



Thin Film Technology Corp.

## Product Guide

*Current Sensing Technology*

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# Current Sensing Resistors + Jumper

|            |                                                                              |               |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|------------|------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 4-Terminal | Separate Voltage & Current Terminals, High Heat Dissipation                  | CPA           |    |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | High Power & Small Size, High Heat Dissipation                               | CPC           |    |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | High Precision, Separate Voltage & Current Terminals, Low TCR                | WRL           |    |    |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | Very Low Resistance, High Heat Dissipation                                   | FCP           |    |    |    |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | Low Height Profile                                                           | MPC           | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | Low Height Profile, High Heat Dissipation                                    | MPC Long-Side |    |    |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|            | General Purpose Current Sensing, Wrapped Electrodes                          | WEL           |   |   |   |   |   |   |   |                                                                                       |                                                                                       |
|            | General Purpose Current Sensing, Wrapped Electrodes, High Power & Small Size | WEL Long-Side |  |  |  |  |  |  |  |  |  |
|            | Non-Wrapped Electrodes                                                       | WKL           |  |  |  |  |  |  |  |                                                                                       |                                                                                       |
|            | Non-Wrapped Electrodes                                                       | WKL Long-Side |  |  |  |  |  |  |  |  |  |
|            | High Power & Small Size, High Heat Dissipation                               | MPA           |  |  |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Jumper     | High Current                                                                 | LPC           | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |                                                                                       |                                                                                       |                                                                                       |

English case sizes shown.

## CSR Applications

- Automotive
- Consumer Electronics
- Industrial
- Telecommunication
- Test & Measure

CPA

Current Sensing Resistor

Construction

- High purity alumina ceramic
- Ni alloy resistive element
- Epoxy-resin overcoat
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

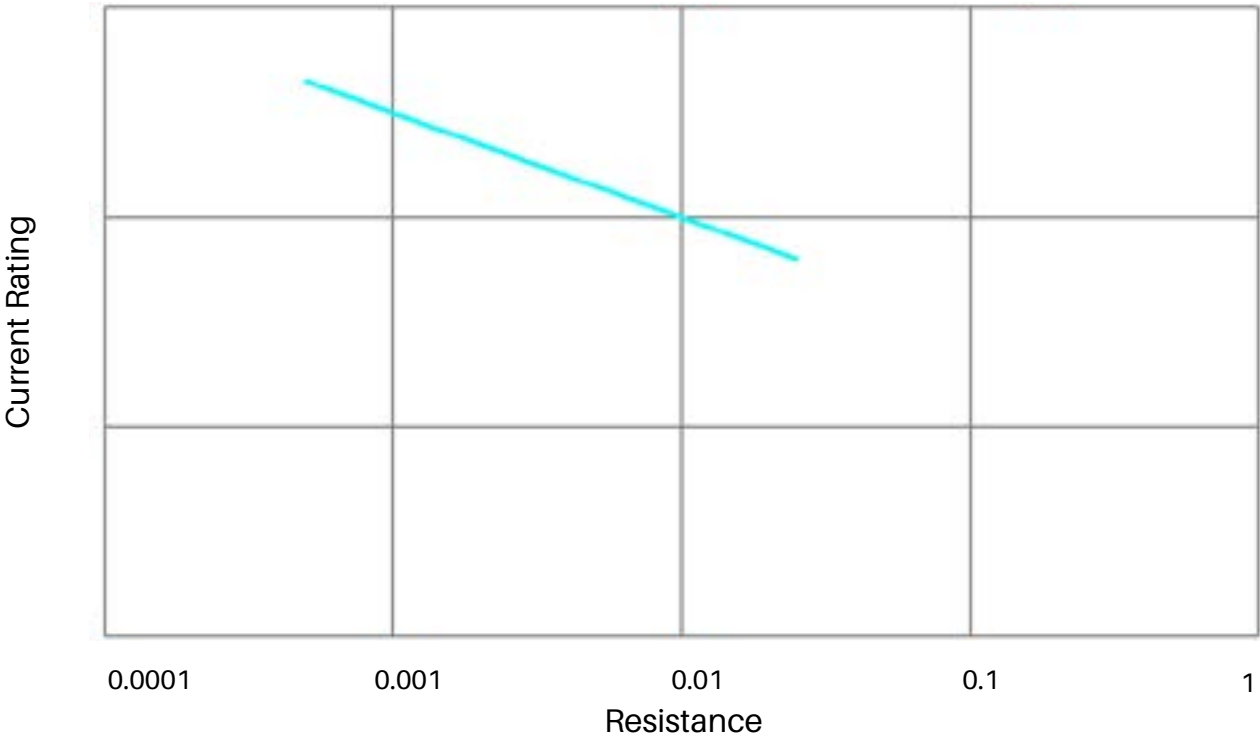
- 0612 English case sizes
- Power of 1W
- Resistance from 0.5mΩ~25mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |     |           |     |
|--------------------------|-------|--------------|-----|-----------|-----|
| Case Size **             |       | 0612         |     |           |     |
| Power Rating             |       | 1W           |     |           |     |
| Resistance Range (mΩ)    | ±0.5% | 5~25         | -   |           |     |
|                          | ±1.0% |              | 1~4 | 0.5, 0.75 |     |
| TCR (±ppm/°C)            |       | 50           | 100 | 150       | 200 |
| Operating Temp. Range    |       | -55°C~+155°C |     |           |     |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



CPC

Current Sensing Resistor

Construction

- High purity alumina ceramic
- Cu alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

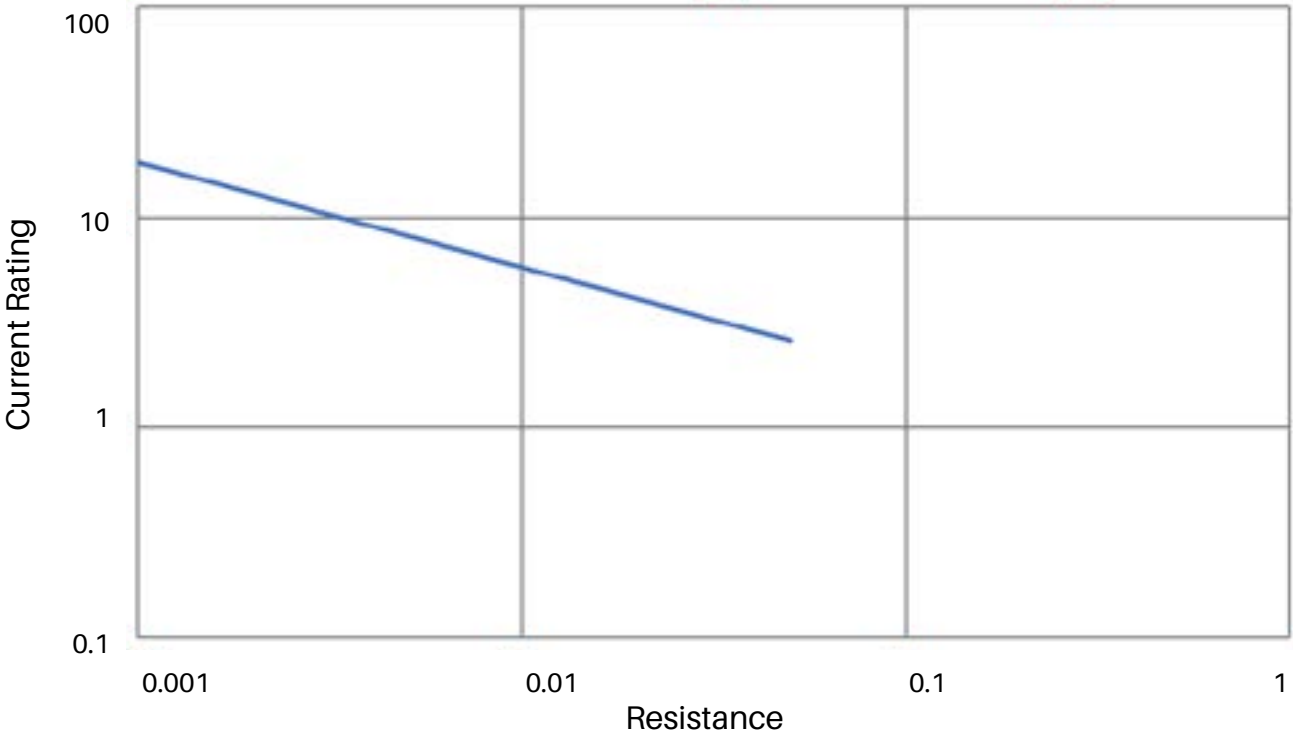
- 0306 English case size
- Power of 1/3W
- Resistance from 1mΩ~50mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |      |      |
|--------------------------|-------|--------------|------|------|
| Case Size **             |       | 0306         |      |      |
| Power Rating             |       | 1/3W         |      |      |
| Resistance Range (mΩ)    | ±0.5% | 5~50         | 1~50 | 5~50 |
|                          | ±1.0% |              |      |      |
| TCR (±ppm/°C)            |       | 50           | 100  | 150  |
| Operating Temp. Range    |       | -55°C~+155°C |      |      |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



WRL

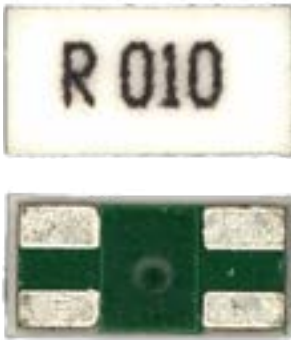
Current Sensing Resistor

Construction

- High purity alumina ceramic
- MnCu resistive element
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

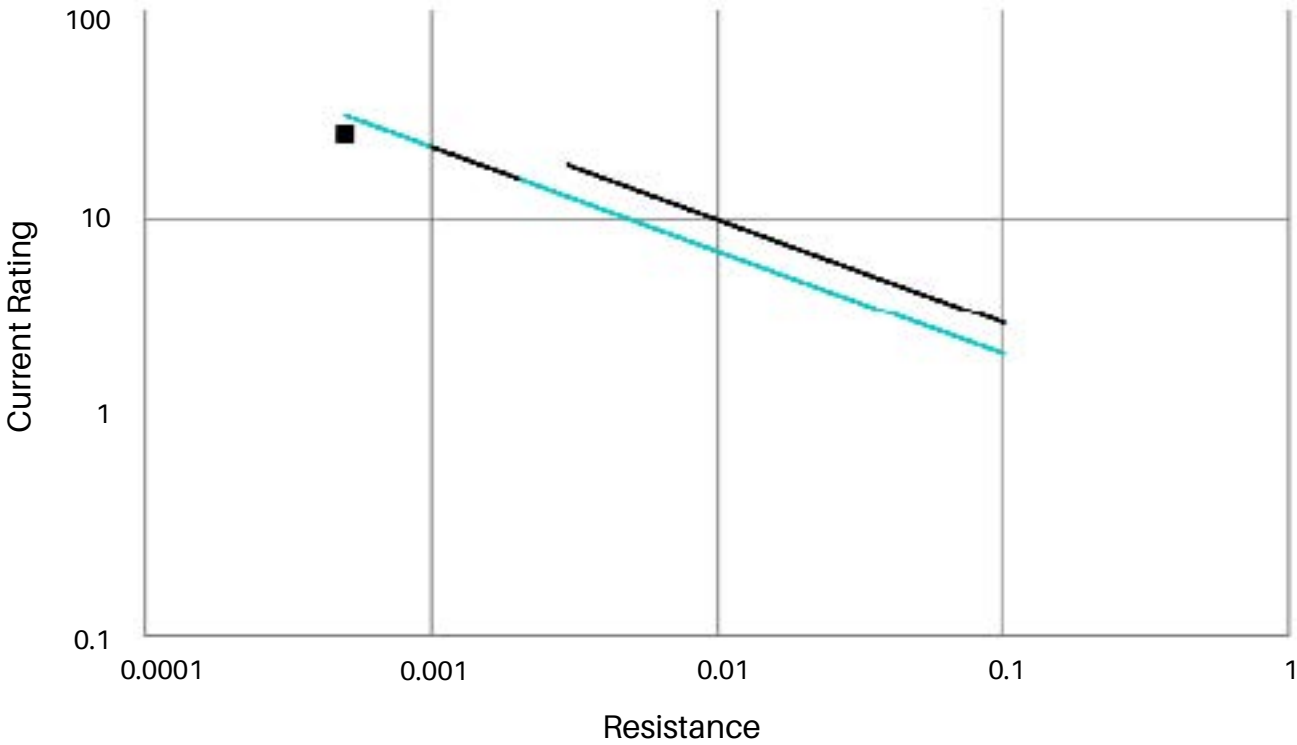
- 1206, 2512 English case sizes
- Power rating up to 1W
- Resistance from 0.5mΩ~100mΩ
- TCR down to ±30ppm/°C
- Tolerance down to ±0.3%
- AEC-Q200 Qualified
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specifications |       |                |     |     |     |      |      |     |       |
|---------------------------|-------|----------------|-----|-----|-----|------|------|-----|-------|
| Case Size**               |       | 1206           |     |     |     | 2512 |      |     |       |
| Power Rating              |       | 1/2W           |     |     |     | 1/3W | 1/2W | 1W  |       |
| Resistance Range (mΩ)     | ±0.3% | 10~100         | -   |     |     | -    | -    | -   |       |
|                           | ±0.5% |                | 5~9 | 1~4 | -   | 0.5  | 1~2  | 3~4 | 5~100 |
|                           | ±1.0% | -              |     |     | 0.5 |      |      |     |       |
| TCR ±ppm/°C               |       | 30             | 50  | 75  | 100 | 100  | 75   | 50  | 30    |
| Operating Temp. Range     |       | -55 °C~+155 °C |     |     |     |      |      |     |       |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



FCP

Current Sensing Resistor

Construction

- Glass epoxy substrate
- Cu alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

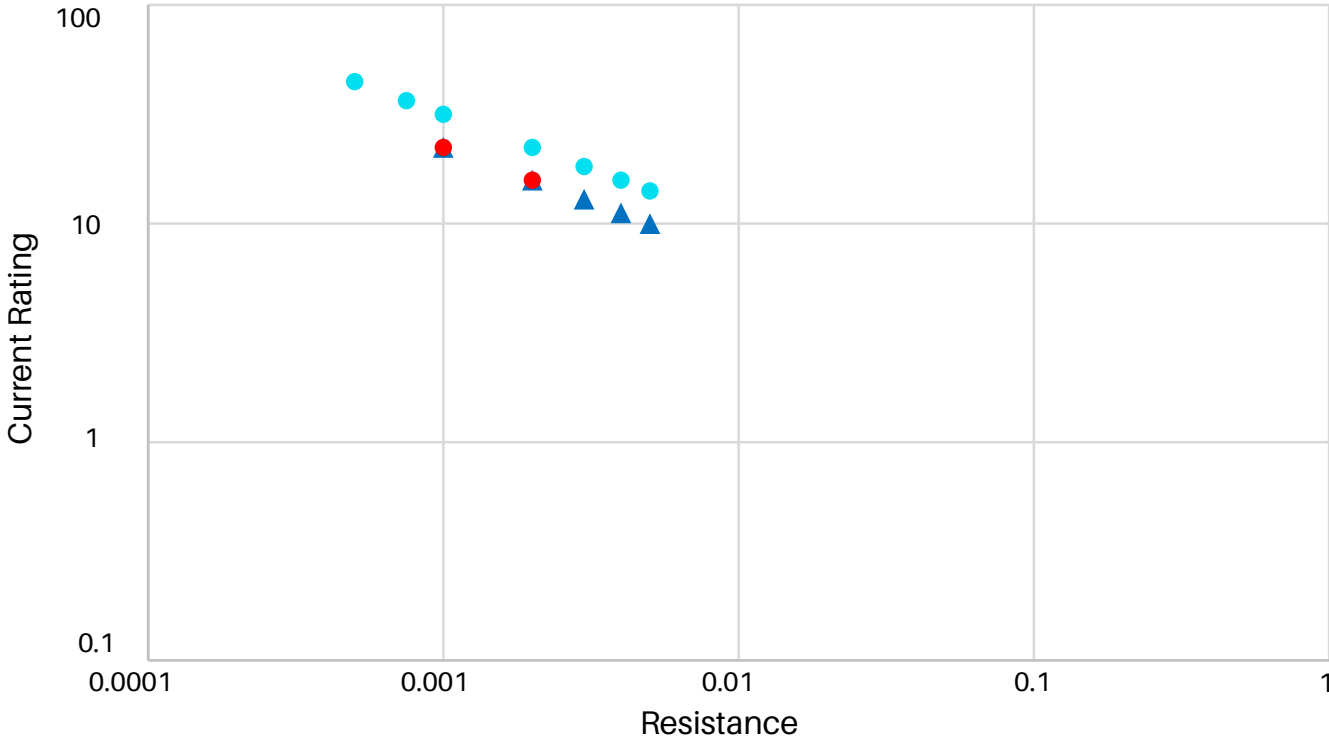
- 0306, 0508, 0612 English case sizes
- Power up to 1W
- Resistance from 0.5mΩ~5mΩ
- TCR's down to ±75ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |      |          |     |
|--------------------------|-------|--------------|------|----------|-----|
| Case Size**              |       | 0306         | 0508 | 0612     |     |
| Power Rating             |       | 1/2W         | 1/2W | 1W       |     |
| Resistance Range (mΩ)    | ±0.5% | -            | -    | 0.5~0.75 | 1~5 |
|                          | ±1.0% | 1~5          | 1~2  |          |     |
| TCR ±ppm/°C              |       | ±100         | ±100 | ±100     | ±75 |
| Operating Temp. Range    |       | -55°C~+155°C |      |          |     |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



MPC

Current Sensing Resistor

Construction

- Cu alloy resistive element
- Epoxy-resin overcoat
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

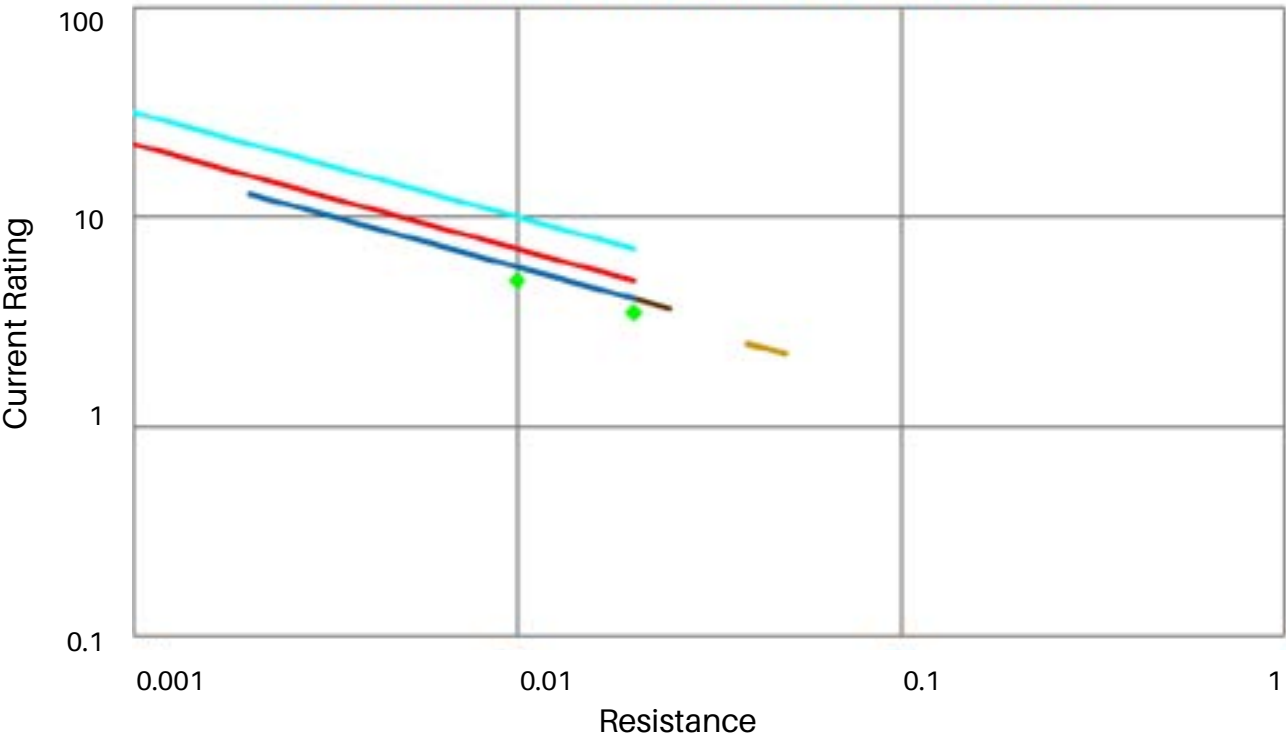
- 0201, 0402, 0603, 0805, 1206 English case sizes
- Power up to 1W
- Resistance from 1mΩ~50mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |     |       |      |       |      |       |     |      |     |     |     |      |      |
|--------------------------|-------|--------------|-----|-------|------|-------|------|-------|-----|------|-----|-----|-----|------|------|
| Case Size **             |       | 0201         |     | 0402  |      |       | 0603 |       |     | 0805 |     |     |     | 1206 |      |
| Power Rating             |       | 1/4W         |     | 1/3W  |      | 1/4W  | 1/3W |       |     | 1/2W |     |     |     | 1W   |      |
| Resistance Range (mΩ)    | ±0.5% | 20           | -   | -     | 20   | -     | -    | 5     | -   | -    |     |     |     | -    |      |
|                          | ±1.0% |              | 10  | 2.5~3 | 5~25 | 40~50 | 6~20 | 2.5~4 | 2   | 6~20 | 2~5 | 1.5 | 1   | 1~4  | 5~20 |
| TCR (±ppm/°C)            |       | 100          | 200 | 150   | 100  |       | 75   | 100   | 150 | 50   | 75  | 100 | 150 | 75   | 50   |
| Operating Temp. Range    |       | -55°C~+155°C |     |       |      |       |      |       |     |      |     |     |     |      |      |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



MPC-Long Side

Current Sensing Resistor

Construction

- Metal foil resistive element
- Glass epoxy substrate
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

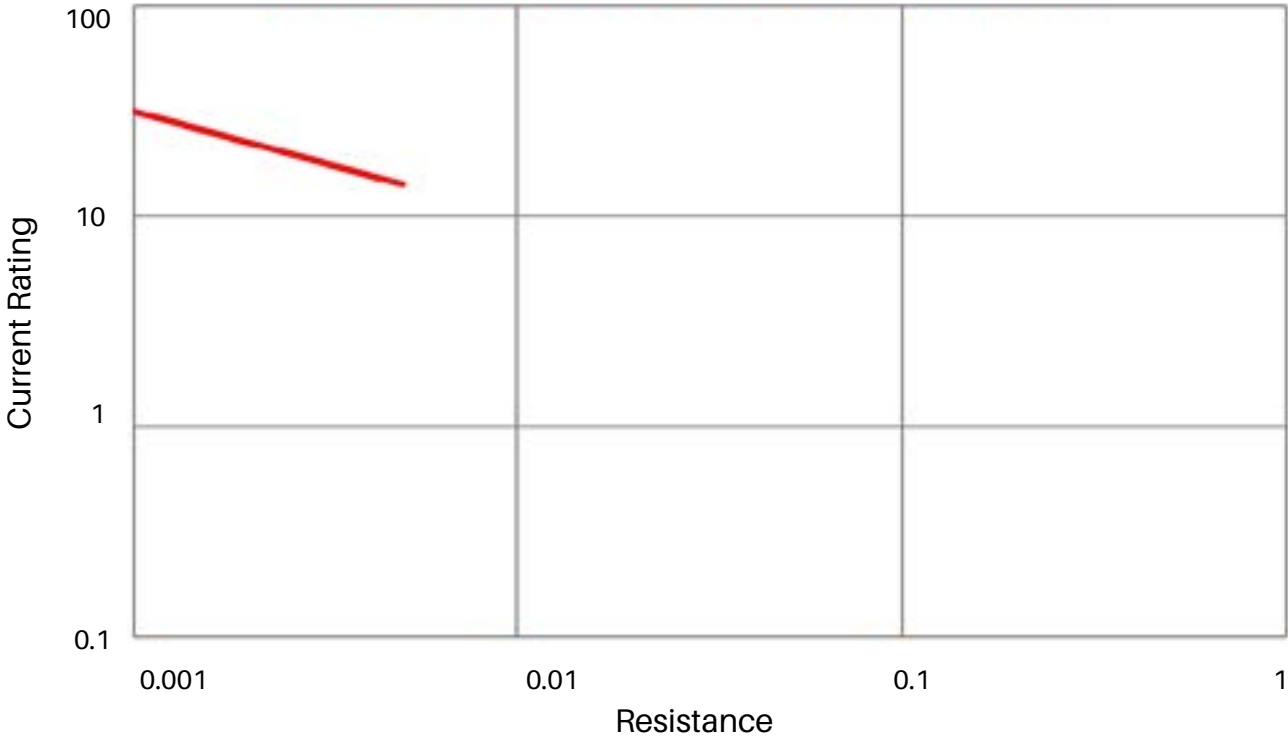
- 0612 & 0508 English case sizes
- Resistance from 1mΩ~5mΩ
- Power rating of 1W
- Tolerance of ±1.0%
- TCR's down to ±50ppm/°C
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |     |     |      |
|--------------------------|-------|--------------|-----|-----|------|
| Case Size **             |       | 0508         |     |     | 0612 |
| Power Rating             |       | 1W           |     |     |      |
| Resistance Range (mΩ)    | ±1.0% | 1~1.5        | 2   | 3~5 | 1~5  |
| TCR (±ppm/°C)            |       | 150          | 100 | 50  |      |
| Operating Temp. Range    |       | -55°C~+155°C |     |     |      |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



Construction

- High purity alumina ceramic
- Cu alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

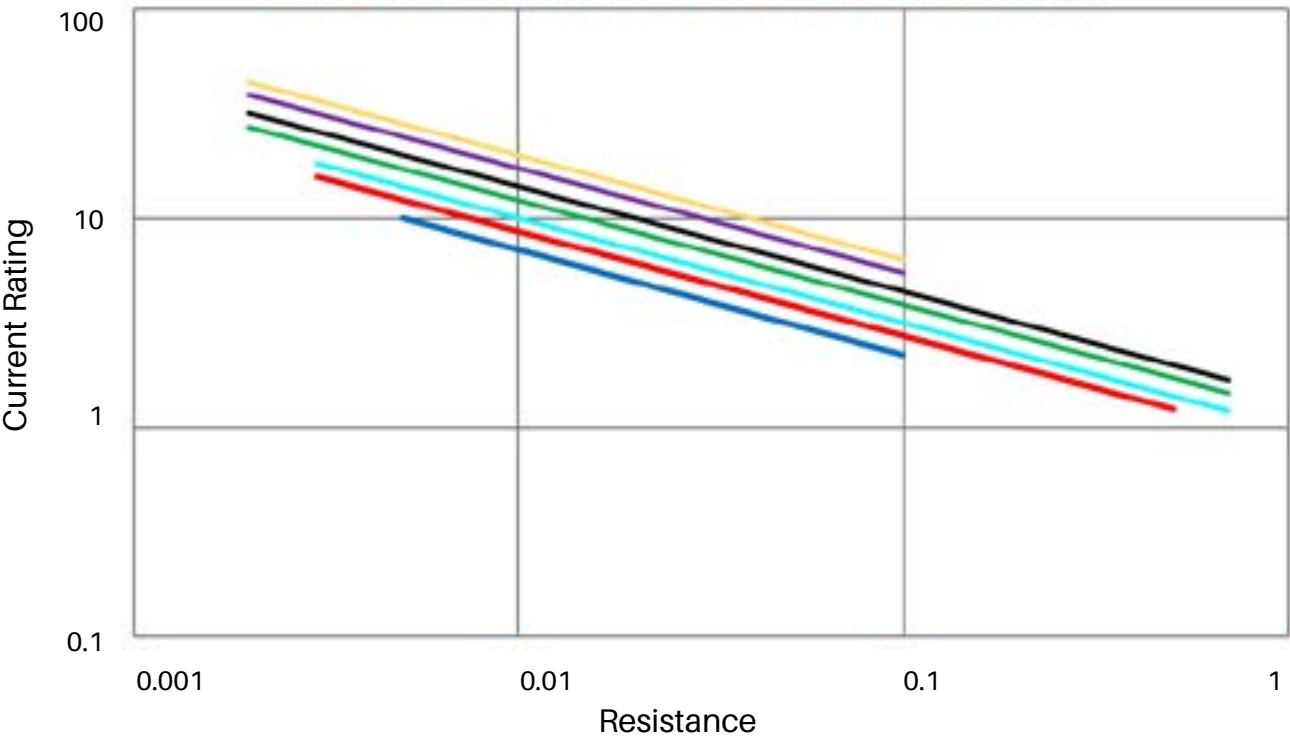
- 0603, 0805, 1206, 2010, 2512, 4320, 4527 English case sizes
- Power up to 4W
- Resistance from 2mΩ~700mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |               |        |      |       |      |       |        |        |      |       |      |        |      |        |
|--------------------------|-------|---------------|--------|------|-------|------|-------|--------|--------|------|-------|------|--------|------|--------|
| Case Size **             |       | 0603          |        | 0805 |       | 1206 |       | 2010   |        | 2512 |       | 4320 |        | 4527 |        |
| Power Rating             |       | 1/2W          |        | 3/4W |       | 1W   |       | 1 1/2W |        | 2W   |       | 3W   |        | 4W   |        |
| Resistance Range (mΩ)    | ±0.5% | -             | 10~100 | -    | 4~500 | -    | 4~700 | -      | 10~700 | -    | 4~700 | -    | 10~100 | -    | 10~100 |
|                          | ±1.0% | 5~9           |        | 3    |       | 3    |       | 2~9    |        | 2~3  |       | 2~9  |        | 2~9  |        |
| TCR (±ppm/°C)            |       | 75            | 50     | 75   | 50    | 75   | 50    | 100    | 50     | 75   | 50    | 100  | 50     | 100  | 50     |
| Operating Temp. Range    |       | -55°C~-+155°C |        |      |       |      |       |        |        |      |       |      |        |      |        |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



Construction

- High purity alumina ceramic
- Cu alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

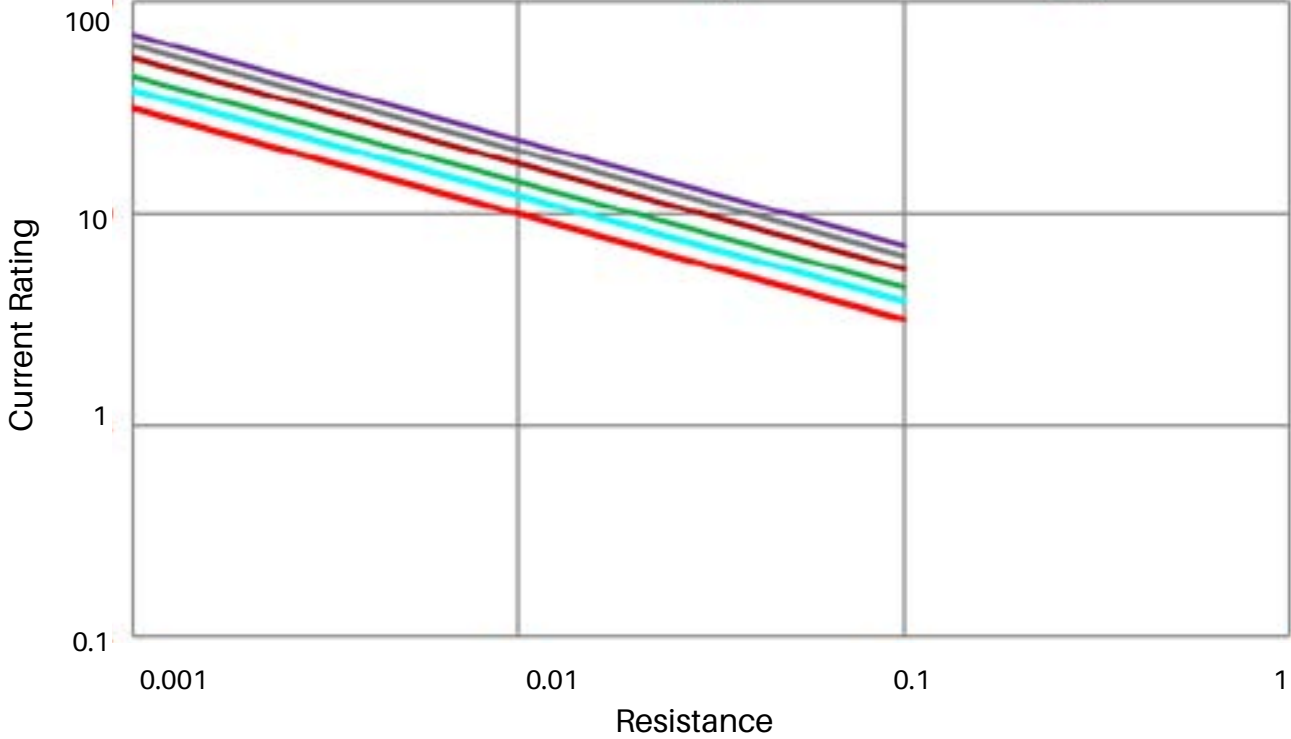
- 0603, 0805, 1206, 2010, 2512, 4320, 4520 English case sizes
- Power up to 2W
- Resistance from 3mΩ~570mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- AEC-Q200 Qualified
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |     |        |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |
|--------------------------|-------|--------------|-----|--------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| Case Size **             |       | 0508         |     | 0612   |     | 0815 |     | 1020 |     | 1225 |     | 0830 |     | 1530 |     | 1836 |     | 2043 |     |
| Power Rating             |       | 1W           |     | 1 1/2W |     | 2W   |     |      |     | 3W   |     |      |     | 4W   |     |      |     | 5W   |     |
| Resistance Range (mΩ)    | ±0.5% | -            | 10~ | -      | 10~ | -    | 10~ | -    | 10~ | -    | 10~ | -    | 10~ | -    | 10~ | -    | 10~ | -    | 10~ |
|                          | ±1.0% | 1~9          | 100 | 1~9    | 100 | 1~9  | 100 | 1~9  | 100 | 1~9  | 100 | 1~9  | 100 | 1~9  | 100 | 1~9  | 100 | 1~9  | 100 |
| TCR (±ppm/°C)            |       | 100          | 50  | 100    | 50  | 100  | 50  | 100  | 50  | 100  | 50  | 100  | 50  | 100  | 50  | 100  | 50  | 100  | 50  |
| Operating Temp. Range    |       | -55°C~+155°C |     |        |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



Construction

- High purity alumina ceramic
- Cu alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

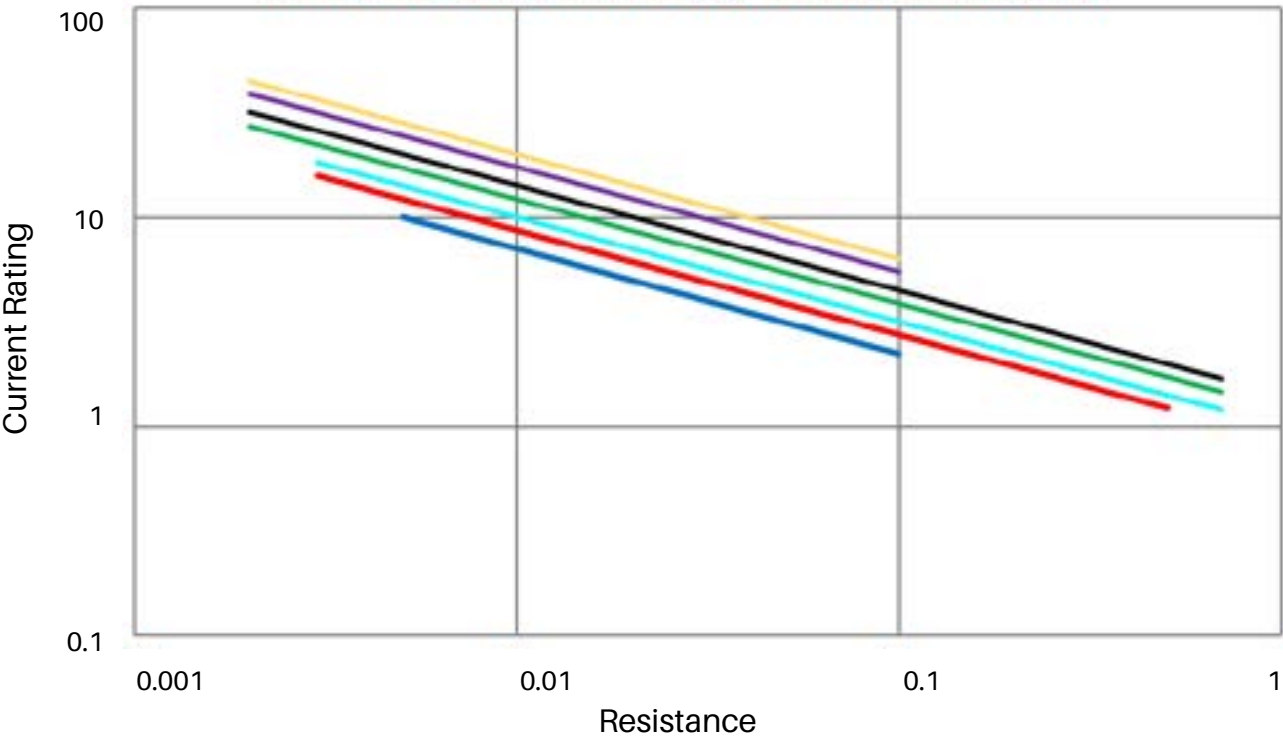
- 0603, 0805, 1206, 2010, 2512, 4320, 4527 English case sizes
- Power up to 4W
- Resistance from 2mΩ~700mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |               |        |      |       |      |       |        |        |      |       |      |        |      |        |
|--------------------------|-------|---------------|--------|------|-------|------|-------|--------|--------|------|-------|------|--------|------|--------|
| Case Size **             |       | 0603          |        | 0805 |       | 1206 |       | 2010   |        | 2512 |       | 4320 |        | 4527 |        |
| Power Rating             |       | 1/2W          |        | 3/4W |       | 1W   |       | 1 1/2W |        | 2W   |       | 3W   |        | 4W   |        |
| Resistance Range (mΩ)    | ±0.5% | -             | 10~100 | -    | 4~500 | -    | 4~700 | -      | 10~700 | -    | 4~700 | -    | 10~100 | -    | 10~100 |
|                          | ±1.0% | 5~9           |        | 3    |       | 3    |       | 2~9    |        | 2~3  |       | 2~9  |        | 2~9  |        |
| TCR (±ppm/°C)            |       | 100           | 50     | 100  | 50    | 100  | 50    | 100    | 50     | 100  | 50    | 100  | 50     | 100  | 50     |
| Operating Temp. Range    |       | -55°C~-+155°C |        |      |       |      |       |        |        |      |       |      |        |      |        |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



Construction

- Metal foil resistive element
- High purity alumina substrate
- Epoxy-resin overcoat
- Sn100 matte terminations over Ni barrier
- Inherently anti-sulfur
- RoHS 3 (EU 2015/863) compliant
- Pb, beryllium, and halogen free

Features

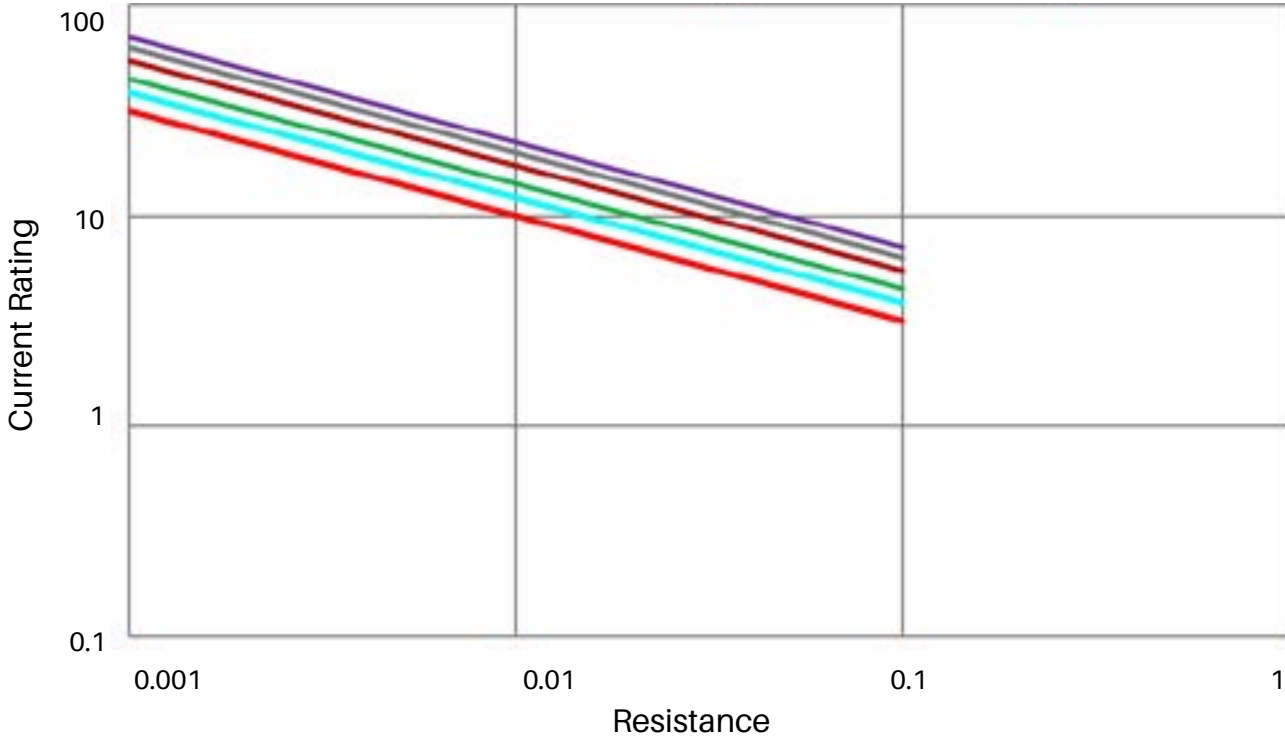
- Resistance from 1mΩ~700mΩ
- Power rating up to 5W
- Tolerance down to ±0.5%
- TCR's down to ±50ppm/°C
- AEC-Q200 qualified



| Electrical Specification |       |              |        |        |        |      |        |      |        |      |        |      |        |      |        |      |        |      |        |
|--------------------------|-------|--------------|--------|--------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| Case Size **             |       | 0508         |        | 0612   |        | 0815 |        | 1020 |        | 1225 |        | 0830 |        | 1530 |        | 1836 |        | 2043 |        |
| Power Rating             |       | 1W           |        | 1 1/2W |        | 2W   |        |      |        | 3W   |        |      |        | 4W   |        |      |        | 5W   |        |
| Resistance Range (mΩ)    | ±0.5% | -            | 10~100 | -      | 10~100 | -    | 10~100 | -    | 10~100 | -    | 10~100 | -    | 10~100 | -    | 10~100 | -    | 10~100 | -    | 10~100 |
|                          | ±1.0% | 1~9          |        | 1~9    |        | 1~9  |        | 1~9  |        | 1~9  |        | 1~9  |        | 1~9  |        | 1~9  |        | 1~9  |        |
| TCR (±ppm/°C)            |       | 100          | 50     | 100    | 50     | 100  | 50     | 100  | 50     | 100  | 50     | 100  | 50     | 100  | 50     | 100  | 50     | 100  | 50     |
| Operating Temp. Range    |       | -55°C~+155°C |        |        |        |      |        |      |        |      |        |      |        |      |        |      |        |      |        |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



MPA

Current Sensing Resistor

Construction

- Complex alloy resistive element
- Epoxy-resin overcoat
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

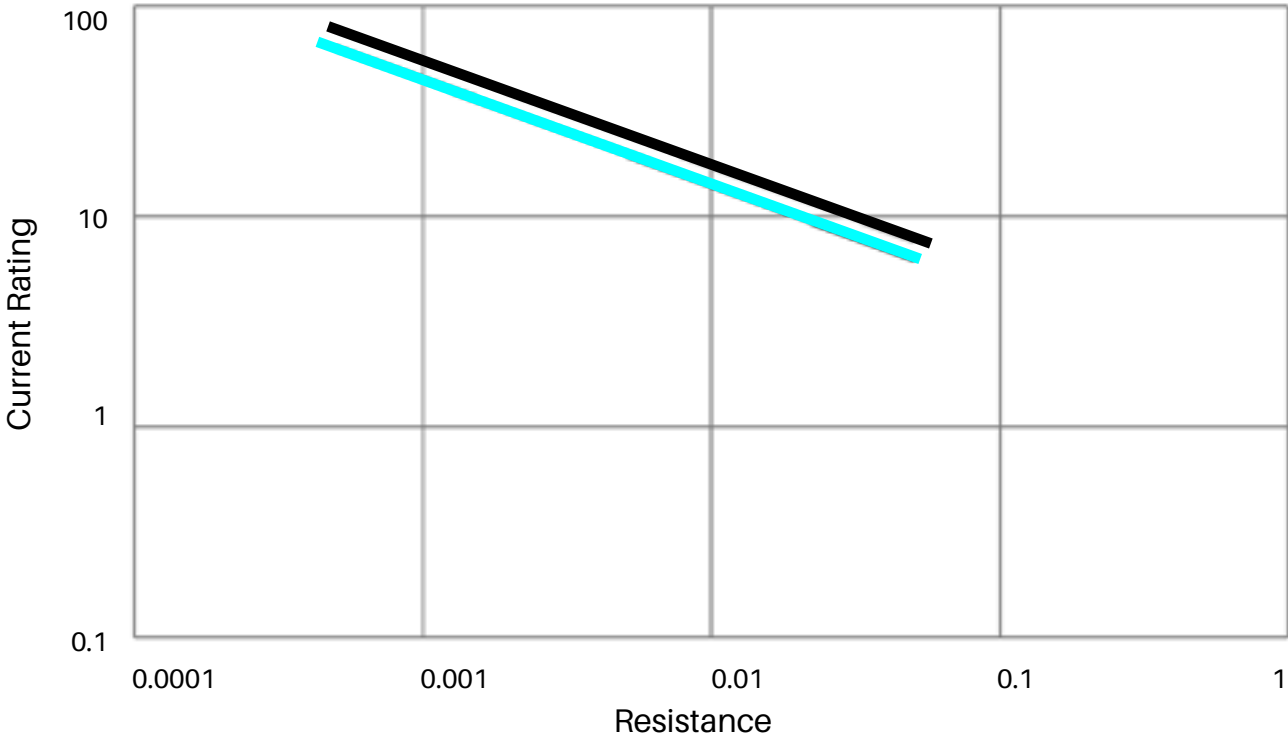
- 1206 & 2512 English case sizes
- Power up to 3W
- Resistance from 0.5mΩ~56mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Moisture Sensitivity Level (MSL) = 1



| Electrical Specification |       |              |     |      |         |            |      |      |     |            |
|--------------------------|-------|--------------|-----|------|---------|------------|------|------|-----|------------|
| Case Size **             |       | 1206         |     | 2512 |         |            | 2512 |      |     |            |
| Power Rating             |       | 1W           |     | 2W   |         |            | 3W   |      |     |            |
| Resistance Range (mΩ)    | ±0.5% | 4~15         | -   | 2~56 | 1, 1.50 | -          | 2~4  | 5~56 | 1   | 0.50, 0.75 |
|                          | ±1.0% |              | 1~3 |      |         | 0.50, 0.75 |      |      |     |            |
| TCR (±ppm/°C)            |       | 75           | 150 | 50   | 100     | 150        | 50   | 100  | 150 |            |
| Operating Temp. Range    |       | -55°C~+170°C |     |      |         |            |      |      |     |            |

\*\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



LPC

Current Sensing Jumper

Construction

- Cu metal foil resistive element
- Epoxy-resin overcoat
- Non-wrapped terminations
- 100% matte tin over Ni terminations
- Halogen Free
- RoHS compliant and Pb free
- Inherently Anti-Sulfur

Features

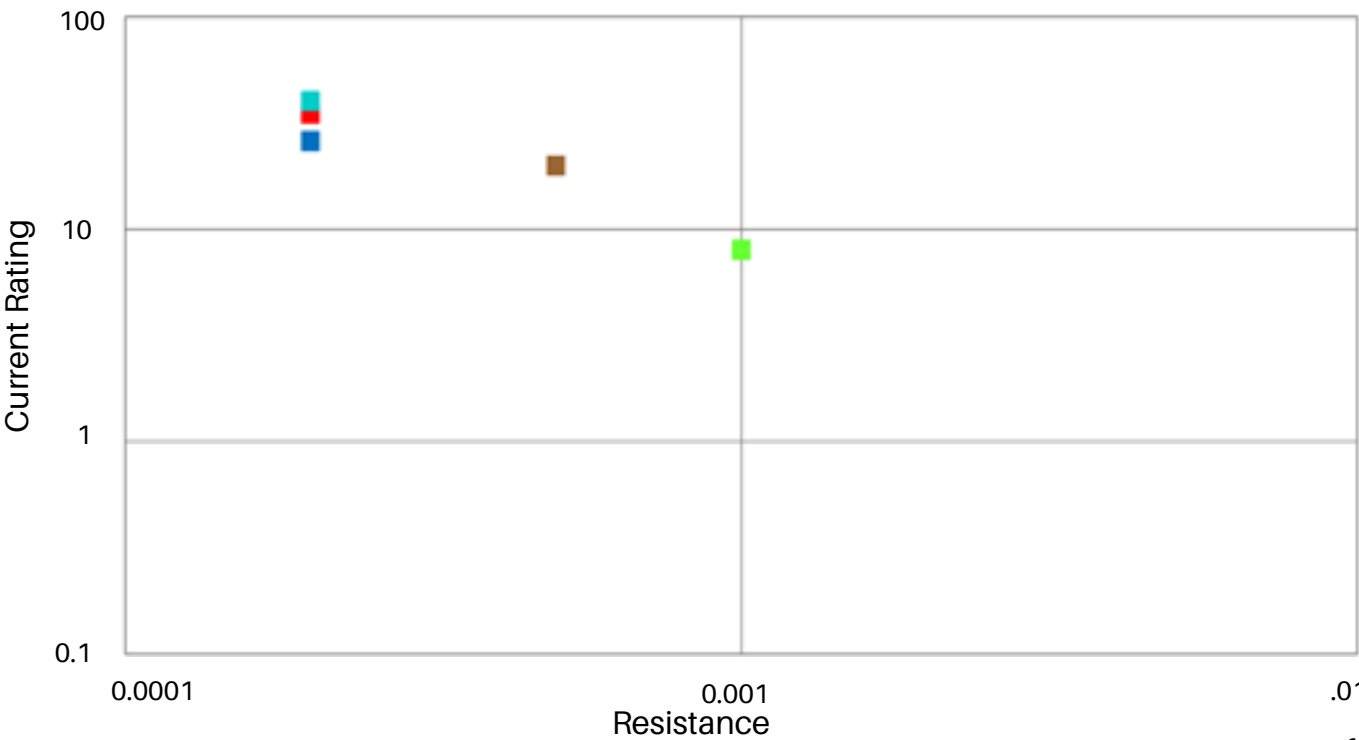
- 0201, 0402, 0603, 0805, 1206 English case size
- Max resistance of up to 1mΩ
- Max current up to 40 Amps
- Low profile (0201: 0.008in max.; 0402: 0.018in max.; 0603: 0.022in max.; 0805-1206: 0.024in max.)
- AEC-Q200 qualified
- Moisture Sensitivity Level (MSL) = 1



| Elecrical Specifications  |                |         |                |         |         |
|---------------------------|----------------|---------|----------------|---------|---------|
| Case Size*                | 0201           | 0402    | 0603           | 0805    | 1206    |
| Max Current               | 8 Amps         | 20 Amps | 26 Amps        | 35 Amps | 40 Amps |
| Resistance Value (mΩ Max) | 1              | 0.5     | 0.2            |         |         |
| Operating Temp. Range     | -55 °C~+155 °C |         | -55 °C~+170 °C |         |         |

\*Case size color reflected in chart

Max Current Rating (A) vs Resistance (Ω)



# QUALITY COMPONENTS WORLDWIDE

Thin Film Technology delivers quality products and services to customers on an ongoing basis. The implementation and maintenance of ISO certified quality management systems helps us to obtain our mission of “total customer satisfaction” with production and operations worldwide.

## INDUSTRY PARTNERS PROVIDING VALUE



### THIN FILM TECHNOLOGY

Component Design & Manufacturing  
Research and Development  
Engineering Services  
Quality Assurance Center  
Sales Center



**JUNEWAY ELECTRONIC  
TECHNOLOGY**  
Mass Production  
Prototyping  
Reliability Testing  
Research and Development  
Qualification Testing



**YOKOHAMA  
ELECTRONIC DEVICES**  
Prototyping  
Production  
Engineering Services  
Research and Development



**WALTER ELECTRONIC**  
Sales Center (Fuses)  
Mass Production (Fuses)  
Prototyping

#### 01 CUSTOMER SATISFACTION

TFT's mission and quality policy focuses on customer satisfaction. TFT works actively to ensure the quality of our components and focus on meeting customer needs including on-time delivery.

#### 02 ENVIRONMENTAL COMPLIANCE

- RoHS Compliance
- REACH Regulation
- Conflict Mineral Policy

#### 03 LOW OHM INDUSTRY LEADER

TFT is an industry leader in the low ohm & CSR market, servicing some of the world's largest companies in current sensing applications, such as battery management and LED circuits.

#### UNITED STATES

TFT Headquarters  
Americas Sales  
Europe Sales  
Design & Engineering  
Quality Center  
Logistics Center

#### CHINA

CSR Components  
HF Components  
Fuses  
Research & Development  
Logistics Center

#### TAIWAN

Asia Sales  
Thin Film Components  
Thick Film Components  
Capacitors  
HF Components  
Logistics Center

#### JAPAN

CSR Components  
HF Components  
Thin Film Components  
Incubation Center  
Prototyping



 [thin-film.com](http://thin-film.com)

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