




Product Family: [Automotive Application Thick Film Chip Resistors](#)
Part Number Series: [TFA Series](#)



	Construction: <ul style="list-style-type: none"> High Purity Alumina Substrate Highly reliable and stable thick film resistive element Wrap around electrodes RoHS 2011/65/EU compliant and Pb Free (100% tin terminations) 	Features: <ul style="list-style-type: none"> 0201, 0402, 0603, 0805, 1206, 1210, 1218, 2010, and 2512 sizes Resistances between 1Ω ~10MΩ +Jumper Tolerance of 1% or 5% TCR's down to ±100ppm/°C AEC Q-200 Automotive Compliant Sulfur Resistant
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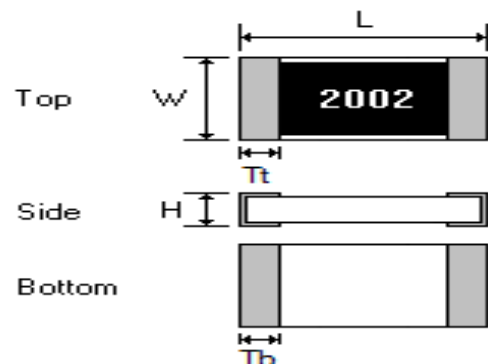
Description:

These precision chip resistors are Automotive grade AEC Q-200 compliant and sulfur resistant making them an excellent choice for automotive applications, telecom applications, and EDP computer applications. High volume manufacturing allows for lower costs for the customer.

Product Dimensions:

Dimension	0201 (0603)	0402 (1005)	0603 (1608)	0805 (2012)	1206 (3216)	1210 (3226)	1218 (3248)	2010 (2025)	2512 (6432)
L	0.024 ±0.001	0.039 ±0.002	0.063 ±0.004	0.079 ±0.004	0.122 ±0.004	0.122 ±0.004	0.120 ±0.006	0.197 ±0.008	0.252 ±0.008
W	0.012 ±0.001	0.020 ±0.002	0.031 ±0.004	0.049 ±0.004	0.063 ±0.004	0.102 ±0.004	0.181 ±0.008	0.098 ±0.008	0.126 ±0.008
H	0.009 ±0.001	0.014 ±0.002	0.018 ±0.006	0.020 ±0.006	0.024 ±0.006	0.022 ±0.004	0.022 ±0.004	0.022 ±0.004	0.024 ±0.004
Tb	0.006 ±0.002	0.010 ±0.004	0.012 ±0.006	0.016 ±0.008	0.018 ±0.008	0.020 ±0.008	0.020 ±0.010	0.024 ±0.010	0.035 ±0.010
Tt	0.004 ±0.002	0.008 ±0.004	0.012 ±0.004	0.016 ±0.008	0.020 ±0.008	0.020 ±0.008	0.018 ±0.010	0.026 ±0.010	0.026 ±0.010

All dimensions are shown in inches. Metric case sizes are shown in parenthesis.



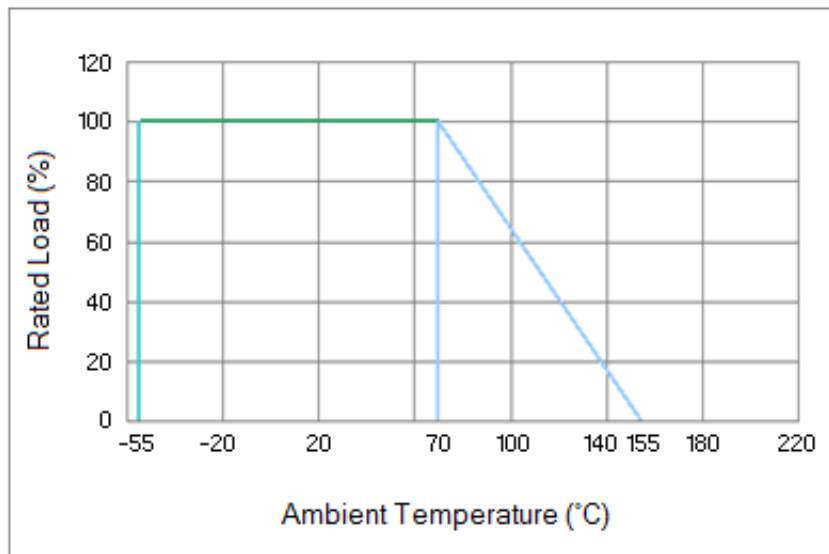
Part Numbering: Ex: TFA0603R1002F-T20

Product Designator	English Size	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
TFA	0201 0402 0603 0805 1206 1210 1218 2010 2512	R = ±100ppm/°C S = ±200ppm/°C W = see electrical table	4 digits with the first 3 being significant. The last digit specifies the number of zeros. "R" denotes decimal position as necessary Jumper = JUMP	F = ±1.0% J = ±5.0%	T3 = 3,000 T4 = 4,000 T5 = 5,000 T10 = 10,000 T15 = 15,000 T20 = 20,000 (see electrical table)

Electrical Specifications:

Type	TFA0201		TFA0402	TFA0603	TFA0805	TFA1206
Metric Size	0603		1005	1608	2012	3216
Power	1/20 W		1/16 W	1/10 W	1/8 W	1/4 W
Resistance Offering	1Ω to 3.3MΩ	1Ω to 10MΩ	1Ω to 10MΩ + Jumper (0Ω)			
Tolerance% (code)	E-96 +E24 + Jumper Values = ±1.0% (F)	E-24 Values ±5.0% (J)	E-24 Values = ±1.0% (F) or ±5.0% (J) E-96 Values +Jumper = ±1.0% (F)			
TCR ppm/°C (code)	10Ω~10MΩ = ±200ppm/°C (S) 1Ω~9.76Ω = +600~-200 (W)		Less than 10Ω = -200 / +400ppm/°C (W) 10Ω to 1MΩ = ±100ppm/°C @ Greater than 1MΩ = ±200ppm/°C (S)			
Max Operating Voltage	25V		50V	50V	150V	200V
Max Overload Voltage	50V		100V	100V	300V	400V
Operating Temp. Range	-55°C ~ 125°C		-55°C ~ 155°C			
Packaging	T15=15,000 pcs/reel		T10=10,000 pcs/reel	T5 = 5,000 pcs/reel T10 = 10,000 pcs/reel T20 = 20,000 pcs/reel		

Type	TFA1210	TFA1218	TFA2010	TFA2512
Metric Size	3225	3248	5025	6432
Power	1/2 W	1 W	1/2 W	1 W
Resistance Offering	1Ω to 10MΩ + Jumper (0Ω)			
Tolerance% (code)	E-24 Values = ±1.0% (F) or ±5.0% (J) E-96 Values +Jumper = ±1.0% (F)			
TCR ppm/°C (code)	Less than 10Ω = -200 / +400ppm/°C (W) 10Ω to 1MΩ = ±100ppm/°C @ Greater than 1MΩ = ±200ppm/°C (S)			
Max Operating Voltage	200V	200V		250V
Max Overload Voltage	400V	400V		500V
Operating Temp. Range	-55°C ~ 155°C			
Packaging	T10=10,000 pcs/reel	T5 = 5,000 pcs/reel T10 = 10,000 pcs/reel T20 = 20,000 pcs/reel	T3=3,000 pcs/reel	T4=4,000 pcs/reel

Power Derating Curve:

Conditions for Jumper:

Type	TFA0201	TFA0402	TFA0603	TFA0805	TFA1206	TFA1210	TFA1218	TFA2010	TFA2512
Power Rating at 70°C	1/20 W	1/16 W	1/10 W	1/8 W	1/4 W	1/2 W	1 W	1/2 W	1 W
Resistance	MAX 0.050Ω (50mΩ)								
Rated Current	1 A			1.5 A	2 A	3 A	4.5 A	3.2 A	4.5 A
Peak Current	2.5 A	2 A	3 A	3.5 A	5 A	7.5 A	11 A	8 A	11 A
Operating Temp. Range	-55°C ~ 125°C -55°C ~ 155°C								

Reliability Specifications:

Test	Test Method	Specification
Short Time Overload	Applied voltage: 2.5X rated voltage or 2X maximum operating voltage, whichever is less. Test duration: 5 seconds	±0.5% +0.05Ω
Resistance to Soldering Heat	MIL-STD-202, Method 210 Dip into 270°C solder bath until fully immersed 10 ±1 seconds	±0.5% +0.05Ω
Load Life	MIL-STD-202, Method 210 Test Temperature: 125°C Applied power: 35% of operational power rated voltage Test period: 1000 hours	±1.0% +0.05Ω
Moisture Load Life	MIL-STD-202, Method 103 Test Condition: 85°C/85 RH Applied power: 10% or rated power Test period: 1000 hours with power cycling as follows:	±1.0% +0.05Ω
Temperature Cycle	JESD22, Method JA-104 -55°C ~155°C, 5-10 minute dwell, 1,000 cycles	±0.5% +0.05Ω
High Temperature Exposure	MIL-STD-202, Method 108 Test Temperature: 155°C No load Test period: 1000 hours	±1.0% +0.05Ω
Mechanical Shock	MIL-STD-202, Method 213 1/2 sine pulse 1,500 peak Velocity 15.4 ft./second	Within specified product tolerance
Board Flex	AEC-Q200-005 Resistor mounted on 90mm FR4 PCB 2mm bend for 10 seconds	±1.0% +0.05Ω
Terminal Strength	AEC-Q200-006 Force of 1Kg Test time: 60 ±1 second	No damage or removal of the termination
Vibration	MIL-STD-202, Method 204 5 G's for 20 minutes 3 orientations 12 cycles	±1.0% +0.05Ω
ESD	AEC-Q200-005 Test contact 1.0KV (0402 size tested with 0.5KV)	±1.0% +0.05Ω
Solderability	Dip into 235°C solder bath until fully immersed (SAC solder) 2 ±0.5 seconds	Minimum 95% coverage of new solder

Power Derating Curve: