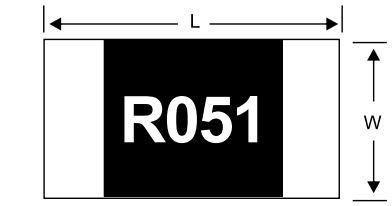
Automotive Grade Anti-Sulfurated Chip Resistor
(AS-A Series)

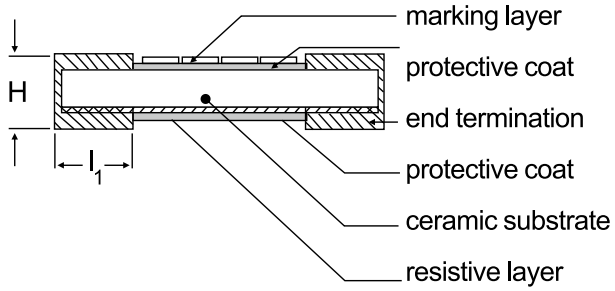
Features

—Special construction to prevent sulfuration in a sulfur containing environment

—AEC-Q200 Compliance

Construction





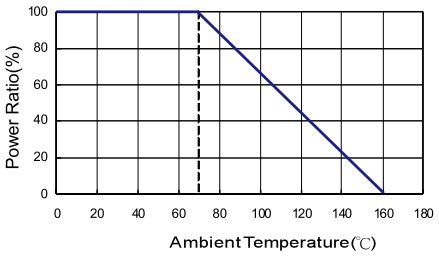
Applications

- Automotive
- High-end Computer
- Industrial Equipment
- Automatic Equipmem Controller
- Medical Equipment
- High-end Multimedia Elactronics
- Outdoor Electronic Applic,ations

Scope

—This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

Derating Curve



Dimensions

Type	L (mm)	W (mm)	H (mm)	l_1 (mm)
AS02	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10
AS03	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.15
AS05	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20
AS06	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.20
AS10	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.15
AS0A	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.15
AS12	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20

Part Numbering

AS	03	F	T	E	1002	A
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/℃)	Resistance	Making
	02:0402 03:0603 05:0805 06:1206 10:1210 0A:2010 12:2512	D:±0.5% F:±1% J:±5%	B:Bulk T: Taping Reel	E:±100 F:±200	1000:100Ω 1002:10KΩ 2201:2.2KΩ 1003:100KΩ	: Standard A:Auto Grade

Standard Electrical Specifications

Item / Type	Power Rating at 70℃ Jumper Rated Current	Operating Temp.Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/℃)
					±0.5%	±1%	±5%	
AS02(0402)	1/16W	−55~+155℃	50V	100V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:1A				0Ω (<50mΩ)			-
AS03(0603)	1/10W		50V	100V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:1A				0Ω (<50mΩ)			-
AS05(0805)	1/8W		150V	300V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:2A				0Ω (<50mΩ)			-
AS06(1206)	1/4W		200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:2A				0Ω (<50mΩ)			-
AS10(1210)	1/3W		200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:2.5A				0Ω (<50mΩ)			-
AS0A(2010)	3/4W		200V	400V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:3.5A				0Ω (<50mΩ)			-
AS12(2512)	1W		250V	500V	1Ω - 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper:4A				0Ω (<50mΩ)			-

Operating Voltage=$\sqrt{}$(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*$\sqrt{}$(P*R) or Max. overload voltage listed above, whichever is lower.
■Thunder is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

Item	Requirement			Test Method
	1% and Below	5%	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.			**JIS C 5201-1.4.8** **IEC 60115-1 4.8** -55℃~+125℃, 25℃ is the reference temperature
Short Time Overload	± (1.0%+0.05Ω)	± (2.0%+0.05Ω)	<50mΩ	**JIS C 5201-1.4.13** **IEC 60115-1 4.13** 2.5 times RCWV or Max.Overload voltage whichever is lower for 5 seconds
Insulation Resistance	⩾10G			**JIS C 5201-1.4.6** **IEC 60115-1 4.6** Max.Overload voltage for 1 minute
Endurance	± (2.0%+0.10Ω)	± (3.0%+0.10Ω)	<100mΩ	**JIS C 5201-1.4.25** **IEC 60115-1 4.25.1** 70 ± 2℃ RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Biased Humidity	± (2.0%+0.10Ω)	± (3.0%+0.10Ω)	<100mΩ	**MIL-STD-202 Method 103** 1000 hrs 85℃/85%RH 10% of operating power.
High Temperature Exposure	± (1.0%+0.05Ω)	± (1.0%+0.10Ω)	<50mΩ	**MIL-STD-202 Method 108** at+155℃ for 1000 hrs
Bending Strength	± (1.0%+0.05Ω)	± (1.0%+0.05Ω)	<50mΩ	**JIS C 5201-1.4.33** **IEC 60115-1 4.33** Bending once for 5 seconds 2010,2512 sizes: 2 mm Other sizes:3mm
Solderability	>95% coverage			**JIS C 5201-1.4.17** **IEC 60115-1 4.17** 245 ± 5℃ for 3 seconds
Resistance to Soldering Heat	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	<50mΩ	**JIS C 5201-1.4.18** **IEC 60115-1 4.18** 260 ± 5℃ for 10 seconds
Voltage Proof	No breakdown or flashover			**JIS C 5201-1.4.7** **IEC 60115-1 4.7** 1.42 times Max.Operating Voltage for 1 minute
Leaching	Individual leaching area ⩽5% Total leaching area ⩽10%			**JIS C 5201-1.4.18** **IEC 60068-2 58 8.21** 260 ± 5℃ for 30 seconds
Temperature Cycling	± (0.5%+0.05Ω)	± (1.5%+0.05Ω)	<50mΩ	**JESD22 Method JA-104** -55℃ to + 125℃ ,1000 cycles
Mechanical Shock	± (0.25%+0.05Ω)	± (1.0%+0.05Ω)	<50mΩ	**MIL-STD-202 Method 213** Wave Form:Tolerance for half sine shock pulse. Peak value is 100g's Normal duration(D)is 6.
Vibration	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	<50mΩ	**MIL-STD-202 Method 204** 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	± (1%+0.05Ω)			**AEC-Q200-002** Human body,2KV
Resistance to solvents	Marking Unsmeared			**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent.Do not use banned solvents.
Terminal strength	No broken			**AEC-Q200-006** Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board			**UL-94** V-0 or V-1 are acceptable Electrical test not required.
Sulfur Test	△R ± 0.5%		<50mΩ	**ASTM-B-809-95** 3~5ppm H2S,50 ± 2℃, 91~93% R.H.,no power rating for 1000 hrs

RCWV(Rated continuous working voltage)=$\sqrt{}$(P*R)or Max. Operating Voltage whichever is lower.

■Storage Temperature:25 ± 3℃; Humidity<80%RH

■Reference Standards:IEC 60115-1,60068-2-58;JIS-C 5201-1;ASTM-B-809;AEC-Q200;MIL-STD-202;JESD22;UL-94