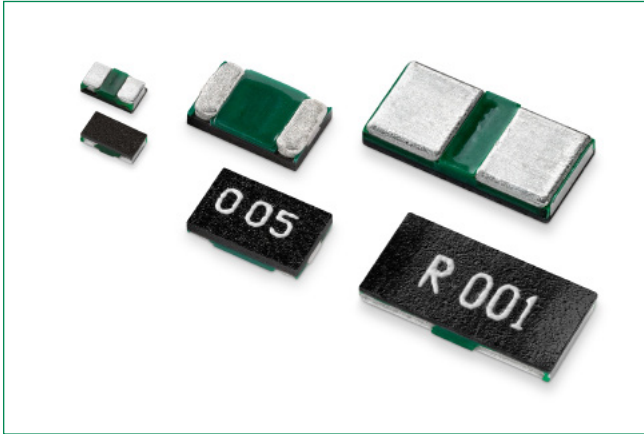


Two-Terminal Surface Mount Resistor

WSTC Series

HF **RoHS** **Pb**


Description

Littelfuse WSTC Series low ohm current sense resistor is designed with long term stability in mind. This series is durable, excels at heat dissipation. The small package is optimal for most applications.

Features & Benefits

- Low TCR
- Optimal linearity in I / V conversion
- Epoxy substrate
- Small size
- High voltage

Application

- Power management
- Low ESL

Additional Information



Resources



Accessories



Samples

Two-Terminal Surface Mount Resistor

WSTC Series

Electrical Specifications

| Part Number | Size | | Resistance Value | | Power Rating (W) | TCR (ppm / °C) | Standard Package Quantity |
|-------------------|------|------|------------------|--------|------------------|----------------|---------------------------|
| | Inch | mm | Ro (mΩ) | Rt (%) | | | |
| WSTC0402RLR043FKR | 0402 | 1005 | 43 | ±1.0% | 0.25 | ±100 | 10000 |
| WSTC0402RLR047FKR | 0402 | 1005 | 47 | ±1.0% | 0.25 | ±100 | 10000 |
| WSTC0402RLR050FKR | 0402 | 1005 | 50 | ±1.0% | 0.25 | ±100 | 10000 |
| WSTC0402RLR005FKR | 0402 | 1005 | 5 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR006FKR | 0402 | 1005 | 6 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR007FKR | 0402 | 1005 | 7 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR008FKR | 0402 | 1005 | 8 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR009FKR | 0402 | 1005 | 9 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR010FKR | 0402 | 1005 | 10 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR011FKR | 0402 | 1005 | 11 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR012FKR | 0402 | 1005 | 12 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR013FKR | 0402 | 1005 | 13 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR014FKR | 0402 | 1005 | 14 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR015FKR | 0402 | 1005 | 15 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR016FKR | 0402 | 1005 | 16 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR018FKR | 0402 | 1005 | 18 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR019FKR | 0402 | 1005 | 19 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR020FKR | 0402 | 1005 | 20 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR021FKR | 0402 | 1005 | 21 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR022FKR | 0402 | 1005 | 22 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0402RLR024FKR | 0402 | 1005 | 24 | ±1.0% | 0.33 | ±100 | 10000 |
| WSTC0603RLR003FNR | 0603 | 1608 | 3 | ±1.0% | 0.33 | ±100 | 5000 |
| WSTC0603RLR004FNR | 0603 | 1608 | 4 | ±1.0% | 0.33 | ±100 | 5000 |
| WSTC0603RLR005DNR | 0603 | 1608 | 5 | ±0.5% | 0.33 | ±100 | 5000 |
| WSTC0603DLR006FNR | 0603 | 1608 | 6 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR007FNR | 0603 | 1608 | 7 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR008FNR | 0603 | 1608 | 8 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR009FNR | 0603 | 1608 | 9 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR010FNR | 0603 | 1608 | 10 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR011FNR | 0603 | 1608 | 11 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR012FNR | 0603 | 1608 | 12 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR013FNR | 0603 | 1608 | 13 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR014FNR | 0603 | 1608 | 14 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR015FNR | 0603 | 1608 | 15 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR016FNR | 0603 | 1608 | 16 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR018FNR | 0603 | 1608 | 18 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0603DLR020FNR | 0603 | 1608 | 20 | ±1.0% | 0.33 | ±75 | 5000 |
| WSTC0805RL1M50FNR | 0805 | 2012 | 1.5 | ±1.0% | 0.5 | ±100 | 5000 |
| WSTC0805GLR001FNR | 0805 | 2012 | 1 | ±1.0% | 0.5 | ±150 | 5000 |
| WSTC0805DLR002FNR | 0805 | 2012 | 2 | ±1.0% | 0.5 | ±75 | 5000 |
| WSTC0805DLR003FNR | 0805 | 2012 | 3 | ±1.0% | 0.5 | ±75 | 5000 |

Two-Terminal Surface Mount Resistor

WSTC Series

Electrical Specifications

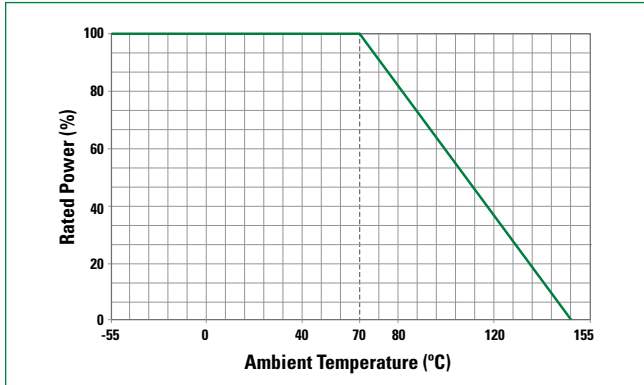
| Part Number | Size | | Resistance Value | | Power Rating (W) | TCR (ppm / °C) | Standard Package Qty |
|-------------------|------|------|------------------|--------|------------------|----------------|----------------------|
| | Inch | mm | Ro (mΩ) | Rt (%) | | | |
| WSTC0805DLR004FNR | 0805 | 2012 | 4 | ±1.0% | 0.5 | ±75 | 5000 |
| WSTC0805DLR005FNR | 0805 | 2012 | 5 | ±1.0% | 0.5 | ±75 | 5000 |
| WSTC0805QLR006FNR | 0805 | 2012 | 6 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR007FNR | 0805 | 2012 | 7 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR008FNR | 0805 | 2012 | 8 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR009FNR | 0805 | 2012 | 9 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR010FNR | 0805 | 2012 | 10 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR011FNR | 0805 | 2012 | 11 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR012FNR | 0805 | 2012 | 12 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR013FNR | 0805 | 2012 | 13 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR014FNR | 0805 | 2012 | 14 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR015FNR | 0805 | 2012 | 15 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR016FNR | 0805 | 2012 | 16 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR018FNR | 0805 | 2012 | 18 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC0805QLR020FNR | 0805 | 2012 | 20 | ±1.0% | 0.5 | ±50 | 5000 |
| WSTC1206DLR001FNR | 1206 | 3216 | 1 | ±1.0% | 1 | ±75 | 5000 |
| WSTC1206DLR002FNR | 1206 | 3216 | 2 | ±1.0% | 1 | ±75 | 5000 |
| WSTC1206DLR003FNR | 1206 | 3216 | 3 | ±1.0% | 1 | ±75 | 5000 |
| WSTC1206DLR004FNR | 1206 | 3216 | 4 | ±1.0% | 1 | ±75 | 5000 |
| WSTC1206QLR005FNR | 1206 | 3216 | 5 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR006FNR | 1206 | 3216 | 6 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR007FNR | 1206 | 3216 | 7 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR008FNR | 1206 | 3216 | 8 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR009FNR | 1206 | 3216 | 9 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR010FNR | 1206 | 3216 | 10 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR011FNR | 1206 | 3216 | 11 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR012FNR | 1206 | 3216 | 12 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR013FNR | 1206 | 3216 | 13 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR014FNR | 1206 | 3216 | 14 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR015FNR | 1206 | 3216 | 15 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR016FNR | 1206 | 3216 | 16 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR018FNR | 1206 | 3216 | 18 | ±1.0% | 1 | ±50 | 5000 |
| WSTC1206QLR020FNR | 1206 | 3216 | 20 | ±1.0% | 1 | ±50 | 5000 |

Note: Resistors are available in steps of 1mΩ. Ratings not indicated in the above table may be available on request.

Two-Terminal Surface Mount Resistor

WSTC Series

Temperature De-rating Curve



Storage / Environment Conditions

Products should be stored under the following environmental conditions.

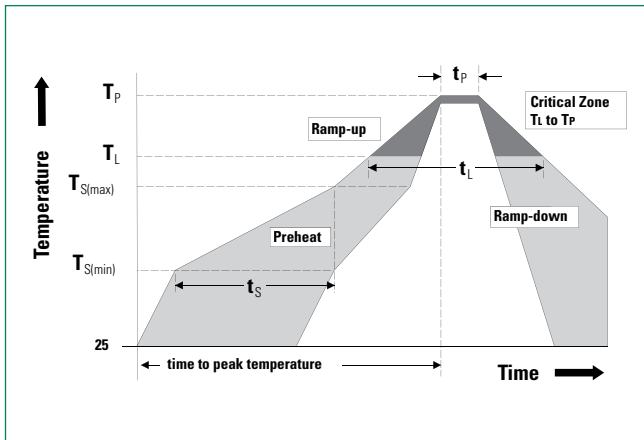
| | |
|------------------------------------|-----------------------------|
| Temperature: | +5 to +35 °C |
| Humidity: | 45 to 85% relative humidity |
| Moisture Sensitivity Level: | 1, J-STD-020 |

Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting poor solderability.

Products should be stored in a space that does not expose to high temperatures, vibration, or direct sunlight.

Products should be stored in the original airtight packaging until use.

Soldering Parameters–Wave Soldering



| Profile Feature | Pb-Free Assembly |
|---|-----------------------|
| Average Ramp-Up Rate (TSmax to Tp) | 3 °C / second max |
| Preheat | |
| Temperature Minimum (TSmin) | 150 °C |
| Temperature Maximum (TSmax) | 200 °C |
| Time (TSmin to TSmax) | 60–180 seconds |
| Time maintained above | |
| Temperature Minimum (Tl) | 217 °C |
| Time (tL) | 60–150 seconds |
| Peak Temperature (Tp) | 260 +0 °C |
| Time within 5 °C of Actual Peak Temperature (tp) | 20–40 seconds |
| Ramp-Down Rate | 6 °C / second Maximum |
| Time 25 °C to Peak Temperature | 8 minutes Maximum |

Two-Terminal Surface Mount Resistor

WSTC Series

Reliability Specifications

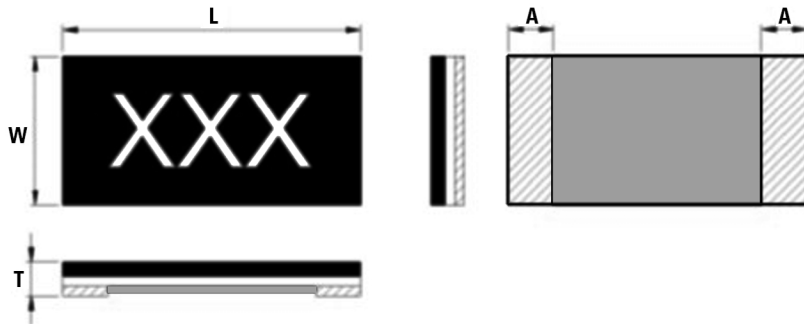
| Test | Procedure | Specifications |
|--------------------------------------|---|--|
| ESD | HBM, 100pF, 1.5k ohms Repetition: 5 times Component Classification: 5C (25KV) | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Load Life (Operational Life) | Test Temperature: 125°C Applied voltage: rated power (derated Power will be required if temp exceeds the derating point of part) Test Period: 1,000 hours (condition D) | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Biased Humidity | Test conditions: 85°C and 85% RH 10% of rated power Test Period 1,000 hours | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Temp. Cycling (Thermal Shock) | Repeat 1,000 cycles as follows: -55°C for 30 minutes 125°C for 30 minutes Transition time of 1 minute max | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| High Temp. Exposure (Storage) | Test Temp 125°C Test Period: 1,000 hours No Electrical Load | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Resistance to soldering heat | Condition B (Solder dip, no pre-heat) 260°C | ±1.0% Parts must meet initial electrical specs. |
| Resistance to Solvents | 3 minute soak 2-3 ounce force 10 strokes/repetition 3 repetitions | Appearance: Without distinct damage, and the marking shall be legible. |
| Terminal Strength (SMD) | Applied force based on part size | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Flammability | UL-94 V-0 or V-1 are acceptable Electrical test not required | V-0 burning less than 10 seconds V-1 burning less than 30 seconds |
| Flame Retardance | Mounted parts subjected to voltages from 9.0 to 32 VDC (current clamped up to 500A) | No flame when full automotive battery potential is applied. |
| Vibration | Frequency: 10-2,000 Hz Acceleration: 5G Test duration: 20 minutes, 12 cycles | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |
| Mechanical Shock | Force: 100G peak Test duration: 6 ms Half-sine waveform Velocity: 12.3ft/sec | ±1.0% Appearance: Without distinct damage, and the marking shall be legible. |

Two-Terminal Surface Mount Resistor

WSTC Series

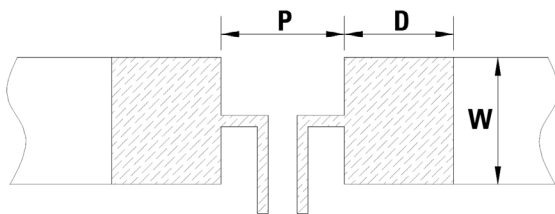
Dimensions

All dimensions in mm



| Part Number | W | L | T | A |
|-------------------------------|-----------|-----------|-----------|-----------|
| WSTC0402 2M50~R003 | 0.55±0.10 | 1.00±0.10 | 0.30±0.05 | 0.30±0.10 |
| WSTC0402 R005~R025, R040~R050 | 0.55±0.10 | 1.00±0.10 | 0.30±0.05 | 0.23±0.10 |
| WSTC0603L R002 | 0.80±0.25 | 1.60±0.25 | 0.35±0.20 | 0.45±0.20 |
| WSTC0603 2M50~R003 | 0.80±0.25 | 1.60±0.25 | 0.35±0.20 | 0.35±0.20 |
| WSTC0603 R004~R020 | 0.80±0.25 | 1.60±0.25 | 0.35±0.20 | 0.30±0.20 |
| WSTC0805 R001~1M50 | 1.25±0.25 | 2.00±0.25 | 0.40±0.20 | 0.70±0.20 |
| WSTC0805 R002~2M50 | 1.25±0.25 | 2.00±0.25 | 0.40±0.20 | 0.60±0.20 |
| WSTC0805 R003~R020 | 1.25±0.25 | 2.00±0.25 | 0.40±0.20 | 0.40±0.20 |
| WSTC1206 R001~1M50 | 1.60±0.25 | 3.20±0.25 | 0.40±0.20 | 1.25±0.30 |
| WSTC1206 R002 | 1.60±0.25 | 3.20±0.25 | 0.40±0.20 | 1.05±0.30 |
| WSTC1206 R003 | 1.60±0.25 | 3.20±0.25 | 0.40±0.20 | 0.80±0.30 |
| WSTC1206 R004~R020 | 1.60±0.25 | 3.20±0.25 | 0.40±0.20 | 0.60±0.30 |

Recommended Land Pattern



| Part Number | P | W | D | Loading |
|--------------------|------|------|------|---------|
| WSTC0402 2M50~R003 | 0.35 | 0.60 | 0.60 | 0.33 W |
| WSTC0402 R005~R025 | 0.40 | 0.60 | 0.60 | 0.33 W |
| WSTC0402 R040~R050 | 0.40 | 0.60 | 0.60 | 0.25 W |
| WSTC0603 R002 | 0.38 | 0.92 | 1.41 | 0.33 W |
| WSTC0603 2M50~R003 | 0.50 | 0.92 | 1.35 | 0.33 W |
| WSTC0603 R004~R020 | 0.60 | 0.92 | 1.30 | 0.33 W |
| WSTC0805 R001 | 0.40 | 1.44 | 1.60 | 0.50 W |
| WSTC0805 1M50~2M50 | 0.50 | 1.44 | 1.55 | 0.50 W |
| WSTC0805 R003~R020 | 0.80 | 1.44 | 1.40 | 0.50 W |
| WSTC1206 R001~1M50 | 0.50 | 1.84 | 2.15 | 1.0 W |
| WSTC1206 R002 | 0.60 | 1.84 | 2.10 | 1.0 W |
| WSTC1206 R003~R020 | 1.20 | 1.84 | 1.80 | 1.0 W |

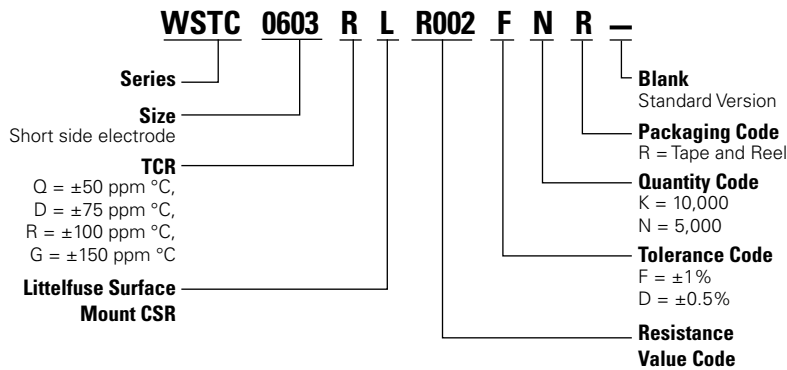
Two-Terminal Surface Mount Resistor

WSTC Series

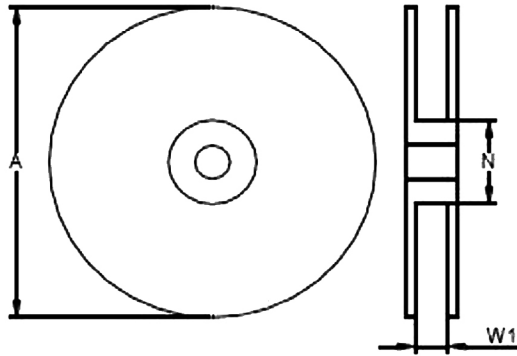
Packaging

| Part Number | Halogen Free | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|--------------|------------------|----------|----------------------------|
| WSTC0402 | Yes | Tape and Reel | 10000 | KR |
| WSTC0603 | Yes | Tape and Reel | 5000 | NR |
| WSTC0805 | Yes | Tape and Reel | 5000 | NR |
| WSTC1206 | Yes | Tape and Reel | 5000 | NR |

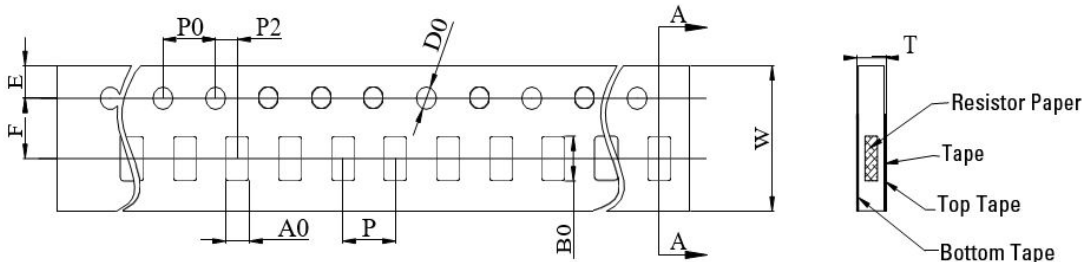
Part Numbering System



Tape and Reel Specifications



| Part Number | A±5 (mm) | N±2 (mm) | W1±1 (mm) |
|-------------|----------|----------|-----------|
| WSTC0402 | 178 | 60 | 9.0 |
| WSTC0603 | 178 | 60 | 9.0 |
| WSTC0805 | 178 | 60 | 9.0 |
| WSTC1206 | 178 | 60 | 9.0 |



| Part Number | W | P0 | P | P2 | A0 | B0 | D0 | F | E | T |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WSTC0402 | 8.00±0.30 | 4.00±0.10 | 2.00±0.10 | 2.00±0.10 | 0.65±0.10 | 1.10±0.10 | 1.50±0.10 | 3.50±0.10 | 1.75±0.10 | 0.42±0.05 |
| WSTC0603 | 8.00±0.30 | 4.00±0.10 | 4.00±0.10 | 2.00±0.10 | 0.98±0.10 | 1.85±0.10 | 1.50±0.10 | 3.50±0.10 | 1.75±0.10 | 0.60±0.05 |
| WSTC0805 | 8.00±0.30 | 4.00±0.10 | 4.00±0.10 | 2.00±0.10 | 1.55±0.10 | 2.30±0.10 | 1.50±0.10 | 3.50±0.10 | 1.75±0.10 | 0.75±0.10 |
| WSTC1206 | 8.00±0.30 | 4.00±0.10 | 4.00±0.10 | 2.00±0.10 | 2.05±0.20 | 3.65±0.20 | 1.50±0.10 | 3.50±0.10 | 1.75±0.10 | 0.75±0.10 |

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