



**THE DATASHEET OF
SMA6J6.0CA**



SMA6J Series



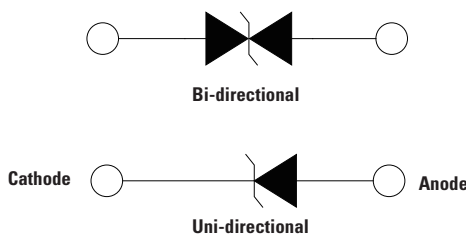
| Agency Approvals | |
|------------------|--------------------|
| Agency | Agency File Number |
| | E230531 |

Maximum Ratings and Thermal Characteristics (T_A = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|------------------|------------|------|
| Peak Pulse Power Dissipation by 10/1000µs Waveform (Fig.2) (Note 1), (Note 2) | P _{PPM} | 600 | W |
| Power Dissipation on Infinite Heat Sink at T _L = 50°C | P _D | 3.3 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I _{FSM} | 60 | A |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only | V _F | 3.5 | V |
| Operating Temperature Range | T _J | -65 to 150 | °C |
| Storage Temperature Range | T _{STG} | -65 to 175 | °C |
| Typical Thermal Resistance Junction to Lead | R _{θJL} | 30 | °C/W |
| Typical Thermal Resistance Junction to Ambient | R _{θJA} | 120 | °C/W |

- Notes:**
1. Non-repetitive current pulse, per Fig.4 and derated above T_J (initial) = 25°C per Fig. 3.
 2. Mounted on 5.0x5.0mm copper pad to each terminal.
 3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only.

Functional Diagram



Description

The SMA6J series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- Small DO-214AC SMT footprint for minimal board space requirement
- Typical failure mode is a short circuit condition for current events exceeding component rating
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC 61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulsepower capability at 10/1000µs waveform, repetition rate (duty cycle): 0.01 %
- Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- Typical I_R < 1µA when V_{BR} min > 12 V
- High temperature reflow soldering guaranteed: 260°C/30sec
- V_{BR} @ T_J = V_{BR} @ 25°C × (1 + α T × (T_J - 25)) (α T: Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, lead-frame maximum peak of 260°C
- Matte tin lead-free plated
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Electrical Characteristics (T_A=25°C unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage V _R (Volts) | Breakdown Voltage V _{BR} (Volts) @ I _T | | Test Current I _T (mA) | Maximum Clamping Voltage V _C @ I _{PP} (V) | Maximum Peak Pulse Current I _{PP} (A) | Maximum Reverse Leakage I _R @ V _R (µA) | Agency Recognition  |
|-------------------|------------------|---------|------|--|--|-------|----------------------------------|---|--|--|--|
| | | UNI | BI | | MIN | MAX | | | | | |
| | | | | | | | | | | | |
| SMA6J5.0A | SMA6J5.0CA | 6BA | 6VVE | 5 | 6.40 | 700 | 10 | 9.2 | 66.0 | 800 | X |
| SMA6J6.0A | SMA6J6.0CA | 6AG | 6VVG | 6 | 6.67 | 737 | 10 | 10.3 | 61.0 | 800 | X |
| SMA6J6.5A | SMA6J6.5CA | 6AK | 6VVK | 6.5 | 7.22 | 798 | 10 | 11.2 | 56.0 | 500 | X |
| SMA6J7.0A | SMA6J7.0CA | 6AM | 6VWM | 7 | 7.78 | 8.60 | 10 | 12.0 | 50.0 | 200 | X |
| SMA6J7.5A | SMA6J7.5CA | 6AP | 6VWP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 46.5 | 100 | X |
| SMA6J8.0A | SMA6J8.0CA | 6AR | 6VWR | 8 | 8.89 | 9.83 | 1 | 13.6 | 44.1 | 50 | X |
| SMA6J8.5A | SMA6J8.5CA | 6AT | 6VWT | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 41.7 | 20 | X |
| SMA6J9.0A | SMA6J9.0CA | 6AV | 6VWV | 9 | 10.0 | 11.1 | 1 | 15.4 | 39.0 | 10 | X |
| SMA6J10A | SMA6J10CA | 6AX | 6VWX | 10 | 11.1 | 12.3 | 1 | 17.0 | 37.0 | 5 | X |
| SMA6J11A | SMA6J11CA | 6AZ | 6VWZ | 11 | 12.2 | 13.5 | 1 | 18.2 | 33.0 | 1 | X |
| SMA6J12A | SMA6J12CA | 6BE | 6XE | 12 | 13.3 | 14.7 | 1 | 19.9 | 31.0 | 1 | X |
| SMA6J13A | SMA6J13CA | 6BG | 6XG | 13 | 14.4 | 15.9 | 1 | 21.5 | 29.0 | 1 | X |
| SMA6J14A | SMA6J14CA | 6BK | 6XK | 14 | 15.6 | 17.2 | 1 | 23.2 | 25.8 | 1 | X |
| SMA6J15A | SMA6J15CA | 6BM | 6XM | 15 | 16.7 | 18.5 | 1 | 24.4 | 25.1 | 1 | X |
| SMA6J16A | SMA6J16CA | 6BP | 6XP | 16 | 17.8 | 19.7 | 1 | 26.0 | 23.1 | 1 | X |
| SMA6J17A | SMA6J17CA | 6BR | 6XR | 17 | 18.9 | 20.9 | 1 | 27.6 | 22.6 | 1 | X |
| SMA6J18A | SMA6J18CA | 6BT | 6XT | 18 | 20.0 | 22.1 | 1 | 29.2 | 21.5 | 1 | X |
| SMA6J20A | SMA6J20CA | 6BV | 6XV | 20 | 22.2 | 24.5 | 1 | 32.4 | 19.4 | 1 | X |
| SMA6J22A | SMA6J22CA | 6BX | 6XX | 22 | 24.4 | 26.9 | 1 | 35.5 | 17.0 | 1 | X |
| SMA6J24A | SMA6J24CA | 6BZ | 6XZ | 24 | 26.7 | 29.5 | 1 | 38.9 | 16.0 | 1 | X |
| SMA6J26A | SMA6J26CA | 6CE | 6YE | 26 | 28.9 | 31.9 | 1 | 42.1 | 14.9 | 1 | X |
| SMA6J28A | SMA6J28CA | 6CG | 6YG | 28 | 31.1 | 34.4 | 1 | 45.4 | 13.8 | 1 | X |
| SMA6J30A | SMA6J30CA | 6CK | 6YK | 30 | 33.3 | 36.8 | 1 | 48.4 | 12.5 | 1 | X |
| SMA6J33A | SMA6J33CA | 6CM | 6YM | 33 | 36.7 | 40.6 | 1 | 53.3 | 11.8 | 1 | X |
| SMA6J36A | SMA6J36CA | 6CP | 6YP | 36 | 40.0 | 44.2 | 1 | 58.1 | 10.4 | 1 | X |
| SMA6J40A | SMA6J40CA | 6CR | 6YR | 40 | 44.4 | 49.1 | 1 | 64.5 | 9.7 | 1 | X |
| SMA6J43A | SMA6J43CA | 6CT | 6YT | 43 | 47.8 | 52.8 | 1 | 69.4 | 8.7 | 1 | X |
| SMA6J45A | SMA6J45CA | 6CV | 6YV | 45 | 50.0 | 55.3 | 1 | 72.7 | 8.3 | 1 | X |
| SMA6J48A | SMA6J48CA | 6CX | 6YX | 48 | 53.3 | 58.9 | 1 | 77.4 | 8.1 | 1 | X |
| SMA6J51A | SMA6J51CA | 6CZ | 6YZ | 51 | 56.7 | 62.7 | 1 | 82.4 | 7.4 | 1 | X |
| SMA6J54A | SMA6J54CA | 6RE | 6ZE | 54 | 60.0 | 66.3 | 1 | 87.1 | 6.9 | 1 | X |
| SMA6J58A | SMA6J58CA | 6RG | 6ZG | 58 | 64.4 | 71.2 | 1 | 93.6 | 6.7 | 1 | X |
| SMA6J60A | SMA6J60CA | 6RK | 6ZK | 60 | 66.7 | 73.7 | 1 | 96.8 | 6.2 | 1 | X |
| SMA6J64A | SMA6J64CA | 6RM | 6ZM | 64 | 71.1 | 78.6 | 1 | 103 | 5.9 | 1 | X |
| SMA6J70A | SMA6J70CA | 6RP | 6ZP | 70 | 77.8 | 86.0 | 1 | 113 | 5.5 | 1 | X |
| SMA6J75A | SMA6J75CA | 6RR | 6ZR | 75 | 83.3 | 92.1 | 1 | 121 | 5.0 | 1 | X |
| SMA6J78A | SMA6J78CA | 6RT | 6ZT | 78 | 86.7 | 95.8 | 1 | 126 | 4.8 | 1 | X |
| SMA6J85A | SMA6J85CA | 6RV | 6ZV | 85 | 94.4 | 104 | 1 | 137 | 4.6 | 1 | X |
| SMA6J90A | SMA6J90CA | 6RX | 6ZX | 90 | 100 | 111 | 1 | 146 | 4.2 | 1 | X |
| SMA6J100A | - | 6RZ | - | 100 | 111 | 123 | 1 | 162 | 3.8 | 1 | X |
| SMA6J110A | - | 6SE | - | 110 | 122 | 135 | 1 | 177 | 3.5 | 1 | X |
| SMA6J120A | - | 6SG | - | 120 | 133 | 147 | 1 | 193 | 3.2 | 1 | X |
| SMA6J130A | - | 6SK | - | 130 | 144 | 159 | 1 | 209 | 2.9 | 1 | X |

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

I-V Curve Characteristics



- P_{PPM}** Peak Pulse Power Dissipation – Max power dissipation
- V_R** Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
- V_{BR}** Breakdown Voltage – Maximum voltage that flows through the TVS at a specified test current (I_T)
- V_C** Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current @ 10/1000)
- I_R** Reverse Leakage Current – Current measured at V_R
- V_F** Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform



Figure 2 - Peak Pulse Power Rating Curve



Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

Figure 3 - Peak Pulse Power Derating Curve

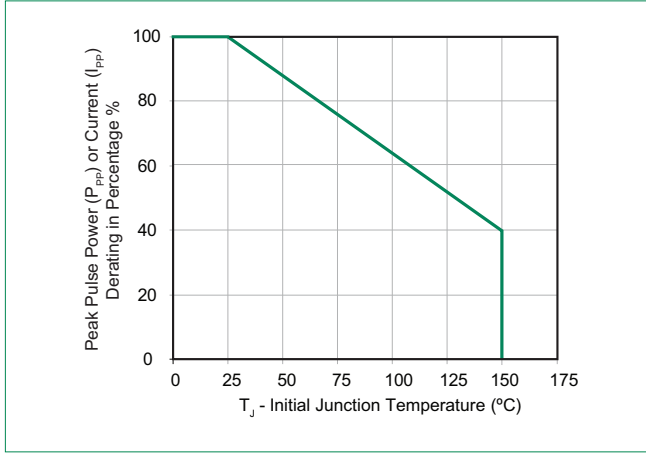


Figure 4 - Pulse Waveform

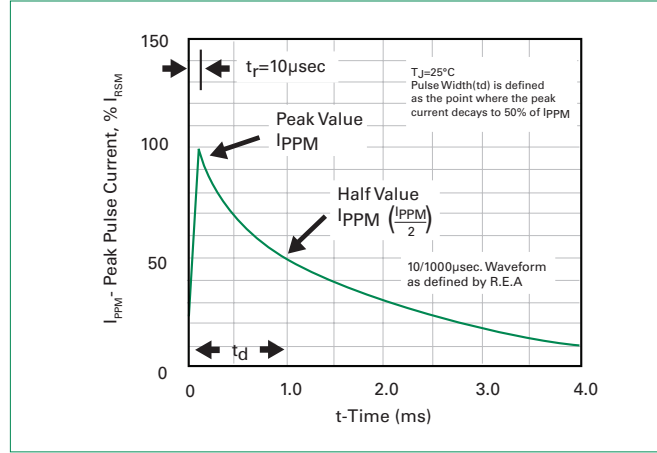


Figure 5 - Typical Transient Thermal Impedance

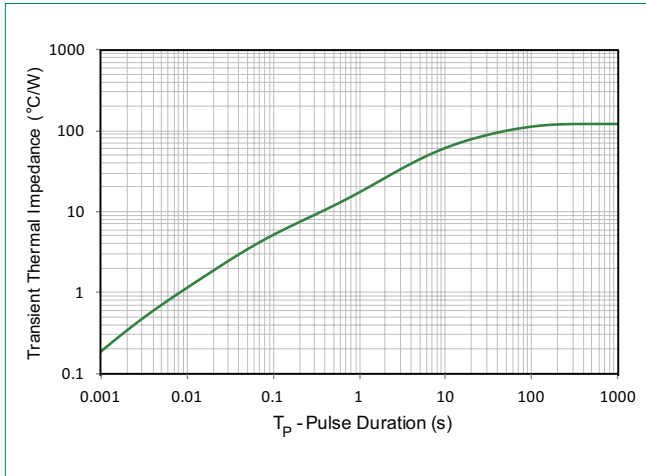


Figure 6 - Peak Forward Voltage Drop vs Peak Forward Current (typical values)

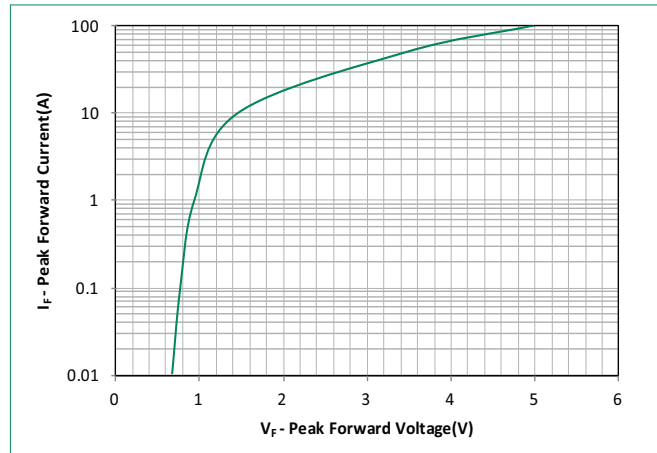
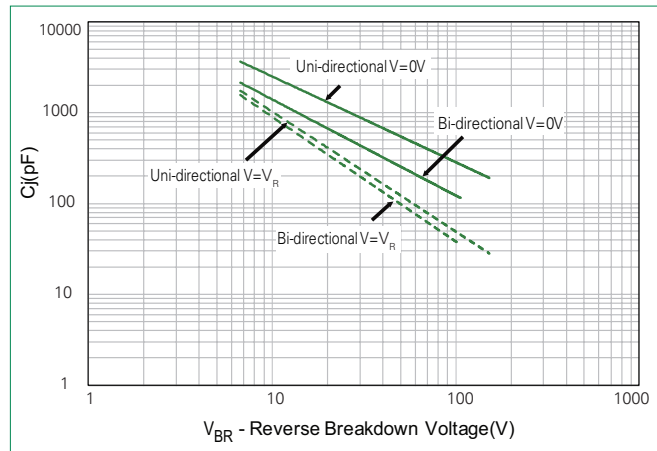


Figure 7 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

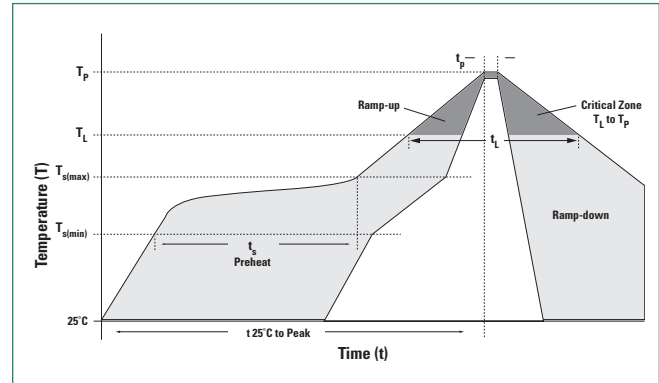


Figure 8 - Typical Junction Capacitance



Soldering Parameters

| | | |
|--|------------------------------------|------------------------|
| Reflow Condition | | Lead-free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 120 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (min to max) (t_L) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 30 seconds max |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



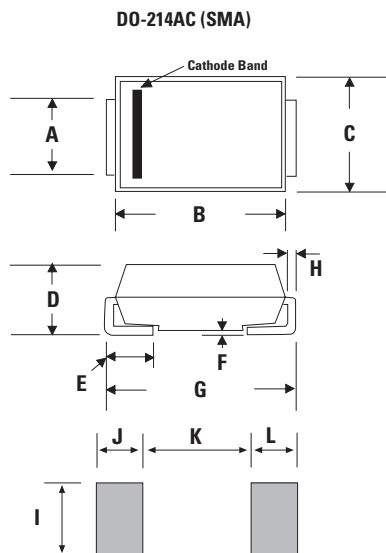
Physical Specifications

| | |
|-----------------|--|
| Weight | 0.002 ounce, 0.061 gram |
| Case | JEDEC DO-214AC Molded Plastic over glass passivated junction |
| Polarity | Color band denotes cathode except Bipolar |
| Terminal | Matte Tin-plated leads, Solderable per JESD22-B102 |

Environmental Specifications

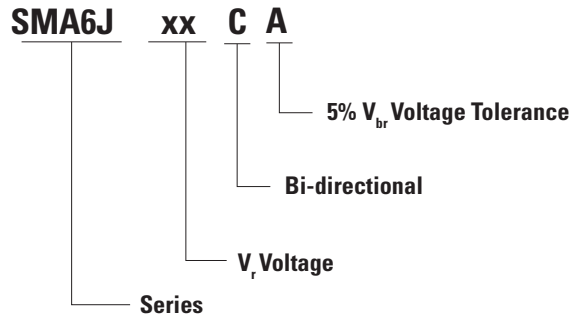
| | |
|----------------------------|--------------------------|
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| MSL | JEDEC-J-STD-020, Level 1 |
| H3TRB | JESD22-A101 |
| RSH | JESD22-A111 |

Dimensions

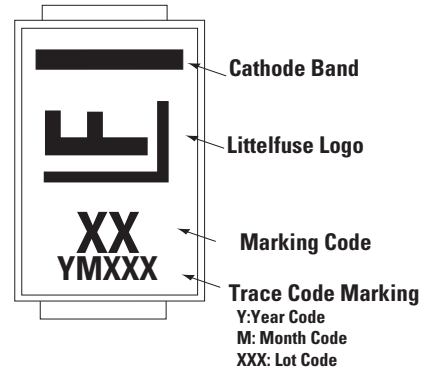


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.049 | 0.065 | 1.250 | 1.650 |
| B | 0.157 | 0.181 | 3.990 | 4.600 |
| C | 0.095 | 0.110 | 2.400 | 2.790 |
| D | 0.075 | 0.090 | 1.900 | 2.290 |
| E | 0.030 | 0.060 | 0.780 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.189 | 0.208 | 4.800 | 5.280 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.070 | - | 1.800 | - |
| J | 0.082 | - | 2.100 | - |
| K | - | 0.090 | - | 2.300 |
| L | 0.082 | - | 2.100 | - |

Part Numbering System



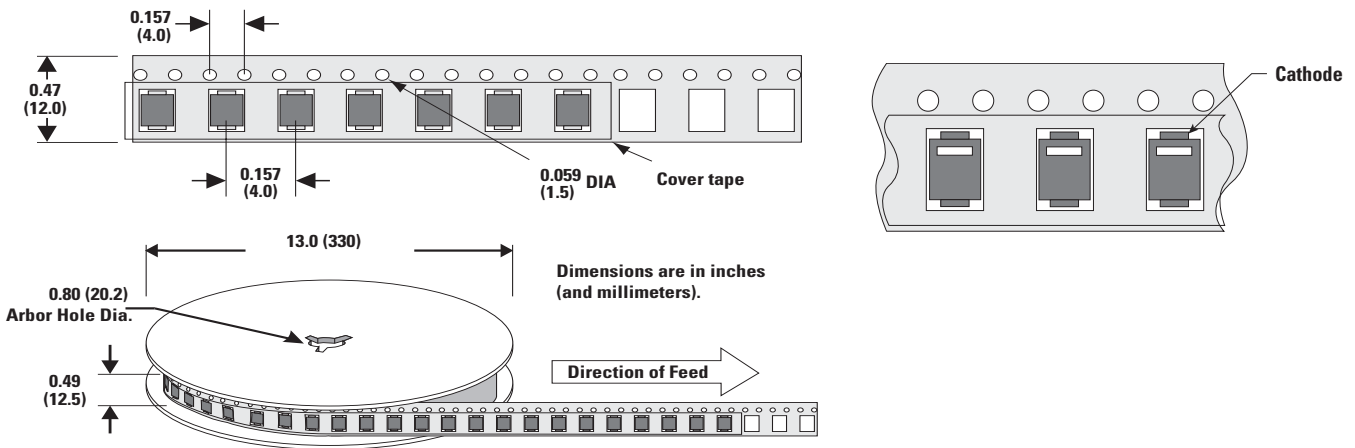
Part Marking System



Packaging



| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|----------------------------------|-------------------------|
| SMA6JxxXX | DO-214AC | 5000 | Tape & Reel - 12mm tape/13" reel | EIA RS-481 |

Tape and Reel Specification



Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View SMA6J6.0CA on WIN SOURCE](#)
-  [Littelfuse Inc. Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management