

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycle):0.01%
- Fast response time
- Typical  $I_R$  less than 1µA above 13V.
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.

### Mechanical Data

- Case: JEDEC DO-201Moulded plastic
- Terminal: Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any

### Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

### Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000µs waveform (Note1, Fig.1)	$P_{PPM}$	Minimum 400	Watts
Peak pulse current of at 10/1000µs waveform (Note 1, Fig.3)	$I_{PPM}$	See Table	Amps
Steady state power dissipation at $T_L=75^\circ\text{C}$ (Fig.4)	$P_{M(AV)}$	3.3	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2)	$I_{FSM}$	40	Amps
Operating junction and Storage Temperature Range.	$T_J, T_{STG}$	-55 to +150	°C
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	°C/W

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.

## Dimensions (DO-214AC/SMA)

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
L	3.90	4.50	0.154	0.177
D	2.40	2.80	0.094	0.110
D1	1.30	1.70	0.051	0.067
T	4.80	5.30	0.189	0.208
T1	0.76	1.52	0.030	0.060
d	0.10	0.20	0.003	0.008
H	2.00	2.50	0.078	0.098

## Electrical Characteristics (T<sub>A</sub>=25°C)

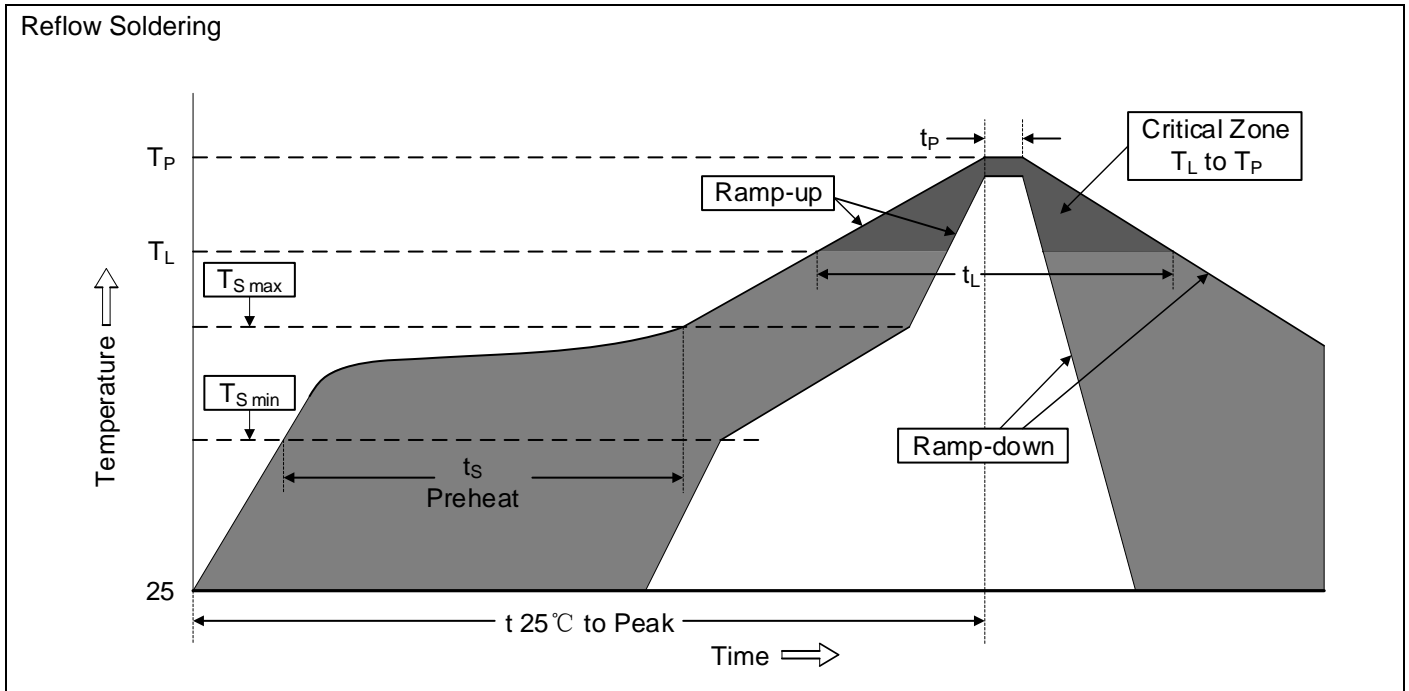
Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>	Test Current	Maximum Clamping Voltage@I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>RWM</sub>
Unidirectional	Bidirectional	UNI	BI	V <sub>RWM</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
P4SMA6.8A	P4SMA6.8CA	6V8A	6V8C	5.80	6.45~7.14	10	10.5	39.0	1000
P4SMA7.5A	P4SMA7.5CA	7V5A	7V5C	6.40	7.13~7.88	10	11.3	36.3	500
P4SMA8.2A	P4SMA8.2CA	8V2A	8V2C	7.02	7.79~8.61	10	12.1	33.9	200
P4SMA9.1A	P4SMA9.1CA	9V1A	9V1C	7.78	8.65~9.55	1	13.4	30.6	50
P4SMA10A	P4SMA10CA	10A	10C	8.55	9.5~10.5	1	14.5	28.3	10
P4SMA11A	P4SMA11CA	11A	11C	9.40	10.5~11.6	1	15.6	26.3	5
P4SMA12A	P4SMA12CA	12A	12C	10.2	11.4~12.6	1	16.7	24.6	5
P4SMA13A	P4SMA13CA	13A	13C	11.1	12.4~13.7	1	18.2	22.5	1
P4SMA15A	P4SMA15CA	15A	15C	12.8	14.3~15.8	1	21.2	19.3	1
P4SMA16A	P4SMA16CA	16A	16C	13.6	15.2~16.8	1	22.5	18.2	1
P4SMA18A	P4SMA18CA	18A	18C	15.3	17.1~18.9	1	25.2	16.1	1
P4SMA20A	P4SMA20CA	20A	20C	17.1	19.0~21.0	1	27.7	14.8	1
P4SMA22A	P4SMA22CA	22A	22C	18.8	20.9~23.1	1	30.6	13.4	1
P4SMA24A	P4SMA24CA	24A	24C	20.5	22.8~25.2	1	33.2	12.3	1
P4SMA27A	P4SMA27CA	27A	27C	23.1	25.7~28.4	1	37.5	10.9	1
P4SMA30A	P4SMA30CA	30A	30C	25.6	28.5~31.5	1	41.4	9.9	1
P4SMA33A	P4SMA33CA	33A	33C	28.2	31.4~34.7	1	45.7	9.0	1
P4SMA36A	P4SMA36CA	36A	36C	30.8	34.2~37.8	1	49.9	8.2	1
P4SMA39A	P4SMA39CA	39A	39C	33.3	37.1~41.0	1	53.9	7.6	1
P4SMA43A	P4SMA43CA	43A	43C	36.8	40.9~45.2	1	59.3	6.9	1
P4SMA47A	P4SMA47CA	47A	47C	40.2	44.7~49.4	1	64.8	6.3	1
P4SMA51A	P4SMA51CA	51A	51C	43.6	48.5~53.6	1	70.1	5.8	1

## Electrical Characteristics ( $T_A=25^\circ\text{C}$ )

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage@ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P4SMA56A	P4SMA56CA	56A	56C	47.8	53.2~58.8	1	77.0	5.3	1
P4SMA62A	P4SMA62CA	62A	62C	53.0	58.9~65.1	1	85.0	4.8	1
P4SMA68A	P4SMA68CA	68A	68C	58.1	64.6~71.4	1	92.0	4.5	1
P4SMA75A	P4SMA75CA	75A	75C	64.1	71.3~78.8	1	103.0	4.0	1
P4SMA82A	P4SMA82CA	82A	82C	70.1	77.9~86.1	1	113.0	3.6	1
P4SMA91A	P4SMA91CA	91A	91C	77.8	86.5~95.5	1	125.0	3.3	1
P4SMA100A	P4SMA100CA	100A	100C	85.5	95~105	1	137.0	3.0	1
P4SMA110A	P4SMA110CA	110A	110C	94.0	105~116	1	152.0	2.7	1
P4SMA120A	P4SMA120CA	120A	120C	102	114~126	1	165.0	2.5	1
P4SMA130A	P4SMA130CA	130A	130C	111	124~137	1	179.0	2.3	1
P4SMA150A	P4SMA150CA	150A	150C	128	143~158	1	207.0	2.0	1
P4SMA160A	P4SMA160CA	160A	160C	136	152~168	1	219.0	1.9	1
P4SMA170A	P4SMA170CA	170A	170C	145	162~179	1	234.0	1.8	1
P4SMA180A	P4SMA180CA	180A	180C	154	171~189	1	246.0	1.7	1
P4SMA200A	P4SMA200CA	200A	200C	171	190~210	1	274.0	1.5	1
P4SMA220A	P4SMA220CA	220A	220C	185	209~231	1	328.0	1.3	1
P4SMA250A	P4SMA250CA	250A	250C	214	237~263	1	344.0	1.2	1
P4SMA300A	P4SMA300CA	300A	300C	256	285~315	1	414.0	1.0	1
P4SMA350A	P4SMA350CA	350A	350C	300	333~368	1	482.0	0.9	1
P4SMA400A	P4SMA400CA	400A	400C	342	380~420	1	548.0	0.8	1
P4SMA440A	P4SMA440CA	440A	440C	376	418~462	1	602.0	0.7	1
P4SMA480A	P4SMA480CA	480A	480C	408	456~504	1	658.0	0.6	1
P4SMA510A	P4SMA510CA	510A	510C	434	485~535	1	698.0	0.6	1
P4SMA530A	P4SMA530CA	530A	530C	450	503~556	1	725.0	0.6	1
P4SMA540A	P4SMA540CA	540A	540C	459	513~567	1	740.0	0.5	1
P4SMA550A	P4SMA550CA	550A	550C	467	523~577	1	760.0	0.5	1

Notes: For bidirectional type having VRWM of 10V and less, the IR limit is double.

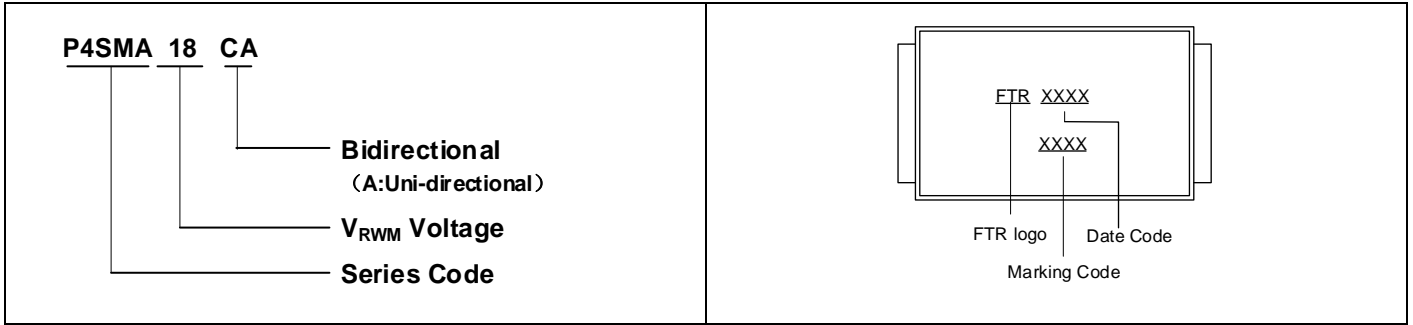
## Recommended Soldering Conditions



### Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat	
-Temperature Min ( $T_{S\ min}$ )	150°C
-Temperature Max ( $T_{S\ max}$ )	200°C
-Time (min to max) ( $t_s$ )	60-180 seconds
$T_{S\ max}$ to $T_L$	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature ( $T_L$ )	217°C
-Time ( $t_L$ )	60-150 seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

## Partnumbercode



## Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

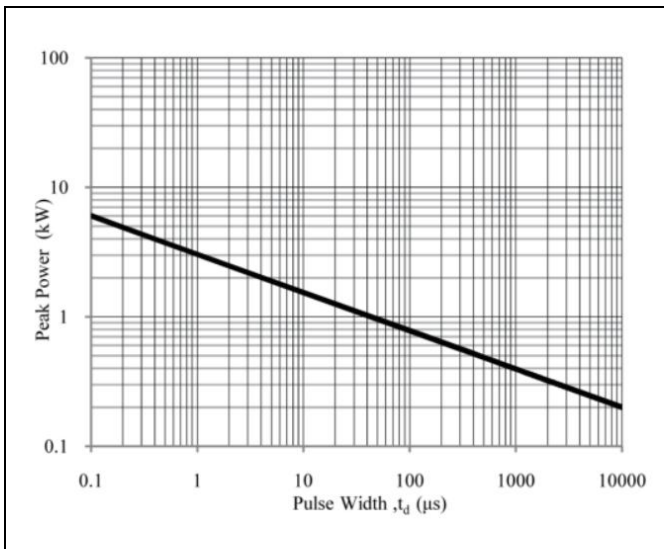


Figure 2. Pulse Derating Curve

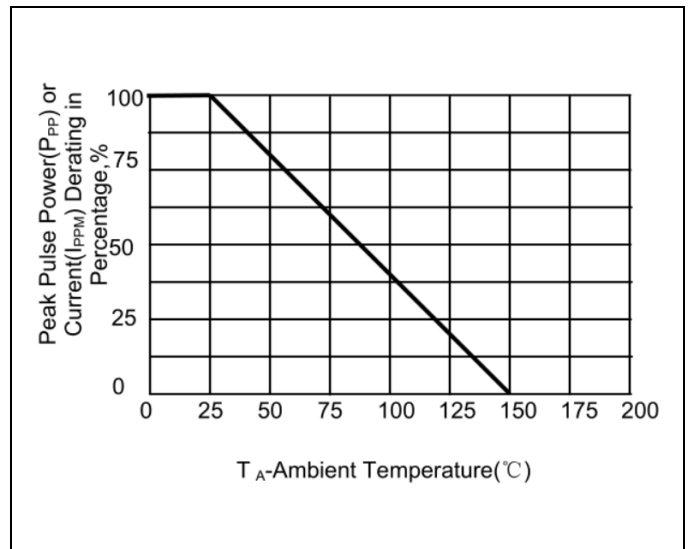


Figure 3. Pulse Waveform

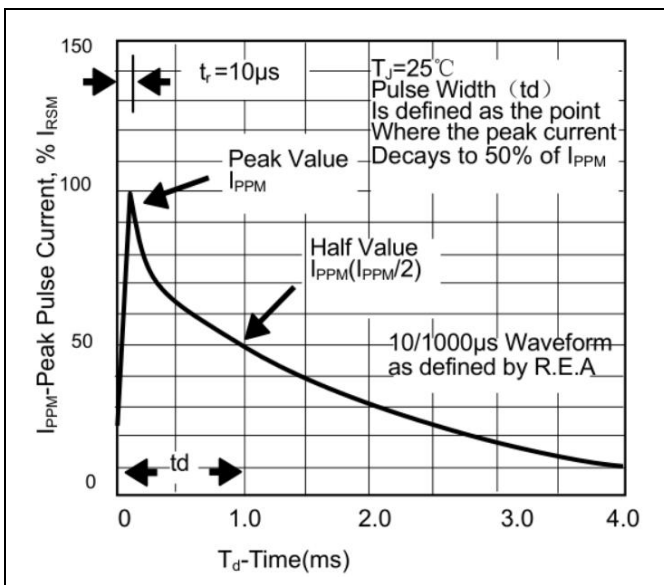
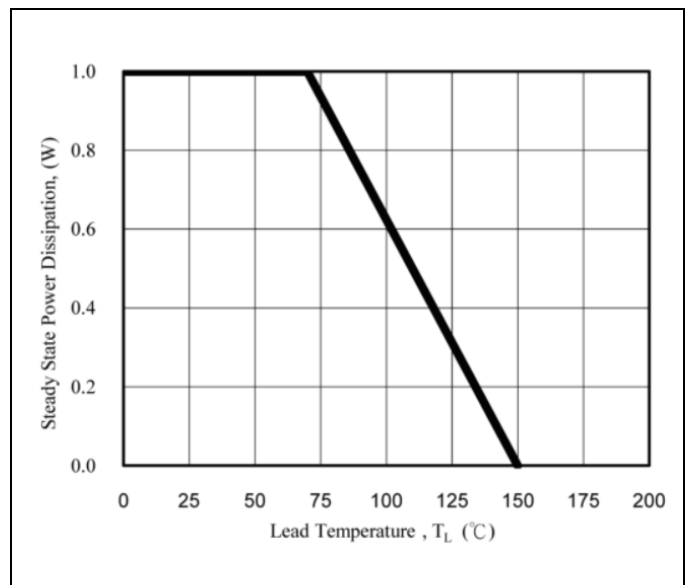


Figure 4. Steady State Power Dissipation Derating Curve



## Packaging

Tape		Symbol	Dimension (mm)		
		W	12.00±0.10		
		P0	4.00±0.10		
		P1	4.00±0.10		
		P2	2.00±0.10		
		D0	Φ1.55±0.10		
		E	1.75±0.10		
		F	5.50±0.10		
		A0	2.80±0.1		
		B0	5.30±0.1		
		K0	2.36±0.1		
		T	0.25±0.1		
		Reel		D5	Φ330.0±2.0
				D6	Φ12.0±0.5
W2	14.0±2.0				
Quantity: 5000PCS					

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