Thin Film Technology Corp.

Product Family: High Precision Thick Film Low Ohm Chip Resistors

Part Number Series: TFEL Series

Construction:

- High Purity Alumina Substrate
- Thick Film resistive element
- Wrap around electrodes
- RoHS 2011/65/EU compliant

Features:

- 0201,0402, 0603, 0805, and 1206, 2010, and 2512 sizes
- Tolerance ±1.0% and ± 5.0%
- Resistance down to 0.010Ω
- TCR's down to ±100 ppm/°C
- Maximum reflow temperature = 260°C ±5°C, MSL = 1

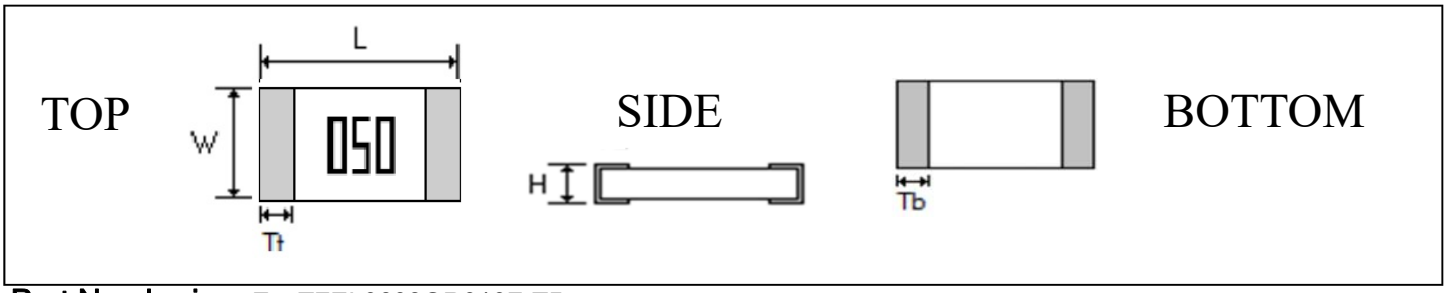
Description:

These high precision thick film low resistant chip resistors are constructed on a high grade ceramic body for extreme durability. Utilizing a proprietary thick film resistive element to deliver a wide range of size, power handling and low resistive values to make this series suitable for applications such as game equipment, mobile phones, battery packs. And power supply. Very competitive pricing for all volume levels.

Product Dimensions:

Dimension (Metric)	TFEL0201 (0603)	TFEL0402 (1005)	TFEL0603 (1608)	TFEL0805 (2012)	TFEL1206 (3216)	TFEL2010 (5025)	TFEL2512 (6432)
L	0.024 ±0.001	0.039 ±0.002	0.063 ±0.004	0.079 ±0.006	0.122 ±0.008	0.196 ±0.008	0.0248 ±0.008
W	0.012 ±0.001	0.020 ±0.002	0.031 +0.004/-0.002	0.049 ±0.004	0.063 ±0.006	0.098 ±0.008	0.122 ±0.008
H	0.009 +0.001/-0.004	0.014 +0.002/-0.004	0.020 ±0.004	0.024 ±0.004	0.024 ±0.006	0.024 ±0.004	0.024 ±0.006
Tb	0.006 ±0.002	0.010 +0.002/-0.004	0.012 ±0.004 (≥0.02Ω) 0.022 ±0.004 (<0.02Ω)	0.016 ±0.008 (≥0.02Ω) 0.024 ±0.008 (<0.02Ω)	0.020 ±0.010	0.024 ±0.010	0.024 ±0.010
Tt	0.006 +0.002/-0.004	0.010 +0.002/-0.004	0.012 ±0.004	0.016 ±0.008	0.020 ±0.010	0.024 ±0.010	0.071 ±0.010

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



Part Numbering: Ex: TFEL0603GR010F-T5

Product Designator	Size L x W (English)	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
TFEL	0201 0402 0603 0805 1206 2010 2512	R= ±100ppm/°C G= ±150ppm/°C W= 0 -±350ppm/°C	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%	-T5 = 5,000/reel -T10 = 10,000/reel -T15= 15,000/reel (see electrical table for offerings)

Reflow/ Storage:

Moisture Sensitivity Level = MSL1	Maximum Reflow Temperature = 260°C ± 5°C
Recommended Reflow Profile: http://www.thin-film.com/uploadedcontent/documents/Soldering_Profile.pdf	

Electrical Specifications:

Type	TFEL0201	TFEL0402	TFEL0603	TFEL0805	TFEL1206
English Size	0201	0402	0603	0805	1206
Power	1/10 W	1/8 W	1/4 W	1/3 W	1/2W
Resistance Range	0.020Ω~0.100Ω (E24 +E96)	0.025Ω~0.100Ω (E24 +E96)	0.010Ω~0.100Ω (E24 +E96)		0.020Ω~0.100Ω (E24 +E96)
Resistance Tolerance	±5%(J)	±1%(F), ±5%(J)			
TCR (ppm/°C)					
0.010Ω ~ 0.019Ω	N/A	N/A	0~+350 ppm (W)	0~+250 ppm (W)	N/A
0.020Ω ~ 0.030Ω	0~+350 ppm (W)	0~+350 ppm (W)	0~+350 ppm (W)	0~+250 ppm (W)	0~+250 ppm (W)
0.033Ω ~ 0.050Ω	0~+350 ppm (W)	0~+350 ppm (W)	0~+250 ppm (W)	±150 ppm (G)	±100 ppm (R)
0.051Ω ~ 0.100Ω	0~+350 ppm (W)	±150 ppm (G)	±150 ppm (G)	±100 ppm (R)	±100 ppm (R)
0.1Ω ~ 0.43Ω	N/A	0~+300 ppm (W)	±200 ppm (S)	±150 ppm (G)	±100 ppm (R)
0.47Ω ~ 0.976Ω	N/A	±200 ppm (S)			
Max. Operation Current (DC or RMS)	1.0 - 2.2 A	1.1 - 2.2 A	1.5 - 5.0 A	1.8 - 5.7 A	2.2 - 5.0A
Operation temperature	-55°C ~125°C				
Packaging	15,000 pcs/reel	10,000 pcs/reel	5,000 pcs/reel		

Type	TFEL2010	TFEL2512
English Size	2010	2512
Power	1W	2W
Resistance Range	0.040Ω~0.976Ω (E24 +E96)	
Resistance Tolerance	±1%(F), ±5%(J)	
TCR (ppm/°C)		
0.020Ω ~ 0.043Ω	±200 ppm (S)	±200 ppm (S)
0.047Ω ~ 0.0976Ω	±150 ppm (G)	±150 ppm (G)
0.100Ω ~ 0.976Ω	±100 ppm (R)	±100 ppm (R)
Max. Operation Voltage	200V	300V
Max. Overload Voltage	400V	500V
Operation temperature	-55°C ~125°C	
Packaging	5,000 pcs/reel	

*Note: This is the maximum current that may be continuously supplied to the resistor element, see "IEC publication 60115-8"
Max. Operation current: So called RCWC (Rated Continuous Working Current) is determined by

$$RCWV = \sqrt{Rated\,Power \times Resistance\,Value}$$

2W loading with total solder-pad and trace size of 300mm²
Resistance value will be changed by soldering condition and design of soldering pad, please design products in consideration of this change of resistance value.

Reliability Specifications:

Test	Test Method	Specification
Short Time Overload	2.5 times RCWC for 2 seconds.	R/R max ±1.0%
Resistance to Soldering Heat	Dip into 260±5°C solder bath until fully immersed 10 ±0.5 seconds	R/R max ±1.0%
Load Life	Test Temperature: 70±2°C Applied current: rated current Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF,	R/R max ±5.0%
Moisture Load Life	Test Condition: 40±2°C/90-95% RH Without current applied Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF	R/R max ±5.0%
Temperature Cycle	Repeat 5 cycles as follows: -55±3°C(30 min.) / Room temp (2 min) / +125±3°C(30 min.) / Room temp (2 min)	R/R max ±1.0%
Solderability	Dip into 235°C±5°C solder bath until fully immersed (SAC solder) 2 ±0.5 seconds	Minimum 95% coverage of new solder

Power Derating Curve: