

# TLS

## +85°C Low Leakage Axial Lead Aluminum Electrolytic Capacitors



*For all timing applications*

### FEATURES

- Alternative to Tantalum Capacitors
- Capacitance range: .1  $\mu$ F to 100  $\mu$ F
- Long life
- Voltage range: 10 WVDC to 50 WVDC
- Solvent Tolerant End Seals Standard

### SPECIFICATIONS

|                                   |   |  |                |      |      |   |      |                             |     |     |     |     |  |  |  |
|-----------------------------------|---|--|----------------|------|------|---|------|-----------------------------|-----|-----|-----|-----|--|--|--|
| Capacitance Tolerance             |   | $\pm 20\%$ at 120Hz, 20°C                      |                |      |      |   |      |                             |     |     |     |     |  |  |  |
| Operating Temperature Range       |   | -40°C to +85°C                                 |                |      |      |   |      |                             |     |     |     |     |  |  |  |
| Dissipation Factor<br>120Hz, 20°C | WVDC  | 10   | 16             | 25   | 35   | 50  |      |                             |     |     |     |     |  |  |  |
|                                   | tan $\delta$  | .20  | .16            | .14  | .12  | .10   |      |                             |     |     |     |     |  |  |  |
| Impedance Ratio<br>(Max.) @120Hz  | WVDC  | 10   | 16             | 25   | 35   | 50  |      |                             |     |     |     |     |  |  |  |
|                                   | -25°C/20°C  | 3  | 2              | 2    | 2    | 2   |      |                             |     |     |     |     |  |  |  |
|                                   | -40°C/20°C  | 6  | 4              | 4    | 3    | 3   |      |                             |     |     |     |     |  |  |  |
| Leakage Current                   | WVDC  | $\leq 50$ WVDC                                 |                |      |      |   |      |                             |     |     |     |     |  |  |  |
|                                   | Time  | 2 minutes                                      |                |      |      |   |      |                             |     |     |     |     |  |  |  |
|                                   |   | <.002 CV or .4 $\mu$ A<br>whichever is greater |                |      |      |   |      |                             |     |     |     |     |  |  |  |
| Load Life                         | <b>2,000 hours at + 85°C with rated voltage</b>   |  |                |      |      |   |      |                             |     |     |     |     |  |  |  |
|                                   | Capacitance change<br>Dissipation factor<br>Leakage current                             |  |                |      |      | < 20% of initial measured value<br><200% of initial specified value<br><Initial specified value |      |                             |     |     |     |     |  |  |  |
| Shelf Life                        | 1000 hours at +85°C with no voltage applied.<br>Units will meet load life specification |  |                |      |      |   |      |                             |     |     |     |     |  |  |  |
| Ripple Current Multipliers        |   |  | Frequency (Hz) |      |      |   |      | Temperature Multiplier (°C) |     |     |     |     |  |  |  |
|                                   | Capacitance ( $\mu$ F)  |  | 50             | 120  | 400  | 1K  | 10K  | 50K                         | +85 | +70 | +60 | +30 |  |  |  |
|                                   | C $\leq$ 10   |  | 0.8            | 1.0  | 1.3  | 1.45  | 1.65 | 1.7                         | 1.0 | 1.3 | 1.5 | 1.8 |  |  |  |
| 10<C $\leq$ 100                   |   | 0.8  | 1.0            | 1.23 | 1.36 | 1.48  | 1.53 | 1.0                         | 1.3 | 1.5 | 1.8 |     |  |  |  |

### SPECIAL ORDER OPTIONS

(See Pages 33 thru 37)

- Special tolerances:  $\pm 10\%$  (K), -10% + 30%(Q)
- Tape and Reel
- Epoxy end seal
- Polyester Sleeve



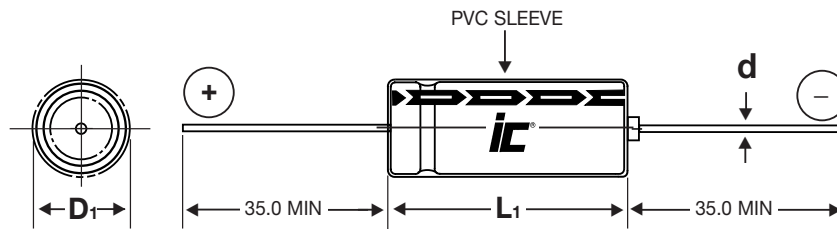
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## PHYSICAL DIMENSIONS

| WVDC (SV)<br>μF | 10 (13) | 16 (20) | 25 (32) | 35 (44) | 50 (63)  |
|-----------------|---------|---------|---------|---------|----------|
| .10             |         |         |         | →       | 5x12.5   |
| .15             |         |         |         | →       | 5x12.5   |
| .22             |         |         |         | →       | 5x12.5   |
| .33             |         |         |         | →       | 5x12.5   |
| .47             |         |         |         | →       | 5x12.5   |
| .68             |         |         |         | →       | 5x12.5   |
| 1.0             |         |         |         | →       | 5x12.5   |
| 1.5             |         |         |         | →       | 5x12.5   |
| 2.2             |         |         |         | →       | 5x12.5   |
| 3.3             |         |         |         | →       | 5x12.5   |
| 4.7             |         |         |         | →       | 5x12.5   |
| 6.8             |         |         |         | →       | 5x12.5   |
| 10              |         |         |         | →       | 5x12.5   |
| 15              |         |         | →       | →       | 6.3x12.5 |
| 22              | →       | →       | →       | →       | 6.3x16   |
| 33              | →       | →       | →       | →       | 8x16     |
| 47              | →       | →       | →       | →       | 8x16     |
| 68              | →       | →       | →       | →       |          |
| 100             | →       | →       | →       | →       |          |

Convert to inches, divide by 25.4

DxL (mm)



NOTE: Case Vent is standard on all diameter ≥8.0mm

### LEAD INFORMATION VS. CASE DIAMETER

| D | 5.0 | 6.3 | 8.0 |
|---|-----|-----|-----|
| d | 0.6 | 0.6 | 0.6 |
| B | 0.5 | 0.5 | 0.5 |

D<sub>1</sub>=D+B Max.  
L<sub>1</sub>=L+1.0 Max.

# TLS

+ 85°C Low Leakage  
Axial Lead Aluminum  
Electrolytic Capacitors

## STANDARD PART LISTING

| Capacitance (µF) | WVDC | ic <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +85°C | Dimension D x L (mm) |
|------------------|------|-----------------------------|-------------------------------|---|----------------------|
| .10              | 50   | 104TLS050M                  | 1657.9                        | 4   | 5x12.5               |
| .15              | 50   | 154TLS050M                  | 1105.2                        | 5   | 5x12.5               |
| .22              | 50   | 224TLS050M                  | 753.57                        | 6   | 5x12.5               |
| .33              | 50   | 334TLS050M                  | 502.38                        | 7   | 5x12.5               |
| .47              | 50   | 474TLS050M                  | 352.94                        | 10  | 5x12.5               |
| .68              | 50   | 684TLS050M                  | 243.8                         | 14  | 5x12.5               |
| 1.0              | 50   | 105TLS050M                  | 165.79                        | 17  | 5x12.5               |
| 1.5              | 50   | 155TLS050M                  | 110.52                        | 22  | 5x12.5               |
| 2.2              | 50   | 225TLS050M                  | 75.36                         | 26  | 5x12.5               |
| 3.3              | 50   | 335TLS050M                  | 50.24                         | 31  | 5x12.5               |
| 4.7              | 50   | 475TLS050M                  | 35.27                         | 37  | 5x12.5               |
| 6.8              | 50   | 685TLS050M                  | 24.38                         | 45  | 5x12.5               |
| 10               | 35   | 106TLS035M                  | 19.89                         | 50  | 5x12.5               |
| 10               | 50   | 106TLS050M                  | 16.58                         | 60  | 6.3x12.5             |
| 15               | 25   | 156TLS025M                  | 15.47                         | 55  | 5x12.5               |
| 15               | 50   | 156TLS050M                  | 11.05                         | 73  | 6.3x12.5             |
| 22               | 16   | 226TLS016M                  | 12.06                         | 62  | 5x12.5               |

| Capacitance (µF) | WVDC | ic <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +85°C | Dimension D x L (mm) |
|------------------|------|-----------------------------|-------------------------------|---|----------------------|
| 22               | 35   | 226TLS035M                  | 9.04                          | 80  | 6.3x12.5             |
| 22               | 50   | 226TLS050M                  | 7.54                          | 98  | 6.3x16               |
| 33               | 10   | 336TLS010M                  | 10.05                         | 68  | 5x12.5               |
| 33               | 25   | 336TLS025M                  | 7.03                          | 90  | 6.3x12.5             |
| 33               | 35   | 336TLS035M                  | 6.03                          | 110   | 6.3x16               |
| 33               | 50   | 336TLS050M                  | 5.02                          | 145   | 8x16                 |
| 47               | 16   | 476TLS016M                  | 5.64                          | 100   | 6.3x12.5             |
| 47               | 25   | 476TLS025M                  | 4.94                          | 120   | 6.3x16               |
| 47               | 50   | 476TLS050M                  | 3.53                          | 165   | 8x16                 |
| 68               | 10   | 686TLS010M                  | 4.88                          | 110   | 6.3x12.5             |
| 68               | 16   | 686TLS016M                  | 3.9                           | 135   | 6.3x16               |
| 68               | 35   | 686TLS035M                  | 2.93                          | 180   | 8x16                 |
| 100              | 10   | 107TLS010M                  | 3.32                          | 148   | 6.3x16               |
| 100              | 16   | 107TLS016M                  | 2.65                          | 190   | 8x16                 |
| 100              | 25   | 107TLS025M                  | 2.32                          | 200   | 8x16                 |
| 100              | 35   | 107TLS035M                  | 1.99                          | 250   | 8x20                 |