

# TL Series

## Modular Heat Sinkable Thick Film Power



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

### SERIES SPECIFICATIONS

| Series | Ultra*  | Std**   | Nominal Power | Surge Load (10 sec.) | Max. Voltage between terminals | Ohm Range  | Thermal Resistance |                   |
|--------|---------|---------|---------------|----------------------|--------------------------------|------------|--------------------|-------------------|
|        | Wattage | Wattage |               |                      |                                |            | Ultra (10% tol.)   | Std. (3%-5% tol.) |
| TL54   | 35      | 27      | 18            | 72                   | 1000                           | 0.3Ω - 1MΩ | 1.26               | 1.67              |
| TL71   | 96      | 71      | 48            | 192                  | 2000                           | 1.0Ω - 2MΩ | 0.53               | 0.70              |
| TL88   | 155     | 114     | 78            | 312                  | 2500                           | 1.5Ω - 3MΩ | 0.34               | 0.45              |
| TL104  | 215     | 158     | 108           | 432                  | 2500                           | 2.0Ω - 4MΩ | 0.25               | 0.33              |
| †TL122 | 275     | 202     | 137           | 548                  | 2500                           | 2.0Ω - 4MΩ |                    |                   |

\* For properly heat sunked, untrimmed resistors - see chart

\*\* For properly heat sunked, trimmed resistors - see chart

† Power Ratings are theoretical. Consult Factory for details.

### CHARACTERISTICS

|                                  |                                                                                    |
|----------------------------------|------------------------------------------------------------------------------------|
| Operating voltage                | 1200 VAC                                                                           |
| Dielectric Withstanding Voltage  | 2500 VAC                                                                           |
| Resistive Element                | Thick Film on Alumina                                                              |
| Housing                          | Aluminum                                                                           |
| Insulators                       | Glass reinforced high temperature Valox®                                           |
| Terminals                        | Tinned brass                                                                       |
| Power Range                      | 27 – 275 watts                                                                     |
| Resistance Range                 | 0.3Ω – 4MΩ                                                                         |
| Tolerance                        | Ultra Power (U Style): ±10% std.<br>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                       | >1002 MΩ/500V                                                                      |
| Air Distance, Terminal to Ground | 7mm                                                                                |
| Inductance                       | 50-100 nH                                                                          |

### 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.

(continued)

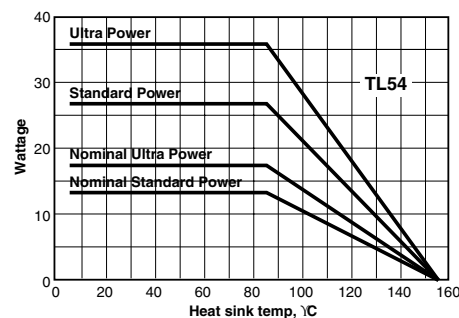
# TL Series

## Modular Heat Sinkable Thick Film Power

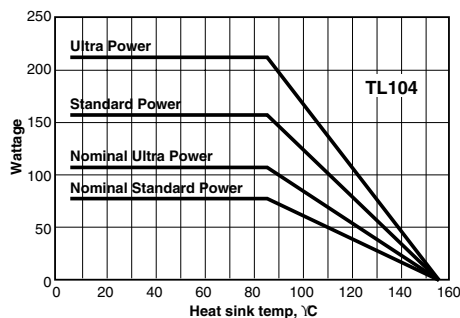
### POWER RATINGS

Maximum and nominal power ratings for Ultra Power and Standard Power resistors

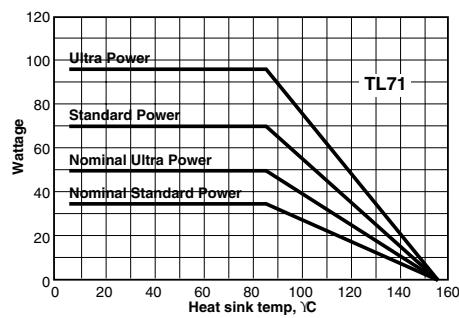
TL54



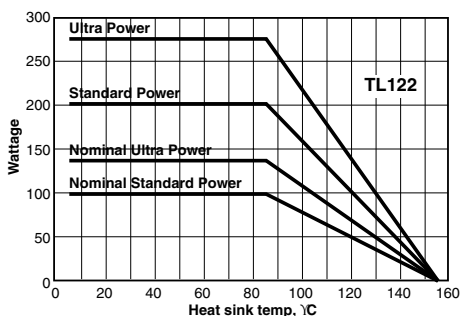
TL104



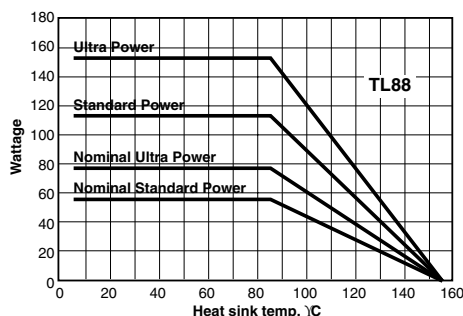
TL71



TL122



TL88



### ORDERING INFORMATION

E = RoHS compliant

| 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

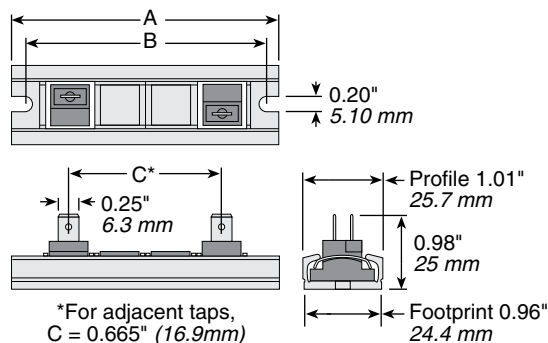
| Ohmic value | Part No. Prefix | Part No. Suffix | TL54K | TL71K | TL88K | TL104K | TL122K |
|-------------|-----------------|-----------------|-------|-------|-------|--------|--------|
| 0.5         | —               | R50             | ✓     |       |       |        |        |
| 1.0         | —               | 1R0             | ✓     | ✓     | ✓     | ✓      |        |
| 1.5         | —               | 1R5             | ✓     | ✓     | ✓     | ✓      |        |
| 2.0         | —               | 2R0             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 3.0         | —               | 3R0             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 4.0         | —               | 4R0             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 5.1         | —               | 5R1             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 10.0        | —               | 10R             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 15.0        | —               | 15R             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 22.0        | —               | 22R             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 47.0        | —               | 47R             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 75.0        | —               | 75R             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 100.0       | —               | 100             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 150.0       | —               | 150             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 220.0       | —               | 220             | ✓     | ✓     | ✓     | ✓      | ✓      |

| Ohmic value | Part No. Prefix | Part No. Suffix | TL54K | TL71K | TL88K | TL104K | TL122K |
|-------------|-----------------|-----------------|-------|-------|-------|--------|--------|
| 240.0       | —               | 240             | ✓     | ✓     | ✓     | ✓      |        |
| 470.0       | —               | 470             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 510.0       | —               | 510             | ✓     | ✓     | ✓     | ✓      |        |
| 750.0       | —               | 750             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 1,000.0     | —               | 1K0             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 1,100.0     | —               | 1K1             | ✓     | ✓     | ✓     | ✓      |        |
| 2,200.0     | —               | 2K2             | ✓     | ✓     | ✓     | ✓      | ✓      |
| 4,700.0     | —               | 4K7             | ✱     | ✱     | ✱     | ✱      |        |
| 5,100.0     | —               | 5K1             | ✱     | ✱     | ✱     | ✱      |        |
| 10,000.0    | —               | 10K             | ✱     | ✱     | ✱     | ✱      |        |
| 22,000.0    | —               | 22K             | ✱     | ✱     | ✱     | ✱      |        |
| 51,000.0    | —               | 51K             | ✱     | ✱     | ✱     | ✱      |        |

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

### DIMENSIONS



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

|          | TL54 | TL71 | TL88 | TL104 | TL122 |
|----------|------|------|------|-------|-------|
| 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    |

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

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[TL71K220E](#) [TL104K1K0E](#) [TL88K75RE](#) [TL122K1R00](#) [TL104K510E](#) [TL104K1R0E](#) [TL122K4R0E](#) [TL71K150E](#)  
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[TL71K75RE](#) [TL54K47RE](#) [TL54K1K1E](#) [TL88K1R0E](#) [TL54K22RE](#) [TL104K75RE](#) [TL122K100E](#) [TL122K10RE](#)  
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[TL71K3R0E](#) [TL122K750E](#) [TL54K470E](#) [TL54K240E](#) [TL54K10RE](#) [TL88K150E](#) [TL104K220E](#) [TL88K10RE](#)  
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[TL71K4R0E](#) [TL71K22RE](#) [TL88K240E](#) [TL54K15RE](#) [TL122K220E](#) [TL54KR50E](#) [TL71K1K1E](#) [TL71K47RE](#)  
[TL122KU2R00E](#) [TL54K2K2E](#) [TL71K5R1E](#) [TL71K2K2E](#)