

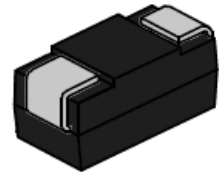


## P4SMA Series 400W Transient Voltage Suppressor

Rev.3.1

### 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-direction

Symbol

### FEATURES:

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 400W peak pulse power capability at 10×1000μs waveform.
- ✧ Typical I<sub>R</sub> less than 1μA above 11V.
- ✧ Fast response time: typically less than 1.0ps from 0V to V<sub>BR</sub> 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-STD020, LF maximum peak of 260°C.
- ✧ For surface mounted applications in order to optimize board space.

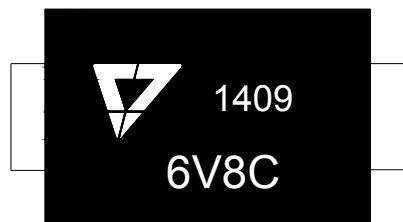
### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, RH=45%-75%, unless otherwise noted)

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



6V8C : 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</sub> @ V <sub>R</sub>	V <sub>BR</sub> @I <sub>T</sub>		I <sub>T</sub>	V <sub>C</sub> @ I <sub>PP</sub>	I <sub>PP</sub> <sup>①</sup>
Uni-polar	Bi-polar	Uni	Bi	(V)	μA	min(V)	max(V)	mA	V	A
P4SMA6.8A	P4SMA6.8CA	6V8A	6V8C	5.8	120	6.45	7.14	10	10.5	39.0
P4SMA7.5A	P4SMA7.5CA	7V5A	7V5C	6.4	80	7.13	7.88	10	11.3	36.3
P4SMA8.2A	P4SMA8.2CA	8V2A	8V2C	7.02	50	7.79	8.61	10	12.1	33.9
P4SMA9.1A	P4SMA9.1CA	9V1A	9V1C	7.78	20	8.65	9.55	1	13.4	30.6
P4SMA10A	P4SMA10CA	10A	10C	8.55	10	9.50	10.50	1	14.5	28.3
P4SMA11A	P4SMA11CA	11A	11C	9.4	5	10.50	11.60	1	15.6	26.3
P4SMA12A	P4SMA12CA	12A	12C	10.2	2	11.40	12.60	1	16.7	24.6
P4SMA13A	P4SMA13CA	13A	13C	11.1	1	12.40	13.70	1	18.2	22.5
P4SMA15A	P4SMA15CA	15A	15C	12.8	1	14.30	15.80	1	21.2	19.3
P4SMA16A	P4SMA16CA	16A	16C	13.6	1	15.20	16.80	1	22.5	18.2
P4SMA18A	P4SMA18CA	18A	18C	15.3	1	17.10	18.90	1	25.2	16.1
P4SMA20A	P4SMA20CA	20A	20C	17.1	1	19.00	21.00	1	27.7	14.8
P4SMA22A	P4SMA22CA	22A	22C	18.8	1	20.90	23.10	1	30.6	13.4
P4SMA24A	P4SMA24CA	24A	24C	20.5	1	22.80	25.20	1	33.2	12.3
P4SMA27A	P4SMA27CA	27A	27C	23.1	1	25.70	28.40	1	37.5	10.9
P4SMA30A	P4SMA30CA	30A	30C	25.6	1	28.50	31.50	1	41.4	9.9
P4SMA33A	P4SMA33CA	33A	33C	28.2	1	31.40	34.70	1	45.7	9.0
P4SMA36A	P4SMA36CA	36A	36C	30.8	1	34.20	37.80	1	49.9	8.2
P4SMA39A	P4SMA39CA	39A	39C	33.3	1	37.10	41.00	1	53.9	7.6
P4SMA43A	P4SMA43CA	43A	43C	36.8	1	40.90	45.20	1	59.3	6.9
P4SMA47A	P4SMA47CA	47A	47C	40.2	1	44.70	49.40	1	64.8	6.3

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

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	$\mu\text{A}$	min(V)	max(V)	mA	V	A
P4SMA51A	P4SMA51CA	51A	51C	43.6	1	48.50	53.60	1	70.1	5.8
P4SMA56A	P4SMA56CA	56A	56C	47.8	1	53.20	58.80	1	77.0	5.2
P4SMA62A	P4SMA62CA	62A	62C	53.0	1	58.90	65.10	1	85.0	4.8
P4SMA68A	P4SMA68CA	68A	68C	58.1	1	64.60	71.40	1	92.0	4.5
P4SMA75A	P4SMA75CA	75A	75C	64.1	1	71.30	78.80	1	103.0	4.0
P4SMA82A	P4SMA82CA	82A	82C	70.1	1	77.90	86.10	1	113.0	3.6
P4SMA91A	P4SMA91CA	91A	91C	77.8	1	86.50	95.50	1	125.0	3.3
P4SMA100A	P4SMA100CA	100A	100C	85.5	1	95.00	105.0	1	137.0	3.0
P4SMA110A	P4SMA110CA	110A	110C	94.0	1	105.0	116.0	1	152.0	2.7
P4SMA120A	P4SMA120CA	120A	120C	102	1	114.0	126.0	1	165.0	2.5
P4SMA130A	P4SMA130CA	130A	130C	111	1	124.0	137.0	1	179.0	2.3
P4SMA150A	P4SMA150CA	150A	150C	128	1	143.0	158.0	1	207.0	2.0
P4SMA160A	P4SMA160CA	160A	160C	136	1	152.0	168.0	1	219.0	1.9
P4SMA170A	P4SMA170CA	170A	170C	145	1	162.0	179.0	1	234.0	1.8
P4SMA180A	P4SMA180CA	180A	180C	154	1	171.0	189.0	1	246.0	1.6
P4SMA200A	P4SMA200CA	200A	200C	171	1	190.0	210.0	1	274.0	1.5
P4SMA220A	P4SMA220CA	220A	220C	185	1	209.0	231.0	1	328.0	1.3
P4SMA235A	P4SMA235CA	235A	235C	200	1	223.0	246	1	324.0	1.3
P4SMA250A	P4SMA250CA	250A	250C	214	1	237.0	263.0	1	344.0	1.2
P4SMA300A	P4SMA300CA	300A	300C	256	1	285.0	315.0	1	414.0	1.0
P4SMA350A	P4SMA350CA	350A	350C	300	1	332.0	368.0	1	482.0	0.9
P4SMA400A	P4SMA400CA	400A	400C	342	1	380.0	420.0	1	548.0	0.8
P4SMA440A	P4SMA440CA	440A	440C	376	1	418.0	462.0	1	602.0	0.7

① Surge waveform: 10/1000 $\mu\text{s}$

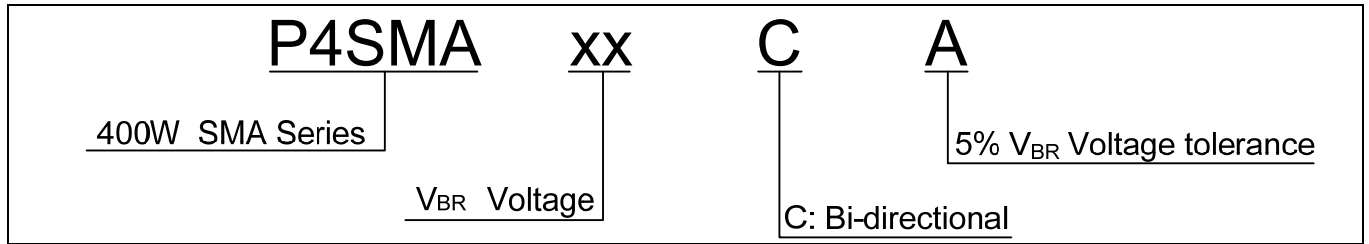
$V_R$ : Stand-off voltage -- Maximum voltage that can be applied

$V_{BR}$ : 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 ( $T_A=25^{\circ}C$ , unless otherwise noted)

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

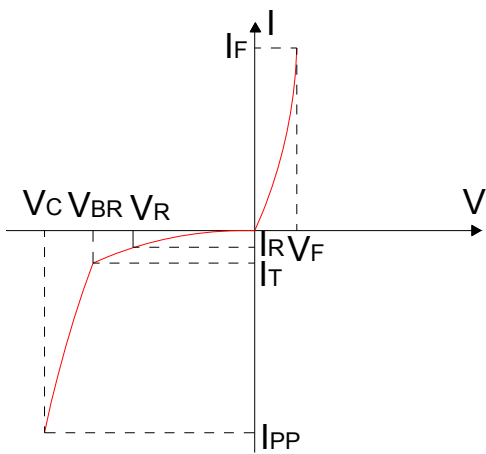


FIG.2:V- I curve characteristics (Bi-directional)

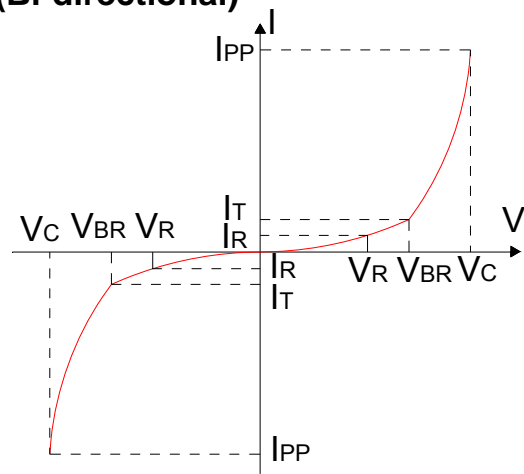


FIG.3: Pulse waveform

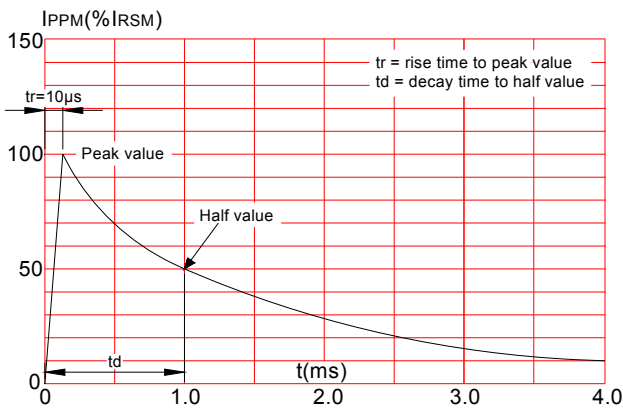
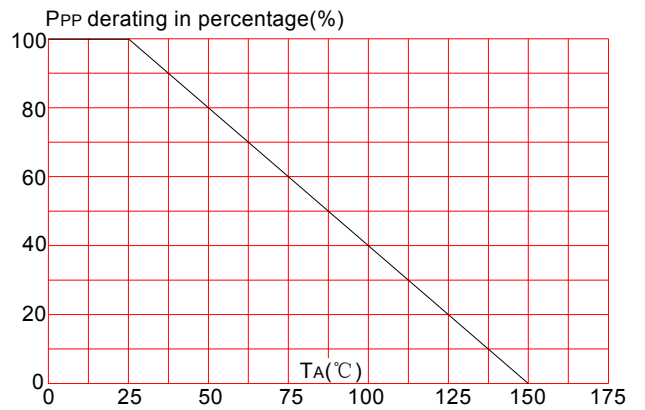
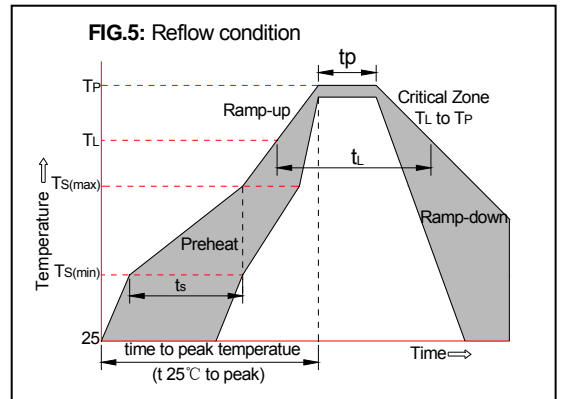


FIG.4: Pulse derating curve

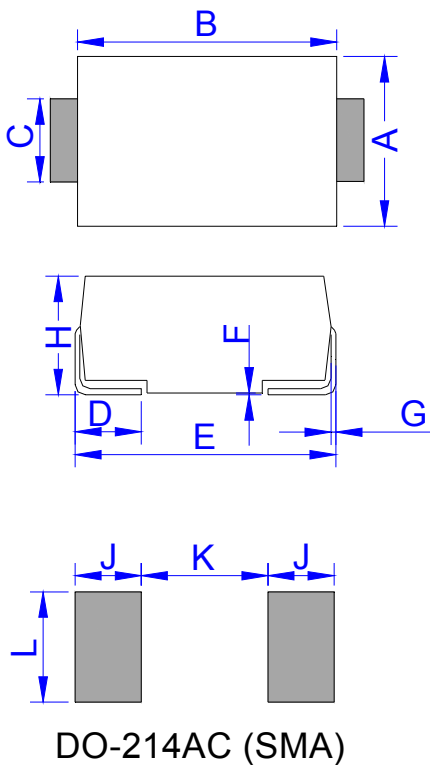


**SOLDERING PARAMETERS**

Reflow Condition		Pb-Free assembly (see FIG.5)
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

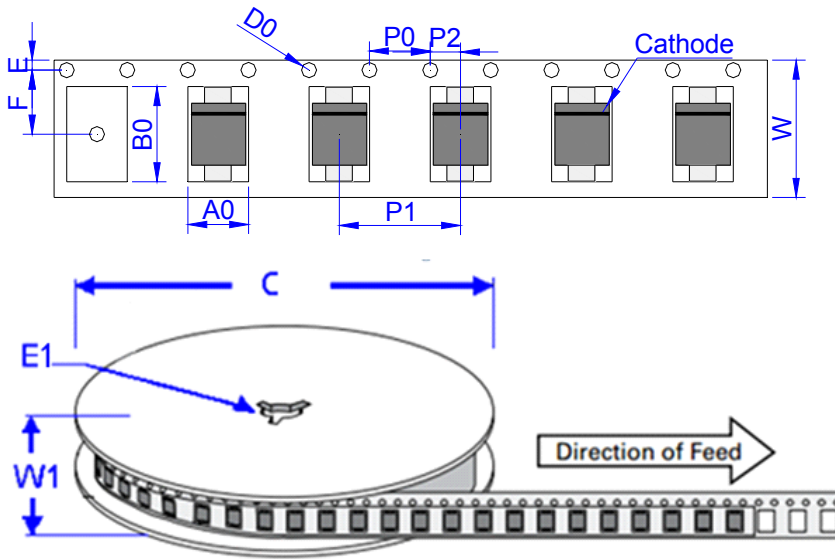


**PACKAGE MECHANICAL DATA**



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

OUTLINE	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
TAPING	0.067	5,000	80,000	330

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