

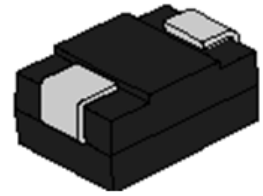


## SMCJxx(C)A-AU Series 1500W Transient Voltage Suppressor

Rev.1.0

### DESCRIPTION

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, telecommunications and intelligent control systems.



SMC



Bi-directional



Uni-directional

Symbol

### FEATURES

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 1500W peak pulse power capability at 10/1000µs waveform.
- ✧ Typical  $I_R$  less than 1µA above 11V.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature to reflow soldering: 260°C/40s at terminals.
- ✧ Plastic package has underwriters laboratory flammability 94V-0.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ IEC61000-4-2 (ESD) ±30kV (air), ±30kV (contact).
- ✧ UL 497B item recognized. (File No.:E480698).
- ✧ For surface mounted applications in order to optimize board space.
- ✧ High reliability application and automotive grade (AEC-Q101 qualified).

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , RH=45%-75%, unless otherwise noted)

| Parameter  | Symbol          | Value       | Unit |
|--|-----------------|-------------|------|
| Operating junction and storage temperature range                 | $T_{STG}/T_J$   | -55 to +150 | °C   |
| Steady state power dissipation at $T_L=75^\circ\text{C}$         | $P_{M(AV)}$     | 6.5         | W    |
| Peak pulse power dissipation at 10/1000µs waveform               | $P_{PP}$        | 1500        | W    |
| Maximum instantaneous forward voltage at 100A for unidirectional | $V_F$           | 5.0         | V    |
| Peak forward surge current, 8.3ms single half sine wave(Note 1)  | $I_{FSM}$       | 200         | A    |
| Typical thermal resistance junction to lead                      | $R_{\theta JL}$ | 15          | °C/W |
| Typical thermal resistance junction to ambient                   | $R_{\theta JA}$ | 75          | °C/W |

#### Notes:

1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

## MARKING



BDX: Device Marking Code  
1409: In ninth week, 2014

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

| Part Number |             | Marking |     | V <sub>R</sub> | I <sub>R@V<sub>R</sub></sub> | V <sub>BR@I<sub>T</sub></sub> |        | I <sub>T</sub> | V <sub>C@I<sub>PP</sub></sub> | I <sub>PP</sub> <sup>Ⓞ</sup> |
|-------------|-------------|---------|-----|----------------|------------------------------|-------------------------------|--------|----------------|-------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar    | Uni     | Bi  | V              | max(μA)                      | min(V)                        | max(V) | mA             | max(V)                        | A                            |
| SMCJ10A-AU  | SMCJ10CA-AU | GDX     | BDX | 10.0           | 5                            | 11.10                         | 12.30  | 1              | 17.0                          | 88.2                         |
| SMCJ11A-AU  | SMCJ11CA-AU | GDZ     | BDZ | 11.0           | 2                            | 12.20                         | 13.50  | 1              | 18.2                          | 82.4                         |
| SMCJ12A-AU  | SMCJ12CA-AU | GEE     | BEE | 12.0           | 1                            | 13.30                         | 14.70  | 1              | 19.9                          | 75.4                         |
| SMCJ13A-AU  | SMCJ13CA-AU | GEG     | BEG | 13.0           | 1                            | 14.40                         | 15.90  | 1              | 21.5                          | 69.8                         |
| SMCJ14A-AU  | SMCJ14CA-AU | GEK     | BEK | 14.0           | 1                            | 15.60                         | 17.20  | 1              | 23.2                          | 64.7                         |
| SMCJ15A-AU  | SMCJ15CA-AU | GEM     | BEM | 15.0           | 1                            | 16.70                         | 18.50  | 1              | 24.4                          | 61.5                         |
| SMCJ16A-AU  | SMCJ16CA-AU | GEP     | BEP | 16.0           | 1                            | 17.80                         | 19.70  | 1              | 26.0                          | 57.7                         |
| SMCJ17A-AU  | SMCJ17CA-AU | GER     | BER | 17.0           | 1                            | 18.90                         | 20.90  | 1              | 27.6                          | 54.4                         |
| SMCJ18A-AU  | SMCJ18CA-AU | GET     | BET | 18.0           | 1                            | 20.00                         | 22.10  | 1              | 29.2                          | 51.4                         |
| SMCJ20A-AU  | SMCJ20CA-AU | GEV     | BEV | 20.0           | 1                            | 22.20                         | 24.50  | 1              | 32.4                          | 46.3                         |
| SMCJ22A-AU  | SMCJ22CA-AU | GEX     | BEX | 22.0           | 1                            | 24.40                         | 26.90  | 1              | 35.5                          | 42.3                         |
| SMCJ24A-AU  | SMCJ24CA-AU | GEZ     | BEZ | 24.0           | 1                            | 26.70                         | 29.50  | 1              | 38.9                          | 38.6                         |
| SMCJ26A-AU  | SMCJ26CA-AU | GFE     | BFE | 26.0           | 1                            | 28.90                         | 31.90  | 1              | 42.1                          | 35.6                         |
| SMCJ28A-AU  | SMCJ28CA-AU | GFG     | BFG | 28.0           | 1                            | 31.10                         | 34.40  | 1              | 45.4                          | 33.1                         |
| SMCJ30A-AU  | SMCJ30CA-AU | GFK     | BFK | 30.0           | 1                            | 33.30                         | 36.80  | 1              | 48.4                          | 31.0                         |
| SMCJ33A-AU  | SMCJ33CA-AU | GFM     | BFM | 33.0           | 1                            | 36.70                         | 40.60  | 1              | 53.3                          | 28.2                         |
| SMCJ36A-AU  | SMCJ36CA-AU | GFP     | BFP | 36.0           | 1                            | 40.00                         | 44.20  | 1              | 58.1                          | 25.8                         |
| SMCJ40A-AU  | SMCJ40CA-AU | GFR     | BFR | 40.0           | 1                            | 44.40                         | 49.10  | 1              | 64.5                          | 23.3                         |
| SMCJ43A-AU  | SMCJ43CA-AU | GFT     | BFT | 43.0           | 1                            | 47.80                         | 52.80  | 1              | 69.4                          | 21.6                         |
| SMCJ45A-AU  | SMCJ45CA-AU | GFV     | BFV | 45.0           | 1                            | 50.00                         | 55.30  | 1              | 72.7                          | 20.6                         |
| SMCJ48A-AU  | SMCJ48CA-AU | GFX     | BFX | 48.0           | 1                            | 53.30                         | 58.90  | 1              | 77.4                          | 19.4                         |
| SMCJ51A-AU  | SMCJ51CA-AU | GFZ     | BFZ | 51.0           | 1                            | 56.70                         | 62.70  | 1              | 82.4                          | 18.2                         |
| SMCJ54A-AU  | SMCJ54CA-AU | GGE     | BGE | 54.0           | 1                            | 60.00                         | 66.30  | 1              | 87.1                          | 17.2                         |
| SMCJ58A-AU  | SMCJ58CA-AU | GGG     | BGG | 58.0           | 1                            | 64.40                         | 71.20  | 1              | 93.6                          | 16.1                         |

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, continued)

| Part Number |              | Marking |     | V <sub>R</sub> | I <sub>R@V<sub>R</sub></sub> | V <sub>BR@I<sub>T</sub></sub> |        | I <sub>T</sub> | V <sub>C@I<sub>PP</sub></sub> | I <sub>PP</sub> <sup>Ⓞ</sup> |
|-------------|--------------|---------|-----|----------------|------------------------------|-------------------------------|--------|----------------|-------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar     | Uni     | Bi  | V              | max(μA)                      | min(V)                        | max(V) | mA             | max(V)                        | A                            |
| SMCJ60A-AU  | SMCJ60CA-AU  | GGK     | BGK | 60.0           | 1                            | 66.70                         | 73.70  | 1              | 96.8                          | 15.5                         |
| SMCJ64A-AU  | SMCJ64CA-AU  | GGM     | BGM | 64.0           | 1                            | 71.10                         | 78.60  | 1              | 103.0                         | 14.6                         |
| SMCJ70A-AU  | SMCJ70CA-AU  | GGP     | BGP | 70.0           | 1                            | 77.80                         | 86.00  | 1              | 113.0                         | 13.3                         |
| SMCJ75A-AU  | SMCJ75CA-AU  | GGR     | BGR | 75.0           | 1                            | 83.30                         | 92.10  | 1              | 121.0                         | 12.4                         |
| SMCJ78A-AU  | SMCJ78CA-AU  | GGT     | BGT | 78.0           | 1                            | 86.70                         | 95.80  | 1              | 126.0                         | 11.9                         |
| SMCJ85A-AU  | SMCJ85CA-AU  | GGV     | BGV | 85.0           | 1                            | 94.40                         | 104.0  | 1              | 137.0                         | 11.0                         |
| SMCJ90A-AU  | SMCJ90CA-AU  | GGX     | BGX | 90.0           | 1                            | 100.0                         | 111.0  | 1              | 146.0                         | 10.3                         |
| SMCJ100A-AU | SMCJ100CA-AU | GGZ     | BGZ | 100.0          | 1                            | 111.0                         | 123.0  | 1              | 162.0                         | 9.3                          |
| SMCJ110A-AU | SMCJ110CA-AU | GHE     | BHE | 110.0          | 1                            | 122.0                         | 135.0  | 1              | 177.0                         | 8.5                          |
| SMCJ120A-AU | SMCJ120CA-AU | GHG     | BHG | 120.0          | 1                            | 133.0                         | 147.0  | 1              | 193.0                         | 7.8                          |
| SMCJ130A-AU | SMCJ130CA-AU | GHK     | BHK | 130.0          | 1                            | 144.0                         | 159.0  | 1              | 209.0                         | 7.2                          |
| SMCJ150A-AU | SMCJ150CA-AU | GHM     | BHM | 150.0          | 1                            | 167.0                         | 185.0  | 1              | 243.0                         | 6.2                          |
| SMCJ160A-AU | SMCJ160CA-AU | GHP     | BHP | 160.0          | 1                            | 178.0                         | 197.0  | 1              | 259.0                         | 5.8                          |
| SMCJ170A-AU | SMCJ170CA-AU | GHR     | BHR | 170.0          | 1                            | 189.0                         | 209.0  | 1              | 275.0                         | 5.5                          |
| SMCJ180A-AU | SMCJ180CA-AU | GHT     | BHT | 180.0          | 1                            | 201.0                         | 222.0  | 1              | 292.0                         | 5.2                          |
| SMCJ190A-AU | SMCJ190CA-AU | GHU     | BHU | 190.0          | 1                            | 211.0                         | 234.0  | 1              | 307.0                         | 4.9                          |
| SMCJ200A-AU | SMCJ200CA-AU | GHV     | BHV | 200.0          | 1                            | 224.0                         | 247.0  | 1              | 324.0                         | 4.7                          |
| SMCJ210A-AU | SMCJ210CA-AU | GHW     | BHW | 210.0          | 1                            | 233.0                         | 258.0  | 1              | 337.0                         | 4.5                          |
| SMCJ220A-AU | SMCJ220CA-AU | GHX     | BHX | 220.0          | 1                            | 246.0                         | 272.0  | 1              | 356.0                         | 4.2                          |
| SMCJ250A-AU | SMCJ250CA-AU | GJG     | BJG | 250.0          | 1                            | 279.0                         | 309.0  | 1              | 405.0                         | 3.7                          |
| SMCJ300A-AU | SMCJ300CA-AU | GJK     | BJK | 300.0          | 1                            | 335.0                         | 371.0  | 1              | 486.0                         | 3.1                          |
| SMCJ350A-AU | SMCJ350CA-AU | GJM     | BJM | 350.0          | 1                            | 391.0                         | 432.0  | 1              | 567.0                         | 2.7                          |
| SMCJ400A-AU | SMCJ400CA-AU | GJP     | BJP | 400.0          | 1                            | 447.0                         | 494.0  | 1              | 648.0                         | 2.3                          |
| SMCJ440A-AU | SMCJ440CA-AU | GJR     | BJR | 440.0          | 1                            | 492.0                         | 543.0  | 1              | 713.0                         | 2.1                          |

Ⓞ Surge waveform: 10/1000μs

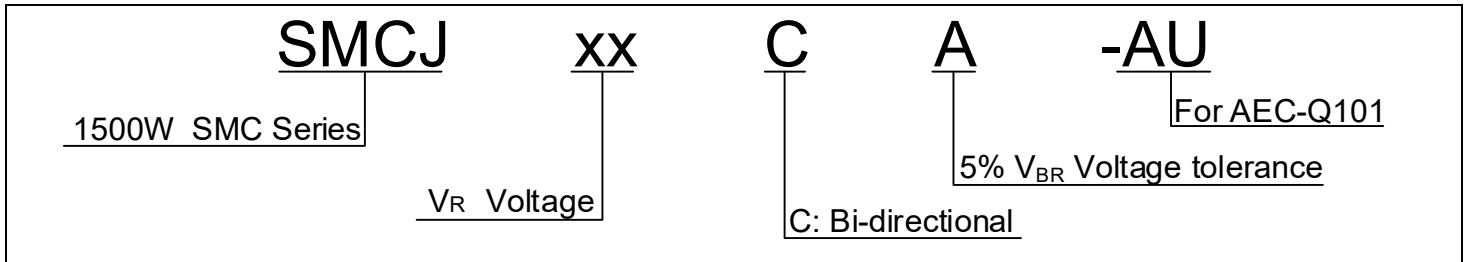
V<sub>R</sub>: Stand-off voltage -- maximum voltage that can be applied

V<sub>BR</sub>: Breakdown voltage

V<sub>C</sub>: Clamping voltage -- peak voltage measured across the suppressor at a specified I<sub>PP</sub>

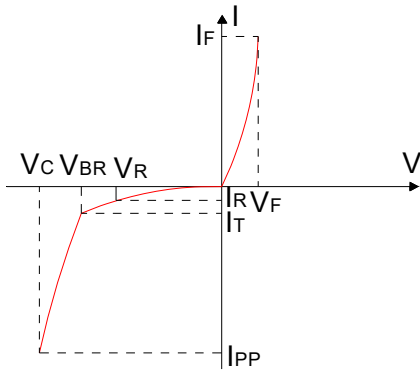
I<sub>R</sub>: Reverse leakage current

## ORDERING INFORMATION

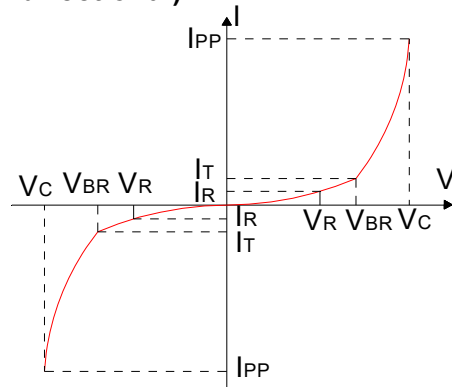


## RATINGS AND V-I CHARACTERISTICS CURVES (T<sub>A</sub>=25°C, unless otherwise noted)

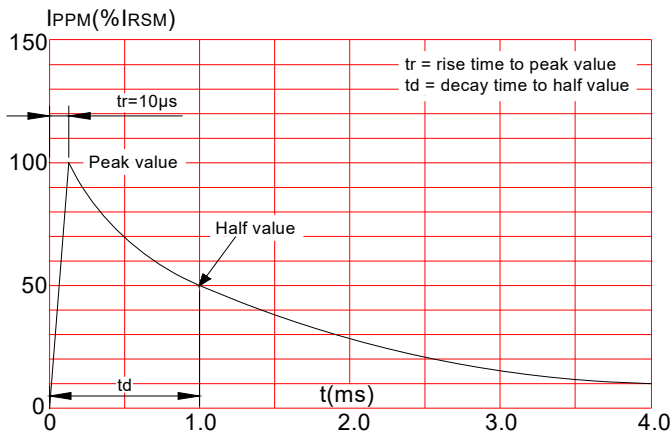
**FIG.1: V- I curve characteristics (Uni-directional)**



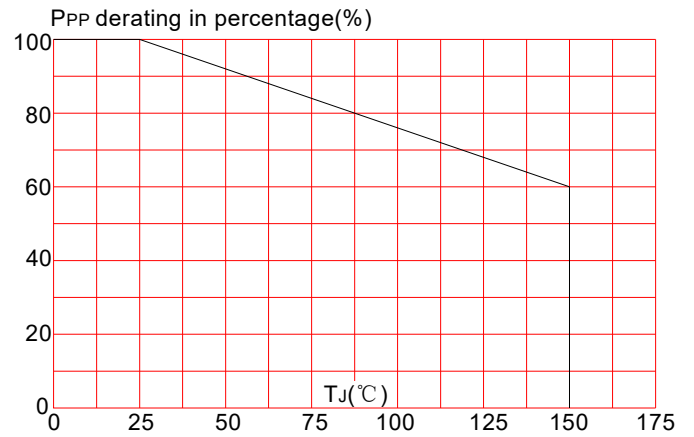
**FIG.2: V- I curve characteristics (Bi-directional)**



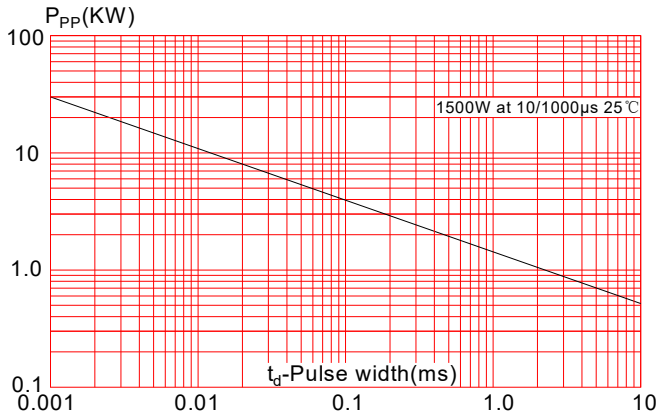
**FIG.3: Pulse waveform**



**FIG.4: Pulse derating curve**

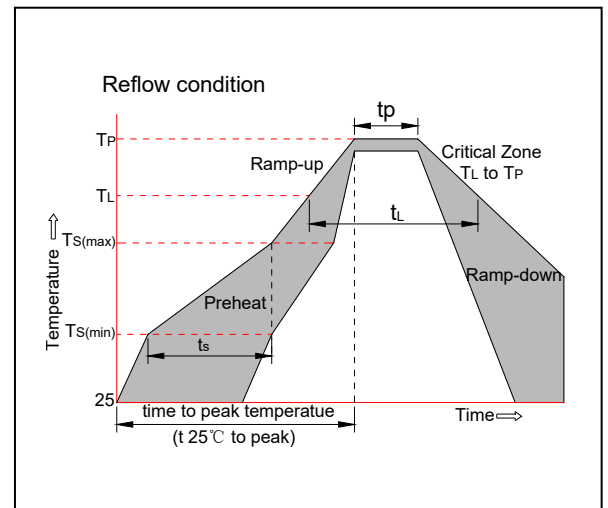


**FIG.5: Peak pulse power dissipation vs. pulse width**

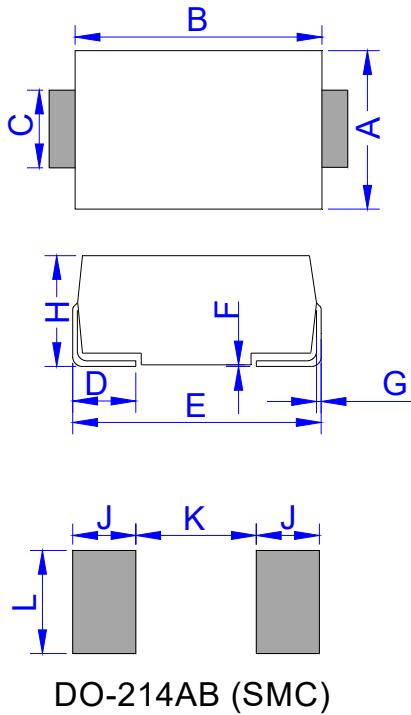


## SOLDERING PARAMETERS

|  |                                   |   |
|--|-----------------------------------|---|
| Reflow Condition                                       |                                   | Pb-Free assembly<br>(see figure at right) |
| Pre Heat   | -Temperature Min ( $T_{s(min)}$ ) | +150°C                                    |
|  | -Temperature Max( $T_{s(max)}$ )  | +200°C                                    |
|  | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.                              |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max                              |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                   | 3°C/sec. Max                              |
| Reflow   | -Temperature( $T_L$ )(Liquidus)   | +217°C                                    |
|  | -Temperature( $t_L$ )             | 60-150 secs.                              |
| Peak Temp ( $T_p$ )                                    |                                   | +260(+0/-5)°C                             |
| Time within 5°C of actual Peak Temp ( $t_p$ )          |                                   | 20-40secs.                                |
| Ramp-down Rate   |                                   | 6°C/sec. Max                              |
| Time 25°C to Peak Temp ( $T_p$ )                       |                                   | 8 min. Max                                |
| Do not exceed  |                                   | +260°C                                    |

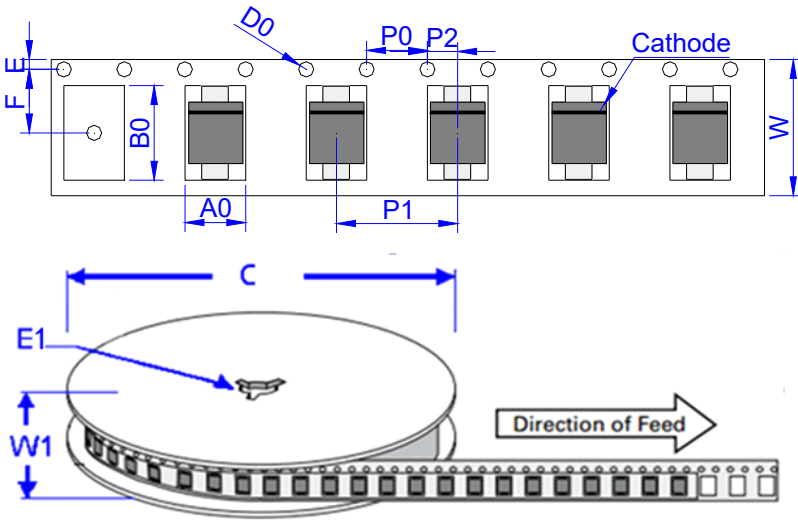


PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |       |        |       |
|------|-------------|-------|--------|-------|
|      | Millimeters |       | Inches |       |
|      | Min.        | Max.  | Min.   | Max.  |
| A    | 5.75        | 6.25  | 0.226  | 0.246 |
| B    | 6.90        | 7.40  | 0.272  | 0.291 |
| C    | 2.75        | 3.25  | 0.108  | 0.128 |
| D    | 0.95        | 1.52  | 0.037  | 0.060 |
| E    | 7.70        | 8.20  | 0.303  | 0.323 |
| F    | 0.051       | 0.203 | 0.002  | 0.008 |
| G    | 0.15        | 0.31  | 0.006  | 0.012 |
| H    | 2.15        | 2.62  | 0.085  | 0.103 |
| J    | 2.40        |       | 0.094  |       |
| K    |             | 4.20  |        | 0.165 |
| L    | 3.30        |       | 0.130  |       |

TAPE AND REEL SPECIFICATION-SMC



| Ref. | Dimensions  |                |
|------|-------------|----------------|
|      | Millimeters | Inches         |
| A0   | 6.05 ± 0.3  | 0.238 ± 0.012  |
| B0   | 8.31 ± 0.3  | 0.327 ± 0.012  |
| C    | 330.0       | 13.0           |
| D0   | 1.55 ± 0.1  | 0.061 ± 0.004  |
| E    | 1.75 ± 0.2  | 0.069 ± 0.008  |
| E1   | 13.3 ± 0.3  | 0.524 ± 0.012  |
| F    | 7.50 ± 0.2  | 0.295 ± 0.008  |
| P0   | 4.00 ± 0.2  | 0.157 ± 0.008  |
| P1   | 8.00 ± 0.2  | 0.3145 ± 0.008 |
| P2   | 2.00 ± 0.2  | 0.079 ± 0.008  |
| W    | 16.0 ± 0.2  | 0.630 ± 0.008  |
| W1   | 19.7 ± 2.0  | 0.776 ± 0.079  |

| PART No.      | UNIT WEIGHT (g/PCS) typ. | REEL (PCS) | PER CARTON (PCS) | DESCRIPTION       |
|---------------|--------------------------|------------|------------------|-------------------|
| SMCJxxA/CA-AU | 0.262                    | 3,000      | 48,000           | 13 inch reel pack |

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