



**Product Family:** [Thick Film Automotive Grade Chip Resistors](#)  
**Part Number Series:** [TFS Series—Anti-Surge/ AEC-Q200 Qualified](#)



**Construction:**

- RoHS compliant and halogen free
- High grade ceramic body
- High purity alumina substrate
- Reduced size of final equipment
- Automotive Applications

**Features:**

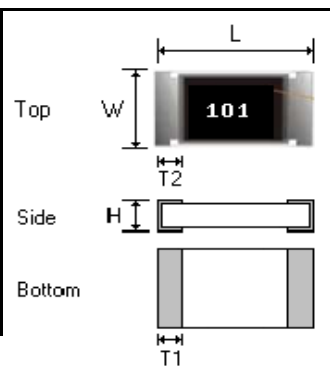
- 0603, 0805, 1206, 1210, 2010, and 2512 sizes and E24 values
- TCR's down to  $\pm 100$  ppm/ $^{\circ}\text{C}$
- Resistance down to  $0.27\Omega$  available
- High anti-surge protection / AEC-Q200 Qualified

**Description:**

These Power Surge Chip Resistors are designed for power supply, PDA, digital meters, computers, automotive, battery, and DC-DC power conversion. Anti-Sulfur design and AEC Q-200 qualified.

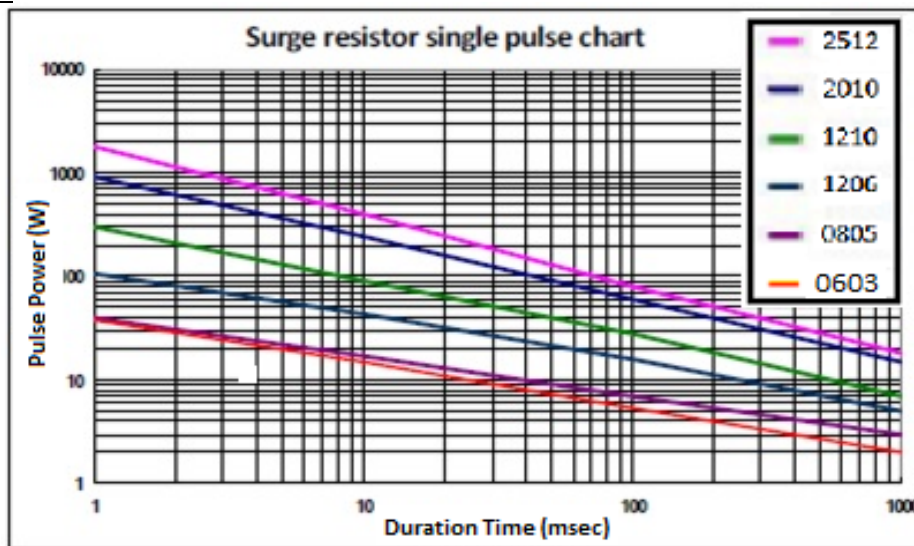
**Product Dimensions:**

Dimension	TFS0603 (1608)	TFS0805 (2012)	TFS1206 (3216)	TFS1210 (2632)	TFS2010 (5025)	TFS2512 (6432)
L	0.063 $\pm$ 0.004	0.079 $\pm$ 0.004	0.122 $\pm$ 0.006	0.122 $\pm$ 0.006	0.197 $\pm$ 0.006	0.248 $\pm$ 0.006
W	0.031 - 0.006/-0.002	0.049 $\pm$ 0.004	0.063 $\pm$ 0.006	0.098 $\pm$ 0.006	0.098 $\pm$ 0.008	0.126 $\pm$ 0.006
H	0.018 $\pm$ 0.006	0.022 $\pm$ 0.004	0.022 $\pm$ 0.004	0.022 $\pm$ 0.006	0.022 $\pm$ 0.006	0.022 $\pm$ 0.006
T1	0.012 $\pm$ 0.004	0.016 $\pm$ 0.008	0.020 $\pm$ 0.010	0.020 $\pm$ 0.010	0.024 $\pm$ 0.008	0.024 $\pm$ 0.008
T2	0.012 $\pm$ 0.008	0.012 $\pm$ 0.008	0.012 $\pm$ 0.008	0.012 $\pm$ 0.008	0.012 $\pm$ 0.006	0.012 $\pm$ 0.006



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

**Single Pulse Power:**



**Part Numbering:** Ex: TFS0603R1002F-T5

Product Designator	English Size	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	Automotive Grade	T&R Packaging Quantity
TFS	0603 0805, 1206 1210, 2010 2512	R = $\pm 100$ ppm/ $^{\circ}\text{C}$ S = $\pm 200$ ppm/ $^{\circ}\text{C}$	4 digits with the first 3 being significant. The last digit specifies the number of zeros. "R" denotes decimal position as necessary	J = $\pm 5.0\%$ K = $\pm 10.0\%$ M = $\pm 20.0\%$	A = Automotive AEC-Q200 Leave blank for Non AEC-Q200	-T4 = 4,000 -T5 = 5,000

\* Note 1: Tape quantity codes can be left off when ordering or requesting quote. These will be assigned by TFT based on part/quantity ordered.  
 Thin Film Technology Corp. / 1980 Commerce Drive, North Mankato, MN 56003 (USA) / (507) 625-8445 / [www.thin-film.com](http://www.thin-film.com)

**Electrical Specifications:**

Type	TFS0603	TFS0805	TFS1206	TFS1210	TFS2010	TFS2512
English Size	0603	0805	1206	1210	2010	2512
Power	1/4 Watt	1/4 Watt	1/3 Watt	1/2 Watt	3/4 Watt	1 Watt
Tolerance% (code)	±5% (J) ±10% (K) ±20% (M) (E24)					
Resistance Range	1Ω~1MΩ	0.27Ω~22MΩ				
TCR ppm/°C (code)	1Ω~9.1Ω = ±200ppm (S) 10Ω~1MΩ = ±100ppm (R)	0.27Ω~0.91Ω = ±200 (S) 1Ω ~ 1MΩ = ±100 (R) 1.1MΩ~22MΩ = ±200 (S)				
Max Operating Voltage	150V	150V	200V	200V	200V	200V
Operating Temp. Range	-55~+155°C					
Packaging	5,000pcs/reel (T5)				4,000pcs/reel (T4)	

**Reliability Specifications:**

Test	Test Method	Specification
Resistance to Soldering Heat	Un-mounted chips completely immersed for 10±1second in a SAC solder bath at 260°C±5°C	±(1%+0.05Ω) AEC Q200-15
Solderability	a) Bake the sample for 155°C dwell time 4hrs/ solder dipping 235°C/ 5sec. b) Immersed for 2±0.5 second in a solder bath F@235°C±5°C	95% coverage min., good tinning
Temperature Cycling	1000 cycles, -55°C±3°C, 2-3 minutes at 20°C+5°C-15°C-1°C 30 min at +155°C+3°C, 2-3 minutes at 20°C+5°C-15°C-1°C	No visible damage R/R max ±(1%+0.05Ω) AEC Q200-4
Short Time Overload	Applied voltage: 2.5X rated voltage or 2X maximum operating voltage, whichever is less. Test duration: 5 seconds	DR/R max. ±(1%+0.05W) no visible damage
Bias Humidity	1000 hours, at 10% rated continuous power in humidity chamber controller at 85°C±2°C and 85% relative humidity	DR/R max. ±(3%+0.1W) no visible damage AEC Q200-7
Operational Life	1000+48/-0 hours; 35% of operation power, 125±2°C	DR/R max. ±(3%+0.1W) no visible damage MIL-STD-202
High Temp. Exposure	155°C, no load, 1000 hours	DR/R max. ±(3%+0.1W) no visible damage AEC Q200-3
Board Flex	Resistors mounted on a 90mm glass epoxy resin PCB(FR4), bending once 2mm for 10sec	DR/R max. ±(1%+0.05W) CAEC Q200-21
Adhesion	Pressurizing force: 20N, Test time: 60±1sec.	No remarkable damage or removal of the terminations AEC Q200-22

**Derating Curve:**