

Thin Film Precision Chip Resistors

Standard & Automotive AEC-Q200 · Nickel Tin, Gold and SnPb terminations · COTS+ options



DESCRIPTION

SRT thin film chip resistors combine tight tolerance, very low temperature coefficient and long-term stability on an alumina substrate. They are available in standard and automotive AEC-Q200 grades, with three termination finishes and optional COTS+ screening for space and high reliability applications.



RoHS compliant with X (NiSn) and G (gold) terminations ; SnPb termination (I) exempted for high reliability applications.

APPLICATIONS

- Medical, testing and measurement equipment
- Industrial equipment, automatic controllers, converters
- Telecommunication devices, sensors
- Automotive (AEC-Q200 grade)

FEATURES

- Advanced thin film technology
- Very tight tolerance down to $\pm 0.01\%$ ($\pm 0.02\%$ automotive grade)
- Extremely low TCR down to ± 1 ppm/ $^{\circ}\text{C}$ (± 5 ppm/ $^{\circ}\text{C}$ automotive grade)
- Resistance range $1\ \Omega$ to $3\ \text{M}\Omega$ standard ; $10\ \Omega$ to $5.1\ \text{M}\Omega$ automotive, E24 / E96 and non-standard values
- Advanced sulfur resistance verified according to ASTM B809
- Nickel barrier, Sn plated termination suitable for reflow and wave soldering (RoHS compliant)
- Gold plated termination (Ni barrier, min $0.2\ \mu\text{m Au}$) suitable for conductive epoxy bonding and wire bonding
- Electrolytic SnPb termination (min 10 % Pb) — whisker free, high reliability (space, medical)
- Automotive grade (option M) qualified according to AEC-Q200
- COTS+ options : class 1, 2 or 3 screening according to ECSS-Q-ST-60-13C

ELECTRICAL PARAMETERS

RESISTANCE RANGE :

Standard $1\ \Omega$ to $3\ \text{M}\Omega$ · automotive $10\ \Omega$ to $5.1\ \text{M}\Omega$ (by size, tolerance and TCR : see Electrical specifications)

RESISTANCE TOLERANCE :

Standard $\pm 0.01\%$, $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$ · automotive $\pm 0.02\%$, $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.5\%$

TEMPERATURE COEFFICIENT (TCR) :

Standard ± 1 to ± 50 ppm/ $^{\circ}\text{C}$ · automotive ± 5 to ± 100 ppm/ $^{\circ}\text{C}$ (+25 / +125 $^{\circ}\text{C}$ reference)

RATED POWER AT +70 $^{\circ}\text{C}$:

$1/32\ \text{W}$ to $1\ \text{W}$ by size — standard, high power and ultra high power ratings, see table

RATED CONTINUOUS WORKING VOLTAGE :

$\sqrt{P \times R}$ or maximum operating voltage of the table, whichever is lower

MAX OVERLOAD VOLTAGE :

$2.5 \times \sqrt{P \times R}$ or maximum overload voltage of the table, whichever is lower (5 s)

OPERATING TEMPERATURE :

$-55\ ^{\circ}\text{C}$, $+155\ ^{\circ}\text{C}$ — power derating from $+70\ ^{\circ}\text{C}$ (+85 $^{\circ}\text{C}$ automotive standard / high power) to zero at $+155\ ^{\circ}\text{C}$

INSULATION RESISTANCE :

$> 1000\ \text{M}\Omega$ (100 Vdc, 1 min)

SULFUR RESISTANCE :

Advanced anti-sulfur design, verified according to ASTM B809

PRODUCT RANGE

	STANDARD GRADE	AUTOMOTIVE GRADE AEC-Q200 (OPTION M)
Sizes (EIA)	0201 → 2512 (0201, 0402, 0603, 0805, 1206, 1210, 2010, 2512)	0402 → 1206 (0402, 0603, 0805, 1206)
Resistance range	$1\ \Omega$ to $3\ \text{M}\Omega$	$10\ \Omega$ to $5.1\ \text{M}\Omega$
Tolerance	$\pm 0.01\%$, $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$	$\pm 0.02\%$, $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.5\%$
TCR	± 1 , ± 2 , ± 3 , ± 5 , ± 10 , ± 15 , ± 25 , ± 50 ppm/ $^{\circ}\text{C}$	± 5 , ± 10 , ± 25 , ± 50 , ± 100 ppm/ $^{\circ}\text{C}$
Rated power	$1/32\ \text{W}$ to $1\ \text{W}$ at $+70\ ^{\circ}\text{C}$	$1/32\ \text{W}$ to $1/4\ \text{W}$ at $+70\ ^{\circ}\text{C}$ / $+85\ ^{\circ}\text{C}$
Terminations	X NiSn · G gold · I SnPb	X NiSn · G gold · I SnPb
Qualification	Tested according to JIS-C-5201 / MIL-STD-202	AEC-Q200
High reliability options	COTS+ class 1, 2, 3	COTS+ class 1, 2, 3

HOW TO ORDER

A	X	M	03	B	T	S	Y	1002	-	COTS1
SERIES	TERMINATION	GRADE	SIZE	TOLERANCE	PACKAGING	TCR	POWER	RESISTANCE	MARKING	SPECIAL
A Thin film chip resistor	X Nickel Tin	- Standard	01 0201	T ±0.01 %	T Tape & reel	5 ±1 ppm/°C	Z 1/32 W	1002 = 10 kΩ (3 digits + multiplier)	- Standard marking	- Standard
	G Gold plated	M Automotive	02 0402	Q ±0.02 %	7"	S ±10 ppm/°C	N 1/20 W		N Unmarked	COTS1 COTS+
	I SnPb plated	AEC-Q200	03 0603	A ±0.05 %	B Bulk	X ±2 ppm/°C	Y 1/16 W			Class 1
			05 0805	B ±0.1 %		S ±5 ppm/°C	X 1/10 W	4R70 = 4.7 Ω (R = decimal point)		COTS2 COTS+
			06 1206	C ±0.25 %		O ±3 ppm/°C	W 1/8 W	0000 = 0 Ω jumper		Class 2
			13 1210	D ±0.5 %		S ±15 ppm/°C	M 1/6 W			COTS3 COTS+
			10 2010	F ±1 %		S ±5 ppm/°C	P 1/5 W			Class 3
			12 2512			B ±10 ppm/°C	V 1/4 W			
						N ±15 ppm/°C	O 1/3 W			
						S ±25 ppm/°C	U 1/2 W			
						C ±50 ppm/°C	Q 3/4 W			
						D ±100 ppm/°C	T 1 W			
						E ±100 ppm/°C				

S standard grade only A automotive grade (M) only - Example : AXM03BTSY1002COTS1 — automotive 0603, ±0.1 %, tape & reel, ±5 ppm/°C, 1/16 W, 10 kΩ, COTS+ class 1. The M, power, N and special codes are omitted when not applicable.

DIMENSIONS IN MILLIMETERS

SIZE	CODE	L	W	T	D1
0201	01	0.58 ± 0.05	0.29 ± 0.05	0.23 ± 0.05	0.12 ± 0.05
0402	02	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10
0603	03	1.55 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20
0805	05	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.30 ± 0.20
1206	06	3.05 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.42 ± 0.20
1210	13	3.10 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.40 ± 0.20
2010	10	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30
2010 (1/2W)	10	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30
2512	12	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30
2512 (1W)	12	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30

1. Ceramic substrate 2. Bottom electrode 3. Top electrode 4. Edge electrode 5. Barrier layer 6. External electrode 7. Resistor layer 8. Overcoat 9. Marking

ELECTRICAL SPECIFICATIONS

Resistance ranges by size, power rating, tolerance and TCR. Operating voltage = √(P × R) or maximum operating voltage, whichever is lower ; overload voltage = 2.5 × √(P × R) or maximum overload voltage, whichever is lower. Operating temperature -55 °C, +155 °C.

Standard grade										
SIZE	POWER RATING	MAX. OP. V	MAX. OVERLOAD V	±0.01 %	±0.05 %	±0.1 %	±0.25 %	±0.5 %	±1 %	TCR PPM/°C
0201	1/32 W standard	15 V	30 V	—	—	—	22Ω–75kΩ	—	—	±25, ±50
0201	1/20 W high power	25 V	50 V	—	—	—	22Ω–75kΩ	—	—	±25, ±50
0402	1/16 W standard	50 V	100 V	49.9Ω–4.99kΩ		—	—	—	—	±1, ±2, ±3
				—		49.9Ω–20kΩ		—	—	±5
				49.9Ω–20kΩ		49.9Ω–100kΩ		—	—	±10, ±15
				—		49.9Ω–12kΩ		4Ω–511kΩ		±25, ±50
0402	1/10 W high power	50 V	100 V	49.9Ω–4.99kΩ		—	—	—	—	±1, ±2, ±3
				—		49.9Ω–20kΩ		—	—	±5
				49.9Ω–12kΩ		49.9Ω–100kΩ		—	—	±10, ±15
				—		49.9Ω–12kΩ		4.7Ω–255kΩ		±25, ±50
0603	1/16 W standard	50 V	100 V	24.9Ω–15kΩ		—	—	—	—	±1, ±2, ±3
				—		24.9Ω–60kΩ		—	—	±5
				24.9Ω–100kΩ		4.7Ω–332kΩ		4.7Ω–511kΩ		±10, ±15
				—		4.7Ω–332kΩ		1Ω–1MΩ		±25, ±50
0603	1/10 W high power	75 V	150 V	24.9Ω–15kΩ		—	—	—	—	±1, ±2, ±3
				—		24.9Ω–60kΩ		—	—	±5
				24.9Ω–100kΩ		4.7Ω–332kΩ		4.7Ω–511kΩ		±10, ±15
				24.9Ω–100kΩ		4.7Ω–332kΩ		1Ω–1MΩ		±25, ±50

Standard grade

SIZE	POWER RATING	MAX. OP. V	MAX. OVERLOAD V	±0.01 %	±0.05 %	±0.1 %	±0.25 %	±0.5 %	±1 %	TCR PPM/°C
0603	1/6 W high power	100 V	150 V	—			10Ω–332kΩ			±25, ±50
				24.9Ω–30kΩ		—	—	—	—	±1, ±2, ±3
0805	1/10 W standard	100 V	200 V				24.9Ω–150kΩ			±5
				24.9Ω–200kΩ			4.7Ω–1MΩ			±10, ±15
				—	4.7Ω–1MΩ		1Ω–2MΩ			±25, ±50
				24.9Ω–30kΩ		—	—	—	—	±1, ±2, ±3
0805	1/8 W high power	150 V	300 V				24.9Ω–150kΩ			±5
				24.9Ω–200kΩ	4.7Ω–511kΩ		4.7Ω–1MΩ			±10, ±15
				24.9Ω–200kΩ	4.7Ω–511kΩ		1Ω–1MΩ			±25, ±50
				—			10Ω–499kΩ			±25, ±50
1206	1/8 W standard	150 V	300 V	24.9Ω–49.9kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1.5MΩ			±10, ±15
				—	4.7Ω–1MΩ		1Ω–2.5MΩ			±25, ±50
1206	1/4 W high power	200 V	400 V	24.9Ω–49.9kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				24.9Ω–499kΩ			1Ω–1MΩ			±25, ±50
1206	1/3 W high power	200 V	400 V	—			10Ω–1MΩ			±25, ±50
1210	1/4 W standard	150 V	300 V	24.9Ω–49.9kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				—	4.7Ω–1MΩ		1Ω–2.5MΩ			±25, ±50
1210	1/3 W high power	200 V	400 V	24.9Ω–49.9kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				24.9Ω–499kΩ			1Ω–1MΩ			±25, ±50
2010	1/4 W standard	150 V	300 V	24.9Ω–100kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				—	4.7Ω–1MΩ		1Ω–3MΩ			±25, ±50
2010	1/3 W high power	200 V	400 V	24.9Ω–49.9kΩ		—	—	—	—	±1, ±2, ±3
							24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				24.9Ω–499kΩ			1Ω–1MΩ			±25, ±50
2010	1/2 W high power (1/2 W version)	200 V	400 V	24.9Ω–2kΩ	4.7Ω–1MΩ			1Ω–1MΩ		±10, ±15, ±25, ±50
				24.9Ω–100kΩ		—	—	—	—	±1, ±2, ±3
2512	1/2 W standard	150 V	300 V				24.9Ω–300kΩ			±5
				24.9Ω–499kΩ			4.7Ω–1MΩ			±10, ±15
				—	4.7Ω–1MΩ		1Ω–3MΩ			±25, ±50
2512	3/4 W high power	200 V	400 V	24.9Ω–2kΩ	4.7Ω–2kΩ			1Ω–2kΩ		±10, ±15, ±25, ±50
2512	1 W high power (1 W version)	200 V	400 V	24.9Ω–2kΩ	4.7Ω–1MΩ			1Ω–1MΩ		±10, ±15, ±25, ±50

Lower resistance values (1 Ω to 10 Ω) available on request.

Automotive grade AEC-Q200

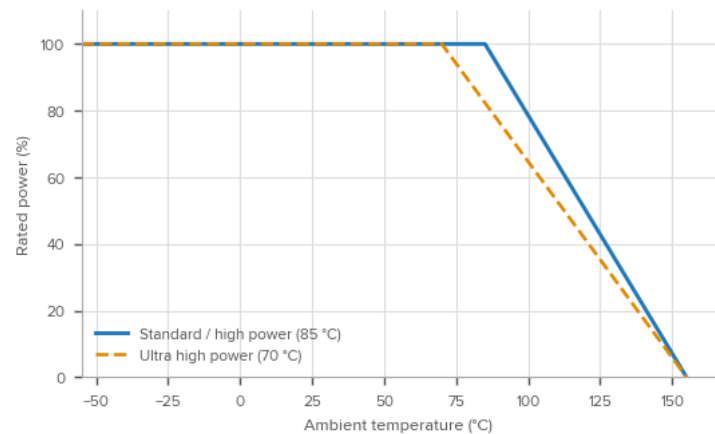
SIZE	POWER RATING	MAX. OP. V	MAX. OVERLOAD V	±0.02 %	±0.05 %	±0.1 %	±0.5 %	TCR PPM/°C
0402	1/32 W · 1/16 W · 1/8 W standard · high · ultra high	75 V	100 V			100Ω–3kΩ		±5
				100Ω–3kΩ		47Ω–100kΩ		±10
				100Ω–3kΩ		47Ω–100kΩ	47Ω–150kΩ	±25
				—	—	—	10Ω–47Ω	±100
0603	1/16 W · 1/10 W · 1/6 W standard · high · ultra high	100 V	200 V			100Ω–5.1kΩ		±5
				100Ω–5.1kΩ		47Ω–270kΩ		±10
				100Ω–5.1kΩ	47Ω–270kΩ	47Ω–332kΩ	47Ω–1MΩ	±25

Automotive grade AEC-Q200

SIZE	POWER RATING	MAX. OP. V	MAX. OVERLOAD V	±0.02 %	±0.05 %	±0.1 %	±0.5 %	TCR PPM/°C
0805	1/10 W - 1/8 W - 1/4 W standard - high - ultra high	150 V	300 V	—	—	—	10Ω–47Ω	±50
				100Ω–10.2kΩ				±5
				100Ω–10.2kΩ	47Ω–475kΩ			±10
				100Ω–10.2kΩ	47Ω–475kΩ	47Ω–2.7MΩ		±25
				—	—	—	10Ω–47Ω	±50
1206	1/8 W - 1/4 W standard - high	200 V	400 V	100Ω–33.2kΩ				±5
				100Ω–33.2kΩ	47Ω–1MΩ			±10
				100Ω–33.2kΩ	47Ω–1MΩ	47Ω–5.1MΩ		±25
				—	—	—	10Ω–47Ω	±50
				—	—	—	10Ω–47Ω	±50

Resistance ranges apply to the standard, high and ultra high power ratings. Rated power at +85 °C (standard / high) and +70 °C (ultra high).

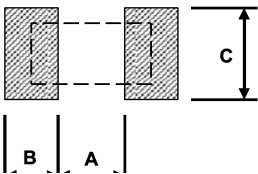
POWER DERATING



Rated power applies up to +70 °C (standard grade and automotive ultra high power) or +85 °C (automotive standard and high power ratings), then decreases linearly to zero at +155 °C.

RECOMMENDED LAND PATTERN

SIZE	A	B	C
0201	0.25	0.30	0.40 ± 0.20
0402	0.50	0.50	0.60 ± 0.20
0603	0.80	1.00	0.90 ± 0.20
0805	1.00	1.00	1.35 ± 0.20
1206	2.00	1.15	1.70 ± 0.20
1210	2.00	1.15	2.50 ± 0.20
2010	3.60	1.40	2.50 ± 0.20
2010 (1/2W)	1.00	2.70	2.50 ± 0.20
2512	4.90	1.60	3.10 ± 0.20
2512 (1W)	1.00	3.55	3.10 ± 0.20
0603 AEC-Q200	1.00	1.00	1.20 ± 0.20
0805 AEC-Q200	1.20	1.40	1.65 ± 0.20
1206 AEC-Q200	2.20	1.40	2.00 ± 0.20



ENVIRONMENTAL CHARACTERISTICS

ITEM	STANDARD GRADE	AUTOMOTIVE AEC-Q200	TEST METHOD
Temperature coefficient of resistance	As specified	As specified	MIL-STD-202 method 304 / IEC 60115-1 4.8 — +25/-55/+25/+125/+25 °C
Short time overload	$\Delta R \pm 0.05 \%$ (tol. $\leq 0.05 \%$) / $\pm 0.2 \%$	$\Delta R \pm 0.05 \%$ ($\geq 47 \Omega$) / $\pm 0.1 \%$ ($< 47 \Omega$)	JIS-C-5201-1 4.13 — $2.5 \times$ RCWW or max overload voltage, 5 s
Insulation resistance	$> 9999 \text{ M}\Omega$	$> 1000 \text{ M}\Omega$	MIL-STD-202 method 302 — 100 Vdc, 1 min

ITEM	STANDARD GRADE	AUTOMOTIVE AEC-Q200	TEST METHOD
Endurance	$\Delta R \pm 0.05 \% / \pm 0.2 \% (\pm 0.5 \% \text{ high power})$	$\Delta R \pm 0.1 \% (\text{std}) / \pm 0.25 \% (\text{high}) / \pm 0.5 \% (\text{ultra high})$	MIL-STD-202 method 108 — 70 °C (85 °C automotive), RCWV 1000 h, 1.5 h on / 0.5 h off
Damp heat with load / biased humidity	$\Delta R \pm 0.05 \% / \pm 0.3 \%$	$\Delta R \pm 0.1 \% / \pm 0.25 \% / \pm 0.5 \%$	MIL-STD-202 method 103 — 40 °C 90-95 % RH (85 °C / 85 % RH automotive), 1000 h
High temperature exposure	$\Delta R \pm 0.5 \%$	$\Delta R \pm 0.1 \% (\geq 47 \Omega) / \pm 0.25 \%$	MIL-STD-202 method 108 — +155 °C, 1000 h
Temperature cycling	—	$\Delta R \pm 0.1 \% (\geq 47 \Omega) / \pm 0.25 \%$	JESD22 JA-104 — -55 / +125 °C, 1000 cycles
Bending strength (board flex)	$\Delta R \pm 0.05 \% / \pm 0.1 \%$	$\Delta R \pm 0.1 \%$	JIS-C-5201-14.33 — 3 mm (2 mm for 2010 / 2512), 60 s
Solderability	95 % min coverage	95 % min coverage	MIL-STD-202 method 208 / IEC 60115-1 4.17 — 245 ± 5 °C, 3 s
Resistance to soldering heat	$\Delta R \pm 0.05 \% / \pm 0.1 \%$	$\Delta R \pm 0.1 \%$	MIL-STD-202 method 210 / IEC 60115-1 4.18 — 260 ± 5 °C, 10 s
Dielectric withstanding voltage	By type	By type	MIL-STD-202 method 301 — max overload voltage, 1 min
Low temperature operation	$\Delta R \pm 0.05 \% / \pm 0.2 \%$	—	JIS-C-5201-14.36 — 1 h at -65 °C then 45 min RCWV
Terminal strength	—	No damage	AEC-Q200-006 — 1.8 kg, 60 s
Mechanical shock	—	$\Delta R \pm 0.1 \%$	MIL-STD-202 method 213 — half sine 100 g, 6 ms
Vibration	—	$\Delta R \pm 0.1 \%$	MIL-STD-202 method 204 — 5 g, 10-2000 Hz, 12 cycles × 3 axes
ESD	—	$\Delta R \pm 0.5 \%$	AEC-Q200-002 HBM — 0.2 kV (0402 / 0603), 1 kV (0805 / 1206)
Resistance to solvents	—	Marking unsmearred	MIL-STD-202 method 215

HIGH RELIABILITY OPTIONS

COTS1 — COTS+ CLASS 1

- COTS+ Class 1 according to ECSS-Q-ST-60-13C

COTS2 — COTS+ CLASS 2

- COTS+ Class 2 according to ECSS-Q-ST-60-13C

COTS3 — COTS+ CLASS 3

- COTS+ Class 3 according to ECSS-Q-ST-60-13C

MARKING

- 0201 and 0402 : unmarked.
- 0603 : 3-digit code — E96 series code (2 digits) + multiplier letter ; E24 values marked with 3 digits (2 significant + multiplier).
- 0805 to 2512 : 4-digit code — 3 significant digits + multiplier (1002 = 10 kΩ), R = decimal point (4R70 = 4.7 Ω).
- Option N : unmarked on request (all sizes).

REVISION HISTORY

REV	ISSUED	PREPARED BY
1	26/10/2026	PEF

Thin Film Precision Chip Resistors

Revision 1 · 1026
issued 26/10/2026

www.srt-microceramique.com/docs/series/DS_RES_THIN_FILM.pdf

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