

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

FEATURES

- 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 μ 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

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)

| 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_{JMAX} | 150 | °C |
| Package | DO-214AC (SMA) | |
| Configuration | Single die | |



DO-214AC (SMA)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | |
|------------------------------------------------------------------------------------|-----------|-------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation at $T_A = 25^\circ\text{C}$, $t_p = 1\text{ms}$ (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 $T_A = 25^\circ\text{C}$ per Fig.2

Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types P4SMA6.8 - types P4SMA200A
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 | | | | | | |
| P4SMA6.8 | ADJ | 6.12 | 7.48 | 10 | 5.50 | 1000 | 38.0 | 10.8 | 0.057 |
| P4SMA6.8A | AEJ | 6.46 | 7.14 | 10 | 5.80 | 1000 | 40.0 | 10.5 | 0.057 |
| P4SMA7.5 | AFJ | 6.75 | 8.25 | 10 | 6.05 | 500 | 35.0 | 11.7 | 0.061 |
| P4SMA7.5A | AGJ | 7.13 | 7.88 | 10 | 6.40 | 500 | 37.0 | 11.3 | 0.061 |
| P4SMA8.2 | AHJ | 7.38 | 9.02 | 10 | 6.63 | 200 | 33.0 | 12.5 | 0.065 |
| P4SMA8.2A | AKJ | 7.79 | 8.61 | 10 | 7.02 | 200 | 34.0 | 12.1 | 0.065 |
| P4SMA9.1 | ALJ | 8.19 | 10.00 | 1.0 | 7.37 | 50 | 30.0 | 13.8 | 0.068 |
| P4SMA9.1A | AMJ | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 31.0 | 13.4 | 0.068 |
| P4SMA10 | ANJ | 9.00 | 11.00 | 1.0 | 8.10 | 10 | 28.0 | 15.0 | 0.073 |
| P4SMA10A | APJ | 9.50 | 10.50 | 1.0 | 8.55 | 10 | 29.0 | 14.5 | 0.073 |
| P4SMA11 | AQJ | 9.90 | 12.10 | 1.0 | 8.92 | 1 | 26.0 | 16.2 | 0.075 |
| P4SMA11A | ARJ | 10.50 | 11.60 | 1.0 | 9.40 | 1 | 27.0 | 15.6 | 0.075 |
| P4SMA12 | ASJ | 10.80 | 13.20 | 1.0 | 9.72 | 1 | 24.0 | 17.3 | 0.078 |
| P4SMA12A | ATJ | 11.40 | 12.60 | 1.0 | 10.2 | 1 | 25.0 | 16.7 | 0.078 |
| P4SMA13 | AUJ | 11.70 | 14.30 | 1.0 | 10.5 | 1 | 22.0 | 19.0 | 0.081 |
| P4SMA13A | AVJ | 12.40 | 13.70 | 1.0 | 11.1 | 1 | 23.0 | 18.2 | 0.081 |
| P4SMA15 | AWJ | 13.50 | 16.50 | 1.0 | 12.1 | 1 | 19.0 | 22.0 | 0.084 |
| P4SMA15A | AXJ | 14.30 | 15.80 | 1.0 | 12.8 | 1 | 20.0 | 21.2 | 0.084 |
| P4SMA16 | AYJ | 14.40 | 17.60 | 1.0 | 12.9 | 1 | 17.8 | 23.5 | 0.086 |
| P4SMA16A | AZJ | 15.20 | 16.80 | 1.0 | 13.6 | 1 | 18.6 | 22.5 | 0.086 |
| P4SMA18 | BDJ | 16.20 | 19.80 | 1.0 | 14.5 | 1 | 16.0 | 26.5 | 0.088 |
| P4SMA18A | BEJ | 17.10 | 18.90 | 1.0 | 15.3 | 1 | 16.5 | 25.5 | 0.088 |
| P4SMA20 | BFJ | 18.00 | 22.00 | 1.0 | 16.2 | 1 | 14.0 | 29.1 | 0.090 |
| P4SMA20A | BGJ | 19.00 | 21.00 | 1.0 | 17.1 | 1 | 15.0 | 27.7 | 0.090 |
| P4SMA22 | BHJ | 19.80 | 24.20 | 1.0 | 17.8 | 1 | 13.0 | 31.9 | 0.092 |
| P4SMA22A | BKJ | 20.90 | 23.10 | 1.0 | 18.8 | 1 | 13.7 | 30.6 | 0.092 |
| P4SMA24 | BLJ | 21.60 | 26.40 | 1.0 | 19.4 | 1 | 12.0 | 34.7 | 0.094 |
| P4SMA24A | BMJ | 22.80 | 25.20 | 1.0 | 20.5 | 1 | 12.6 | 33.2 | 0.094 |
| P4SMA27 | BNJ | 24.30 | 29.70 | 1.0 | 21.8 | 1 | 10.7 | 39.1 | 0.096 |
| P4SMA27A | BPJ | 25.70 | 28.40 | 1.0 | 23.1 | 1 | 11.0 | 37.5 | 0.096 |
| P4SMA30 | BQJ | 27.00 | 33.00 | 1.0 | 24.3 | 1 | 9.6 | 43.5 | 0.097 |
| P4SMA30A | BRJ | 28.50 | 31.50 | 1.0 | 25.6 | 1 | 10.0 | 41.4 | 0.097 |
| P4SMA33 | BSJ | 29.70 | 36.30 | 1.0 | 26.8 | 1 | 8.8 | 47.7 | 0.098 |
| P4SMA33A | BTJ | 31.40 | 34.70 | 1.0 | 28.2 | 1 | 9.0 | 45.7 | 0.098 |
| P4SMA36 | BUJ | 32.40 | 39.60 | 1.0 | 29.1 | 1 | 8.0 | 52.0 | 0.099 |
| P4SMA36A | BVJ | 34.20 | 37.80 | 1.0 | 30.8 | 1 | 8.4 | 49.9 | 0.099 |
| P4SMA39 | BWJ | 35.10 | 42.90 | 1.0 | 31.6 | 1 | 7.4 | 56.4 | 0.100 |
| P4SMA39A | BXJ | 37.10 | 41.00 | 1.0 | 33.3 | 1 | 7.7 | 53.9 | 0.100 |
| P4SMA43 | BYJ | 38.70 | 47.30 | 1.0 | 34.8 | 1 | 6.7 | 61.9 | 0.101 |
| P4SMA43A | BZJ | 40.90 | 45.20 | 1.0 | 36.8 | 1 | 7.0 | 59.3 | 0.101 |
| P4SMA47 | CDJ | 42.30 | 51.70 | 1.0 | 38.1 | 1 | 6.2 | 67.8 | 0.101 |
| P4SMA47A | CEJ | 44.70 | 49.40 | 1.0 | 40.2 | 1 | 6.4 | 64.8 | 0.101 |
| P4SMA51 | CFJ | 45.90 | 56.10 | 1.0 | 41.3 | 1 | 5.7 | 73.5 | 0.102 |
| P4SMA51A | CGJ | 48.50 | 53.60 | 1.0 | 43.6 | 1 | 6.0 | 70.1 | 0.102 |
| P4SMA56 | CHJ | 50.40 | 61.60 | 1.0 | 45.4 | 1 | 5.2 | 80.5 | 0.103 |
| P4SMA56A | CKJ | 53.20 | 58.80 | 1.0 | 47.8 | 1 | 5.4 | 77.0 | 0.103 |
| P4SMA62 | CLJ | 55.8 | 68.2 | 1.0 | 50.2 | 1 | 4.7 | 89.0 | 0.104 |
| P4SMA62A | CMJ | 58.9 | 65.1 | 1.0 | 53.0 | 1 | 5.0 | 85.0 | 0.104 |

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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) $t_p = 10/1000 \mu\text{s}$ | Maximum clamping voltage $V_C@I_{PPM}$ (V) $t_p = 10/1000 \mu\text{s}$ | Maximum Temperature Coefficient of V_{BR} (%/°C) |
|-------------|--------------|------------------------------------------------|------|-------------------------------|----------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------|
| | | Min | Max | | | | | | |
| P4SMA68 | CNJ | 61.2 | 74.8 | 1.0 | 55.1 | 1 | 4.2 | 98.0 | 0.104 |
| P4SMA68A | CPJ | 64.6 | 71.4 | 1.0 | 58.1 | 1 | 4.5 | 92.0 | 0.104 |
| P4SMA75 | CQJ | 67.5 | 82.5 | 1.0 | 60.7 | 1 | 3.8 | 108 | 0.105 |
| P4SMA75A | CRJ | 71.3 | 78.8 | 1.0 | 64.1 | 1 | 4.0 | 103 | 0.105 |
| P4SMA82 | CSJ | 73.8 | 90.2 | 1.0 | 66.4 | 1 | 3.5 | 118 | 0.105 |
| P4SMA82A | CTJ | 77.9 | 86.1 | 1.0 | 70.1 | 1 | 3.7 | 113 | 0.105 |
| P4SMA91 | CUJ | 81.9 | 100 | 1.0 | 73.7 | 1 | 3.2 | 131 | 0.106 |
| P4SMA91A | CVJ | 86.5 | 95.5 | 1.0 | 77.8 | 1 | 3.3 | 125 | 0.106 |
| P4SMA100 | CWJ | 90 | 110 | 1.0 | 81.0 | 1 | 2.9 | 144 | 0.106 |
| P4SMA100A | CXJ | 95 | 105 | 1.0 | 85.5 | 1 | 3.0 | 137 | 0.106 |
| P4SMA110 | CYJ | 99 | 121 | 1.0 | 89.2 | 1 | 2.6 | 158 | 0.107 |
| P4SMA110A | CZJ | 105 | 116 | 1.0 | 94.0 | 1 | 2.7 | 152 | 0.107 |
| P4SMA120 | RDJ | 108 | 132 | 1.0 | 97.2 | 1 | 2.4 | 173 | 0.107 |
| P4SMA120A | REJ | 114 | 126 | 1.0 | 102 | 1 | 2.5 | 165 | 0.107 |
| P4SMA130 | RFJ | 117 | 143 | 1.0 | 105 | 1 | 2.2 | 187 | 0.107 |
| P4SMA130A | RGJ | 124 | 137 | 1.0 | 111 | 1 | 2.3 | 179 | 0.107 |
| P4SMA150 | RHJ | 135 | 165 | 1.0 | 121 | 1 | 1.9 | 215 | 0.108 |
| P4SMA150A | RKJ | 143 | 158 | 1.0 | 128 | 1 | 2.0 | 207 | 0.108 |
| P4SMA160 | RLJ | 144 | 176 | 1.0 | 130 | 1 | 1.8 | 230 | 0.108 |
| P4SMA160A | RMJ | 152 | 168 | 1.0 | 136 | 1 | 1.9 | 219 | 0.108 |
| P4SMA170 | RNJ | 153 | 187 | 1.0 | 138 | 1 | 1.7 | 244 | 0.108 |
| P4SMA170A | RPJ | 162 | 179 | 1.0 | 145 | 1 | 1.8 | 234 | 0.108 |
| P4SMA180 | RQJ | 162 | 198 | 1.0 | 146 | 1 | 1.6 | 258 | 0.108 |
| P4SMA180A | RRJ | 171 | 189 | 1.0 | 154 | 1 | 1.7 | 246 | 0.108 |
| P4SMA200 | RSJ | 180 | 220 | 1.0 | 162 | 1 | 1.4 | 287 | 0.108 |
| P4SMA200A | RTJ | 190 | 210 | 1.0 | 171 | 1 | 1.51 | 274 | 0.108 |

Notes:

1. V_{BR} measure after I_T applied for $300\mu\text{s}$, $I_T =$ 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 C or CA suffix for types PS4MA6.8 through P4SMA200A.
5. All terms and symbols are consistent with ANSI/IEEE C62.35.

ORDERING INFORMATION

| ORDERING CODE ⁽¹⁾ | PACKAGE | PACKING |
|------------------------------|----------------|---------------------|
| P4SMAx | DO-214AC (SMA) | 7,500 / Tape & Reel |

Notes:

1. "x" defines voltage from 6.8V(P4SMA6.8) to 200V(P4SMA200A)

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Rating Curve



Fig.2 Pulse Derating Curve

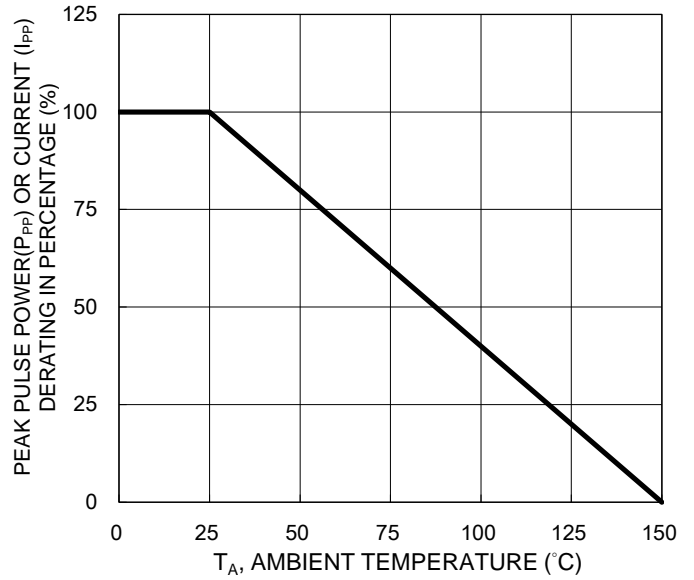


Fig.3 Typical Junction Capacitance

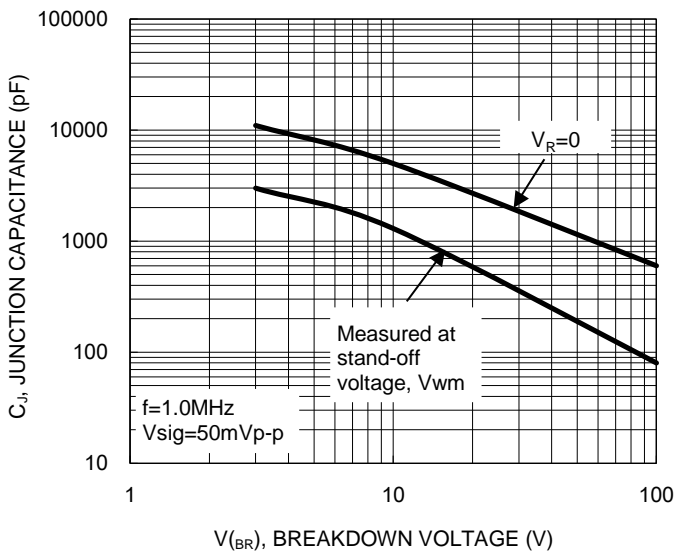
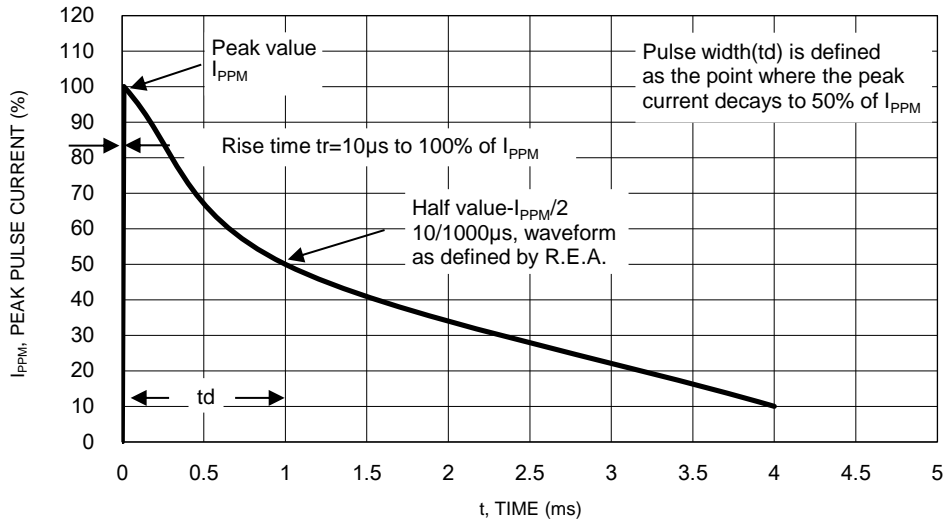


Fig.4 Maximum Non-repetitive Forward Surge Current



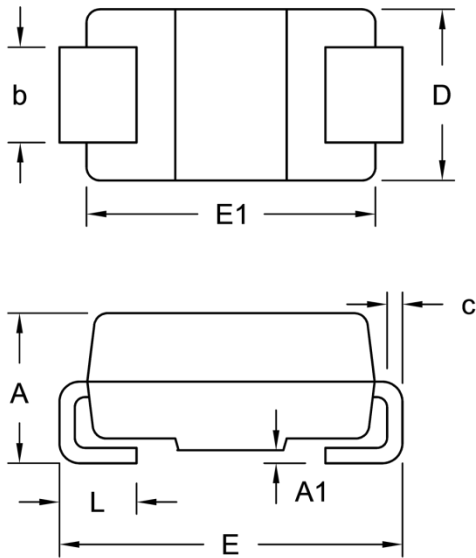
CHARACTERISTICS CURVES

Fig.5 Clamping Power Pulse Waveform



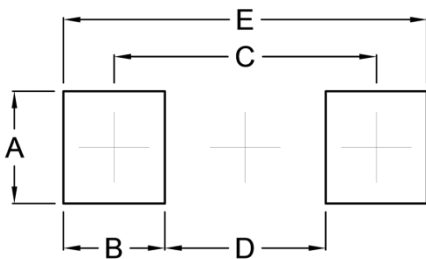
PACKAGE OUTLINE DIMENSIONS

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