

The TL Series add heat sinkable options to the thick film resistor family. The resistor element is packaged with plastic insulators, and quick-connect terminals in a symmetrical aluminum profile for easy heat sink mounting. Special tapped configurations are offered to reduce on board component count.

Efficient thermal packaging provides improved heat conduction to the heat sink. Self-insulating package design increases voltage withstanding characteristics when compared to traditional aluminum housings. The in line mounting profile makes the TL Series easily adaptable to most heat sink systems. Thermal compound is always recommended when heat sinking.

## FEATURES

- Very low inductance
- Low profile design
- In-Line Mounting Profile
- 1/4" Quick connect terminals
- Consult factory for common, isolated, or special multiple tap options.

## APPLICATIONS

- Semiconductor Balancing
- Frequency Converters
- Snubber
- In-Rush Current Limiter
- Bleeder Resistor
- Power Switching
- Voltage Dividers

## SPECIFICATIONS

### Material

**Resistive Element:** Thick Film on Alumina

**Housing:** Aluminum

**Insulators:** Glass reinforced high temperature Valox®

**Terminals:** Tinned brass

### Electrical

**Power Range:** 27 – 275 watts

**Resistance Range:**

0.3 ohm – 4 megohm

**Tolerance:**

Ultra Power (U Style): ±10% std;  
Standard Power: ±10% std;  
5% and 1% available

**Temperature Coefficient:**

±250 PPM

**Test Voltage for 1 Minute:**

6000 VDC/2500 VAC

**Working Voltage:** 1200 VAC

**External Creeping Distance:**

12mm

**Temperature Limits:** -40°C to +125°C

**Insulation:** >100<sup>2</sup> Mohm/500V

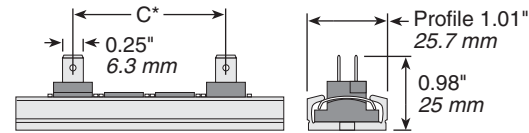
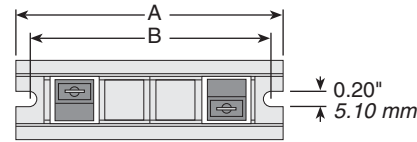
**Air Distance, Terminal to Ground:** 7mm

**Inductance:** 50-100 nH

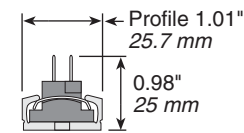


# TL Series

## Modular Heat Sinkable Thick Film Power



\*For adjacent taps, C = 0.665" (16.9mm)



Footprint 0.96" (24.4 mm)

| Series | Ultra*<br>Wattage | Std**<br>Wattage | Ohm<br>Range | A<br>(mm) | B<br>(mm) | Operating<br>Voltage<br>VAC | Dielectric<br>Withstanding<br>Voltage VAC |
|--------|-------------------|------------------|--------------|-----------|-----------|-----------------------------|---|
| TL54   | 35                | 27               | 0.3 - 1 Meg  | 54        | 46        | 1200                        | 2500                                      |
| TL71   | 96                | 71               | 1.0 - 2 Meg  | 71        | 63        | 1200                        | 2500                                      |
| TL88   | 155               | 114              | 1.5 - 3 Meg  | 88        | 80        | 1200                        | 2500                                      |
| TL104  | 215               | 158              | 2.0 - 4 Meg  | 104       | 96        | 1200                        | 2500                                      |
| †TL122 | 275               | 202              | 2.0 - 4 Meg  | 122       | 114       | 1200                        | 2500                                      |

\* For properly heat sinked, untrimmed resistors - see chart  
\*\* For properly heat sinked, trimmed resistors - see chart  
† Power Ratings are theoretical. Consult Factory for details.

| THERMAL RESISTANCE (°C/W)     |      |      |      |       |
|-------------------------------|------|------|------|-------|
|                               | TL54 | TL71 | TL88 | TL104 |
| Ultra Power (10% Tolerance)   | 1.26 | 0.53 | 0.34 | 0.25  |
| Std Power (5% - 3% Tolerance) | 1.67 | 0.70 | 0.45 | 0.33  |

Consult factory for multiple tap options in common, isolated, and special configurations.

## ELECTRICAL/MECHANICAL SPECS

| Type                          |     | TL54  | TL71  | TL88  | TL104 | TL122 |
|-------------------------------|-----|-------|-------|-------|-------|-------|
| Values for Standard Resistors |     |       |       |       |       |       |
| Max. Rated Wattage            | W   | 35    | 96    | 155   | 215   | 275   |
| Nominal Power                 | W   | 18    | 48    | 78    | 108   | 137   |
| Surge Load in 10 sec          | W   | 72    | 192   | 312   | 432   | 548   |
| Max Voltage Between Terminal  | V   | 1000  | 2000  | 2500  | 2500  | 2500  |
| Resistance Min                | ohm | 0.3   | 1     | 1.5   | 2     | 2     |
| Resistance Max                | ohm | 1 meg | 2 meg | 3 meg | 4 meg | 4 meg |
| Mechanics:                    |     |       |       |       |       |       |
| A                             | mm  | 54    | 71    | 88    | 104   | 122   |
| B                             | mm  | 46    | 63    | 80    | 96    | 114   |
| C                             | mm  | 16.9  | 33.8  | 50.7  | 67.6  | 84.5  |
| Weight                        | g   | 26    | 33    | 44    | 55    | 65    |

## ORDERING INFORMATION

E = RoHS compliant

**TL104KUR500CE**

| Size           | Tolerance | Power                | Ohms             | Center tap (optional) |
|----------------|-----------|----------------------|------------------|-----------------------|
| TL54 = 54 mm   | F = 1%    | U = ultra (optional) | R500 = 0.50      |                       |
| TL71 = 71 mm   | J = 5%    |                      | 10R0 = 10.0      |                       |
| TL88 = 88 mm   | K = 10%   |                      | 1K00 = 1,000     |                       |
| TL104 = 104 mm |           |                      | 1M00 = 1,000,000 |                       |
| TL122 = 122 mm |           |                      |                  |                       |

## STANDARD PART NUMBERS FOR TL SERIES

| Ohmic value | Part No. |        |       |       |       | Ohmic value | Part No. |          |        |        |       |       |       |        |        |
|-------------|----------|--------|-------|-------|-------|-------------|----------|----------|--------|--------|-------|-------|-------|--------|--------|
|             | Prefix   | Suffix | TL54K | TL71K | TL88K |             | TL104K   | TL122K   | Prefix | Suffix | TL54K | TL71K | TL88K | TL104K | TL122K |
| 0.5         | —        | R50    | ✓     |       |       |             |          | 240.0    | —      | 240    | ✓     | ✓     | ✓     | ✓      |        |
| 1.0         | —        | 1R0    | ✓     | ✓     | ✓     |             |          | 470.0    | —      | 470    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 1.5         | —        | 1R5    | ✓     | ✓     | ✓     |             |          | 510.0    | —      | 510    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 2.0         | —        | 2R0    | ✓     | ✓     | ✓     | ✓           |          | 750.0    | —      | 750    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 3.0         | —        | 3R0    | ✓     | ✓     | ✓     | ✓           |          | 1,000.0  | —      | 1K0    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 4.0         | —        | 4R0    | ✓     | ✓     | ✓     | ✓           |          | 1,100.0  | —      | 1K1    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 5.0         | —        | 5R1    | ✓     | ✓     | ✓     | ✓           |          | 2,200.0  | —      | 2K2    | ✓     | ✓     | ✓     | ✓      | ✓      |
| 10.0        | —        | 10R    | ✓     | ✓     | ✓     | ✓           | ✓        | 4,700.0  | —      | 4K7    | ✳     | ✳     | ✳     | ✳      | ✳      |
| 15.0        | —        | 15R    | ✓     | ✓     | ✓     | ✓           | ✓        | 5,100.0  | —      | 5K1    | ✳     | ✳     | ✳     | ✳      | ✳      |
| 22.0        | —        | 22R    | ✓     | ✓     | ✓     | ✓           | ✓        | 10,000.0 | —      | 10K    | ✳     | ✳     | ✳     | ✳      | ✳      |
| 47.0        | —        | 47R    | ✓     | ✓     | ✓     | ✓           | ✓        | 22,000.0 | —      | 22K    | ✳     | ✳     | ✳     | ✳      | ✳      |
| 75.0        | —        | 75R    | ✓     | ✓     | ✓     | ✓           | ✓        | 51,000.0 | —      | 51K    | ✳     | ✳     | ✳     | ✳      | ✳      |
| 100.0       | —        | 100    | ✓     | ✓     | ✓     | ✓           | ✓        |          |        |        |       |       |       |        |        |
| 150.0       | —        | 150    | ✓     | ✓     | ✓     | ✓           | ✓        |          |        |        |       |       |       |        |        |
| 220.0       | —        | 220    | ✓     | ✓     | ✓     | ✓           | ✓        |          |        |        |       |       |       |        |        |

✓ = Standard values  
✳ = Non-standard values subject to minimum handling charge per item

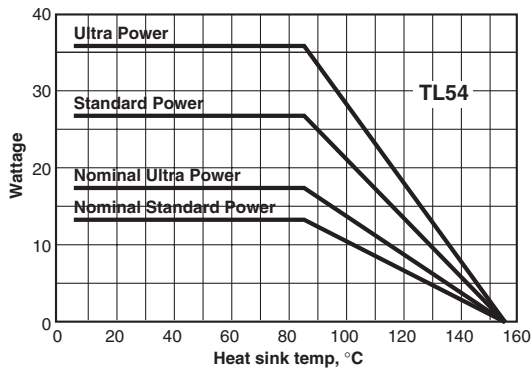
**THIS PRODUCT IS DESIGNED FOR USE WITH PROPER HEATSINKING.** Maximum base plate temperature of the resistor must be monitored and kept within specified limits to establish the power rating. Best technique is to attach a thermocouple to the side of the base plate of the resistor. Temperature of plastic housing or heat sink cannot be used to establish rating of the resistor.

# TL Series

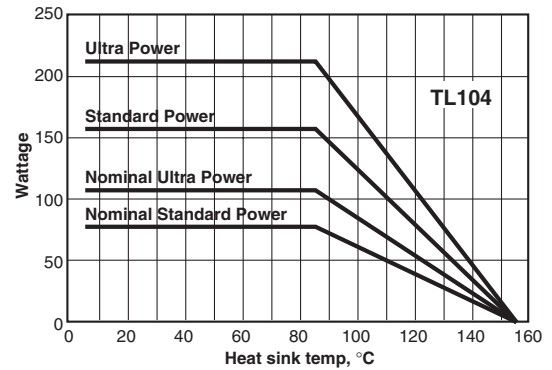
## Modular Heat Sinkable Thick Film Power

### MAXIMUM AND NOMINAL POWER RATINGS FOR ULTRA POWER AND STANDARD POWER RESISTORS

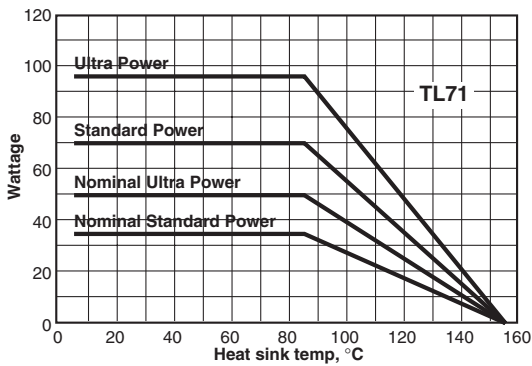
#### TL54



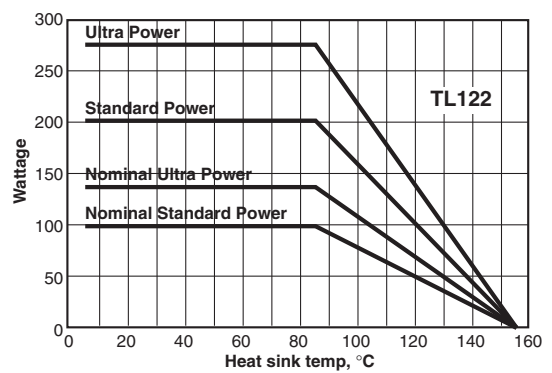
#### TL104



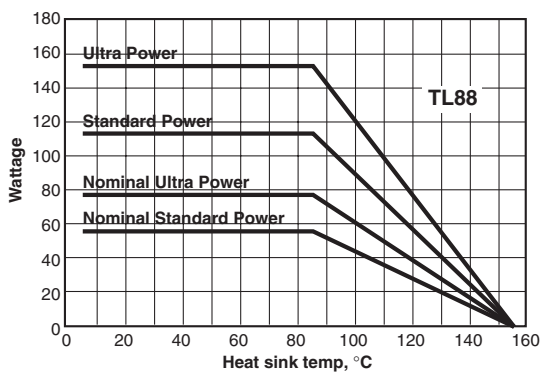
#### TL71



#### TL122



#### TL88



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**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331