% to +80%
Rated Working Voltage _ 16Vdc to 50Vdc
Packaging _ Reel

Safety Certification Series
NP0, X7R CERAMIC CHIPS
Surface Mount Chip

Size _ 1808 to 1812
Capacitance Range _ 2pF to 1.5μF
Capacitance Tolerance _
NP0: ±5%
X7R: ±10%
Rated Working Voltage _ X1 / Y2, X2 / Y3
Operating Temp. Range _ -55°C to +125°C
Packaging _ Reel, Bulk

High Frequency Series
NP0 CERAMIC CHIPS
Surface Mount Chip

Size _ 0402 to 0805
Capacitance Range _ 0.22pF to 8.2pF
Capacitance Tolerance _
C < 10pF: ±0.1pF, ±0.25pF, ±0.5pF
Rated Working Voltage _ 50Vdc
Operating Temp. Range _ -55°C to +125°C
Packaging _ Reel

Microwave Series
NP0 CERAMIC CHIPS
Surface Mount Chip

Size _ 0603 to 1206
Capacitance Range _ 0.47pF to 47pF
Capacitance Tolerance _
C < 10pF: ±0.1pF, ±0.25pF, ±0.5pF
C ≥ 10pF: ±1%, ±2%, ±5%
Rated Working Voltage _ 50Vdc
Operating Temp. Range _ -55°C to +125°C
Packaging _ Reel
## Low Inductance Series

**X7R CERAMIC CHIPS**  
Surface Mount Chip  

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacitance Range</th>
<th>Capacitance Tolerance</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0306 to 0612</td>
<td>10nF to 220nF</td>
<td>±10%, ±20%</td>
<td>10Vdc to 50Vdc</td>
<td>-55°C to +125°C</td>
<td>Reel, Bulk</td>
</tr>
</tbody>
</table>

## X2Y

### X5R X2Y Series

**HIGH CAPACITANCE**  
Surface Mount Chip  

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacitance Range</th>
<th>Capacitance Tolerance</th>
<th>Insulation Resistance</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0603</td>
<td>220nF to 470nF</td>
<td>±20%</td>
<td>( R_{ins} \times C &gt; 500 \text{sec or } R_{ins} &gt; 10G\Omega )</td>
<td>10Vdc</td>
<td>-55°C to +85°C</td>
<td>Reel</td>
</tr>
</tbody>
</table>

### X7R X2Y Series

**GENERAL PURPOSE**  
Surface Mount Chip  

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacitance Range</th>
<th>Capacitance Tolerance</th>
<th>Insulation Resistance</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0603 to 1410</td>
<td>1nF to 1μF</td>
<td>±20%</td>
<td>( R_{ins} \times C &gt; 500 \text{sec or } R_{ins} &gt; 10G\Omega )</td>
<td>10Vdc to 100Vdc</td>
<td>-55°C to +125°C</td>
<td>Reel</td>
</tr>
</tbody>
</table>

### NP0 X2Y Series

**GENERAL PURPOSE**  
Surface Mount Chip  

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacitance Range</th>
<th>Capacitance Tolerance</th>
<th>Insulation Resistance</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0805</td>
<td>22pF and 47pF</td>
<td>±20%</td>
<td>( R_{ins} \times C &gt; 500 \text{sec or } R_{ins} &gt; 10G\Omega )</td>
<td>50Vdc</td>
<td>-55°C to +125°C</td>
<td>Reel</td>
</tr>
</tbody>
</table>

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### General Purpose

**RC SERIES**
- **THICK FILM CHIP**
- **Case Sizes**: 01005 to 2512
- **Resistance Range**: (E24/E96) 1Ω to 100Ω / Jumper
- **Rated Power @ 70°C**: 1/32W to 2W
- **Temp. Coefficient**: ±100, ±200, ±250, ±300, ±350ppm/°C
- **Resistance Tolerance**: ±0.5%, ±1%, ±5%, ±10%, ±20%
- **Max. Working Voltage**: 15Vdc to 200Vdc
- **Max. Overload Voltage**: 30Vdc to 500Vdc
- **Packaging**: Reel, Bulk

### Precision Grade Series

**RE SERIES**
- **THICK FILM CHIP**
- **Case Sizes**: 0402 to 1206
- **Resistance Range**: (E24/E96) 1Ω to 1MΩ
- **Rated Power @ 70°C**: 1/16W to 1/4W
- **Temp. Coefficient**: ±50ppm/°C
- **Resistance Tolerance**: ±0.5%, ±1%
- **Packaging**: Reel

### Low Ohmic

**RL / PT SERIES**
- **THICK FILM CHIP**
- **Current Sensing Applications**
- **Case Sizes**: 0402 to 2512
- **Resistance Range**: (E24) 0.01Ω to 1Ω
- **Rated Power @ 70°C**: 1/16W to 2W
- **Temp. Coefficient**: ±75ppm/°C to 1,500ppm/°C
- **Resistance Tolerance**: ±1%, ±2%, ±5%
- **Packaging**: Reel

### Low Ohmic Low TCR (Wide Termination Type)

**PT SERIES**
- **THICK FILM CHIP**
- **Current Sensing Applications**
- **Case Sizes**: 0815
- **Resistance Range**: (E24) 0.025Ω to 0.05Ω
- **Rated Power @ 70°C**: 1/2W & 1W
- **Temp. Coefficient**: ±75, ±100, ±150ppm/°C
- **Resistance Tolerance**: ±1%, ±2%, ±5%
- **Packaging**: Reel

### Current Sensor Low TCR (Wide Termination Type)

**PF SERIES**
- **METAL TECHNOLOGY**
- **Current Sensing Applications**
- **Case Sizes**: 0508, 0612, 0815
- **Resistance Range**: (E24) 0.002Ω to 0.05Ω
- **Rated Power @ 70°C**: 1/2W to 1W
- **Temp. Coefficient**: ±75, ±100, ±150ppm/°C
- **Resistance Tolerance**: ±1%, ±2%, ±5%
- **Packaging**: Reel

### High Precision High Stability Series

**RT SERIES**
- **THIN FILM CHIP**
- **Case Sizes**: 0402 to 2512
- **Resistance Range**: (E24/E96) 5.1Ω to 1.5MΩ
- **Rated Power @ 70°C**: 1/16W to 3/4W
- **Temp. Coefficient**: ±10, ±15, ±25, ±350ppm/°C
- **Resistance Tolerance**: ±0.05%, ±0.1%, ±0.25%, ±0.5%, ±1%
- **Max. Working Voltage**: 50Vdc to 200Vdc
- **Max. Overload Voltage**: 100Vdc to 400Vdc
- **Packaging**: Reel

### General Purpose Thin Film Series

**RJ SERIES**
- **THIN FILM CHIP**
- **Case Sizes**: 0402 to 2512
- **Resistance Range**: (E24/E96) 5.1Ω to 1.5MΩ
- **Rated Power @ 70°C**: 1/16W to 3/4W
- **Temp. Coefficient**: ±50ppm/°C
- **Resistance Tolerance**: ±1%
- **Max. Working Voltage**: 25Vdc to 150Vdc
- **Max. Overload Voltage**: 100Vdc to 400Vdc
- **Packaging**: Reel

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<table>
<thead>
<tr>
<th>Series</th>
<th>Array Type</th>
<th>Circuit Types</th>
<th>Resistance Range (E24/E96)</th>
<th>Number of Resistors</th>
<th>Rated Power Per Element</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0201 * 2 Series</td>
<td>YC102 SERIES</td>
<td>Isolated</td>
<td>10Ω to 1MΩ / Jumper</td>
<td>2</td>
<td>1/32W</td>
<td>±200ppm/°C</td>
<td>±1%, ±5%</td>
<td>15Vdc</td>
<td>30Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td>0402 * 2 Series 0402 * 4 Series</td>
<td>YC122 SERIES YC124 SERIES</td>
<td>Isolated</td>
<td>1Ω to 1MΩ / Jumper</td>
<td>2 and 4</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±1%, ±5%</td>
<td>50Vdc</td>
<td>100Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td>0603 * 2 Series 0603 * 4 Series</td>
<td>YC162 SERIES YC164 SERIES</td>
<td>Isolated</td>
<td>10Ω to 1MΩ / Jumper</td>
<td>2</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>50Vdc</td>
<td>100Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td>0603 * 4 Series</td>
<td>TC164 SERIES</td>
<td>Isolated</td>
<td>10Ω to 1MΩ / Jumper</td>
<td>4</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±1%, ±5%</td>
<td>50Vdc</td>
<td>100Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td>0602 * 8 Series</td>
<td>YC248 SERIES</td>
<td>Isolated</td>
<td>10Ω to 1MΩ / Jumper</td>
<td>8</td>
<td>1/8W</td>
<td>±200ppm/°C</td>
<td>±1%, ±5%</td>
<td>200Vdc</td>
<td>500Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td>1206 * 4 Series</td>
<td>YC324 SERIES</td>
<td>Isolated</td>
<td>10Ω to 1MΩ</td>
<td>4</td>
<td>1/8W</td>
<td>±200ppm/°C</td>
<td>±1%, ±5%</td>
<td>200Vdc</td>
<td>500Vdc</td>
<td>Reel</td>
</tr>
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</table>
# Networks

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10P8R Series</td>
<td>0402 to 1206</td>
<td>1Ω to 10MΩ</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>25Vdc to 50Vdc</td>
<td>50Vdc to 100Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3Ω to 47KΩ</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>100KΩ to 27MD</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

# Application Specific Resistors

<table>
<thead>
<tr>
<th>Series</th>
<th>Case Sizes</th>
<th>Resistance Range (E24)</th>
<th>Circuit Types</th>
<th>Number of Resistors</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiAu-termination Series</td>
<td>0402 to 1206</td>
<td>1Ω to 10MΩ</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>50Vdc to 200Vdc</td>
<td>100Vdc to 500Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3Ω to 47KΩ</td>
<td></td>
<td></td>
<td>1/4W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100KΩ to 27MD</td>
<td></td>
<td></td>
<td>1/8W</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</table>

# High Voltage Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Case Sizes</th>
<th>Resistance Range (E24)</th>
<th>Circuit Types</th>
<th>Number of Resistors</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimmable Series</td>
<td>0402 to 1206</td>
<td>1Ω to 10MΩ</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>50Vdc to 200Vdc</td>
<td>100Vdc to 500Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3Ω to 47KΩ</td>
<td></td>
<td></td>
<td>1/4W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100KΩ to 27MD</td>
<td></td>
<td></td>
<td>1/8W</td>
<td></td>
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</table>

# Surge Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Case Sizes</th>
<th>Resistance Range (E24)</th>
<th>Circuit Types</th>
<th>Number of Resistors</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Sulfuration Series</td>
<td>0402 to 1206</td>
<td>1Ω to 22MΩ</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>50Vdc to 200Vdc</td>
<td>100Vdc to 500Vdc</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3Ω to 47KΩ</td>
<td></td>
<td></td>
<td>1/4W</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100KΩ to 27MD</td>
<td></td>
<td></td>
<td>1/8W</td>
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</table>

# Automotive Grade Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Case Sizes</th>
<th>Resistance Range (E24)</th>
<th>Circuit Types</th>
<th>Number of Resistors</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuator</td>
<td>0404</td>
<td>1dB to 20dB</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>1dB to 10dB: 2.5GHz</td>
<td>15dB and 20dB: 2.0GHz</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6dB to 10dB</td>
<td></td>
<td></td>
<td>1/4W</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15dB to 1Ω</td>
<td></td>
<td></td>
<td>1/2W</td>
<td></td>
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</table>

# Chip Resistors RF Attenuators

<table>
<thead>
<tr>
<th>Series</th>
<th>Case Sizes</th>
<th>Resistance Range (E24)</th>
<th>Circuit Types</th>
<th>Number of Resistors</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATV321 SERIES</td>
<td>0402</td>
<td>1Ω to 10MΩ</td>
<td>Dual Common</td>
<td>8</td>
<td>1/16W</td>
<td>±200ppm/°C</td>
<td>±5%</td>
<td>1dB to 10dB: 2.5GHz</td>
<td>15dB and 20dB: 2.0GHz</td>
<td>Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3Ω to 47KΩ</td>
<td></td>
<td></td>
<td>1/4W</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100KΩ to 27MD</td>
<td></td>
<td></td>
<td>1/8W</td>
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</tr>
</tbody>
</table>

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### High Frequency Antennas

#### Chip Antenna

**Size (mm)**: 24 x 5.0 x 1.6  
**Frequency Range**: 88MHz to 108MHz  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**Temp. Range**: -25°C to +85°C  
**Packaging**: Reel

**Size (mm)**: 37.5 x 6.8 x 0.9  
**Frequency Range**: 400MHz to 500MHz  
**Band Width**: > 20MHz  
**Gain (Max)**: < 0.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.0  
**Temp. Range**: -55°C to +125°C  
**Packaging**: Bulk, Reel

**Size (mm)**: 37 x 6.8 x 1.6  
**Frequency Range**: 400MHz to 500MHz  
**Band Width**: > 20MHz  
**Gain (Max)**: < 0.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.0  
**Temp. Range**: -40°C to +125°C  
**Packaging**: Bulk, Reel

**Size (mm)**: 16.5 x 14 x 0.9  
**Frequency Range**: 850MHz to 950MHz  
**Band Width**: > 100MHz  
**Gain (Max)**: < 0.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.0  
**Temp. Range**: -55°C to +125°C  
**Packaging**: Bulk, Reel

**Size (mm)**: 12 x 4 x 0.9  
**Frequency Range**: 850MHz to 950MHz  
**Band Width**: > 20MHz  
**Gain (Max)**: < 0.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.0  
**Temp. Range**: -55°C to +125°C  
**Packaging**: Bulk

**Size (mm)**: 21 x 12 x 0.9  
**Frequency Range**: 880MHz to 960MHz, 1,710MHz to 1,880MHz  
**Band Width**: > 30MHz, > 170MHz  
**Gain (Max)**: < 0.5dB to 1dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.7  
**Temp. Range**: -55°C to +125°C  
**Packaging**: Bulk

**Size (mm)**: 8.7 x 8.0 x 0.9  
**Frequency Range**: 2.45 / 5.20 GHz  
**Band Width**: > 100MHz  
**Gain (Max)**: 3.5dB / 1.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.5  
**Temp. Range**: -55°C to +85°C  
**Packaging**: Reel

**Size (mm)**: 30 x 9.4 x 0.8  
**Frequency Range**: 880MHz to 960MHz, 1,710MHz to 1,880MHz  
**Band Width**: > 90MHz, > 280MHz  
**Gain (Max)**: < 1dB to 1.5dB  
**Polarization**: Linear  
**Azimuth**: Omni-Directional  
**VSWR**: < 2.5  
**Temp. Range**: -55°C to +125°C  
**Packaging**: Bulk

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* Depends on the Yageo demoboard
<table>
<thead>
<tr>
<th>Antenna Type</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| **Triple-band Antenna** | **900 / 1800 / 1900 MHz**
| Size (mm) | 35 x 6.0 x 0.4 |
| Frequency Range* | 880MHz to 960MHz, 1,710MHz to 1,880MHz, 1,850MHz to 1,990MHz |
| Band Width | > 80MHz, > 170MHz |
| Gain (Max.)* | 0dB to 0.5dB, 0.5dB to 1dB |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 3.5 |
| Temp. Range | -40°C to +85°C |
| Packaging | Bulk |

| **Chip Antenna** | **DECT / WCDMA**
| Size (mm) | 8.8 x 6.8 x 0.9 |
| Frequency Range* | 1.88GHz to 2.1GHz |
| Gain (Max.)* | 2.0dBi |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.0 |
| Temp. Range | -55°C to +125°C |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI PIFA MODE**
| Size (mm) | 12 x 4.0 x 2.0, 19 x 3.0 x 3.6 |
| Frequency Range* | 2.45GHz |
| Band Width | > 200MHz |
| Gain (Max.)* | 5.0dBi for Size 1930, 6.6dBi for Size 1240 |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.0 |
| Temp. Range | -40°C to +85°C for size 1930, -25°C to +85°C for size 1240 |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI**
| Size (mm) | 9.5 x 2.0 x 1.1 |
| Frequency Range* | 2.70GHz, 2.79GHz, 2.90GHz |
| Band Width | > 200MHz |
| Gain (Max.)* | 3.0dB |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.0 |
| Temp. Range | -55°C to +125°C |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI**
| Size (mm) | 8.0 x 1.0 x 1.0 |
| Center Frequency | 2.10GHz, 2.20GHz, 2.30GHz, 2.45GHz, 2.55GHz, 2.60GHz, 2.70GHz, 2.80GHz |
| Band Width | > 100MHz |
| Gain (Max.)* | 3.0dB |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.5 |
| Temp. Range | -55°C to +125°C |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI**
| Size (mm) | 7.8 x 3.6 x 0.9 |
| Frequency Range* | 2.45GHz, 2.60GHz, 2.70GHz |
| Band Width | > 100MHz |
| Gain (Max.)* | 4.1dB |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.5 |
| Temp. Range | -55°C to +85°C |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI**
| Size (mm) | 7.3 x 5.5 x 1.3 |
| Frequency Range* | 2.45GHz, 2.80GHz, 2.90GHz |
| Band Width | > 100MHz |
| Gain (Max.)* | 1.2dB |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.0 |
| Temp. Range | -55°C to +125°C |
| Packaging | Reel |

| **Chip Antenna** | **BT / WIFI**
| Size (mm) | 4.0 x 1.8 x 1.2, 6.0 x 2.0 x 1.2, 6.5 x 2.2 x 1.2 |
| Frequency Range* | 2.45GHz |
| Band Width | > 200MHz |
| Gain (Max.)* | 4.57dB for Size 6522, 5.1dB for Size 6020 |
| Polarization | Linear |
| Azimuth | Omni-Directional |
| VSWR* | < 2.0 |
| Temp. Range | -25°C to +85°C for size 6522, -55°C to +125°C for size 6020, 4018 |
| Packaging | Reel |

*Please check our website for ordering codes*
## Chip Antenna

**BT / WIFI**

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Frequency Range</th>
<th>Band Width</th>
<th>Gain (Max)</th>
<th>Polarization</th>
<th>Azimuth</th>
<th>Temp. Range</th>
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<td>5.3 x 2.0 x 1.3</td>
<td>2.00GHz, 2.10GHz, 2.20GHz, 2.30GHz, 2.40GHz, 2.45GHz, 2.50GHz</td>
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<tbody>
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<td>5.0 x 1.0 x 1.0</td>
<td>2.30GHz, 2.40GHz, 2.80GHz, 3.10GHz, 3.30GHz, 3.70GHz</td>
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<td>2.20GHz, 2.30GHz, 2.40GHz, 2.45GHz, 2.50GHz, 2.60GHz, 2.70GHz, 2.80GHz, 2.90GHz, 3.3GHz to 3.9GHz</td>
<td>&gt; 100MHz</td>
<td>3.1dB</td>
<td>Linear</td>
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<th>Packaging</th>
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<th>Azimuth</th>
<th>Temp. Range</th>
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<tr>
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<th>Azimuth</th>
<th>Temp. Range</th>
<th>Packaging</th>
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<tbody>
<tr>
<td></td>
<td>6.15 x 3.0 x 1.25</td>
<td>1.575GHz, 1.675GHz</td>
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<td>1dB</td>
<td>Linear</td>
<td>Omni-Directional</td>
<td>15°C to +85°C</td>
<td>Reel</td>
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<th>Azimuth</th>
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<tbody>
<tr>
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* Depends on the Yageo demoboard
<table>
<thead>
<tr>
<th>Patch Antenna</th>
<th>Size (mm)</th>
<th>Frequency Range*</th>
<th>Band Width</th>
<th>Gain (Max.)*</th>
<th>Polarization</th>
<th>Azimuth</th>
<th>VSWR*</th>
<th>Temp. Range</th>
<th>Packaging</th>
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</thead>
<tbody>
<tr>
<td>High Frequency Antennas</td>
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<td>Pin</td>
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<td>Bulk</td>
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<tr>
<td>High Frequency Antennas</td>
<td>12 x 12 x 4, 15 x 15 x 4</td>
<td>1.575GHz</td>
<td>&gt; 10MHz</td>
<td>1dB</td>
<td>Right Hand Circular Polarization</td>
<td>Pin</td>
<td>&lt; 2.0</td>
<td>-25°C to +85°C</td>
<td>Bulk</td>
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<tr>
<td>High Frequency Antennas</td>
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<td>1.575GHz</td>
<td>&gt; 10MHz</td>
<td>1dB</td>
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<td>Pin</td>
<td>&lt; 2.0</td>
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<td>Bulk</td>
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<tr>
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<td>1dB</td>
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<th><strong>High Frequency Filters</strong></th>
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<td><strong>Active Antenna</strong></td>
<td><strong>Low Pass Filter</strong></td>
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<tr>
<td>GPS / GLONASS / SDARS CABLE + IPEX CONNECTOR</td>
<td>Size (mm)</td>
</tr>
<tr>
<td><strong>Frequency Range</strong></td>
<td>2.45GHz</td>
</tr>
<tr>
<td><strong>Pass Band</strong></td>
<td>2.4GHz to 2.5GHz</td>
</tr>
<tr>
<td><strong>Impedance</strong></td>
<td>50Ω</td>
</tr>
<tr>
<td><strong>Insertion Loss (Max.)</strong></td>
<td>0.45dB</td>
</tr>
<tr>
<td><strong>Ripple (Max.)</strong></td>
<td>0.6dB</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>17 ±1dB (at fc, without SAW filter)</td>
</tr>
<tr>
<td><strong>Noise Figure</strong></td>
<td>1.5dB typ (at fc, 1.8dB Max)</td>
</tr>
<tr>
<td><strong>Output VSWR</strong></td>
<td>2.0 (at fc)</td>
</tr>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>3.3 ±5% V</td>
</tr>
<tr>
<td><strong>Current Consumption</strong></td>
<td>6mA</td>
</tr>
<tr>
<td><strong>Output Impedance</strong></td>
<td>50Ω</td>
</tr>
<tr>
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* Depends on the Yageo demoboard
### High Frequency Balancers

#### Diplexer
- **Size (mm)**: 2.0 x 1.25 x 0.85
- **Frequency Range**: 2.4 / 5.0GHz
- **Pass Band**: 2.40GHz to 2.50GHz
- **Insertion Loss (Max.)**: 0.7dB
- **VSWR (Max.)**: 2.0
- **Attenuation**: 20dB Min @ 4.00MHz to 5.00MHz
- **Pass Band**: 4.900GHz to 5.900GHz
- **Insertion Loss (Max.)**: 0.3dB
- **VSWR (Max.)**: 2.0
- **Packaging**: Reel

#### Balanced Filter COMBO
- **Size (mm)**: 2.0 x 1.25 x 0.9
- **Frequency Range**: 2.40GHz
- **Pass Band**: 2.40GHz to 2.50GHz
- **Impedance**: Conjugate match to CSR BC03 / 04 / 05 series
- **Impedance**: Conjugate match to MTK MT6616 series
- **Insertion Loss (Max.)**: 3.5dB
- **Ripple (Max.)**: 0.5dB
- **Amplitude Balance (Max)**: 1.0dB
- **Phase Differential**: 180 ±10 degree
- **Amplitude Balance (Max)**: 1.5dB
- **Phase Differential**: 180 ±10 degree
- **Packaging**: Reel

#### Balanced Filter COMBO
- **Size (mm)**: 2.5 x 2.0 x 1.2
- **Frequency Range**: 2.40GHz
- **Pass Band**: 2.40GHz to 2.50GHz
- **Impedance**: Conjugate match to CSR BC02/03 series
- **Impedance**: Conjugate match to MTK MT6616 series
- **Insertion Loss (Max.)**: 3.1dB
- **Ripple (Max.)**: 1.0dB
- **Amplitude Balance (Max)**: 1.0dB
- **Phase Differential**: 180 ±10 degree
- **Amplitude Balance (Max)**: 1.5dB
- **Phase Differential**: 180 ±10 degree
- **Packaging**: Reel

#### Balun
- **Size (mm)**: 1.8 x 0.8 x 0.65
- **Frequency Range**: 5.0GHz
- **Pass Band**: 4.900MHz to 5.950MHz
- **Impedance**: 50 / 100Ω
- **Insertion Loss (Max.)**: 1.2dB
- **Ripple (Max.)**: 0.6dB
- **VSWR**: 2.0
- **Amplitude Balance (Max.)**: 1.5dB
- **Phase Differential**: 180 ±10 degree
- **Packaging**: Reel

#### Balun
- **Size (mm)**: 2.0 x 1.25 x 0.8
- **Frequency Range**: 5.0GHz
- **Pass Band**: 4.900MHz to 5.900MHz
- **Impedance**: 50 / 100Ω
- **Impedance**: 50 / 100Ω, 50 / 200Ω
- **Impedance**: 50 / 50Ω, 50 / 100Ω
- **Impedance**: 50 / 100Ω
- **Insertion Loss (Max.)**: 1.0dB
- **Ripple (Max.)**: 0.6dB
- **VSWR**: 2.0
- **Amplitude Balance (Max.)**: 2.0dB
- **Phase Differential**: 180 ±10 degree
- **Packaging**: Reel

#### Balun
- **Size (mm)**: 2.0 x 1.25 x 0.8
- **Frequency Range**: 5.0GHz
- **Pass Band**: 4.900MHz to 5.900MHz
- **Impedance**: 50 / 100Ω
- **Impedance**: 50 / 100Ω
- **Impedance**: 50 / 100Ω
- **Insertion Loss (Max.)**: 1.2dB
- **Ripple (Max.)**: 0.6dB
- **VSWR**: 2.0
- **Amplitude Balance (Max.)**: 2.0dB
- **Phase Differential**: 180 ±10 degree
- **Packaging**: Reel

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*Please check our website for ordering codes*
<table>
<thead>
<tr>
<th>MLV Series</th>
<th>Size</th>
<th>Capacitance Range</th>
<th>Capacitance Tolerance</th>
<th>Varistor Voltage Tolerance</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Packaging</th>
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<tbody>
<tr>
<td>SURGE SUPPRESSOR</td>
<td>±0402 to ±1206</td>
<td>3pF to 3000pF</td>
<td>±30%</td>
<td>±10%, ±15%, ±20%, Special Range</td>
<td>3.3Vdc to 42Vdc</td>
<td>-40°C to +85°C</td>
<td>Reel</td>
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<td>ESD PROTECTION</td>
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<td>Meet IEC 61051-2-2</td>
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<td>Type</td>
<td>Capacitance Range</td>
<td>Rated Working Voltage</td>
<td>Operating Temp. Range</td>
<td>Capacitance Tolerance</td>
<td>Max. Leakage Current</td>
<td>Load Life</td>
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<tr>
<td>S5/SS</td>
<td>MINIATURE Radial</td>
<td>0.1μF to 470μF</td>
<td>4Vdc to 63Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>0.01CV or 3μA</td>
<td>1,000Hr. @ 105°C</td>
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<tr>
<td>SK</td>
<td>GENERAL PURPOSE Radial</td>
<td>0.1μF to 22,000μF</td>
<td>6.3Vdc to 450Vdc</td>
<td>-40°C to +85°C</td>
<td>±20%</td>
<td>0.01CV + 3μA ≤ 100Vdc</td>
<td>2,000Hr. @ 85°C</td>
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<tr>
<td>SE-K</td>
<td>GENERAL PURPOSE Radial</td>
<td>0.47μF to 15,000μF</td>
<td>6.3Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>0.01CV + 10μA ≥ 160Vdc</td>
<td>1,000Hr. @ 105°C</td>
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<tr>
<td>SH</td>
<td>GENERAL PURPOSE Radial</td>
<td>0.47μF to 15,000μF</td>
<td>6.3Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>0.01CV + 10μA ≥ 160Vdc</td>
<td>1,000Hr. @ 105°C</td>
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<tr>
<td>SG</td>
<td>MINIATURE LONG LIFE</td>
<td>3.3μF to 330μF</td>
<td>600Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.03CV + 10μA</td>
<td>5,000Hr. @ 105°C</td>
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<tr>
<td>SP</td>
<td>LONG LIFE Radial</td>
<td>3.3μF to 330μF</td>
<td>160Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>0.04CV + 100μA</td>
<td>8,000Hr. to 10,000Hr. @ 105°C</td>
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<tr>
<td>SQ</td>
<td>HIGH VOLTAGE LOW IMPEDANCE Radial</td>
<td>2.2μF to 220μF</td>
<td>160Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.03CV + 10μA</td>
<td>2,000Hr. @ 105°C</td>
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<tr>
<td>SC</td>
<td>LOW IMPEDANCE Radial</td>
<td>4.7μF to 15,000μF</td>
<td>6.3Vdc to 100Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>0.01CV or 3μA</td>
<td>2,000Hr. @ 3,000Hr. @ 105°C</td>
</tr>
</tbody>
</table>
## Aluminum Electrolytic Capacitors

### SZ Series
**Ultra Low Impedance and High Ripple**
- **Radial**
- **Capacitance Range**: 470μF to 3,300μF
- **Rated Working Voltage**: 6.3Vdc to 16Vdc
- **Operating Temp. Range**: -40°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: 0.03CV
- **Load Life**: 2,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### SY Series
**Low Impedance and Long Life**
- **Radial**
- **Capacitance Range**: 2.2μF to 15,000μF
- **Rated Working Voltage**: 6.3Vdc to 100Vdc
- **Operating Temp. Range**: -40°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: 0.01CV or 3µA
- **Load Life**: 3,000Hr. to 6,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### SN Series
**Non-Polar**
- **Radial**
- **Capacitance Range**: 0.22μF to 2,200μF
- **Rated Working Voltage**: 6.3Vdc to 250Vdc
- **Operating Temp. Range**:
  - V ≤ 100Vdc: -40°C to +105°C
  - V ≥ 160Vdc: -25°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: 0.03CV + 3µA
- **Load Life**: 1,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### SB Series
**Low leakage Current**
- **Radial**
- **Capacitance Range**: 0.1μF to 4,700μF
- **Rated Working Voltage**: 6.3Vdc to 100Vdc
- **Operating Temp. Range**: -40°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: 0.002CV or 0.4µA
- **Load Life**: 1,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### SR Series
**Bi-Polar**
- **Radial**
- **Capacitance Range**: 2.2μF to 47μF
- **Rated Working Voltage**: 25Vdc to 50Vdc
- **Operating Temp. Range**: -40°C to +85°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: 100µA (after 2Min. both direction)
- **Load Life**: 1,000Hr. @ 85°C
- **Packaging**: Bulk / Tape

### SJ Series
**Low Impedance and Long Life**
- **Radial**
- **Capacitance Range**: 5.6μF to 6,800μF
- **Rated Working Voltage**: 6.3Vdc to 100Vdc
- **Operating Temp. Range**: -40°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: ≤ 0.01CV or 3µA
- **Load Life**: 1,000Hr. to 5,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### ST Series
**Low Impedance and Long Life**
- **Radial**
- **Capacitance Range**: 6.8μF to 15,000μF
- **Rated Working Voltage**: 6.3Vdc to 63Vdc
- **Operating Temp. Range**: -40°C to +105°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: ≤ 0.01CV or 3µA
- **Load Life**: 4,000Hr. to 10,000Hr. @ 105°C
- **Packaging**: Bulk / Tape

### SU Series
**High Temperature**
- **Radial**
- **Capacitance Range**: 4.7μF to 4,700μF
- **Rated Working Voltage**: 10Vdc to 63Vdc
- **Operating Temp. Range**: -40°C to +125°C
- **Capacitance Tolerance**: ±20%
- **Max. Leakage Current**: ≤ 0.01CV or 3µA
- **Load Life**: 2,000Hr. @ 125°C
- **Packaging**: Bulk / Tape

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Please check our website for ordering codes.
<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Capacitance Range</th>
<th>Rated Working Voltage</th>
<th>Operating Temp. Range</th>
<th>Capacitance Tolerance</th>
<th>Max. Leakage Current</th>
<th>Load Life</th>
<th>Packaging</th>
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</thead>
<tbody>
<tr>
<td><strong>SW Series</strong></td>
<td>HIGH TEMPERATURE AND LONG LIFE</td>
<td>Radial</td>
<td>47μF to 4,700μF</td>
<td>10Vdc to 63Vdc</td>
<td>-40°C to +125°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>2,000Hr. to 5,000Hr. @ 125°C</td>
</tr>
<tr>
<td><strong>SD Series</strong></td>
<td>HIGH RIPPLE CURRENT</td>
<td>Radial</td>
<td>22μF to 330μF</td>
<td>160Vdc to 450Vdc</td>
<td>-25°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.02CV +15μA</td>
<td>5,000Hr. @ 105°C</td>
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<tr>
<td><strong>SL Series</strong></td>
<td>HIGH RIPPLE CURRENT AND LONG LIFE</td>
<td>Radial</td>
<td>2.2μF to 18,000μF</td>
<td>6.3Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>3,000Hr. to 7,000Hr. @ 105°C</td>
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<tr>
<td><strong>LH Series</strong></td>
<td>GENERAL PURPOSE</td>
<td>Snap-In</td>
<td>56μF to 120,000μF</td>
<td>6.3Vdc to 500Vdc</td>
<td>-25°C to +85°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 3mA</td>
<td>2,000Hr. @ 85°C</td>
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<td><strong>LG Series</strong></td>
<td>GENERAL PURPOSE</td>
<td>Snap-In</td>
<td>47μF to 82,000μF</td>
<td>6.3Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>I = 0.02CV, L = 20 m/m</td>
<td>2,000Hr. @ 105°C</td>
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<tr>
<td><strong>LV Series</strong></td>
<td>LONG LIFE</td>
<td>Snap-In</td>
<td>270μF to 68,000μF</td>
<td>10Vdc to 450Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.02VC or 3mA</td>
<td>3,000Hr. @ 105°C</td>
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<tr>
<td><strong>LC Series</strong></td>
<td>LONG LIFE</td>
<td>Snap-In</td>
<td>270μF to 2,200μF</td>
<td>180Vdc to 450Vdc</td>
<td>-25°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.02VC or 3mA</td>
<td>5,000Hr. @ 105°C</td>
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<tr>
<td><strong>CA Series</strong></td>
<td>LOW PROFILE</td>
<td>SMD V-Chip</td>
<td>0.1μF to 1,000μF</td>
<td>4Vdc to 100Vdc</td>
<td>-40°C to +85°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>2,000Hr. @ 85°C</td>
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<tr>
<td>Capacitor Series</td>
<td>Description</td>
<td>Capacitance Range</td>
<td>Rated Working Voltage</td>
<td>Operating Temp. Range</td>
<td>Capacitance Tolerance</td>
<td>Max. Leakage Current</td>
<td>Load Life</td>
<td>Packaging</td>
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<tr>
<td>CB Series</td>
<td>LOW PROFILE SMD V-Chip</td>
<td>0.1μF to 1,000μF</td>
<td>4Vdc to 100Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>1,000Hr. @ 105°C</td>
<td>Reel</td>
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<tr>
<td>CD Series</td>
<td>ULTRA LOW IMPEDANCE SMD V-Chip</td>
<td>4.7μF to 1,500μF</td>
<td>6.3Vdc to 35Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>2,000Hr. @ 105°C</td>
<td>Reel</td>
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<td>CE Series</td>
<td>LONG LIFE SMD V-Chip</td>
<td>0.1μF to 1,000μF</td>
<td>6.3Vdc to 100Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>2,000Hr. @ 105°C</td>
<td>Reel</td>
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<tr>
<td>CZ Series</td>
<td>LOW IMPEDANCE SMD V-Chip</td>
<td>0.1μF to 1,000μF</td>
<td>4Vdc to 50Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>1,000Hr. @ 105°C</td>
<td>Reel</td>
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<tr>
<td>CH Series</td>
<td>ULTRA LOW IMPEDANCE AND HIGH TEMPERATURE SMD V-Chip</td>
<td>47μF to 1,000μF</td>
<td>6.3Vdc to 50Vdc</td>
<td>-40°C to +125°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>1,000Hr. to 2,000Hr. @ 125°C</td>
<td>Reel</td>
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<td>CX Series</td>
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<td>6.3Vdc to 50Vdc</td>
<td>-40°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.01CV or 3μA</td>
<td>3,000Hr. to 5,000Hr. @ 105°C</td>
<td>Reel</td>
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<td>ULTRA LOW IMPEDANCE 8mm Height Radial Conductive Polymer Capacitor</td>
<td>470μF to 820μF</td>
<td>2.5Vdc to 6.3Vdc</td>
<td>-55°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.2CV</td>
<td>2,000Hr. @ 105°C</td>
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<tr>
<td>CG Series</td>
<td>ULTRA LOW IMPEDANCE Conductive Polymer Capacitor</td>
<td>33μF to 2,700μF</td>
<td>2.5Vdc to 25Vdc</td>
<td>-55°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.2CV</td>
<td>2,000Hr. @ 105°C</td>
<td>Bulk / Tape</td>
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<tbody>
<tr>
<td><strong>NP Series</strong></td>
<td>270µF to 820,000µF</td>
<td>10Vdc to 450Vdc</td>
<td>10Vdc to 250Vdc: -40°C to +85°C 315Vdc to 450Vdc: -25°C to +85°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 5μA</td>
<td>2,000Hr. @ 85°C</td>
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<tr>
<td><strong>NM Series</strong></td>
<td>220µF to 330,000µF</td>
<td>25Vdc to 450Vdc</td>
<td>25Vdc to 100Vdc: -40°C to +105°C 160Vdc to 450Vdc: -25°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 5μA</td>
<td>2,000Hr. @ 105°C</td>
<td>Bulk</td>
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<tr>
<td><strong>NF Series</strong></td>
<td>1,800µF to 22,000µF</td>
<td>400Vdc to 450Vdc</td>
<td>-40°C to +85°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 5μA</td>
<td>5,000Hr. @ 85°C</td>
<td>Bulk</td>
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<tr>
<td><strong>NH Series</strong></td>
<td>330µF to 390,000µF</td>
<td>10Vdc to 500Vdc</td>
<td>10Vdc to 100Vdc: -40°C to +105°C 160Vdc to 500Vdc: -25°C to +105°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 5μA</td>
<td>5,000Hr. @ 105°C</td>
<td>Bulk</td>
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<tr>
<td><strong>NG Series</strong></td>
<td>2,200µF to 1,000,000µF</td>
<td>10Vdc to 100Vdc</td>
<td>-40°C to +85°C</td>
<td>±20%</td>
<td>≤ 0.02CV or 5μA</td>
<td>2,000Hr. @ 85°C</td>
<td>Bulk</td>
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*Please check our website for ordering codes*
### Leaded Resistors

#### MFR Series
**METAL FILM**  
Normal & Miniature Style  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 1/6W to 3W  
- **Temp. Coefficient**: ±15, ±25, ±50, ±100ppm/°C  
- **Resistance Tolerance**: ±0.5%, ±1%  
- **Max. Working Voltage**: 200Vdc to 500Vdc  
- **Max. Overload Voltage**: 400Vdc to 1KVdc  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### MFP Series
**PRECISION METAL FILM**  
Normal & Miniature Style  
- **Resistance Range**: 1Ω to 1MΩ  
- **Rated Power @ 70°C**: 1/6W to 3W  
- **Temp. Coefficient**: ±15, ±25ppm/°C  
- **Resistance Tolerance**: ±0.1%, ±0.25%  
- **Max. Working Voltage**: 150Vdc to 500Vdc  
- **Max. Overload Voltage**: 300Vdc to 1KVdc  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### MHP Series
**HIGH PRECISION METAL FILM**  
Normal Style  
- **Resistance Range**: 100Ω to 500KΩ  
- **Rated Power @ 70°C**: 1/4W & 1/2W  
- **Temp. Coefficient**: ±5, ±10ppm/°C  
- **Resistance Tolerance**: ±0.02%, ±0.05%  
- **Max. Working Voltage**: 200Vdc to 250Vdc  
- **Max. Overload Voltage**: 400Vdc to 500Vdc  
- **Packaging**: Bulk

#### MF0 Series
**PROFESSIONAL METAL FILM**  
Miniature Style  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 0.4W & 0.6W  
- **Temp. Coefficient**: ±50ppm/°C  
- **Resistance Tolerance**: ±1%  
- **Max. Working Voltage**: 200Vdc to 350Vdc  
- **Max. Overload Voltage**: 400Vdc to 700Vdc  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### MFN Series
**METAL FILM**  
High Temp / High Humidity  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 1/6W to 3W  
- **Temp. Coefficient**: ±15, ±25, ±50, ±100ppm/°C  
- **Resistance Tolerance**: ±0.5%, ±1%  
- **Max. Working Voltage**: 200Vdc to 500Vdc  
- **Max. Overload Voltage**: 400Vdc to 1KVdc  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### FMF Series
**METAL FILM FLAME-PROOF**  
Normal & Miniature Style  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 1/4W to 3W  
- **Temp. Coefficient**: ±50, ±100ppm/°C  
- **Resistance Tolerance**: ±1%  
- **Max. Working Voltage**: 200Vdc to 500Vdc  
- **Max. Overload Voltage**: 500Vdc to 1KVdc  
- **Flameproof Silicone Coating Meet**: UL94V-0  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### FM0 Series
**PROFESSIONAL METAL FILM FLAME-PROOF**  
Miniature Style  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 0.4W & 0.6W  
- **Temp. Coefficient**: ±50ppm/°C  
- **Resistance Tolerance**: ±1%  
- **Max. Working Voltage**: 200Vdc to 300Vdc  
- **Max. Overload Voltage**: 400Vdc to 600Vdc  
- **Flameproof Silicone Coating Meet**: UL94V-0  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

#### FMP Series
**HIGH POWER FLAME-PROOF**  
METAL FILM  
Ultra Miniature Style  
- **Resistance Range**: 1Ω to 10MΩ & 0Ω  
- **Rated Power @ 70°C**: 1/2W to 3W  
- **Temp. Coefficient**: ±100ppm/°C  
- **Resistance Tolerance**: ±1%, ±5%  
- **Max. Working Voltage**: 200Vdc to 750Vdc  
- **Max. Overload Voltage**: 400Vdc to 1KVdc  
- **Flameproof Silicone Coating Meet**: UL94V-0  
- **Packaging**: Bulk, Tape / Box, Tape / Reel

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Please check our website for ordering codes
<table>
<thead>
<tr>
<th><strong>LRR Series</strong></th>
<th>METAL OXIDE FILM</th>
<th>Normal &amp; Miniature Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Range</td>
<td>1Ω to 1MΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±300ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>200Vdc to 750Vdc</td>
<td>Max. Overload Voltage</td>
</tr>
<tr>
<td>Flameproof Silicone Coating</td>
<td>Meet UL94V-0</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>MRR Series</strong></th>
<th>LOW INDUCTIVE METAL OXIDE FILM</th>
<th>Normal &amp; Miniature Style</th>
</tr>
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<tbody>
<tr>
<td>Resistance Range</td>
<td>1Ω to 100KΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±300ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>200Vdc to 350Vdc</td>
<td>Max. Overload Voltage</td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>DAR Series</strong></th>
<th>FUSIBLE METAL FILM</th>
<th>Normal &amp; Miniature Style</th>
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</thead>
<tbody>
<tr>
<td>Resistance Range</td>
<td>4.7Ω to 560Ω (±2%)</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±200ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Fusing Characteristics</td>
<td>Fusing time within 30 seconds at 16 times of rated power. Fusing residual resistive value at least 100 times rated resistance.</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>HAR Series</strong></th>
<th>HIGH TEMPERATURE</th>
<th>Normal Style</th>
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<tbody>
<tr>
<td>Resistance Range</td>
<td>2KΩ to 68KΩ</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±250ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>750Vdc</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>MAR Series</strong></th>
<th>MELF METAL RESISTORS</th>
<th>Normal &amp; Miniature Style</th>
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<tbody>
<tr>
<td>Resistance Range</td>
<td>1Ω to 1MΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±5, ±25, ±50, ±100, ±200ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>150Vdc to 350Vdc</td>
<td>Max. Overload Voltage</td>
</tr>
<tr>
<td>Packaging</td>
<td>Tape / Reel</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>PAB Series</strong></th>
<th>MELF METAL RESISTORS</th>
<th>Ultra Miniature Style</th>
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</thead>
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<tr>
<td>Resistance Range</td>
<td>1Ω to 1MΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>±50, ±100, ±200ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>350Vdc</td>
<td></td>
</tr>
<tr>
<td>Max. Overload Voltage</td>
<td>700Vdc</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>Tape / Reel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CRAR Series</strong></th>
<th>CARBON FILM</th>
<th>Normal &amp; Miniature Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Range</td>
<td>1Ω to 10MΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>150Vdc to 500Vdc</td>
<td>Max. Overload Voltage</td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CFAR Series</strong></th>
<th>PROFESSIONAL CARBON FILM</th>
<th>Miniature Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Range</td>
<td>1Ω to 10MΩ &amp; 0Ω</td>
<td>Rated Power @ 70°C</td>
</tr>
<tr>
<td>Temp. Coefficient</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>Resistance Tolerance</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>200Vdc to 300Vdc</td>
<td>Max. Overload Voltage</td>
</tr>
<tr>
<td>Packaging</td>
<td>Bulk, Tape / Box, Tape / Reel</td>
<td></td>
</tr>
</tbody>
</table>

Please check our website for ordering codes.
<table>
<thead>
<tr>
<th>Series</th>
<th>Type Description</th>
<th>Resistance Range</th>
<th>Rated Power @ 70°C</th>
<th>Temp. Coefficient</th>
<th>Resistance Tolerance</th>
<th>Max. Working Voltage</th>
<th>Max. Overload Voltage</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFN</td>
<td>CARBON FILM, High Temp / High Humidity</td>
<td>1Ω to 10MΩ &amp; 0Ω</td>
<td>1/6W to 3W</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>±2%, ±5%</td>
<td>150Vdc to 500Vdc</td>
<td>300Vdc to 1Kdc</td>
<td>Bulk, Tape / Box / Tape / Reel</td>
</tr>
<tr>
<td>FCR</td>
<td>CARBON FILM FLAME-PROOF, Normal &amp; Miniature Style</td>
<td>1Ω to 10MΩ &amp; 0Ω</td>
<td>1/4W to 3W</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>±2%, ±5%</td>
<td>250Vdc to 500Vdc</td>
<td>500Vdc to 1Kdc</td>
<td>Bulk, Tape / Box / Tape / Reel</td>
</tr>
<tr>
<td>FC0</td>
<td>PROFESSIONAL CARBON FILM, FLAME-PROOF, Miniature Style</td>
<td>1Ω to 10MΩ &amp; 0Ω</td>
<td>0.4W &amp; 0.6W</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>±2%, ±5%</td>
<td>200Vdc to 300Vdc</td>
<td>400Vdc to 600Vdc</td>
<td>Bulk, Tape / Box / Tape / Reel</td>
</tr>
<tr>
<td>NCR</td>
<td>NON-INDUCTIVE CARBON FILM, Normal &amp; Miniature Style</td>
<td>2.2Ω to 10KΩ</td>
<td>1/4W to 3W</td>
<td>-500ppm/°C to +500ppm/°C</td>
<td>±5%, ±10%</td>
<td>250Vdc to 500Vdc</td>
<td>500Vdc to 1Kdc</td>
<td>Bulk, Tape / Box / Tape / Reel</td>
</tr>
<tr>
<td>HTR</td>
<td>HIGH TEMPERATURE, Normal Style</td>
<td>2KΩ to 68KΩ</td>
<td>2W</td>
<td>-125ppm/°C</td>
<td>±5%</td>
<td>500Vdc</td>
<td></td>
<td>Bulk, Tape / Box / Tape / Reel</td>
</tr>
<tr>
<td>MCF</td>
<td>MELF CARBON RESISTORS, Normal &amp; Miniature Style</td>
<td>1Ω to 1MD &amp; 0Ω</td>
<td>1/6W to 1W</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>±2%, ±5%</td>
<td>200Vdc to 350Vdc</td>
<td>400Vdc to 700Vdc</td>
<td>Tape / Reel</td>
</tr>
<tr>
<td>MCP</td>
<td>MELF CARBON RESISTORS, Ultra Miniature Style</td>
<td>1Ω to 1MD &amp; 0Ω</td>
<td>1W &amp; 2W</td>
<td>-1,500ppm/°C to +350ppm/°C</td>
<td>±2%, ±5%</td>
<td>350Vdc</td>
<td>700Vdc</td>
<td>Tape / Reel</td>
</tr>
<tr>
<td>HHV</td>
<td>HIGH VOLTAGE &amp; HIGH OHMIC RESISTORS, Normal Style</td>
<td>109Ω to 68MD</td>
<td>1/4W to 3W</td>
<td>-1200ppm/°C</td>
<td>±1%, ±5%</td>
<td>1.6KVdc to 7KVdc</td>
<td>3KVdc to 14KVdc</td>
<td>Tape / Box</td>
</tr>
</tbody>
</table>
### Lead Resistor Selection

<table>
<thead>
<tr>
<th>Series</th>
<th>Description</th>
<th>Parameters</th>
<th>Packaging Options</th>
</tr>
</thead>
</table>
| APR      | PULSE-LOADING RESISTORS                   | Resistance Range _100KΩ to 10MΩ_  
Rated Power @ 70°C _1/4W to 2W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±5%_ | Bulk, Tape / Box, Tape / Reel                                    |
| ZOR      | ZERO OHM RESISTORS                        | Max. Resistance Value _≤ 20mΩ or less_  
Rated Power _1/6W & 1/4W_ | Bulk, Tape / Box, Tape / Reel                                    |
| JPW      | JUMPER WIRES                              | Material _Soft Copper Wire with Tin Plating_  
Conductor Resistance _0.54mΩ / cm_  
Wire Diameter _Φ0.5mm to Φ0.8mm & Φ1.0mm (±0.05mm)_ | Tape / Box, Tape / Reel                                    |
| KNP      | WIREWOUND RESISTORS                       | Resistance Range _0.1Ω to 1KΩ_  
Rated Power @ 70°C _1/4W to 7W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±1%, ±5%_ | Bulk, Tape / Box, Tape / Reel                                    |
| NKN      | NON-INDUCTIVE WIREWOUND RESISTORS         | Resistance Range _0.1Ω to 33Ω_  
Rated Power @ 70°C _1/2W to 7W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±5%_ | Bulk, Tape / Box, Tape / Reel                                    |
| FKN      | FUSIBLE WIREWOUND FLAME-PROOF TYPE        | Resistance Range _0.1Ω to 390Ω_  
Rated Power @ 70°C _1/4W to 7W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±1%, ±5%_ | Bulk, Tape / Box, Tape / Reel                                    |
| PNP      | POWER WIREWOUND RESISTORS                 | Resistance Range _0.1Ω to 8.2KΩ_  
Rated Power @ 70°C _1W to 10W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±1%, ±5%_ | Bulk, Tape / Box, Tape / Reel                                    |
| PNP V    | POWER WIREWOUND RESISTORS                 | Resistance Range _0.1Ω to 8.2KΩ_  
Rated Power @ 70°C _1W to 10W_  
Temp. Coefficient _±300ppm/°C_  
Resistance Tolerance _±1%, ±5%_ | Bulk, Tape / Box, Tape / Reel                                    |

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Leaded Resistors

**SQP & NSP Series**
- **CEMENT RESISTORS**
- Axial Lead Style
- **Resistance Range:** 0.1Ω to 200KΩ
- **Rated Power @ 70°C:** 2W to 40W
- **Temp. Coefficient:** ±300ppm/°C
- **Resistance Tolerance:** ±5%
- **Load Life:** ±5.0% + 0.05Ω
- **Insulation Resistance:** > 1,000MΩ
- **Packaging:** Bulk

**SQM & NSM Series**
- **CEMENT RESISTORS**
- Vertical Lead Style
- **Resistance Range:** 0.1Ω to 200KΩ
- **Rated Power @ 70°C:** 2W to 10W
- **Temp. Coefficient:** ±300ppm/°C
- **Resistance Tolerance:** ±5%
- **Load Life:** ±5.0% + 0.05Ω
- **Insulation Resistance:** > 1,000MΩ
- **Packaging:** Bulk

**SQZ & NSZ Series**
- **CEMENT RESISTORS**
- Radial Terminals Style
- **Resistance Range:** 0.1Ω to 200KΩ
- **Rated Power @ 70°C:** 3W to 20W
- **Temp. Coefficient:** ±300ppm/°C
- **Resistance Tolerance:** ±5%
- **Load Life:** ±5.0% + 0.05Ω
- **Insulation Resistance:** > 1,000MΩ
- **Packaging:** Bulk

**PSP Series**
- **CEMENT RESISTORS**
- AXIAL LEAD TYPE
- Power Wirewound Style
- **Resistance Range:** 0.1Ω to 3.9KΩ
- **Rated Power @ 70°C:** 4W to 9W
- **Temp. Coefficient:** ±400ppm/°C
- **Resistance Tolerance:** ±5%, ±10%
- **Load Life:** ±5.0% + 0.1Ω
- **Insulation Resistance:** ≥ 1,000MΩ
- **Packaging:** Bulk

**PSM Series**
- **CEMENT RESISTORS**
- VERTICAL LEAD TYPE
- Power Wirewound Style
- **Resistance Range:** 0.1Ω to 3.9KΩ
- **Rated Power @ 70°C:** 4W to 9W
- **Temp. Coefficient:** ±400ppm/°C
- **Resistance Tolerance:** ±5%, ±10%
- **Load Life:** ±5.0% + 0.1Ω
- **Insulation Resistance:** ≥ 1,000MΩ
- **Packaging:** Bulk

**FTR Series**
- **CEMENT RESISTORS**
- VERTICAL LEAD TYPE
- Fusible Thermal Style
- **Resistance Range:** 1Ω to 10KΩ
- **Rated Current:** 2A to 10A
- **Temp. Coefficient:** ±250ppm/°C
- **Resistance Tolerance:** ±5%, ±10%
- **Standard Voltage:** 250Vdc
- **Packaging:** Bulk

**SLR Series**
- **CERAMIC METAL PLATE RESISTORS**
- Normal Style
- **Resistance Range:** 0.05Ω to 3.3Ω
- **Rated Power @ 70°C:** 2W to 10W
- **Temp. Coefficient:** ±250ppm/°C
- **Resistance Tolerance:** ±5%, ±10%
- **Max. Working Voltage:** 250Vdc to 500Vdc
- **Max. Overload Voltage:** 500Vdc to 1KVdc
- **Packaging:** Bulk

**AHA & AHP Series**
- **ALUMINUM HOUSED RESISTORS**
- Power Wirewound Style
- **Resistance Range:** 0.1Ω to 3KΩ
- **Rated Power @ 70°C:** 5W to 250W
- **Temp. Coefficient:** ±250ppm/°C
- **Resistance Tolerance:** ±0.25% to ±10%
- **Packaging:** Bulk
### SMD Chip Beads

#### SB Series
- **Size**: 100505, 160808, 201209, 321611, 321616, 322513, 451616, 453215
- **Impedance Range**: 6Ω to 2,700Ω
- **Test Frequency**: 30MHz to 100MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.05Ω to 1.4Ω
- **Rated Current**: 100mA to 600mA
- **Packaging**: Tape, Reel

#### NB Series
- **Size**: 100505, 160808, 201209, 321611
- **Impedance Range**: 6Ω to 2,700Ω
- **Test Frequency**: 100MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.05Ω to 1.0Ω
- **Rated Current**: 50mA to 800mA
- **Packaging**: Tape, Reel

#### HF Series
- **Size**: 100505, 160808
- **Impedance Range**: 120Ω to 1,800Ω
- **Test Frequency**: 100MHz & 1,000MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.09Ω to 2.2Ω
- **Rated Current**: 50mA to 1,500mA
- **Packaging**: Tape, Reel

#### GB Series
- **Size**: 160808, 201209, 321611, 321616, 322513, 451616, 453215
- **Impedance Range**: 7Ω to 2,000Ω
- **Test Frequency**: 30MHz to 100MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.03Ω to 0.55Ω
- **Rated Current**: 300mA to 1,000mA
- **Packaging**: Tape, Reel

#### PB Series
- **Size**: 100505, 160808, 201209, 321611, 322513, 451616, 453215
- **Impedance Range**: 10Ω to 1,500Ω
- **Test Frequency**: 50MHz to 100MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.01Ω to 0.25Ω
- **Rated Current**: 800mA to 6,000mA
- **Packaging**: Tape, Reel

#### UPB Series
- **Size**: 160808, 201209, 201212, 321611, 451616, 453215
- **Impedance Range**: 11Ω to 150Ω
- **Test Frequency**: 100MHz
- **Tolerance**: ±25%
- **DC Resistance**: 0.01Ω to 0.025Ω
- **Rated Current**: 4,500mA to 9,000mA
- **Packaging**: Tape, Reel

#### FB Series
- **Size**: 423226, 784729, 863226, 865626
- **Impedance Range**: 24Ω to 72Ω
- **Test Frequency**: 25MHz & 100MHz
- **Tolerance**: ±20%
- **DC Resistance**: 0.6Ω to 0.9Ω
- **Packaging**: Tape, Reel

### SMD Multilayer Chip Inductors

#### CL Series
- **Size**: 100505, 160808, 201209, 201212, 321611
- **Inductance Range**: 0.01μH to 33μH
- **Test Frequency**: 1MHz to 50MHz
- **Tolerance**: ±10%, ±20%
- **DC Resistance**: 0.15Ω to 2.2Ω
- **IDC**: 1mA to 300mA
- **Packaging**: Tape, Reel

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Please check our website for ordering codes.
<table>
<thead>
<tr>
<th>Series</th>
<th>Notes</th>
<th>Size(s)</th>
<th>Inductance Range</th>
<th>Test Frequency</th>
<th>Tolerance</th>
<th>SRF</th>
<th>DC Resistance</th>
<th>IDC</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLH Series</td>
<td>MULTILAYER HIGH FREQUENCY</td>
<td>1005, 1608, 2012</td>
<td>1nH to 470nH</td>
<td>50MHz to 800MHz</td>
<td>±0.3, ±5%, ±10%</td>
<td>300MHz to 10,000MHz</td>
<td>0.1Ω to 4Ω</td>
<td>100mA to 600mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>SQV Series</td>
<td>FERRITE High Q &amp; F / Low DC Resistance</td>
<td>322520, 453226</td>
<td>0.1µH to 2.200µH</td>
<td>1kHz to 1MHz</td>
<td>±5%, ±10%, ±20%</td>
<td>1.3MHz to 200MHz</td>
<td>0.025Ω to 9Ω</td>
<td>30mA to 700mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>SQC Series</td>
<td>FERRITE High Current / Low DC Resistance</td>
<td>201609, 321618, 322517, 322520, 453226</td>
<td>0.12µH to 560µH</td>
<td>0.001MHz to 1MHz</td>
<td>±5%, ±10%, ±20%</td>
<td>3MHz to 250MHz</td>
<td>0.08Ω to 15.6Ω</td>
<td>60mA to 1,080mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>NL Series</td>
<td>FERRITE Open Wire</td>
<td>201614, 252018</td>
<td>0.005µH to 100µH</td>
<td>0.79MHz to 25.2MHz</td>
<td>±5%, ±10%</td>
<td>12MHz to 3,000MHz</td>
<td>0.08Ω to 15.6Ω</td>
<td>70mA to 2,000mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>NLC Series</td>
<td>FERRITE Open for High Current</td>
<td>252018, 322522</td>
<td>0.47µH to 680µH</td>
<td>0.79MHz to 25.2MHz</td>
<td>±5%, ±10%</td>
<td>2MHz to 450MHz</td>
<td>0.07Ω to 28Ω</td>
<td>65mA to 1,800mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>NLV Series</td>
<td></td>
<td>322522</td>
<td>0.01µH to 470µH</td>
<td>0.79MHz to 100MHz</td>
<td>±5%, ±10%</td>
<td>4MHz to 2,500MHz</td>
<td>0.13Ω to 4Ω</td>
<td>25mA to 450mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>NLCV Series</td>
<td></td>
<td>453232</td>
<td>1µH to 330µH</td>
<td>0.79MHz to 7.99MHz</td>
<td>±5%, ±10%</td>
<td>4MHz to 200MHz</td>
<td>0.11Ω to 13Ω</td>
<td>90mA to 1,050mA</td>
<td>Tape, Reel</td>
</tr>
<tr>
<td>LS Series</td>
<td>HIGH FREQUENCY</td>
<td>0603, 0805, 1008</td>
<td>1.2nH to 47,000nH</td>
<td>2.5MHz to 7.99MHz</td>
<td>±5%, ±10%</td>
<td>150MHz to 1,700MHz</td>
<td>0.06Ω to 14.5Ω</td>
<td>180mA to 2,000mA</td>
<td>Tape, Reel</td>
</tr>
</tbody>
</table>
SMD Wire Wound Chip Inductors

**LT Series**
- **Size**: 0805, 1210
- **Inductance Range**: 120nH to 39,000nH
- **Test Frequency**: 2.52MHz to 25.2MHz
- **Tolerance**: ±10%
- **SRF**: 15MHz to 1,500MHz
- **RDC**: 0.33Ω to 16Ω
- **IDC**: 190mA to 1,500mA
- **Packaging**: Tape, Reel

**LD Series**
- **Size**: 0805
- **Inductance Range**: 1.0μH to 100μH
- **Test Frequency**: 7.96MHz
- **Tolerance**: ±10%, ±20%
- **SRF**: 9MHz to 100MHz
- **RDC**: 0.1Ω to 9Ω
- **IDC**: 70mA to 800mA
- **Packaging**: Tape, Reel

**PS Series**
- **Size**: 1008
- **Inductance Range**: 1.0μH to 1,000μH
- **Test Frequency**: 100KHz
- **Tolerance**: ±10%, ±20%
- **SRF**: 1.5MHz to 344MHz
- **RDC**: 0.05Ω to 29.2Ω
- **IDC**: 70mA to 800mA
- **Packaging**: Tape, Reel

**CS Series**
- **Size**: 0402, 0603, 0805, 1008
- **Inductance Range**: 1.0nH to 10,000nH
- **Test Frequency**: 2.52MHz to 250MHz
- **Tolerance**: ±2%, ±5%, ±10%
- **SRF**: 25MHz to 12,500MHz
- **RDC**: 0.03Ω to 8Ω
- **Irms**: 30mA to 1,360mA
- **Packaging**: Tape, Reel

**CT Series**
- **Size**: 0805
- **Inductance Range**: 1.8nH to 1,000nH
- **Test Frequency**: 25MHz to 250MHz
- **Tolerance**: ±2%, ±5%, ±10%
- **SRF**: 330MHz to 9,400MHz
- **RDC**: 0.03Ω to 3.1Ω
- **Irms**: 300mA to 1,360mA
- **Packaging**: Tape, Reel

**HC Series**
- **Size**: 0603
- **Inductance Range**: 1.6nH to 24nH
- **Test Frequency**: 250MHz
- **Tolerance**: ±2%, ±5%, ±10%
- **SRF**: 2,400MHz to 12,900MHz
- **RDC**: 0.03Ω to 0.105Ω
- **Irms**: 1,800mA to 2,400mA
- **Packaging**: Tape, Reel

**HQ Series**
- **Size**: 0805, 1008
- **Inductance Range**: 2.5nH to 390nH
- **Test Frequency**: 25MHz to 250MHz
- **Tolerance**: ±2%, ±5%, ±10%
- **SRF**: 530MHz to 6,000MHz
- **RDC**: 0.02Ω to 0.7Ω
- **Irms**: 900mA to 1,600mA
- **Packaging**: Tape, Reel

**LCN Series**
- **Size**: 0603, 0805, 1008, 1206
- **Inductance Range**: 1.6nH to 8,200nH
- **Test Frequency**: 7.9MHz to 250MHz
- **Tolerance**: ±2%, ±5%, ±10%
- **SRF**: 25MHz to 12,500MHz
- **RDC**: 0.03Ω to 6Ω
- **Irms**: 170mA to 1,000mA
- **Packaging**: Tape, Reel

*Please check our website for ordering codes*
<table>
<thead>
<tr>
<th>SMD Wire Wound Chip Inductors</th>
<th>CMM Series</th>
<th>SIZE</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMON MODE</td>
<td>Impedance Range</td>
<td>30Ω to 900Ω</td>
<td></td>
</tr>
<tr>
<td>Test Frequency</td>
<td>100MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolerance</td>
<td>±20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDC</td>
<td>0.2Ω to 0.6Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDC</td>
<td>80mA to 450mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>Tape, Reel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Size</td>
<td>Inductance Range</td>
<td>Test Frequency</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>SCDA Series</strong></td>
<td>2D12, 2D15, 2D18</td>
<td>1.2μH to 47μH</td>
<td>100kHz / 1.0V</td>
</tr>
<tr>
<td><strong>STD Series</strong></td>
<td>1109</td>
<td>10μH to 1.200μH</td>
<td>1kHz</td>
</tr>
<tr>
<td><strong>SLH Series</strong></td>
<td>0630, 0650, 1040, 1250</td>
<td>0.1μH to 10μH</td>
<td>100kHz / 1.0V</td>
</tr>
<tr>
<td><strong>SFI Series</strong></td>
<td>100605</td>
<td>0.1μH to 0.2μH</td>
<td>1MHz</td>
</tr>
<tr>
<td><strong>PMC Series</strong></td>
<td>107, 109, 115, 127, 129</td>
<td>0.25μH to 4.7μH</td>
<td>100MHz</td>
</tr>
<tr>
<td><strong>PMD Series</strong></td>
<td>0808, 1109, 9595</td>
<td>0.3μH to 1.2μH</td>
<td>100kHz / 200kHz</td>
</tr>
<tr>
<td><strong>PMF Series</strong></td>
<td>0806, 1008, 107, 109, 118, 129</td>
<td>0.25μH to 220μH</td>
<td>100kHz / 200kHz</td>
</tr>
<tr>
<td><strong>NSF Series</strong></td>
<td>0806, 0808, 109, 118, 1210, 1310</td>
<td>0.25μH to 220μH</td>
<td>100kHz / 1.0V</td>
</tr>
</tbody>
</table>

Please check our website for ordering codes.
### MC Series
- **Size:** 1208, 1209, 1210, 1211
- **Inductance Range:** 0.22μH to 4.7μH
- **Test Frequency:** 100KHz / 1.0V
- **Tolerance:** ±20%
- **DC Resistance:** 0.5mΩ to 10mΩ
- **Rated Current:** 10A to 56A
- **Packaging:** Bulk

### SLM Series
- **Size:** 0709, 0808, 1112
- **Inductance Range:** 1.0μH to 4,700μH
- **Tolerance:** ±10%, ±15%, ±20%
- **DC Resistance:** 0.006Ω to 7.6Ω
- **Packaging:** Bulk

### SL Series
- **Size:** 0406, 0608, 1016
- **Inductance Range:** 1.0μH to 47,000μH
- **Test Frequency:** 1KHz to 7.96MHz
- **Tolerance:** ±10%
- **DC Resistance:** 0.018Ω to 190Ω
- **IDC:** 15mA to 10A
- **Packaging:** Tape, Bulk

### MB Series
- **Size:** 5018, 5026, 5052, 6018, 6052
- **Inductance Range:** 1μH to 10μH
- **Test Frequency:** 1KHz to 300KHz
- **Tolerance:** ±15%
- **DC Current:** 2A to 20A

### BC Series
- **Size:** 1005, 1104, 1305, 1306, 1506, 1806, 2006, 2310, 2711, 3311
- **Inductance Range:** 30μH to 140μH
- **Test Frequency:** 100KHz
- **Tolerance:** ±15%
- **RDC:** 30mΩ to 71Ω
- **Turns:** 24 to 40
- **Packaging:** Tape, Bulk

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<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
</table>
| Asia      | Suzhou, China             | 10, Zhu Yuan Rd.  
Suzhou New District  
Suzhou, Jiangsu Province 215011  
P.R.C.  
Tel. +86 512 6825 5568 Fax. +86 512 6825 5386 |                |                 |
|           | Dongguan, China           | 7-1, Gaoli 1st Rd.  
Gaoli Industrial Zone  
Guangdong Province 523726  
P.R.C.  
Tel. +86 769 8772 0275 Fax. +86 769 8791 0053 |                |                 |
|           | Beijing, China            | Suite 1216, No.8, Jianguomennei Ave.  
Dong Cheng District  
Beijing COFCO Plaza Tower B  
Beijing 100005  
P.R.C.  
Tel. +86 10 851 20810 Fax. +86 10 851 20200 |                |                 |
|           | Hong Kong, China          | Room 7, 1F South Seas Centre, Tower 2  
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Tsimmshatsui East  
Kowloon  
Hong Kong  
Tel. +852 2342 6833 Fax. +852 2342 6588 |                |                 |
|           | Mudu, China               | No. 158, Jinchang Rd., Building #1  
Nan Bing Industrial Zone, Mu Du New District  
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P.R.C.  
Tel. +86 512 6651 8889 Fax. +86 512 6651 9889 |                |                 |
|           | Qingdao, China            | 1057, Jingshui Road  
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Shandong Province 266021  
P.R.C.  
Tel. +86 157 2525 4907 Fax: +86 512 6825 5568 x 2688 |                |                 |
|           | Wuhan, China              | 805, Donggu Silver Building  
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|           | Saitama, Japan            | 16th Namiki Building 3F, 4-116-1  
Miya-cho Omiya-ku,  
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Japan  
Tel. +81 48 795 8953 Fax. +81 48 795 8954 |                |                 |
|           | Kyunggi-Do, Korea         | Room 1211, Hyundai Office Bldg.  
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|           | Kuala Lumpur, Malaysia    | 29-1, Jln Puteri 2/3  
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Selangor 47100  
Malaysia  
Tel. +60 3 8063 8864 Fax. +60 3 8063 7376 |                |                 |
|           | Singapore                 | No. 514 Chai Chee Lane  
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United Kingdom
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