

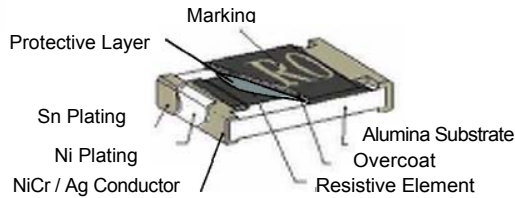
Anti-Sulfurated Thick Film Chip Resistor – AS Series

Features

- Special construction to prevent sulfuration in a sulfur containing environment



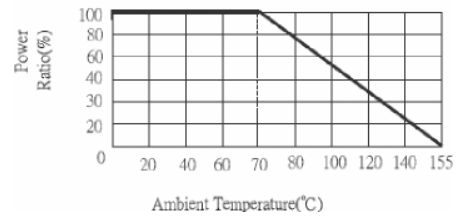
Construction



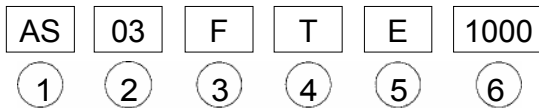
Applications

- Automotive
- High-end Computer
- Industrial Equipment
- Automatic Equipment Controller
- Medical Equipment
- High-end Multimedia Electronics
- Outdoor Electronic Applications

Derating Curve



Part Numbering



~ Product Type

| Product Type | Description |
|--------------|--|
| AS | Anti-Sulfurated Thick Film Chip Resistor |

©Dimensions (LxW)

| Codes | Dimensions (LxW) | EIA |
|-------|------------------|------|
| AS02 | 1.00×0.50mm | 0402 |
| AS03 | 1.60×0.80mm | 0603 |
| AS05 | 2.00×1.25mm | 0805 |
| AS06 | 3.10×1.55mm | 1206 |
| AS10 | 3.20×2.60mm | 1210 |
| AS0A | 5.00×2.50mm | 2010 |
| AS12 | 6.35×3.20mm | 2512 |

©Resistance Tolerance

| Codes | Resistance Tolerance |
|-------|----------------------|
| D | ±0.5% |
| F | ±1% |
| J | ±5% |

©Packaging

| Codes | Type |
|-------|-------------|
| T | Taping Reel |
| B | Bulk |

~TCR

| Codes | Type |
|-------|-------------|
| F | ±100 PPM/°C |
| E | ±200 PPM/°C |

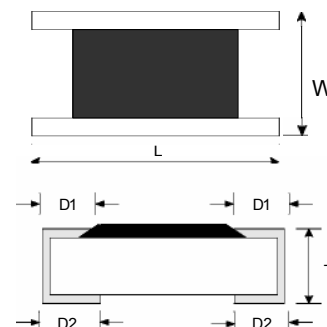
©Resistance

| Codes | Type |
|-------|----------|
| 1000 | 100fl |
| 2201 | 2200fl |
| 1002 | 10000fl |
| 4992 | 49900fl |
| 1003 | 100000fl |

Dimensions

Unit: mm

| Codes | L | W | T | D1 | D2 |
|-------|-----------|-----------|-----------|-----------|-----------|
| AS02 | 1.00±0.05 | 0.50±0.05 | 0.35±0.05 | 0.20±0.10 | 0.20±0.10 |
| AS03 | 1.60±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 |
| AS05 | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 |
| AS06 | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 |
| AS10 | 3.20±0.20 | 2.60±0.15 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 |
| AS0A | 5.00±0.20 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 |
| AS12 | 6.35±0.20 | 3.20±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 |



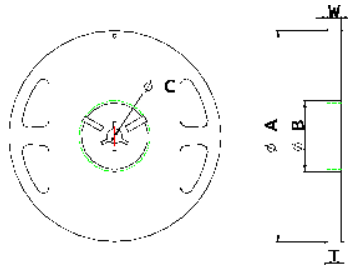
Standard Electrical Specifications

| Item Type | Power Rating at 70 °C | Operating Temp. Range | Max Operating Voltage | Max Overloading Voltage | Resistance Tolerance | Resistance Range | TCR (PPM/°C) |
|--------------|-----------------------|-----------------------|-----------------------|-------------------------|----------------------|---|----------------------|
| AS02 (0402) | 1/16W | -55 ~ +155 °C | 50V | 100V | ±0.5% ±1% ±5% | 1 fl~9.76fl 10fl~1Mfl 1.02Mfl~10Mfl | ±200 ±100 ±200 |
| AS03 (0603) | 1/10W | -55 ~ +155 °C | 50V | 100V | | | |
| AS05 (0805) | 1/8W | -55 ~ +155 °C | 150V | 300V | | | |
| AS06 (1206) | 1/4W | -55 ~ +155 °C | 200V | 400V | | | |
| AS10 (1210) | 1/3W | -55 ~ +155 °C | 200V | 400V | | | |
| AS0A (201 0) | 3/4W | -55 ~ +155 °C | 200V | 400V | | | |
| AS12 (2512) | 1W | -55 ~ +155 °C | 250V | 500V | | | |

Operating Voltage $V=\sqrt{(P \cdot R)}$ or Maximum Operating Voltage listed above, whichever is smaller.
 Overload Voltage $V=2.5 \cdot \sqrt{(P \cdot R)}$ or Maximum Overloading Voltage listed above, whichever is smaller.

Packaging

Packaging Quantity & Reel Specifications

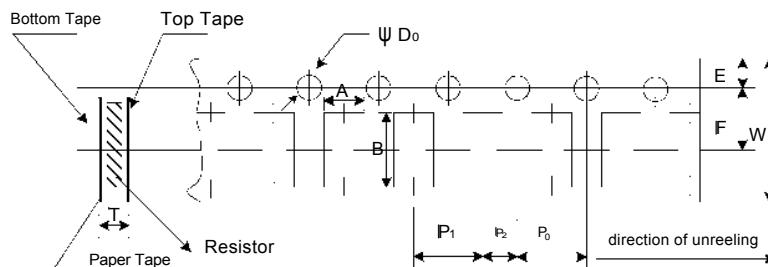


Unit: mm

| Codes | ØA | ØB | ØC | W | T | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|-------|----------|---------|----------|----------|----------|-----------------|--------------------------|
| AS02 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 | 10,000 | — |
| AS03 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 | 5,000 | — |
| AS05 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 | 5,000 | — |
| AS06 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 | 5,000 | — |
| AS10 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 | 5,000 | — |
| AS0A | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 13.0±0.5 | 15.5±0.5 | — | 4000 |
| AS12 | 180+0/-3 | 60+1/-0 | 13.0±0.2 | 13.0±0.5 | 15.5±0.5 | — | 4000 |

Packaging

Paper Tape Specifications

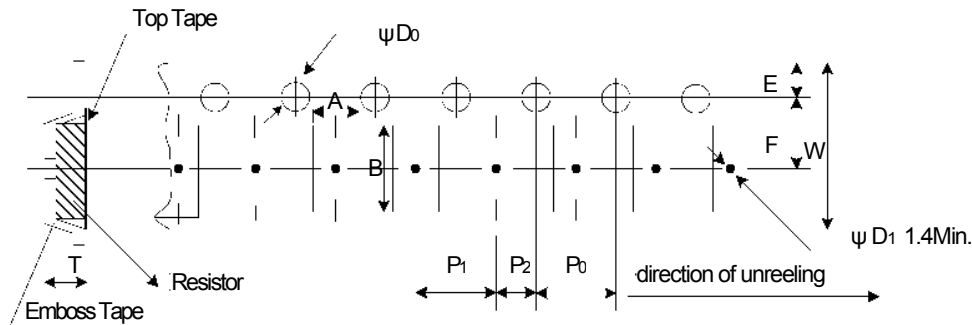


Unit: mm

| Codes | A | B | W | F | E | P1 | P2 | P0 | ØD0 | T |
|-------|-----------|----------|---------|-----------|----------|-----------|-----------|-----------|-------------|----------|
| AS02 | 0.65±0.10 | 1.15±0.1 | 8.0±0.2 | 3.50±0.05 | 1.75±0.1 | 2.00±0.05 | 2.00±0.05 | 4.00±0.10 | 1.50+0.1,-0 | 0.45±0.1 |
| AS03 | 1.10±0.10 | 1.90±0.1 | 8.0±0.2 | 3.50±0.05 | 1.75±0.1 | 4.00±0.05 | 2.00±0.05 | 4.00±0.10 | 1.50+0.1,-0 | 0.70±0.1 |
| AS05 | 1.60±0.10 | 2.40±0.2 | 8.0±0.2 | 3.50±0.05 | 1.75±0.1 | 4.00±0.05 | 2.00±0.05 | 4.00±0.10 | 1.50+0.1,-0 | 0.85±0.1 |
| AS06 | 1.90±0.10 | 3.50±0.2 | 8.0±0.2 | 3.50±0.05 | 1.75±0.1 | 4.00±0.05 | 2.00±0.05 | 4.00±0.10 | 1.50+0.1,-0 | 0.85±0.1 |
| AS10 | 2.80±0.10 | 3.50±0.2 | 8.0±0.2 | 3.50±0.05 | 1.75±0.1 | 4.00±0.05 | 2.00±0.05 | 4.00±0.10 | 1.50+0.1,-0 | 0.85±0.1 |

Packaging

Emboss Plastic Tape Specifications



Unit: mm

| Codes | A | B | W | F | E | P1 | P2 | P0 | ØD0 | T |
|-------|----------|----------|----------|----------|----------|----------|-----------|-----------|---------------|-------------------|
| AS0A | 2.8±0.20 | 5.5±0.20 | 12.0±0.3 | 5.5±0.05 | 1.75±0.1 | 4.00±0.1 | 2.00±0.05 | 4.00±0.10 | 1.50+0.25, -0 | 1.2 ⁺⁰ |
| AS12 | 3.5±0.20 | 6.7±0.20 | 12.0±0.3 | 5.5±0.05 | 1.75±0.1 | 4.00±0.1 | 2.00±0.05 | 4.00±0.10 | 1.50+0.25, -0 | 1.2 ⁺⁰ |

Environmental Characteristics

| Test Item | Specification | | Test Method |
|--|---|---------------|---|
| | .1% and Below | .5% | |
| Temperature Coefficient of Resistance (T.C.R.) | Within the specification | | JIS C 5201 4.8 IEC 60115-1 4.8 -55C~+1 55C, 20.C is the reference temperature |
| Short Time Overload | ±(1.0%+0.05%) | ±(2.0%+0.05%) | JIS C 5201 4.13 IEC 60115-1 4.13 2.5 times RCWV or Max. overload voltage for 5 seconds |
| Insulation Resistance | ≥10G | | JIS C 5201 4.6 IEC 60115-1 4.6 Max. overload voltage for 1 minute |
| Voltage Proof | No breakdown or flashover | | JIS C 5201 4.7 IEC 60115-1 4.7 1.42 times RCWV (RMS) for 1 minute |
| Substrate Bending Test | ±(1.0%+0.05%) | ±(1.0%+0.05%) | JIS C 5201 4.33 IEC 60115-1 4.33 Bending once for 5 seconds. 2010,2512 size: 2mm. Other size: 3mm |
| Resistance to soldering heat | ±(0.5%+0.05%) | ±(1.0%+0.05%) | JIS C 5201 4.18 IEC 60115 4.18 260.5C for 10 seconds |
| Leaching | Individual leaching area ≤5% Total leaching area | | JIS C 5201 4.18 IEC 60068-2-58 8.2.1 260.5C for 30 seconds |
| Solderability | >95% coverage | | JIS C 5201 4.17 IEC 60115-1 4.17 245.5C for 3 seconds |
| Endurance at upper category temperature | ±(1.0%+0.05%) | ±(1.5%+0.10%) | JIS C 5201 4.23 IEC 60115-1 2.23.2 at +155C for 1000 hrs |
| Rapid change of temperature | ±(0.5%+0.05%) | ±(1.0%+0.05%) | JIS C 5201 4.19 IEC 60115-1 4.19 -55C to +155C, 5 cycles |
| Damp heat with load | ±(2.0%+0.10%) | ±(3.0%+0.10%) | JIS 5201 4.24 40.2C, 90~95% R.H. or Max. working voltage for 1000 hrs with 1.5hrs "ON" and 0.5 hr "OFF" |
| Endurance | ±(2.0%+0.10%) | ±(3.0%+0.10%) | JIS C 5201 4.25 IEC 60115-1 4.25.1 70.2C, or Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" |
| Sulfur Test | △R.0.5% | | ASTM-B-809 3~5ppm H2S, 50.2C, 91~93% R.H., no power rating for 1000 hrs |

* Storage Temperature: 25±3°C; Humidity < 80%RH