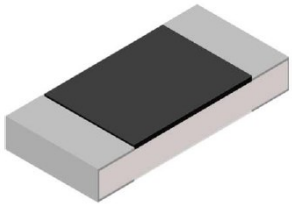
Thin Film Technology Corp.

Product Family: Automotive Thin Film Chip Resistor

Part Number Series: KN0201_A Series

RoHS COMPLIANT 2011/65/EU

HF HALOGEN-FREE



Construction:

- High purity alumina substrate
- Ni alloy thin film resistive element
- Wrap around electrodes
- 100% matte tin over Ni terminations
- RoHS compliant and Pb free
- ASTM B809-95 sulfur resistance
- EIA-977-B 105°C Anti-Sulfur Resistant

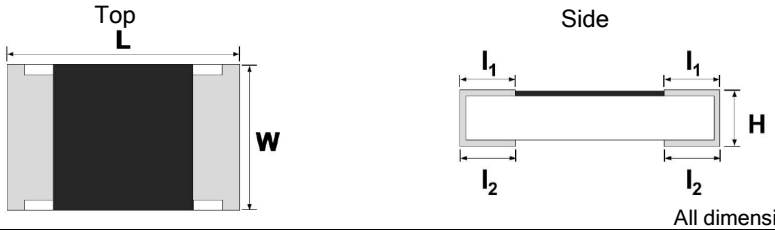
Features:

- 0201 English case size
- Resistance from 10Ω to 82KΩ
- Tolerance down to ±0.05%
- TCR down to ±10ppm/°C
- AEC-Q200 qualified
- IATF-16949 Certified Factory

Description:

These thin film chip resistors are automotive grade AEC-Q200 qualified. They offer great performance in tolerance and TCR and are excellent in applications such as automotive, ADAS, industrial electronics, consumer electronics, computer, telecom, measuring instruments, printing equipment, and converters. High volume production provides excellent pricing and is suitable for commercial and special applications.

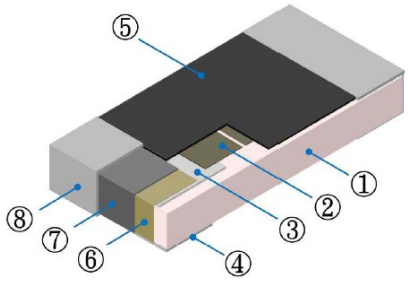
Product Dimensions:



All dimensions are in inches, mm in parentheses.

Dimension (Metric)	L	W	H	l_1	l_2
KN0201 (0603)	0.024 ±0.002 (0.60 ±0.05)	0.012 ±0.002 (0.30 ±0.05)	0.009 ±0.002 (0.23 ±0.05)	0.005 ±0.002 (0.12 ±0.05)	0.006 ±0.002 (0.15 ±0.05)

Product Construction:



0201: no marking

Number	Description
1	Alumina substrate
2	Resistive layer
3	Top inner electrode
4	Bottom inner electrode
5	Protective overcoat
6	Side inner electrode
7	Nickel barrier
8	Solder coating (Sn)

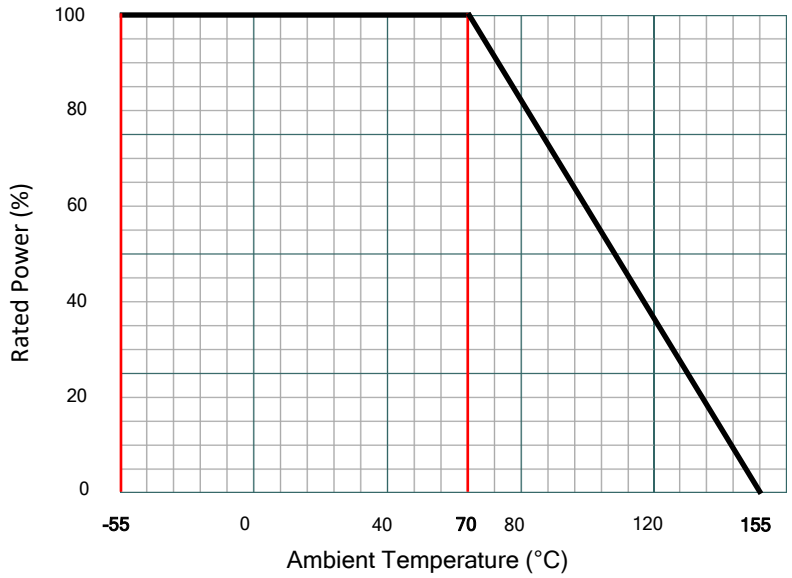
Part Numbering: Ex: KN0201AE10R0FA-T10

Series Name	English Size (Metric Size)	Internal Code	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	Automotive	T&R Packaging Quantity
KN	**0201** (0603)	**A**	**Y** = ±10ppm/°C **X** = ±15ppm/°C **E** = ±25ppm/°C **Q** = ±50ppm/°C	For all sizes, use 4 digit code for all values. "R" denotes decimal position as necessary. Ex. **10R0 =** 10 Ω	**A** = ±0.05% **B** = ±0.10% **C** = ±0.25% **D** = ±0.50% **F** = ±1.00%	**A** = AEC-Q200	**-T10** = 10,000

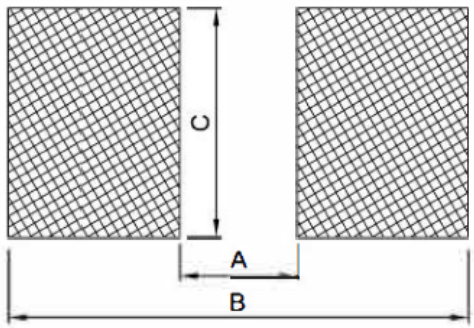
Electrical Specifications:

Type	KN0201		
Metric Size	0603		
Power Rating	1/20W		
Resistance Range	10Ω ~ <49.9Ω	49.9Ω ~ 5.1KΩ	>5.1KΩ ~ 82KΩ
Resistance Tolerance (code)	±0.10% (B), ±0.25% (C), ±0.50% (D), ±1.00% (F)	±0.05% (A), ±0.10% (B), ±0.25% (C), ±0.50% (D), ±1.00% (F)	±0.10% (B), ±0.25% (C), ±0.50% (D), ±1.00% (F)
TCR ppm/°C (code)	±10(Y) ±15(X) ±25(E) ±50(Q)	±10(Y) ±15(X) ±25(E) ±50(Q)	±25(E) ±50(Q)
Max Operating Voltage	25V		
Max Overload Voltage	50V		
Operating Temp. Range	-55°C ~ +155°C		
Packaging (code)	10,000pcs/reel (-T10)		

Power Derating Curve:



Recommended Land Pattern:



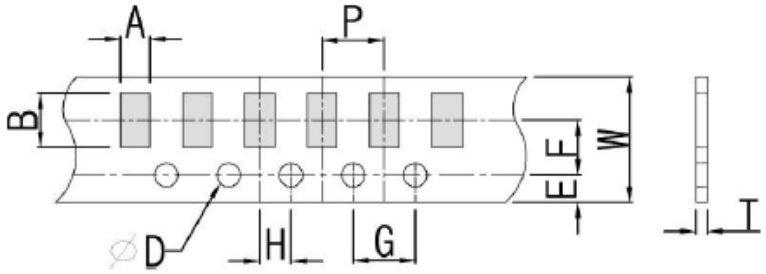
All dimensions are in mm.

Size	A	B	C
0201	0.25	0.85	0.35

Reliability Specifications:

Test	Procedure	Specification
Temperature Coefficient of Resistance (TCR) JIS-C 5201-1 4.8 IEC-60115-1 4.8	At 25/-55°C and 25°C/+125°C, 25°C is the reference temperature	Refer to Electrical Specifications
Short Time Overload JIS-C 5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. overload voltage, whichever is less for 5 seconds	±(0.1%+0.05Ω) No visual damage
Leaching JIS-C 5201-1 4.18 IEC-60068-2-58 8.2.1	260 ±5°C for 30 seconds	>95% Coverage No visual damage
High Temp. Exposure (Storage) MIL-STD-202 Method 108	Test Temperature: 155°C Test period: 1,000 hours, unpowered Measurement at 24 ±4 hours after test conclusion	±(0.3%+0.05Ω)
Temperature Cycling JESD22 Method JA-104	1,000 cycles (-55°C to +125°C) Measurement at 24 ±4 hours after test conclusion. 30 minutes dwell time at each temperature extreme.	±(0.3%+0.05Ω) No visual damage
Biased Humidity MIL-STD-202 Method 103	1000 hours; 85°C/85% RH, 10% of operating power. Measurement at 24 ±4 hours after test conclusion	±(0.3%+0.05Ω)
Operational Life MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power Measurement at 24 ±4 hours after test conclusion	±(0.3%+0.05Ω)
Resistance to Solvents MIL-STD-202 Method 215	Add aqueous wash chemical–OKEM Clean or equivalent : 3 minute soak 2-3 ounce force 10 strokes/repetition	±(0.1%+0.05Ω) No visual damage
Mechanical Shock MIL-STD-202 Method 213	Test 1/2 Since Pulse, Peak Value: 100G Normal Duration: 6ms Velocity Change: 12.3 ft/sec 10 shocks in each direction, total of 30 shocks	±(0.1%+0.05Ω)
Vibration MIL-STD-202 Method 204	Frequency: 10 - 2,000Hz Acceleration: 5G Test Duration: 20 mins / 12 Cycles each of 3 orientations	±(0.1%+0.05Ω)
Resistance to Soldering Heat JIS-C 5201-1 4.8 IEC-60115-1 4.8	260°C ±5°C for 10 seconds	±(0.1%+0.05Ω) No visual damage
ESD AEC-Q200-002	Human body model 0201: 200 V	±(0.5%+0.05Ω)
Solderability J-STD-002	(1) 4 hours 155°C dry heat (2) 245 ±5°C, 3 seconds	>95% Coverage No Visual damage
Insulation Resistance JJIS-C-5201 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute	≧10GΩ
Board Flex AEC Q200-005	Bending once for 60 seconds 0201: 3mm	±(0.1%+0.05Ω)
Sulfur Test (FoS) ASTM B809-95 ANSI/EIA-977	105 ±2°C, no power rating for 1000 hours	±(1.0%+0.05Ω)
Terminal Strength (SMD) AEC Q200-006	Pressurizing force for 60 seconds 0201: 4N	Not broken

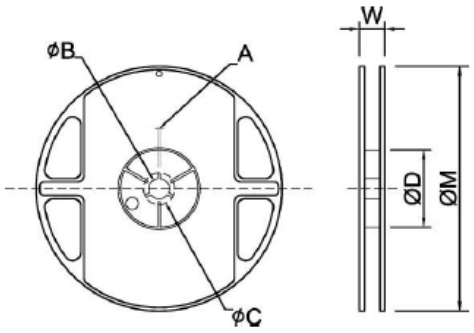
Paper Tape Dimensions:



All dimensions are in mm.

Size	A	B	W	E	F	G	H	T	ΦD	P
0201	0.40 ±0.05	0.70 ±0.05	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.45 ±0.10	1.50 +0.10/-1	2.00 ±0.10

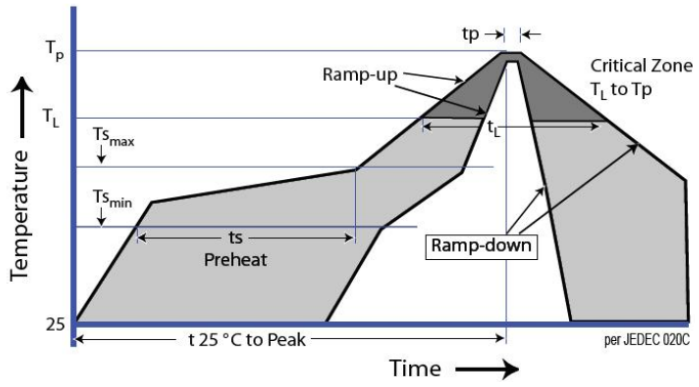
Reel Dimensions:



All dimensions are in mm.

Size	Quantity	A	ΦB	ΦC	ΦD	W	ΦM
0201	10,000 pcs/reel	2.00 ±0.50	13.5 ±1.00	21.0 ±1.00	60.0 ±1.00	11.5 ±2.00	178 ±2.00

Soldering Profile:



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to Tp)	3 °C/second max.
Preheat	
- Temperature Min (Ts_{min})	150 °C
- Temperature Max (Ts_{max})	200 °C
- Time (ts_{min} to ts_{max})	60-180 seconds
Time maintained above:	
- Temperature (T_L)	217 °C
- Time (t_L)	60-150 seconds
Peak Temperature (T_p)	260 +0 °C
Time within 5 °C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Storage Conditions:

Environment Conditions:

Products should be stored under the following environmental conditions.

- Temperature: +5 to +35°C
- Humidity: 45 to 85% relative humidity
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.