

Transient Voltage Suppression Diodes: P4SMA Series *αTherm*

SMD Type 400 W

■ Features

1. For surface mounted applications
2. RoHS compliant and halogen-free
3. Reliable low cost construction utilizing molded plastic technique
4. Glass passivated chip junction
5. Both bi-directional and uni-directional devices are available
6. Typical IR less than 1μA above 13V
7. Fast response time
8. Excellent clamping capacity
9. 400 W peak pulse power capability with a 10/1000 μs waveform, repetition rate (duty cycle): 0.01%



■ Recommended Applications

1. Telecommunication
2. Computer
3. Industrial device
4. Consumer electronic device

■ Mechanical Data

1. Case: DO-214AC (SMA), molded plastic meets UL flammability rating 94V-0
2. Terminal: Matte Tin-plated leads, solderable per MIL-STD-750, Method 2026.
3. Polarity: The band denotes cathode (Note: no polarity indicator for bi-directional devices)

■ Part Number Code

P	4	S	M	A	6	.	8	C	A
1	2	3	4	5	6	7	8	9	10

Product Series	
P4SMA	Transient Voltage Suppression Diodes P4SMA Series

Central of Breakage Voltage (V_{BR})	
6.8	6.8V
75	75V
200	200V

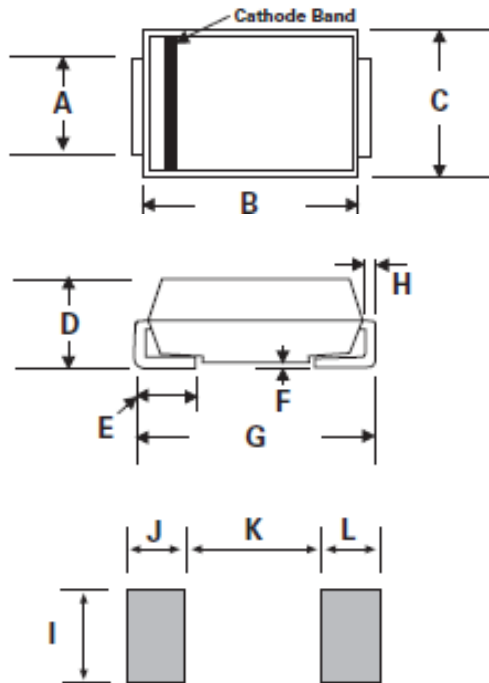
Type Code	
Blank	Uni-directional, 10% V_{BR} Voltage Tolerance
C	Bi-directional, 10% V_{BR} Voltage Tolerance
A	Uni-directional, 5% V_{BR} Voltage Tolerance
CA	Bi-directional, 5% V_{BR} Voltage Tolerance

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■ Structures and Dimensions

SMA/DO-214AC



Item	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.25	1.65	0.049	0.065
B	3.99	4.60	0.157	0.181
C	2.40	2.80	0.094	0.110
D	1.90	2.30	0.074	0.090
E	0.76	1.52	0.030	0.060
F	-	0.203	-	0.008
G	4.80	5.28	0.188	0.208
H	0.152	0.305	0.006	0.012
I	1.80	-	0.070	-
J/L	2.10	-	0.082	-
K	-	2.30	-	0.090

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

Parameter	Symbol	Value	Unit
Peak pulse power dissipation at $T_A=25^\circ\text{C}$ by 10/1000 μs waveform (Note1, Fig.1)	P_{PPM}	400	W
Peak Pulse Current of on 10/1000 μs waveform.(Note1, Fig.3)	I_{PPM}	See Table	A
Peak forward surge current, 8.3ms single half sine wave on rated load (Note 2)	I_{FSM}	40	A
Steady State Power Dissipation at $T_A=50^\circ\text{C}$ (Fig.5).	$P_{M(AV)}$	3.3	W
Operating junction and storage temperature range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

Notes: 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig. 2.

2. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

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

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage V_{BR} @ IT		Test Current	Maximum Clamping Voltage V_C @ I_{pp}	Maximum Peak Pulse Current	Maximum Reverse Leakage I_R @ VRWM	Marking Code	
			V_{RWM} (V)	Min(V)					Max(V)	IT(mA)
P4SMA6.8A	P4SMA6.8CA	5.8	6.46	7.14	10	10.5	38.10	1000	6V8A	6V8C
P4SMA7.5A	P4SMA7.5CA	6.4	7.13	7.88	10	11.3	35.40	500	7V5A	7V5C
P4SMA8.2A	P4SMA8.2CA	7.0	7.79	8.61	10	12.1	33.06	200	8V2A	8V2C
P4SMA9.1A	P4SMA9.1CA	7.8	8.65	9.56	1	13.4	29.85	50	9V1A	9V1C
P4SMA10A	P4SMA10CA	8.6	9.50	10.50	1	14.5	27.59	10	10A	10C
P4SMA11A	P4SMA11CA	9.4	10.45	11.55	1	15.6	25.64	5	11A	11C
P4SMA12A	P4SMA12CA	10.2	11.40	12.60	1	16.7	23.95	5	12A	12C
P4SMA13A	P4SMA13CA	11.1	12.35	13.65	1	18.2	21.98	1	13A	13C
P4SMA15A	P4SMA15CA	12.8	14.25	15.75	1	21.2	18.87	1	15A	15C
P4SMA16A	P4SMA16CA	13.6	15.20	16.80	1	22.5	17.78	1	16A	16C
P4SMA18A	P4SMA18CA	15.3	17.10	18.90	1	25.5	15.87	1	18A	18C
P4SMA20A	P4SMA20CA	17.1	19.00	21.00	1	27.7	14.44	1	20A	20C
P4SMA22A	P4SMA22CA	18.8	20.90	23.10	1	30.6	13.07	1	22A	22C
P4SMA24A	P4SMA24CA	20.5	22.80	25.20	1	33.2	12.05	1	24A	24C
P4SMA27A	P4SMA27CA	23.1	25.65	28.35	1	37.5	10.67	1	27A	27C
P4SMA30A	P4SMA30CA	25.6	28.50	31.50	1	41.4	9.66	1	30A	30C
P4SMA33A	P4SMA33CA	28.2	31.35	34.65	1	45.7	8.75	1	33A	33C
P4SMA36A	P4SMA36CA	30.8	34.20	37.80	1	49.9	8.02	1	36A	36C
P4SMA39A	P4SMA39CA	33.3	37.05	40.95	1	53.9	7.42	1	39A	39C
P4SMA43A	P4SMA43CA	36.8	40.85	45.15	1	59.3	6.75	1	43A	43C
P4SMA47A	P4SMA47CA	40.2	44.65	49.35	1	64.8	6.17	1	47A	47C
P4SMA51A	P4SMA51CA	43.6	48.45	53.55	1	70.1	5.71	1	51A	51C
P4SMA56A	P4SMA56CA	47.8	53.20	58.80	1	77.0	5.19	1	56A	56C
P4SMA62A	P4SMA62CA	53.0	58.90	65.10	1	85.0	4.71	1	62A	62C
P4SMA68A	P4SMA68CA	58.1	64.60	71.40	1	92.0	4.35	1	68A	68C
P4SMA75A	P4SMA75CA	64.1	71.25	78.75	1	103.0	3.88	1	75A	75C
P4SMA82A	P4SMA82CA	70.1	77.90	86.10	1	113.0	3.54	1	82A	82C
P4SMA91A	P4SMA91CA	77.8	86.45	95.55	1	125.0	3.20	1	91A	91C
P4SMA100A	P4SMA100CA	85.5	95.00	105.00	1	137.0	2.92	1	100A	100C

Notes: For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.

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

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage V_{BR} @ I_T		Test Current	Maximum Clamping Voltage V_C @ I_{pp}	Maximum Peak Pulse Current	Maximum Reverse Leakage I_R @ V_{RWM}	Marking Code	
			V_{RWM} (V)	Min(V)					Max(V)	I_T (mA)
P4SMA110A	P4SMA110CA	94.0	104.50	115.50	1	152.0	2.63	1	110A	110C
P4SMA120A	P4SMA120CA	102.0	114.00	126.00	1	165.0	2.42	1	120A	120C
P4SMA130A	P4SMA130CA	111.0	123.50	136.50	1	179.0	2.23	1	130A	130C
P4SMA150A	P4SMA150CA	128.0	142.50	157.50	1	207.0	1.93	1	150A	150C
P4SMA160A	P4SMA160CA	136.0	152.00	168.00	1	219.0	1.83	1	160A	160C
P4SMA170A	P4SMA170CA	145.0	161.50	178.50	1	234.0	1.71	1	170A	170C
P4SMA180A	P4SMA180CA	154.0	171.00	189.00	1	246.0	1.63	1	180A	180C
P4SMA200A	P4SMA200CA	171.0	190.00	210.00	1	274.0	1.46	1	200A	200C
P4SMA220A	P4SMA220CA	185.0	209.00	231.00	1	328.0	1.22	1	220A	220C
P4SMA250A	P4SMA250CA	214.0	237.50	262.50	1	344.0	1.16	1	250A	250C
P4SMA300A	P4SMA300CA	256.0	285.00	315.00	1	414.0	0.97	1	300A	300C
P4SMA350A	P4SMA350CA	299.3	332.50	367.50	1	482.0	0.83	1	350A	350C
P4SMA380A	P4SMA380CA	324.9	361.00	399.00	1	524.4	0.76	1	380A	380C
P4SMA400A	P4SMA400CA	342.0	380.00	420.00	1	552.0	0.72	1	400A	400C
P4SMA440A	P4SMA440CA	376.2	418.00	462.00	1	607.2	0.66	1	440A	440C
P4SMA500A	P4SMA500CA	427.5	475.00	525.00	1	690.0	0.58	1	500A	500C
P4SMA520A	P4SMA520CA	444.6	494.00	546.00	1	717.6	0.56	1	520A	520C
P4SMA550A	P4SMA550CA	470.3	522.50	577.50	1	759.0	0.53	1	550A	550C
P4SMA600A	P4SMA600CA	513.0	570.00	630.00	1	828.0	0.48	1	600A	600C

Notes: For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.

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■ Rate and Characteristic Curve ($T_A=25^\circ\text{C}$ unless otherwise noted)

FIG.1 - PULSE RATING CURVE

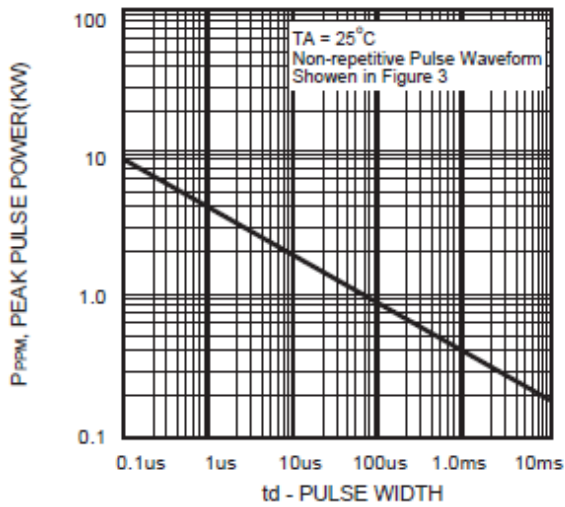


FIG.2 - PULSE DERATING CURVE

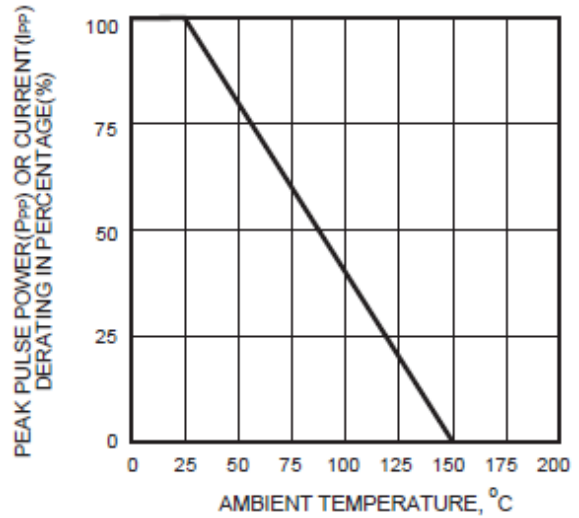


FIG.3 - PULSE WAVEFORM

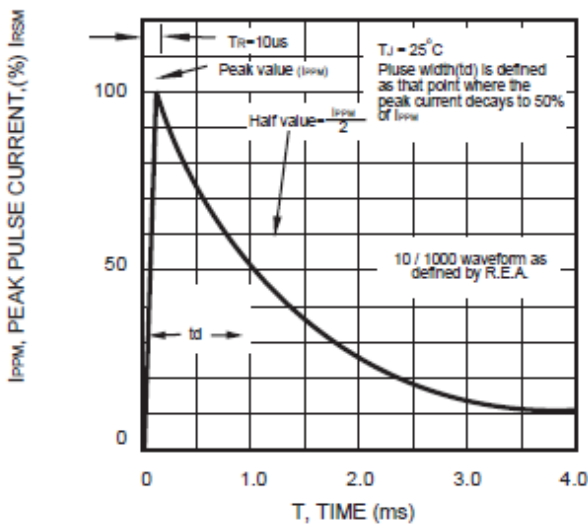


FIG.4 - TYPICAL JUNCTION CAPACITANCE

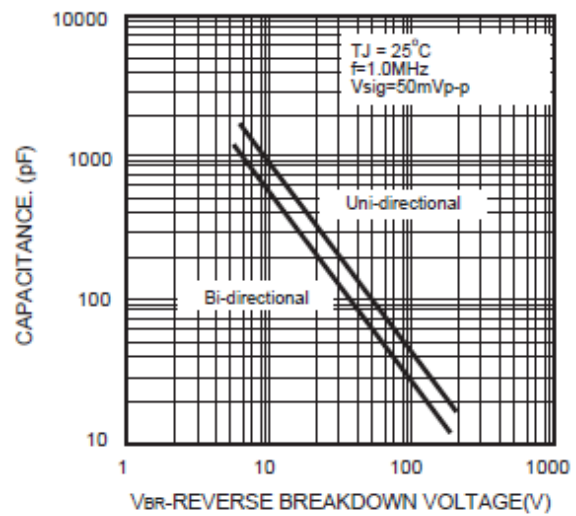
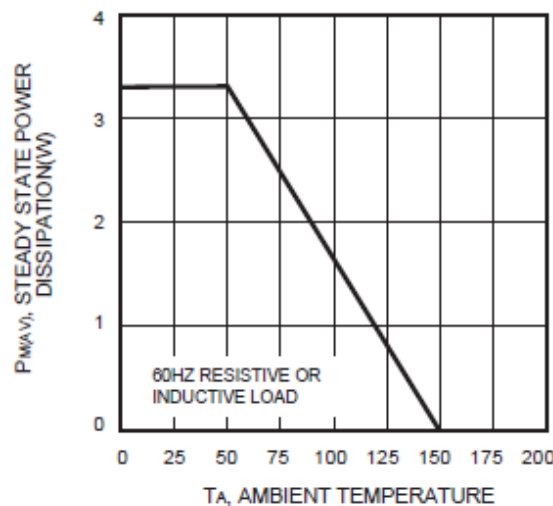
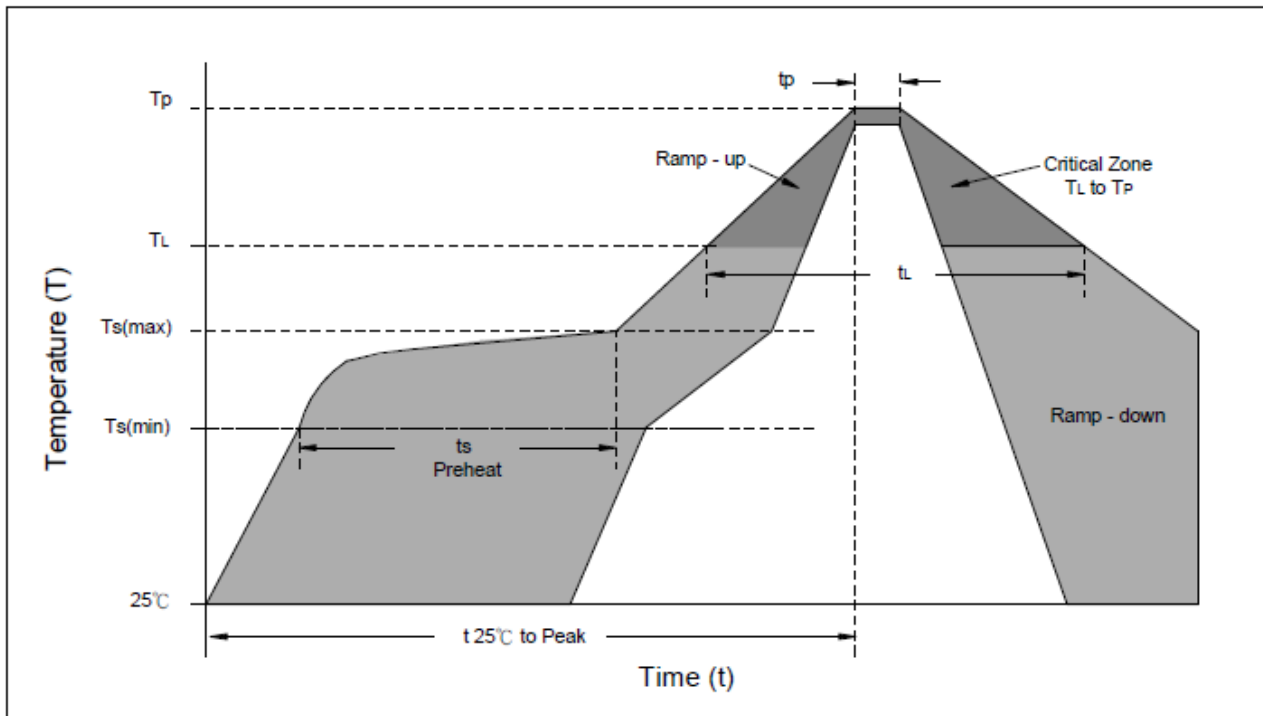


FIG.5 - STEADY STATE POWER DERATING CURVE



SMD Type 400 W

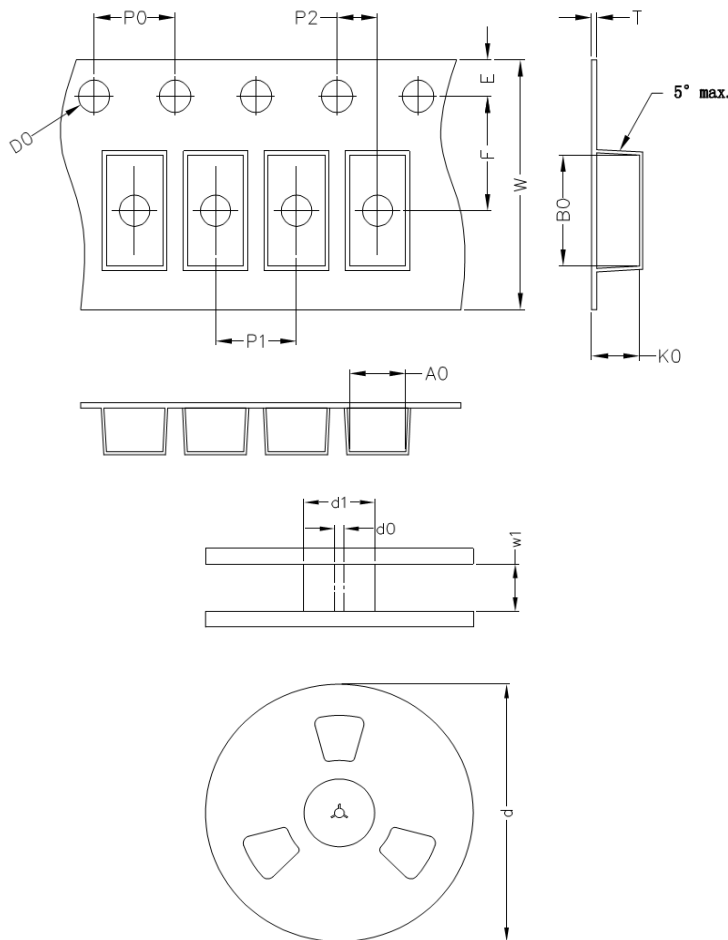
■ Soldering Recommendation



Reflow Condition	Lead-free assembly
Preheat -Temperature Min(Ts min) -Temperature Min(Ts max) -Time (min to max) (ts)	150°C 200°C 60 – 180 seconds
Average ramp up rate -Temperature Liquidus (TL) to peak	3°C/second max
Ts(max) to TL -Ramp-up Rate	3°C/second max.
Reflow -Temperature Liquidus (TL) -Time (tL)	217°C 60 – 150 seconds
Peak Temperature (TP)	260°C
Time within 5°C of actual peak Temperature(tp)	20 – 40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to peak Temperature(TP)	8 minutes max.
Do not exceed	260°C

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■ Packaging



Item	Symbol	DO-214AC (SMA) 單位: mm
Carrier width	A0	2.80
Carrier length	B0	5.33
Carrier depth	K0	2.36
Sprocket hole	D0	1.55
Sprocket hole position	E	1.75
Punch hole position	F	5.50
Sprocket hole pinth	P0	4.00
Carrier pinth	P1	4.00
Embossment center	P2	2.00
Tape thickness	T	0.25
Tape width	W	12.00
Reel outside diameter	d (13")	330.00
Reel inner diameter	d1	75
Feed hole diameter	d0	13.50
Reel inner width	w1	13.50

Notes: The tolerance of carrier tape and top cover is $\pm 0.1\text{mm}$, the tolerance of reel is $\pm 2\text{mm}$

■ Quantity

Package Type	Reel Size	Reel	Inner Box
	inch	Kpcs	Kpcs
DO-214AC	13	5	10

■ Warehouse Storage Conditions of product

- Storage condition:
 - Storage Temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
 - Relative Humidity: $\leq 75\% \text{RH}$
 - Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.