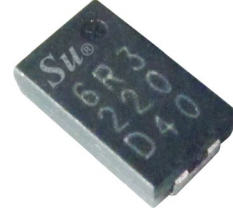


TS13MA



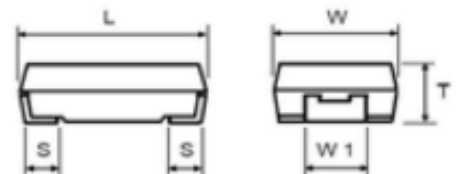
FEATURES

- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended Applications: System Board, Display Card, Small Charger and intelligent TV
- RoHS Compliance & Lead -Free

| S P E C I F I C A T I O N S | | | | | | | | | |
|---|--|---|-----------|-----------|-----------|----|------|----|---------------|
| Category Temperature Range | -55 ~ +105°C | | | | | | | | |
| Rated Working Voltage Range | 2 ~ 16 Vdc | | | | | | | | |
| Nominal Capacitance Range | 47 ~ 470µF | | | | | | | | |
| Capacitance Tolerance | ±20% ; -35%~+10% at 20°C; 120Hz | | | | | | | | |
| DC Leakage Current | $I \leq 0.1 CV$ Where, I: Leakage current (µA), C: Nominal capacitance (µF), V: Rated voltage M (at 20°C after 2 minutes) | | | | | | | | |
| Dissipation Factor (tan δ) | Rated Voltage (Vdc) | 2 | 2.5 | 4 | 6.3 | 10 | 12.5 | 16 | At 20°C,120Hz |
| | Dissipation Factor (max) | 0.06 | | | | | | | |
| ESR (100kHz, 20°C) | Value In characteristics table | | | | | | | | |
| Temperature Characteristics (Impedance Ratio at 100kHz) | $Z(+105^\circ C)/Z(+20^\circ C) \leq 1.25$ $Z(-55^\circ C) / Z(+20^\circ C) \leq 1.25$ | | | | | | | | |
| Endurance | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements. | | | | | | | | |
| | Appearance | No significant damage | | | | | | | |
| | Capacitance Change | $\leq \pm 20\%$ of the Initial value | | | | | | | |
| | Dissipation Factor | $\leq 150\%$ of the initial specified value | | | | | | | |
| | ESR | $\leq 150\%$ of the initial specified value | | | | | | | |
| | Leakage Current | \leq The initial specified value | | | | | | | |
| Humidity Test | After subjecting to 90%~95% RH for 500 hours at 60°C (no voltage), the capacitors shall meet the requirements as Endurance. | | | | | | | | |
| | Rated Voltage {Vdc} | 2~2.5 | 4 | 6.3~7.5 | 8~16 | | | | |
| | Capacitance Change | +70, -20% | +60, -20% | +50, -20% | +40, -20% | | | | |
| | D.F. (tan δ) | $\leq 200\%$ of the initial specified value | | | | | | | |
| | Leakage Current | The initial specified value | | | | | | | |
| Surge Test | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. | | | | | | | | |
| | Appearance | No significant damage | | | | | | | |
| | Capacitance Change | $\leq \pm 20\%$ of the Initial value | | | | | | | |
| | Dissipation Factor | $\leq 150\%$ of the initial specified value | | | | | | | |
| | ESR | $\leq 150\%$ of the initial specified value | | | | | | | |
| | Leakage Current | \leq The initial specified value | | | | | | | |

Drawing (unit: mm):

| Case Size | L ± 0.3 | W ± 0.3 | T ± 0.3 | W1 ± 0.3 | S ± 0.3 |
|-------------|---------|---------|---------|----------|---------|
| 7.3x4.3x1.9 | 7.3 | 4.3 | 1.9 | 2.4 | 1.3 |



TS13MA

Characteristics Table:

| WV(VDC) | Cap (μ F)@120Hz | tan δ Max. | Leakage Current (μ A) | ESR Max. (m Ω) | RippleCurrent (A r.m.s)@100kHz | Tolerance |
|---------|-------------------------|-------------------|-------------------------------|---------------------------|-----------------------------------|-----------|
| 2.0 | 220 | 0.06 | 44 | 15 | 5.1 | \pm 20% |
| | 220 | 0.06 | 44 | 9 | 6.3 | \pm 20% |
| | 220 | 0.06 | 44 | 6 | 7.5 | \pm 20% |
| | 330 | 0.06 | 66 | 9 | 6.3 | \pm 20% |
| | 330 | 0.06 | 66 | 6 | 7.5 | \pm 20% |
| | 470 | 0.06 | 94 | 9 | 6.3 | \pm 20% |
| | 470 | 0.06 | 94 | 6 | 7.5 | \pm 20% |
| | 470 | 0.06 | 94 | 4 | 8.0 | \pm 20% |
| 2.5 | 470 | 0.06 | 94 | 3 | 10.2 | \pm 20% |
| | 220 | 0.06 | 55 | 12 | 5.1 | \pm 20% |
| | 220 | 0.06 | 55 | 9 | 6.3 | \pm 20% |
| | 330 | 0.06 | 83 | 9 | 6.3 | \pm 20% |
| | 330 | 0.06 | 83 | 6 | 7.5 | \pm 20% |
| | 470 | 0.06 | 118 | 9 | 6.3 | \pm 20% |
| | 470 | 0.06 | 118 | 6 | 7.5 | \pm 20% |
| | 470 | 0.06 | 118 | 4 | 8.0 | \pm 20% |
| 6.3 | 470 | 0.06 | 118 | 3 | 10.2 | \pm 20% |
| | 100 | 0.06 | 63 | 45 | 5.1 | \pm 20% |
| | 100 | 0.06 | 63 | 40 | 5.1 | \pm 20% |
| | 100 | 0.06 | 63 | 30 | 5.1 | \pm 20% |
| | 100 | 0.06 | 63 | 15 | 5.1 | \pm 20% |
| | 150 | 0.06 | 95 | 40 | 5.1 | \pm 20% |
| | 150 | 0.06 | 95 | 30 | 5.1 | \pm 20% |
| | 150 | 0.06 | 95 | 20 | 5.1 | \pm 20% |
| | 220 | 0.06 | 139 | 30 | 5.1 | \pm 20% |
| | 220 | 0.06 | 139 | 18 | 5.1 | \pm 20% |
| | 220 | 0.06 | 139 | 15 | 5.1 | \pm 20% |
| | 220 | 0.06 | 139 | 12 | 5.6 | \pm 20% |
| | 330 | 0.06 | 208 | 30 | 5.1 | -35%,+10% |
| 330 | 0.06 | 208 | 15 | 5.1 | -35%,+10% | |

TS13MA

Characteristics Table:

| WV(VDC) | Cap (μ F)@120Hz | tan δ Max. | Leakage Current (μ A) | ESR Max. (m Ω) | Ripple Current (A r.m.s)@100kHz | Tolerance |
|---------|-------------------------|-------------------|-------------------------------|---------------------------|------------------------------------|-----------|
| 10 | 100 | 0.06 | 100 | 40 | 2.2 | \pm 20% |
| | 100 | 0.06 | 100 | 30 | 3.2 | \pm 20% |
| | 150 | 0.06 | 150 | 40 | 2.2 | \pm 20% |
| | 150 | 0.06 | 150 | 30 | 3.2 | \pm 20% |
| | 150 | 0.06 | 150 | 20 | 3.2 | \pm 20% |
| | 220 | 0.06 | 220 | 20 | 3.2 | -35%,+10% |
| | 220 | 0.06 | 220 | 30 | 3.2 | -35%,+10% |
| | 220 | 0.06 | 220 | 50 | 2.2 | -35%,+10% |
| 16 | 47 | 0.06 | 75 | 45 | 2.2 | \pm 20% |
| | 47 | 0.06 | 75 | 30 | 2.2 | \pm 20% |
| | 68 | 0.06 | 109 | 40 | 2.2 | \pm 20% |
| | 68 | 0.06 | 109 | 30 | 1.4 | \pm 20% |
| | 100 | 0.06 | 160 | 80 | 1.4 | \pm 20% |
| | 100 | 0.06 | 160 | 50 | 1.4 | \pm 20% |
| | 100 | 0.06 | 160 | 40 | 2.2 | \pm 20% |
| | 100 | 0.06 | 160 | 30 | 2.2 | \pm 20% |
| | 150 | 0.06 | 240 | 80 | 1.4 | -35%,+10% |
| | 150 | 0.06 | 240 | 60 | 1.4 | -35%,+10% |

Note: Specifications are subject to change without notice. For more details and updates, please visit our website.