

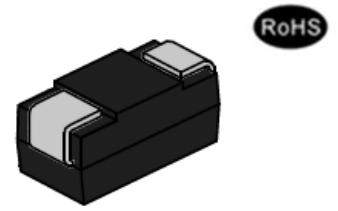


P4SMAxx(C)AS Series 400W Transient Voltage Suppressor

Rev.1.2

DESCRIPTION:

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



SMA



Bi-directional



Uni-directional

Symbol

FEATURES:

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 400W peak pulse power capability at 10/1000μs waveform.
- ✧ Typical I_R less than 1μA above 12V.
- ✧ 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.
- ✧ For surface mounted applications in order to optimize board space.
- ✧ IEC61000-4-2 (ESD) ±30kV (air), ±30kV (contact).

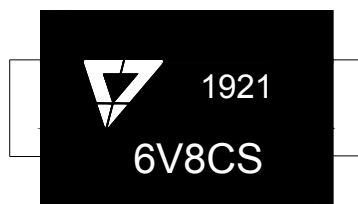
ABSOLUTE MAXIMUM RATINGS (T_A=25°C, RH=45%-75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|----------------------------------|-------------|------|
| Storage and operating junction temperature range | T _{STG} /T _J | -55 to +150 | °C |
| Peak pulse power dissipation at 10/1000μs waveform | P _{PP} | 400 | W |
| Steady state power dissipation at T _L =75°C | P _{M(AV)} | 3.3 | W |
| Maximum instantaneous forward voltage at 25A for unidirectional | V _F | 5.0 | V |
| Peak forward surge current, 8.3ms single half sine wave(Note 1) | I _{FSM} | 60 | A |
| Typical thermal resistance junction to lead | R _{θJL} | 30 | °C/W |
| Typical thermal resistance junction to ambient | R _{θJA} | 120 | °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



6V8CS : Device Marking Code
1921: the 21th week, 2019

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$)

| Part Number | | Marking | | V_R | $I_R@V_R$ | $V_{BR}@I_T$ | | I_T | $V_C@I_{PP}$ | $I_{PP}^{\text{①}}$ |
|-------------|-------------|---------|-------|-------|----------------------|--------------|--------|-------|--------------|---------------------|
| Uni-polar | Bi-polar | Uni | Bi | V | max(μA) | min(V) | max(V) | mA | V | A |
| P4SMA6.8AS | P4SMA6.8CAS | 6V8AS | 6V8CS | 5.8 | 120 | 6.45 | 7.14 | 10 | 10.5 | 39.0 |
| P4SMA7.5AS | P4SMA7.5CAS | 7V5AS | 7V5CS | 6.4 | 80 | 7.13 | 7.88 | 10 | 11.3 | 36.3 |
| P4SMA8.2AS | P4SMA8.2CAS | 8V2AS | 8V2CS | 7.02 | 50 | 7.79 | 8.61 | 10 | 12.1 | 33.9 |
| P4SMA9.1AS | P4SMA9.1CAS | 9V1AS | 9V1CS | 7.78 | 20 | 8.65 | 9.55 | 1 | 13.4 | 30.6 |
| P4SMA10AS | P4SMA10CAS | 10AS | 10CS | 8.55 | 10 | 9.50 | 10.50 | 1 | 14.5 | 28.3 |
| P4SMA11AS | P4SMA11CAS | 11AS | 11CS | 9.4 | 5 | 10.50 | 11.60 | 1 | 15.6 | 26.3 |
| P4SMA12AS | P4SMA12CAS | 12AS | 12CS | 10.2 | 2 | 11.40 | 12.60 | 1 | 16.7 | 24.6 |
| P4SMA13AS | P4SMA13CAS | 13AS | 13CS | 11.1 | 1 | 12.40 | 13.70 | 1 | 18.2 | 22.5 |
| P4SMA15AS | P4SMA15CAS | 15AS | 15CS | 12.8 | 1 | 14.30 | 15.80 | 1 | 21.2 | 19.3 |
| P4SMA16AS | P4SMA16CAS | 16AS | 16CS | 13.6 | 1 | 15.20 | 16.80 | 1 | 22.5 | 18.2 |
| P4SMA18AS | P4SMA18CAS | 18AS | 18CS | 15.3 | 1 | 17.10 | 18.90 | 1 | 25.2 | 16.1 |
| P4SMA20AS | P4SMA20CAS | 20AS | 20CS | 17.1 | 1 | 19.00 | 21.00 | 1 | 27.7 | 14.8 |
| P4SMA22AS | P4SMA22CAS | 22AS | 22CS | 18.8 | 1 | 20.90 | 23.10 | 1 | 30.6 | 13.4 |
| P4SMA24AS | P4SMA24CAS | 24AS | 24CS | 20.5 | 1 | 22.80 | 25.20 | 1 | 33.2 | 12.3 |
| P4SMA27AS | P4SMA27CAS | 27AS | 27CS | 23.1 | 1 | 25.70 | 28.40 | 1 | 37.5 | 10.9 |
| P4SMA30AS | P4SMA30CAS | 30AS | 30CS | 25.6 | 1 | 28.50 | 31.50 | 1 | 41.4 | 9.9 |
| P4SMA33AS | P4SMA33CAS | 33AS | 33CS | 28.2 | 1 | 31.40 | 34.70 | 1 | 45.7 | 9.0 |
| P4SMA36AS | P4SMA36CAS | 36AS | 36CS | 30.8 | 1 | 34.20 | 37.80 | 1 | 49.9 | 8.2 |
| P4SMA39AS | P4SMA39CAS | 39AS | 39CS | 33.3 | 1 | 37.10 | 41.00 | 1 | 53.9 | 7.6 |
| P4SMA43AS | P4SMA43CAS | 43AS | 43CS | 36.8 | 1 | 40.90 | 45.20 | 1 | 59.3 | 6.9 |
| P4SMA47AS | P4SMA47CAS | 47AS | 47CS | 40.2 | 1 | 44.70 | 49.40 | 1 | 64.8 | 6.3 |
| P4SMA51AS | P4SMA51CAS | 51AS | 51CS | 43.6 | 1 | 48.50 | 53.60 | 1 | 70.1 | 5.8 |
| P4SMA56AS | P4SMA56CAS | 56AS | 56CS | 47.8 | 1 | 53.20 | 58.80 | 1 | 77.0 | 5.2 |

ELECTRICAL CHARACTERISTICS (T_A=25°C, continued)

| Part Number | | Marking | | V _R | I _{R@V_R} | V _{BR@I_T} | | I _T | V _{C@I_{PP}} | I _{PP} ^① |
|-------------|-------------|---------|-------|----------------|------------------------------|-------------------------------|--------|----------------|-------------------------------|------------------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | max(μA) | min(V) | max(V) | mA | V | A |
| P4SMA62AS | P4SMA62CAS | 62AS | 62CS | 53.0 | 1 | 58.90 | 65.10 | 1 | 85.0 | 4.8 |
| P4SMA68AS | P4SMA68CAS | 68AS | 68CS | 58.1 | 1 | 64.60 | 71.40 | 1 | 92.0 | 4.5 |
| P4SMA75AS | P4SMA75CAS | 75AS | 75CS | 64.1 | 1 | 71.30 | 78.80 | 1 | 103.0 | 4.0 |
| P4SMA82AS | P4SMA82CAS | 82AS | 82CS | 70.1 | 1 | 77.90 | 86.10 | 1 | 113.0 | 3.6 |
| P4SMA91AS | P4SMA91CAS | 91AS | 91CS | 77.8 | 1 | 86.50 | 95.50 | 1 | 125.0 | 3.3 |
| P4SMA100AS | P4SMA100CAS | 100AS | 100CS | 85.5 | 1 | 95.00 | 105.0 | 1 | 137.0 | 3.0 |
| P4SMA110AS | P4SMA110CAS | 110AS | 110CS | 94.0 | 1 | 105.0 | 116.0 | 1 | 152.0 | 2.7 |
| P4SMA120AS | P4SMA120CAS | 120AS | 120CS | 102 | 1 | 114.0 | 126.0 | 1 | 165.0 | 2.5 |

① Surge waveform: 10/1000μs

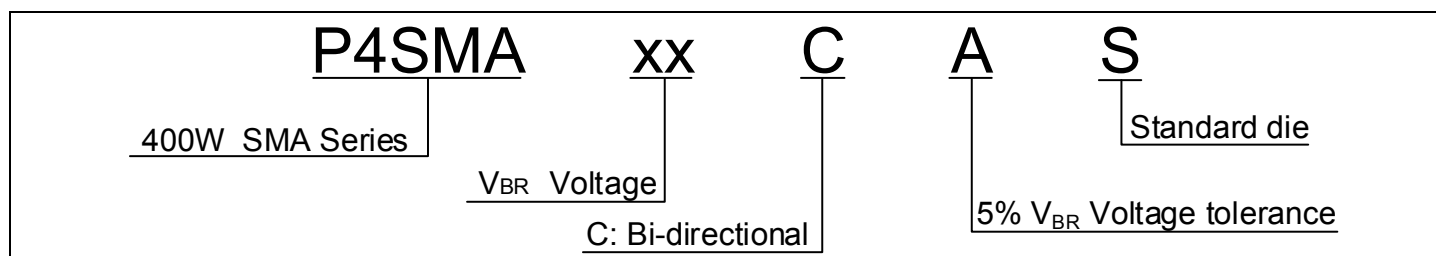
V_R: Stand-off voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown voltage

V_C: Clamping voltage -- Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

ORDERING INFORMATION



RATINGS AND V-I CHARACTERISTICS CURVES (T_A=25°C, unless otherwise noted)

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

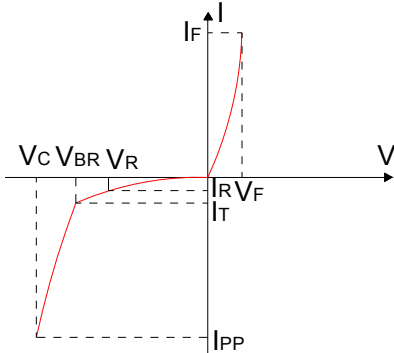


FIG.2:V- I curve characteristics (Bi-directional)

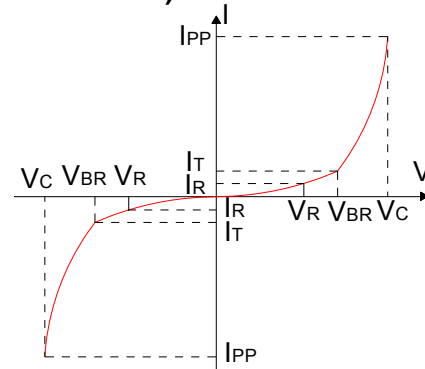


FIG.3: Pulse waveform

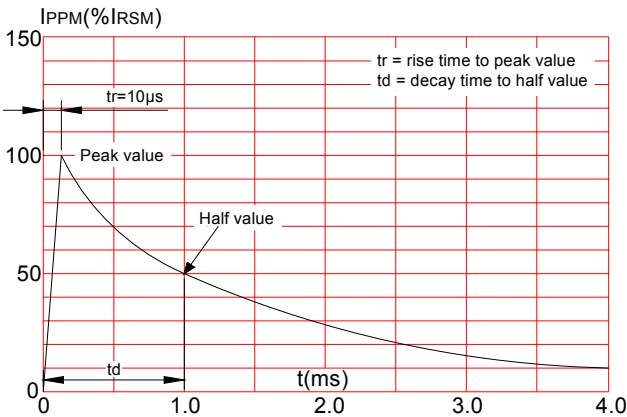
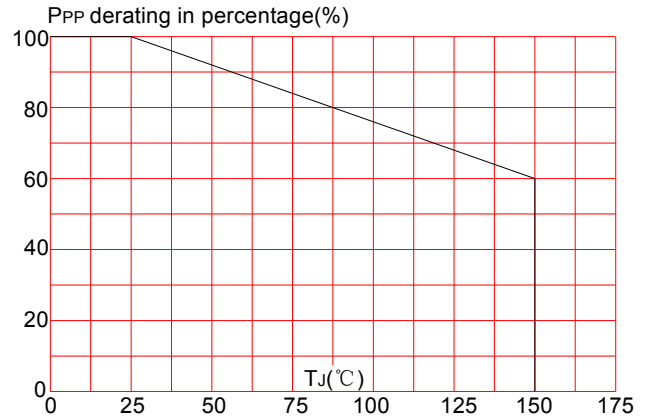
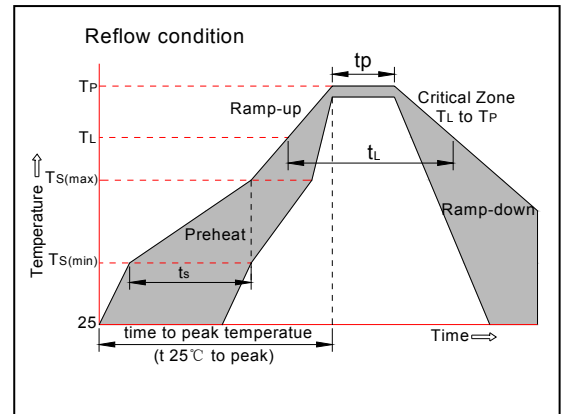


FIG.4: Pulse derating curve

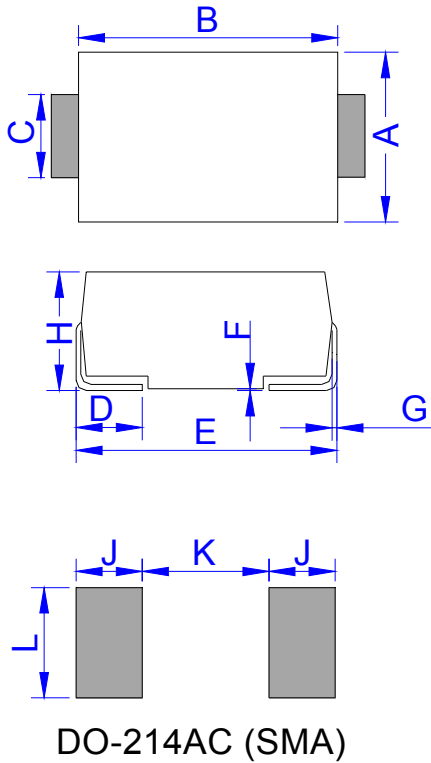


SOLDERING PARAMETERS

| Reflow Condition | | Pb-Free assembly (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 |

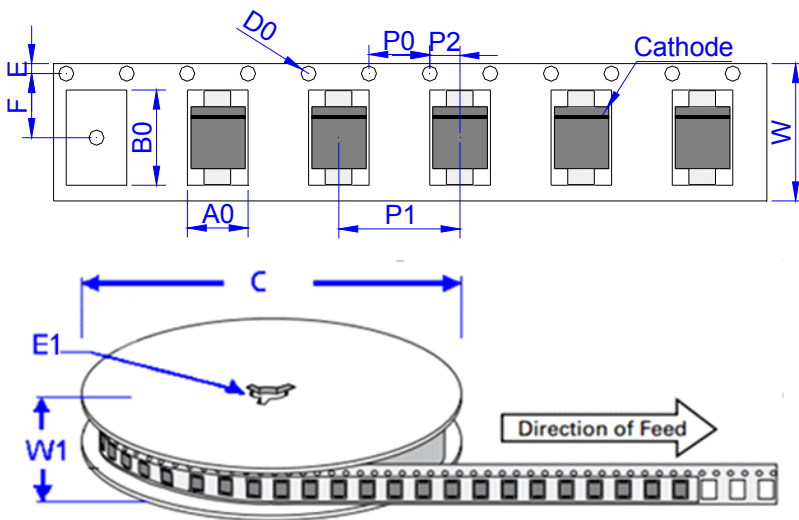


PACKAGE MECHANICAL DATA



| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 2.60 | 3.00 | 0.102 | 0.118 |
| B | 4.15 | 4.65 | 0.163 | 0.183 |
| C | 1.25 | 1.65 | 0.049 | 0.065 |
| D | 0.95 | 1.52 | 0.037 | 0.060 |
| E | 4.90 | 5.30 | 0.193 | 0.209 |
| F | 0.051 | 0.203 | 0.002 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 2.00 | 2.44 | 0.079 | 0.096 |
| J | 2.00 | | 0.079 | |
| K | | 2.30 | | 0.091 |
| L | 1.80 | | 0.071 | |

TAPE AND REEL SPECIFICATION-SMA



| Ref. | Dimensions | |
|------|-------------|---------------|
| | Millimeters | Inches |
| A0 | 2.79 ± 0.3 | 0.110 ± 0.012 |
| B0 | 5.33 ± 0.3 | 0.210 ± 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 | 5.5 ± 0.2 | 0.217 ± 0.008 |
| P0 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P1 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P2 | 2.00 ± 0.2 | 0.079 ± 0.008 |
| W | 12.0 ± 0.2 | 0.472 ± 0.008 |
| W1 | 15.7 ± 2.0 | 0.618 ± 0.079 |

| PART No. | UNIT WEIGHT (g/PCS) typ. | REEL (PCS) | PER CARTON (PCS) | DESCRIPTION |
|---------------|--------------------------|------------|------------------|-------------------|
| P4SMAxxAS/CAS | 0.067 | 7,500 | 120,000 | 13 inch reel pack |

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