

400W, 6.8V - 200V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Ideal for automated placement
- Glass passivated chip junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps
- Typical I_R less than $1\mu A$ above 10V
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

| KEY PARAMETERS | | |
|--|----------------|------|
| PARAMETER | VALUE | UNIT |
| V_{WM} | 5.5 - 171 | V |
| V_{BR} | 6.12 - 210 | V |
| P_{PPM} $t_p = 10/1000\mu s$ waveform | 400 | W |
| $T_{J MAX}$ | 150 | °C |
| Package | DO-214AC (SMA) | |
| Configuration | Single die | |



APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter

MECHANICAL DATA

- Case: DO-214AC (SMA)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.060g (approximately)



DO-214AC (SMA)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ unless otherwise noted) | | | |
|--|-----------|-------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation at $T_A = 25^\circ C$, $t_p = 1ms$ (Note 1) | P_{PK} | 400 | W |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load | I_{FSM} | 40 | A |
| Maximum instantaneous forward voltage at 25A for unidirectional only | V_F | 3.5 | V |
| Operating junction temperature range | T_J | -55 to +150 | °C |
| Storage temperature range | T_{STG} | -55 to +150 | °C |

Notes:

1. Non-repetitive current pulse per Fig.5 and derated above $T_A = 25^\circ C$ per Fig.2

Devices for Bipolar Applications

1. For bidirectional use CH or CAH suffix for types P4SMA6.8H - types P4SMA200AH
2. Electrical characteristics apply in both directions

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

| Part number | Marking code | Breakdown voltage V _{BR} @I _T ⁽¹⁾ (V) | | Test current I _T (mA) | Working stand-off voltage V _{WM} (V) | Maximum reverse leakage current I _R @V _{WM} ⁽¹⁾ (μA) | Maximum peak impulse current I _{PPM} (A) t _p = 10/1000 μs | Maximum clamping voltage V _C @I _{PPM} (V) t _p = 10/1000 μs | Maximum Temperature Coefficient of V _{BR} (%/°C) |
|-------------|--------------|--|-------|--|---|---|---|---|---|
| | | Min | Max | | | | | | |
| P4SMA6.8H | ADJ | 6.12 | 7.48 | 10 | 5.50 | 1000 | 38.0 | 10.8 | 0.057 |
| P4SMA6.8AH | AEJ | 6.46 | 7.14 | 10 | 5.80 | 1000 | 40.0 | 10.5 | 0.057 |
| P4SMA7.5H | AFJ | 6.75 | 8.25 | 10 | 6.05 | 500 | 35.0 | 11.7 | 0.061 |
| P4SMA7.5AH | AGJ | 7.13 | 7.88 | 10 | 6.40 | 500 | 37.0 | 11.3 | 0.061 |
| P4SMA8.2H | AHJ | 7.38 | 9.02 | 10 | 6.63 | 200 | 33.0 | 12.5 | 0.065 |
| P4SMA8.2AH | AKJ | 7.79 | 8.61 | 10 | 7.02 | 200 | 34.0 | 12.1 | 0.065 |
| P4SMA9.1H | ALJ | 8.19 | 10.00 | 1.0 | 7.37 | 50 | 30.0 | 13.8 | 0.068 |
| P4SMA9.1AH | AMJ | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 31.0 | 13.4 | 0.068 |
| P4SMA10H | ANJ | 9.00 | 11.00 | 1.0 | 8.10 | 10 | 28.0 | 15.0 | 0.073 |
| P4SMA10AH | APJ | 9.50 | 10.50 | 1.0 | 8.55 | 10 | 29.0 | 14.5 | 0.073 |
| P4SMA11H | AQJ | 9.90 | 12.10 | 1.0 | 8.92 | 1 | 26.0 | 16.2 | 0.075 |
| P4SMA11AH | ARJ | 10.50 | 11.60 | 1.0 | 9.40 | 1 | 27.0 | 15.6 | 0.075 |
| P4SMA12H | ASJ | 10.80 | 13.20 | 1.0 | 9.72 | 1 | 24.0 | 17.3 | 0.078 |
| P4SMA12AH | ATJ | 11.40 | 12.60 | 1.0 | 10.2 | 1 | 25.0 | 16.7 | 0.078 |
| P4SMA13H | AUJ | 11.70 | 14.30 | 1.0 | 10.5 | 1 | 22.0 | 19.0 | 0.081 |
| P4SMA13AH | AVJ | 12.40 | 13.70 | 1.0 | 11.1 | 1 | 23.0 | 18.2 | 0.081 |
| P4SMA15H | AWJ | 13.50 | 16.50 | 1.0 | 12.1 | 1 | 19.0 | 22.0 | 0.084 |
| P4SMA15AH | AXJ | 14.30 | 15.80 | 1.0 | 12.8 | 1 | 20.0 | 21.2 | 0.084 |
| P4SMA16H | AYJ | 14.40 | 17.60 | 1.0 | 12.9 | 1 | 17.8 | 23.5 | 0.086 |
| P4SMA16AH | AZJ | 15.20 | 16.80 | 1.0 | 13.6 | 1 | 18.6 | 22.5 | 0.086 |
| P4SMA18H | BDJ | 16.20 | 19.80 | 1.0 | 14.5 | 1 | 16.0 | 26.5 | 0.088 |
| P4SMA18AH | BEJ | 17.10 | 18.90 | 1.0 | 15.3 | 1 | 16.5 | 25.5 | 0.088 |
| P4SMA20H | BFJ | 18.00 | 22.00 | 1.0 | 16.2 | 1 | 14.0 | 29.1 | 0.090 |
| P4SMA20AH | BGJ | 19.00 | 21.00 | 1.0 | 17.1 | 1 | 15.0 | 27.7 | 0.090 |
| P4SMA22H | BHJ | 19.80 | 24.20 | 1.0 | 17.8 | 1 | 13.0 | 31.9 | 0.092 |
| P4SMA22AH | BKJ | 20.90 | 23.10 | 1.0 | 18.8 | 1 | 13.7 | 30.6 | 0.092 |
| P4SMA24H | BLJ | 21.60 | 26.40 | 1.0 | 19.4 | 1 | 12.0 | 34.7 | 0.094 |
| P4SMA24AH | BMJ | 22.80 | 25.20 | 1.0 | 20.5 | 1 | 12.6 | 33.2 | 0.094 |
| P4SMA27H | BNJ | 24.30 | 29.70 | 1.0 | 21.8 | 1 | 10.7 | 39.1 | 0.096 |
| P4SMA27AH | BPJ | 25.70 | 28.40 | 1.0 | 23.1 | 1 | 11.0 | 37.5 | 0.096 |
| P4SMA30H | BQJ | 27.00 | 33.00 | 1.0 | 24.3 | 1 | 9.6 | 43.5 | 0.097 |
| P4SMA30AH | BRJ | 28.50 | 31.50 | 1.0 | 25.6 | 1 | 10.0 | 41.4 | 0.097 |
| P4SMA33H | BSJ | 29.70 | 36.30 | 1.0 | 26.8 | 1 | 8.8 | 47.7 | 0.098 |
| P4SMA33AH | BTJ | 31.40 | 34.70 | 1.0 | 28.2 | 1 | 9.0 | 45.7 | 0.098 |
| P4SMA36H | BUJ | 32.40 | 39.60 | 1.0 | 29.1 | 1 | 8.0 | 52.0 | 0.099 |
| P4SMA36AH | BVJ | 34.20 | 37.80 | 1.0 | 30.8 | 1 | 8.4 | 49.9 | 0.099 |
| P4SMA39H | BWJ | 35.10 | 42.90 | 1.0 | 31.6 | 1 | 7.4 | 56.4 | 0.100 |
| P4SMA39AH | BXJ | 37.10 | 41.00 | 1.0 | 33.3 | 1 | 7.7 | 53.9 | 0.100 |
| P4SMA43H | BYJ | 38.70 | 47.30 | 1.0 | 34.8 | 1 | 6.7 | 61.9 | 0.101 |
| P4SMA43AH | BZJ | 40.90 | 45.20 | 1.0 | 36.8 | 1 | 7.0 | 59.3 | 0.101 |
| P4SMA47H | CDJ | 42.30 | 51.70 | 1.0 | 38.1 | 1 | 6.2 | 67.8 | 0.101 |
| P4SMA47AH | CEJ | 44.70 | 49.40 | 1.0 | 40.2 | 1 | 6.4 | 64.8 | 0.101 |
| P4SMA51H | CFJ | 45.90 | 56.10 | 1.0 | 41.3 | 1 | 5.7 | 73.5 | 0.102 |
| P4SMA51AH | CGJ | 48.50 | 53.60 | 1.0 | 43.6 | 1 | 6.0 | 70.1 | 0.102 |
| P4SMA56H | CHJ | 50.40 | 61.60 | 1.0 | 45.4 | 1 | 5.2 | 80.5 | 0.103 |
| P4SMA56AH | CKJ | 53.20 | 58.80 | 1.0 | 47.8 | 1 | 5.4 | 77.0 | 0.103 |
| P4SMA62H | CLJ | 55.8 | 68.2 | 1.0 | 50.2 | 1 | 4.7 | 89.0 | 0.104 |
| P4SMA62AH | CMJ | 58.9 | 65.1 | 1.0 | 53.0 | 1 | 5.0 | 85.0 | 0.104 |

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

| Part number | Marking code | Breakdown voltage V _{BR} @I _T ⁽¹⁾ (V) | | Test current I _T (mA) | Working stand-off voltage V _{WM} (V) | Maximum reverse leakage current I _R @V _{WM} ⁽¹⁾ (μA) | Maximum peak impulse current I _{PPM} (A) t _p = 10/1000 μs | Maximum clamping voltage V _C @I _{PPM} (V) t _p = 10/1000 μs | Maximum Temperature Coefficient of V _{BR} (%/°C) |
|-------------|--------------|--|------|--|---|---|---|---|---|
| | | Min | Max | | | | | | |
| P4SMA68H | CNJ | 61.2 | 74.8 | 1.0 | 55.1 | 1 | 4.2 | 98.0 | 0.104 |
| P4SMA68AH | CPJ | 64.6 | 71.4 | 1.0 | 58.1 | 1 | 4.5 | 92.0 | 0.104 |
| P4SMA75H | CQJ | 67.5 | 82.5 | 1.0 | 60.7 | 1 | 3.8 | 108 | 0.105 |
| P4SMA75AH | CRJ | 71.3 | 78.8 | 1.0 | 64.1 | 1 | 4.0 | 103 | 0.105 |
| P4SMA82H | CSJ | 73.8 | 90.2 | 1.0 | 66.4 | 1 | 3.5 | 118 | 0.105 |
| P4SMA82AH | CTJ | 77.9 | 86.1 | 1.0 | 70.1 | 1 | 3.7 | 113 | 0.105 |
| P4SMA91H | CUJ | 81.9 | 100 | 1.0 | 73.7 | 1 | 3.2 | 131 | 0.106 |
| P4SMA91AH | CVJ | 86.5 | 95.5 | 1.0 | 77.8 | 1 | 3.3 | 125 | 0.106 |
| P4SMA100H | CWJ | 90 | 110 | 1.0 | 81.0 | 1 | 2.9 | 144 | 0.106 |
| P4SMA100AH | CXJ | 95 | 105 | 1.0 | 85.5 | 1 | 3.0 | 137 | 0.106 |
| P4SMA110H | CYJ | 99 | 121 | 1.0 | 89.2 | 1 | 2.6 | 158 | 0.107 |
| P4SMA110AH | CZJ | 105 | 116 | 1.0 | 94.0 | 1 | 2.7 | 152 | 0.107 |
| P4SMA120H | RDJ | 108 | 132 | 1.0 | 97.2 | 1 | 2.4 | 173 | 0.107 |
| P4SMA120AH | REJ | 114 | 126 | 1.0 | 102 | 1 | 2.5 | 165 | 0.107 |
| P4SMA130H | RFJ | 117 | 143 | 1.0 | 105 | 1 | 2.2 | 187 | 0.107 |
| P4SMA130AH | RGJ | 124 | 137 | 1.0 | 111 | 1 | 2.3 | 179 | 0.107 |
| P4SMA150H | RHJ | 135 | 165 | 1.0 | 121 | 1 | 1.9 | 215 | 0.108 |
| P4SMA150AH | RKJ | 143 | 158 | 1.0 | 128 | 1 | 2.0 | 207 | 0.108 |
| P4SMA160H | RLJ | 144 | 176 | 1.0 | 130 | 1 | 1.8 | 230 | 0.108 |
| P4SMA160AH | RMJ | 152 | 168 | 1.0 | 136 | 1 | 1.9 | 219 | 0.108 |
| P4SMA170H | RNJ | 153 | 187 | 1.0 | 138 | 1 | 1.7 | 244 | 0.108 |
| P4SMA170AH | RPJ | 162 | 179 | 1.0 | 145 | 1 | 1.8 | 234 | 0.108 |
| P4SMA180H | RQJ | 162 | 198 | 1.0 | 146 | 1 | 1.6 | 258 | 0.108 |
| P4SMA180AH | RRJ | 171 | 189 | 1.0 | 154 | 1 | 1.7 | 246 | 0.108 |
| P4SMA200H | RSJ | 180 | 220 | 1.0 | 162 | 1 | 1.4 | 287 | 0.108 |
| P4SMA200AH | RTJ | 190 | 210 | 1.0 | 171 | 1 | 1.51 | 274 | 0.108 |

Notes:

1. V_{BR} measure after I_T applied for 300μs, I_T = square wave pulse or equivalent.
2. Surge current waveform per Figure.5 and derate per Figure.2.
3. For bipolar types having V_{WM} of 10 volts and under, the I_D limit is doubled.
4. For bidirectional use CH or CAH suffix for types PS4MA6.8H through P4SMA200AH.
5. All terms and symbols are consistent with ANSI/IEEE C62.35.

ORDERING INFORMATION

| ORDERING CODE ⁽¹⁾ | PACKAGE | PACKING |
|------------------------------|----------------|---------------------|
| P4SMAxH | DO-214AC (SMA) | 7,500 / Tape & Reel |

Notes:

1. "x" defines voltage from 6.8V(P4SMA6.8H) to 200V(P4SMA200AH)

CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 Peak Pulse Power Rating Curve



Fig.2 Pulse Derating Curve



Fig.3 Typical Junction Capacitance



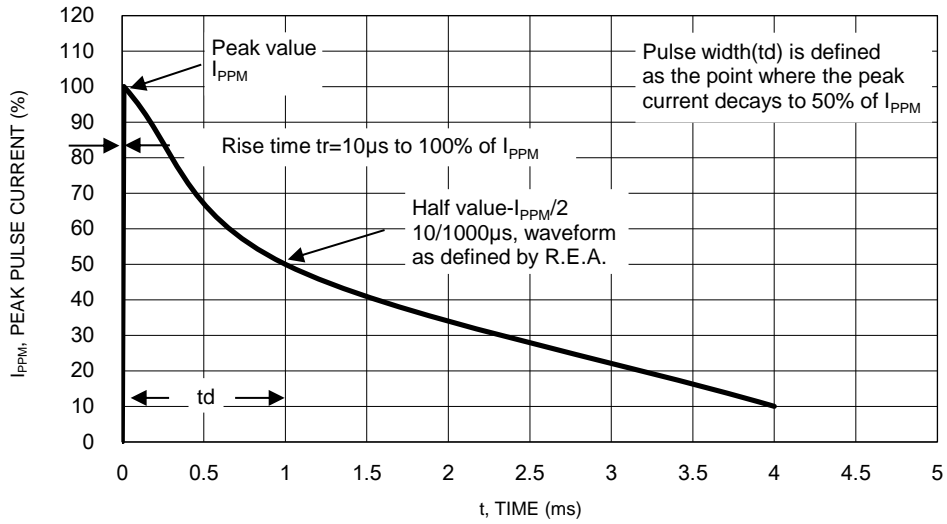
Fig.4 Maximum Non-repetitive Forward Surge Current



CHARACTERISTICS CURVES

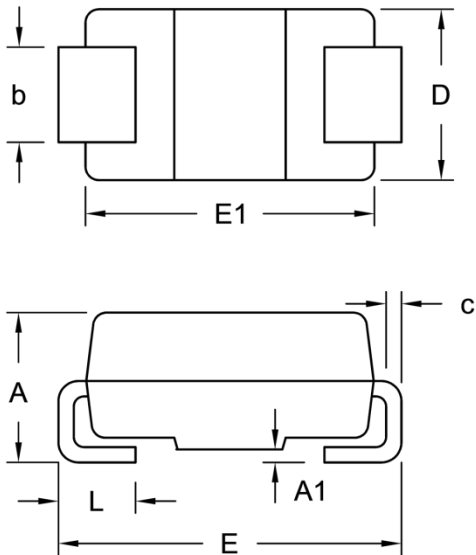
($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.5 Clamping Power Pulse Waveform



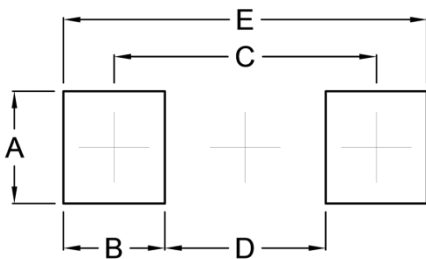
PACKAGE OUTLINE DIMENSIONS

DO-214AC (SMA)



| DIM. | Unit (mm) | | Unit (inch) | |
|------|-----------|------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.99 | 2.50 | 0.078 | 0.098 |
| A1 | 0.10 | 0.20 | 0.004 | 0.008 |
| b | 1.27 | 1.58 | 0.050 | 0.062 |
| c | 0.15 | 0.31 | 0.006 | 0.012 |
| D | 2.29 | 2.83 | 0.090 | 0.111 |
| E | 4.95 | 5.33 | 0.195 | 0.210 |
| E1 | 4.06 | 4.60 | 0.160 | 0.181 |
| L | 0.90 | 1.41 | 0.035 | 0.056 |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 1.68 | 0.066 |
| B | 1.52 | 0.060 |
| C | 3.93 | 0.155 |
| D | 2.41 | 0.095 |
| E | 5.45 | 0.215 |

MARKING DIAGRAM



Cathode band for uni-directional products only

- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code